

EE382m: Homework 2

Manipulating BDDs

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Due 2.18.04

1. Draw the (RO)BDD for the function

$$f = !c * e * b * d + !a * c * !e + a * !c * e$$

under the variable ordering $a \prec b \prec c \prec d \prec e$.

7 marks

2. Give commented detailed pseudo-code for a procedure which takes an ROBDD F and a variable x and returns the ROBDD for F_x .

By detailed, I mean do not simply write `return ite(F,x,0)` (which in any case is not correct).

15 marks

3. Draw the BDDs for the functions $f = x_1 + x_2' \cdot x_3$, and $g = x_2' + x_3' \cdot x_4$ under the variable ordering $x_1 \prec x_2 \prec x_3 \prec x_4$. Compute the BDD for the function $f \cdot g$ using the ITE operator. Show all steps, assuming the ITE cache starts off empty, and that there are no BDD nodes, save for those from f and g .

15 marks

4. Suppose you were given a BDD F for a nonzero function $f : B^n \rightarrow B$. Give an **efficient** algorithm for finding a minterm m in f^1 which has the fewest bits set to 1.

15 marks