

Hereditary Worst-Case Heaps

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Abstract

This paper refers to **Heapsort**, the Java code of which may be find in any standard textbook on *Data Structures, Analysis of Algorithms*, or in [1].

References

- [1] WWW, Heapsort in Java: <http://csc.csudh.edu/suchenek/MakeHeap.html>.



1. Definition of a hereditary worst-case heap

For the purpose of this paper, I assert that a heap of $N \geq 1$ nodes is a certain permutation (usually represented as a 1-dimensional array with indices ranging from 1 to N) of first N positive integers.

A worst-case heap for the deconstruction phase¹ of **Heapsort**, to which I refer as a *worst-case heap*, is any non-empty heap H that forces that deconstruction phase to perform at least as many comparisons of keys as any heap of the size of H would.

¹Also known as **RemoveAll**

Hereditary worst-case heaps for the deconstruction phase of **Heapsort**, to which I refer to as *hereditary worst-case heaps*, are defined by induction.

1. The 1-node heap is a hereditary worst-case heap.
2. Any worst-case heap H such that removal of the largest element of H results in a hereditary worst-case heap is a hereditary worst-case heap.
3. Nothing else is a hereditary worst-case heap.

```
RemoveAllRec: Remove of 12 took 6 comps.
RemoveAllRec: 12-element heap deconstructed in 40 comps.
RemoveAllRec: Theoretic worst-case number of comps = 41
12-element heap level-by-level:

Level 0:          12
Level 1:    11~~~~~7
Level 2:    9~~~~~10    6~~~~~2
Level 3:  8~~~5    4~~~3    1

RemoveAllRec: Remove of 13 took 6 comps.
RemoveAllRec: 13-element heap deconstructed in 46 comps.
RemoveAllRec: Theoretic worst-case number of comps = 46
>>> Worst-case 13-element heap level-by-level:

Level 0:          13
Level 1:    12~~~~~7
Level 2:    9~~~~~11    6~~~~~2
Level 3:  8~~~5    4~~~10    1~~~3

Creative sequence: <1, 2, 1, 1, 1, 2, 1, 1, 1, 3, 1, 3>

>>> Number of comparisons while sorting = 66
>>> Theoretic worst-case number of comps = 66
BUILD SUCCESSFUL (total time: 0 seconds)
```

Figure 1: A worst-case heap of 13 nodes (shown on the lower part of this figure) and the non-worst-case heap of 12 nodes (shown on the upper part of this figure); the latter is the result of removing the maximal node from the former. Thus the former is not a hereditary worst-case heap.

It follows that all worst-case heaps of 12 or less nodes are also hereditary worst-case. However, not all worst-case heaps of more than 12 nodes are hereditary worst-case. For instance, Figure 1 visualizes a 13-node worst-case heap that is not hereditary worst-case. Furthermore, there are only 1017 hereditary worst-case heaps, all of them having 22 or less nodes.

Figure 2 shows the distribution of all hereditary worst-case heaps.

```

I can't find any hereditary worst-case heap of size 23
Stats: the total number of hereditary worst-case heaps is 1017
1 hereditary worst-case heap of size 1
1 hereditary worst-case heap of size 2
2 hereditary worst-case heaps of size 3
3 hereditary worst-case heaps of size 4
6 hereditary worst-case heaps of size 5
6 hereditary worst-case heaps of size 6
4 hereditary worst-case heaps of size 7
18 hereditary worst-case heaps of size 8
36 hereditary worst-case heaps of size 9
48 hereditary worst-case heaps of size 10
32 hereditary worst-case heaps of size 11
12 hereditary worst-case heaps of size 12
12 hereditary worst-case heaps of size 13
12 hereditary worst-case heaps of size 14
8 hereditary worst-case heaps of size 15
56 hereditary worst-case heaps of size 16
112 hereditary worst-case heaps of size 17
144 hereditary worst-case heaps of size 18
96 hereditary worst-case heaps of size 19
120 hereditary worst-case heaps of size 20
192 hereditary worst-case heaps of size 21
96 hereditary worst-case heaps of size 22
0 hereditary worst-case heaps of size 23
Control sum = 1017
BUILD SUCCESSFUL (total time: 3 seconds)

```

Figure 2: A statistics of all hereditary worst-case heaps produced by a Java program.

Section 2 (pages 4 through 329) comprises a list of all 1017 hereditary worst-case heaps. They were all produced by my Java program, except for the first 1-node heap that I added manually; the remainder of the list is an actual output of that program. The heaps are visualized as binary trees and as 1-dimensional arrays. The term *strategy* refers to the sequence of of indices of pull downs² that, when consecutively applied to the 1-element heap, produce the hereditary worst-case heap in question. The stats shown on Figure 2 are at the end of that list, on page 329.

²Also known as *unsifts*.

2. A list of all 1017 hereditary worst-case heaps

Hereditary worst-case heap # 1
1-element heap level-by-level:

Level 0: 1

1 heap: [1]
Strategy was: ()

run:
Worst-case heap generation for $N = 22$

Hereditary worst-case heap # 2
2-element heap level-by-level:

Level 0: 2
Level 1: 1^1

2 heap: [2, 1]
Strategy was: (1)

Hereditary worst-case heap # 3
3-element heap level-by-level:

Level 0: 3
Level 1: 1^2

3 heap: [3, 1, 2]
Strategy was: (1, 1)

Hereditary worst-case heap # 4
4-element heap level-by-level:

Level 0: 4
Level 1: 3^{112}

Level 2: 1^4

4 heap: [4, 3, 2, 1]

Strategy was: (1, 1, 2)

Hereditary worst-case heap # 5

5-element heap level-by-level:

Level 0: 5

Level 1: 4^{3^2}

Level 2: 1^3

5 heap: [5, 4, 2, 1, 3]

Strategy was: (1, 1, 2, 2)

Hereditary worst-case heap # 6

6-element heap level-by-level:

Level 0: 6

Level 1: 5^{3^2}

Level 2: $4^3 1^4$

6 heap: [6, 5, 2, 4, 3, 1]

Strategy was: (1, 1, 2, 2, 4)

Hereditary worst-case heap # 7

5-element heap level-by-level:

Level 0: 5

Level 1: 4^{3^2}

Level 2: 3^1

5 heap: [5, 4, 2, 3, 1]

Strategy was: (1, 1, 2, 4)

Hereditary worst-case heap # 8

6-element heap level-by-level:

Level 0: 6
Level 1: $5^{^^^2}$
Level 2: $3^4 1^1$

6 heap: [6, 5, 2, 3, 4, 1]
Strategy was: (1, 1, 2, 4, 5)

Hereditary worst-case heap # 9
3-element heap level-by-level:

Level 0: 3
Level 1: 2^1

3 heap: [3, 2, 1]
Strategy was: (1, 2)

Hereditary worst-case heap # 10
4-element heap level-by-level:

Level 0: 4
Level 1: $3^{^^^1}$
Level 2: 2^1

4 heap: [4, 3, 1, 2]
Strategy was: (1, 2, 2)

Hereditary worst-case heap # 11
5-element heap level-by-level:

Level 0: 5
Level 1: $4^{^^^1}$
Level 2: 2^3

5 heap: [5, 4, 1, 2, 3]
Strategy was: (1, 2, 2, 2)

Hereditary worst-case heap # 12

5-element heap level-by-level:

Level 0: 5

Level 1: 4^{111}

Level 2: 3^2

5 heap: [5, 4, 1, 3, 2]

Strategy was: (1, 2, 2, 4)

Hereditary worst-case heap # 13

4-element heap level-by-level:

Level 0: 4

Level 1: 2^{1113}

Level 2: 1^1

4 heap: [4, 2, 3, 1]

Strategy was: (1, 2, 3)

Hereditary worst-case heap # 14

5-element heap level-by-level:

Level 0: 5

Level 1: 4^{1113}

Level 2: 1^2

5 heap: [5, 4, 3, 1, 2]

Strategy was: (1, 2, 3, 2)

Hereditary worst-case heap # 15

6-element heap level-by-level:

Level 0: 6

Level 1: 5^{1113}

Level 2: $4^2 1^1$

6 heap: [6, 5, 3, 4, 2, 1]
 Strategy was: (1, 2, 3, 2, 4)

Hereditary worst-case heap # 16
 7-element heap level-by-level:

Level 0: 7
 Level 1: 6^{^^^3}
 Level 2: 4^{^5} 1^{^2}

7 heap: [7, 6, 3, 4, 5, 1, 2]
 Strategy was: (1, 2, 3, 2, 4, 5)

Hereditary worst-case heap # 17
 8-element heap level-by-level:

Level 0: 8
 Level 1: 6^{^^^^^^7}
 Level 2: 4^{^^^5} 1^{^^^2}
 Level 3: 3[^]

8 heap: [8, 6, 7, 4, 5, 1, 2, 3]
 Strategy was: (1, 2, 3, 2, 4, 5, 3)

Hereditary worst-case heap # 18
 9-element heap level-by-level:

Level 0: 9
 Level 1: 8^{^^^^^^7}
 Level 2: 6^{^^^5} 1^{^^^2}
 Level 3: 3^{^4}

9 heap: [9, 8, 7, 6, 5, 1, 2, 3, 4]
 Strategy was: (1, 2, 3, 2, 4, 5, 3, 4)

Hereditary worst-case heap # 19
 10-element heap level-by-level:

Level 0: 10
 Level 1: 9^{^^^^^^^^^^^^^^7}

Level 2: 8~~~~~5 1~~~~~2
 Level 3: 6~~~4 3~~

10 heap: [10, 9, 7, 8, 5, 1, 2, 6, 4, 3]
 Strategy was: (1, 2, 3, 2, 4, 5, 3, 4, 8)

Hereditary worst-case heap # 20
 11-element heap level-by-level:

Level 0: 11
 Level 1: 10~~~~~7
 Level 2: 9~~~~~5 1~~~~~2
 Level 3: 6~~~8 3~~~4

11 heap: [11, 10, 7, 9, 5, 1, 2, 6, 8, 3, 4]
 Strategy was: (1, 2, 3, 2, 4, 5, 3, 4, 8, 9)

Hereditary worst-case heap # 21
 10-element heap level-by-level:

Level 0: 10
 Level 1: 9~~~~~7
 Level 2: 8~~~~~5 1~~~~~2
 Level 3: 3~~~6 4~~

10 heap: [10, 9, 7, 8, 5, 1, 2, 3, 6, 4]
 Strategy was: (1, 2, 3, 2, 4, 5, 3, 4, 9)

Hereditary worst-case heap # 22
 11-element heap level-by-level:

Level 0: 11
 Level 1: 10~~~~~7
 Level 2: 9~~~~~5 1~~~~~2
 Level 3: 8~~~6 4~~~3

11 heap: [11, 10, 7, 9, 5, 1, 2, 8, 6, 4, 3]
 Strategy was: (1, 2, 3, 2, 4, 5, 3, 4, 9, 8)

Hereditary worst-case heap # 23
 9-element heap level-by-level:

Level 0: 9
 Level 1: 8~~~~~7
 Level 2: 6~~~5 1~~~2
 Level 3: 4^3

9 heap: [9, 8, 7, 6, 5, 1, 2, 4, 3]
 Strategy was: (1, 2, 3, 2, 4, 5, 3, 8)

Hereditary worst-case heap # 24
 10-element heap level-by-level:

Level 0: 10
 Level 1: 9~~~~~7
 Level 2: 8~~~~~5 1~~~~~2
 Level 3: 6~~~3 4^^

10 heap: [10, 9, 7, 8, 5, 1, 2, 6, 3, 4]
 Strategy was: (1, 2, 3, 2, 4, 5, 3, 8, 8)

Hereditary worst-case heap # 25
 11-element heap level-by-level:

Level 0: 11
 Level 1: 10~~~~~7
 Level 2: 9~~~~~5 1~~~~~2
 Level 3: 6~~~8 4~~~3

11 heap: [11, 10, 7, 9, 5, 1, 2, 6, 8, 4, 3]
 Strategy was: (1, 2, 3, 2, 4, 5, 3, 8, 8, 9)

Hereditary worst-case heap # 26

10-element heap level-by-level:

```

Level 0:          10
Level 1:      9^^^^^^^^^^^^^^^^7
Level 2:  8^^^^^5      1^^^^^^2
Level 3:  4^^^6   3^^

```

10 heap: [10, 9, 7, 8, 5, 1, 2, 4, 6, 3]
 Strategy was: (1, 2, 3, 2, 4, 5, 3, 8, 9)

Hereditary worst-case heap # 27
 11-element heap level-by-level:

```

Level 0:          11
Level 1:      10^^^^^^^^^^^^^^^^7
Level 2:  9^^^^^^5      1^^^^^^2
Level 3:  8^^^6   3^^4

```

11 heap: [11, 10, 7, 9, 5, 1, 2, 8, 6, 3, 4]
 Strategy was: (1, 2, 3, 2, 4, 5, 3, 8, 9, 8)

Hereditary worst-case heap # 28
 8-element heap level-by-level:

```

Level 0:          8
Level 1:      7^^^^^^3
Level 2:  6^^^5   1^^2
Level 3:  4^

```

8 heap: [8, 7, 3, 6, 5, 1, 2, 4]
 Strategy was: (1, 2, 3, 2, 4, 5, 4)

Hereditary worst-case heap # 29
 9-element heap level-by-level:

```

Level 0:          9

```

Level 1: 8~~~~~3
 Level 2: 7~~~5 1~~~2
 Level 3: 4^6

9 heap: [9, 8, 3, 7, 5, 1, 2, 4, 6]
 Strategy was: (1, 2, 3, 2, 4, 5, 4, 4)

Hereditary worst-case heap # 30
 10-element heap level-by-level:

Level 0: 10
 Level 1: 9~~~~~3
 Level 2: 8~~~~~5 1~~~~~2
 Level 3: 7~~~6 4^^

10 heap: [10, 9, 3, 8, 5, 1, 2, 7, 6, 4]
 Strategy was: (1, 2, 3, 2, 4, 5, 4, 4, 8)

Hereditary worst-case heap # 31
 9-element heap level-by-level:

Level 0: 9
 Level 1: 8~~~~~3
 Level 2: 7~~~5 1~~~2
 Level 3: 6^4

9 heap: [9, 8, 3, 7, 5, 1, 2, 6, 4]
 Strategy was: (1, 2, 3, 2, 4, 5, 4, 8)

Hereditary worst-case heap # 32
 10-element heap level-by-level:

Level 0: 10
 Level 1: 9~~~~~3
 Level 2: 8~~~~~5 1~~~~~2
 Level 3: 6~~~7 4^^

10 heap: [10, 9, 3, 8, 5, 1, 2, 6, 7, 4]

Strategy was: (1, 2, 3, 2, 4, 5, 4, 8, 9)

Hereditary worst-case heap # 33

8-element heap level-by-level:

Level 0: 8
 Level 1: 6⁷
 Level 2: 4⁵ 3²
 Level 3: 1¹

8 heap: [8, 6, 7, 4, 5, 3, 2, 1]

Strategy was: (1, 2, 3, 2, 4, 5, 6)

Hereditary worst-case heap # 34

9-element heap level-by-level:

Level 0: 9
 Level 1: 8⁷
 Level 2: 6⁵ 3²
 Level 3: 1⁴

9 heap: [9, 8, 7, 6, 5, 3, 2, 1, 4]

Strategy was: (1, 2, 3, 2, 4, 5, 6, 4)

Hereditary worst-case heap # 35

10-element heap level-by-level:

Level 0: 10
 Level 1: 9⁷
 Level 2: 8⁵ 3²
 Level 3: 6⁴ 1¹

10 heap: [10, 9, 7, 8, 5, 3, 2, 6, 4, 1]

Strategy was: (1, 2, 3, 2, 4, 5, 6, 4, 8)

Hereditary worst-case heap # 36

11-element heap level-by-level:

```

Level 0:          11
Level 1:      10^^^^^^^^^^^^^^^^7
Level 2:   9^^^^^^5          3^^^^^^2
Level 3: 6^^^8   1^^^4

```

11 heap: [11, 10, 7, 9, 5, 3, 2, 6, 8, 1, 4]

Strategy was: (1, 2, 3, 2, 4, 5, 6, 4, 8, 9)

Hereditary worst-case heap # 37

12-element heap level-by-level:

```

Level 0:          12
Level 1:      11^^^^^^^^^^^^^^^^7
Level 2:   9^^^^^^10          3^^^^^^2
Level 3: 6^^^8   5^^^4   1^^

```

12 heap: [12, 11, 7, 9, 10, 3, 2, 6, 8, 5, 4, 1]

Strategy was: (1, 2, 3, 2, 4, 5, 6, 4, 8, 9, 10)

Hereditary worst-case heap # 38

13-element heap level-by-level:

```

Level 0:          13
Level 1:      11^^^^^^^^^^^^^^^^12
Level 2:   9^^^^^^10          7^^^^^^2
Level 3: 6^^^8   5^^^4   3^^^1

```

13 heap: [13, 11, 12, 9, 10, 7, 2, 6, 8, 5, 4, 3, 1]

Strategy was: (1, 2, 3, 2, 4, 5, 6, 4, 8, 9, 10, 12)

Hereditary worst-case heap # 39

14-element heap level-by-level:

```

Level 0:          14
Level 1:      11^^^^^^^^^^^^^^^^13
Level 2:   9^^^^^^10          12^^^^^^2
Level 3: 6^^^8   5^^^4   3^^^7   1^^

```

14 heap: [14, 11, 13, 9, 10, 12, 2, 6, 8, 5, 4, 3, 7, 1]

Strategy was: (1, 2, 3, 2, 4, 5, 6, 4, 8, 9, 10, 12, 13)

Hereditary worst-case heap # 40

10-element heap level-by-level:

```

Level 0:                10
Level 1:          9~~~~~7
Level 2:    8~~~~~5      3~~~~~2
Level 3:  1~~~6   4~~

```

10 heap: [10, 9, 7, 8, 5, 3, 2, 1, 6, 4]

Strategy was: (1, 2, 3, 2, 4, 5, 6, 4, 9)

Hereditary worst-case heap # 41

11-element heap level-by-level:

```

Level 0:                11
Level 1:          10~~~~~7
Level 2:    9~~~~~5      3~~~~~2
Level 3:  8~~~6   4~~~1

```

11 heap: [11, 10, 7, 9, 5, 3, 2, 8, 6, 4, 1]

Strategy was: (1, 2, 3, 2, 4, 5, 6, 4, 9, 8)

Hereditary worst-case heap # 42

12-element heap level-by-level:

```

Level 0:                12
Level 1:          11~~~~~7
Level 2:    9~~~~~10      3~~~~~2
Level 3:  8~~~6   4~~~5   1~~

```

12 heap: [12, 11, 7, 9, 10, 3, 2, 8, 6, 4, 5, 1]

Strategy was: (1, 2, 3, 2, 4, 5, 6, 4, 9, 8, 11)

Hereditary worst-case heap # 43
 13-element heap level-by-level:

```

Level 0:          13
Level 1:    11^^^^^^^^^^^^^^^^12
Level 2:    9^^^^^^10          7^^^^^^2
Level 3:  8^^^6   4^^^5   3^^^1

```

13 heap: [13, 11, 12, 9, 10, 7, 2, 8, 6, 4, 5, 3, 1]
 Strategy was: (1, 2, 3, 2, 4, 5, 6, 4, 9, 8, 11, 12)

Hereditary worst-case heap # 44
 14-element heap level-by-level:

```

Level 0:          14
Level 1:    11^^^^^^^^^^^^^^^^13
Level 2:    9^^^^^^10          12^^^^^^2
Level 3:  8^^^6   4^^^5   3^^^7   1^^

```

14 heap: [14, 11, 13, 9, 10, 12, 2, 8, 6, 4, 5, 3, 7, 1]
 Strategy was: (1, 2, 3, 2, 4, 5, 6, 4, 9, 8, 11, 12, 13)

Hereditary worst-case heap # 45
 9-element heap level-by-level:

```

Level 0:          9
Level 1:    8^^^^^^7
Level 2:  6^^^5   3^^^2
Level 3: 4^1

```

9 heap: [9, 8, 7, 6, 5, 3, 2, 4, 1]
 Strategy was: (1, 2, 3, 2, 4, 5, 6, 8)

Hereditary worst-case heap # 46

10-element heap level-by-level:

```

Level 0:          10
Level 1:      9^^^^^^^^^^^^^^^^7
Level 2:  8^^^^^^5      3^^^^^^2
Level 3: 6^^^1  4^^

```

10 heap: [10, 9, 7, 8, 5, 3, 2, 6, 1, 4]
 Strategy was: (1, 2, 3, 2, 4, 5, 6, 8, 8)

Hereditary worst-case heap # 47
 11-element heap level-by-level:

```

Level 0:          11
Level 1:      10^^^^^^^^^^^^^^^^7
Level 2:  9^^^^^^5      3^^^^^^2
Level 3: 6^^^8  4^^^1

```

11 heap: [11, 10, 7, 9, 5, 3, 2, 6, 8, 4, 1]
 Strategy was: (1, 2, 3, 2, 4, 5, 6, 8, 8, 9)

Hereditary worst-case heap # 48
 12-element heap level-by-level:

```

Level 0:          12
Level 1:      11^^^^^^^^^^^^^^^^7
Level 2:  9^^^^^^10      3^^^^^^2
Level 3: 6^^^8  4^^^5  1^^

```

12 heap: [12, 11, 7, 9, 10, 3, 2, 6, 8, 4, 5, 1]
 Strategy was: (1, 2, 3, 2, 4, 5, 6, 8, 8, 9, 11)

Hereditary worst-case heap # 49
 13-element heap level-by-level:

```

Level 0:          13
Level 1:      11^^^^^^^^^^^^^^^^12
Level 2:  9^^^^^^10      7^^^^^^2
Level 3: 6^^^8  4^^^5  3^^^1

```

13 heap: [13, 11, 12, 9, 10, 7, 2, 6, 8, 4, 5, 3, 1]
 Strategy was: (1, 2, 3, 2, 4, 5, 6, 8, 8, 9, 11, 12)

Hereditary worst-case heap # 50
 14-element heap level-by-level:

```

Level 0:          14
Level 1:    11~~~~~13
Level 2:    9~~~~10      12~~~~2
Level 3:  6~~~8   4~~~5   3~~~7   1~~

```

14 heap: [14, 11, 13, 9, 10, 12, 2, 6, 8, 4, 5, 3, 7, 1]
 Strategy was: (1, 2, 3, 2, 4, 5, 6, 8, 8, 9, 11, 12, 13)

Hereditary worst-case heap # 51
 10-element heap level-by-level:

```

Level 0:          10
Level 1:    9~~~~~7
Level 2:    8~~~~5      3~~~~2
Level 3:  4~~~6   1~~

```

10 heap: [10, 9, 7, 8, 5, 3, 2, 4, 6, 1]
 Strategy was: (1, 2, 3, 2, 4, 5, 6, 8, 9)

Hereditary worst-case heap # 52
 11-element heap level-by-level:

```

Level 0:          11
Level 1:    10~~~~~7
Level 2:    9~~~~5      3~~~~2
Level 3:  8~~~6   1~~~4

```

11 heap: [11, 10, 7, 9, 5, 3, 2, 8, 6, 1, 4]
 Strategy was: (1, 2, 3, 2, 4, 5, 6, 8, 9, 8)

Hereditary worst-case heap # 53

12-element heap level-by-level:

```

Level 0:          12
Level 1:      11^^^^^^^^^^^^^^^^^7
Level 2:   9^^^^^^10          3^^^^^^2
Level 3:  8^^^6   5^^^4   1^^

```

12 heap: [12, 11, 7, 9, 10, 3, 2, 8, 6, 5, 4, 1]

Strategy was: (1, 2, 3, 2, 4, 5, 6, 8, 9, 8, 10)

Hereditary worst-case heap # 54

13-element heap level-by-level:

```

Level 0:          13
Level 1:      11^^^^^^^^^^^^^^^^^12
Level 2:   9^^^^^^10          7^^^^^^2
Level 3:  8^^^6   5^^^4   3^^^1

```

13 heap: [13, 11, 12, 9, 10, 7, 2, 8, 6, 5, 4, 3, 1]

Strategy was: (1, 2, 3, 2, 4, 5, 6, 8, 9, 8, 10, 12)

Hereditary worst-case heap # 55

14-element heap level-by-level:

```

Level 0:          14
Level 1:      11^^^^^^^^^^^^^^^^^13
Level 2:   9^^^^^^10          12^^^^^^2
Level 3:  8^^^6   5^^^4   3^^^7   1^^

```

14 heap: [14, 11, 13, 9, 10, 12, 2, 8, 6, 5, 4, 3, 7, 1]

Strategy was: (1, 2, 3, 2, 4, 5, 6, 8, 9, 8, 10, 12, 13)

Hereditary worst-case heap # 56

8-element heap level-by-level:

Level 0: 8
 Level 1: 6~~~~~7
 Level 2: 4~~~5 1~~~3
 Level 3: 2^

8 heap: [8, 6, 7, 4, 5, 1, 3, 2]

Strategy was: (1, 2, 3, 2, 4, 5, 7)

Hereditary worst-case heap # 57

9-element heap level-by-level:

Level 0: 9
 Level 1: 8~~~~~7
 Level 2: 6~~~5 1~~~3
 Level 3: 2^4

9 heap: [9, 8, 7, 6, 5, 1, 3, 2, 4]

Strategy was: (1, 2, 3, 2, 4, 5, 7, 4)

Hereditary worst-case heap # 58

10-element heap level-by-level:

Level 0: 10
 Level 1: 9~~~~~7
 Level 2: 8~~~~~5 1~~~~~3
 Level 3: 6~~~4 2^^

10 heap: [10, 9, 7, 8, 5, 1, 3, 6, 4, 2]

Strategy was: (1, 2, 3, 2, 4, 5, 7, 4, 8)

Hereditary worst-case heap # 59

11-element heap level-by-level:

Level 0: 11
 Level 1: 10~~~~~7
 Level 2: 9~~~~~5 1~~~~~3

Level 3: $6^{8} 2^{4}$

11 heap: [11, 10, 7, 9, 5, 1, 3, 6, 8, 2, 4]
 Strategy was: (1, 2, 3, 2, 4, 5, 7, 4, 8, 9)

Hereditary worst-case heap # 60
 10-element heap level-by-level:

Level 0: 10
 Level 1: 9^{7}
 Level 2: $8^{5} 1^{3}$
 Level 3: $2^{6} 4^{2}$

10 heap: [10, 9, 7, 8, 5, 1, 3, 2, 6, 4]
 Strategy was: (1, 2, 3, 2, 4, 5, 7, 4, 9)

Hereditary worst-case heap # 61
 11-element heap level-by-level:

Level 0: 11
 Level 1: 10^{7}
 Level 2: $9^{5} 1^{3}$
 Level 3: $8^{6} 4^{2}$

11 heap: [11, 10, 7, 9, 5, 1, 3, 8, 6, 4, 2]
 Strategy was: (1, 2, 3, 2, 4, 5, 7, 4, 9, 8)

Hereditary worst-case heap # 62
 9-element heap level-by-level:

Level 0: 9
 Level 1: 8^{7}
 Level 2: $6^{5} 1^{3}$
 Level 3: 4^{2}

9 heap: [9, 8, 7, 6, 5, 1, 3, 4, 2]
 Strategy was: (1, 2, 3, 2, 4, 5, 7, 8)

Hereditary worst-case heap # 63
 10-element heap level-by-level:

```

Level 0:          10
Level 1:      9~~~~~7
Level 2:   8~~~~~5      1~~~~~3
Level 3:  6~~~2   4~~

```

10 heap: [10, 9, 7, 8, 5, 1, 3, 6, 2, 4]
 Strategy was: (1, 2, 3, 2, 4, 5, 7, 8, 8)

Hereditary worst-case heap # 64
 11-element heap level-by-level:

```

Level 0:          11
Level 1:      10~~~~~7
Level 2:   9~~~~~5      1~~~~~3
Level 3:  6~~~8   4~~~2

```

11 heap: [11, 10, 7, 9, 5, 1, 3, 6, 8, 4, 2]
 Strategy was: (1, 2, 3, 2, 4, 5, 7, 8, 8, 9)

Hereditary worst-case heap # 65
 10-element heap level-by-level:

```

Level 0:          10
Level 1:      9~~~~~7
Level 2:   8~~~~~5      1~~~~~3
Level 3:  4~~~6   2~~

```

10 heap: [10, 9, 7, 8, 5, 1, 3, 4, 6, 2]
 Strategy was: (1, 2, 3, 2, 4, 5, 7, 8, 9)

Hereditary worst-case heap # 66
 11-element heap level-by-level:

```

Level 0:          11
Level 1:      10^^^^^^^^^^^^^^^^7
Level 2:   9^^^^^^5          1^^^^^^3
Level 3:  8^^^6   2^^^4

11 heap: [11, 10, 7, 9, 5, 1, 3, 8, 6, 2, 4]
Strategy was: (1, 2, 3, 2, 4, 5, 7, 8, 9, 8)

```

Hereditary worst-case heap # 67
 6-element heap level-by-level:

```

Level 0:    6
Level 1:  5^^^3
Level 2: 1^4 2^

```

```

6 heap: [6, 5, 3, 1, 4, 2]
Strategy was: (1, 2, 3, 2, 5)

```

Hereditary worst-case heap # 68
 7-element heap level-by-level:

```

Level 0:    7
Level 1:  6^^^3
Level 2: 5^4 2^1

```

```

7 heap: [7, 6, 3, 5, 4, 2, 1]
Strategy was: (1, 2, 3, 2, 5, 4)

```

Hereditary worst-case heap # 69
 8-element heap level-by-level:

```

Level 0:    8
Level 1:  6^^^^^^7

```

Level 2: 5⁴ 2¹
 Level 3: 3¹

8 heap: [8, 6, 7, 5, 4, 2, 1, 3]
 Strategy was: (1, 2, 3, 2, 5, 4, 3)

Hereditary worst-case heap # 70
 9-element heap level-by-level:

Level 0: 9
 Level 1: 8⁷
 Level 2: 6⁴ 2¹
 Level 3: 3⁵

9 heap: [9, 8, 7, 6, 4, 2, 1, 3, 5]
 Strategy was: (1, 2, 3, 2, 5, 4, 3, 4)

Hereditary worst-case heap # 71
 10-element heap level-by-level:

Level 0: 10
 Level 1: 9⁷
 Level 2: 8⁴ 2¹
 Level 3: 6⁵ 3¹

10 heap: [10, 9, 7, 8, 4, 2, 1, 6, 5, 3]
 Strategy was: (1, 2, 3, 2, 5, 4, 3, 4, 8)

Hereditary worst-case heap # 72
 9-element heap level-by-level:

Level 0: 9
 Level 1: 8⁷
 Level 2: 6⁴ 2¹
 Level 3: 5³

9 heap: [9, 8, 7, 6, 4, 2, 1, 5, 3]
 Strategy was: (1, 2, 3, 2, 5, 4, 3, 8)

Hereditary worst-case heap # 73

10-element heap level-by-level:

```

Level 0:          10
Level 1:      9^^^^^^^^^^^^^^^^^7
Level 2:   8^^^^^^4          2^^^^^^1
Level 3:  5^^^6   3^^

```

10 heap: [10, 9, 7, 8, 4, 2, 1, 5, 6, 3]

Strategy was: (1, 2, 3, 2, 5, 4, 3, 8, 9)

Hereditary worst-case heap # 74

8-element heap level-by-level:

```

Level 0:      8
Level 1:   7^^^^^^3
Level 2:  6^^^4   2^^^1
Level 3: 5^

```

8 heap: [8, 7, 3, 6, 4, 2, 1, 5]

Strategy was: (1, 2, 3, 2, 5, 4, 4)

Hereditary worst-case heap # 75

9-element heap level-by-level:

```

Level 0:      9
Level 1:   8^^^^^^3
Level 2:  7^^^4   2^^^1
Level 3: 5^6

```

9 heap: [9, 8, 3, 7, 4, 2, 1, 5, 6]

Strategy was: (1, 2, 3, 2, 5, 4, 4, 4)

Hereditary worst-case heap # 76

9-element heap level-by-level:

```

Level 0:      9
Level 1:    8^^^^^^3
Level 2:  7^^^^4   2^^^1
Level 3: 6^5

```

```

9 heap: [9, 8, 3, 7, 4, 2, 1, 6, 5]
Strategy was: (1, 2, 3, 2, 5, 4, 4, 8)

```

```

Hereditary worst-case heap # 77
8-element heap level-by-level:

```

```

Level 0:      8
Level 1:    7^^^^^^3
Level 2:  5^^^^6   2^^^1
Level 3: 4^

```

```

8 heap: [8, 7, 3, 5, 6, 2, 1, 4]
Strategy was: (1, 2, 3, 2, 5, 4, 5)

```

```

Hereditary worst-case heap # 78
9-element heap level-by-level:

```

```

Level 0:      9
Level 1:    8^^^^^^3
Level 2:  7^^^^6   2^^^1
Level 3: 4^5

```

```

9 heap: [9, 8, 3, 7, 6, 2, 1, 4, 5]
Strategy was: (1, 2, 3, 2, 5, 4, 5, 4)

```

```

Hereditary worst-case heap # 79
10-element heap level-by-level:

```

```

Level 0:      10
Level 1:    9^^^^^^^^^^^^^^3
Level 2:  8^^^^^^6          2^^^^^^1
Level 3: 7^^^^5   4^

```

10 heap: [10, 9, 3, 8, 6, 2, 1, 7, 5, 4]
 Strategy was: (1, 2, 3, 2, 5, 4, 5, 4, 8)

Hereditary worst-case heap # 80
 11-element heap level-by-level:

```

Level 0:          11
Level 1:      10^^^^^^^^^^^^^^^^^3
Level 2:   9^^^^^^6          2^^^^^^1
Level 3:  7^^^8    4^^^5

```

11 heap: [11, 10, 3, 9, 6, 2, 1, 7, 8, 4, 5]
 Strategy was: (1, 2, 3, 2, 5, 4, 5, 4, 8, 9)

Hereditary worst-case heap # 81
 10-element heap level-by-level:

```

Level 0:          10
Level 1:      9^^^^^^^^^^^^^^^^^3
Level 2:   8^^^^^^6          2^^^^^^1
Level 3:  4^^^7    5^^

```

10 heap: [10, 9, 3, 8, 6, 2, 1, 4, 7, 5]
 Strategy was: (1, 2, 3, 2, 5, 4, 5, 4, 9)

Hereditary worst-case heap # 82
 11-element heap level-by-level:

```

Level 0:          11
Level 1:      10^^^^^^^^^^^^^^^^^3
Level 2:   9^^^^^^6          2^^^^^^1
Level 3:  8^^^7    5^^^4

```

11 heap: [11, 10, 3, 9, 6, 2, 1, 8, 7, 5, 4]
 Strategy was: (1, 2, 3, 2, 5, 4, 5, 4, 9, 8)

Hereditary worst-case heap # 83

9-element heap level-by-level:

Level 0: 9
 Level 1: 8~~~~~3
 Level 2: 7~~~6 2~~~1
 Level 3: 5^4

9 heap: [9, 8, 3, 7, 6, 2, 1, 5, 4]

Strategy was: (1, 2, 3, 2, 5, 4, 5, 8)

Hereditary worst-case heap # 84

10-element heap level-by-level:

Level 0: 10
 Level 1: 9~~~~~3
 Level 2: 8~~~~~6 2~~~~~1
 Level 3: 7~~~4 5^^

10 heap: [10, 9, 3, 8, 6, 2, 1, 7, 4, 5]

Strategy was: (1, 2, 3, 2, 5, 4, 5, 8, 8)

Hereditary worst-case heap # 85

11-element heap level-by-level:

Level 0: 11
 Level 1: 10~~~~~3
 Level 2: 9~~~~~6 2~~~~~1
 Level 3: 7~~~8 5~~~4

11 heap: [11, 10, 3, 9, 6, 2, 1, 7, 8, 5, 4]

Strategy was: (1, 2, 3, 2, 5, 4, 5, 8, 8, 9)

Hereditary worst-case heap # 86

10-element heap level-by-level:

```

Level 0:          10
Level 1:      9^^^^^^^^^^^^^^^^^3
Level 2:   8^^^^^^6          2^^^^^^1
Level 3: 5^^^7   4^^

```

10 heap: [10, 9, 3, 8, 6, 2, 1, 5, 7, 4]
 Strategy was: (1, 2, 3, 2, 5, 4, 5, 8, 9)

Hereditary worst-case heap # 87
 11-element heap level-by-level:

```

Level 0:          11
Level 1:      10^^^^^^^^^^^^^^^^^3
Level 2:   9^^^^^^6          2^^^^^^1
Level 3: 8^^^7   4^^^5

```

11 heap: [11, 10, 3, 9, 6, 2, 1, 8, 7, 4, 5]
 Strategy was: (1, 2, 3, 2, 5, 4, 5, 8, 9, 8)

Hereditary worst-case heap # 88
 8-element heap level-by-level:

```

Level 0:          8
Level 1:   6^^^^^^7
Level 2: 5^^^4   3^^^1
Level 3: 2^

```

8 heap: [8, 6, 7, 5, 4, 3, 1, 2]
 Strategy was: (1, 2, 3, 2, 5, 4, 6)

Hereditary worst-case heap # 89
 9-element heap level-by-level:

```

Level 0:          9
Level 1:   8^^^^^^7
Level 2: 6^^^4   3^^^1

```

Level 3: 2^5

9 heap: [9, 8, 7, 6, 4, 3, 1, 2, 5]

Strategy was: (1, 2, 3, 2, 5, 4, 6, 4)

Hereditary worst-case heap # 90

10-element heap level-by-level:

```
Level 0:          10
Level 1:      9^^^^^^^^^^^^^^^^7
Level 2:   8^^^^^^4          3^^^^^^1
Level 3:  6^^^5   2^^
```

10 heap: [10, 9, 7, 8, 4, 3, 1, 6, 5, 2]

Strategy was: (1, 2, 3, 2, 5, 4, 6, 4, 8)

