X

Unit 11 - Binary Decision Diagram and Symbolic model checking

Week 8--Assignment

The due date for submitting this assignment has passed. **Due on 2016-09-18, 23:58 IST.**

Submitted assignment

1) 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. Count the number of nodes in B_X and B_Y. ***2 points***

- 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:
B_X=6, B_Y=5

2) Consider the Boolean function of 2-bit comparator, $f(a_1,a_2,b_1,b_2)= (a_1 \text{ XNOR } b_1) \bullet (a_2 \text{ XNOR } b_2)$. Draw ROBDD to represent f with variable ordering < a_1, a_2, b_1, b_2> and find the number of nodes in it. ***2 points***

- 10
- 11
- 12
- 14

No, the answer is incorrect.
Score: 0

Accepted Answers:
11

3) Let ***f(a,b)=a'b'+a'b+ ab'+ab*** be a Boolean function . Which of the followings is true? ***1 point***

- ***f*** is independent of only a
- ***f*** is independent of only b
- ***f*** is independent of both a and b
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
f is independent of both a and b

4) Let ***f(a,b,c)=a'b'+abc+a'c'*** be a Boolean function. What is the negative Shannon cofactor of ***f*** with respect to ***c*** ? ***1 point***

- a′
- b′
- c′
- a′b′+ab

No, the answer is incorrect.
Score: 0

Accepted Answers:
a'

5) Let B_f is a ROBDD of Boolean expression ***f***. If B_f contains only one node and that is labeled with 1, then which of the followings is true for ***f***. ***1 point***

- ***f*** is not a valid Boolean expression
- ***f*** is not a satisfiable Boolean expression
- ***f*** is a valid Boolean expression
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
f is a valid Boolean expression

6) Let B_f be a ROBDD of a Boolean expression ***f***. If there exists 4 paths to terminal node 1 and 3 paths to terminal node 0 in B_f, then what can we say about ***f***. ***1 point***

- ***f*** is valid but not satisfiable
- ***f*** is valid and satisfiable
- ***f*** is neither valid nor satisfiable
- ***f*** is not valid but satisfiable

No, the answer is incorrect.
Score: 0

Accepted Answers:
f is not valid but satisfiable

7) Let B_f be a OBDD representing Boolean function ***f(a,b,c)=a'b+b'c*** and B_g be another OBDD representing Boolean function ***g(a,b,c)=a'b***. Perform XOR operation on B_f and B_g (i.e., B_{XOR}= B_f XOR B_g) and reduce it. Find the number of nodes and number of satisfying assignments in B_{XOR}. Assume order of variables in all cases is <a, b, c>. ***3 points***

- Nodes=4, Satisfying assignments =2
- Nodes=6, Satisfying assignments =2
- Nodes=8, Satisfying assignments =3
- Nodes=6, Satisfying assignments =3

No, the answer is incorrect.
Score: 0

Accepted Answers:
Nodes=4, Satisfying assignments =2

8) Consider the Boolean function ***f(a,b,c,d)= ab'c + ab + c'd+ bcd***. Construct ROBDD, B_f, to represent ***f***. Construct ROBDDs B_X and B_Y to represent ***restrict (0,c, B_f)*** and ***restrict(1,c,B_f),*** respectively. Finally, construct ROBDD, B_Z, to represent ***exists(c, B_f)*** using B_X and B_Y. Find the number of nodes in B_f, B_X, B_Y and B_Z. Assume order of variables in all cases is <a, b, c, d>. ***3 points***

- B_f=8, B_X=5, B_Y=5, B_Z=4
- B_f=8, B_X=6, B_Y=6, B_Z=5
- B_f=8, B_X=5, B_Y=5, B_Z=8
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
B_f=8, B_X=5, B_Y=5, B_Z=4

9) Let ***f(x, y) = x(y + x')*** be a Boolean function. Find the restrictions of ***f*** with respect to ***x.*** ***1 point***

- 0, xy
- x′, xy
- 0, y
- x′, x+y

No, the answer is incorrect.
Score: 0

Accepted Answers:
0, y

Previous Page End

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