

EE5811 : FPGA LAB

ASSIGNMENT 1

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Problem

Question 5) c) from papers/icse/cs/2018.pdf
Simplify the following expression using Boolean Laws :

$$A.(A' + B).C.(A + B)$$

Solution

$$A.(A' + B).C.(A + B) = A.A.(A' + B).C.(A + B) \quad \{\text{As } A = A.A\} \quad (1)$$

$$= A.(A' + B).C.A.(A + B) \quad (2)$$

$$= (A.A' + A.B).C.(A.A + A.B) \quad (3)$$

$$= (0 + A.B).C.(A + A.B) \quad \{\text{As } A.A' = 0 \text{ and } A.A = A\} \quad (4)$$

$$= A.B.C.(A) \quad \{\text{As } A + A.B = A\} \quad (5)$$

$$= A.B.C.A \quad (6)$$

$$= A.B.C \quad (7)$$

$$\text{So } A.(A' + B).C.(A + B) = A.B.C$$

Truth Table

A	B	C	LHS	RHS
0	0	0	0	0
0	0	1	0	0
0	1	0	0	0
0	1	1	0	0
1	0	0	0	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

Table 1: Truth table for $A.(A' + B).C.(A + B) = A.B.C$