Hereditary worst-case heap # 91

9-element heap level-by-level:

```
Level 0:          9
Level 1:   8^^^^^^7
Level 2:  6^^^4   3^^^1
Level 3: 5^2
```

9 heap: [9, 8, 7, 6, 4, 3, 1, 5, 2]

Strategy was: (1, 2, 3, 2, 5, 4, 6, 8)

Hereditary worst-case heap # 92

10-element heap level-by-level:

```
Level 0:          10
Level 1:      9^^^^^^^^^^^^^^^^7
Level 2:   8^^^^^^4          3^^^^^^1
Level 3:  5^^^6   2^^
```

10 heap: [10, 9, 7, 8, 4, 3, 1, 5, 6, 2]

Strategy was: (1, 2, 3, 2, 5, 4, 6, 8, 9)

Hereditary worst-case heap # 93
 8-element heap level-by-level:

Level 0: 8
 Level 1: 6~~~~~7
 Level 2: 5~~~4 2~~~3
 Level 3: 1^

8 heap: [8, 6, 7, 5, 4, 2, 3, 1]
 Strategy was: (1, 2, 3, 2, 5, 4, 7)

Hereditary worst-case heap # 94
 9-element heap level-by-level:

Level 0: 9
 Level 1: 8~~~~~7
 Level 2: 6~~~4 2~~~3
 Level 3: 1^5

9 heap: [9, 8, 7, 6, 4, 2, 3, 1, 5]
 Strategy was: (1, 2, 3, 2, 5, 4, 7, 4)

Hereditary worst-case heap # 95
 10-element heap level-by-level:

Level 0: 10
 Level 1: 9~~~~~7
 Level 2: 8~~~~~4 2~~~~~3
 Level 3: 6~~~5 1^^

10 heap: [10, 9, 7, 8, 4, 2, 3, 6, 5, 1]
 Strategy was: (1, 2, 3, 2, 5, 4, 7, 4, 8)

Hereditary worst-case heap # 96
 9-element heap level-by-level:

```

Level 0:      9
Level 1:    8^^^^^7
Level 2:  6^^^4   2^^^3
Level 3: 5^1

```

```

9 heap: [9, 8, 7, 6, 4, 2, 3, 5, 1]
Strategy was: (1, 2, 3, 2, 5, 4, 7, 8)

```

```

Hereditary worst-case heap # 97
10-element heap level-by-level:

```

```

Level 0:      10
Level 1:    9^^^^^^^^^^^^^^^^7
Level 2:  8^^^^^^4      2^^^^^^3
Level 3: 5^^^6   1^^

```

```

10 heap: [10, 9, 7, 8, 4, 2, 3, 5, 6, 1]
Strategy was: (1, 2, 3, 2, 5, 4, 7, 8, 9)

```

```

Hereditary worst-case heap # 98
5-element heap level-by-level:

```

```

Level 0:    5
Level 1:  4^^^3
Level 2: 2^1

```

```

5 heap: [5, 4, 3, 2, 1]
Strategy was: (1, 2, 3, 4)

```

```

Hereditary worst-case heap # 99
6-element heap level-by-level:

```

```

Level 0:    6

```

Level 1: 5^{33}

Level 2: $4^1 2^1$

6 heap: [6, 5, 3, 4, 1, 2]

Strategy was: (1, 2, 3, 4, 4)

Hereditary worst-case heap # 100

7-element heap level-by-level:

Level 0: 7

Level 1: 6^{33}

Level 2: $4^5 2^1$

7 heap: [7, 6, 3, 4, 5, 2, 1]

Strategy was: (1, 2, 3, 4, 4, 5)

Hereditary worst-case heap # 101

8-element heap level-by-level:

Level 0: 8

Level 1: 6^{77}

Level 2: $4^{55} 2^{11}$

Level 3: 3^1

8 heap: [8, 6, 7, 4, 5, 2, 1, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 3)

Hereditary worst-case heap # 102

9-element heap level-by-level:

Level 0: 9

Level 1: 8^{77}

Level 2: $6^{55} 2^{11}$

Level 3: 3^4

9 heap: [9, 8, 7, 6, 5, 2, 1, 3, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 3, 4)

Hereditary worst-case heap # 103

10-element heap level-by-level:

```

Level 0:          10
Level 1:      9^^^^^^^^^^^^^^^^7
Level 2:   8^^^^^^5          2^^^^^^1
Level 3: 6^^^4   3^^

```

10 heap: [10, 9, 7, 8, 5, 2, 1, 6, 4, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 3, 4, 8)

Hereditary worst-case heap # 104
 11-element heap level-by-level:

```

Level 0:          11
Level 1:      10^^^^^^^^^^^^^^^^7
Level 2:   9^^^^^^5          2^^^^^^1
Level 3: 6^^^8   3^^4

```

11 heap: [11, 10, 7, 9, 5, 2, 1, 6, 8, 3, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 3, 4, 8, 9)

Hereditary worst-case heap # 105
 10-element heap level-by-level:

```

Level 0:          10
Level 1:      9^^^^^^^^^^^^^^^^7
Level 2:   8^^^^^^5          2^^^^^^1
Level 3: 3^^^6   4^^

```

10 heap: [10, 9, 7, 8, 5, 2, 1, 3, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 3, 4, 9)

Hereditary worst-case heap # 106
 11-element heap level-by-level:

```

Level 0:          11
Level 1:      10^^^^^^^^^^^^^^^^7
Level 2:   9^^^^^^5          2^^^^^^1
Level 3: 8^^^6   4^^3

```

11 heap: [11, 10, 7, 9, 5, 2, 1, 8, 6, 4, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 3, 4, 9, 8)

Hereditary worst-case heap # 107
 9-element heap level-by-level:

Level 0: 9
 Level 1: 8~~~~~7
 Level 2: 6~~~5 2~~~1
 Level 3: 4^3

9 heap: [9, 8, 7, 6, 5, 2, 1, 4, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 3, 8)

Hereditary worst-case heap # 108
 10-element heap level-by-level:

Level 0: 10
 Level 1: 9~~~~~7
 Level 2: 8~~~~~5 2~~~~~1
 Level 3: 6~~~3 4^^

10 heap: [10, 9, 7, 8, 5, 2, 1, 6, 3, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 3, 8, 8)

Hereditary worst-case heap # 109
 11-element heap level-by-level:

Level 0: 11
 Level 1: 10~~~~~7
 Level 2: 9~~~~~5 2~~~~~1
 Level 3: 6~~~8 4~~~3

11 heap: [11, 10, 7, 9, 5, 2, 1, 6, 8, 4, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 3, 8, 8, 9)

Hereditary worst-case heap # 110

10-element heap level-by-level:

```

Level 0:          10
Level 1:      9^^^^^^^^^^^^^^^^7
Level 2:  8^^^^^^5          2^^^^^^1
Level 3: 4^^^6   3^^

```

10 heap: [10, 9, 7, 8, 5, 2, 1, 4, 6, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 3, 8, 9)

Hereditary worst-case heap # 111

11-element heap level-by-level:

```

Level 0:          11
Level 1:      10^^^^^^^^^^^^^^^^7
Level 2:  9^^^^^^5          2^^^^^^1
Level 3: 8^^^6   3^^^4

```

11 heap: [11, 10, 7, 9, 5, 2, 1, 8, 6, 3, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 3, 8, 9, 8)

Hereditary worst-case heap # 112

8-element heap level-by-level:

```

Level 0:          8
Level 1:  7^^^^^^3
Level 2: 6^^^5   2^^^1
Level 3: 4^

```

8 heap: [8, 7, 3, 6, 5, 2, 1, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 4)

Hereditary worst-case heap # 113

9-element heap level-by-level:

Level 0: 9
 Level 1: 8~~~~~3
 Level 2: 7~~~5 2~~~1
 Level 3: 4^6

9 heap: [9, 8, 3, 7, 5, 2, 1, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 4, 4)

Hereditary worst-case heap # 114
 10-element heap level-by-level:

Level 0: 10
 Level 1: 9~~~~~3
 Level 2: 8~~~~~5 2~~~~~1
 Level 3: 7~~~6 4^^

10 heap: [10, 9, 3, 8, 5, 2, 1, 7, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 4, 4, 8)

Hereditary worst-case heap # 115
 9-element heap level-by-level:

Level 0: 9
 Level 1: 8~~~~~3
 Level 2: 7~~~5 2~~~1
 Level 3: 6^4

9 heap: [9, 8, 3, 7, 5, 2, 1, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 4, 8)

Hereditary worst-case heap # 116
 10-element heap level-by-level:

Level 0: 10
 Level 1: 9~~~~~3
 Level 2: 8~~~~~5 2~~~~~1

Level 3: 6^{^^^7} 4^{^^}

10 heap: [10, 9, 3, 8, 5, 2, 1, 6, 7, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 4, 8, 9)

Hereditary worst-case heap # 117

8-element heap level-by-level:

Level 0: 8

Level 1: 6^{^^^^^^7}

Level 2: 4^{^^^5} 3^{^^^1}

Level 3: 2[^]

8 heap: [8, 6, 7, 4, 5, 3, 1, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 6)

Hereditary worst-case heap # 118

9-element heap level-by-level:

Level 0: 9

Level 1: 8^{^^^^^^7}

Level 2: 6^{^^^5} 3^{^^^1}

Level 3: 2^{^4}

9 heap: [9, 8, 7, 6, 5, 3, 1, 2, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 6, 4)

Hereditary worst-case heap # 119

10-element heap level-by-level:

Level 0: 10

Level 1: 9^{^^^^^^^^^^^^^^7}

Level 2: 8^{^^^^^^5} 3^{^^^^^^1}

Level 3: 6^{^^^4} 2^{^^}

10 heap: [10, 9, 7, 8, 5, 3, 1, 6, 4, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 6, 4, 8)

Hereditary worst-case heap # 120

11-element heap level-by-level:

```

Level 0:          11
Level 1:      10^^^^^^^^^^^^^^^^7
Level 2:   9^^^^^^5          3^^^^^^1
Level 3:  6^^^8   2^^^4

```

11 heap: [11, 10, 7, 9, 5, 3, 1, 6, 8, 2, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 6, 4, 8, 9)

Hereditary worst-case heap # 121

12-element heap level-by-level:

```

Level 0:          12
Level 1:      11^^^^^^^^^^^^^^^^7
Level 2:   9^^^^^^10          3^^^^^^1
Level 3:  6^^^8   5^^^4   2^^

```

12 heap: [12, 11, 7, 9, 10, 3, 1, 6, 8, 5, 4, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 6, 4, 8, 9, 10)

Hereditary worst-case heap # 122

13-element heap level-by-level:

```

Level 0:          13
Level 1:      11^^^^^^^^^^^^^^^^12
Level 2:   9^^^^^^10          7^^^^^^1
Level 3:  6^^^8   5^^^4   3^^^2

```

13 heap: [13, 11, 12, 9, 10, 7, 1, 6, 8, 5, 4, 3, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 6, 4, 8, 9, 10, 12)

Hereditary worst-case heap # 123

10-element heap level-by-level:

```

Level 0:          10
Level 1:      9^^^^^^^^^^^^^^^^7
Level 2:  8^^^^^^5          3^^^^^^1
Level 3:  2^^^6   4^^

```

10 heap: [10, 9, 7, 8, 5, 3, 1, 2, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 6, 4, 9)

Hereditary worst-case heap # 124
 11-element heap level-by-level:

```

Level 0:          11
Level 1:      10^^^^^^^^^^^^^^^^7
Level 2:  9^^^^^^5          3^^^^^^1
Level 3:  8^^^6   4^^2

```

11 heap: [11, 10, 7, 9, 5, 3, 1, 8, 6, 4, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 6, 4, 9, 8)

Hereditary worst-case heap # 125
 12-element heap level-by-level:

```

Level 0:          12
Level 1:      11^^^^^^^^^^^^^^^^7
Level 2:  9^^^^^^10          3^^^^^^1
Level 3:  8^^^6   4^^5   2^^

```

12 heap: [12, 11, 7, 9, 10, 3, 1, 8, 6, 4, 5, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 6, 4, 9, 8, 11)

Hereditary worst-case heap # 126
 13-element heap level-by-level:

```

Level 0:          13
Level 1:      11^^^^^^^^^^^^^^^^12
Level 2:  9^^^^^^10          7^^^^^^1
Level 3:  8^^^6   4^^5   3^^2

```

13 heap: [13, 11, 12, 9, 10, 7, 1, 8, 6, 4, 5, 3, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 6, 4, 9, 8, 11, 12)

Hereditary worst-case heap # 127

9-element heap level-by-level:

Level 0: 9
 Level 1: 8^{~~~~~}7
 Level 2: 6^{~~~}5 3^{~~~}1
 Level 3: 4[^]2

9 heap: [9, 8, 7, 6, 5, 3, 1, 4, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 6, 8)

Hereditary worst-case heap # 128

10-element heap level-by-level:

Level 0: 10
 Level 1: 9^{~~~~~}7
 Level 2: 8^{~~~~~}5 3^{~~~~~}1
 Level 3: 6^{~~~}2 4^{^^}

10 heap: [10, 9, 7, 8, 5, 3, 1, 6, 2, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 6, 8, 8)

Hereditary worst-case heap # 129

11-element heap level-by-level:

Level 0: 11
 Level 1: 10^{~~~~~}7
 Level 2: 9^{~~~~~}5 3^{~~~~~}1
 Level 3: 6^{~~~}8 4^{~~~}2

11 heap: [11, 10, 7, 9, 5, 3, 1, 6, 8, 4, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 6, 8, 8, 9)

Hereditary worst-case heap # 130

12-element heap level-by-level:

```

Level 0:          12
Level 1:    11^^^^^^^^^^^^^^^^7
Level 2:    9^^^^^^10      3^^^^^^1
Level 3:  6^^^8   4^^^5   2^^

```

12 heap: [12, 11, 7, 9, 10, 3, 1, 6, 8, 4, 5, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 6, 8, 8, 9, 11)

Hereditary worst-case heap # 131

13-element heap level-by-level:

```

Level 0:          13
Level 1:    11^^^^^^^^^^^^^^^^12
Level 2:    9^^^^^^10      7^^^^^^1
Level 3:  6^^^8   4^^^5   3^^^2

```

13 heap: [13, 11, 12, 9, 10, 7, 1, 6, 8, 4, 5, 3, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 6, 8, 8, 9, 11, 12)

Hereditary worst-case heap # 132

10-element heap level-by-level:

```

Level 0:          10
Level 1:    9^^^^^^^^^^^^^^^^7
Level 2:    8^^^^^^5      3^^^^^^1
Level 3:  4^^^6   2^^

```

10 heap: [10, 9, 7, 8, 5, 3, 1, 4, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 6, 8, 9)

Hereditary worst-case heap # 133

11-element heap level-by-level:

```

Level 0:          11
Level 1:      10^^^^^^^^^^^^^^^^7
Level 2:   9^^^^^^5          3^^^^^^1
Level 3:  8^^^6   2^^^4

```

11 heap: [11, 10, 7, 9, 5, 3, 1, 8, 6, 2, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 6, 8, 9, 8)

Hereditary worst-case heap # 134
 12-element heap level-by-level:

```

Level 0:          12
Level 1:      11^^^^^^^^^^^^^^^^7
Level 2:   9^^^^^^10        3^^^^^^1
Level 3:  8^^^6   5^^^4   2^^

```

12 heap: [12, 11, 7, 9, 10, 3, 1, 8, 6, 5, 4, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 6, 8, 9, 8, 10)

Hereditary worst-case heap # 135
 13-element heap level-by-level:

```

Level 0:          13
Level 1:      11^^^^^^^^^^^^^^^^12
Level 2:   9^^^^^^10        7^^^^^^1
Level 3:  8^^^6   5^^^4   3^^^2

```

13 heap: [13, 11, 12, 9, 10, 7, 1, 8, 6, 5, 4, 3, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 6, 8, 9, 8, 10, 12)

Hereditary worst-case heap # 136
 8-element heap level-by-level:

```

Level 0:          8

```

Level 1: 6^^^^^^7
 Level 2: 4^^^5 2^^^3
 Level 3: 1^

8 heap: [8, 6, 7, 4, 5, 2, 3, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7)

Hereditary worst-case heap # 137
 9-element heap level-by-level:

Level 0: 9
 Level 1: 8^^^^^^7
 Level 2: 6^^^5 2^^^3
 Level 3: 1^4

9 heap: [9, 8, 7, 6, 5, 2, 3, 1, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4)

Hereditary worst-case heap # 138
 10-element heap level-by-level:

Level 0: 10
 Level 1: 9^^^^^^^^^^^^^^7
 Level 2: 8^^^^^^5 2^^^^^^3
 Level 3: 6^^^4 1^^

10 heap: [10, 9, 7, 8, 5, 2, 3, 6, 4, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8)

Hereditary worst-case heap # 139
 11-element heap level-by-level:

Level 0: 11
 Level 1: 10^^^^^^^^^^^^^^7
 Level 2: 9^^^^^^5 2^^^^^^3
 Level 3: 6^^^8 1^^4

11 heap: [11, 10, 7, 9, 5, 2, 3, 6, 8, 1, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9)

Hereditary worst-case heap # 140

12-element heap level-by-level:

```

Level 0:          12
Level 1:      11~-----~7
Level 2:   9~-----10      2~-----3
Level 3: 6~--8   5~--4   1~

```

12 heap: [12, 11, 7, 9, 10, 2, 3, 6, 8, 5, 4, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10)

Hereditary worst-case heap # 141

13-element heap level-by-level:

```

Level 0:          13
Level 1:      11~-----~12
Level 2:   9~-----10      7~-----3
Level 3: 6~--8   5~--4   2~--1

```

13 heap: [13, 11, 12, 9, 10, 7, 3, 6, 8, 5, 4, 2, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12)

Hereditary worst-case heap # 142

14-element heap level-by-level:

```

Level 0:          14
Level 1:      11~-----~13
Level 2:   9~-----10      12~-----3
Level 3: 6~--8   5~--4   7~--1   2~

```

14 heap: [14, 11, 13, 9, 10, 12, 3, 6, 8, 5, 4, 7, 1, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12)

Hereditary worst-case heap # 143

15-element heap level-by-level:

```

Level 0:          15
Level 1:      11~-----~14
Level 2:   9~-----10      13~-----3
Level 3: 6~--8   5~--4   7~12   2~--1

```

15 heap: [15, 11, 14, 9, 10, 13, 3, 6, 8, 5, 4, 7, 12, 2, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13)

Hereditary worst-case heap # 144
 16-element heap level-by-level:

```

Level 0:                                16
Level 1:          11~::~::~::~::~15
Level 2:      9~::~8      10~::13~::~14
Level 3:  6~::8      5~::4      7~::12      2~::1
Level 4: 3~

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 6, 8, 5, 4, 7, 12, 2, 1, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 7)

Hereditary worst-case heap # 145
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~15
Level 2:      11~::~8      10~::13~::~14
Level 3:  9~::8      5~::4      7~::12      2~::1
Level 4: 3~6

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 5, 4, 7, 12, 2, 1, 3, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 7, 8)

Hereditary worst-case heap # 146
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~15
Level 2:      16~::~8      10~::13~::~14
Level 3:  11~::8      5~::4      7~::12      2~::1
Level 4: 9~6  3~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 7, 12, 2, 1, 9, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 7, 8, 16)

Hereditary worst-case heap # 147

19-element heap level-by-level:

```

Level 0:                      19
Level 1:          18~~~~~15
Level 2:      17~~~~~10          13~~~~~14
Level 3:  16~~~~~8      5~~~~~4      7~~~~~12      2~~~~~1
Level 4:  9~~11   3~~6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 7, 12, 2, 1, 9, 11, 3, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 7, 8, 16, 17)

Hereditary worst-case heap # 148

20-element heap level-by-level:

```

Level 0:                      20
Level 1:          19~~~~~15
Level 2:      18~~~~~10          13~~~~~14
Level 3:  16~~~~~17      5~~~~~4      7~~~~~12      2~~~~~1
Level 4:  9~~11   8~~6   3~~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 7, 12, 2, 1, 9, 11, 8, 6, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 7, 8, 16, 17, 18)

Hereditary worst-case heap # 149

18-element heap level-by-level:

```

Level 0:                      18
Level 1:          17~~~~~15
Level 2:      16~~~~~10          13~~~~~14
Level 3:  11~~~~~8      5~~~~~4      7~~~~~12      2~~~~~1
Level 4:  3~~~9   6~~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 7, 12, 2, 1, 3, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 7, 8, 17)

Hereditary worst-case heap # 150

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^8      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 11^^^9   6^^^3

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 7, 12, 2, 1, 11, 9, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 7, 8, 17, 16)

Hereditary worst-case heap # 151

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 11^^^9   6^^^8   3^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 7, 12, 2, 1, 11, 9, 6, 8, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 7, 8, 17, 16, 19)

Hereditary worst-case heap # 152

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   9^^^^^^8      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4:  6^^^3

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 5, 4, 7, 12, 2, 1, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 7, 16)

Hereditary worst-case heap # 153

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^8      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4:  9^^^3    6^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 7, 12, 2, 1, 9, 3, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 7, 16, 16)

Hereditary worst-case heap # 154

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^8      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4:  9^^11    6^^^3

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 7, 12, 2, 1, 9, 11, 6, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 7, 16, 16, 17)

Hereditary worst-case heap # 155

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4:  9^^11    6^^^8    3^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 7, 12, 2, 1, 9, 11, 6, 8, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 7, 16, 16, 17, 19)

Hereditary worst-case heap # 156

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~::~15
Level 2:      16~::~10          13~::~14
Level 3:  11~::8      5~::4      7~::12      2~::1
Level 4:  6~^9   3~^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 7, 12, 2, 1, 6, 9, 3]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 7, 16, 17)

Hereditary worst-case heap # 157
19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18~::~::~::~15
Level 2:      17~::~10          13~::~14
Level 3:  16~::8      5~::4      7~::12      2~::1
Level 4: 11~^9   3~^6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 7, 12, 2, 1, 11, 9, 3, 6]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 7, 16, 17, 16)

Hereditary worst-case heap # 158
20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~::~15
Level 2:      18~::~10          13~::~14
Level 3:  16~::17      5~::4      7~::12      2~::1
Level 4: 11~^9   8~^6   3~^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 7, 12, 2, 1, 11, 9, 8, 6, 3]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 7, 16, 17, 16, 18)

Hereditary worst-case heap # 159

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15~::~::~::~::~14
Level 2:      11~::~10                13~::3
Level 3:   9~::8      5~::4      7~::12      2~::1
Level 4: 6~

```

16 heap: [16, 15, 14, 11, 10, 13, 3, 9, 8, 5, 4, 7, 12, 2, 1, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 8)

Hereditary worst-case heap # 160

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~14
Level 2:      15~::~10                13~::3
Level 3:  11~::8      5~::4      7~::12      2~::1
Level 4: 6~9

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 8, 5, 4, 7, 12, 2, 1, 6, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 8, 8)

Hereditary worst-case heap # 161

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~14
Level 2:      16~::~10                13~::3
Level 3:  15~::8      5~::4      7~::12      2~::1
Level 4: 11~9  6~

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 8, 5, 4, 7, 12, 2, 1, 11, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 8, 8, 16)

Hereditary worst-case heap # 162

17-element heap level-by-level:

```

Level 0:                                17
Level 1:                    16~14
Level 2:            15~10            13~3
Level 3:    11~8            5~4            7~12            2~1
Level 4:    9~6

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 8, 5, 4, 7, 12, 2, 1, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 8, 16)

Hereditary worst-case heap # 163

18-element heap level-by-level:

```

Level 0:                                18
Level 1:                    17~14
Level 2:            16~10            13~3
Level 3:    15~8            5~4            7~12            2~1
Level 4:    9~11    6~

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 8, 5, 4, 7, 12, 2, 1, 9, 11, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 8, 16, 17)

Hereditary worst-case heap # 164

16-element heap level-by-level:

```

Level 0:                                16
Level 1:                    15~14
Level 2:            9~11            13~3
Level 3:    6~8            10~4            7~12            2~1
Level 4:    5~

```

16 heap: [16, 15, 14, 9, 11, 13, 3, 6, 8, 10, 4, 7, 12, 2, 1, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10)

Hereditary worst-case heap # 165

17-element heap level-by-level:

```

Level 0:                                17

```

```

Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   9^^^^^^8      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 5^^^6

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 8, 10, 4, 7, 12, 2, 1, 5, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8)

Hereditary worst-case heap # 166
 18-element heap level-by-level:

```

Level 0:                  18
Level 1:      17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:   16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3: 15^^^^^^8      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 9^^^6   5^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 10, 4, 7, 12, 2, 1, 9, 6, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16)

Hereditary worst-case heap # 167
 19-element heap level-by-level:

```

Level 0:                  19
Level 1:      18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:   17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3: 16^^^^^^8      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 9^^15   5^^^6

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 10, 4, 7, 12, 2, 1, 9, 15, 5, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17)

Hereditary worst-case heap # 168
 20-element heap level-by-level:

```

Level 0:                  20
Level 1:      19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:   18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3: 16^^^^^^17      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 9^^15   5^^^6   8^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 7, 12, 2, 1, 9, 15, 5, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17, 9)

Hereditary worst-case heap # 169
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~4      7~~~~~12      2~~~~~1
Level 4: 16~~15   5~~~6   8~~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 7, 12, 2, 1, 16, 15, 5, 6, 8, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17, 9, 16)

Hereditary worst-case heap # 170
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      7~~~~~12      2~~~~~1
Level 4:  9~~15   17~~~6   8~~~5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 9, 15, 17, 6, 8, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17, 9, 18)

Hereditary worst-case heap # 171
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      7~~~~~12      2~~~~~1
Level 4:  9~~15   5~~17   8~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 9, 15, 5, 17, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17, 9, 19)

Hereditary worst-case heap # 172

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  17^^^^^^8      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 16^^15   5^^6   9^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 17, 8, 10, 4, 7, 12, 2, 1, 16, 15, 5, 6, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17, 16)

Hereditary worst-case heap # 173

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  17^^^^^^18      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 16^^15   5^^6   9^^8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 7, 12, 2, 1, 16, 15, 5, 6, 9, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17, 16, 9)

Hereditary worst-case heap # 174

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  17^^^^^^18      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 16^^15   8^^6   9^^5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 7, 12, 2, 1, 16, 15, 8, 6, 9, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17, 16, 18)

Hereditary worst-case heap # 175

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  17~~~~~18      10~~~~~4      7~~~~~12      2~~~~~1
Level 4: 16~~15   5~~~8   9~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 7, 12, 2, 1, 16, 15, 5, 8, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17, 16, 19)

Hereditary worst-case heap # 176

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:      18~~~~~11          13~~~~~3
Level 3:  16~~~~~17      10~~~~~4      7~~~~~12      2~~~~~1
Level 4:  9~~15   8~~~6   5~~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 7, 12, 2, 1, 9, 15, 8, 6, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17, 18)

Hereditary worst-case heap # 177

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~4      7~~~~~12      2~~~~~1
Level 4: 16~~15   8~~~6   5~~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 7, 12, 2, 1, 16, 15, 8, 6, 5, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17, 18, 16)

Hereditary worst-case heap # 178

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      7~~~~~12      2~~~~~1
Level 4:  9~~15  17~~~6   5~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 9, 15, 17, 6, 5, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17, 18, 18)

Hereditary worst-case heap # 179

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      7~~~~~12      2~~~~~1
Level 4:  9~~15   8~~17   5~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 9, 15, 8, 17, 5, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17, 18, 19)

Hereditary worst-case heap # 180

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:      18~~~~~11          13~~~~~3
Level 3:  16~~~~~17      10~~~~~4      7~~~~~12      2~~~~~1
Level 4:  9~~15   5~~~8   6~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 7, 12, 2, 1, 9, 15, 5, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17, 19)

Hereditary worst-case heap # 181

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  18~~~~~17    10~~~~~4    7~~~~~12    2~~~~~1
Level 4: 16~~15    5~~8    6~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 7, 12, 2, 1, 16, 15, 5, 8, 6, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17, 19, 16)

Hereditary worst-case heap # 182

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  16~~~~~18    10~~~~~4    7~~~~~12    2~~~~~1
Level 4:  9~~15  17~~8    6~~5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 9, 15, 17, 8, 6, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17, 19, 18)

Hereditary worst-case heap # 183

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  16~~~~~18    10~~~~~4    7~~~~~12    2~~~~~1
Level 4:  9~~15    5~~17    6~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 9, 15, 5, 17, 6, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 16, 17, 19, 19)

Hereditary worst-case heap # 184

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^8      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4:  5^^^9  6^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 10, 4, 7, 12, 2, 1, 5, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17)

Hereditary worst-case heap # 185

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^8      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^^9  6^^^5

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 10, 4, 7, 12, 2, 1, 15, 9, 6, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16)

Hereditary worst-case heap # 186

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^17      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^^9  6^^^5  8^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 7, 12, 2, 1, 15, 9, 6, 5, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16, 9)

Hereditary worst-case heap # 187

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~4      7~~~~~12      2~~~~~1
Level 4: 15~~16   6~~~5   8~~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 7, 12, 2, 1, 15, 16, 6, 5, 8, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16, 9, 17)

Hereditary worst-case heap # 188
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      7~~~~~12      2~~~~~1
Level 4: 15~~~9  17~~~5   8~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 15, 9, 17, 5, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16, 9, 18)

Hereditary worst-case heap # 189
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      7~~~~~12      2~~~~~1
Level 4: 15~~~9   6~~17   8~~~5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 15, 9, 6, 17, 8, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16, 9, 19)

Hereditary worst-case heap # 190
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~::~::~14
Level 2:      18~::~11          13~::~3
Level 3:  17~::8      10~::4      7~::12      2~::1
Level 4: 15~16  6~5  9~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 17, 8, 10, 4, 7, 12, 2, 1, 15, 16, 6, 5, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16, 17)

Hereditary worst-case heap # 191
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~::~::~::~14
Level 2:      19~::~11          13~::~3
Level 3:  17~::18      10~::4      7~::12      2~::1
Level 4: 15~16  6~5  9~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 7, 12, 2, 1, 15, 16, 6, 5, 9, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16, 17, 9)

Hereditary worst-case heap # 192
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~::~::~::~14
Level 2:      19~::~11          13~::~3
Level 3:  17~::18      10~::4      7~::12      2~::1
Level 4: 15~16  8~5  9~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 7, 12, 2, 1, 15, 16, 8, 5, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16, 17, 18)

Hereditary worst-case heap # 193
 21-element heap level-by-level:

```

Level 0:                                21

```

```

Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  17^^^^^^18      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^16   6^^^8   9^^^5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 7, 12, 2, 1, 15, 16, 6, 8, 9, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16, 17, 19)

Hereditary worst-case heap # 194
 20-element heap level-by-level:

```

Level 0:          20
Level 1:      19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:  18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^17      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^9    8^^^5   6^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 7, 12, 2, 1, 15, 9, 8, 5, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16, 18)

Hereditary worst-case heap # 195
 21-element heap level-by-level:

```

Level 0:          21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:  19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  18^^^^^^17      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^16   8^^^5   6^^^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 7, 12, 2, 1, 15, 16, 8, 5, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16, 18, 17)

Hereditary worst-case heap # 196
 21-element heap level-by-level:

```

Level 0:          21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14

```

```

Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^18      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^^9  17^^^5   6^^^8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 15, 9, 17, 5, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16, 18, 18)

Hereditary worst-case heap # 197
 21-element heap level-by-level:

```

Level 0:                      21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^18      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^^9   8^^17   6^^^5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 15, 9, 8, 17, 6, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16, 18, 19)

Hereditary worst-case heap # 198
 20-element heap level-by-level:

```

Level 0:                      20
Level 1:      19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^17      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^^9   6^^^8   5^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 7, 12, 2, 1, 15, 9, 6, 8, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16, 19)

Hereditary worst-case heap # 199
 21-element heap level-by-level:

```

Level 0:                      21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3

```

Level 3: 18~~~~~17 10~~~~~4 7~~~~~12 2~~~~~1
 Level 4: 15~~16 6~~~8 5~~~9

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 7, 12, 2, 1, 15, 16, 6, 8, 5, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16, 19, 17)

Hereditary worst-case heap # 200
 21-element heap level-by-level:

Level 0: 21
 Level 1: 20~~~~~14
 Level 2: 19~~~~~11 13~~~~~3
 Level 3: 16~~~~~18 10~~~~~4 7~~~~~12 2~~~~~1
 Level 4: 15~~~9 17~~~8 5~~~6

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 15, 9, 17, 8, 5, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16, 19, 18)

Hereditary worst-case heap # 201
 21-element heap level-by-level:

Level 0: 21
 Level 1: 20~~~~~14
 Level 2: 19~~~~~11 13~~~~~3
 Level 3: 16~~~~~18 10~~~~~4 7~~~~~12 2~~~~~1
 Level 4: 15~~~9 6~~17 5~~~8

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 15, 9, 6, 17, 5, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 8, 17, 16, 19, 19)

Hereditary worst-case heap # 202
 17-element heap level-by-level:

```

Level 0:                                     17
Level 1:                        16~::~~14
Level 2:           15~::~~11           13~::~~3
Level 3:    9~::~8      10~::~4      7~::~12      2~::~1
Level 4:  6~::5

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 8, 10, 4, 7, 12, 2, 1, 6, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16)

Hereditary worst-case heap # 203

18-element heap level-by-level:

```

Level 0:                                     18
Level 1:                        17~::~~14
Level 2:           16~::~~11           13~::~~3
Level 3:    15~::~8      10~::~4      7~::~12      2~::~1
Level 4:  9~::5  6~::

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 10, 4, 7, 12, 2, 1, 9, 5, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16)

Hereditary worst-case heap # 204

19-element heap level-by-level:

```

Level 0:                                     19
Level 1:                        18~::~~14
Level 2:           17~::~~11           13~::~~3
Level 3:    16~::~8      10~::~4      7~::~12      2~::~1
Level 4:  9~15  6~::5

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 10, 4, 7, 12, 2, 1, 9, 15, 6, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17)

Hereditary worst-case heap # 205

20-element heap level-by-level:

```

Level 0:                                     20
Level 1:                        19~::~~14
Level 2:           18~::~~11           13~::~~3
Level 3:    16~::~17      10~::~4      7~::~12      2~::~1

```

Level 4: 9¹⁵ 6⁵ 8²

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 7, 12, 2, 1, 9, 15, 6, 5, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17, 9)

Hereditary worst-case heap # 206

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~4      7~~~~~12      2~~~~~1
Level 4: 1615 65 89

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 7, 12, 2, 1, 16, 15, 6, 5, 8, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17, 9, 16)

Hereditary worst-case heap # 207

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      7~~~~~12      2~~~~~1
Level 4: 915 175 86

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 9, 15, 17, 5, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17, 9, 18)

Hereditary worst-case heap # 208

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      7~~~~~12      2~~~~~1
Level 4: 915 617 85

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 9, 15, 6, 17, 8, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17, 9, 19)

Hereditary worst-case heap # 209
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~::~::~::~14
Level 2:      18~::~11          13~::~3
Level 3:  17~::8      10~::4      7~::12      2~::1
Level 4: 16~15  6~5  9~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 17, 8, 10, 4, 7, 12, 2, 1, 16, 15, 6, 5, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17, 16)

Hereditary worst-case heap # 210
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~::~::~::~::~14
Level 2:      19~::~11          13~::~3
Level 3:  17~::18      10~::4      7~::12      2~::1
Level 4: 16~15  6~5  9~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 7, 12, 2, 1, 16, 15, 6, 5, 9, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17, 16, 9)

Hereditary worst-case heap # 211
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~::~::~::~::~14
Level 2:      19~::~11          13~::~3
Level 3:  17~::18      10~::4      7~::12      2~::1
Level 4: 16~15  8~5  9~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 7, 12, 2, 1, 16, 15, 8, 5, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17, 16, 18)

Hereditary worst-case heap # 212
21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  17~~~~~18      10~~~~~4      7~~~~~12      2~~~~~1
Level 4: 16~~15   6~~~8   9~~~5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 7, 12, 2, 1, 16, 15, 6, 8, 9, 5]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17, 16, 19)

Hereditary worst-case heap # 213
20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:      18~~~~~11          13~~~~~3
Level 3:  16~~~~~17      10~~~~~4      7~~~~~12      2~~~~~1
Level 4:  9~~15   8~~~5   6~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 7, 12, 2, 1, 9, 15, 8, 5, 6]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17, 18)

Hereditary worst-case heap # 214
21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~4      7~~~~~12      2~~~~~1
Level 4: 16~~15   8~~~5   6~~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 7, 12, 2, 1, 16, 15, 8, 5, 6, 9]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17, 18, 16)

Hereditary worst-case heap # 215

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  16~~~~~18    10~~~~~4    7~~~~~12    2~~~~~1
Level 4:  9~~15  17~~~5  6~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 9, 15, 17, 5, 6, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17, 18, 18)

Hereditary worst-case heap # 216

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  16~~~~~18    10~~~~~4    7~~~~~12    2~~~~~1
Level 4:  9~~15  8~~17  6~~~5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 9, 15, 8, 17, 6, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17, 18, 19)

Hereditary worst-case heap # 217

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:    18~~~~~11          13~~~~~3
Level 3:  16~~~~~17    10~~~~~4    7~~~~~12    2~~~~~1
Level 4:  9~~15  6~~~8  5~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 7, 12, 2, 1, 9, 15, 6, 8, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17, 19)

Hereditary worst-case heap # 218

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~4      7~~~~~12      2~~~~~1
Level 4: 16~~15   6~~8   5~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 7, 12, 2, 1, 16, 15, 6, 8, 5, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17, 19, 16)

Hereditary worst-case heap # 219

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      7~~~~~12      2~~~~~1
Level 4:  9~~15  17~~8   5~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 9, 15, 17, 8, 5, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17, 19, 18)

Hereditary worst-case heap # 220

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      7~~~~~12      2~~~~~1
Level 4:  9~~15   6~~17   5~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 9, 15, 6, 17, 5, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 16, 17, 19, 19)

