DIGITAL LOGIC AND CIRCUIT DESIGN LAB

LABORATORY ASSIGNMENTS

3rd SEMESTER COMPUTER SCIENCE & ENGINEERING

SUBMITTED BY

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EXPT NO.2 :
STUDY OF UNIVERSAL GATES

Objective :
To study NAND and NOR gates as Universal Logic Gates.

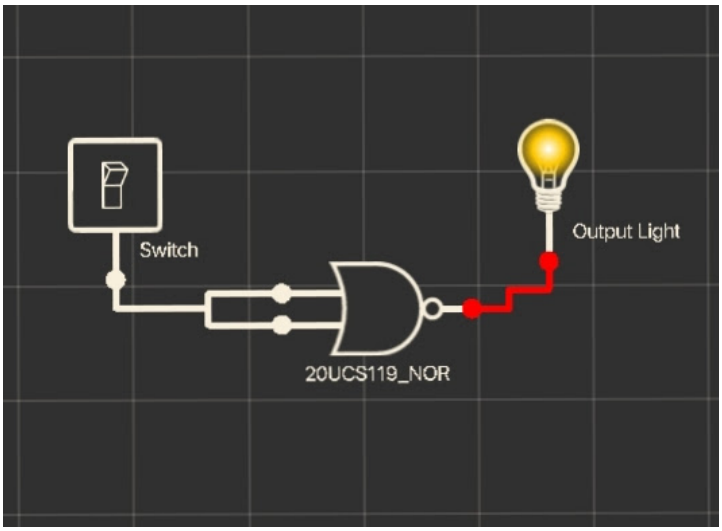
Equipments :
Logic Circuit Simulator Pro.

Procedure :

1. Firstly we have to install the LOGIC CIRCUIT SIMULATOR PRO APP and then after opening it, we have to make a new project.
2. Then we have to add the required elements to make the circuits i.e LOGIC gates, inputs, outputs etc.
3. Then connect the elements together with the help of a path to form a circuit and through the given gates we have to connect the input and output.
4. Lastly, we have to apply the TOUCH button to turn on/off the inputs i.e the switch by clicking on it, then we have to observe the output from the output section and verify the given truth tables.

1) Realization of all basic gates using NOR gate :

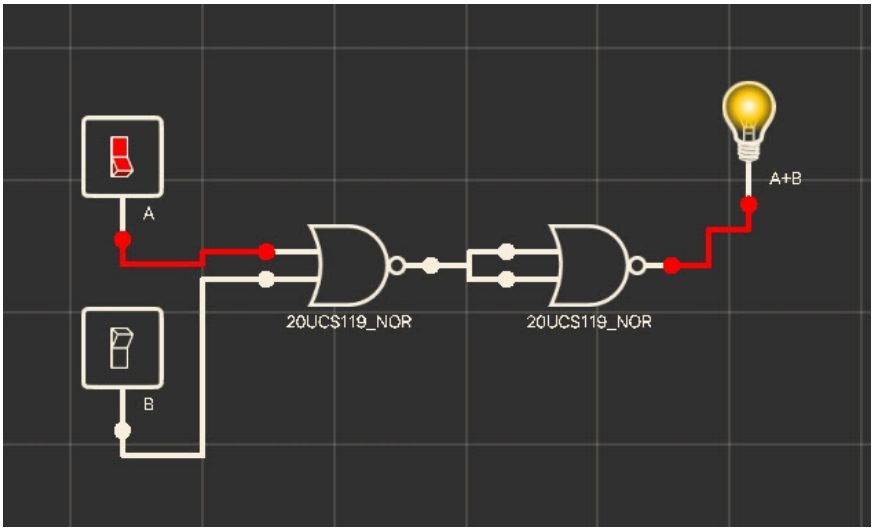
NOT GATE :



