Purdue University
CS 182

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Quiz 1 Version A Solutions

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The quiz has 2+10 questions to bubble in.
Keep the question sheet for your records.

1. I have spelled out and bubbled in correctly my first name, last name, and Purdue ID.

   A True

   B False

2. Your version of the quiz is Version A. Bubble in the version below. If you do not bubble in the version, your quiz score will be 0/10.

   A Version A

   B Version B

3. The contrapositive of $p \to q$ is

   A $\neg p \to \neg q$

   B $\neg q \to p$

   C $\neg q \to \neg p$

   D $q \to p$

   Solution: item[C] $\neg q \to \neg p$

4. Which of the following constitutes a tautology?

   A $P \wedge \neg P$

   B $(p \vee \neg q) \to q$

   C $(p \vee q) \to (p \wedge q)$

   D $(p \to q) \leftrightarrow (\neg q \to \neg p)$

   Solution: item[D] $(p \to q) \leftrightarrow (\neg q \to \neg p)$

5. Which of the following statement constitutes a proposition?

   A close the door

   B all CS182 students are smart

   C P(x): x+2<10

   D $\forall x, (x + y) > 20$

   E $n/2$

   Solution: item[B] all CS182 students are smart

6. The negation operator is logically complete

   A True

   B False

   Solution: item[B] False

7. Let C(x,y):= program x crashes on input y, Let L(x,y):= program x loops on input y forever. Every program has some input on which it either crashes or loops forever can be represented using which proposition?

   A $\exists x \forall y C(x, y) \oplus L(x, y)$

   B $\exists y \forall x C(x, y) \oplus L(x, y)$

   C $\forall x \exists y C(x, y) \oplus L(x, y)$

   D $\exists x \exists y C(x, y) \oplus L(x, y)$

   E $\exists y \exists x C(x, y) \oplus L(x, y)$

   Solution: item[C] $\forall x \exists y C(x, y) \oplus L(x, y)$

Which of the following statements are correct? A is True and B is False.

8. $(\log n)^3 = \Theta(\log n^3)$
   Solution:False

9. $n^6 \log n = O(n^7)$
   Solution: True

10. $n! = \Theta(2^n)$
    Solution: False

11. $3 \log n = O(n)$
    Solution: True

12. $((p \to q) \wedge \neg p) \to \neg q$ is a tautology
    Solution: False