Hereditary worst-case heap # 221
18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~::~14
Level 2:      16~::~11~::13~::~3
Level 3:  15~::8~::10~::4~::7~::12~::2~::1
Level 4:  6~::9~::5~::

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 10, 4, 7, 12, 2, 1, 6, 9, 5]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17)

Hereditary worst-case heap # 222
19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18~::~::~::~14
Level 2:      17~::~11~::13~::~3
Level 3:  16~::8~::10~::4~::7~::12~::2~::1
Level 4: 15~::9~::5~::6

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 10, 4, 7, 12, 2, 1, 15, 9, 5, 6]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16)

Hereditary worst-case heap # 223
20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~::~14
Level 2:      18~::~11~::13~::~3
Level 3:  16~::17~::10~::4~::7~::12~::2~::1
Level 4: 15~::9~::5~::6~::8~::

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 7, 12, 2, 1, 15, 9, 5, 6, 8]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16, 9)

Hereditary worst-case heap # 224

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~4      7~~~~~12      2~~~~~1
Level 4: 15~~16   5~~6   8~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 7, 12, 2, 1, 15, 16, 5, 6, 8, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16, 9, 17)

Hereditary worst-case heap # 225

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      7~~~~~12      2~~~~~1
Level 4: 15~~~9  17~~~6   8~~5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 15, 9, 17, 6, 8, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16, 9, 18)

Hereditary worst-case heap # 226

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      7~~~~~12      2~~~~~1
Level 4: 15~~~9   5~~17   8~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 15, 9, 5, 17, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16, 9, 19)

Hereditary worst-case heap # 227

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:    18~~~~~11          13~~~~~3
Level 3:  17~~~~~8    10~~~~~4    7~~~~~12    2~~~~~1
Level 4: 15~~16    5~~~6    9~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 17, 8, 10, 4, 7, 12, 2, 1, 15, 16, 5, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16, 17)

Hereditary worst-case heap # 228

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  17~~~~~18    10~~~~~4    7~~~~~12    2~~~~~1
Level 4: 15~~16    5~~~6    9~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 7, 12, 2, 1, 15, 16, 5, 6, 9, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16, 17, 9)

Hereditary worst-case heap # 229

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  17~~~~~18    10~~~~~4    7~~~~~12    2~~~~~1
Level 4: 15~~16    8~~~6    9~~~5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 7, 12, 2, 1, 15, 16, 8, 6, 9, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16, 17, 18)

Hereditary worst-case heap # 230

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  17^^^^^^18      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^16   5^^^8   9^^^6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 7, 12, 2, 1, 15, 16, 5, 8, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16, 17, 19)

Hereditary worst-case heap # 231
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^17      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^^9   8^^^6   5^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 7, 12, 2, 1, 15, 9, 8, 6, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16, 18)

Hereditary worst-case heap # 232
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  18^^^^^^17      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^16   8^^^6   5^^^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 7, 12, 2, 1, 15, 16, 8, 6, 5, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16, 18, 17)

Hereditary worst-case heap # 233
 21-element heap level-by-level:

```

Level 0:                                21

```

```

Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^^9  17^^^6  5^^^8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 15, 9, 17, 6, 5, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16, 18, 18)

Hereditary worst-case heap # 234

21-element heap level-by-level:

```

Level 0:          21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^^9  8^^17  5^^^6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 15, 9, 8, 17, 5, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16, 18, 19)

Hereditary worst-case heap # 235

20-element heap level-by-level:

```

Level 0:          20
Level 1:      19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^17      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^^9  5^^^8  6^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 7, 12, 2, 1, 15, 9, 5, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16, 19)

Hereditary worst-case heap # 236

21-element heap level-by-level:

```

Level 0:          21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14

```

```

Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   18^^^^^^17      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^16   5^^8   6^^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 7, 12, 2, 1, 15, 16, 5, 8, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16, 19, 17)

Hereditary worst-case heap # 237
 21-element heap level-by-level:

```

Level 0:                      21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^18      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^9   17^^8   6^^5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 15, 9, 17, 8, 6, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16, 19, 18)

Hereditary worst-case heap # 238
 21-element heap level-by-level:

```

Level 0:                      21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^18      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^9   5^^17   6^^8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 7, 12, 2, 1, 15, 9, 5, 17, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 10, 16, 17, 16, 19, 19)

Hereditary worst-case heap # 239

```

Level 0:                                16
Level 1:          15~~~~~14
Level 2:    9~~~~~11          13~~~~~3
Level 3:  6~~~~~8    5~~~~~10    7~~~~~12    2~~~~~1
Level 4: 4~~

```

```

Level 0:                                17
Level 1:          16~~~~~14
Level 2:    15~~~~~11          13~~~~~3
Level 3:    9~~~~~8      5~~~~~10      7~~~~~12      2~~~~~1
Level 4:  4~~~~6

```

```

Level 0:                                18
Level 1:          17~~~~~14
Level 2:      16~~~~~11          13~~~~~3
Level 3:  15~~~~~8      5~~~~~10      7~~~~~12      2~~~~~1
Level 4: 9~~~~6  4~~

```

```

Level 0:                                19
Level 1: 18~::~::~::~::~::~::~::~::~::~14

```

```

Level 2:      17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^8      5^^^^^^10      7^^^^^^12      2^^^^^^1
Level 4:  9^^15   4^^^6

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 5, 10, 7, 12, 2, 1, 9, 15, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 11, 8, 16, 17)

Hereditary worst-case heap # 243
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:      19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^17      5^^^^^^10      7^^^^^^12      2^^^^^^1
Level 4:  9^^15   8^^^6   4^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 5, 10, 7, 12, 2, 1, 9, 15, 8, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 11, 8, 16, 17, 18)

Hereditary worst-case heap # 244
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:      17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   15^^^^^^8      5^^^^^^10      7^^^^^^12      2^^^^^^1
Level 4:  4^^^9   6^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 5, 10, 7, 12, 2, 1, 4, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 11, 8, 17)

Hereditary worst-case heap # 245
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:      18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3

```

Level 3: 16^^^^^^8 5^^^^^^10 7^^^^^^12 2^^^^^^1
 Level 4: 15^^^9 6^^^4

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 5, 10, 7, 12, 2, 1, 15, 9, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 11, 8, 17, 16)

Hereditary worst-case heap # 246
 20-element heap level-by-level:

Level 0: 20
 Level 1: 19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
 Level 2: 18^^^^^^^^^^^^^^^^11 13^^^^^^^^^^^^^^^^3
 Level 3: 16^^^^^^17 5^^^^^^10 7^^^^^^12 2^^^^^^1
 Level 4: 15^^^9 6^^^8 4^^

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 5, 10, 7, 12, 2, 1, 15, 9, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 11, 8, 17, 16, 19)

Hereditary worst-case heap # 247
 17-element heap level-by-level:

Level 0: 17
 Level 1: 16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
 Level 2: 15^^^^^^^^^^^^^^^^11 13^^^^^^^^^^^^^^^^3
 Level 3: 9^^^^^^8 5^^^^^^10 7^^^^^^12 2^^^^^^1
 Level 4: 6^^^4

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 8, 5, 10, 7, 12, 2, 1, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 11, 16)

Hereditary worst-case heap # 248
 18-element heap level-by-level:

Level 0: 18
 Level 1: 17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
 Level 2: 16^^^^^^^^^^^^^^^^11 13^^^^^^^^^^^^^^^^3

Level 3: 15~~~~~8 5~~~~~10 7~~~~~12 2~~~~~1
 Level 4: 9~~~4 6~~

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 5, 10, 7, 12, 2, 1, 9, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 11, 16, 16)

Hereditary worst-case heap # 249
 19-element heap level-by-level:

Level 0: 19
 Level 1: 18~~~~~14
 Level 2: 17~~~~~11 13~~~~~3
 Level 3: 16~~~~~8 5~~~~~10 7~~~~~12 2~~~~~1
 Level 4: 9~~15 6~~~4

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 5, 10, 7, 12, 2, 1, 9, 15, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 11, 16, 16, 17)

Hereditary worst-case heap # 250
 20-element heap level-by-level:

Level 0: 20
 Level 1: 19~~~~~14
 Level 2: 18~~~~~11 13~~~~~3
 Level 3: 16~~~~~17 5~~~~~10 7~~~~~12 2~~~~~1
 Level 4: 9~~15 6~~~8 4~~

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 5, 10, 7, 12, 2, 1, 9, 15, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 11, 16, 16, 17, 19)

Hereditary worst-case heap # 251
 18-element heap level-by-level:

Level 0: 18
 Level 1: 17~~~~~14
 Level 2: 16~~~~~11 13~~~~~3
 Level 3: 15~~~~~8 5~~~~~10 7~~~~~12 2~~~~~1

Level 4: 6⁹ 4²

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 5, 10, 7, 12, 2, 1, 6, 9, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 11, 16, 17)

Hereditary worst-case heap # 252

19-element heap level-by-level:

```

Level 0:                                     19
Level 1:                                18~~~~~14
Level 2:                    17~~~~~11          13~~~~~3
Level 3:    16~~~~~8          5~~~~~10          7~~~~~12          2~~~~~1
Level 4: 159 46

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 5, 10, 7, 12, 2, 1, 15, 9, 4, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 11, 16, 17, 16)

Hereditary worst-case heap # 253

20-element heap level-by-level:

```

Level 0:                                     20
Level 1:                                19~~~~~14
Level 2:                    18~~~~~11          13~~~~~3
Level 3:    16~~~~~17          5~~~~~10          7~~~~~12          2~~~~~1
Level 4: 159 86 42

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 5, 10, 7, 12, 2, 1, 15, 9, 8, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 11, 16, 17, 16, 18)

Hereditary worst-case heap # 254

16-element heap level-by-level:

```

Level 0:                                     16
Level 1:                                11~~~~~15
Level 2:                    9~~~~~10          13~~~~~14

```

Level 3: 6~~~~~8 5~~~~~4 7~~~~~12 3~~~~~1
 Level 4: 2^^

16 heap: [16, 11, 15, 9, 10, 13, 14, 6, 8, 5, 4, 7, 12, 3, 1, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 14)

Hereditary worst-case heap # 255
 17-element heap level-by-level:

Level 0: 17
 Level 1: 16~~~~~15
 Level 2: 11~~~~~10 13~~~~~14
 Level 3: 9~~~~~8 5~~~~~4 7~~~~~12 3~~~~~1
 Level 4: 2^^6

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 5, 4, 7, 12, 3, 1, 2, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 14, 8)

Hereditary worst-case heap # 256
 18-element heap level-by-level:

Level 0: 18
 Level 1: 17~~~~~15
 Level 2: 16~~~~~10 13~~~~~14
 Level 3: 11~~~~~8 5~~~~~4 7~~~~~12 3~~~~~1
 Level 4: 9^^6 2^^

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 7, 12, 3, 1, 9, 6, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 14, 8, 16)

Hereditary worst-case heap # 257
 19-element heap level-by-level:

Level 0: 19
 Level 1: 18~~~~~15
 Level 2: 17~~~~~10 13~~~~~14
 Level 3: 16~~~~~8 5~~~~~4 7~~~~~12 3~~~~~1
 Level 4: 9^^11 2^^6

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 7, 12, 3, 1, 9, 11, 2, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 14, 8, 16, 17)

Hereditary worst-case heap # 258

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~::~::~::~15
Level 2:      18~::~::~10          13~::~::~14
Level 3:  16~::~17      5~::~4      7~::~12      3~::~1
Level 4:  9~11  8~6  2~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 7, 12, 3, 1, 9, 11, 8, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 14, 8, 16, 17, 18)

Hereditary worst-case heap # 259

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~::~15
Level 2:      16~::~::~10          13~::~::~14
Level 3:  11~::~8      5~::~4      7~::~12      3~::~1
Level 4:  2~9  6~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 7, 12, 3, 1, 2, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 14, 8, 17)

Hereditary worst-case heap # 260

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18~::~::~::~::~15
Level 2:      17~::~::~10          13~::~::~14
Level 3:  16~::~8      5~::~4      7~::~12      3~::~1
Level 4: 11~9  6~2

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 7, 12, 3, 1, 11, 9, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 14, 8, 17, 16)

Hereditary worst-case heap # 261

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~::~::~::~::~15
Level 2:      18~::~10          13~::~14
Level 3:  16~::17      5~::4      7~::12      3~::1
Level 4: 11~9  6~8  2~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 7, 12, 3, 1, 11, 9, 6, 8, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 14, 8, 17, 16, 19)

Hereditary worst-case heap # 262

17-element heap level-by-level:

```

Level 0:                17
Level 1:          16~::~15
Level 2:      11~::10          13~::14
Level 3:  9~8      5~4      7~12      3~1
Level 4: 6~2

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 5, 4, 7, 12, 3, 1, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 14, 16)

Hereditary worst-case heap # 263

18-element heap level-by-level:

```

Level 0:                18
Level 1:          17~::~15
Level 2:      16~::10          13~::14
Level 3:  11~8      5~4      7~12      3~1
Level 4: 9~2  6~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 7, 12, 3, 1, 9, 2, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 14, 16, 16)

Hereditary worst-case heap # 264

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^8      5^^^^^^4      7^^^^^^12      3^^^^^^1
Level 4:  9^^11  6^^^2

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 7, 12, 3, 1, 9, 11, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 14, 16, 16, 17)

Hereditary worst-case heap # 265

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17      5^^^^^^4      7^^^^^^12      3^^^^^^1
Level 4:  9^^11  6^^^8  2^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 7, 12, 3, 1, 9, 11, 6, 8, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 14, 16, 16, 17, 19)

Hereditary worst-case heap # 266

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^8      5^^^^^^4      7^^^^^^12      3^^^^^^1
Level 4:  6^^^9  2^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 7, 12, 3, 1, 6, 9, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 14, 16, 17)

Hereditary worst-case heap # 267

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^8      5^^^^^^4      7^^^^^^12      3^^^^^^1
Level 4: 11^^^9    2^^6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 7, 12, 3, 1, 11, 9, 2, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 14, 16, 17, 16)

Hereditary worst-case heap # 268

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17      5^^^^^^4      7^^^^^^12      3^^^^^^1
Level 4: 11^^^9    8^^6    2^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 7, 12, 3, 1, 11, 9, 8, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 14, 16, 17, 16, 18)

Hereditary worst-case heap # 269

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          11^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      9^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  6^^^^^^8      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4: 1^^

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 6, 8, 5, 4, 7, 12, 2, 3, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 15)

Hereditary worst-case heap # 270

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   9^^^^^^8      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4: 1^^^6

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 5, 4, 7, 12, 2, 3, 1, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 15, 8)

Hereditary worst-case heap # 271

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^8      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4: 9^^^6  1^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 7, 12, 2, 3, 9, 6, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 15, 8, 16)

Hereditary worst-case heap # 272

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^8      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4: 9^^11  1^^^6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 7, 12, 2, 3, 9, 11, 1, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 15, 8, 16, 17)

Hereditary worst-case heap # 273

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4:  9^^11  8^^6  1^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 7, 12, 2, 3, 9, 11, 8, 6, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 15, 8, 16, 17, 18)

Hereditary worst-case heap # 274
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^8      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4:  1^^9  6^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 7, 12, 2, 3, 1, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 15, 8, 17)

Hereditary worst-case heap # 275
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^8      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4: 11^^9  6^^1

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 7, 12, 2, 3, 11, 9, 6, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 15, 8, 17, 16)

Hereditary worst-case heap # 276
 20-element heap level-by-level:

```

Level 0:                                20

```

```

Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4: 11^^^9   6^^^8   1^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 7, 12, 2, 3, 11, 9, 6, 8, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 15, 8, 17, 16, 19)

Hereditary worst-case heap # 277

17-element heap level-by-level:

```

Level 0:                      17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   9^^^^^^8      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4: 6^^^1

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 5, 4, 7, 12, 2, 3, 6, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 15, 16)

Hereditary worst-case heap # 278

18-element heap level-by-level:

```

Level 0:                      18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^8      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4: 9^^^1   6^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 7, 12, 2, 3, 9, 1, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 15, 16, 16)

Hereditary worst-case heap # 279

19-element heap level-by-level:

```

Level 0:                      19

```

```

Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^8      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4:  9^^11  6^^1

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 7, 12, 2, 3, 9, 11, 6, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 15, 16, 16, 17)

Hereditary worst-case heap # 280
 20-element heap level-by-level:

```

Level 0:          20
Level 1:      19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4:  9^^11  6^^8  1^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 7, 12, 2, 3, 9, 11, 6, 8, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 15, 16, 16, 17, 19)

Hereditary worst-case heap # 281
 18-element heap level-by-level:

```

Level 0:          18
Level 1:      17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^8      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4:  6^^9  1^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 7, 12, 2, 3, 6, 9, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 15, 16, 17)

Hereditary worst-case heap # 282
 19-element heap level-by-level:

```

Level 0:          19
Level 1:      18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15

```

```

Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   16^^^^^^8      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4: 11^^^9   1^^^6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 7, 12, 2, 3, 11, 9, 1, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 15, 16, 17, 16)

Hereditary worst-case heap # 283
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:      19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   16^^^^^^17      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4: 11^^^9   8^^^6   1^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 7, 12, 2, 3, 11, 9, 8, 6, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 12, 13, 15, 16, 17, 16, 18)

Hereditary worst-case heap # 284
 14-element heap level-by-level:

```

Level 0:              14
Level 1:      11^^^^^^^^^^^^^^^^13
Level 2:   9^^^^^^10      12^^^^^^3
Level 3: 6^^^8   5^^^4   2^^^7   1^^

```

14 heap: [14, 11, 13, 9, 10, 12, 3, 6, 8, 5, 4, 2, 7, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13)

Hereditary worst-case heap # 285
 15-element heap level-by-level:

```

Level 0:          15
Level 1:      11~14
Level 2:   9~10    13~3
Level 3: 6~8  5~4  12~7  1~2

```

15 heap: [15, 11, 14, 9, 10, 13, 3, 6, 8, 5, 4, 12, 7, 1, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12)

Hereditary worst-case heap # 286
 16-element heap level-by-level:

```

Level 0:          16
Level 1:      11~15
Level 2:   9~10    13~14
Level 3: 6~8  5~4  12~7  1~2
Level 4: 3~

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 6, 8, 5, 4, 12, 7, 1, 2, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 7)

Hereditary worst-case heap # 287
 17-element heap level-by-level:

```

Level 0:          17
Level 1:      16~15
Level 2:   11~10    13~14
Level 3:  9~8  5~4  12~7  1~2
Level 4: 3~6

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 5, 4, 12, 7, 1, 2, 3, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 7, 8)

Hereditary worst-case heap # 288
 18-element heap level-by-level:

```

Level 0:          18
Level 1:      17~15
Level 2:   16~10    13~14
Level 3: 11~8  5~4  12~7  1~2
Level 4: 9~6  3~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 12, 7, 1, 2, 9, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 7, 8, 16)

Hereditary worst-case heap # 289
 19-element heap level-by-level:

```

Level 0:                                     19
Level 1:          18~::~::~::~::~::~::~::~15
Level 2:      17~::~10          13~::~14
Level 3:  16~::8      5~::4      12~::7      1~::2
Level 4:  9~11  3~6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 12, 7, 1, 2, 9, 11, 3, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 7, 8, 16, 17)

Hereditary worst-case heap # 290
 20-element heap level-by-level:

```

Level 0:                                     20
Level 1:          19~::~::~::~::~::~::~15
Level 2:      18~::~10          13~::~14
Level 3:  16~::17      5~::4      12~::7      1~::2
Level 4:  9~11  8~6  3~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 12, 7, 1, 2, 9, 11, 8, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 7, 8, 16, 17, 18)

Hereditary worst-case heap # 291
 18-element heap level-by-level:

```

Level 0:                                     18
Level 1:          17~::~::~::~::~::~::~15
Level 2:      16~::~10          13~::~14
Level 3:  11~::8      5~::4      12~::7      1~::2
Level 4:  3~9  6~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 12, 7, 1, 2, 3, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 7, 8, 17)

Hereditary worst-case heap # 292
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18~15
Level 2:      17~10      13~14
Level 3:  16~8      5~4      12~7      1~2
Level 4: 11~9  6~3

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 12, 7, 1, 2, 11, 9, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 7, 8, 17, 16)

Hereditary worst-case heap # 293
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~15
Level 2:      18~10      13~14
Level 3:  16~17      5~4      12~7      1~2
Level 4: 11~9  6~8  3~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 12, 7, 1, 2, 11, 9, 6, 8, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 7, 8, 17, 16, 19)

Hereditary worst-case heap # 294
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~15
Level 2:      11~10      13~14
Level 3:  9~8      5~4      12~7      1~2
Level 4: 6~3

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 5, 4, 12, 7, 1, 2, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 7, 16)

Hereditary worst-case heap # 295
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~::~::~15
Level 2:      16~::~::~10          13~::~::~14
Level 3:  11~::8      5~::4      12~::7      1~::2
Level 4:  9~3  6~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 12, 7, 1, 2, 9, 3, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 7, 16, 16)

Hereditary worst-case heap # 296
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18~::~::~::~::~15
Level 2:      17~::~::~10          13~::~::~14
Level 3:  16~::8      5~::4      12~::7      1~::2
Level 4:  9~11  6~3

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 12, 7, 1, 2, 9, 11, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 7, 16, 16, 17)

Hereditary worst-case heap # 297
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~::~::~15
Level 2:      18~::~::~10          13~::~::~14
Level 3:  16~::17      5~::4      12~::7      1~::2
Level 4:  9~11  6~8  3~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 12, 7, 1, 2, 9, 11, 6, 8, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 7, 16, 16, 17, 19)

Hereditary worst-case heap # 298

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~::~::~::~::~::~15
Level 2:      16~::~::~10~::~13~::~14
Level 3:  11~::8      5~::4      12~::7      1~::2
Level 4:  6~9      3~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 12, 7, 1, 2, 6, 9, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 7, 16, 17)

Hereditary worst-case heap # 299

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18~::~::~::~::~::~::~::~15
Level 2:      17~::~10~::~13~::~14
Level 3:  16~::8      5~::4      12~::7      1~::2
Level 4: 11~9      3~6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 12, 7, 1, 2, 11, 9, 3, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 7, 16, 17, 16)

Hereditary worst-case heap # 300

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~::~::~::~::~15
Level 2:      18~::~10~::~13~::~14
Level 3:  16~::17      5~::4      12~::7      1~::2
Level 4: 11~9      8~6      3~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 12, 7, 1, 2, 11, 9, 8, 6, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 7, 16, 17, 16, 18)

Hereditary worst-case heap # 301
16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15~::~::~::~::~14
Level 2:      11~::~10          13~::~3
Level 3:  9~::8      5~::4      12~::7      1~::2
Level 4:  6~

```

16 heap: [16, 15, 14, 11, 10, 13, 3, 9, 8, 5, 4, 12, 7, 1, 2, 6]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 8)

Hereditary worst-case heap # 302
17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~14
Level 2:      15~::~10          13~::~3
Level 3:  11~::8      5~::4      12~::7      1~::2
Level 4:  6~9

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 8, 5, 4, 12, 7, 1, 2, 6, 9]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 8, 8)

Hereditary worst-case heap # 303
18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~14
Level 2:      16~::~10          13~::~3
Level 3:  15~::8      5~::4      12~::7      1~::2
Level 4: 11~9      6~

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 8, 5, 4, 12, 7, 1, 2, 11, 9, 6]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 8, 8, 16)

Hereditary worst-case heap # 304

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~::~::~14
Level 2:      15~::~::~10          13~::~::~3
Level 3:  11~::~8      5~::~4      12~::~7      1~::~2
Level 4:  9~::6

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 8, 5, 4, 12, 7, 1, 2, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 8, 16)

Hereditary worst-case heap # 305

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~::~14
Level 2:      16~::~::~10          13~::~::~3
Level 3:  15~::~8      5~::~4      12~::~7      1~::~2
Level 4:  9~11  6~

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 8, 5, 4, 12, 7, 1, 2, 9, 11, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 8, 16, 17)

Hereditary worst-case heap # 306

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15~::~::~::~::~14
Level 2:      9~::~11          13~::~::~3
Level 3:  6~::~8      10~::~4      12~::~7      1~::~2
Level 4:  5~

```

16 heap: [16, 15, 14, 9, 11, 13, 3, 6, 8, 10, 4, 12, 7, 1, 2, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10)

Hereditary worst-case heap # 307

17-element heap level-by-level:

```

Level 0:                                17
Level 1:                    16^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:            15^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:    9^^^^^^8        10^^^^^^4        12^^^^^^7        1^^^^^^2
Level 4:    5^^^6

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 8, 10, 4, 12, 7, 1, 2, 5, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8)

Hereditary worst-case heap # 308

18-element heap level-by-level:

```

Level 0:                                18
Level 1:                    17^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:            16^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:    15^^^^^^8        10^^^^^^4        12^^^^^^7        1^^^^^^2
Level 4:    9^^^6    5^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 10, 4, 12, 7, 1, 2, 9, 6, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16)

Hereditary worst-case heap # 309

19-element heap level-by-level:

```

Level 0:                                19
Level 1:                    18^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:            17^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:    16^^^^^^8        10^^^^^^4        12^^^^^^7        1^^^^^^2
Level 4:    9^^15    5^^^6

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 10, 4, 12, 7, 1, 2, 9, 15, 5, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17)

Hereditary worst-case heap # 310

20-element heap level-by-level:

```

Level 0:                                20

```

```

Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^17      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:  9^^15   5^^6   8^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 12, 7, 1, 2, 9, 15, 5, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17, 9)

Hereditary worst-case heap # 311
 21-element heap level-by-level:

```

Level 0:                      21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  18^^^^^^17      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 16^^15   5^^6   8^^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 12, 7, 1, 2, 16, 15, 5, 6, 8, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17, 9, 16)

Hereditary worst-case heap # 312
 21-element heap level-by-level:

```

Level 0:                      21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:  9^^15  17^^6   8^^5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 9, 15, 17, 6, 8, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17, 9, 18)

Hereditary worst-case heap # 313
 21-element heap level-by-level:

```

Level 0:                      21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3

```

Level 3: 16^^^^^18 10^^^^^^4 12^^^^^^7 1^^^^^^2
 Level 4: 9^^15 5^^17 8^^6

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 9, 15, 5, 17, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17, 9, 19)

Hereditary worst-case heap # 314
 20-element heap level-by-level:

Level 0: 20
 Level 1: 19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
 Level 2: 18^^^^^^^^^^^^^^11 13^^^^^^^^^^^^^^3
 Level 3: 17^^^^^^8 10^^^^^^4 12^^^^^^7 1^^^^^^2
 Level 4: 16^^15 5^^6 9^^

20 heap: [20, 19, 14, 18, 11, 13, 3, 17, 8, 10, 4, 12, 7, 1, 2, 16, 15, 5, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17, 16)

Hereditary worst-case heap # 315
 21-element heap level-by-level:

Level 0: 21
 Level 1: 20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
 Level 2: 19^^^^^^^^^^^^^^11 13^^^^^^^^^^^^^^3
 Level 3: 17^^^^^^18 10^^^^^^4 12^^^^^^7 1^^^^^^2
 Level 4: 16^^15 5^^6 9^^8

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 12, 7, 1, 2, 16, 15, 5, 6, 9, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17, 16, 9)

Hereditary worst-case heap # 316
 21-element heap level-by-level:

Level 0: 21
 Level 1: 20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
 Level 2: 19^^^^^^^^^^^^^^11 13^^^^^^^^^^^^^^3
 Level 3: 17^^^^^^18 10^^^^^^4 12^^^^^^7 1^^^^^^2

Level 4: 16^^15 8^^^6 9^^^5

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 12, 7, 1, 2, 16, 15, 8, 6, 9, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17, 16, 18)

Hereditary worst-case heap # 317

21-element heap level-by-level:

```

Level 0:                                21
Level 1:                20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:        19^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:    17^^^^^^18        10^^^^^^4        12^^^^^^7        1^^^^^^2
Level 4: 16^^15    5^^^8    9^^^6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 12, 7, 1, 2, 16, 15, 5, 8, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17, 16, 19)

Hereditary worst-case heap # 318

20-element heap level-by-level:

```

Level 0:                                20
Level 1:                19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:        18^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:    16^^^^^^17        10^^^^^^4        12^^^^^^7        1^^^^^^2
Level 4: 9^^15    8^^^6    5^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 12, 7, 1, 2, 9, 15, 8, 6, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17, 18)

Hereditary worst-case heap # 319

21-element heap level-by-level:

```

Level 0:                                21
Level 1:                20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:        19^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:    18^^^^^^17        10^^^^^^4        12^^^^^^7        1^^^^^^2
Level 4: 16^^15    8^^^6    5^^^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 12, 7, 1, 2, 16, 15, 8, 6, 5, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17, 18, 16)

Hereditary worst-case heap # 320
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4:  9~~15  17~~~6   5~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 9, 15, 17, 6, 5, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17, 18, 18)

Hereditary worst-case heap # 321
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4:  9~~15   8~~17   5~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 9, 15, 8, 17, 5, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17, 18, 19)

Hereditary worst-case heap # 322
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~~~~~14
Level 2:      18~~~~~11          13~~~~~3
Level 3:  16~~~~~17      10~~~~~4      12~~~~~7      1~~~~~2
Level 4:  9~~15   5~~~8   6~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 12, 7, 1, 2, 9, 15, 5, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17, 19)

Hereditary worst-case heap # 323
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  18^^^^^^17      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 16^^15   5^^8   6^^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 12, 7, 1, 2, 16, 15, 5, 8, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17, 19, 16)

Hereditary worst-case heap # 324
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:  9^^15   17^^8   6^^5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 9, 15, 17, 8, 6, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17, 19, 18)

Hereditary worst-case heap # 325
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:  9^^15   5^^17   6^^8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 9, 15, 5, 17, 6, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 16, 17, 19, 19)

Hereditary worst-case heap # 326

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~~~~~14
Level 2:      16~~~~~11          13~~~~~3
Level 3:  15~~~~~8      10~~~~~4      12~~~~~7      1~~~~~2
Level 4:  5~~~~9  6~~

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 10, 4, 12, 7, 1, 2, 5, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17)

Hereditary worst-case heap # 327

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18~~~~~14
Level 2:      17~~~~~11          13~~~~~3
Level 3:  16~~~~~8      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~~~9  6~~~~5

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 10, 4, 12, 7, 1, 2, 15, 9, 6, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16)

Hereditary worst-case heap # 328

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~~~~~14
Level 2:      18~~~~~11          13~~~~~3
Level 3:  16~~~~~17      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~~~9  6~~~~5  8~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 12, 7, 1, 2, 15, 9, 6, 5, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16, 9)

Hereditary worst-case heap # 329

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  18^^^^^^17      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 15^^16   6^^^5   8^^^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 12, 7, 1, 2, 15, 16, 6, 5, 8, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16, 9, 17)

Hereditary worst-case heap # 330

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 15^^^9  17^^^5   8^^^6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 15, 9, 17, 5, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16, 9, 18)

Hereditary worst-case heap # 331

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 15^^^9   6^^17   8^^^5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 15, 9, 6, 17, 8, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16, 9, 19)

Hereditary worst-case heap # 332

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:      18~~~~~11          13~~~~~3
Level 3:  17~~~~~8      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~16   6~~~5   9~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 17, 8, 10, 4, 12, 7, 1, 2, 15, 16, 6, 5, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16, 17)

Hereditary worst-case heap # 333

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  17~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~16   6~~~5   9~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 12, 7, 1, 2, 15, 16, 6, 5, 9, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16, 17, 9)

Hereditary worst-case heap # 334

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  17~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~16   8~~~5   9~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 12, 7, 1, 2, 15, 16, 8, 5, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16, 17, 18)

Hereditary worst-case heap # 335

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  17~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~16   6~~8   9~~5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 12, 7, 1, 2, 15, 16, 6, 8, 9, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16, 17, 19)

Hereditary worst-case heap # 336

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:      18~~~~~11          13~~~~~3
Level 3:  16~~~~~17      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~9    8~~5    6~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 12, 7, 1, 2, 15, 9, 8, 5, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16, 18)

Hereditary worst-case heap # 337

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~16   8~~5   6~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 12, 7, 1, 2, 15, 16, 8, 5, 6, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16, 18, 17)

Hereditary worst-case heap # 338

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~~9  17~~~5  6~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 15, 9, 17, 5, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16, 18, 18)

Hereditary worst-case heap # 339

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~~9   8~~17  6~~~5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 15, 9, 8, 17, 6, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16, 18, 19)

Hereditary worst-case heap # 340

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:      18~~~~~11          13~~~~~3
Level 3:  16~~~~~17      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~~9   6~~~8   5~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 12, 7, 1, 2, 15, 9, 6, 8, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16, 19)

Hereditary worst-case heap # 341

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  18~~~~~17    10~~~~~4    12~~~~~7    1~~~~~2
Level 4: 15~~16    6~~~8    5~~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 12, 7, 1, 2, 15, 16, 6, 8, 5, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16, 19, 17)

Hereditary worst-case heap # 342
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  16~~~~~18    10~~~~~4    12~~~~~7    1~~~~~2
Level 4: 15~~~9  17~~~8    5~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 15, 9, 17, 8, 5, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16, 19, 18)

Hereditary worst-case heap # 343
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  16~~~~~18    10~~~~~4    12~~~~~7    1~~~~~2
Level 4: 15~~~9    6~~17    5~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 15, 9, 6, 17, 5, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 8, 17, 16, 19, 19)

Hereditary worst-case heap # 344

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  9^^^^^^8      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 6^^^5

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 8, 10, 4, 12, 7, 1, 2, 6, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16)

Hereditary worst-case heap # 345

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^8      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 9^^^5  6^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 10, 4, 12, 7, 1, 2, 9, 5, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16)

Hereditary worst-case heap # 346

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^8      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 9^^15  6^^^5

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 10, 4, 12, 7, 1, 2, 9, 15, 6, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17)

Hereditary worst-case heap # 347

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~::~::~::~14
Level 2:      18~::~11          13~::~3
Level 3:  16~::17      10~::4      12~::7      1~::2
Level 4:  9~15   6~5   8~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 12, 7, 1, 2, 9, 15, 6, 5, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17, 9)

Hereditary worst-case heap # 348

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~::~::~::~::~14
Level 2:      19~::~11          13~::~3
Level 3:  18~::17      10~::4      12~::7      1~::2
Level 4: 16~15   6~5   8~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 12, 7, 1, 2, 16, 15, 6, 5, 8, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17, 9, 16)

Hereditary worst-case heap # 349

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~::~::~::~::~14
Level 2:      19~::~11          13~::~3
Level 3:  16~::18      10~::4      12~::7      1~::2
Level 4:  9~15   17~5   8~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 9, 15, 17, 5, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17, 9, 18)

Hereditary worst-case heap # 350

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~::~::~::~::~14

```

```

Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^18      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:  9^^15   6^^17   8^^5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 9, 15, 6, 17, 8, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17, 9, 19)

Hereditary worst-case heap # 351
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:      19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   17^^^^^^8      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 16^^15   6^^5   9^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 17, 8, 10, 4, 12, 7, 1, 2, 16, 15, 6, 5, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17, 16)

Hereditary worst-case heap # 352
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   17^^^^^^18      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 16^^15   6^^5   9^^8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 12, 7, 1, 2, 16, 15, 6, 5, 9, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17, 16, 9)

Hereditary worst-case heap # 353
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3

```

Level 3: 17~~~~~18 10~~~~~4 12~~~~~7 1~~~~~2
 Level 4: 16~~15 8~~~5 9~~~6

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 12, 7, 1, 2, 16, 15, 8, 5, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17, 16, 18)

Hereditary worst-case heap # 354
 21-element heap level-by-level:

Level 0: 21
 Level 1: 20~~~~~14
 Level 2: 19~~~~~11 13~~~~~3
 Level 3: 17~~~~~18 10~~~~~4 12~~~~~7 1~~~~~2
 Level 4: 16~~15 6~~~8 9~~~5

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 12, 7, 1, 2, 16, 15, 6, 8, 9, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17, 16, 19)

Hereditary worst-case heap # 355
 20-element heap level-by-level:

Level 0: 20
 Level 1: 19~~~~~14
 Level 2: 18~~~~~11 13~~~~~3
 Level 3: 16~~~~~17 10~~~~~4 12~~~~~7 1~~~~~2
 Level 4: 9~~15 8~~~5 6~~

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 12, 7, 1, 2, 9, 15, 8, 5, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17, 18)

Hereditary worst-case heap # 356
 21-element heap level-by-level:

Level 0: 21
 Level 1: 20~~~~~14
 Level 2: 19~~~~~11 13~~~~~3
 Level 3: 18~~~~~17 10~~~~~4 12~~~~~7 1~~~~~2

Level 4: 16¹⁵ 8⁵ 6⁹

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 12, 7, 1, 2, 16, 15, 8, 5, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17, 18, 16)

Hereditary worst-case heap # 357

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4:  915 175 68

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 9, 15, 17, 5, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17, 18, 18)

Hereditary worst-case heap # 358

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4:  915 817 65

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 9, 15, 8, 17, 6, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17, 18, 19)

Hereditary worst-case heap # 359

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~~~~~14
Level 2:      18~~~~~11          13~~~~~3
Level 3:  16~~~~~17      10~~~~~4      12~~~~~7      1~~~~~2

```

Level 4: 9¹⁵ 6⁸ 5¹

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 12, 7, 1, 2, 9, 15, 6, 8, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17, 19)

Hereditary worst-case heap # 360

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 1615 68 59

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 12, 7, 1, 2, 16, 15, 6, 8, 5, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17, 19, 16)

Hereditary worst-case heap # 361

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 915 178 56

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 9, 15, 17, 8, 5, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17, 19, 18)

Hereditary worst-case heap # 362

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 915 617 58

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 9, 15, 6, 17, 5, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 16, 17, 19, 19)

Hereditary worst-case heap # 363
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~14
Level 2:      16~11          13~3
Level 3:  15~8      10~4      12~7      1~2
Level 4:  6~9      5~

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 10, 4, 12, 7, 1, 2, 6, 9, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17)

