

Department of Computing
Course 112 - Hardware
Tutorial 2

This tutorial contains exercises that are assessed. Make certain that your name, initials and group are clearly filled in. Do all your work on this sheet and hand it in at the end of the tutorial session.

LAST NAME _____ **INITIALS** _____ **GROUP** _____

1. Simplify the following expressions:

a. $((A \cdot B')' + B') \cdot B$

b. $A + ((A \cdot B')' \cdot C)$

c. $A + ((B + C)' \cdot A)$

2. Draw circuits of your simplified expressions. Each circuit will have one output. The result of the boolean equation.

3. You are to design a circuit that has three inputs A B C, and one output R. The output R should be 1 if one or two of the inputs are 1. Fill up the following truth table for the circuit, then write down the canonical form of the boolean equation using a sum of minterms. Simplify the resulting expression as far as you can.

A	B	C	R
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

R =

4. (optional) Write down the equation for the circuit using maxterms. Verify that the result is the same as your solution to Q3. (You can do this with a truth table or by arguments based on cases, but can you find a proof in Boolean Algebra?)

R =

(continue overleaf)