


Department of Electrical and Electronic Engineering,  
Bangladesh University of Engineering and Technology

## EEE 303: Digital Electronics

Level 3/ Term 1/ Section A  
February 2013 Session

Course Teacher  
**Upal Mahbub**  
Assistant Professor,  
Dept. of EEE, BUET.  
E-mail:  
omeecd@eee.buet.ac.bd;  
omeecd@yahoo.com

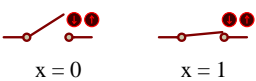
Topic of the Day  
**LIGHT THE LOGICAL BULB!!**



**LECTURE 1**

## Switches and Bulbs

2



$x = 0$        $x = 1$

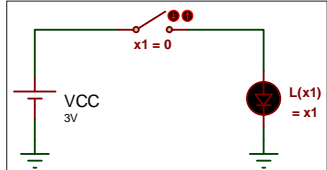
Fig. Two States of a Switch

Text Book  
**Fundamentals of Digital Logic with VERILOG Design**  
by Stephen Brown, Zvonko Vranesic, 2nd Edition.  
Software  
Altera - Quartus  
CIS  
Proteus - ISIS

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## Switches and Bulbs

3



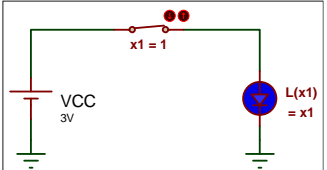
x1	L(x1)=x1
0	0
1	1

The Truth Table

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## Switches and Bulbs

4



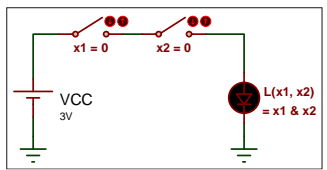
x1	L(x1)=x1
0	0
1	1

The Truth Table

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## X1 AND X2

5

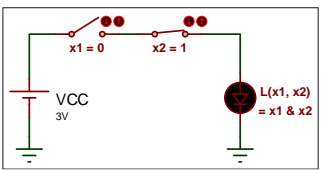


x1	x2	L(x1, x2)=x1 & x2
0	0	0
0	1	0
1	0	0
1	1	1

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## X1 AND X2

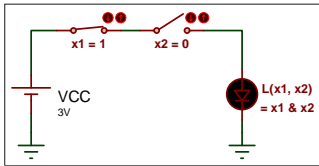
6



x1	x2	L(x1, x2)=x1 & x2
0	0	0
0	1	0
1	0	0
1	1	1

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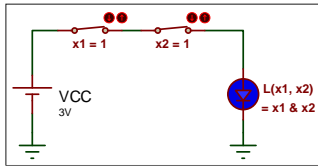
### X1 AND X2



x1	x2	L(x1, x2) = x1 & x2
0	0	0
0	1	0
1	0	0
1	1	1

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### X1 AND X2

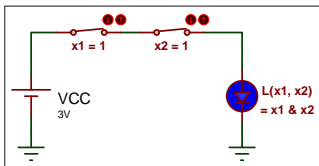


x1	x2	L(x1, x2) = x1 & x2
0	0	0
0	1	0
1	0	0
1	1	1

You Can Represent the AND Operation with "&" or "." (dot)

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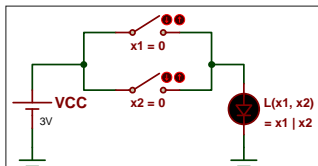
### X1 AND X2




x1	x2	L(x1, x2) = x1 & x2
0	0	0
0	1	0
1	0	0
1	1	1

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### X1 OR X2

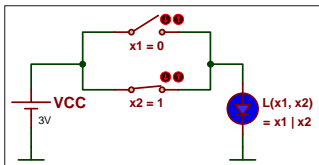


x1	x2	L(x1, x2) = x1   x2
0	0	0
0	1	1
1	0	1
1	1	1



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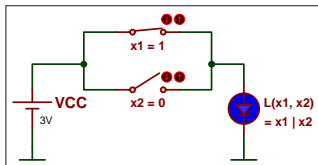
### X1 OR X2



x1	x2	L(x1, x2) = x1   x2
0	0	0
0	1	1
1	0	1
1	1	1

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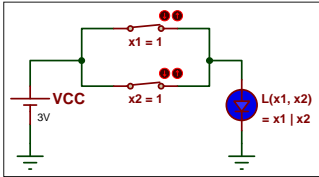
### X1 OR X2



x1	x2	L(x1, x2) = x1   x2
0	0	0
0	1	1
1	0	1
1	1	1

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### X1 OR X2

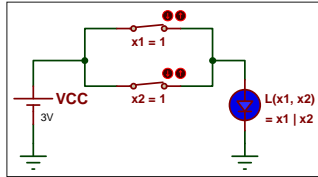


x1	x2	$L(x1, x2) = x1   x2$
0	0	0
0	1	1
1	0	1
1	1	1

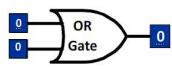
You Can Represent the OR Operation with “|” or “+”