Hereditary worst-case heap # 364
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18~14
Level 2:      17~11          13~3
Level 3:  16~8      10~4      12~7      1~2
Level 4: 15~9      5~6

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 10, 4, 12, 7, 1, 2, 15, 9, 5, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16)

Hereditary worst-case heap # 365
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~14
Level 2:      18~11          13~3
Level 3:  16~17      10~4      12~7      1~2
Level 4: 15~9      5~6      8~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 12, 7, 1, 2, 15, 9, 5, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16, 9)

Hereditary worst-case heap # 366
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~16   5~~~6   8~~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 12, 7, 1, 2, 15, 16, 5, 6, 8, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16, 9, 17)

Hereditary worst-case heap # 367
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~~9  17~~~6   8~~~5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 15, 9, 17, 6, 8, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16, 9, 18)

Hereditary worst-case heap # 368
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~~9   5~~17   8~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 15, 9, 5, 17, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16, 9, 19)

Hereditary worst-case heap # 369
 20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~14
Level 2:      18~11      13~3
Level 3:  17~8      10~4      12~7      1~2
Level 4: 15~16   5~6   9~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 17, 8, 10, 4, 12, 7, 1, 2, 15, 16, 5, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16, 17)

Hereditary worst-case heap # 370
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~14
Level 2:      19~11      13~3
Level 3:  17~18      10~4      12~7      1~2
Level 4: 15~16   5~6   9~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 12, 7, 1, 2, 15, 16, 5, 6, 9, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16, 17, 9)

Hereditary worst-case heap # 371
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~14
Level 2:      19~11      13~3
Level 3:  17~18      10~4      12~7      1~2
Level 4: 15~16   8~6   9~5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 12, 7, 1, 2, 15, 16, 8, 6, 9, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16, 17, 18)

Hereditary worst-case heap # 372

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  17~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~16   5~~~8   9~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 4, 12, 7, 1, 2, 15, 16, 5, 8, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16, 17, 19)

Hereditary worst-case heap # 373

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:      18~~~~~11          13~~~~~3
Level 3:  16~~~~~17      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~~9   8~~~6   5~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 12, 7, 1, 2, 15, 9, 8, 6, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16, 18)

Hereditary worst-case heap # 374

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~16   8~~~6   5~~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 12, 7, 1, 2, 15, 16, 8, 6, 5, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16, 18, 17)

Hereditary worst-case heap # 375

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~~9  17~~~6  5~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 15, 9, 17, 6, 5, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16, 18, 18)

Hereditary worst-case heap # 376

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~~9   8~~17  5~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 15, 9, 8, 17, 5, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16, 18, 19)

Hereditary worst-case heap # 377

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:      18~~~~~11          13~~~~~3
Level 3:  16~~~~~17      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~~9   5~~~8   6~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 4, 12, 7, 1, 2, 15, 9, 5, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16, 19)

Hereditary worst-case heap # 378

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~16   5~~8   6~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 4, 12, 7, 1, 2, 15, 16, 5, 8, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16, 19, 17)

Hereditary worst-case heap # 379

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~~9  17~~~8   6~~5

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 15, 9, 17, 8, 6, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16, 19, 18)

Hereditary worst-case heap # 380

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~4      12~~~~~7      1~~~~~2
Level 4: 15~~~9   5~~17   6~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 4, 12, 7, 1, 2, 15, 9, 5, 17, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 10, 16, 17, 16, 19, 19)

Hereditary worst-case heap # 381
16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15~::~::~::~::~14
Level 2:      9~::~11~::13~::~3
Level 3:  6~::8~::5~::10~::12~::7~::1~::2
Level 4:  4~^

```

16 heap: [16, 15, 14, 9, 11, 13, 3, 6, 8, 5, 10, 12, 7, 1, 2, 4]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 11)

Hereditary worst-case heap # 382
17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~14
Level 2:      15~::~11~::13~::~3
Level 3:  9~::8~::5~::10~::12~::7~::1~::2
Level 4:  4~^6

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 8, 5, 10, 12, 7, 1, 2, 4, 6]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 11, 8)

Hereditary worst-case heap # 383
18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~14
Level 2:      16~::~11~::13~::~3
Level 3:  15~::8~::5~::10~::12~::7~::1~::2
Level 4:  9~^6  4~^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 5, 10, 12, 7, 1, 2, 9, 6, 4]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 11, 8, 16)

Hereditary worst-case heap # 384

19-element heap level-by-level:

```

Level 0:                      19
Level 1:          18~14
Level 2:      17~11          13~3
Level 3:  16~8      5~10      12~7      1~2
Level 4:  9~15  4~6

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 5, 10, 12, 7, 1, 2, 9, 15, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 11, 8, 16, 17)

Hereditary worst-case heap # 385

20-element heap level-by-level:

```

Level 0:                      20
Level 1:          19~14
Level 2:      18~11          13~3
Level 3:  16~17      5~10      12~7      1~2
Level 4:  9~15  8~6  4~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 5, 10, 12, 7, 1, 2, 9, 15, 8, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 11, 8, 16, 17, 18)

Hereditary worst-case heap # 386

18-element heap level-by-level:

```

Level 0:                      18
Level 1:          17~14
Level 2:      16~11          13~3
Level 3:  15~8      5~10      12~7      1~2
Level 4:  4~9  6~

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 5, 10, 12, 7, 1, 2, 4, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 11, 8, 17)

Hereditary worst-case heap # 387

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^8      5^^^^^^10      12^^^^^^7      1^^^^^^2
Level 4: 15^^^9   6^^^4

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 5, 10, 12, 7, 1, 2, 15, 9, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 11, 8, 17, 16)

Hereditary worst-case heap # 388
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^17      5^^^^^^10      12^^^^^^7      1^^^^^^2
Level 4: 15^^^9   6^^^8   4^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 5, 10, 12, 7, 1, 2, 15, 9, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 11, 8, 17, 16, 19)

Hereditary worst-case heap # 389
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   9^^^^^^8      5^^^^^^10      12^^^^^^7      1^^^^^^2
Level 4:  6^^^4

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 8, 5, 10, 12, 7, 1, 2, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 11, 16)

Hereditary worst-case heap # 390
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^8      5^^^^^^10      12^^^^^^7      1^^^^^^2
Level 4:  9^^^4    6^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 5, 10, 12, 7, 1, 2, 9, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 11, 16, 16)

Hereditary worst-case heap # 391
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^8      5^^^^^^10      12^^^^^^7      1^^^^^^2
Level 4:  9^^15    6^^^4

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 5, 10, 12, 7, 1, 2, 9, 15, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 11, 16, 16, 17)

Hereditary worst-case heap # 392
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^17      5^^^^^^10      12^^^^^^7      1^^^^^^2
Level 4:  9^^15    6^^^8    4^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 5, 10, 12, 7, 1, 2, 9, 15, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 11, 16, 16, 17, 19)

Hereditary worst-case heap # 393
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^8      5^^^^^^10      12^^^^^^7      1^^^^^^2
Level 4:  6^^^9   4^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 5, 10, 12, 7, 1, 2, 6, 9, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 11, 16, 17)

Hereditary worst-case heap # 394

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^8      5^^^^^^10      12^^^^^^7      1^^^^^^2
Level 4: 15^^^9   4^^6

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 5, 10, 12, 7, 1, 2, 15, 9, 4, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 11, 16, 17, 16)

Hereditary worst-case heap # 395

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^17      5^^^^^^10      12^^^^^^7      1^^^^^^2
Level 4: 15^^^9   8^^6   4^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 5, 10, 12, 7, 1, 2, 15, 9, 8, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 11, 16, 17, 16, 18)

Hereditary worst-case heap # 396

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          11^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      9^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  6^^^^^^8      5^^^^^^4      12^^^^^^7      3^^^^^^2
Level 4:  1^^

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 6, 8, 5, 4, 12, 7, 3, 2, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 14)

Hereditary worst-case heap # 397
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  9^^^^^^8      5^^^^^^4      12^^^^^^7      3^^^^^^2
Level 4:  1^^^6

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 5, 4, 12, 7, 3, 2, 1, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 14, 8)

Hereditary worst-case heap # 398
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^8      5^^^^^^4      12^^^^^^7      3^^^^^^2
Level 4:  9^^^6  1^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 12, 7, 3, 2, 9, 6, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 14, 8, 16)

Hereditary worst-case heap # 399
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14

```

Level 3: 16~~~~~8 5~~~~~4 12~~~~~7 3~~~~~2
 Level 4: 9~~11 1~~~6

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 12, 7, 3, 2, 9, 11, 1, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 14, 8, 16, 17)

Hereditary worst-case heap # 400
 20-element heap level-by-level:

Level 0: 20
 Level 1: 19~~~~~15
 Level 2: 18~~~~~10 13~~~~~14
 Level 3: 16~~~~~17 5~~~~~4 12~~~~~7 3~~~~~2
 Level 4: 9~~11 8~~~6 1~~~

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 12, 7, 3, 2, 9, 11, 8, 6, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 14, 8, 16, 17, 18)

Hereditary worst-case heap # 401
 18-element heap level-by-level:

Level 0: 18
 Level 1: 17~~~~~15
 Level 2: 16~~~~~10 13~~~~~14
 Level 3: 11~~~~~8 5~~~~~4 12~~~~~7 3~~~~~2
 Level 4: 1~~~9 6~~~

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 12, 7, 3, 2, 1, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 14, 8, 17)

Hereditary worst-case heap # 402
 19-element heap level-by-level:

Level 0: 19
 Level 1: 18~~~~~15
 Level 2: 17~~~~~10 13~~~~~14
 Level 3: 16~~~~~8 5~~~~~4 12~~~~~7 3~~~~~2

Level 4: 11^^^9 6^^^1

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 12, 7, 3, 2, 11, 9, 6, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 14, 8, 17, 16)

Hereditary worst-case heap # 403
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17      5^^^^^^4      12^^^^^^7      3^^^^^^2
Level 4: 11^^^9  6^^^8  1^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 12, 7, 3, 2, 11, 9, 6, 8, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 14, 8, 17, 16, 19)

Hereditary worst-case heap # 404
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   9^^^^^^8      5^^^^^^4      12^^^^^^7      3^^^^^^2
Level 4: 6^^^1

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 5, 4, 12, 7, 3, 2, 6, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 14, 16)

Hereditary worst-case heap # 405
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^8      5^^^^^^4      12^^^^^^7      3^^^^^^2

```

Level 4: 9¹¹ 6¹

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 12, 7, 3, 2, 9, 1, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 14, 16, 16)

Hereditary worst-case heap # 406

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18~15
Level 2:      17~10          13~14
Level 3:  16~8      5~4      12~7      3~2
Level 4:  9~11  6~1

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 12, 7, 3, 2, 9, 11, 6, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 14, 16, 16, 17)

Hereditary worst-case heap # 407

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~15
Level 2:      18~10          13~14
Level 3:  16~17      5~4      12~7      3~2
Level 4:  9~11  6~8  1~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 12, 7, 3, 2, 9, 11, 6, 8, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 14, 16, 16, 17, 19)

Hereditary worst-case heap # 408

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~15
Level 2:      16~10          13~14
Level 3:  11~8      5~4      12~7      3~2
Level 4:  6~9  1~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 12, 7, 3, 2, 6, 9, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 14, 16, 17)

Hereditary worst-case heap # 409
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^10                13^^^^^^^^^^^^14
Level 3:  16^^^^^^8      5^^^^^^4      12^^^^^^7      3^^^^^^2
Level 4: 11^^^9   1^^^6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 12, 7, 3, 2, 11, 9, 1, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 14, 16, 17, 16)

Hereditary worst-case heap # 410
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^10                13^^^^^^^^^^^^14
Level 3:  16^^^^^^17      5^^^^^^4      12^^^^^^7      3^^^^^^2
Level 4: 11^^^9   8^^^6   1^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 12, 7, 3, 2, 11, 9, 8, 6, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 14, 16, 17, 16, 18)

Hereditary worst-case heap # 411
 16-element heap level-by-level:

```

Level 0:                                16
Level 1:          11^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      9^^^^^^^^^^^^10                13^^^^^^^^^^^^14
Level 3:  6^^^^^^8      5^^^^^^4      12^^^^^^7      1^^^^^^3

```

Level 4: 2^^

16 heap: [16, 11, 15, 9, 10, 13, 14, 6, 8, 5, 4, 12, 7, 1, 3, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 15)

Hereditary worst-case heap # 412

17-element heap level-by-level:

```

Level 0:                                     17
Level 1:                        16^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:           11^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:    9^^^^^^8      5^^^^^^4      12^^^^^^7      1^^^^^^3
Level 4:  2^^^6

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 5, 4, 12, 7, 1, 3, 2, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 15, 8)

Hereditary worst-case heap # 413

18-element heap level-by-level:

```

Level 0:                                     18
Level 1:                        17^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:           16^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:    11^^^^^^8      5^^^^^^4      12^^^^^^7      1^^^^^^3
Level 4:  9^^^6   2^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 12, 7, 1, 3, 9, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 15, 8, 16)

Hereditary worst-case heap # 414

19-element heap level-by-level:

```

Level 0:                                     19
Level 1:                        18^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:           17^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:    16^^^^^^8      5^^^^^^4      12^^^^^^7      1^^^^^^3
Level 4:  9^^11   2^^^6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 12, 7, 1, 3, 9, 11, 2, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 15, 8, 16, 17)

Hereditary worst-case heap # 415

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~15
Level 2:      18~10      13~14
Level 3:  16~17      5~4      12~7      1~3
Level 4:  9~11  8~6  2~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 12, 7, 1, 3, 9, 11, 8, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 15, 8, 16, 17, 18)

Hereditary worst-case heap # 416

18-element heap level-by-level:

```

Level 0:                18
Level 1:          17~15
Level 2:      16~10      13~14
Level 3:  11~8      5~4      12~7      1~3
Level 4:  2~9  6~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 12, 7, 1, 3, 2, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 15, 8, 17)

Hereditary worst-case heap # 417

19-element heap level-by-level:

```

Level 0:                19
Level 1:          18~15
Level 2:      17~10      13~14
Level 3:  16~8      5~4      12~7      1~3
Level 4: 11~9  6~2

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 12, 7, 1, 3, 11, 9, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 15, 8, 17, 16)

Hereditary worst-case heap # 418

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~15
Level 2:    18~10      13~14
Level 3:  16~17      5~4      12~7      1~3
Level 4: 11~9   6~8   2~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 12, 7, 1, 3, 11, 9, 6, 8, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 15, 8, 17, 16, 19)

Hereditary worst-case heap # 419

17-element heap level-by-level:

```

Level 0:                17
Level 1:          16~15
Level 2:    11~10      13~14
Level 3:   9~8      5~4      12~7      1~3
Level 4: 6~2

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 5, 4, 12, 7, 1, 3, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 15, 16)

Hereditary worst-case heap # 420

18-element heap level-by-level:

```

Level 0:                18
Level 1:          17~15
Level 2:    16~10      13~14
Level 3:  11~8      5~4      12~7      1~3
Level 4: 9~2   6~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 12, 7, 1, 3, 9, 2, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 15, 16, 16)

Hereditary worst-case heap # 421

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^8      5^^^^^^4      12^^^^^^7      1^^^^^^3
Level 4:  9^^11  6^^2

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 12, 7, 1, 3, 9, 11, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 15, 16, 16, 17)

Hereditary worst-case heap # 422

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17      5^^^^^^4      12^^^^^^7      1^^^^^^3
Level 4:  9^^11  6^^8  2^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 12, 7, 1, 3, 9, 11, 6, 8, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 15, 16, 16, 17, 19)

Hereditary worst-case heap # 423

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^8      5^^^^^^4      12^^^^^^7      1^^^^^^3
Level 4:  6^^9  2^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 5, 4, 12, 7, 1, 3, 6, 9, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 15, 16, 17)

Hereditary worst-case heap # 424

19-element heap level-by-level:

```

Level 0:                      19
Level 1:          18~15
Level 2:      17~10          13~14
Level 3:  16~8      5~4      12~7      1~3
Level 4: 11~9  2~6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 5, 4, 12, 7, 1, 3, 11, 9, 2, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 15, 16, 17, 16)

Hereditary worst-case heap # 425

20-element heap level-by-level:

```

Level 0:                      20
Level 1:          19~15
Level 2:      18~10          13~14
Level 3:  16~17      5~4      12~7      1~3
Level 4: 11~9  8~6  2~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 5, 4, 12, 7, 1, 3, 11, 9, 8, 6, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 8, 9, 10, 12, 13, 12, 15, 16, 17, 16, 18)

Hereditary worst-case heap # 426

10-element heap level-by-level:

```

Level 0:          10
Level 1:      9~7
Level 2:  8~5      2~3

```

Level 3: 1^^^6 4^^

10 heap: [10, 9, 7, 8, 5, 2, 3, 1, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9)

Hereditary worst-case heap # 427

11-element heap level-by-level:

Level 0: 11

Level 1: 10^^^^^^^^^^^^^^^^^7

Level 2: 9^^^^^^5 2^^^^^^3

Level 3: 8^^^6 4^^^1

11 heap: [11, 10, 7, 9, 5, 2, 3, 8, 6, 4, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8)

Hereditary worst-case heap # 428

12-element heap level-by-level:

Level 0: 12

Level 1: 11^^^^^^^^^^^^^^^^^7

Level 2: 9^^^^^^10 2^^^^^^3

Level 3: 8^^^6 4^^^5 1^^

12 heap: [12, 11, 7, 9, 10, 2, 3, 8, 6, 4, 5, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11)

Hereditary worst-case heap # 429

13-element heap level-by-level:

Level 0: 13

Level 1: 11^^^^^^^^^^^^^^^^^12

Level 2: 9^^^^^^10 7^^^^^^3

Level 3: 8^^^6 4^^^5 2^^^1

13 heap: [13, 11, 12, 9, 10, 7, 3, 8, 6, 4, 5, 2, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12)

Hereditary worst-case heap # 430

14-element heap level-by-level:

```

Level 0:          14
Level 1:      11~13
Level 2:   9~10    12~3
Level 3: 8~6  4~5  7~1  2~

```

14 heap: [14, 11, 13, 9, 10, 12, 3, 8, 6, 4, 5, 7, 1, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12)

Hereditary worst-case heap # 431

15-element heap level-by-level:

```

Level 0:          15
Level 1:      11~14
Level 2:   9~10    13~3
Level 3: 8~6  4~5  7~12  2~1

```

15 heap: [15, 11, 14, 9, 10, 13, 3, 8, 6, 4, 5, 7, 12, 2, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13)

Hereditary worst-case heap # 432

16-element heap level-by-level:

```

Level 0:          16
Level 1:      11~15
Level 2:   9~10    13~14
Level 3: 8~6  4~5  7~12  2~1
Level 4: 3~

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 8, 6, 4, 5, 7, 12, 2, 1, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 7)

Hereditary worst-case heap # 433

17-element heap level-by-level:

```

Level 0:          17
Level 1:      16~15
Level 2:   11~10    13~14
Level 3:  9~6  4~5  7~12  2~1
Level 4: 3~8

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 4, 5, 7, 12, 2, 1, 3, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 7, 8)

Hereditary worst-case heap # 434
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^6      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  9^^^8   3^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 4, 5, 7, 12, 2, 1, 9, 8, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 7, 8, 16)

Hereditary worst-case heap # 435
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  9^^^^^^6      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  8^^^3

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 4, 5, 7, 12, 2, 1, 8, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 7, 16)

Hereditary worst-case heap # 436
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^6      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  8^^^9   3^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 4, 5, 7, 12, 2, 1, 8, 9, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 7, 16, 17)

Hereditary worst-case heap # 437

16-element heap level-by-level:

```

Level 0:                                     16
Level 1:                        15~::~::~::~::~::~::~::~::~14
Level 2:           11~::~::~10~::13~::~::~3
Level 3:    9~::6      4~::5      7~::12      2~::1
Level 4:  8^^

```

16 heap: [16, 15, 14, 11, 10, 13, 3, 9, 6, 4, 5, 7, 12, 2, 1, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 8)

Hereditary worst-case heap # 438

17-element heap level-by-level:

```

Level 0:                                     17
Level 1:                        16~::~::~::~::~::~::~::~14
Level 2:           15~::~::~10~::13~::~::~3
Level 3:    11~::6      4~::5      7~::12      2~::1
Level 4:  8^^9

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 6, 4, 5, 7, 12, 2, 1, 8, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 8, 8)

Hereditary worst-case heap # 439

17-element heap level-by-level:

```

Level 0:                                     17
Level 1:                        16~::~::~::~::~::~::~14
Level 2:           15~::~::~10~::13~::~::~3
Level 3:    11~::6      4~::5      7~::12      2~::1
Level 4:  9^^8

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 6, 4, 5, 7, 12, 2, 1, 9, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 8, 16)

Hereditary worst-case heap # 440
16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      11^^^^^^^^^^^^10              13^^^^^^^^^^^^3
Level 3:   8^^^^^^9      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 6^^

```

16 heap: [16, 15, 14, 11, 10, 13, 3, 8, 9, 4, 5, 7, 12, 2, 1, 6]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 9)

Hereditary worst-case heap # 441
17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^10              13^^^^^^^^^^^^3
Level 3:   11^^^^^^9      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 6^^8

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 9, 4, 5, 7, 12, 2, 1, 6, 8]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 9, 8)

Hereditary worst-case heap # 442
18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^10              13^^^^^^^^^^^^3
Level 3:   15^^^^^^9      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 11^^8  6^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 9, 4, 5, 7, 12, 2, 1, 11, 8, 6]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 9, 8, 16)

Hereditary worst-case heap # 443

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^9      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 11^^15    6^^8

```

19 heap: [19, 18, 14, 17, 10, 13, 3, 16, 9, 4, 5, 7, 12, 2, 1, 11, 15, 6, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 9, 8, 16, 17)

Hereditary worst-case heap # 444

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^9      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  6^^11    8^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 9, 4, 5, 7, 12, 2, 1, 6, 11, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 9, 8, 17)

Hereditary worst-case heap # 445

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^9      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 15^^11    8^^6

```

19 heap: [19, 18, 14, 17, 10, 13, 3, 16, 9, 4, 5, 7, 12, 2, 1, 15, 11, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 9, 8, 17, 16)

Hereditary worst-case heap # 446

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  11^^^^^^9      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  8^^^6

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 9, 4, 5, 7, 12, 2, 1, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 9, 16)

Hereditary worst-case heap # 447

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^9      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 11^^^6  8^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 9, 4, 5, 7, 12, 2, 1, 11, 6, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 9, 16, 16)

Hereditary worst-case heap # 448

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^9      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 11^^15  8^^^6

```

19 heap: [19, 18, 14, 17, 10, 13, 3, 16, 9, 4, 5, 7, 12, 2, 1, 11, 15, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 9, 16, 16, 17)

Hereditary worst-case heap # 449

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^9      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  8^^11  6^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 9, 4, 5, 7, 12, 2, 1, 8, 11, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 9, 16, 17)

Hereditary worst-case heap # 450

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^9      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 15^^11  6^^8

```

19 heap: [19, 18, 14, 17, 10, 13, 3, 16, 9, 4, 5, 7, 12, 2, 1, 15, 11, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 9, 16, 17, 16)

Hereditary worst-case heap # 451

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      9^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  8^^^^^^6      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  4^^

```

16 heap: [16, 15, 14, 9, 11, 13, 3, 8, 6, 10, 5, 7, 12, 2, 1, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 10)

Hereditary worst-case heap # 452

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   9^^^^^^6      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  4^^^8

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 6, 10, 5, 7, 12, 2, 1, 4, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 10, 8)

Hereditary worst-case heap # 453

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   15^^^^^^6      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  9^^^8   4^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 6, 10, 5, 7, 12, 2, 1, 9, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 10, 8, 16)

Hereditary worst-case heap # 454

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   9^^^^^^6      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  8^^^4

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 6, 10, 5, 7, 12, 2, 1, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 10, 16)

Hereditary worst-case heap # 455

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^6      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  8^^^9  4^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 6, 10, 5, 7, 12, 2, 1, 8, 9, 4]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 10, 16, 17)

Hereditary worst-case heap # 456
16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      9^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  8^^^^^^6      4^^^^^^10      7^^^^^^12      2^^^^^^1
Level 4:  5^^

```

16 heap: [16, 15, 14, 9, 11, 13, 3, 8, 6, 4, 10, 7, 12, 2, 1, 5]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 11)

Hereditary worst-case heap # 457
17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  9^^^^^^6      4^^^^^^10      7^^^^^^12      2^^^^^^1
Level 4:  5^^^8

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 6, 4, 10, 7, 12, 2, 1, 5, 8]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 11, 8)

Hereditary worst-case heap # 458
18-element heap level-by-level:

```

Level 0:                                18

```

```

Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^6      4^^^^^^10      7^^^^^^12      2^^^^^^1
Level 4:  9^^^8    5^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 6, 4, 10, 7, 12, 2, 1, 9, 8, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 11, 8, 16)

Hereditary worst-case heap # 459
 17-element heap level-by-level:

```

Level 0:                      17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  9^^^^^^6      4^^^^^^10      7^^^^^^12      2^^^^^^1
Level 4:  8^^^5

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 6, 4, 10, 7, 12, 2, 1, 8, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 11, 16)

Hereditary worst-case heap # 460
 18-element heap level-by-level:

```

Level 0:                      18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^6      4^^^^^^10      7^^^^^^12      2^^^^^^1
Level 4:  8^^^9    5^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 6, 4, 10, 7, 12, 2, 1, 8, 9, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 11, 16, 17)

Hereditary worst-case heap # 461
 16-element heap level-by-level:

```

Level 0:                                     16
Level 1:                        11~::~::~::~::~15
Level 2:                9~::~10                14~::~3
Level 3:    8~::6        4~::5        13~::12        2~::1
Level 4:  7~

```

16 heap: [16, 11, 15, 9, 10, 14, 3, 8, 6, 4, 5, 13, 12, 2, 1, 7]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 12)

Hereditary worst-case heap # 462

17-element heap level-by-level:

```

Level 0:                                     17
Level 1:                        16~::~::~::~15
Level 2:                11~::~10                14~::~3
Level 3:    9~::6        4~::5        13~::12        2~::1
Level 4:  7~^8

```

17 heap: [17, 16, 15, 11, 10, 14, 3, 9, 6, 4, 5, 13, 12, 2, 1, 7, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 12, 8)

Hereditary worst-case heap # 463

17-element heap level-by-level:

```

Level 0:                                     17
Level 1:                        16~::~::~::~15
Level 2:                11~::~10                14~::~3
Level 3:    9~::6        4~::5        13~::12        2~::1
Level 4:  8~^7

```

17 heap: [17, 16, 15, 11, 10, 14, 3, 9, 6, 4, 5, 13, 12, 2, 1, 8, 7]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 12, 16)

Hereditary worst-case heap # 464

16-element heap level-by-level:

```

Level 0:                                     16

```

```

Level 1:          11~15
Level 2:      9~10      13~14
Level 3:  8~6      4~5      7~12      3~1
Level 4:  2~

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 8, 6, 4, 5, 7, 12, 3, 1, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 14)

Hereditary worst-case heap # 465

17-element heap level-by-level:

```

Level 0:          17
Level 1:      16~15
Level 2:  11~10      13~14
Level 3:  9~6      4~5      7~12      3~1
Level 4:  2~8

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 4, 5, 7, 12, 3, 1, 2, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 14, 8)

Hereditary worst-case heap # 466

18-element heap level-by-level:

```

Level 0:          18
Level 1:      17~15
Level 2:  16~10      13~14
Level 3:  11~6      4~5      7~12      3~1
Level 4:  9~8  2~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 4, 5, 7, 12, 3, 1, 9, 8, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 14, 8, 16)

Hereditary worst-case heap # 467

17-element heap level-by-level:

```

Level 0:          17
Level 1:      16~15
Level 2:  11~10      13~14

```

Level 3: 9~~~~~6 4~~~~~5 7~~~~~12 3~~~~~1
 Level 4: 8~~~2

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 4, 5, 7, 12, 3, 1, 8, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 14, 16)

Hereditary worst-case heap # 468
 18-element heap level-by-level:

Level 0: 18
 Level 1: 17~~~~~15
 Level 2: 16~~~~~10 13~~~~~14
 Level 3: 11~~~~~6 4~~~~~5 7~~~~~12 3~~~~~1
 Level 4: 8~~~9 2~~

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 4, 5, 7, 12, 3, 1, 8, 9, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 14, 16, 17)

Hereditary worst-case heap # 469
 16-element heap level-by-level:

Level 0: 16
 Level 1: 11~~~~~15
 Level 2: 9~~~~~10 13~~~~~14
 Level 3: 8~~~~~6 4~~~~~5 7~~~~~12 2~~~~~3
 Level 4: 1~~

16 heap: [16, 11, 15, 9, 10, 13, 14, 8, 6, 4, 5, 7, 12, 2, 3, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 15)

Hereditary worst-case heap # 470
 17-element heap level-by-level:

Level 0: 17
 Level 1: 16~~~~~15
 Level 2: 11~~~~~10 13~~~~~14
 Level 3: 9~~~~~6 4~~~~~5 7~~~~~12 2~~~~~3

Level 4: 1^{^^^8}

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 4, 5, 7, 12, 2, 3, 1, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 15, 8)

Hereditary worst-case heap # 471

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^6      4^^^^^^5      7^^^^^^12      2^^^^^^3
Level 4:  9^^^^8  1^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 4, 5, 7, 12, 2, 3, 9, 8, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 15, 8, 16)

Hereditary worst-case heap # 472

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   9^^^^^^6      4^^^^^^5      7^^^^^^12      2^^^^^^3
Level 4:  8^^^^1

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 4, 5, 7, 12, 2, 3, 8, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 15, 16)

Hereditary worst-case heap # 473

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^6      4^^^^^^5      7^^^^^^12      2^^^^^^3
Level 4:  8^^^^9  1^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 4, 5, 7, 12, 2, 3, 8, 9, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 12, 13, 15, 16, 17)

Hereditary worst-case heap # 474

14-element heap level-by-level:

```

Level 0:          14
Level 1:      11~13
Level 2:   9~10      12~3
Level 3: 8~6  4~5  2~7  1~

```

14 heap: [14, 11, 13, 9, 10, 12, 3, 8, 6, 4, 5, 2, 7, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13)

Hereditary worst-case heap # 475

15-element heap level-by-level:

```

Level 0:          15
Level 1:      11~14
Level 2:   9~10      13~3
Level 3: 8~6  4~5  12~7  1~2

```

15 heap: [15, 11, 14, 9, 10, 13, 3, 8, 6, 4, 5, 12, 7, 1, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12)

Hereditary worst-case heap # 476

16-element heap level-by-level:

```

Level 0:          16
Level 1:      11~15
Level 2:   9~10      13~14
Level 3: 8~6  4~5  12~7  1~2
Level 4: 3~

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 8, 6, 4, 5, 12, 7, 1, 2, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 7)

Hereditary worst-case heap # 477

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  9^^^^^^6      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  3^^^8

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 4, 5, 12, 7, 1, 2, 3, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 7, 8)

Hereditary worst-case heap # 478

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^6      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  9^^^8   3^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 4, 5, 12, 7, 1, 2, 9, 8, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 7, 8, 16)

Hereditary worst-case heap # 479

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  9^^^^^^6      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  8^^^3

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 4, 5, 12, 7, 1, 2, 8, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 7, 16)

Hereditary worst-case heap # 480

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^6      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  8^^^9    3^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 4, 5, 12, 7, 1, 2, 8, 9, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 7, 16, 17)

Hereditary worst-case heap # 481

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      11^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^3
Level 3:  9^^^^^^6      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  8^^

```

16 heap: [16, 15, 14, 11, 10, 13, 3, 9, 6, 4, 5, 12, 7, 1, 2, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 8)

Hereditary worst-case heap # 482

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^3
Level 3:  11^^^^^^6      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  8^^^9

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 6, 4, 5, 12, 7, 1, 2, 8, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 8, 8)

Hereditary worst-case heap # 483

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  11^^^^^^6      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  9^^^8

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 6, 4, 5, 12, 7, 1, 2, 9, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 8, 16)

Hereditary worst-case heap # 484

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:   8^^^^^^9      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  6^^

```

16 heap: [16, 15, 14, 11, 10, 13, 3, 8, 9, 4, 5, 12, 7, 1, 2, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 9)

Hereditary worst-case heap # 485

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  11^^^^^^9      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  6^^^8

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 9, 4, 5, 12, 7, 1, 2, 6, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 9, 8)

Hereditary worst-case heap # 486

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^9      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 11^^8    6^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 9, 4, 5, 12, 7, 1, 2, 11, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 9, 8, 16)

Hereditary worst-case heap # 487
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^9      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 11^15    6^^8

```

19 heap: [19, 18, 14, 17, 10, 13, 3, 16, 9, 4, 5, 12, 7, 1, 2, 11, 15, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 9, 8, 16, 17)

Hereditary worst-case heap # 488
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^9      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 6^^11    8^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 9, 4, 5, 12, 7, 1, 2, 6, 11, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 9, 8, 17)

Hereditary worst-case heap # 489
 19-element heap level-by-level:

```

Level 0:                                19

```

```

Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^9      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 15^^11  8^^6

```

19 heap: [19, 18, 14, 17, 10, 13, 3, 16, 9, 4, 5, 12, 7, 1, 2, 15, 11, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 9, 8, 17, 16)

Hereditary worst-case heap # 490
 17-element heap level-by-level:

```

Level 0:          17
Level 1:      16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:  15^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  11^^^^^^9      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  8^^6

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 9, 4, 5, 12, 7, 1, 2, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 9, 16)

Hereditary worst-case heap # 491
 18-element heap level-by-level:

```

Level 0:          18
Level 1:      17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:  16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^9      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 11^^6  8^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 9, 4, 5, 12, 7, 1, 2, 11, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 9, 16, 16)

Hereditary worst-case heap # 492
 19-element heap level-by-level:

```

Level 0:          19
Level 1:      18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14

```

```

Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^9      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 11^^15   8^^6

```

19 heap: [19, 18, 14, 17, 10, 13, 3, 16, 9, 4, 5, 12, 7, 1, 2, 11, 15, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 9, 16, 16, 17)

Hereditary worst-case heap # 493
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:      17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:   16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^9      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  8^^11   6^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 9, 4, 5, 12, 7, 1, 2, 8, 11, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 9, 16, 17)

Hereditary worst-case heap # 494
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:      18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:   17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^9      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 15^^11   6^^8

```

19 heap: [19, 18, 14, 17, 10, 13, 3, 16, 9, 4, 5, 12, 7, 1, 2, 15, 11, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 9, 16, 17, 16)

Hereditary worst-case heap # 495
 16-element heap level-by-level:

```

Level 0:                                16
Level 1:                    15~::~::~::~::~::~::~::~::~14
Level 2:            9~::~::~11~::~13~::~3
Level 3:    8~::~6    10~::~5    12~::~7    1~::~2
Level 4:  4~

```

16 heap: [16, 15, 14, 9, 11, 13, 3, 8, 6, 10, 5, 12, 7, 1, 2, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 10)

Hereditary worst-case heap # 496

17-element heap level-by-level:

```

Level 0:                                17
Level 1:                    16~::~::~::~::~::~::~::~14
Level 2:            15~::~11~::~13~::~3
Level 3:    9~::~6    10~::~5    12~::~7    1~::~2
Level 4:  4~8

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 6, 10, 5, 12, 7, 1, 2, 4, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 10, 8)

Hereditary worst-case heap # 497

18-element heap level-by-level:

```

Level 0:                                18
Level 1:                    17~::~::~::~::~::~::~14
Level 2:            16~::~11~::~13~::~3
Level 3:    15~::~6    10~::~5    12~::~7    1~::~2
Level 4:  9~8    4~

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 6, 10, 5, 12, 7, 1, 2, 9, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 10, 8, 16)

Hereditary worst-case heap # 498

17-element heap level-by-level:

```

Level 0:                                17
Level 1:                    16~::~::~::~::~::~::~14

```

```

Level 2:      15^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:      9^^^^^^6      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:      8^^^4

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 6, 10, 5, 12, 7, 1, 2, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 10, 16)

Hereditary worst-case heap # 499

18-element heap level-by-level:

```

Level 0:                      18
Level 1:      17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:      15^^^^^^6      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:      8^^^9      4^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 6, 10, 5, 12, 7, 1, 2, 8, 9, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 10, 16, 17)

Hereditary worst-case heap # 500

16-element heap level-by-level:

```

Level 0:                      16
Level 1:      15^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      9^^^^^^6      11          13^^^^^^^^^^^^^^^^3
Level 3:      8^^^^^^6      4^^^^^^10      12^^^^^^7      1^^^^^^2
Level 4:      5^^

```

16 heap: [16, 15, 14, 9, 11, 13, 3, 8, 6, 4, 10, 12, 7, 1, 2, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 11)

Hereditary worst-case heap # 501

17-element heap level-by-level:

```

Level 0:                      17
Level 1:      16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3

```

Level 3: 9~~~~~6 4~~~~~10 12~~~~~7 1~~~~~2
 Level 4: 5~~~8

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 6, 4, 10, 12, 7, 1, 2, 5, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 11, 8)

Hereditary worst-case heap # 502
 18-element heap level-by-level:

Level 0: 18
 Level 1: 17~~~~~14
 Level 2: 16~~~~~11 13~~~~~3
 Level 3: 15~~~~~6 4~~~~~10 12~~~~~7 1~~~~~2
 Level 4: 9~~~8 5~~

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 6, 4, 10, 12, 7, 1, 2, 9, 8, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 11, 8, 16)

Hereditary worst-case heap # 503
 17-element heap level-by-level:

Level 0: 17
 Level 1: 16~~~~~14
 Level 2: 15~~~~~11 13~~~~~3
 Level 3: 9~~~~~6 4~~~~~10 12~~~~~7 1~~~~~2
 Level 4: 8~~~5

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 6, 4, 10, 12, 7, 1, 2, 8, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 11, 16)

Hereditary worst-case heap # 504
 18-element heap level-by-level:

Level 0: 18
 Level 1: 17~~~~~14
 Level 2: 16~~~~~11 13~~~~~3
 Level 3: 15~~~~~6 4~~~~~10 12~~~~~7 1~~~~~2
 Level 4: 8~~~9 5~~

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 6, 4, 10, 12, 7, 1, 2, 8, 9, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 11, 16, 17)

Hereditary worst-case heap # 505
 16-element heap level-by-level:

