# Computer Architecture

## Tutorial 1 – Boolean Algebra - Answers

1) Write the Truth Table for the following Boolean expression: R = A • B + C'

| A | B | C | C' | A • B | R = A • 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) Simply the following Boolean Expressions to its simplest form



a) R = A + A' • B

| | | |
|---|---|---|
| R | = (A + A') • (A + B) | Distributive Rule |
| | = 1 • (A + B) | Negation Rule |
| | = A + B | Simplification Rule |

b) R = A • (A' + B)

| | | |
|---|---|---|
| R | = (A • A') + (A • B) | Distributive Rule |
| | = 0 + A • B | Negation Rule |
| | = A • B | Simplification Rule |

c) R = (A + C) • (A • D + A • D') + A • C + C

| | | |
|---|---|---|
| R | = (A + C) • (A • (D + D')) + A • C + C | Distributive Rule |
| | = (A + C) • A + A • C + C | Negation Rule |
| | = A • A + C • A + A • C + C | Distributive Rule |
| | = A + A • C + C | Idempotent Rule |
| 1 . (A + C) + C | = A • (1 + C) + C----- | Distributive Rule |
| A+C+C | = A + C | Simplification Rule |
| A+C | | |