

**American University of Beirut**  
**Department of Electrical and Computer Engineering**  
EECE 320 – Digital Systems Design

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Assignment 2

due 27/9/2014

1) Prove the following identity using a truth table:

$$A'B+B'C'+AB+B'C=1$$

2) Prove the following equalities using **rules of Boolean algebra**, state the theorem you are using at each step.

a-  $X'Y'+Y'Z+XZ+XY+YZ'=X'Y'+XZ+YZ'$

b-  $ABC'+BC'D'+BC+C'D=B+C'D$

3) Draw the minimized functions of the **previous question 2**

- using AND, OR, inverter gates.
- using only NAND gates

4) Minimize the following functions to minimum **product of sums** expressions, using **rules of Boolean algebra**, then draw the corresponding circuits.

a-  $ABC'+BC'D'+BC+C'D$

b-  $AD'+A'B+C'D+B'C$

5) Analyze the following circuit and express g as a minimal **sum of product** expression.