```

Level 0:                                16
Level 1:          11~::~::~::~::~15
Level 2:      9~::~10          14~::~3
Level 3:  8~::6      4~::5      12~::13      1~::2
Level 4:  7^^

```

16 heap: [16, 11, 15, 9, 10, 14, 3, 8, 6, 4, 5, 12, 13, 1, 2, 7]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 13)

Hereditary worst-case heap # 506
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~15
Level 2:      11~::~10          14~::~3
Level 3:  9~::6      4~::5      12~::13      1~::2
Level 4:  7^^8

```

17 heap: [17, 16, 15, 11, 10, 14, 3, 9, 6, 4, 5, 12, 13, 1, 2, 7, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 13, 8)

Hereditary worst-case heap # 507
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~15
Level 2:      11~::~10          14~::~3
Level 3:  9~::6      4~::5      12~::13      1~::2
Level 4:  8^^7

```

17 heap: [17, 16, 15, 11, 10, 14, 3, 9, 6, 4, 5, 12, 13, 1, 2, 8, 7]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 13, 16)

Hereditary worst-case heap # 508

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          11~::~::~::~::~::~::~::~::~15
Level 2:      9~::~::~10~::13~::~14
Level 3:  8~::6~::4~::5~::12~::7~::3~::2
Level 4:  1~^

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 8, 6, 4, 5, 12, 7, 3, 2, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 14)

Hereditary worst-case heap # 509

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~::~::~::~::~15
Level 2:      11~::~10~::13~::~14
Level 3:  9~::6~::4~::5~::12~::7~::3~::2
Level 4:  1~^8

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 4, 5, 12, 7, 3, 2, 1, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 14, 8)

Hereditary worst-case heap # 510

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~::~::~::~15
Level 2:      16~::~10~::13~::~14
Level 3:  11~::6~::4~::5~::12~::7~::3~::2
Level 4:  9~^8  1~^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 4, 5, 12, 7, 3, 2, 9, 8, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 14, 8, 16)

Hereditary worst-case heap # 511

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   9^^^^^^6      4^^^^^^5      12^^^^^^7      3^^^^^^2
Level 4: 8^^1

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 4, 5, 12, 7, 3, 2, 8, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 14, 16)

Hereditary worst-case heap # 512

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   11^^^^^^6      4^^^^^^5      12^^^^^^7      3^^^^^^2
Level 4: 8^^9  1^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 4, 5, 12, 7, 3, 2, 8, 9, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 14, 16, 17)

Hereditary worst-case heap # 513

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          11^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      9^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   8^^^^^^6      4^^^^^^5      12^^^^^^7      1^^^^^^3
Level 4: 2^^

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 8, 6, 4, 5, 12, 7, 1, 3, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 15)

Hereditary worst-case heap # 514
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~-----15
Level 2:      11~-----10          13~-----14
Level 3:   9~-----6      4~-----5      12~-----7      1~-----3
Level 4:  2~--8

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 4, 5, 12, 7, 1, 3, 2, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 15, 8)

Hereditary worst-case heap # 515
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~-----15
Level 2:      16~-----10          13~-----14
Level 3:   11~-----6      4~-----5      12~-----7      1~-----3
Level 4:  9~--8  2~--

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 4, 5, 12, 7, 1, 3, 9, 8, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 15, 8, 16)

Hereditary worst-case heap # 516
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~-----15
Level 2:      11~-----10          13~-----14
Level 3:   9~-----6      4~-----5      12~-----7      1~-----3
Level 4:  8~--2

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 4, 5, 12, 7, 1, 3, 8, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 15, 16)

Hereditary worst-case heap # 517

18-element heap level-by-level:

```

Level 0:                      18
Level 1:          17~::~::~::~::~15
Level 2:      16~::~::~10          13~::~::~14
Level 3:  11~::~6      4~::~5      12~::~7      1~::~3
Level 4:  8~::9      2~::

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 4, 5, 12, 7, 1, 3, 8, 9, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 4, 9, 8, 11, 12, 13, 12, 15, 16, 17)

Hereditary worst-case heap # 518

9-element heap level-by-level:

```

Level 0:      9
Level 1:  8~::~7
Level 2:  6~::5      2~::3
Level 3: 4~1

```

9 heap: [9, 8, 7, 6, 5, 2, 3, 4, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8)

Hereditary worst-case heap # 519

10-element heap level-by-level:

```

Level 0:          10
Level 1:      9~::~7
Level 2:  8~::~5      2~::~3

```

Level 3: 6^^^1 4^^

10 heap: [10, 9, 7, 8, 5, 2, 3, 6, 1, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8)

Hereditary worst-case heap # 520

11-element heap level-by-level:

Level 0: 11

Level 1: 10^^^^^^^^^^^^^^^^^7

Level 2: 9^^^^^^5 2^^^^^^3

Level 3: 6^^^8 4^^^1

11 heap: [11, 10, 7, 9, 5, 2, 3, 6, 8, 4, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9)

Hereditary worst-case heap # 521

12-element heap level-by-level:

Level 0: 12

Level 1: 11^^^^^^^^^^^^^^^^^7

Level 2: 9^^^^^^10 2^^^^^^3

Level 3: 6^^^8 4^^^5 1^^

12 heap: [12, 11, 7, 9, 10, 2, 3, 6, 8, 4, 5, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11)

Hereditary worst-case heap # 522

13-element heap level-by-level:

Level 0: 13

Level 1: 11^^^^^^^^^^^^^^^^^12

Level 2: 9^^^^^^10 7^^^^^^3

Level 3: 6^^^8 4^^^5 2^^^1

13 heap: [13, 11, 12, 9, 10, 7, 3, 6, 8, 4, 5, 2, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12)

Hereditary worst-case heap # 523

14-element heap level-by-level:

```

Level 0:          14
Level 1:      11~13
Level 2:   9~10    12~3
Level 3: 6~8  4~5  7~1  2~

```

14 heap: [14, 11, 13, 9, 10, 12, 3, 6, 8, 4, 5, 7, 1, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12)

Hereditary worst-case heap # 524

15-element heap level-by-level:

```

Level 0:          15
Level 1:      11~14
Level 2:   9~10    13~3
Level 3: 6~8  4~5  7~12  2~1

```

15 heap: [15, 11, 14, 9, 10, 13, 3, 6, 8, 4, 5, 7, 12, 2, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13)

Hereditary worst-case heap # 525

16-element heap level-by-level:

```

Level 0:          16
Level 1:      11~15
Level 2:   9~10    13~14
Level 3: 6~8  4~5  7~12  2~1
Level 4: 3~

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 6, 8, 4, 5, 7, 12, 2, 1, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 7)

Hereditary worst-case heap # 526

17-element heap level-by-level:

```

Level 0:          17
Level 1:      16~15
Level 2:   11~10    13~14
Level 3:  9~8  4~5  7~12  2~1
Level 4: 3~6

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 4, 5, 7, 12, 2, 1, 3, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 7, 8)

Hereditary worst-case heap # 527
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^8          4^^^^^^5          7^^^^^^12          2^^^^^^1
Level 4:  9^^6    3^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 7, 12, 2, 1, 9, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 7, 8, 16)

Hereditary worst-case heap # 528
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^8          4^^^^^^5          7^^^^^^12          2^^^^^^1
Level 4:  9^^11   3^^6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 7, 12, 2, 1, 9, 11, 3, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 7, 8, 16, 17)

Hereditary worst-case heap # 529
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17          4^^^^^^5          7^^^^^^12          2^^^^^^1
Level 4:  9^^11   8^^6   3^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 7, 12, 2, 1, 9, 11, 8, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 7, 8, 16, 17, 18)

Hereditary worst-case heap # 530
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~::~15
Level 2:      16~::~10          13~::~14
Level 3:  11~8      4~5      7~12      2~1
Level 4:  3~9  6~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 7, 12, 2, 1, 3, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 7, 8, 17)

Hereditary worst-case heap # 531
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18~::~15
Level 2:      17~10          13~14
Level 3:  16~8      4~5      7~12      2~1
Level 4: 11~9  6~3

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 7, 12, 2, 1, 11, 9, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 7, 8, 17, 16)

Hereditary worst-case heap # 532
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~15
Level 2:      18~10          13~14
Level 3:  16~17      4~5      7~12      2~1
Level 4: 11~9  6~8  3~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 7, 12, 2, 1, 11, 9, 6, 8, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 7, 8, 17, 16, 19)

Hereditary worst-case heap # 533
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   9^^^^^^8      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  6^^^3

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 4, 5, 7, 12, 2, 1, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 7, 16)

Hereditary worst-case heap # 534
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   11^^^^^^8      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  9^^^3  6^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 7, 12, 2, 1, 9, 3, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 7, 16, 16)

Hereditary worst-case heap # 535
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   16^^^^^^8      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  9^^11  6^^^3

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 7, 12, 2, 1, 9, 11, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 7, 16, 16, 17)

Hereditary worst-case heap # 536

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~15
Level 2:    18~10      13~14
Level 3:  16~17      4~5      7~12      2~1
Level 4:  9~11   6~8   3~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 7, 12, 2, 1, 9, 11, 6, 8, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 7, 16, 16, 17, 19)

Hereditary worst-case heap # 537

18-element heap level-by-level:

```

Level 0:                18
Level 1:          17~15
Level 2:    16~10      13~14
Level 3:  11~8      4~5      7~12      2~1
Level 4:  6~9   3~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 7, 12, 2, 1, 6, 9, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 7, 16, 17)

Hereditary worst-case heap # 538

19-element heap level-by-level:

```

Level 0:                19
Level 1:          18~15
Level 2:    17~10      13~14
Level 3:  16~8      4~5      7~12      2~1
Level 4: 11~9   3~6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 7, 12, 2, 1, 11, 9, 3, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 7, 16, 17, 16)

Hereditary worst-case heap # 539

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 11^^^9   8^^^6   3^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 7, 12, 2, 1, 11, 9, 8, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 7, 16, 17, 16, 18)

Hereditary worst-case heap # 540
 16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:   9^^^^^^8      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  6^^

```

16 heap: [16, 15, 14, 11, 10, 13, 3, 9, 8, 4, 5, 7, 12, 2, 1, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 8)

Hereditary worst-case heap # 541
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  11^^^^^^8      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  6^^^9

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 8, 4, 5, 7, 12, 2, 1, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 8, 8)

Hereditary worst-case heap # 542

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^8      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 11^^^9  6^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 8, 4, 5, 7, 12, 2, 1, 11, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 8, 8, 16)

Hereditary worst-case heap # 543

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^3
Level 3:  11^^^^^^8      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  9^^^6

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 8, 4, 5, 7, 12, 2, 1, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 8, 16)

Hereditary worst-case heap # 544

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^8      4^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  9^^11  6^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 8, 4, 5, 7, 12, 2, 1, 9, 11, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 8, 16, 17)

Hereditary worst-case heap # 545

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15~::~::~::~::~14
Level 2:      9~::~11~::13~::~3
Level 3:  6~::8~::10~::5~::7~::12~::2~::1
Level 4:  4~

```

16 heap: [16, 15, 14, 9, 11, 13, 3, 6, 8, 10, 5, 7, 12, 2, 1, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10)

Hereditary worst-case heap # 546

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~14
Level 2:      15~::~11~::13~::~3
Level 3:  9~::8~::10~::5~::7~::12~::2~::1
Level 4:  4~6

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 8, 10, 5, 7, 12, 2, 1, 4, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8)

Hereditary worst-case heap # 547

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~14
Level 2:      16~::~11~::13~::~3
Level 3:  15~::8~::10~::5~::7~::12~::2~::1
Level 4:  9~6~4~

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 10, 5, 7, 12, 2, 1, 9, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16)

Hereditary worst-case heap # 548

19-element heap level-by-level:

```

Level 0:                                19

```

```

Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^8      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  9^^15   4^^6

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 10, 5, 7, 12, 2, 1, 9, 15, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17)

Hereditary worst-case heap # 549
 20-element heap level-by-level:

```

Level 0:                      20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^17      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  9^^15   4^^6   8^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 7, 12, 2, 1, 9, 15, 4, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 9)

Hereditary worst-case heap # 550
 21-element heap level-by-level:

```

Level 0:                      21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  18^^^^^^17      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 16^^15   4^^6   8^^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 7, 12, 2, 1, 16, 15, 4, 6, 8, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 9, 16)

Hereditary worst-case heap # 551
 22-element heap level-by-level:

```

Level 0:                      22
Level 1:          21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      20^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  18^^^^^^19      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 16^^15 17^^6   8^^9   4^^

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 18, 19, 10, 5, 7, 12, 2, 1, 16, 15, 17, 6, 8, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 9, 16, 18)

Hereditary worst-case heap # 552

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  9^^15  17^^^6  8^^^4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 9, 15, 17, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 9, 18)

Hereditary worst-case heap # 553

22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^20          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      11^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  9^^15  17^^^6  8^^10  4^^

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 7, 12, 2, 1, 9, 15, 17, 6, 8, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 9, 18, 21)

Hereditary worst-case heap # 554

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  9^^15  4^^17  8^^^6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 9, 15, 4, 17, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 9, 19)

Hereditary worst-case heap # 555
 22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21~14
Level 2:      20~11      13~3
Level 3:  16~19      10~5      7~12      2~1
Level 4:  9~15  18~17  8~6  4~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 16, 19, 10, 5, 7, 12, 2, 1, 9, 15, 18, 17, 8, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 9, 19, 18)

Hereditary worst-case heap # 556
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~14
Level 2:      18~11      13~3
Level 3:  17~8      10~5      7~12      2~1
Level 4: 16~15  4~6  9~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 17, 8, 10, 5, 7, 12, 2, 1, 16, 15, 4, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 16)

Hereditary worst-case heap # 557
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~14
Level 2:      19~11      13~3
Level 3:  17~18      10~5      7~12      2~1
Level 4: 16~15  4~6  9~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 7, 12, 2, 1, 16, 15, 4, 6, 9, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 16, 9)

Hereditary worst-case heap # 558
 22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      20~~~~~11          13~~~~~3
Level 3:  17~~~~~19      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 16~~15  18~~~6  9~~~8  4~~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 17, 19, 10, 5, 7, 12, 2, 1, 16, 15, 18, 6, 9, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 16, 9, 18)

Hereditary worst-case heap # 559
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  17~~~~~18      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 16~~15  8~~~6  9~~~4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 7, 12, 2, 1, 16, 15, 8, 6, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 16, 18)

Hereditary worst-case heap # 560
 22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  17~~~~~18      11~~~~~5      7~~~~~12      2~~~~~1
Level 4: 16~~15  8~~~6  9~~10  4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 17, 18, 11, 5, 7, 12, 2, 1, 16, 15, 8, 6, 9, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 16, 18, 21)

Hereditary worst-case heap # 561
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  17~~~~~18      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 16^^15  4^^^8  9^^^6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 7, 12, 2, 1, 16, 15, 4, 8, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 16, 19)

Hereditary worst-case heap # 562
 22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      20~~~~~11          13~~~~~3
Level 3:  17~~~~~19      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 16^^15  18^^^8  9^^^6  4^^

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 17, 19, 10, 5, 7, 12, 2, 1, 16, 15, 18, 8, 9, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 16, 19, 18)

Hereditary worst-case heap # 563
 20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:      18~~~~~11          13~~~~~3
Level 3:  16~~~~~17      10~~~~~5      7~~~~~12      2~~~~~1
Level 4:  9^^15  8^^^6  4^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 7, 12, 2, 1, 9, 15, 8, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 18)

Hereditary worst-case heap # 564

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 16~~15   8~~~6   4~~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 7, 12, 2, 1, 16, 15, 8, 6, 4, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 18, 16)

Hereditary worst-case heap # 565

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  18~~~~~17      11~~~~~5      7~~~~~12      2~~~~~1
Level 4: 16~~15   8~~~6   10~~~9   4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 18, 17, 11, 5, 7, 12, 2, 1, 16, 15, 8, 6, 10, 9, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 18, 16, 20)

Hereditary worst-case heap # 566

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      7~~~~~12      2~~~~~1
Level 4:  9~~15  17~~~6   4~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 9, 15, 17, 6, 4, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 18, 18)

Hereditary worst-case heap # 567

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  16~~~~~18      11~~~~~5      7~~~~~12      2~~~~~1
Level 4:  9~~15  17~~~6  10~~~8  4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 7, 12, 2, 1, 9, 15, 17, 6, 10, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 18, 18, 20)

Hereditary worst-case heap # 568

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      7~~~~~12      2~~~~~1
Level 4:  9~~15  8~~17  4~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 9, 15, 8, 17, 4, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 18, 19)

Hereditary worst-case heap # 569

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  16~~~~~18      11~~~~~5      7~~~~~12      2~~~~~1
Level 4:  9~~15  8~~17  10~~~6  4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 7, 12, 2, 1, 9, 15, 8, 17, 10, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 18, 19, 20)

Hereditary worst-case heap # 570

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~::~::~::~::~::~::~14
Level 2:      18~::~11~::13~::~::~3
Level 3:  16~::17~::10~::5~::7~::12~::2~::1
Level 4:  9~15  4~8  6~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 7, 12, 2, 1, 9, 15, 4, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 19)

Hereditary worst-case heap # 571

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~::~::~::~::~::~::~::~14
Level 2:      19~::~11~::13~::~::~3
Level 3:  18~::17~::10~::5~::7~::12~::2~::1
Level 4: 16~15  4~8  6~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 7, 12, 2, 1, 16, 15, 4, 8, 6, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 19, 16)

Hereditary worst-case heap # 572

22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21~::~::~::~::~::~::~14
Level 2:      20~::~11~::13~::~::~3
Level 3:  18~::19~::10~::5~::7~::12~::2~::1
Level 4: 16~15 17~8  6~9  4~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 18, 19, 10, 5, 7, 12, 2, 1, 16, 15, 17, 8, 6, 9, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 19, 16, 18)

Hereditary worst-case heap # 573

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  16~~~~~18    10~~~~~5    7~~~~~12    2~~~~~1
Level 4:  9~~15  17~~~8    6~~~4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 9, 15, 17, 8, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 19, 18)

Hereditary worst-case heap # 574

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:    19~~~~~20          13~~~~~3
Level 3:  16~~~~~18    11~~~~~5    7~~~~~12    2~~~~~1
Level 4:  9~~15  17~~~8    6~~10    4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 7, 12, 2, 1, 9, 15, 17, 8, 6, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 19, 18, 21)

Hereditary worst-case heap # 575

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  16~~~~~18    10~~~~~5    7~~~~~12    2~~~~~1
Level 4:  9~~15    4~~17    6~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 9, 15, 4, 17, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 19, 19)

Hereditary worst-case heap # 576

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      20~~~~~11          13~~~~~3
Level 3:  16~~~~~19      10~~~~~5      7~~~~~12      2~~~~~1
Level 4:  9~~15  18~~17  6~~~8  4~~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 16, 19, 10, 5, 7, 12, 2, 1, 9, 15, 18, 17, 6, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 16, 17, 19, 19, 18)

Hereditary worst-case heap # 577

18-element heap level-by-level:

```

Level 0:                18
Level 1:          17~~~~~14
Level 2:      16~~~~~11          13~~~~~3
Level 3:  15~~~~~8      10~~~~~5      7~~~~~12      2~~~~~1
Level 4:  4~~~9  6~~

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 10, 5, 7, 12, 2, 1, 4, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17)

Hereditary worst-case heap # 578

19-element heap level-by-level:

```

Level 0:                19
Level 1:          18~~~~~14
Level 2:      17~~~~~11          13~~~~~3
Level 3:  16~~~~~8      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 15~~~9  6~~~4

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 10, 5, 7, 12, 2, 1, 15, 9, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16)

Hereditary worst-case heap # 579

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~::~::~::~14
Level 2:      18~::~11          13~::~3
Level 3:  16~::17      10~::5      7~::12      2~::1
Level 4: 15~9   6~4   8~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 7, 12, 2, 1, 15, 9, 6, 4, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 9)

Hereditary worst-case heap # 580
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~::~::~::~::~14
Level 2:      19~::~11          13~::~3
Level 3:  18~::17      10~::5      7~::12      2~::1
Level 4: 15~16   6~4   8~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 7, 12, 2, 1, 15, 16, 6, 4, 8, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 9, 17)

Hereditary worst-case heap # 581
 22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21~::~::~::~14
Level 2:      20~::~11          13~::~3
Level 3:  18~::19      10~::5      7~::12      2~::1
Level 4: 15~16   6~17   8~9   4~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 18, 19, 10, 5, 7, 12, 2, 1, 15, 16, 6, 17, 8, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 9, 17, 19)

Hereditary worst-case heap # 582
 21-element heap level-by-level:

```

Level 0:                                21

```

```

Level 1:          20~14
Level 2:    19~11          13~3
Level 3:  16~18    10~5    7~12    2~1
Level 4: 15~9  17~4  8~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 15, 9, 17, 4, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 9, 18)

Hereditary worst-case heap # 583
 22-element heap level-by-level:

```

Level 0:          22
Level 1:    21~14
Level 2:    20~11    13~3
Level 3:  16~19    10~5    7~12    2~1
Level 4: 15~9  17~18  8~6  4~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 16, 19, 10, 5, 7, 12, 2, 1, 15, 9, 17, 18, 8, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 9, 18, 19)

Hereditary worst-case heap # 584
 21-element heap level-by-level:

```

Level 0:          21
Level 1:    20~14
Level 2:    19~11    13~3
Level 3:  16~18    10~5    7~12    2~1
Level 4: 15~9  6~17  8~4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 15, 9, 6, 17, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 9, 19)

Hereditary worst-case heap # 585
 22-element heap level-by-level:

```

Level 0:          22
Level 1:    21~14
Level 2:    19~20    13~3

```

Level 3: 16~~~~~18 11~~~~~5 7~~~~~12 2~~~~~1
 Level 4: 15~~~9 6~~17 8~~10 4~~

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 7, 12, 2, 1, 15, 9, 6, 17, 8, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 9, 19, 21)

Hereditary worst-case heap # 586

20-element heap level-by-level:

Level 0: 20
 Level 1: 19~~~~~14
 Level 2: 18~~~~~11 13~~~~~3
 Level 3: 17~~~~~8 10~~~~~5 7~~~~~12 2~~~~~1
 Level 4: 15~~16 6~~~4 9~~

20 heap: [20, 19, 14, 18, 11, 13, 3, 17, 8, 10, 5, 7, 12, 2, 1, 15, 16, 6, 4, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 17)

Hereditary worst-case heap # 587

21-element heap level-by-level:

Level 0: 21
 Level 1: 20~~~~~14
 Level 2: 19~~~~~11 13~~~~~3
 Level 3: 17~~~~~18 10~~~~~5 7~~~~~12 2~~~~~1
 Level 4: 15~~16 6~~~4 9~~~8

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 7, 12, 2, 1, 15, 16, 6, 4, 9, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 17, 9)

Hereditary worst-case heap # 588

22-element heap level-by-level:

Level 0: 22
 Level 1: 21~~~~~14
 Level 2: 20~~~~~11 13~~~~~3
 Level 3: 17~~~~~19 10~~~~~5 7~~~~~12 2~~~~~1

Level 4: 15¹⁶ 6¹⁸ 9⁸ 4²

22 heap: [22, 21, 14, 20, 11, 13, 3, 17, 19, 10, 5, 7, 12, 2, 1, 15, 16, 6, 18, 9, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 17, 9, 19)

Hereditary worst-case heap # 589

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~14
Level 2:    19~11          13~3
Level 3:  17~18    10~5    7~12    2~1
Level 4: 15~16    8~4    9~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 7, 12, 2, 1, 15, 16, 8, 4, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 17, 18)

Hereditary worst-case heap # 590

22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21~14
Level 2:    20~11          13~3
Level 3:  17~19    10~5    7~12    2~1
Level 4: 15~16    8~18    9~6    4~2

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 17, 19, 10, 5, 7, 12, 2, 1, 15, 16, 8, 18, 9, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 17, 18, 19)

Hereditary worst-case heap # 591

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~14
Level 2:    19~11          13~3
Level 3:  17~18    10~5    7~12    2~1

```

Level 4: 15^^16 6^^^8 9^^^4

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 7, 12, 2, 1, 15, 16, 6, 8, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 17, 19)

Hereditary worst-case heap # 592

22-element heap level-by-level:

```

Level 0:                                     22
Level 1:                                21^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:                    19^^^^^^^^^^^^20                13^^^^^^^^^^^^3
Level 3:    17^^^^^^18        11^^^^^^5        7^^^^^^12        2^^^^^^1
Level 4: 15^^16    6^^^8    9^^10    4^^

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 17, 18, 11, 5, 7, 12, 2, 1, 15, 16, 6, 8, 9, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 17, 19, 21)

Hereditary worst-case heap # 593

20-element heap level-by-level:

```

Level 0:                                     20
Level 1:                                19^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:                    18^^^^^^^^^^^^11                13^^^^^^^^^^^^3
Level 3:    16^^^^^^17        10^^^^^^5        7^^^^^^12        2^^^^^^1
Level 4: 15^^^9    8^^^4    6^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 7, 12, 2, 1, 15, 9, 8, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 18)

Hereditary worst-case heap # 594

21-element heap level-by-level:

```

Level 0:                                     21
Level 1:                                20^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:                    19^^^^^^^^^^^^11                13^^^^^^^^^^^^3
Level 3:    18^^^^^^17        10^^^^^^5        7^^^^^^12        2^^^^^^1
Level 4: 15^^16    8^^^4    6^^^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 7, 12, 2, 1, 15, 16, 8, 4, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 18, 17)

Hereditary worst-case heap # 595
 22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      20^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  18^^^^19      10^^^^5      7^^^^12      2^^^^1
Level 4: 15^^16  8^^17  6^^9  4^^

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 18, 19, 10, 5, 7, 12, 2, 1, 15, 16, 8, 17, 6, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 18, 17, 19)

Hereditary worst-case heap # 596
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^18      10^^^^5      7^^^^12      2^^^^1
Level 4: 15^^9  17^^4  6^^8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 15, 9, 17, 4, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 18, 18)

Hereditary worst-case heap # 597
 22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      20^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^19      10^^^^5      7^^^^12      2^^^^1
Level 4: 15^^9  17^^18  6^^8  4^^

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 16, 19, 10, 5, 7, 12, 2, 1, 15, 9, 17, 18, 6, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 18, 18, 19)

Hereditary worst-case heap # 598

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 15^^^9   8^^17   6^^4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 15, 9, 8, 17, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 18, 19)

Hereditary worst-case heap # 599

22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^20          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      11^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 15^^^9   8^^17   6^^10   4^^

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 7, 12, 2, 1, 15, 9, 8, 17, 6, 10, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 18, 19, 21)

Hereditary worst-case heap # 600

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^17      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 15^^^9   6^^^8   4^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 7, 12, 2, 1, 15, 9, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 19)

Hereditary worst-case heap # 601
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 15~~16   6~~~8   4~~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 7, 12, 2, 1, 15, 16, 6, 8, 4, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 19, 17)

Hereditary worst-case heap # 602
 22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  18~~~~~17      11~~~~~5      7~~~~~12      2~~~~~1
Level 4: 15~~16   6~~~8   10~~~9   4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 18, 17, 11, 5, 7, 12, 2, 1, 15, 16, 6, 8, 10, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 19, 17, 20)

Hereditary worst-case heap # 603
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 15~~~9   17~~~8   4~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 15, 9, 17, 8, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 19, 18)

Hereditary worst-case heap # 604

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  16~~~~~18      11~~~~~5      7~~~~~12      2~~~~~1
Level 4: 15~~~9  17~~~8  10~~~6  4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 7, 12, 2, 1, 15, 9, 17, 8, 10, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 19, 18, 20)

Hereditary worst-case heap # 605

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 15~~~9   6~~17   4~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 15, 9, 6, 17, 4, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 19, 19)

Hereditary worst-case heap # 606

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  16~~~~~18      11~~~~~5      7~~~~~12      2~~~~~1
Level 4: 15~~~9   6~~17  10~~~8  4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 7, 12, 2, 1, 15, 9, 6, 17, 10, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 8, 17, 16, 19, 19, 20)

Hereditary worst-case heap # 607

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  9^^^^^^8      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 6^^^4

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 8, 10, 5, 7, 12, 2, 1, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16)

Hereditary worst-case heap # 608

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^8      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 9^^^4  6^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 10, 5, 7, 12, 2, 1, 9, 4, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16)

Hereditary worst-case heap # 609

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^8      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 9^^15  6^^^4

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 10, 5, 7, 12, 2, 1, 9, 15, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17)

Hereditary worst-case heap # 610

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~14
Level 2:    18~11          13~3
Level 3:  16~17    10~5    7~12    2~1
Level 4:  9~15    6~4    8~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 7, 12, 2, 1, 9, 15, 6, 4, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 9)

Hereditary worst-case heap # 611

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~14
Level 2:    19~11          13~3
Level 3:  18~17    10~5    7~12    2~1
Level 4: 16~15    6~4    8~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 7, 12, 2, 1, 16, 15, 6, 4, 8, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 9, 16)

Hereditary worst-case heap # 612

22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21~14
Level 2:    20~11          13~3
Level 3:  18~19    10~5    7~12    2~1
Level 4: 16~15    6~17    8~9    4~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 18, 19, 10, 5, 7, 12, 2, 1, 16, 15, 6, 17, 8, 9, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 9, 16, 19)

Hereditary worst-case heap # 613

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      7~~~~~12      2~~~~~1
Level 4:  9~~15  17~~~4  8~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 9, 15, 17, 4, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 9, 18)

Hereditary worst-case heap # 614

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      20~~~~~11          13~~~~~3
Level 3:  16~~~~~19      10~~~~~5      7~~~~~12      2~~~~~1
Level 4:  9~~15  17~~18  8~~~6  4~~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 16, 19, 10, 5, 7, 12, 2, 1, 9, 15, 17, 18, 8, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 9, 18, 19)

Hereditary worst-case heap # 615

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      7~~~~~12      2~~~~~1
Level 4:  9~~15  6~~17  8~~~4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 9, 15, 6, 17, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 9, 19)

Hereditary worst-case heap # 616

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  16~~~~~18      11~~~~~5      7~~~~~12      2~~~~~1
Level 4:  9~~15   6~~17   8~~10   4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 7, 12, 2, 1, 9, 15, 6, 17, 8, 10, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 9, 19, 21)

Hereditary worst-case heap # 617

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:      18~~~~~11          13~~~~~3
Level 3:  17~~~~~8      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 16~~15   6~~4   9~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 17, 8, 10, 5, 7, 12, 2, 1, 16, 15, 6, 4, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 16)

Hereditary worst-case heap # 618

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  17~~~~~18      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 16~~15   6~~4   9~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 7, 12, 2, 1, 16, 15, 6, 4, 9, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 16, 9)

Hereditary worst-case heap # 619

22-element heap level-by-level:

```

Level 0:                22

```

```

Level 1:          21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      20^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  17^^^^^^19      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 16^^15  6^^18  9^^8  4^^

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 17, 19, 10, 5, 7, 12, 2, 1, 16, 15, 6, 18, 9, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 16, 9, 19)

Hereditary worst-case heap # 620
 21-element heap level-by-level:

```

Level 0:          21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:  19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  17^^^^^^18      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 16^^15  8^^4  9^^6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 7, 12, 2, 1, 16, 15, 8, 4, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 16, 18)

Hereditary worst-case heap # 621
 22-element heap level-by-level:

```

Level 0:          22
Level 1:      21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:  20^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  17^^^^^^19      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 16^^15  8^^18  9^^6  4^^

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 17, 19, 10, 5, 7, 12, 2, 1, 16, 15, 8, 18, 9, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 16, 18, 19)

Hereditary worst-case heap # 622
 21-element heap level-by-level:

```

Level 0:          21

```

```

Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  17^^^^^^18      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 16^^15   6^^8   9^^4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 7, 12, 2, 1, 16, 15, 6, 8, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 16, 19)

Hereditary worst-case heap # 623
 22-element heap level-by-level:

```

Level 0:          22
Level 1:      21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^20          13^^^^^^^^^^^^^^^^3
Level 3:  17^^^^^^18      11^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 16^^15   6^^8   9^^10   4^^

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 17, 18, 11, 5, 7, 12, 2, 1, 16, 15, 6, 8, 9, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 16, 19, 21)

Hereditary worst-case heap # 624
 20-element heap level-by-level:

```

Level 0:          20
Level 1:      19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^17      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 9^^15   8^^4   6^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 7, 12, 2, 1, 9, 15, 8, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 18)

Hereditary worst-case heap # 625
 21-element heap level-by-level:

```

Level 0:          21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14

```

```

Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   18^^^^^^17      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 16^^15   8^^4   6^^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 7, 12, 2, 1, 16, 15, 8, 4, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 18, 16)

Hereditary worst-case heap # 626
 22-element heap level-by-level:

```

Level 0:                      22
Level 1:      21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      20^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   18^^^^^^19      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 16^^15   8^^17   6^^9   4^^

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 18, 19, 10, 5, 7, 12, 2, 1, 16, 15, 8, 17, 6, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 18, 16, 19)

Hereditary worst-case heap # 627
 21-element heap level-by-level:

```

Level 0:                      21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^18      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  9^^15  17^^4   6^^8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 9, 15, 17, 4, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 18, 18)

Hereditary worst-case heap # 628
 22-element heap level-by-level:

```

Level 0:                      22
Level 1:      21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      20^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^19      10^^^^^^5      7^^^^^^12      2^^^^^^1

```

Level 4: 9¹⁵ 17¹⁸ 6⁸ 4²

22 heap: [22, 21, 14, 20, 11, 13, 3, 16, 19, 10, 5, 7, 12, 2, 1, 9, 15, 17, 18, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 18, 18, 19)

Hereditary worst-case heap # 629
 21-element heap level-by-level:

Level 0: 21
 Level 1: 20¹⁴
 Level 2: 19¹¹ 13³
 Level 3: 16¹⁸ 10⁵ 7¹² 2¹
 Level 4: 9¹⁵ 8¹⁷ 6⁴

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 9, 15, 8, 17, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 18, 19)

Hereditary worst-case heap # 630
 22-element heap level-by-level:

Level 0: 22
 Level 1: 21¹⁴
 Level 2: 19²⁰ 13³
 Level 3: 16¹⁸ 11⁵ 7¹² 2¹
 Level 4: 9¹⁵ 8¹⁷ 6¹⁰ 4²

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 7, 12, 2, 1, 9, 15, 8, 17, 6, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 18, 19, 21)

Hereditary worst-case heap # 631
 20-element heap level-by-level:

Level 0: 20
 Level 1: 19¹⁴
 Level 2: 18¹¹ 13³

Level 3: 16~~~~~17 10~~~~~5 7~~~~~12 2~~~~~1
 Level 4: 9~~15 6~~~8 4~~

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 7, 12, 2, 1, 9, 15, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 19)

Hereditary worst-case heap # 632
 21-element heap level-by-level:

Level 0: 21
 Level 1: 20~~~~~14
 Level 2: 19~~~~~11 13~~~~~3
 Level 3: 18~~~~~17 10~~~~~5 7~~~~~12 2~~~~~1
 Level 4: 16~~15 6~~~8 4~~~9

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 7, 12, 2, 1, 16, 15, 6, 8, 4, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 19, 16)

Hereditary worst-case heap # 633
 22-element heap level-by-level:

Level 0: 22
 Level 1: 21~~~~~14
 Level 2: 19~~~~~20 13~~~~~3
 Level 3: 18~~~~~17 11~~~~~5 7~~~~~12 2~~~~~1
 Level 4: 16~~15 6~~~8 10~~~9 4~~

22 heap: [22, 21, 14, 19, 20, 13, 3, 18, 17, 11, 5, 7, 12, 2, 1, 16, 15, 6, 8, 10, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 19, 16, 20)

Hereditary worst-case heap # 634
 21-element heap level-by-level:

Level 0: 21
 Level 1: 20~~~~~14
 Level 2: 19~~~~~11 13~~~~~3
 Level 3: 16~~~~~18 10~~~~~5 7~~~~~12 2~~~~~1
 Level 4: 9~~15 17~~~8 4~~~6

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 9, 15, 17, 8, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 19, 18)

Hereditary worst-case heap # 635
 22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^20                13^^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      11^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  9^^15  17^^8  10^^6  4^^

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 7, 12, 2, 1, 9, 15, 17, 8, 10, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 19, 18, 20)

Hereditary worst-case heap # 636
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  9^^15  6^^17  4^^8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 9, 15, 6, 17, 4, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 19, 19)

Hereditary worst-case heap # 637
 22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^20                13^^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      11^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4:  9^^15  6^^17  10^^8  4^^

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 7, 12, 2, 1, 9, 15, 6, 17, 10, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 16, 17, 19, 19, 20)

Hereditary worst-case heap # 638

18-element heap level-by-level:

```

Level 0:                                18
Level 1:                17~14
Level 2:        16~11                13~3
Level 3:    15~8        10~5        7~12        2~1
Level 4:    6~9    4~

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 10, 5, 7, 12, 2, 1, 6, 9, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17)

Hereditary worst-case heap # 639

19-element heap level-by-level:

```

Level 0:                                19
Level 1:                18~14
Level 2:        17~11                13~3
Level 3:    16~8        10~5        7~12        2~1
Level 4: 15~9    4~6

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 10, 5, 7, 12, 2, 1, 15, 9, 4, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16)

