

# FPGA-assignment1

Gundluru Ramesh

EE22MTECH02001

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## 1 6.a Question

State any one Absorption law of Boolean Algebra and verify it using truth table.

## 2 Solution

### 2.1 Verifying laws

The following laws are called as Absorption laws of Boolean Algebra.

1.  $x + xy = x$

2.  $x(x + y) = x$

Verifying law 1:

x	y	xy	x+xy
0	0	0	0
0	1	0	0
1	0	0	1
1	1	1	1

Verifying law 2:

x	y	x+y	x(x+y)
0	0	0	0
0	1	1	0
1	0	1	1
1	1	1	1

## 2.2 K-MAP implementation

1.  $x + xy$

The SOP max terms are considered for minimizing the law1 through k-map

		$y$		0	1
		$x$			
0				0	0
				1	1

From the k-map , the implicant is  $x$  , so output  $z = x + xy = x$

2.  $x(x + y)$

The SOP max terms are considered for minimizing the law 2 through k-map

		$y$		0	1
		$x$			
0				0	0
				1	1

From the k-map , the implicant is  $x$  , so output  $z = x(x + y) = x$

## 2.3 implementation of laws using NAND gate

minimal equivalent of law 1  $x + xy$  is  $x$ (obtained by k-map)

