

# Computer Architecture

## Tutorial 1 – Boolean Algebra - Answers

- 1) Write the Truth Table for the following Boolean expression:  $R = A \cdot B + C'$

A	B	C	C'	$A \cdot B$	$R = A \cdot B + C'$
0	0	0	1	0	1
0	0	1	0	0	0
0	1	0	1	0	1
0	1	1	0	0	0
1	0	0	1	0	1
1	0	1	0	0	0
1	1	0	1	1	1
1	1	1	0	1	1

- 2) Simplify the following Boolean Expressions to its simplest form

a)  $R = A + A' \cdot B$

R

$= A + B$

Negation  
Simplification Rule

b)  $R = A \cdot (A' + B)$

R

$= (A \cdot A') + (A \cdot B)$

$= 0 + A \cdot B$

$= A \cdot B$

Distributive Rule  
Negation Rule  
Simplification Rule

c)  $R = (A + C) \cdot (A \cdot D + A \cdot D') + A \cdot C + C$

R

$= (A + C) \cdot (A \cdot (D + D')) + A \cdot C + C$

$= (A + C) \cdot A + A \cdot C + C$

$= A \cdot A + C \cdot A + A \cdot C + C$

$= A + A \cdot C + C$

$1 \cdot (A + C) + C$

$A + C + C$

$A + C$

$= A + C$

Distributive Rule  
Negation Rule  
Distributive Rule  
Idempotent Rule  
Distributive Rule  
Simplification Rule