

CSC 501/401 Analysis of Algorithms Fall '18

Extra Credit Test

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Due September 17, 2018, in class.

This test is supposed to be the result of your own work. No collaboration of any form, including any kind of help via the Internet, is allowed while taking this test.

INSTRUCTIONS - READ CAREFULLY

There are 8 multiple-choice questions on this test.

For all questions, use scantron form 882-E like this:

The image shows a Scantron form 882-E. It includes a header with 'SCANTRON' and 'FORM NO. 882-E'. Below this is a section for 'NAME', 'SUBJECT', 'DATE', 'TEST NO.', 'PERIOD', and 'SEMESTER'. To the right is a 'TEST RECORD' table with columns for 'PART 1', 'PART 2', and 'TOTAL'. The main body of the form consists of a grid of bubbles for marking answers, numbered 1 through 50. Instructions on the left side of the grid include: 'IMPORTANT: USE ONLY PENCIL ONLY', 'TO USE SUBJECTIVE SCORE FEATURE: Mark total possible subjective points, Only one mark per line on key, No partial marking', 'MAKE DARK MARKS', 'ERASE COMPLETELY TO CHANGE', and 'EXAMPLE OF STUDENT SCORE: 1 2 3 4 5'. A 'SUBJECTIVE SCORE INSTRUCTOR USE ONLY' section is also present. At the bottom, there is a 'FEED THIS DIRECTION' arrow and a 'CARTON SERVICE' logo.

Each multiple-choice question is worth $\frac{1}{4}$ point of credit for graduate students and $\frac{3}{8}$ point of credit for undergraduate students.

Pick one answer for each question and mark it clearly on your scantron. If none of the choices provided for any question seems correct, or more than one choice provided seems correct, chose the answer that, in your opinion, is the closest to the correct one or is the best one.

THE QUESTIONS BEGIN HERE

1. Which of the following formulas defines the intersection $A \cap B$ of two sets A and B ?

(A) $x \in A \cap B \equiv (x \in A \wedge x \notin B)$

(B) $x \in A \cap B \equiv (x \in A \vee x \in B)$

(C) $x \in A \cap B \equiv (x \in A \wedge x \in B)$

(D) $x \in A \cap B \equiv (x \in A \Leftrightarrow x \in B)$

2. Which of the following formulas defines the union $A \cup B$ of two sets A and B ?

(A) $x \in A \cup B \equiv (x \in A \wedge x \notin B)$

(B) $x \in A \cup B \equiv (x \in A \vee x \in B)$

(C) $x \in A \cup B \equiv (x \in A \wedge x \in B)$

(D) $x \in A \cup B \equiv (x \in A \Leftrightarrow x \in B)$

3. Which of the following formulas defines the set-theoretic difference $A \setminus B$ of two sets A and B ?

(A) $x \in A \setminus B \equiv (x \in A \wedge x \notin B)$

(B) $x \in A \setminus B \equiv (x \in A \vee x \in B)$

(C) $x \in A \setminus B \equiv (x \in A \wedge x \in B)$

(D) $x \in A \setminus B \equiv (x \in A \Leftrightarrow x \in B)$

4. What is the least integer not less than x ?

(A) $\lfloor x \rfloor$

(B) $\lceil x \rceil$

(C) $\lfloor x \rfloor + 1$

(D) $\lceil x \rceil - 1$

5. What is the greatest integer not greater than x ?

(A) $\lfloor x \rfloor$

- (B) $\lceil x \rceil$
(C) $\lfloor x \rfloor + 1$
(D) $\lceil x \rceil - 1$
6. What is the greatest power of 3 less than or equal to n ?
- (A) $\lfloor x \rfloor$, where $n - 1 < x \leq n$
(B) $3^{\lceil x \rceil}$, where $n - 1 < x \leq n$
(C) $3^{\lfloor \log_3 n \rfloor}$
(D) $3^{\lceil \log_3 n \rceil}$
7. What is the least power of 10 greater than or equal to n ?
- (A) $\lfloor x \rfloor$, where $n - 1 < x \leq n$
(B) $10^{\lceil x \rceil}$, where $n - 1 < x \leq n$
(C) $10^{\lfloor \log_{10} n \rfloor}$
(D) $10^{\lceil \log_{10} n \rceil}$
8. How many decimal digits are needed to represent an integer $n > 0$ in decimal?
- (A) $\lfloor \frac{n}{10} \rfloor$
(B) $2^{\lfloor \log_{10} n \rfloor}$
(C) $\lceil \log_{10} n \rceil + 1$
(D) $\lfloor \log_{10} n \rfloor + 1$

THAT'S ALL, FOLKS.