Assignment-7

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. **Due on 2018-09-19, 23:59 IST.**

1) Binary Decision Diagram (BDD) construction of a Boolean expression is based on _________.
   - Shannon expansion
   - SOP representation
   - POS representation
   - Both b & c

No, the answer is incorrect.
Score: 0
Accepted Answers:
Shannon expansion

2) How many nodes are required to create a Binary Decision Tree having 4 variables?
   - $2^4$
   - $2^5$
   - $2^{5-1}$
   - $2^{4-1}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$2^{5-1}$

3) Find the number of terminal nodes of a Boolean function $f(a,b,c)=a\bar{b}+abc+b'c'$ in BDT and BDD representation.
   - BDT=5, BDD=5
4) Which Boolean function is represented by the given ROBDD? 

- f = b' + a'c'
- f = a' + b'c'
- f = a'b' + c'
- f = a' + b' + c'

No, the answer is incorrect. 
Score: 0

Accepted Answers:
- f = b' + a'c'

5) Which one is the ROBDD for the given Boolean expression f = abc + a'c'? Assume variable ordering is <a, b, c>
No, the answer is incorrect.
Score: 0
Accepted Answers:

6) Which among the following are false for the given BDD, where
path 1: x-y-z-y-1
path 2: x-y-z-y-0
7) What will be the optimal ordering of variables for the Boolean function \( f = ab + a'c + bc'd \)?

- \(<a,b,c,d>\)
- \(<a,c,d,b>\)
- \(<a,b,d,c>\)
- \(<a,c,b,d>\)

No, the answer is incorrect.
Score: 0
Accepted Answers:
\(<a,c,d,b>\)

8) Let \( B_X \) and \( B_Y \) are two ROBDDs representing Boolean function \( f(a,b,c) = a'b + ac + bc' \) with variable ordering \(<a, b, c>\) and \(<c, a, b>\) respectively. The number of nodes in \( B_X \) and \( B_Y \) are:

- \( B_X = 5, B_Y = 5 \)
- \( B_X = 5, B_Y = 6 \)
- \( B_X = 6, B_Y = 5 \)
- \( B_X = 6, B_Y = 6 \)

No, the answer is incorrect.
Score: 0
Accepted Answers:
9) Consider the Boolean function of 2-bit comparator, \( f(a_1, a_2, b_1, b_2) = (a_1 \text{ XNOR } b_1) \cdot (a_2 \text{ XNOR } b_2) \). Consider a ROBDD that represents \( f \) with variable ordering < \( a_1, a_2, b_1, b_2 \). How many nodes will this ROBDD have?

No, the answer is incorrect.
Score: 0
Accepted Answers: 11

10) Consider the Boolean function \( f(a, b, c, d) = ab'c + ab + c'd + bcd \). Construct ROBDD \( B_f \) to represent \( f \). Assume order of variables is < \( a, b, c, d \). The number of nodes in \( B_f \) is:

No, the answer is incorrect.
Score: 0
Accepted Answers: 8

11) Consider the boolean function in the question 10. Construct ROBDDs \( B_X \) and \( B_Y \) to represent restrict \((0, c, B_f)\) and restrict\((1, c, B_f)\), respectively. Assume order of variables is < \( a, b, c, d \). The number of nodes in \( B_X \) and \( B_Y \) are:

No, the answer is incorrect.
Score: 0
Accepted Answers: \( B_X = 5, B_Y = 5 \)

12) Consider the ROBDDs constructed in question 11 using the Boolean function given in question 10. Construct ROBDD \( B_z \) to represent exists(c, Bf) using \( B_X \) and \( B_Y \). Assume order of variables is < \( a, b, c, d \). The number of nodes in \( B_z \) are:

No, the answer is incorrect.
Score: 0
Accepted Answers: 5
13. Let \( f(x, y) = x(y + x') \) be a Boolean function. What will be the restrictions of \( f \) with respect to \( x \), if \( x=0 \) and \( x=1 \) respectively?

- 0, xy
- \( x', xy \)
- 0, y
- \( x', x+y \)

No, the answer is incorrect.
Score: 0
Accepted Answers:
0, y

14. Which among the following is True?

- \( \text{Pre}_\forall(X) = S - \text{Pre}_\exists(X) \)
- \( \text{Pre}_\forall(X) = S - \text{Pre}_\exists(S-X) \)
- \( \text{Pre}_\exists(X) = S - \text{Pre}_\forall(X-S) \)
- \( \text{Pre}_\exists(X) = S - \text{Pre}_\forall(S-X) \)

No, the answer is incorrect.
Score: 0
Accepted Answers:
\( \text{Pre}_\forall(X) = S - \text{Pre}_\exists(S-X) \)

15. What is \( \text{Pre}_\exists(X) \) for the given state transition diagram where \( S=\{x_1,x_2,y_1,y_2,y_3,y_4\} \) and \( X=\{y_2,y_3\} \)?

- \( \{x_2,y_1,y_2,y_3\} \)
- \( \{x_2,x_1,y_1,y_3\} \)
- \( \{x_2,y_1,y_3\} \)
- \( \{y_1,y_3,y_4\} \)

No, the answer is incorrect.
Score: 0
Accepted Answers:
\( \{x_2,y_1,y_3\} \)
16. What is Pre_\phi(X) for the state transition diagram shown in Question 15?

- \{x_2,y_1\}
- \{x_2,y_1,y_3\}
- \{x_1,x_2,y_3\}
- \{x_1,x_2,y_1,y_3\}

No, the answer is incorrect.
Score: 0
Accepted Answers:
\{x_2,y_1\}

17. Which of the following symbolic model checking function returns Pre_\exists(B_\phi), where B_\phi is the OBDD for set of states where \phi is true?

- EF(B_\phi)
- AF(B_\phi)
- AG(B_\phi)
- EX(B_\phi)

No, the answer is incorrect.
Score: 0
Accepted Answers:
EX(B_\phi)