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### X1 OR X2

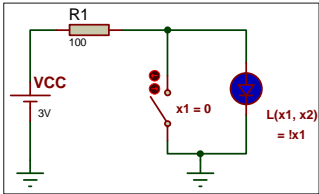


x1	x2	$L(x1, x2) = x1   x2$
0	0	0
0	1	1
1	0	1
1	1	1



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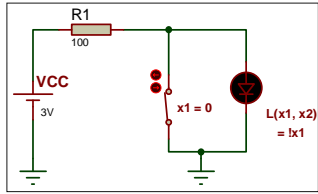
### NOT X1



x1	$L(x1) = !x1$
0	1
1	0

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### NOT X1

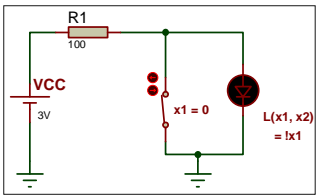


x1	$L(x1) = !x1$
0	1
1	0

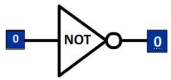
You Can Represent the NOT Operation with “!” or “—” (overhead bar)

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### NOT X1

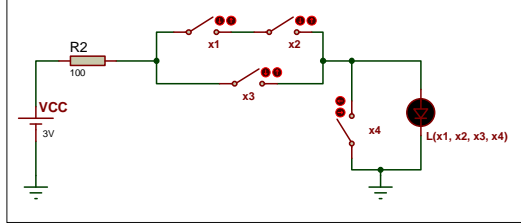


x1	$L(x1) = !x1$
0	1
1	0



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### Exercise 1: Write the Function

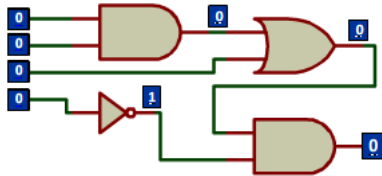


$L(x1, x2, x3, x4) = (x1 \cdot x2 + x3) \cdot \bar{x4}$

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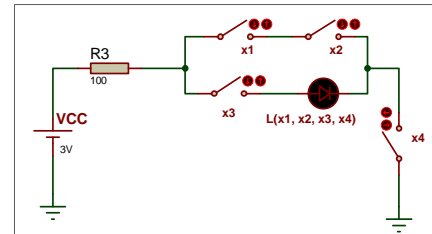
## Exercise 1: Write the Function

$$L(x_1, x_2, x_3, x_4) = (x_1 \cdot x_2 + x_3) \cdot \overline{x_4}$$



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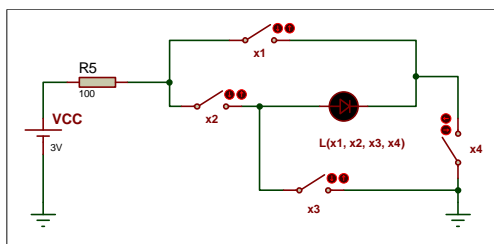
## Exercise 2: Write the Function



$$L(x_1, x_2, x_3, x_4) = (\overline{x_1} + \overline{x_2}) \cdot x_3 \cdot x_4$$

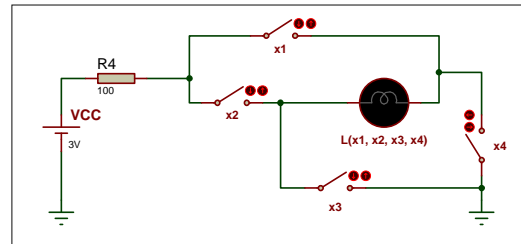
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## Exercise 3: Write the Function



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## Exercise 4: Write the Function



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That's All for Today!

Learn Proteus  
Simulate the switch-bulbs at home 😊

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