Hereditary worst-case heap # 640

20-element heap level-by-level:

```

Level 0:                                20
Level 1:                19~14
Level 2:        18~11                13~3
Level 3:    16~17        10~5        7~12        2~1
Level 4: 15~9    4~6    8~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 7, 12, 2, 1, 15, 9, 4, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 9)

Hereditary worst-case heap # 641
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 15~~16   4~~~6   8~~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 7, 12, 2, 1, 15, 16, 4, 6, 8, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 9, 17)

Hereditary worst-case heap # 642
 22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      20~~~~~11          13~~~~~3
Level 3:  18~~~~~19      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 15~~16  17~~~6   8~~~9   4~~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 18, 19, 10, 5, 7, 12, 2, 1, 15, 16, 17, 6, 8, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 9, 17, 18)

Hereditary worst-case heap # 643
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 15~~~9  17~~~6   8~~~4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 15, 9, 17, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 9, 18)

Hereditary worst-case heap # 644

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~14
Level 2:    19~20      13~3
Level 3:  16~18    11~5    7~12    2~1
Level 4: 15~9  17~6  8~10  4~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 7, 12, 2, 1, 15, 9, 17, 6, 8, 10, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 9, 18, 21)

Hereditary worst-case heap # 645

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~14
Level 2:    19~11      13~3
Level 3:  16~18    10~5    7~12    2~1
Level 4: 15~9  4~17  8~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 15, 9, 4, 17, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 9, 19)

Hereditary worst-case heap # 646

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~14
Level 2:    20~11      13~3
Level 3:  16~19    10~5    7~12    2~1
Level 4: 15~9  18~17  8~6  4~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 16, 19, 10, 5, 7, 12, 2, 1, 15, 9, 18, 17, 8, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 9, 19, 18)

Hereditary worst-case heap # 647

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~::~::~::~14
Level 2:      18~::~11~::13~::~3
Level 3:  17~::8~::10~::5~::7~::12~::2~::1
Level 4: 15~16  4~6  9~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 17, 8, 10, 5, 7, 12, 2, 1, 15, 16, 4, 6, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 17)

Hereditary worst-case heap # 648

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~::~::~::~::~14
Level 2:      19~::~11~::13~::~3
Level 3:  17~::18~::10~::5~::7~::12~::2~::1
Level 4: 15~16  4~6  9~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 7, 12, 2, 1, 15, 16, 4, 6, 9, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 17, 9)

Hereditary worst-case heap # 649

22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21~::~::~::~::~14
Level 2:      20~::~11~::13~::~3
Level 3:  17~::19~::10~::5~::7~::12~::2~::1
Level 4: 15~16 18~6  9~8  4~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 17, 19, 10, 5, 7, 12, 2, 1, 15, 16, 18, 6, 9, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 17, 9, 18)

Hereditary worst-case heap # 650

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  17~~~~~18      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 15~~16   8~~~6   9~~~4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 7, 12, 2, 1, 15, 16, 8, 6, 9, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 17, 18)

Hereditary worst-case heap # 651

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  17~~~~~18      11~~~~~5      7~~~~~12      2~~~~~1
Level 4: 15~~16   8~~~6   9~~10   4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 17, 18, 11, 5, 7, 12, 2, 1, 15, 16, 8, 6, 9, 10, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 17, 18, 21)

Hereditary worst-case heap # 652

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  17~~~~~18      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 15~~16   4~~~8   9~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 7, 12, 2, 1, 15, 16, 4, 8, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 17, 19)

Hereditary worst-case heap # 653

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:    20~~~~~11          13~~~~~3
Level 3:  17~~~~~19    10~~~~~5    7~~~~~12    2~~~~~1
Level 4: 15~~16  18~~~8   9~~~6   4~~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 17, 19, 10, 5, 7, 12, 2, 1, 15, 16, 18, 8, 9, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 17, 19, 18)

Hereditary worst-case heap # 654
 20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:    18~~~~~11          13~~~~~3
Level 3:  16~~~~~17    10~~~~~5    7~~~~~12    2~~~~~1
Level 4: 15~~~9   8~~~6   4~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 7, 12, 2, 1, 15, 9, 8, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 18)

Hereditary worst-case heap # 655
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  18~~~~~17    10~~~~~5    7~~~~~12    2~~~~~1
Level 4: 15~~16   8~~~6   4~~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 7, 12, 2, 1, 15, 16, 8, 6, 4, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 18, 17)

Hereditary worst-case heap # 656
 22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  18~~~~~17      11~~~~~5      7~~~~~12      2~~~~~1
Level 4: 15~~16   8~~~6   10~~~9   4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 18, 17, 11, 5, 7, 12, 2, 1, 15, 16, 8, 6, 10, 9, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 18, 17, 20)

Hereditary worst-case heap # 657

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      7~~~~~12      2~~~~~1
Level 4: 15~~~9   17~~~6   4~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 15, 9, 17, 6, 4, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 18, 18)

Hereditary worst-case heap # 658

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  16~~~~~18      11~~~~~5      7~~~~~12      2~~~~~1
Level 4: 15~~~9   17~~~6   10~~~8   4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 7, 12, 2, 1, 15, 9, 17, 6, 10, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 18, 18, 20)

Hereditary worst-case heap # 659

21-element heap level-by-level:

```

Level 0:                                21
Level 1:                20~14
Level 2:        19~11                13~3
Level 3:    16~18    10~5    7~12    2~1
Level 4: 15~9    8~17    4~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 15, 9, 8, 17, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 18, 19)

Hereditary worst-case heap # 660

22-element heap level-by-level:

```

Level 0:                                22
Level 1:                21~14
Level 2:        19~20                13~3
Level 3:    16~18    11~5    7~12    2~1
Level 4: 15~9    8~17    10~6    4~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 7, 12, 2, 1, 15, 9, 8, 17, 10, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 18, 19, 20)

Hereditary worst-case heap # 661

20-element heap level-by-level:

```

Level 0:                                20
Level 1:                19~14
Level 2:        18~11                13~3
Level 3:    16~17    10~5    7~12    2~1
Level 4: 15~9    4~8    6~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 7, 12, 2, 1, 15, 9, 4, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 19)

Hereditary worst-case heap # 662

21-element heap level-by-level:

```

Level 0:                                21

```

```

Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  18^^^^^^17      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 15^^16   4^^8   6^^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 7, 12, 2, 1, 15, 16, 4, 8, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 19, 17)

Hereditary worst-case heap # 663
 22-element heap level-by-level:

```

Level 0:          22
Level 1:      21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      20^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  18^^^^^^19      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 15^^16  17^^8   6^^9   4^^

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 18, 19, 10, 5, 7, 12, 2, 1, 15, 16, 17, 8, 6, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 19, 17, 18)

Hereditary worst-case heap # 664
 21-element heap level-by-level:

```

Level 0:          21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      10^^^^^^5      7^^^^^^12      2^^^^^^1
Level 4: 15^^9   17^^8   6^^4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 15, 9, 17, 8, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 19, 18)

Hereditary worst-case heap # 665
 22-element heap level-by-level:

```

Level 0:          22
Level 1:      21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^20          13^^^^^^^^^^^^^^^^3

```

Level 3: 16^^^^^18 11^^^^^^5 7^^^^^^12 2^^^^^^1
 Level 4: 15^^^9 17^^^8 6^^10 4^^

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 7, 12, 2, 1, 15, 9, 17, 8, 6, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 19, 18, 21)

Hereditary worst-case heap # 666

21-element heap level-by-level:

Level 0: 21
 Level 1: 20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
 Level 2: 19^^^^^^^^^^^^^^^^11 13^^^^^^^^^^^^^^^^3
 Level 3: 16^^^^^^18 10^^^^^^5 7^^^^^^12 2^^^^^^1
 Level 4: 15^^^9 4^^17 6^^8

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 7, 12, 2, 1, 15, 9, 4, 17, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 19, 19)

Hereditary worst-case heap # 667

22-element heap level-by-level:

Level 0: 22
 Level 1: 21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
 Level 2: 20^^^^^^^^^^^^^^^^11 13^^^^^^^^^^^^^^^^3
 Level 3: 16^^^^^^19 10^^^^^^5 7^^^^^^12 2^^^^^^1
 Level 4: 15^^^9 18^^17 6^^8 4^^

22 heap: [22, 21, 14, 20, 11, 13, 3, 16, 19, 10, 5, 7, 12, 2, 1, 15, 9, 18, 17, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 10, 16, 17, 16, 19, 19, 18)

Hereditary worst-case heap # 668

```

Level 0:                                16
Level 1:          15~~~~~14
Level 2:    9~~~~~11          13~~~~~3
Level 3:  6~~~~~8    4~~~~~10    7~~~~~12    2~~~~~1
Level 4: 5~~

```

```
Hereditary worst-case heap # 669
17-element heap level-by-level:
```

```
Hereditary worst-case heap # 670
18-element heap level-by-level:
```

```
Hereditary worst-case heap # 671
19-element heap level-by-level:
```

```

Level 0:                                19
Level 1: 18~::~::~::~::~::~::~::~::~::~14

```

```

Level 2:      17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^8      4^^^^^^10      7^^^^^^12      2^^^^^^1
Level 4:  9^^15   5^^6

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 4, 10, 7, 12, 2, 1, 9, 15, 5, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 11, 8, 16, 17)

Hereditary worst-case heap # 672

18-element heap level-by-level:

```

Level 0:                                18
Level 1:      17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   15^^^^^^8      4^^^^^^10      7^^^^^^12      2^^^^^^1
Level 4:  5^^9   6^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 4, 10, 7, 12, 2, 1, 5, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 11, 8, 17)

Hereditary worst-case heap # 673

19-element heap level-by-level:

```

Level 0:                                19
Level 1:      18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^8      4^^^^^^10      7^^^^^^12      2^^^^^^1
Level 4: 15^^9   6^^5

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 4, 10, 7, 12, 2, 1, 15, 9, 6, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 11, 8, 17, 16)

Hereditary worst-case heap # 674

17-element heap level-by-level:

```

Level 0:                                17

```

```

Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   9^^^^^^8      4^^^^^^10      7^^^^^^12      2^^^^^^1
Level 4:  6^^^5

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 8, 4, 10, 7, 12, 2, 1, 6, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 11, 16)

Hereditary worst-case heap # 675

18-element heap level-by-level:

```

Level 0:                      18
Level 1:      17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^8      4^^^^^^10      7^^^^^^12      2^^^^^^1
Level 4:  9^^^5   6^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 4, 10, 7, 12, 2, 1, 9, 5, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 11, 16, 16)

Hereditary worst-case heap # 676

19-element heap level-by-level:

```

Level 0:                      19
Level 1:      18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^8      4^^^^^^10      7^^^^^^12      2^^^^^^1
Level 4:  9^^15   6^^^5

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 4, 10, 7, 12, 2, 1, 9, 15, 6, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 11, 16, 16, 17)

Hereditary worst-case heap # 677

18-element heap level-by-level:

```

Level 0:                      18
Level 1:      17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3

```

Level 3: 15~~~~~8 4~~~~~10 7~~~~~12 2~~~~~1
 Level 4: 6~~~9 5~~

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 4, 10, 7, 12, 2, 1, 6, 9, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 11, 16, 17)

Hereditary worst-case heap # 678
 19-element heap level-by-level:

Level 0: 19
 Level 1: 18~~~~~14
 Level 2: 17~~~~~11 13~~~~~3
 Level 3: 16~~~~~8 4~~~~~10 7~~~~~12 2~~~~~1
 Level 4: 15~~~9 5~~~6

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 4, 10, 7, 12, 2, 1, 15, 9, 5, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 11, 16, 17, 16)

Hereditary worst-case heap # 679
 16-element heap level-by-level:

Level 0: 16
 Level 1: 11~~~~~15
 Level 2: 9~~~~~10 13~~~~~14
 Level 3: 6~~~~~8 4~~~~~5 7~~~~~12 3~~~~~1
 Level 4: 2~~

16 heap: [16, 11, 15, 9, 10, 13, 14, 6, 8, 4, 5, 7, 12, 3, 1, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 14)

Hereditary worst-case heap # 680
 17-element heap level-by-level:

Level 0: 17
 Level 1: 16~~~~~15
 Level 2: 11~~~~~10 13~~~~~14

Level 3: 9~~~~~8 4~~~~~5 7~~~~~12 3~~~~~1
 Level 4: 2~~~6

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 4, 5, 7, 12, 3, 1, 2, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 14, 8)

Hereditary worst-case heap # 681
 18-element heap level-by-level:

Level 0: 18
 Level 1: 17~~~~~15
 Level 2: 16~~~~~10 13~~~~~14
 Level 3: 11~~~~~8 4~~~~~5 7~~~~~12 3~~~~~1
 Level 4: 9~~~6 2~~

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 7, 12, 3, 1, 9, 6, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 14, 8, 16)

Hereditary worst-case heap # 682
 19-element heap level-by-level:

Level 0: 19
 Level 1: 18~~~~~15
 Level 2: 17~~~~~10 13~~~~~14
 Level 3: 16~~~~~8 4~~~~~5 7~~~~~12 3~~~~~1
 Level 4: 9~~11 2~~~6

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 7, 12, 3, 1, 9, 11, 2, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 14, 8, 16, 17)

Hereditary worst-case heap # 683
 20-element heap level-by-level:

Level 0: 20
 Level 1: 19~~~~~15
 Level 2: 18~~~~~10 13~~~~~14
 Level 3: 16~~~~~17 4~~~~~5 7~~~~~12 3~~~~~1
 Level 4: 9~~11 8~~~6 2~~

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 7, 12, 3, 1, 9, 11, 8, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 14, 8, 16, 17, 18)

Hereditary worst-case heap # 684

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^8      4^^^^^^5      7^^^^^^12      3^^^^^^1
Level 4:  2^^^9  6^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 7, 12, 3, 1, 2, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 14, 8, 17)

Hereditary worst-case heap # 685

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^8      4^^^^^^5      7^^^^^^12      3^^^^^^1
Level 4: 11^^^9  6^^^2

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 7, 12, 3, 1, 11, 9, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 14, 8, 17, 16)

Hereditary worst-case heap # 686

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17      4^^^^^^5      7^^^^^^12      3^^^^^^1
Level 4: 11^^^9  6^^^8  2^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 7, 12, 3, 1, 11, 9, 6, 8, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 14, 8, 17, 16, 19)

Hereditary worst-case heap # 687

17-element heap level-by-level:

```

Level 0:                                17
Level 1:                    16~15
Level 2:            11~10                13~14
Level 3:    9~8        4~5        7~12        3~1
Level 4:  6~2

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 4, 5, 7, 12, 3, 1, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 14, 16)

Hereditary worst-case heap # 688

18-element heap level-by-level:

```

Level 0:                                18
Level 1:                    17~15
Level 2:            16~10                13~14
Level 3:    11~8        4~5        7~12        3~1
Level 4:  9~2    6~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 7, 12, 3, 1, 9, 2, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 14, 16, 16)

Hereditary worst-case heap # 689

19-element heap level-by-level:

```

Level 0:                                19
Level 1:                    18~15
Level 2:            17~10                13~14
Level 3:    16~8        4~5        7~12        3~1
Level 4:  9~11    6~2

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 7, 12, 3, 1, 9, 11, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 14, 16, 16, 17)

Hereditary worst-case heap # 690

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~15
Level 2:      18~10      13~14
Level 3:  16~17      4~5      7~12      3~1
Level 4:  9~11  6~8  2~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 7, 12, 3, 1, 9, 11, 6, 8, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 14, 16, 16, 17, 19)

Hereditary worst-case heap # 691

18-element heap level-by-level:

```

Level 0:                18
Level 1:          17~15
Level 2:      16~10      13~14
Level 3:  11~8      4~5      7~12      3~1
Level 4:  6~9  2~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 7, 12, 3, 1, 6, 9, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 14, 16, 17)

Hereditary worst-case heap # 692

19-element heap level-by-level:

```

Level 0:                19
Level 1:          18~15
Level 2:      17~10      13~14
Level 3:  16~8      4~5      7~12      3~1
Level 4: 11~9  2~6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 7, 12, 3, 1, 11, 9, 2, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 14, 16, 17, 16)

Hereditary worst-case heap # 693

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~15
Level 2:      18~10      13~14
Level 3:  16~17      4~5      7~12      3~1
Level 4: 11~9   8~6   2~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 7, 12, 3, 1, 11, 9, 8, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 14, 16, 17, 16, 18)

Hereditary worst-case heap # 694

16-element heap level-by-level:

```

Level 0:                16
Level 1:          11~15
Level 2:      9~10      13~14
Level 3:  6~8      4~5      7~12      2~3
Level 4: 1~

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 6, 8, 4, 5, 7, 12, 2, 3, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 15)

Hereditary worst-case heap # 695

17-element heap level-by-level:

```

Level 0:                17
Level 1:          16~15
Level 2:      11~10      13~14
Level 3:  9~8      4~5      7~12      2~3
Level 4: 1~6

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 4, 5, 7, 12, 2, 3, 1, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 15, 8)

Hereditary worst-case heap # 696

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~::~15
Level 2:      16~::~::~10          13~::~::~14
Level 3:  11~::~8      4~::~5      7~::~12      2~::~3
Level 4:  9~6  1~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 7, 12, 2, 3, 9, 6, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 15, 8, 16)

Hereditary worst-case heap # 697

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18~::~::~15
Level 2:      17~::~10          13~::~14
Level 3:  16~::~8      4~::~5      7~::~12      2~::~3
Level 4:  9~11  1~6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 7, 12, 2, 3, 9, 11, 1, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 15, 8, 16, 17)

Hereditary worst-case heap # 698

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~15
Level 2:      18~::~10          13~::~14
Level 3:  16~::~17      4~::~5      7~::~12      2~::~3
Level 4:  9~11  8~6  1~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 7, 12, 2, 3, 9, 11, 8, 6, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 15, 8, 16, 17, 18)

Hereditary worst-case heap # 699

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^8      4^^^^^^5      7^^^^^^12      2^^^^^^3
Level 4:  1^^^9    6^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 7, 12, 2, 3, 1, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 15, 8, 17)

Hereditary worst-case heap # 700

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^8      4^^^^^^5      7^^^^^^12      2^^^^^^3
Level 4: 11^^^9    6^^1

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 7, 12, 2, 3, 11, 9, 6, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 15, 8, 17, 16)

Hereditary worst-case heap # 701

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17      4^^^^^^5      7^^^^^^12      2^^^^^^3
Level 4: 11^^^9    6^^8    1^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 7, 12, 2, 3, 11, 9, 6, 8, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 15, 8, 17, 16, 19)

Hereditary worst-case heap # 702

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:   9^^^^^^8      4^^^^^^5      7^^^^^^12      2^^^^^^3
Level 4: 6^^1

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 4, 5, 7, 12, 2, 3, 6, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 15, 16)

Hereditary worst-case heap # 703

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:   11^^^^^^8      4^^^^^^5      7^^^^^^12      2^^^^^^3
Level 4: 9^^1  6^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 7, 12, 2, 3, 9, 1, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 15, 16, 16)

Hereditary worst-case heap # 704

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:   16^^^^^^8      4^^^^^^5      7^^^^^^12      2^^^^^^3
Level 4: 9^^11  6^^1

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 7, 12, 2, 3, 9, 11, 6, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 15, 16, 16, 17)

Hereditary worst-case heap # 705

20-element heap level-by-level:

```

Level 0:                                20

```

```

Level 1:          19~15
Level 2:      18~10      13~14
Level 3:  16~17      4~5      7~12      2~3
Level 4:  9~11  6~8  1~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 7, 12, 2, 3, 9, 11, 6, 8, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 15, 16, 16, 17, 19)

Hereditary worst-case heap # 706
 18-element heap level-by-level:

```

Level 0:          18
Level 1:      17~15
Level 2:  16~10      13~14
Level 3:  11~8      4~5      7~12      2~3
Level 4:  6~9  1~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 7, 12, 2, 3, 6, 9, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 15, 16, 17)

Hereditary worst-case heap # 707
 19-element heap level-by-level:

```

Level 0:          19
Level 1:      18~15
Level 2:  17~10      13~14
Level 3:  16~8      4~5      7~12      2~3
Level 4: 11~9  1~6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 7, 12, 2, 3, 11, 9, 1, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 15, 16, 17, 16)

Hereditary worst-case heap # 708
 20-element heap level-by-level:

```

Level 0:          20
Level 1:      19~15

```

```

Level 2:      18^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   16^^^^^^17      4^^^^^^5      7^^^^^^12      2^^^^^^3
Level 4: 11^^^9   8^^^6   1^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 7, 12, 2, 3, 11, 9, 8, 6, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 12, 13, 15, 16, 17, 16, 18)

Hereditary worst-case heap # 709
 14-element heap level-by-level:

```

Level 0:              14
Level 1:      11^^^^^^^^^^^^^^^^13
Level 2:   9^^^^^^10      12^^^^^^3
Level 3: 6^^^8   4^^^5   2^^^7   1^^

```

14 heap: [14, 11, 13, 9, 10, 12, 3, 6, 8, 4, 5, 2, 7, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13)

Hereditary worst-case heap # 710
 15-element heap level-by-level:

```

Level 0:              15
Level 1:      11^^^^^^^^^^^^^^^^14
Level 2:   9^^^^^^10      13^^^^^^3
Level 3: 6^^^8   4^^^5   12^^^7   1^^2

```

15 heap: [15, 11, 14, 9, 10, 13, 3, 6, 8, 4, 5, 12, 7, 1, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12)

Hereditary worst-case heap # 711
 16-element heap level-by-level:

```

Level 0:              16

```

```

Level 1:          11^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      9^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  6^^^^^^8      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  3^^

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 6, 8, 4, 5, 12, 7, 1, 2, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 7)

Hereditary worst-case heap # 712

17-element heap level-by-level:

```

Level 0:                      17
Level 1:      16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:  11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  9^^^^^^8      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  3^^6

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 4, 5, 12, 7, 1, 2, 3, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 7, 8)

Hereditary worst-case heap # 713

18-element heap level-by-level:

```

Level 0:                      18
Level 1:      17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:  16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^8      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  9^^6  3^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 12, 7, 1, 2, 9, 6, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 7, 8, 16)

Hereditary worst-case heap # 714

19-element heap level-by-level:

```

Level 0:                      19
Level 1:      18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:  17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^8      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  9^^11  3^^6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 12, 7, 1, 2, 9, 11, 3, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 7, 8, 16, 17)

Hereditary worst-case heap # 715
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~::~::~15
Level 2:      18~::~10          13~::~14
Level 3:  16~::17      4~::5      12~::7      1~::2
Level 4:  9~11  8~6  3~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 12, 7, 1, 2, 9, 11, 8, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 7, 8, 16, 17, 18)

Hereditary worst-case heap # 716
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~15
Level 2:      16~::~10          13~::~14
Level 3:  11~::8      4~::5      12~::7      1~::2
Level 4:  3~9  6~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 12, 7, 1, 2, 3, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 7, 8, 17)

Hereditary worst-case heap # 717
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18~::~::~15
Level 2:      17~::~10          13~::~14
Level 3:  16~::8      4~::5      12~::7      1~::2
Level 4: 11~9  6~3

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 12, 7, 1, 2, 11, 9, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 7, 8, 17, 16)

Hereditary worst-case heap # 718
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~::~::~15
Level 2:      18~::~10          13~::~14
Level 3:  16~::17      4~::5      12~::7      1~::2
Level 4: 11~9   6~8   3~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 12, 7, 1, 2, 11, 9, 6, 8, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 7, 8, 17, 16, 19)

Hereditary worst-case heap # 719
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~15
Level 2:      11~::10          13~::14
Level 3:   9~8      4~5      12~7      1~2
Level 4: 6~3

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 4, 5, 12, 7, 1, 2, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 7, 16)

Hereditary worst-case heap # 720
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~15
Level 2:      16~::~10          13~::~14
Level 3:  11~8      4~5      12~7      1~2
Level 4: 9~3   6~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 12, 7, 1, 2, 9, 3, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 7, 16, 16)

Hereditary worst-case heap # 721
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18~::~::~::~::~15
Level 2:      17~::~10~::~13~::~14
Level 3:  16~::8~::4~::5~::12~::7~::1~::2
Level 4:  9~11~6~3

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 12, 7, 1, 2, 9, 11, 6, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 7, 16, 16, 17)

Hereditary worst-case heap # 722
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~::~15
Level 2:      18~::~10~::~13~::~14
Level 3:  16~::17~::4~::5~::12~::7~::1~::2
Level 4:  9~11~6~8~3~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 12, 7, 1, 2, 9, 11, 6, 8, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 7, 16, 16, 17, 19)

Hereditary worst-case heap # 723
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~15
Level 2:      16~::~10~::~13~::~14
Level 3:  11~::8~::4~::5~::12~::7~::1~::2
Level 4:  6~9~3~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 12, 7, 1, 2, 6, 9, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 7, 16, 17)

Hereditary worst-case heap # 724

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^8      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 11^^^9   3^^^6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 12, 7, 1, 2, 11, 9, 3, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 7, 16, 17, 16)

Hereditary worst-case heap # 725

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 11^^^9   8^^^6   3^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 12, 7, 1, 2, 11, 9, 8, 6, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 7, 16, 17, 16, 18)

Hereditary worst-case heap # 726

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:   9^^^^^^8      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 6^^

```

16 heap: [16, 15, 14, 11, 10, 13, 3, 9, 8, 4, 5, 12, 7, 1, 2, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 8)

Hereditary worst-case heap # 727
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~::~14
Level 2:      15~::~10          13~::~3
Level 3:  11~::8      4~::5      12~::7      1~::2
Level 4:  6~::9

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 8, 4, 5, 12, 7, 1, 2, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 8, 8)

Hereditary worst-case heap # 728
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~14
Level 2:      16~::~10          13~::~3
Level 3:  15~::8      4~::5      12~::7      1~::2
Level 4: 11~::9  6~::

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 8, 4, 5, 12, 7, 1, 2, 11, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 8, 8, 16)

Hereditary worst-case heap # 729
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~14
Level 2:      15~::~10          13~::~3
Level 3:  11~::8      4~::5      12~::7      1~::2
Level 4:  9~::6

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 8, 4, 5, 12, 7, 1, 2, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 8, 16)

Hereditary worst-case heap # 730

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^8      4^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  9^^11  6^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 8, 4, 5, 12, 7, 1, 2, 9, 11, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 8, 16, 17)

Hereditary worst-case heap # 731

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      9^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:  6^^^^^^8      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  4^^

```

16 heap: [16, 15, 14, 9, 11, 13, 3, 6, 8, 10, 5, 12, 7, 1, 2, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10)

Hereditary worst-case heap # 732

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:  9^^^^^^8      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  4^^^6

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 8, 10, 5, 12, 7, 1, 2, 4, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8)

Hereditary worst-case heap # 733

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^8      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  9^^6    4^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 10, 5, 12, 7, 1, 2, 9, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16)

Hereditary worst-case heap # 734

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^8      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  9^^15    4^^6

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 10, 5, 12, 7, 1, 2, 9, 15, 4, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17)

Hereditary worst-case heap # 735

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^17      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  9^^15    4^^6    8^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 12, 7, 1, 2, 9, 15, 4, 6, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 9)

Hereditary worst-case heap # 736

21-element heap level-by-level:

```

Level 0:                                21

```

```

Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  18^^^^^^17      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 16^^15   4^^6   8^^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 12, 7, 1, 2, 16, 15, 4, 6, 8, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 9, 16)

Hereditary worst-case heap # 737
 22-element heap level-by-level:

```

Level 0:          22
Level 1:      21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      20^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  18^^^^^^19      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 16^^15  17^^6   8^^9   4^^

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 18, 19, 10, 5, 12, 7, 1, 2, 16, 15, 17, 6, 8, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 9, 16, 18)

Hereditary worst-case heap # 738
 21-element heap level-by-level:

```

Level 0:          21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^18      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:  9^^15  17^^6   8^^4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 9, 15, 17, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 9, 18)

Hereditary worst-case heap # 739
 22-element heap level-by-level:

```

Level 0:          22
Level 1:      21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^20          13^^^^^^^^^^^^^^^^3

```

Level 3: 16~~~~~18 11~~~~~5 12~~~~~7 1~~~~~2
 Level 4: 9~~15 17~~~6 8~~10 4~~

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 12, 7, 1, 2, 9, 15, 17, 6, 8, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 9, 18, 21)

Hereditary worst-case heap # 740
 21-element heap level-by-level:

Level 0: 21
 Level 1: 20~~~~~14
 Level 2: 19~~~~~11 13~~~~~3
 Level 3: 16~~~~~18 10~~~~~5 12~~~~~7 1~~~~~2
 Level 4: 9~~15 4~~17 8~~~6

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 9, 15, 4, 17, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 9, 19)

Hereditary worst-case heap # 741
 22-element heap level-by-level:

Level 0: 22
 Level 1: 21~~~~~14
 Level 2: 20~~~~~11 13~~~~~3
 Level 3: 16~~~~~19 10~~~~~5 12~~~~~7 1~~~~~2
 Level 4: 9~~15 18~~17 8~~~6 4~~

22 heap: [22, 21, 14, 20, 11, 13, 3, 16, 19, 10, 5, 12, 7, 1, 2, 9, 15, 18, 17, 8, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 9, 19, 18)

Hereditary worst-case heap # 742
 20-element heap level-by-level:

Level 0: 20
 Level 1: 19~~~~~14

```

Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   17^^^^^^8      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 16^^15   4^^^6   9^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 17, 8, 10, 5, 12, 7, 1, 2, 16, 15, 4, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 16)

Hereditary worst-case heap # 743
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   17^^^^^^18      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 16^^15   4^^^6   9^^^8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 12, 7, 1, 2, 16, 15, 4, 6, 9, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 16, 9)

Hereditary worst-case heap # 744
 22-element heap level-by-level:

```

Level 0:                                22
Level 1:      21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      20^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   17^^^^^^19      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 16^^15  18^^^6   9^^^8   4^^

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 17, 19, 10, 5, 12, 7, 1, 2, 16, 15, 18, 6, 9, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 16, 9, 18)

Hereditary worst-case heap # 745
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   17^^^^^^18      10^^^^^^5      12^^^^^^7      1^^^^^^2

```

Level 4: 16¹⁵ 8⁶ 9⁴

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 12, 7, 1, 2, 16, 15, 8, 6, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 16, 18)

Hereditary worst-case heap # 746

22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^20          13^^^^^^^^^^^^^^^^3
Level 3:  17^^^^^^18      11^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 1615 86 910 4^

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 17, 18, 11, 5, 12, 7, 1, 2, 16, 15, 8, 6, 9, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 16, 18, 21)

Hereditary worst-case heap # 747

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  17^^^^^^18      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 1615 48 96

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 12, 7, 1, 2, 16, 15, 4, 8, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 16, 19)

Hereditary worst-case heap # 748

22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      20^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  17^^^^^^19      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 1615 188 96 4^

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 17, 19, 10, 5, 12, 7, 1, 2, 16, 15, 18, 8, 9, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 16, 19, 18)

Hereditary worst-case heap # 749

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~::~::~::~::~::~14
Level 2:      18~::~::~11          13~::~::~3
Level 3:  16~::~17      10~::~5      12~::~7      1~::~2
Level 4:  9~15   8~6   4~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 12, 7, 1, 2, 9, 15, 8, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 18)

Hereditary worst-case heap # 750

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~::~::~::~::~::~::~14
Level 2:      19~::~::~11          13~::~::~3
Level 3:  18~::~17      10~::~5      12~::~7      1~::~2
Level 4: 16~15   8~6   4~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 12, 7, 1, 2, 16, 15, 8, 6, 4, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 18, 16)

Hereditary worst-case heap # 751

22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21~::~::~::~::~::~::~14
Level 2:      19~::~::~20          13~::~::~3
Level 3:  18~::~17      11~::~5      12~::~7      1~::~2
Level 4: 16~15   8~6   10~9   4~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 18, 17, 11, 5, 12, 7, 1, 2, 16, 15, 8, 6, 10, 9, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 18, 16, 20)

Hereditary worst-case heap # 752

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      12~~~~~7      1~~~~~2
Level 4:  9~~15  17~~~6   4~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 9, 15, 17, 6, 4, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 18, 18)

Hereditary worst-case heap # 753

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  16~~~~~18      11~~~~~5      12~~~~~7      1~~~~~2
Level 4:  9~~15  17~~~6  10~~~8   4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 12, 7, 1, 2, 9, 15, 17, 6, 10, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 18, 18, 20)

Hereditary worst-case heap # 754

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      12~~~~~7      1~~~~~2
Level 4:  9~~15   8~~17   4~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 9, 15, 8, 17, 4, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 18, 19)

Hereditary worst-case heap # 755

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  16~~~~~18      11~~~~~5      12~~~~~7      1~~~~~2
Level 4:  9~~15   8~~17   10~~~6   4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 12, 7, 1, 2, 9, 15, 8, 17, 10, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 18, 19, 20)

Hereditary worst-case heap # 756

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:      18~~~~~11          13~~~~~3
Level 3:  16~~~~~17      10~~~~~5      12~~~~~7      1~~~~~2
Level 4:  9~~15   4~~~8   6~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 12, 7, 1, 2, 9, 15, 4, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 19)

Hereditary worst-case heap # 757

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 16~~15   4~~~8   6~~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 12, 7, 1, 2, 16, 15, 4, 8, 6, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 19, 16)

Hereditary worst-case heap # 758

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      20~~~~~11          13~~~~~3
Level 3:  18~~~~~19      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 16~~15  17~~~8   6~~~9   4~~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 18, 19, 10, 5, 12, 7, 1, 2, 16, 15, 17, 8, 6, 9, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 19, 16, 18)

Hereditary worst-case heap # 759

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      12~~~~~7      1~~~~~2
Level 4:  9~~15  17~~~8   6~~~4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 9, 15, 17, 8, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 19, 18)

Hereditary worst-case heap # 760

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  16~~~~~18      11~~~~~5      12~~~~~7      1~~~~~2
Level 4:  9~~15  17~~~8   6~~10   4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 12, 7, 1, 2, 9, 15, 17, 8, 6, 10, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 19, 18, 21)

Hereditary worst-case heap # 761

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  16~~~~~18    10~~~~~5    12~~~~~7    1~~~~~2
Level 4:  9~~15   4~~17   6~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 9, 15, 4, 17, 6, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 19, 19)

Hereditary worst-case heap # 762

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:    20~~~~~11          13~~~~~3
Level 3:  16~~~~~19    10~~~~~5    12~~~~~7    1~~~~~2
Level 4:  9~~15  18~~17   6~~~8   4~~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 16, 19, 10, 5, 12, 7, 1, 2, 9, 15, 18, 17, 6, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 16, 17, 19, 19, 18)

Hereditary worst-case heap # 763

18-element heap level-by-level:

```

Level 0:                18
Level 1:          17~~~~~14
Level 2:    16~~~~~11          13~~~~~3
Level 3:  15~~~~~8    10~~~~~5    12~~~~~7    1~~~~~2
Level 4:  4~~~9   6~~

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 10, 5, 12, 7, 1, 2, 4, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17)

Hereditary worst-case heap # 764

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18~::~::~::~::~14
Level 2:      17~::~11~::13~::~3
Level 3:  16~::8~::10~::5~::12~::7~::1~::2
Level 4: 15~^9  6~^4

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 10, 5, 12, 7, 1, 2, 15, 9, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16)

Hereditary worst-case heap # 765

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~::~::~::~14
Level 2:      18~::~11~::13~::~3
Level 3:  16~::17~::10~::5~::12~::7~::1~::2
Level 4: 15~^9  6~^4  8~^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 12, 7, 1, 2, 15, 9, 6, 4, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 9)

Hereditary worst-case heap # 766

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~::~::~::~14
Level 2:      19~::~11~::13~::~3
Level 3:  18~::17~::10~::5~::12~::7~::1~::2
Level 4: 15~^16  6~^4  8~^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 12, 7, 1, 2, 15, 16, 6, 4, 8, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 9, 17)

Hereditary worst-case heap # 767

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:    20~~~~~11          13~~~~~3
Level 3:  18~~~~~19    10~~~~~5    12~~~~~7    1~~~~~2
Level 4: 15~~16   6~~17   8~~~9   4~~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 18, 19, 10, 5, 12, 7, 1, 2, 15, 16, 6, 17, 8, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 9, 17, 19)

Hereditary worst-case heap # 768
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  16~~~~~18    10~~~~~5    12~~~~~7    1~~~~~2
Level 4: 15~~~9   17~~~4   8~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 15, 9, 17, 4, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 9, 18)

Hereditary worst-case heap # 769
 22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:    20~~~~~11          13~~~~~3
Level 3:  16~~~~~19    10~~~~~5    12~~~~~7    1~~~~~2
Level 4: 15~~~9   17~~18   8~~~6   4~~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 16, 19, 10, 5, 12, 7, 1, 2, 15, 9, 17, 18, 8, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 9, 18, 19)

Hereditary worst-case heap # 770
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  16~~~~~18    10~~~~~5    12~~~~~7    1~~~~~2
Level 4: 15~~~9   6~~17   8~~~4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 15, 9, 6, 17, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 9, 19)

Hereditary worst-case heap # 771
 22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:    19~~~~~20          13~~~~~3
Level 3:  16~~~~~18    11~~~~~5    12~~~~~7    1~~~~~2
Level 4: 15~~~9   6~~17   8~~10   4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 12, 7, 1, 2, 15, 9, 6, 17, 8, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 9, 19, 21)

Hereditary worst-case heap # 772
 20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:    18~~~~~11          13~~~~~3
Level 3:  17~~~~~8    10~~~~~5    12~~~~~7    1~~~~~2
Level 4: 15~~16   6~~~4   9~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 17, 8, 10, 5, 12, 7, 1, 2, 15, 16, 6, 4, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 17)

Hereditary worst-case heap # 773
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  17~~~~~18      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~16   6~~~4   9~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 12, 7, 1, 2, 15, 16, 6, 4, 9, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 17, 9)

Hereditary worst-case heap # 774

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      20~~~~~11          13~~~~~3
Level 3:  17~~~~~19      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~16   6~~18   9~~~8   4~~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 17, 19, 10, 5, 12, 7, 1, 2, 15, 16, 6, 18, 9, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 17, 9, 19)

Hereditary worst-case heap # 775

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  17~~~~~18      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~16   8~~~4   9~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 12, 7, 1, 2, 15, 16, 8, 4, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 17, 18)

Hereditary worst-case heap # 776

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14

