



Zayd

## Homework Assignment Submitted Successfully.

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**You obtained a score of 18.0 points, out of a possible 18.0 points.**  
**You have answered all the questions correctly.**

**Congratulations, you have achieved the maximum possible score.**

**Submission number:** 58448  
**Submission certificate:** AG740568  
**Submission time:** 2014-02-01 15:12:45 PST (GMT - 8:00)

Help

**Number of questions:** 6  
**Positive points per question:** 3.0  
**Negative points per question:** 1.0  
**Your score:** 18

Based on Ch. 1 of HMU.

1. What is the concatenation of  $abc$  and  $cda$ ?

- a)  $cdaabc$
- b)  $abc.cda$
- c)  $abccda$
- d)  $acbdca$

Answer submitted: **c)**

You have answered the question correctly.

2. Find in the list below the expression that is the contrapositive of  $A \text{ AND } (\text{NOT } B) \rightarrow C \text{ OR } (\text{NOT } D)$ . Note: the hypothesis and conclusion of the choices in the list below may have some simple logical rules applied to them, in order to simplify the expressions.

- a)  $(\text{NOT } C) \text{ AND } D \rightarrow (\text{NOT } A) \text{ OR } B$
- b)  $(\text{NOT } C) \text{ OR } D \rightarrow B \text{ AND } (\text{NOT } A)$
- c)  $A \text{ OR } (\text{NOT } B) \rightarrow D \text{ AND } (\text{NOT } C)$
- d)  $B \text{ AND } (\text{NOT } A) \rightarrow C \text{ OR } (\text{NOT } D)$

Answer submitted: **a)**

You have answered the question correctly.

3. The binary string 0101111 is a member of which of the following problems? Remember, a "problem" is a language whose strings represent the cases of a problem that have the answer "yes." In this question, you should assume that all languages are sets of binary strings interpreted as base-2 integers. The exception is the problem of finding *palindromes*, which are strings that are identical when reversed, like 0110110, regardless of their numerical value.
- a) Is the given string a prime?
  - b) Is the given string a multiple of 3?
  - c) Is the given string a perfect cube?
  - d) Is the given string greater than 50?

Answer submitted: **a)**

You have answered the question correctly.

4. Suppose we want to prove the statement  $S(n)$ : "If  $n \geq 2$ , the sum of the integers 2 through  $n$  is  $(n+2)(n-1)/2$ " by induction on  $n$ . To prove the inductive step, we can make use of the fact that

$$2+3+4+\dots+(n+1) = (2+3+4+\dots+n) + (n+1)$$

Find, in the list below an equality that we may prove to conclude the inductive part.

- a) If  $n \geq 2$  then  $(n+2)(n-1)/2 + n = (n+1)(n+3)/2$
- b) If  $n \geq 2$  then  $n + 1 + (n+2)(n-1)/2 = (n+3)(n)/2$
- c) If  $n \geq 3$  then  $(n+2)(n-1)/2 + n + 1 = (n+3)(n)/2$
- d) If  $n \geq 1$  then  $n + 1 + (n+2)(n-1)/2 = (n+3)(n)/2$

Answer submitted: **b)**

You have answered the question correctly.

5. The length of the string `cbccaba` is:
- a) 6
  - b) 8
  - c) 3
  - d) 7

Answer submitted: **d)**

You have answered the question correctly.

6. To prove  $A \text{ AND } (\text{NOT } B) \rightarrow C \text{ OR } (\text{NOT } D)$  by contradiction, which of the statements below would we prove? Note: each of the choices is simplified by pushing NOT's down until they apply only to atomic statements A through D.

- a)  $(A \text{ AND } (\text{NOT } B) \text{ AND } (\text{NOT } C) \text{ AND } D) \rightarrow \text{false}$
- b)  $(A \text{ AND } (\text{NOT } B) \text{ AND } C \text{ AND } (\text{NOT } D)) \rightarrow \text{false}$
- c)  $(B \text{ AND } (\text{NOT } A) \text{ AND } (\text{NOT } D) \text{ AND } C) \rightarrow \text{false}$
- d)  $(B \text{ AND } (\text{NOT } A) \text{ AND } D \text{ AND } (\text{NOT } C)) \rightarrow \text{false}$

Answer submitted: **a)**

You have answered the question correctly.