

$$E = I + 2n$$

I - total number of comparisons needed to build the binary search tree whose internal path length is I

$I + 2n$ - cost of BS-sort (the same as the cost of QuickSort) counted as the number of comps + the number of writes.

$$= E$$

$$C = \frac{I}{n} + 1$$

$$C' = \frac{E}{n+1} = \frac{I+2n}{n+1} \approx \frac{I+2n}{n} =$$

$$= \frac{I}{n} + 2 = C + 1$$

Best case

$$I \approx n \lg n - 2n$$

$$E = I + 2n = n \lg n$$

$$C = \frac{I}{n} + 1 \approx \lg n - 0.5$$

$$C' \approx C + 1 = \lg n + 0.5$$

Avg case

$$I \approx 1.4 n \lg n - 2.8 n$$

$$E \approx 1.4 n \lg n - 0.8 n$$

$$C \approx 1.4 \lg n - 1.8$$

$$C' \approx 1.4 \lg n - 0.8$$

Worst case

$$I = \frac{n(n-1)}{2}$$

$$E = \frac{n(n+3)}{2}$$

$$C = \frac{n+1}{2}$$

$$C' = \frac{n+3}{2}$$

Note

Consolidate calculation
of S_M (the internal
path in the ~~smallest~~
shortest binary tree)

with I_M and with

E_M (in CSC401 - extend
path)