```

```

Level 2:      20^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   17^^^^^^19      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 15^^16   8^^18   9^^6   4^^

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 17, 19, 10, 5, 12, 7, 1, 2, 15, 16, 8, 18, 9, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 17, 18, 19)

Hereditary worst-case heap # 777

21-element heap level-by-level:

```

Level 0:                      21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   17^^^^^^18      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 15^^16   6^^8   9^^4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 12, 7, 1, 2, 15, 16, 6, 8, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 17, 19)

Hereditary worst-case heap # 778

22-element heap level-by-level:

```

Level 0:                      22
Level 1:      21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^20          13^^^^^^^^^^^^^^^^3
Level 3:   17^^^^^^18      11^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 15^^16   6^^8   9^^10   4^^

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 17, 18, 11, 5, 12, 7, 1, 2, 15, 16, 6, 8, 9, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 17, 19, 21)

Hereditary worst-case heap # 779

20-element heap level-by-level:

```

Level 0:                      20

```

```

Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^17      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 15^^^9   8^^^4   6^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 12, 7, 1, 2, 15, 9, 8, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 18)

Hereditary worst-case heap # 780
 21-element heap level-by-level:

```

Level 0:                      21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  18^^^^^^17      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 15^^16   8^^^4   6^^^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 12, 7, 1, 2, 15, 16, 8, 4, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 18, 17)

Hereditary worst-case heap # 781
 22-element heap level-by-level:

```

Level 0:                      22
Level 1:      21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      20^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  18^^^^^^19      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 15^^16   8^^17   6^^^9   4^^

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 18, 19, 10, 5, 12, 7, 1, 2, 15, 16, 8, 17, 6, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 18, 17, 19)

Hereditary worst-case heap # 782
 21-element heap level-by-level:

```

Level 0:                      21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3

```

Level 3: 16~~~~~18 10~~~~~5 12~~~~~7 1~~~~~2
 Level 4: 15~~~9 17~~~4 6~~~8

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 15, 9, 17, 4, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 18, 18)

Hereditary worst-case heap # 783

22-element heap level-by-level:

Level 0: 22
 Level 1: 21~~~~~14
 Level 2: 20~~~~~11 13~~~~~3
 Level 3: 16~~~~~19 10~~~~~5 12~~~~~7 1~~~~~2
 Level 4: 15~~~9 17~~~18 6~~~8 4~~

22 heap: [22, 21, 14, 20, 11, 13, 3, 16, 19, 10, 5, 12, 7, 1, 2, 15, 9, 17, 18, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 18, 18, 19)

Hereditary worst-case heap # 784

21-element heap level-by-level:

Level 0: 21
 Level 1: 20~~~~~14
 Level 2: 19~~~~~11 13~~~~~3
 Level 3: 16~~~~~18 10~~~~~5 12~~~~~7 1~~~~~2
 Level 4: 15~~~9 8~~~17 6~~~4

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 15, 9, 8, 17, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 18, 19)

Hereditary worst-case heap # 785

22-element heap level-by-level:

Level 0: 22
 Level 1: 21~~~~~14
 Level 2: 19~~~~~20 13~~~~~3
 Level 3: 16~~~~~18 11~~~~~5 12~~~~~7 1~~~~~2
 Level 4: 15~~~9 8~~~17 6~~~10 4~~

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 12, 7, 1, 2, 15, 9, 8, 17, 6, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 18, 19, 21)

Hereditary worst-case heap # 786
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~14
Level 2:      18~11          13~3
Level 3:  16~17      10~5      12~7      1~2
Level 4: 15~9  6~8  4~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 12, 7, 1, 2, 15, 9, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 19)

Hereditary worst-case heap # 787
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~14
Level 2:      19~11          13~3
Level 3:  18~17      10~5      12~7      1~2
Level 4: 15~16  6~8  4~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 12, 7, 1, 2, 15, 16, 6, 8, 4, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 19, 17)

Hereditary worst-case heap # 788
 22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21~14
Level 2:      19~20          13~3
Level 3:  18~17      11~5      12~7      1~2
Level 4: 15~16  6~8  10~9  4~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 18, 17, 11, 5, 12, 7, 1, 2, 15, 16, 6, 8, 10, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 19, 17, 20)

Hereditary worst-case heap # 789

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~18      10~~~~5      12~~~~7      1~~~~2
Level 4: 15~~~9  17~~~8  4~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 15, 9, 17, 8, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 19, 18)

Hereditary worst-case heap # 790

22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  16~~~~18      11~~~~5      12~~~~7      1~~~~2
Level 4: 15~~~9  17~~~8  10~~~6  4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 12, 7, 1, 2, 15, 9, 17, 8, 10, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 19, 18, 20)

Hereditary worst-case heap # 791

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~18      10~~~~5      12~~~~7      1~~~~2
Level 4: 15~~~9  6~~17  4~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 15, 9, 6, 17, 4, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 19, 19)

Hereditary worst-case heap # 792
 22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  16~~~~~18      11~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~~9   6~~17   10~~~8   4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 12, 7, 1, 2, 15, 9, 6, 17, 10, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 8, 17, 16, 19, 19, 20)

Hereditary worst-case heap # 793
 17-element heap level-by-level:

```

Level 0:                17
Level 1:          16~~~~~14
Level 2:      15~~~~~11          13~~~~~3
Level 3:   9~~~~~8      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 6~~~4

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 8, 10, 5, 12, 7, 1, 2, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16)

Hereditary worst-case heap # 794
 18-element heap level-by-level:

```

Level 0:                18
Level 1:          17~~~~~14
Level 2:      16~~~~~11          13~~~~~3
Level 3:  15~~~~~8      10~~~~~5      12~~~~~7      1~~~~~2

```

Level 4: 9^{^^^4} 6^{^^}

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 10, 5, 12, 7, 1, 2, 9, 4, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16)

Hereditary worst-case heap # 795

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^8      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 9^^15 6^^^4

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 10, 5, 12, 7, 1, 2, 9, 15, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17)

Hereditary worst-case heap # 796

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^17      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 9^^15 6^^^4 8^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 12, 7, 1, 2, 9, 15, 6, 4, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 9)

Hereditary worst-case heap # 797

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  18^^^^^^17      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 16^^15 6^^^4 8^^^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 12, 7, 1, 2, 16, 15, 6, 4, 8, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 9, 16)

Hereditary worst-case heap # 798

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~14
Level 2:    20~11      13~3
Level 3:  18~19    10~5    12~7    1~2
Level 4: 16~15  6~17  8~9  4~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 18, 19, 10, 5, 12, 7, 1, 2, 16, 15, 6, 17, 8, 9, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 9, 16, 19)

Hereditary worst-case heap # 799

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~14
Level 2:    19~11      13~3
Level 3:  16~18    10~5    12~7    1~2
Level 4:  9~15  17~4  8~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 9, 15, 17, 4, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 9, 18)

Hereditary worst-case heap # 800

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~14
Level 2:    20~11      13~3
Level 3:  16~19    10~5    12~7    1~2
Level 4:  9~15  17~18  8~6  4~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 16, 19, 10, 5, 12, 7, 1, 2, 9, 15, 17, 18, 8, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 9, 18, 19)

Hereditary worst-case heap # 801

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      12~~~~~7      1~~~~~2
Level 4:  9~~15   6~~17   8~~4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 9, 15, 6, 17, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 9, 19)

Hereditary worst-case heap # 802

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  16~~~~~18      11~~~~~5      12~~~~~7      1~~~~~2
Level 4:  9~~15   6~~17   8~~10   4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 12, 7, 1, 2, 9, 15, 6, 17, 8, 10, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 9, 19, 21)

Hereditary worst-case heap # 803

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:      18~~~~~11          13~~~~~3
Level 3:  17~~~~~8      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 16~~15   6~~4   9~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 17, 8, 10, 5, 12, 7, 1, 2, 16, 15, 6, 4, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 16)

Hereditary worst-case heap # 804

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  17~~~~~18      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 16~~15   6~~4   9~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 12, 7, 1, 2, 16, 15, 6, 4, 9, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 16, 9)

Hereditary worst-case heap # 805

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      20~~~~~11          13~~~~~3
Level 3:  17~~~~~19      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 16~~15   6~~18   9~~8   4~~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 17, 19, 10, 5, 12, 7, 1, 2, 16, 15, 6, 18, 9, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 16, 9, 19)

Hereditary worst-case heap # 806

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  17~~~~~18      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 16~~15   8~~4   9~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 12, 7, 1, 2, 16, 15, 8, 4, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 16, 18)

Hereditary worst-case heap # 807

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:    20~~~~~11          13~~~~~3
Level 3:  17~~~~~19    10~~~~~5    12~~~~~7    1~~~~~2
Level 4: 16~~15   8~~18   9~~~6   4~~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 17, 19, 10, 5, 12, 7, 1, 2, 16, 15, 8, 18, 9, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 16, 18, 19)

Hereditary worst-case heap # 808
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  17~~~~~18    10~~~~~5    12~~~~~7    1~~~~~2
Level 4: 16~~15   6~~~8   9~~~4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 12, 7, 1, 2, 16, 15, 6, 8, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 16, 19)

Hereditary worst-case heap # 809
 22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:    19~~~~~20          13~~~~~3
Level 3:  17~~~~~18    11~~~~~5    12~~~~~7    1~~~~~2
Level 4: 16~~15   6~~~8   9~~10   4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 17, 18, 11, 5, 12, 7, 1, 2, 16, 15, 6, 8, 9, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 16, 19, 21)

Hereditary worst-case heap # 810

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~14
Level 2:      18~11      13~3
Level 3:  16~17      10~5      12~7      1~2
Level 4:  9~15   8~4   6~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 12, 7, 1, 2, 9, 15, 8, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 18)

Hereditary worst-case heap # 811

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~14
Level 2:      19~11      13~3
Level 3:  18~17      10~5      12~7      1~2
Level 4: 16~15   8~4   6~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 12, 7, 1, 2, 16, 15, 8, 4, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 18, 16)

Hereditary worst-case heap # 812

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~14
Level 2:      20~11      13~3
Level 3:  18~19      10~5      12~7      1~2
Level 4: 16~15   8~17   6~9   4~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 18, 19, 10, 5, 12, 7, 1, 2, 16, 15, 8, 17, 6, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 18, 16, 19)

Hereditary worst-case heap # 813

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~::~::~::~::~::~14
Level 2:      19~::~11          13~::~3
Level 3:  16~::18      10~::5      12~::7      1~::2
Level 4:  9~15  17~4  6~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 9, 15, 17, 4, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 18, 18)

Hereditary worst-case heap # 814

22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21~::~::~::~::~14
Level 2:      20~::~11          13~::~3
Level 3:  16~::19      10~::5      12~::7      1~::2
Level 4:  9~15  17~18  6~8  4~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 16, 19, 10, 5, 12, 7, 1, 2, 9, 15, 17, 18, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 18, 18, 19)

Hereditary worst-case heap # 815

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~::~::~::~::~14
Level 2:      19~::~11          13~::~3
Level 3:  16~::18      10~::5      12~::7      1~::2
Level 4:  9~15  8~17  6~4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 9, 15, 8, 17, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 18, 19)

Hereditary worst-case heap # 816

22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21~::~::~::~::~14

```

```

Level 2:      19^^^^^^^^^^^^^^^^20          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^18      11^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:   9^^15   8^^17   6^^10   4^^

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 12, 7, 1, 2, 9, 15, 8, 17, 6, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 18, 19, 21)

Hereditary worst-case heap # 817
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:      19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^17      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4:   9^^15   6^^^8   4^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 12, 7, 1, 2, 9, 15, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 19)

Hereditary worst-case heap # 818
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   18^^^^^^17      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 16^^15   6^^^8   4^^^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 12, 7, 1, 2, 16, 15, 6, 8, 4, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 19, 16)

Hereditary worst-case heap # 819
 22-element heap level-by-level:

```

Level 0:                                22
Level 1:      21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^20          13^^^^^^^^^^^^^^^^3

```

Level 3: 18~~~~~17 11~~~~~5 12~~~~~7 1~~~~~2
 Level 4: 16~~15 6~~~8 10~~~9 4~~

22 heap: [22, 21, 14, 19, 20, 13, 3, 18, 17, 11, 5, 12, 7, 1, 2, 16, 15, 6, 8, 10, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 19, 16, 20)

Hereditary worst-case heap # 820

21-element heap level-by-level:

Level 0: 21
 Level 1: 20~~~~~14
 Level 2: 19~~~~~11 13~~~~~3
 Level 3: 16~~~~~18 10~~~~~5 12~~~~~7 1~~~~~2
 Level 4: 9~~15 17~~~8 4~~~6

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 9, 15, 17, 8, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 19, 18)

Hereditary worst-case heap # 821

22-element heap level-by-level:

Level 0: 22
 Level 1: 21~~~~~14
 Level 2: 19~~~~~20 13~~~~~3
 Level 3: 16~~~~~18 11~~~~~5 12~~~~~7 1~~~~~2
 Level 4: 9~~15 17~~~8 10~~~6 4~~

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 12, 7, 1, 2, 9, 15, 17, 8, 10, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 19, 18, 20)

Hereditary worst-case heap # 822

21-element heap level-by-level:

Level 0: 21
 Level 1: 20~~~~~14
 Level 2: 19~~~~~11 13~~~~~3

Level 3: 16~~~~~18 10~~~~~5 12~~~~~7 1~~~~~2
 Level 4: 9~~15 6~~17 4~~~8

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 9, 15, 6, 17, 4, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 19, 19)

Hereditary worst-case heap # 823

22-element heap level-by-level:

Level 0: 22
 Level 1: 21~~~~~14
 Level 2: 19~~~~~20 13~~~~~3
 Level 3: 16~~~~~18 11~~~~~5 12~~~~~7 1~~~~~2
 Level 4: 9~~15 6~~17 10~~~8 4~~

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 12, 7, 1, 2, 9, 15, 6, 17, 10, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 16, 17, 19, 19, 20)

Hereditary worst-case heap # 824

18-element heap level-by-level:

Level 0: 18
 Level 1: 17~~~~~14
 Level 2: 16~~~~~11 13~~~~~3
 Level 3: 15~~~~~8 10~~~~~5 12~~~~~7 1~~~~~2
 Level 4: 6~~~9 4~~

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 10, 5, 12, 7, 1, 2, 6, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17)

Hereditary worst-case heap # 825

19-element heap level-by-level:

Level 0: 19
 Level 1: 18~~~~~14

```

Level 2:      17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^8      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 15^^9   4^^6

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 10, 5, 12, 7, 1, 2, 15, 9, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16)

Hereditary worst-case heap # 826
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:      19^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      18^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^17      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 15^^9   4^^6   8^^

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 12, 7, 1, 2, 15, 9, 4, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 9)

Hereditary worst-case heap # 827
 21-element heap level-by-level:

```

Level 0:                                21
Level 1:      20^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      19^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   18^^^^^^17      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 15^^16   4^^6   8^^9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 12, 7, 1, 2, 15, 16, 4, 6, 8, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 9, 17)

Hereditary worst-case heap # 828
 22-element heap level-by-level:

```

Level 0:                                22
Level 1:      21^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      20^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:   18^^^^^^19      10^^^^^^5      12^^^^^^7      1^^^^^^2
Level 4: 15^^16   17^^6   8^^9   4^^

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 18, 19, 10, 5, 12, 7, 1, 2, 15, 16, 17, 6, 8, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 9, 17, 18)

Hereditary worst-case heap # 829

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~~9  17~~~6  8~~~4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 15, 9, 17, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 9, 18)

Hereditary worst-case heap # 830

22-element heap level-by-level:

```

Level 0:                                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  16~~~~~18      11~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~~9  17~~~6  8~~10  4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 12, 7, 1, 2, 15, 9, 17, 6, 8, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 9, 18, 21)

Hereditary worst-case heap # 831

21-element heap level-by-level:

```

Level 0:                                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~~9  4~~17  8~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 15, 9, 4, 17, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 9, 19)

Hereditary worst-case heap # 832
 22-element heap level-by-level:

```

Level 0:                22
Level 1:      21~~~~~14
Level 2:    20~~~~~11      13~~~~~3
Level 3:  16~~~~~19    10~~~~~5    12~~~~~7    1~~~~~2
Level 4: 15~~~9  18~~17  8~~~6  4~~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 16, 19, 10, 5, 12, 7, 1, 2, 15, 9, 18, 17, 8, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 9, 19, 18)

Hereditary worst-case heap # 833
 20-element heap level-by-level:

```

Level 0:                20
Level 1:      19~~~~~14
Level 2:    18~~~~~11      13~~~~~3
Level 3:  17~~~~~8    10~~~~~5    12~~~~~7    1~~~~~2
Level 4: 15~~16  4~~~6  9~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 17, 8, 10, 5, 12, 7, 1, 2, 15, 16, 4, 6, 9]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 17)

Hereditary worst-case heap # 834
 21-element heap level-by-level:

```

Level 0:                21
Level 1:      20~~~~~14
Level 2:    19~~~~~11      13~~~~~3
Level 3:  17~~~~~18    10~~~~~5    12~~~~~7    1~~~~~2
Level 4: 15~~16  4~~~6  9~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 12, 7, 1, 2, 15, 16, 4, 6, 9, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 17, 9)

Hereditary worst-case heap # 835

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      20~~~~~11          13~~~~~3
Level 3:  17~~~~~19      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~16  18~~~6  9~~~8  4~~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 17, 19, 10, 5, 12, 7, 1, 2, 15, 16, 18, 6, 9, 8, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 17, 9, 18)

Hereditary worst-case heap # 836

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  17~~~~~18      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~16   8~~~6  9~~~4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 12, 7, 1, 2, 15, 16, 8, 6, 9, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 17, 18)

Hereditary worst-case heap # 837

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  17~~~~~18      11~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~16   8~~~6  9~~10  4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 17, 18, 11, 5, 12, 7, 1, 2, 15, 16, 8, 6, 9, 10, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 17, 18, 21)

Hereditary worst-case heap # 838

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  17~~~~~18    10~~~~~5    12~~~~~7    1~~~~~2
Level 4: 15~~16    4~~~8    9~~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 17, 18, 10, 5, 12, 7, 1, 2, 15, 16, 4, 8, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 17, 19)

Hereditary worst-case heap # 839

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:    20~~~~~11          13~~~~~3
Level 3:  17~~~~~19    10~~~~~5    12~~~~~7    1~~~~~2
Level 4: 15~~16  18~~~8    9~~~6    4~~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 17, 19, 10, 5, 12, 7, 1, 2, 15, 16, 18, 8, 9, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 17, 19, 18)

Hereditary worst-case heap # 840

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:    18~~~~~11          13~~~~~3
Level 3:  16~~~~~17    10~~~~~5    12~~~~~7    1~~~~~2
Level 4: 15~~~9    8~~~6    4~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 12, 7, 1, 2, 15, 9, 8, 6, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 18)

Hereditary worst-case heap # 841

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~16   8~~~6   4~~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 12, 7, 1, 2, 15, 16, 8, 6, 4, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 18, 17)

Hereditary worst-case heap # 842

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  18~~~~~17      11~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~16   8~~~6  10~~~9   4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 18, 17, 11, 5, 12, 7, 1, 2, 15, 16, 8, 6, 10, 9, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 18, 17, 20)

Hereditary worst-case heap # 843

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~~9  17~~~6   4~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 15, 9, 17, 6, 4, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 18, 18)

Hereditary worst-case heap # 844

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:    19~~~~~20          13~~~~~3
Level 3:  16~~~~~18    11~~~~~5    12~~~~~7    1~~~~~2
Level 4: 15~~~9  17~~~6  10~~~8  4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 12, 7, 1, 2, 15, 9, 17, 6, 10, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 18, 18, 20)

Hereditary worst-case heap # 845

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:    19~~~~~11          13~~~~~3
Level 3:  16~~~~~18    10~~~~~5    12~~~~~7    1~~~~~2
Level 4: 15~~~9   8~~17   4~~6

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 15, 9, 8, 17, 4, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 18, 19)

Hereditary worst-case heap # 846

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:    19~~~~~20          13~~~~~3
Level 3:  16~~~~~18    11~~~~~5    12~~~~~7    1~~~~~2
Level 4: 15~~~9   8~~17  10~~~6  4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 12, 7, 1, 2, 15, 9, 8, 17, 10, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 18, 19, 20)

Hereditary worst-case heap # 847

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~~~~~14
Level 2:      18~~~~~11          13~~~~~3
Level 3:  16~~~~~17      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~~9   4~~~8   6~~

```

20 heap: [20, 19, 14, 18, 11, 13, 3, 16, 17, 10, 5, 12, 7, 1, 2, 15, 9, 4, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 19)

Hereditary worst-case heap # 848

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  18~~~~~17      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~16   4~~~8   6~~~9

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 18, 17, 10, 5, 12, 7, 1, 2, 15, 16, 4, 8, 6, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 19, 17)

Hereditary worst-case heap # 849

22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      20~~~~~11          13~~~~~3
Level 3:  18~~~~~19      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~16  17~~~8   6~~~9   4~~

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 18, 19, 10, 5, 12, 7, 1, 2, 15, 16, 17, 8, 6, 9, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 19, 17, 18)

Hereditary worst-case heap # 850

21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~~9  17~~~8   6~~~4

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 15, 9, 17, 8, 6, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 19, 18)

Hereditary worst-case heap # 851
 22-element heap level-by-level:

```

Level 0:                22
Level 1:          21~~~~~14
Level 2:      19~~~~~20          13~~~~~3
Level 3:  16~~~~~18      11~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~~9  17~~~8   6~~10   4~~

```

22 heap: [22, 21, 14, 19, 20, 13, 3, 16, 18, 11, 5, 12, 7, 1, 2, 15, 9, 17, 8, 6, 10, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 19, 18, 21)

Hereditary worst-case heap # 852
 21-element heap level-by-level:

```

Level 0:                21
Level 1:          20~~~~~14
Level 2:      19~~~~~11          13~~~~~3
Level 3:  16~~~~~18      10~~~~~5      12~~~~~7      1~~~~~2
Level 4: 15~~~9   4~~17   6~~~8

```

21 heap: [21, 20, 14, 19, 11, 13, 3, 16, 18, 10, 5, 12, 7, 1, 2, 15, 9, 4, 17, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 19, 19)

Hereditary worst-case heap # 853
 22-element heap level-by-level:

```

Level 0:                22

```

```

Level 1:          21^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      20^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^19      10^^^^5      12^^^^7      1^^^^2
Level 4: 15^^9  18^^17  6^^8  4^^

```

22 heap: [22, 21, 14, 20, 11, 13, 3, 16, 19, 10, 5, 12, 7, 1, 2, 15, 9, 18, 17, 6, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 10, 16, 17, 16, 19, 19, 18)

Hereditary worst-case heap # 854
 16-element heap level-by-level:

```

Level 0:          16
Level 1:      15^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      9^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  6^^^^8      4^^^^10      12^^^^7      1^^^^2
Level 4:  5^^

```

16 heap: [16, 15, 14, 9, 11, 13, 3, 6, 8, 4, 10, 12, 7, 1, 2, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 11)

Hereditary worst-case heap # 855
 17-element heap level-by-level:

```

Level 0:          17
Level 1:      16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  9^^^^8      4^^^^10      12^^^^7      1^^^^2
Level 4:  5^^6

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 8, 4, 10, 12, 7, 1, 2, 5, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 11, 8)

Hereditary worst-case heap # 856

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^8          4^^^^^^10          12^^^^^^7          1^^^^^^2
Level 4:  9^^^6    5^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 4, 10, 12, 7, 1, 2, 9, 6, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 11, 8, 16)

Hereditary worst-case heap # 857

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^8          4^^^^^^10          12^^^^^^7          1^^^^^^2
Level 4:  9^^15    5^^^6

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 4, 10, 12, 7, 1, 2, 9, 15, 5, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 11, 8, 16, 17)

Hereditary worst-case heap # 858

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^8          4^^^^^^10          12^^^^^^7          1^^^^^^2
Level 4:  5^^^9    6^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 4, 10, 12, 7, 1, 2, 5, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 11, 8, 17)

Hereditary worst-case heap # 859

19-element heap level-by-level:

```

Level 0:                                     19
Level 1:                        18~::~::~::~::~14
Level 2:           17~::~::~11                13~::~::~3
Level 3:    16~::~8           4~::~10           12~::~7           1~::~2
Level 4: 15~::9    6~::5

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 4, 10, 12, 7, 1, 2, 15, 9, 6, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 11, 8, 17, 16)

Hereditary worst-case heap # 860

17-element heap level-by-level:

```

Level 0:                                     17
Level 1:                        16~::~::~::~14
Level 2:           15~::~::~11                13~::~::~3
Level 3:    9~::~8           4~::~10           12~::~7           1~::~2
Level 4: 6~::5

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 8, 4, 10, 12, 7, 1, 2, 6, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 11, 16)

Hereditary worst-case heap # 861

18-element heap level-by-level:

```

Level 0:                                     18
Level 1:                        17~::~::~::~14
Level 2:           16~::~::~11                13~::~::~3
Level 3:    15~::~8           4~::~10           12~::~7           1~::~2
Level 4: 9~::5    6~::

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 4, 10, 12, 7, 1, 2, 9, 5, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 11, 16, 16)

Hereditary worst-case heap # 862

19-element heap level-by-level:

```

Level 0:                                     19

```

```

Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^8      4^^^^^^10      12^^^^^^7      1^^^^^^2
Level 4:  9^^15   6^^5

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 4, 10, 12, 7, 1, 2, 9, 15, 6, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 11, 16, 16, 17)

Hereditary worst-case heap # 863
 18-element heap level-by-level:

```

Level 0:                      18
Level 1:      17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^8      4^^^^^^10      12^^^^^^7      1^^^^^^2
Level 4:  6^^9   5^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 8, 4, 10, 12, 7, 1, 2, 6, 9, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 11, 16, 17)

Hereditary worst-case heap # 864
 19-element heap level-by-level:

```

Level 0:                      19
Level 1:      18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^8      4^^^^^^10      12^^^^^^7      1^^^^^^2
Level 4: 15^^9   5^^6

```

19 heap: [19, 18, 14, 17, 11, 13, 3, 16, 8, 4, 10, 12, 7, 1, 2, 15, 9, 5, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 11, 16, 17, 16)

Hereditary worst-case heap # 865
 16-element heap level-by-level:

```

Level 0:                                16
Level 1:          11~::~::~::~::~::~::~::~15
Level 2:      9~::~8      4~::~5      13~::~14
Level 3:  6~::~8      4~::~5      12~::~7      3~::~2
Level 4:  1~^

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 6, 8, 4, 5, 12, 7, 3, 2, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 14)

Hereditary worst-case heap # 866
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~::~::~::~15
Level 2:      11~::~10      13~::~14
Level 3:  9~::~8      4~::~5      12~::~7      3~::~2
Level 4:  1~^6

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 4, 5, 12, 7, 3, 2, 1, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 14, 8)

Hereditary worst-case heap # 867
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~::~::~15
Level 2:      16~::~10      13~::~14
Level 3:  11~::~8      4~::~5      12~::~7      3~::~2
Level 4:  9~^6  1~^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 12, 7, 3, 2, 9, 6, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 14, 8, 16)

Hereditary worst-case heap # 868
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18~::~::~::~::~15
Level 2:      17~::~10      13~::~14

```

Level 3: 16~~~~~8 4~~~~~5 12~~~~~7 3~~~~~2
 Level 4: 9~~11 1~~~6

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 12, 7, 3, 2, 9, 11, 1, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 14, 8, 16, 17)

Hereditary worst-case heap # 869
 20-element heap level-by-level:

Level 0: 20
 Level 1: 19~~~~~15
 Level 2: 18~~~~~10 13~~~~~14
 Level 3: 16~~~~~17 4~~~~~5 12~~~~~7 3~~~~~2
 Level 4: 9~~11 8~~~6 1~~~

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 12, 7, 3, 2, 9, 11, 8, 6, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 14, 8, 16, 17, 18)

Hereditary worst-case heap # 870
 18-element heap level-by-level:

Level 0: 18
 Level 1: 17~~~~~15
 Level 2: 16~~~~~10 13~~~~~14
 Level 3: 11~~~~~8 4~~~~~5 12~~~~~7 3~~~~~2
 Level 4: 1~~~9 6~~~

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 12, 7, 3, 2, 1, 9, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 14, 8, 17)

Hereditary worst-case heap # 871
 19-element heap level-by-level:

Level 0: 19
 Level 1: 18~~~~~15
 Level 2: 17~~~~~10 13~~~~~14
 Level 3: 16~~~~~8 4~~~~~5 12~~~~~7 3~~~~~2

Level 4: 11^^^9 6^^^1

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 12, 7, 3, 2, 11, 9, 6, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 14, 8, 17, 16)

Hereditary worst-case heap # 872
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17      4^^^^^^5      12^^^^^^7      3^^^^^^2
Level 4: 11^^^9  6^^^8  1^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 12, 7, 3, 2, 11, 9, 6, 8, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 14, 8, 17, 16, 19)

Hereditary worst-case heap # 873
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   9^^^^^^8      4^^^^^^5      12^^^^^^7      3^^^^^^2
Level 4: 6^^^1

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 4, 5, 12, 7, 3, 2, 6, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 14, 16)

Hereditary worst-case heap # 874
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^8      4^^^^^^5      12^^^^^^7      3^^^^^^2

```

Level 4: 9¹¹ 6¹

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 12, 7, 3, 2, 9, 1, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 14, 16, 16)

Hereditary worst-case heap # 875

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18~15
Level 2:      17~10          13~14
Level 3:  16~8      4~5      12~7      3~2
Level 4:  9~11  6~1

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 12, 7, 3, 2, 9, 11, 6, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 14, 16, 16, 17)

Hereditary worst-case heap # 876

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19~15
Level 2:      18~10          13~14
Level 3:  16~17      4~5      12~7      3~2
Level 4:  9~11  6~8  1~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 12, 7, 3, 2, 9, 11, 6, 8, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 14, 16, 16, 17, 19)

Hereditary worst-case heap # 877

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~15
Level 2:      16~10          13~14
Level 3:  11~8      4~5      12~7      3~2
Level 4:  6~9  1~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 12, 7, 3, 2, 6, 9, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 14, 16, 17)

Hereditary worst-case heap # 878
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^10          13^^^^^^^^^^^^14
Level 3:  16^^^^^^8      4^^^^^^5      12^^^^^^7      3^^^^^^2
Level 4: 11^^^9   1^^^6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 12, 7, 3, 2, 11, 9, 1, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 14, 16, 17, 16)

Hereditary worst-case heap # 879
 20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^10          13^^^^^^^^^^^^14
Level 3:  16^^^^^^17      4^^^^^^5      12^^^^^^7      3^^^^^^2
Level 4: 11^^^9   8^^^6   1^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 12, 7, 3, 2, 11, 9, 8, 6, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 14, 16, 17, 16, 18)

Hereditary worst-case heap # 880
 16-element heap level-by-level:

```

Level 0:                                16
Level 1:          11^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      9^^^^^^^^^^^^10          13^^^^^^^^^^^^14
Level 3:  6^^^^^^8      4^^^^^^5      12^^^^^^7      1^^^^^^3

```

Level 4: 2^^

16 heap: [16, 11, 15, 9, 10, 13, 14, 6, 8, 4, 5, 12, 7, 1, 3, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 15)

Hereditary worst-case heap # 881

17-element heap level-by-level:

```

Level 0:                                     17
Level 1:                               16^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:                   11^^^^^^^^^^^^^^^^10               13^^^^^^^^^^^^^^^^14
Level 3:           9^^^^^^8           4^^^^^^5           12^^^^^^7           1^^^^^^3
Level 4: 2^^^6

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 4, 5, 12, 7, 1, 3, 2, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 15, 8)

Hereditary worst-case heap # 882

18-element heap level-by-level:

```

Level 0:                                     18
Level 1:                               17^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:                   16^^^^^^^^^^^^^^^^10               13^^^^^^^^^^^^^^^^14
Level 3:           11^^^^^^8           4^^^^^^5           12^^^^^^7           1^^^^^^3
Level 4: 9^^^6  2^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 12, 7, 1, 3, 9, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 15, 8, 16)

Hereditary worst-case heap # 883

19-element heap level-by-level:

```

Level 0:                                     19
Level 1:                               18^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:                   17^^^^^^^^^^^^^^^^10               13^^^^^^^^^^^^^^^^14
Level 3:           16^^^^^^8           4^^^^^^5           12^^^^^^7           1^^^^^^3
Level 4: 9^^11  2^^^6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 12, 7, 1, 3, 9, 11, 2, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 15, 8, 16, 17)

Hereditary worst-case heap # 884

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~::~::~::~::~15
Level 2:      18~::~10          13~::~14
Level 3:  16~::17      4~::5      12~::7      1~::3
Level 4:  9~11  8~6  2~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 12, 7, 1, 3, 9, 11, 8, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 15, 8, 16, 17, 18)

Hereditary worst-case heap # 885

18-element heap level-by-level:

```

Level 0:                18
Level 1:          17~::~::~15
Level 2:      16~::~10          13~::~14
Level 3:  11~::8      4~::5      12~::7      1~::3
Level 4:  2~9  6~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 12, 7, 1, 3, 2, 9, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 15, 8, 17)

Hereditary worst-case heap # 886

19-element heap level-by-level:

```

Level 0:                19
Level 1:          18~::~::~15
Level 2:      17~::~10          13~::~14
Level 3:  16~::8      4~::5      12~::7      1~::3
Level 4: 11~9  6~2

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 12, 7, 1, 3, 11, 9, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 15, 8, 17, 16)

Hereditary worst-case heap # 887

20-element heap level-by-level:

```

Level 0:                20
Level 1:          19~::~::~::~::~15
Level 2:      18~::~10          13~::~14
Level 3:  16~::17      4~::5      12~::7      1~::3
Level 4: 11~9   6~8   2~

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 12, 7, 1, 3, 11, 9, 6, 8, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 15, 8, 17, 16, 19)

Hereditary worst-case heap # 888

17-element heap level-by-level:

```

Level 0:                17
Level 1:          16~::~::~15
Level 2:      11~::10          13~::14
Level 3:   9~8      4~5      12~7      1~3
Level 4: 6~2

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 8, 4, 5, 12, 7, 1, 3, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 15, 16)

Hereditary worst-case heap # 889

18-element heap level-by-level:

```

Level 0:                18
Level 1:          17~::~::~15
Level 2:      16~::~10          13~::~14
Level 3:  11~8      4~5      12~7      1~3
Level 4: 9~2   6~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 12, 7, 1, 3, 9, 2, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 15, 16, 16)

Hereditary worst-case heap # 890

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^8      4^^^^^^5      12^^^^^^7      1^^^^^^3
Level 4:  9^^11   6^^2

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 12, 7, 1, 3, 9, 11, 6, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 15, 16, 16, 17)

Hereditary worst-case heap # 891

20-element heap level-by-level:

```

Level 0:                                20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17     4^^^^^^5      12^^^^^^7      1^^^^^^3
Level 4:  9^^11   6^^8   2^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 12, 7, 1, 3, 9, 11, 6, 8, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 15, 16, 16, 17, 19)

Hereditary worst-case heap # 892

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^8     4^^^^^^5      12^^^^^^7      1^^^^^^3
Level 4:  6^^9    2^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 8, 4, 5, 12, 7, 1, 3, 6, 9, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 15, 16, 17)

Hereditary worst-case heap # 893

19-element heap level-by-level:

```

Level 0:                      19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^8      4^^^^^^5      12^^^^^^7      1^^^^^^3
Level 4: 11^^^9  2^^^6

```

19 heap: [19, 18, 15, 17, 10, 13, 14, 16, 8, 4, 5, 12, 7, 1, 3, 11, 9, 2, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 15, 16, 17, 16)

Hereditary worst-case heap # 894

20-element heap level-by-level:

```

Level 0:                      20
Level 1:          19^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      18^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  16^^^^^^17      4^^^^^^5      12^^^^^^7      1^^^^^^3
Level 4: 11^^^9  8^^^6  2^^

```

20 heap: [20, 19, 15, 18, 10, 13, 14, 16, 17, 4, 5, 12, 7, 1, 3, 11, 9, 8, 6, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 8, 9, 11, 12, 13, 12, 15, 16, 17, 16, 18)

Hereditary worst-case heap # 895

10-element heap level-by-level:

```

Level 0:          10
Level 1:      9^^^^^^^^^^^^^^^^7
Level 2:  8^^^^^^5      2^^^^^^3

```

Level 3: 4⁶ 1²

10 heap: [10, 9, 7, 8, 5, 2, 3, 4, 6, 1]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9)

Hereditary worst-case heap # 896
11-element heap level-by-level:

Level 0: 11
Level 1: 10⁷
Level 2: 9⁵ 2³
Level 3: 8⁶ 1⁴

11 heap: [11, 10, 7, 9, 5, 2, 3, 8, 6, 1, 4]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8)

Hereditary worst-case heap # 897
12-element heap level-by-level:

Level 0: 12
Level 1: 11⁷
Level 2: 9¹⁰ 2³
Level 3: 8⁶ 5⁴ 1²

12 heap: [12, 11, 7, 9, 10, 2, 3, 8, 6, 5, 4, 1]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10)

Hereditary worst-case heap # 898
13-element heap level-by-level:

Level 0: 13
Level 1: 11¹²
Level 2: 9¹⁰ 7³
Level 3: 8⁶ 5⁴ 2¹

13 heap: [13, 11, 12, 9, 10, 7, 3, 8, 6, 5, 4, 2, 1]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12)

Hereditary worst-case heap # 899
14-element heap level-by-level:

```

Level 0:          14
Level 1:    11~13
Level 2:    9~10    12~3
Level 3:  8~6  5~4  7~1  2~

```

14 heap: [14, 11, 13, 9, 10, 12, 3, 8, 6, 5, 4, 7, 1, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12)

Hereditary worst-case heap # 900

15-element heap level-by-level:

```

Level 0:          15
Level 1:    11~14
Level 2:    9~10    13~3
Level 3:  8~6  5~4  7~12  2~1

```

15 heap: [15, 11, 14, 9, 10, 13, 3, 8, 6, 5, 4, 7, 12, 2, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13)

Hereditary worst-case heap # 901

16-element heap level-by-level:

```

Level 0:          16
Level 1:    11~15
Level 2:    9~10    13~14
Level 3:  8~6  5~4  7~12  2~1
Level 4:  3~

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 8, 6, 5, 4, 7, 12, 2, 1, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 7)

Hereditary worst-case heap # 902

17-element heap level-by-level:

```

Level 0:          17
Level 1:    16~15
Level 2:    11~10    13~14
Level 3:  9~6  5~4  7~12  2~1
Level 4:  3~8

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 5, 4, 7, 12, 2, 1, 3, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 7, 8)

Hereditary worst-case heap # 903
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^6      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4:  9^^^8   3^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 5, 4, 7, 12, 2, 1, 9, 8, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 7, 8, 16)

Hereditary worst-case heap # 904
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:  9^^^^^^6      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4:  8^^^3

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 5, 4, 7, 12, 2, 1, 8, 3]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 7, 16)

Hereditary worst-case heap # 905
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^6      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4:  8^^^9   3^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 5, 4, 7, 12, 2, 1, 8, 9, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 7, 16, 17)

Hereditary worst-case heap # 906

16-element heap level-by-level:

```

Level 0:                                     16
Level 1:                        15~::~::~::~::~::~::~::~::~14
Level 2:           11~::~::~10~::~13~::~::~3
Level 3:    9~::~6~::5~::~4~::7~::~12~::2~::~1
Level 4:  8^^

```

16 heap: [16, 15, 14, 11, 10, 13, 3, 9, 6, 5, 4, 7, 12, 2, 1, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 8)

Hereditary worst-case heap # 907

17-element heap level-by-level:

```

Level 0:                                     17
Level 1:                        16~::~::~::~::~::~::~::~14
Level 2:           15~::~10~::~13~::~3
Level 3:    11~::~6~::5~::~4~::7~::~12~::2~::~1
Level 4:  8^^9

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 6, 5, 4, 7, 12, 2, 1, 8, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 8, 8)

Hereditary worst-case heap # 908

17-element heap level-by-level:

```

Level 0:                                     17
Level 1:                        16~::~::~::~::~::~::~14
Level 2:           15~::~10~::~13~::~3
Level 3:    11~::~6~::5~::~4~::7~::~12~::2~::~1
Level 4:  9^^8

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 6, 5, 4, 7, 12, 2, 1, 9, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 8, 16)

Hereditary worst-case heap # 909

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  8^^^^^^9      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 6^^

```

16 heap: [16, 15, 14, 11, 10, 13, 3, 8, 9, 5, 4, 7, 12, 2, 1, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 9)

Hereditary worst-case heap # 910

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  11^^^^^^9      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 6^^8

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 9, 5, 4, 7, 12, 2, 1, 6, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 9, 8)

Hereditary worst-case heap # 911

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^9      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 11^^8  6^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 9, 5, 4, 7, 12, 2, 1, 11, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 9, 8, 16)

Hereditary worst-case heap # 912

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^9      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 11^^15    6^^8

```

19 heap: [19, 18, 14, 17, 10, 13, 3, 16, 9, 5, 4, 7, 12, 2, 1, 11, 15, 6, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 9, 8, 16, 17)

Hereditary worst-case heap # 913

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^9      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4:  6^^11    8^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 9, 5, 4, 7, 12, 2, 1, 6, 11, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 9, 8, 17)

Hereditary worst-case heap # 914

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^9      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^11    8^^6

```

19 heap: [19, 18, 14, 17, 10, 13, 3, 16, 9, 5, 4, 7, 12, 2, 1, 15, 11, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 9, 8, 17, 16)

Hereditary worst-case heap # 915

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  11^^^^^^9      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4:  8^^^6

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 9, 5, 4, 7, 12, 2, 1, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 9, 16)

Hereditary worst-case heap # 916

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^9      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 11^^^6  8^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 9, 5, 4, 7, 12, 2, 1, 11, 6, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 9, 16, 16)

Hereditary worst-case heap # 917

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^9      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 11^^15  8^^^6

```

19 heap: [19, 18, 14, 17, 10, 13, 3, 16, 9, 5, 4, 7, 12, 2, 1, 11, 15, 8, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 9, 16, 16, 17)

Hereditary worst-case heap # 918

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^9      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4:  8^^11  6^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 9, 5, 4, 7, 12, 2, 1, 8, 11, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 9, 16, 17)

Hereditary worst-case heap # 919

19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^9      5^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4: 15^^11  6^^8

```

19 heap: [19, 18, 14, 17, 10, 13, 3, 16, 9, 5, 4, 7, 12, 2, 1, 15, 11, 6, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 9, 16, 17, 16)

Hereditary worst-case heap # 920

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      9^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:  8^^^^^^6      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4:  5^^

```

16 heap: [16, 15, 14, 9, 11, 13, 3, 8, 6, 10, 4, 7, 12, 2, 1, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 10)

Hereditary worst-case heap # 921

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:   9^^^^^^6      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4:  5^^^8

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 6, 10, 4, 7, 12, 2, 1, 5, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 10, 8)

Hereditary worst-case heap # 922

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:   15^^^^^^6      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4:  9^^^8   5^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 6, 10, 4, 7, 12, 2, 1, 9, 8, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 10, 8, 16)

Hereditary worst-case heap # 923

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^11                13^^^^^^^^^^^^^^^^3
Level 3:   9^^^^^^6      10^^^^^^4      7^^^^^^12      2^^^^^^1
Level 4:  8^^^5

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 6, 10, 4, 7, 12, 2, 1, 8, 5]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 10, 16)

Hereditary worst-case heap # 924

18-element heap level-by-level:

```

Level 0:                                     18
Level 1:                        17~::~~14
Level 2:           16~::~~11                13~::~~3
Level 3:    15~::~~6        10~::~~4        7~::~~12        2~::~~1
Level 4:    8~::~~9    5~::~~

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 6, 10, 4, 7, 12, 2, 1, 8, 9, 5]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 10, 16, 17)

Hereditary worst-case heap # 925
16-element heap level-by-level:

```

Level 0:                                     16
Level 1:                        15~::~~14
Level 2:           9~::~~11                13~::~~3
Level 3:    8~::~~6        5~::~~10        7~::~~12        2~::~~1
Level 4:    4~::~~

```

16 heap: [16, 15, 14, 9, 11, 13, 3, 8, 6, 5, 10, 7, 12, 2, 1, 4]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 11)

Hereditary worst-case heap # 926
17-element heap level-by-level:

```

Level 0:                                     17
Level 1:                        16~::~~14
Level 2:           15~::~~11                13~::~~3
Level 3:    9~::~~6        5~::~~10        7~::~~12        2~::~~1
Level 4:    4~::~~8

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 6, 5, 10, 7, 12, 2, 1, 4, 8]
Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 11, 8)

Hereditary worst-case heap # 927
18-element heap level-by-level:

```

Level 0:                                     18

```

```

Level 1:          17~::~~14
Level 2:      16~::~~11      13~::~~3
Level 3:  15~::~~6      5~::~~10      7~::~~12      2~::~~1
Level 4:  9~::~8      4~::

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 6, 5, 10, 7, 12, 2, 1, 9, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 11, 8, 16)

Hereditary worst-case heap # 928
 17-element heap level-by-level:

```

Level 0:                      17
Level 1:      16~::~~14
Level 2:  15~::~~11      13~::~~3
Level 3:   9~::~~6      5~::~~10      7~::~~12      2~::~~1
Level 4:  8~::~4

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 6, 5, 10, 7, 12, 2, 1, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 11, 16)

Hereditary worst-case heap # 929
 18-element heap level-by-level:

```

Level 0:                      18
Level 1:      17~::~~14
Level 2:  16~::~~11      13~::~~3
Level 3:  15~::~~6      5~::~~10      7~::~~12      2~::~~1
Level 4:  8~::~9      4~::

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 6, 5, 10, 7, 12, 2, 1, 8, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 11, 16, 17)

Hereditary worst-case heap # 930
 16-element heap level-by-level:

```

Level 0:                                     16
Level 1:                        11~::~::~::~::~15
Level 2:                9~::~10                14~::~3
Level 3:    8~::6        5~::4        13~::12        2~::1
Level 4:  7~

```

16 heap: [16, 11, 15, 9, 10, 14, 3, 8, 6, 5, 4, 13, 12, 2, 1, 7]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 12)

Hereditary worst-case heap # 931

17-element heap level-by-level:

```

Level 0:                                     17
Level 1:                        16~::~::~::~15
Level 2:                11~::~10                14~::~3
Level 3:    9~::6        5~::4        13~::12        2~::1
Level 4:  7~^8

```

17 heap: [17, 16, 15, 11, 10, 14, 3, 9, 6, 5, 4, 13, 12, 2, 1, 7, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 12, 8)

Hereditary worst-case heap # 932

17-element heap level-by-level:

```

Level 0:                                     17
Level 1:                        16~::~::~::~15
Level 2:                11~::~10                14~::~3
Level 3:    9~::6        5~::4        13~::12        2~::1
Level 4:  8~^7

```

17 heap: [17, 16, 15, 11, 10, 14, 3, 9, 6, 5, 4, 13, 12, 2, 1, 8, 7]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 12, 16)

Hereditary worst-case heap # 933

16-element heap level-by-level:

```

Level 0:                                     16

```

```

Level 1:          11^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      9^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  8^^^^^^6      5^^^^^^4      7^^^^^^12      3^^^^^^1
Level 4:  2^^

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 8, 6, 5, 4, 7, 12, 3, 1, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 14)

Hereditary worst-case heap # 934

17-element heap level-by-level:

```

Level 0:                      17
Level 1:      16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:  11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  9^^^^^^6      5^^^^^^4      7^^^^^^12      3^^^^^^1
Level 4:  2^^^8

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 5, 4, 7, 12, 3, 1, 2, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 14, 8)

Hereditary worst-case heap # 935

18-element heap level-by-level:

```

Level 0:                      18
Level 1:      17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:  16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^6      5^^^^^^4      7^^^^^^12      3^^^^^^1
Level 4:  9^^^8  2^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 5, 4, 7, 12, 3, 1, 9, 8, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 14, 8, 16)

Hereditary worst-case heap # 936

17-element heap level-by-level:

```

Level 0:                      17
Level 1:      16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:  11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14

```

Level 3: 9~~~~~6 5~~~~~4 7~~~~~12 3~~~~~1
 Level 4: 8~~~2

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 5, 4, 7, 12, 3, 1, 8, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 14, 16)

Hereditary worst-case heap # 937
 18-element heap level-by-level:

Level 0: 18
 Level 1: 17~~~~~15
 Level 2: 16~~~~~10 13~~~~~14
 Level 3: 11~~~~~6 5~~~~~4 7~~~~~12 3~~~~~1
 Level 4: 8~~~9 2~~

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 5, 4, 7, 12, 3, 1, 8, 9, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 14, 16, 17)

Hereditary worst-case heap # 938
 16-element heap level-by-level:

Level 0: 16
 Level 1: 11~~~~~15
 Level 2: 9~~~~~10 13~~~~~14
 Level 3: 8~~~~~6 5~~~~~4 7~~~~~12 2~~~~~3
 Level 4: 1~~

16 heap: [16, 11, 15, 9, 10, 13, 14, 8, 6, 5, 4, 7, 12, 2, 3, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 15)

Hereditary worst-case heap # 939
 17-element heap level-by-level:

Level 0: 17
 Level 1: 16~~~~~15
 Level 2: 11~~~~~10 13~~~~~14
 Level 3: 9~~~~~6 5~~~~~4 7~~~~~12 2~~~~~3

Level 4: 1^^^8

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 5, 4, 7, 12, 2, 3, 1, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 15, 8)

Hereditary worst-case heap # 940

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^6      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4:  9^^^^8  1^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 5, 4, 7, 12, 2, 3, 9, 8, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 15, 8, 16)

Hereditary worst-case heap # 941

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   9^^^^^^6      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4:  8^^^^1

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 5, 4, 7, 12, 2, 3, 8, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 15, 16)

Hereditary worst-case heap # 942

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^6      5^^^^^^4      7^^^^^^12      2^^^^^^3
Level 4:  8^^^^9  1^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 5, 4, 7, 12, 2, 3, 8, 9, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 12, 13, 15, 16, 17)

Hereditary worst-case heap # 943

14-element heap level-by-level:

```

Level 0:          14
Level 1:      11~13
Level 2:   9~10      12~3
Level 3: 8~6  5~4  2~7  1~

```

14 heap: [14, 11, 13, 9, 10, 12, 3, 8, 6, 5, 4, 2, 7, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13)

Hereditary worst-case heap # 944

15-element heap level-by-level:

```

Level 0:          15
Level 1:      11~14
Level 2:   9~10      13~3
Level 3: 8~6  5~4  12~7  1~2

```

15 heap: [15, 11, 14, 9, 10, 13, 3, 8, 6, 5, 4, 12, 7, 1, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12)

Hereditary worst-case heap # 945

16-element heap level-by-level:

```

Level 0:          16
Level 1:      11~15
Level 2:   9~10      13~14
Level 3: 8~6  5~4  12~7  1~2
Level 4: 3~

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 8, 6, 5, 4, 12, 7, 1, 2, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 7)

Hereditary worst-case heap # 946

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  9^^^^^^6      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:  3^^^8

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 5, 4, 12, 7, 1, 2, 3, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 7, 8)

Hereditary worst-case heap # 947

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^6      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:  9^^^8   3^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 5, 4, 12, 7, 1, 2, 9, 8, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 7, 8, 16)

Hereditary worst-case heap # 948

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:  9^^^^^^6      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:  8^^^3

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 5, 4, 12, 7, 1, 2, 8, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 7, 16)

Hereditary worst-case heap # 949

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^14
Level 3:  11^^^^^^6      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:  8^^^9    3^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 5, 4, 12, 7, 1, 2, 8, 9, 3]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 7, 16, 17)

Hereditary worst-case heap # 950

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      11^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^3
Level 3:  9^^^^^^6      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:  8^^

```

16 heap: [16, 15, 14, 11, 10, 13, 3, 9, 6, 5, 4, 12, 7, 1, 2, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 8)

Hereditary worst-case heap # 951

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^10                13^^^^^^^^^^^^^^^^3
Level 3:  11^^^^^^6      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:  8^^^9

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 6, 5, 4, 12, 7, 1, 2, 8, 9]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 8, 8)

Hereditary worst-case heap # 952

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  11^^^^^^6      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:  9^^^8

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 6, 5, 4, 12, 7, 1, 2, 9, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 8, 16)

Hereditary worst-case heap # 953

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  8^^^^^^9      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:  6^^

```

16 heap: [16, 15, 14, 11, 10, 13, 3, 8, 9, 5, 4, 12, 7, 1, 2, 6]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 9)

Hereditary worst-case heap # 954

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  11^^^^^^9      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:  6^^^8

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 9, 5, 4, 12, 7, 1, 2, 6, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 9, 8)

Hereditary worst-case heap # 955

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^9      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 11^^8    6^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 9, 5, 4, 12, 7, 1, 2, 11, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 9, 8, 16)

Hereditary worst-case heap # 956
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^9      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 11^15    6^^8

```

19 heap: [19, 18, 14, 17, 10, 13, 3, 16, 9, 5, 4, 12, 7, 1, 2, 11, 15, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 9, 8, 16, 17)

Hereditary worst-case heap # 957
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^9      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 6^^11    8^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 9, 5, 4, 12, 7, 1, 2, 6, 11, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 9, 8, 17)

Hereditary worst-case heap # 958
 19-element heap level-by-level:

```

Level 0:                                19

```

```

Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  16^^^^^^9      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 15^^11  8^^6

```

19 heap: [19, 18, 14, 17, 10, 13, 3, 16, 9, 5, 4, 12, 7, 1, 2, 15, 11, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 9, 8, 17, 16)

Hereditary worst-case heap # 959
 17-element heap level-by-level:

```

Level 0:                      17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  11^^^^^^9      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:  8^^6

```

17 heap: [17, 16, 14, 15, 10, 13, 3, 11, 9, 5, 4, 12, 7, 1, 2, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 9, 16)

Hereditary worst-case heap # 960
 18-element heap level-by-level:

```

Level 0:                      18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:  15^^^^^^9      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 11^^6  8^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 9, 5, 4, 12, 7, 1, 2, 11, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 9, 16, 16)

Hereditary worst-case heap # 961
 19-element heap level-by-level:

```

Level 0:                      19
Level 1:          18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14

```

```

Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^9      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 11^^15   8^^6

```

19 heap: [19, 18, 14, 17, 10, 13, 3, 16, 9, 5, 4, 12, 7, 1, 2, 11, 15, 8, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 9, 16, 16, 17)

Hereditary worst-case heap # 962
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:      17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:   15^^^^^^9      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:  8^^11   6^^

```

18 heap: [18, 17, 14, 16, 10, 13, 3, 15, 9, 5, 4, 12, 7, 1, 2, 8, 11, 6]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 9, 16, 17)

Hereditary worst-case heap # 963
 19-element heap level-by-level:

```

Level 0:                                19
Level 1:      18^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      17^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^3
Level 3:   16^^^^^^9      5^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4: 15^^11   6^^8

```

19 heap: [19, 18, 14, 17, 10, 13, 3, 16, 9, 5, 4, 12, 7, 1, 2, 15, 11, 6, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 9, 16, 17, 16)

Hereditary worst-case heap # 964
 16-element heap level-by-level:

```

Level 0:                                16
Level 1:          15~::~::~::~::~::~14
Level 2:      9~::~::~11          13~::~::~3
Level 3:  8~::~6      10~::~4      12~::~7      1~::~2
Level 4:  5^^

```

16 heap: [16, 15, 14, 9, 11, 13, 3, 8, 6, 10, 4, 12, 7, 1, 2, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 10)

Hereditary worst-case heap # 965

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~::~14
Level 2:      15~::~11          13~::~3
Level 3:  9~::~6      10~::~4      12~::~7      1~::~2
Level 4:  5^^8

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 6, 10, 4, 12, 7, 1, 2, 5, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 10, 8)

Hereditary worst-case heap # 966

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~::~14
Level 2:      16~::~11          13~::~3
Level 3:  15~::~6      10~::~4      12~::~7      1~::~2
Level 4:  9^^8  5^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 6, 10, 4, 12, 7, 1, 2, 9, 8, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 10, 8, 16)

Hereditary worst-case heap # 967

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~::~14

```

```

Level 2:      15^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:      9^^^^^^6      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:      8^^^5

```

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 6, 10, 4, 12, 7, 1, 2, 8, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 10, 16)

Hereditary worst-case heap # 968

18-element heap level-by-level:

```

Level 0:                      18
Level 1:      17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      16^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:      15^^^^^^6      10^^^^^^4      12^^^^^^7      1^^^^^^2
Level 4:      8^^^9      5^^

```

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 6, 10, 4, 12, 7, 1, 2, 8, 9, 5]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 10, 16, 17)

Hereditary worst-case heap # 969

16-element heap level-by-level:

```

Level 0:                      16
Level 1:      15^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      9^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3
Level 3:      8^^^^^^6      5^^^^^^10      12^^^^^^7      1^^^^^^2
Level 4:      4^^

```

16 heap: [16, 15, 14, 9, 11, 13, 3, 8, 6, 5, 10, 12, 7, 1, 2, 4]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 11)

Hereditary worst-case heap # 970

17-element heap level-by-level:

```

Level 0:                      17
Level 1:      16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^14
Level 2:      15^^^^^^^^^^^^^^^^11          13^^^^^^^^^^^^^^^^3

```

Level 3: 9~~~~~6 5~~~~~10 12~~~~~7 1~~~~~2
 Level 4: 4~~~8

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 6, 5, 10, 12, 7, 1, 2, 4, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 11, 8)

Hereditary worst-case heap # 971
 18-element heap level-by-level:

Level 0: 18
 Level 1: 17~~~~~14
 Level 2: 16~~~~~11 13~~~~~3
 Level 3: 15~~~~~6 5~~~~~10 12~~~~~7 1~~~~~2
 Level 4: 9~~~8 4~~

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 6, 5, 10, 12, 7, 1, 2, 9, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 11, 8, 16)

Hereditary worst-case heap # 972
 17-element heap level-by-level:

Level 0: 17
 Level 1: 16~~~~~14
 Level 2: 15~~~~~11 13~~~~~3
 Level 3: 9~~~~~6 5~~~~~10 12~~~~~7 1~~~~~2
 Level 4: 8~~~4

17 heap: [17, 16, 14, 15, 11, 13, 3, 9, 6, 5, 10, 12, 7, 1, 2, 8, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 11, 16)

Hereditary worst-case heap # 973
 18-element heap level-by-level:

Level 0: 18
 Level 1: 17~~~~~14
 Level 2: 16~~~~~11 13~~~~~3
 Level 3: 15~~~~~6 5~~~~~10 12~~~~~7 1~~~~~2
 Level 4: 8~~~9 4~~

18 heap: [18, 17, 14, 16, 11, 13, 3, 15, 6, 5, 10, 12, 7, 1, 2, 8, 9, 4]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 11, 16, 17)

Hereditary worst-case heap # 974

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          11~::~::~::~::~15
Level 2:      9~::~10          14~::~3
Level 3:  8~::6      5~::4      12~::13      1~::2
Level 4:  7^^

```

16 heap: [16, 11, 15, 9, 10, 14, 3, 8, 6, 5, 4, 12, 13, 1, 2, 7]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 13)

Hereditary worst-case heap # 975

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~15
Level 2:      11~::~10          14~::~3
Level 3:  9~::6      5~::4      12~::13      1~::2
Level 4:  7^^8

```

17 heap: [17, 16, 15, 11, 10, 14, 3, 9, 6, 5, 4, 12, 13, 1, 2, 7, 8]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 13, 8)

Hereditary worst-case heap # 976

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~15
Level 2:      11~::~10          14~::~3
Level 3:  9~::6      5~::4      12~::13      1~::2
Level 4:  8^^7

```

17 heap: [17, 16, 15, 11, 10, 14, 3, 9, 6, 5, 4, 12, 13, 1, 2, 8, 7]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 13, 16)

Hereditary worst-case heap # 977

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          11~::~::~::~::~::~::~::~::~15
Level 2:      9~::~::~10~::13~::~14
Level 3:  8~::6~::5~::4~::12~::7~::3~::2
Level 4:  1~^

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 8, 6, 5, 4, 12, 7, 3, 2, 1]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 14)

Hereditary worst-case heap # 978

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~::~::~::~::~15
Level 2:      11~::~10~::13~::~14
Level 3:  9~::6~::5~::4~::12~::7~::3~::2
Level 4:  1~^8

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 5, 4, 12, 7, 3, 2, 1, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 14, 8)

Hereditary worst-case heap # 979

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~::~::~::~15
Level 2:      16~::~10~::13~::~14
Level 3:  11~::6~::5~::4~::12~::7~::3~::2
Level 4:  9~^8  1~^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 5, 4, 12, 7, 3, 2, 9, 8, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 14, 8, 16)

Hereditary worst-case heap # 980

17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      11^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   9^^^^^^6      5^^^^^^4      12^^^^^^7      3^^^^^^2
Level 4: 8^^1

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 5, 4, 12, 7, 3, 2, 8, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 14, 16)

Hereditary worst-case heap # 981

18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      16^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   11^^^^^^6      5^^^^^^4      12^^^^^^7      3^^^^^^2
Level 4: 8^^9  1^^

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 5, 4, 12, 7, 3, 2, 8, 9, 1]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 14, 16, 17)

Hereditary worst-case heap # 982

16-element heap level-by-level:

```

Level 0:                                16
Level 1:          11^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^15
Level 2:      9^^^^^^^^^^^^^^^^10          13^^^^^^^^^^^^^^^^14
Level 3:   8^^^^^^6      5^^^^^^4      12^^^^^^7      1^^^^^^3
Level 4: 2^^

```

16 heap: [16, 11, 15, 9, 10, 13, 14, 8, 6, 5, 4, 12, 7, 1, 3, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 15)

Hereditary worst-case heap # 983
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~::~15
Level 2:      11~::~10          13~::~14
Level 3:  9~::6      5~::4      12~::7      1~::3
Level 4:  2~::8

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 5, 4, 12, 7, 1, 3, 2, 8]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 15, 8)

Hereditary worst-case heap # 984
 18-element heap level-by-level:

```

Level 0:                                18
Level 1:          17~::~::~::~15
Level 2:      16~::~10          13~::~14
Level 3:  11~::6      5~::4      12~::7      1~::3
Level 4:  9~::8      2~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 5, 4, 12, 7, 1, 3, 9, 8, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 15, 8, 16)

Hereditary worst-case heap # 985
 17-element heap level-by-level:

```

Level 0:                                17
Level 1:          16~::~::~::~15
Level 2:      11~::~10          13~::~14
Level 3:  9~::6      5~::4      12~::7      1~::3
Level 4:  8~::2

```

17 heap: [17, 16, 15, 11, 10, 13, 14, 9, 6, 5, 4, 12, 7, 1, 3, 8, 2]
 Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 15, 16)

Hereditary worst-case heap # 986

18-element heap level-by-level:

```

Level 0:                18
Level 1:          17~15
Level 2:    16~10      13~14
Level 3:  11~6      5~4      12~7      1~3
Level 4:  8~9      2~

```

18 heap: [18, 17, 15, 16, 10, 13, 14, 11, 6, 5, 4, 12, 7, 1, 3, 8, 9, 2]

Strategy was: (1, 2, 3, 4, 4, 5, 7, 8, 9, 8, 10, 12, 13, 12, 15, 16, 17)

Hereditary worst-case heap # 987

6-element heap level-by-level:

```

Level 0:    6
Level 1:  5~3
Level 2: 2^4 1^

```

6 heap: [6, 5, 3, 2, 4, 1]

Strategy was: (1, 2, 3, 4, 5)

Hereditary worst-case heap # 988

7-element heap level-by-level:

```

Level 0:    7

```

Level 1: 6^{3^3}
 Level 2: $5^4 1^2$

7 heap: [7, 6, 3, 5, 4, 1, 2]
 Strategy was: (1, 2, 3, 4, 5, 4)

Hereditary worst-case heap # 989
 8-element heap level-by-level:

Level 0: 8
 Level 1: 6^{7^6}
 Level 2: $5^{4^5} 1^{2^4}$
 Level 3: 3^3

8 heap: [8, 6, 7, 5, 4, 1, 2, 3]
 Strategy was: (1, 2, 3, 4, 5, 4, 3)

Hereditary worst-case heap # 990
 9-element heap level-by-level:

Level 0: 9
 Level 1: 8^{7^8}
 Level 2: $6^{4^6} 1^{2^5}$
 Level 3: 3^5

9 heap: [9, 8, 7, 6, 4, 1, 2, 3, 5]
 Strategy was: (1, 2, 3, 4, 5, 4, 3, 4)

Hereditary worst-case heap # 991
 10-element heap level-by-level:

Level 0: 10
 Level 1: $9^{7^{10}}$
 Level 2: $8^{4^8} 1^{2^7}$
 Level 3: $6^{5^6} 3^3$

10 heap: [10, 9, 7, 8, 4, 1, 2, 6, 5, 3]
 Strategy was: (1, 2, 3, 4, 5, 4, 3, 4, 8)

Hereditary worst-case heap # 992

9-element heap level-by-level:

Level 0: 9
 Level 1: 8^{~~~~~}7
 Level 2: 6^{~~~}4 1^{~~~}2
 Level 3: 5[^]3

9 heap: [9, 8, 7, 6, 4, 1, 2, 5, 3]

Strategy was: (1, 2, 3, 4, 5, 4, 3, 8)

Hereditary worst-case heap # 993

10-element heap level-by-level:

Level 0: 10
 Level 1: 9^{~~~~~}7
 Level 2: 8^{~~~~~}4 1^{~~~~~}2
 Level 3: 5^{~~~}6 3^{^^}

10 heap: [10, 9, 7, 8, 4, 1, 2, 5, 6, 3]

Strategy was: (1, 2, 3, 4, 5, 4, 3, 8, 9)

Hereditary worst-case heap # 994

8-element heap level-by-level:

Level 0: 8
 Level 1: 7^{~~~~~}3
 Level 2: 6^{~~~}4 1^{~~~}2
 Level 3: 5[^]

8 heap: [8, 7, 3, 6, 4, 1, 2, 5]

Strategy was: (1, 2, 3, 4, 5, 4, 4)

Hereditary worst-case heap # 995

9-element heap level-by-level:

Level 0: 9
 Level 1: 8^{~~~~~3}
 Level 2: 7^{~~~4} 1^{~~~2}
 Level 3: 5^{^6}

9 heap: [9, 8, 3, 7, 4, 1, 2, 5, 6]
 Strategy was: (1, 2, 3, 4, 5, 4, 4, 4)

Hereditary worst-case heap # 996
 9-element heap level-by-level:

Level 0: 9
 Level 1: 8^{~~~~~3}
 Level 2: 7^{~~~4} 1^{~~~2}
 Level 3: 6^{^5}

9 heap: [9, 8, 3, 7, 4, 1, 2, 6, 5]
 Strategy was: (1, 2, 3, 4, 5, 4, 4, 8)

Hereditary worst-case heap # 997
 8-element heap level-by-level:

Level 0: 8
 Level 1: 7^{~~~~~3}
 Level 2: 5^{~~~6} 1^{~~~2}
 Level 3: 4[^]

8 heap: [8, 7, 3, 5, 6, 1, 2, 4]
 Strategy was: (1, 2, 3, 4, 5, 4, 5)

Hereditary worst-case heap # 998
 9-element heap level-by-level:

Level 0: 9
 Level 1: 8^{~~~~~3}
 Level 2: 7^{~~~6} 1^{~~~2}
 Level 3: 4^{^5}

9 heap: [9, 8, 3, 7, 6, 1, 2, 4, 5]
 Strategy was: (1, 2, 3, 4, 5, 4, 5, 4)

Hereditary worst-case heap # 999
 10-element heap level-by-level:

```

Level 0:          10
Level 1:      9^^^^^^^^^^^^^^^^^3
Level 2:   8^^^^^^6          1^^^^^^2
Level 3:  7^^^5   4^^

```

10 heap: [10, 9, 3, 8, 6, 1, 2, 7, 5, 4]
 Strategy was: (1, 2, 3, 4, 5, 4, 5, 4, 8)

Hereditary worst-case heap # 1000
 11-element heap level-by-level:

```

Level 0:          11
Level 1:      10^^^^^^^^^^^^^^^^^3
Level 2:   9^^^^^^6          1^^^^^^2
Level 3:  7^^^8   4^^^5

```

11 heap: [11, 10, 3, 9, 6, 1, 2, 7, 8, 4, 5]
 Strategy was: (1, 2, 3, 4, 5, 4, 5, 4, 8, 9)

Hereditary worst-case heap # 1001
 10-element heap level-by-level:

```

Level 0:          10
Level 1:      9^^^^^^^^^^^^^^^^^3
Level 2:   8^^^^^^6          1^^^^^^2
Level 3:  4^^^7   5^^

```

10 heap: [10, 9, 3, 8, 6, 1, 2, 4, 7, 5]
 Strategy was: (1, 2, 3, 4, 5, 4, 5, 4, 9)

Hereditary worst-case heap # 1002

11-element heap level-by-level:

```

Level 0:          11
Level 1:      10^^^^^^^^^^^^^^^^^3
Level 2:   9^^^^^^6          1^^^^^^2
Level 3:  8^^^7   5^^^4

```

11 heap: [11, 10, 3, 9, 6, 1, 2, 8, 7, 5, 4]
 Strategy was: (1, 2, 3, 4, 5, 4, 5, 4, 9, 8)

Hereditary worst-case heap # 1003
 9-element heap level-by-level:

```

Level 0:          9
Level 1:      8^^^^^^3
Level 2:  7^^^6   1^^^2
Level 3: 5^4

```

9 heap: [9, 8, 3, 7, 6, 1, 2, 5, 4]
 Strategy was: (1, 2, 3, 4, 5, 4, 5, 8)

Hereditary worst-case heap # 1004
 10-element heap level-by-level:

```

Level 0:          10
Level 1:      9^^^^^^^^^^^^^^^^^3
Level 2:   8^^^^^^6          1^^^^^^2
Level 3:  7^^^4   5^^

```

10 heap: [10, 9, 3, 8, 6, 1, 2, 7, 4, 5]
 Strategy was: (1, 2, 3, 4, 5, 4, 5, 8, 8)

Hereditary worst-case heap # 1005
 11-element heap level-by-level:

```

Level 0:          11
Level 1:      10^^^^^^^^^^^^^^^^^3

```

```

Level 2:    9^^^^^^6        1^^^^^^2
Level 3:   7^^^8    5^^^4

```

```

11 heap: [11, 10, 3, 9, 6, 1, 2, 7, 8, 5, 4]
Strategy was: (1, 2, 3, 4, 5, 4, 5, 8, 8, 9)

```

```

Hereditary worst-case heap # 1006
10-element heap level-by-level:

```

```

Level 0:                10
Level 1:           9^^^^^^^^^^^^^^^^3
Level 2:    8^^^^^^6        1^^^^^^2
Level 3:   5^^^7    4^^

```

```

10 heap: [10, 9, 3, 8, 6, 1, 2, 5, 7, 4]
Strategy was: (1, 2, 3, 4, 5, 4, 5, 8, 9)

```

```

Hereditary worst-case heap # 1007
11-element heap level-by-level:

```

```

Level 0:                11
Level 1:          10^^^^^^^^^^^^^^^^3
Level 2:    9^^^^^^6        1^^^^^^2
Level 3:   8^^^7    4^^^5

```

```

11 heap: [11, 10, 3, 9, 6, 1, 2, 8, 7, 4, 5]
Strategy was: (1, 2, 3, 4, 5, 4, 5, 8, 9, 8)

```

```

Hereditary worst-case heap # 1008
8-element heap level-by-level:

```

```

Level 0:           8
Level 1:    6^^^^^^7
Level 2:   5^^^4    3^^^2

```

```
9 heap: [9, 8, 7, 6, 4, 3, 2, 5, 1]
Strategy was: (1, 2, 3, 4, 5, 4, 6, 8)
```

Hereditary worst-case heap # 1012

10-element heap level-by-level:

```

Level 0:          10
Level 1:      9^^^^^^^^^^^^^^^^7
Level 2:   8^^^^^^4          3^^^^^^2
Level 3:  5^^^6   1^^

```

10 heap: [10, 9, 7, 8, 4, 3, 2, 5, 6, 1]

Strategy was: (1, 2, 3, 4, 5, 4, 6, 8, 9)

Hereditary worst-case heap # 1013

8-element heap level-by-level:

```

Level 0:          8
Level 1:   6^^^^^^7
Level 2:  5^^^4   1^^^3
Level 3: 2^

```

8 heap: [8, 6, 7, 5, 4, 1, 3, 2]

Strategy was: (1, 2, 3, 4, 5, 4, 7)

Hereditary worst-case heap # 1014

9-element heap level-by-level:

```

Level 0:          9
Level 1:   8^^^^^^7
Level 2:  6^^^4   1^^^3
Level 3: 2^5

```

9 heap: [9, 8, 7, 6, 4, 1, 3, 2, 5]

Strategy was: (1, 2, 3, 4, 5, 4, 7, 4)

Hereditary worst-case heap # 1015

10-element heap level-by-level:

```

Level 0:          10

```

```

Level 1:      9^^^^^^^^^^^^^^^^^7
Level 2:      8^^^^^^4      1^^^^^^3
Level 3:      6^^^5      2^^

```

10 heap: [10, 9, 7, 8, 4, 1, 3, 6, 5, 2]
 Strategy was: (1, 2, 3, 4, 5, 4, 7, 4, 8)

Hereditary worst-case heap # 1016
 9-element heap level-by-level:

```

Level 0:      9
Level 1:      8^^^^^^7
Level 2:      6^^^4      1^^^3
Level 3:      5^2

```

9 heap: [9, 8, 7, 6, 4, 1, 3, 5, 2]
 Strategy was: (1, 2, 3, 4, 5, 4, 7, 8)

Hereditary worst-case heap # 1017
 10-element heap level-by-level:

```

Level 0:      10
Level 1:      9^^^^^^^^^^^^^^^^^7
Level 2:      8^^^^^^4      1^^^^^^3
Level 3:      5^^^6      2^^

```

10 heap: [10, 9, 7, 8, 4, 1, 3, 5, 6, 2]
 Strategy was: (1, 2, 3, 4, 5, 4, 7, 8, 9)

```
I can't find any hereditary worst-case heap of size 23
Stats: the total number of hereditary worst-case heaps is 1017
1 hereditary worst-case heap of size 1
1 hereditary worst-case heap of size 2
2 hereditary worst-case heaps of size 3
3 hereditary worst-case heaps of size 4
6 hereditary worst-case heaps of size 5
6 hereditary worst-case heaps of size 6
4 hereditary worst-case heaps of size 7
18 hereditary worst-case heaps of size 8
36 hereditary worst-case heaps of size 9
48 hereditary worst-case heaps of size 10
32 hereditary worst-case heaps of size 11
12 hereditary worst-case heaps of size 12
12 hereditary worst-case heaps of size 13
12 hereditary worst-case heaps of size 14
8 hereditary worst-case heaps of size 15
56 hereditary worst-case heaps of size 16
112 hereditary worst-case heaps of size 17
144 hereditary worst-case heaps of size 18
96 hereditary worst-case heaps of size 19
120 hereditary worst-case heaps of size 20
192 hereditary worst-case heaps of size 21
96 hereditary worst-case heaps of size 22
0 hereditary worst-case heaps of size 23
Control sum = 1017
BUILD SUCCESSFUL (total time: 3 seconds)
```

References

- [1] WWW, Heapsort in Java: <http://csc.csudh.edu/suchenek/MakeHeap.html>.