Truth Table	
A	A'
0	1
1	0

Figure : NOT gate

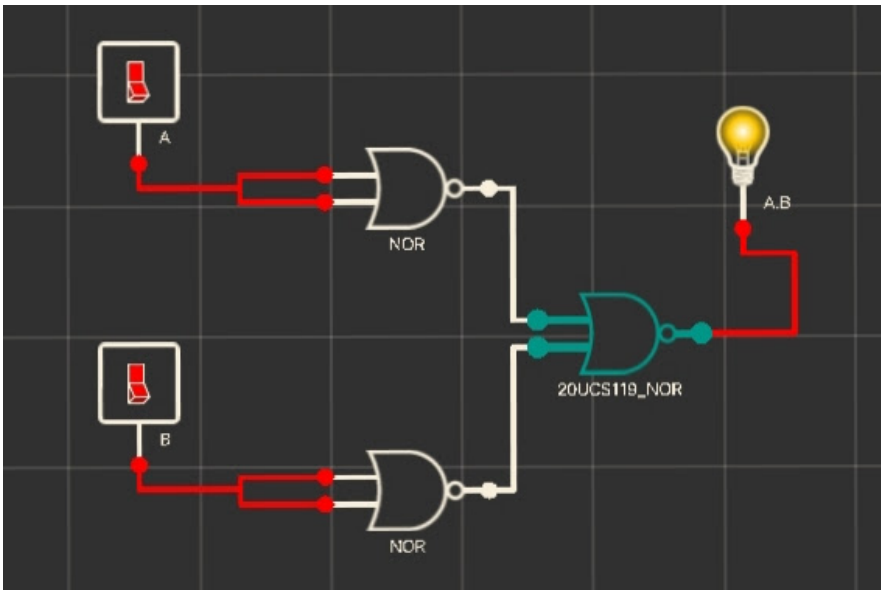
OR GATE:



Truth Table		
A	B	A+B
0	0	0
0	1	1
1	0	1
1	1	1

Figure : OR gate

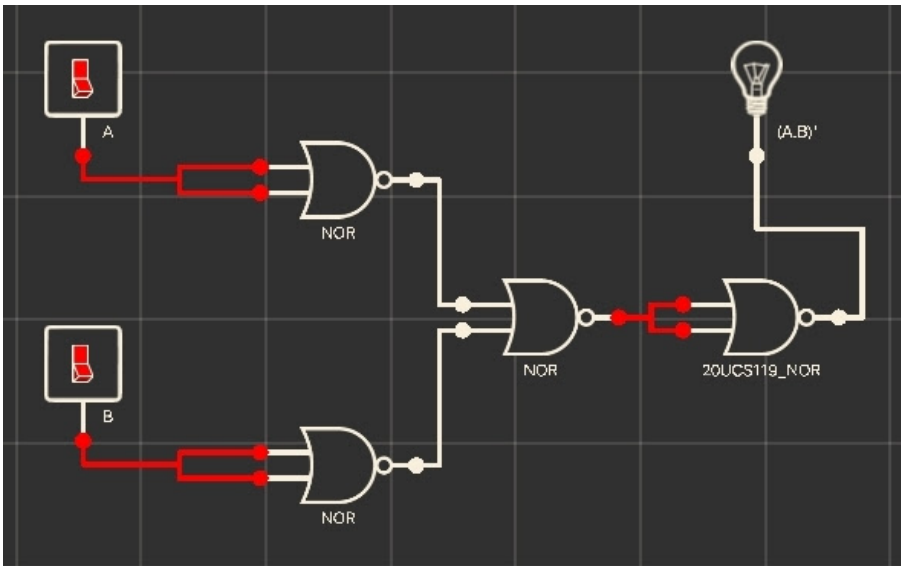
AND GATE:



Truth Table		
A	B	A.B
0	0	0
0	1	0
1	0	0
1	1	1

Figure : AND gate

NAND GATE:

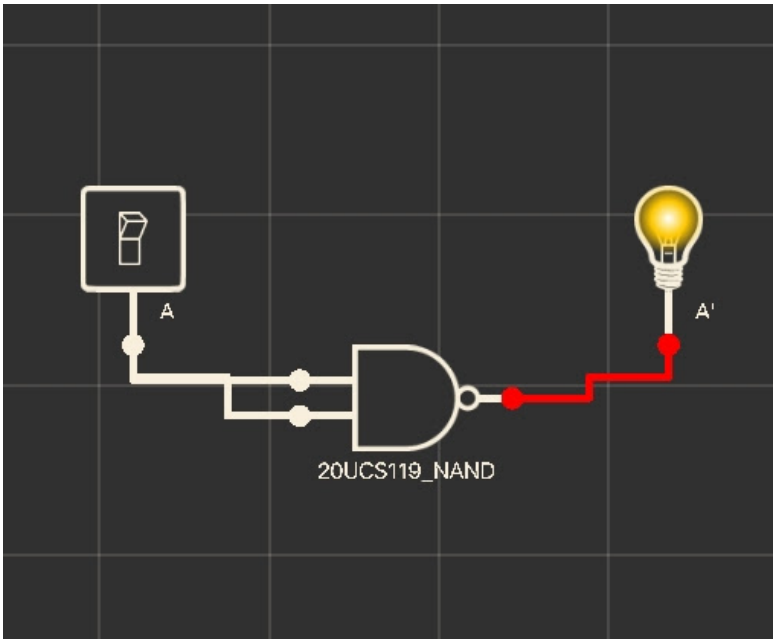


Truth Table		
A	B	$\overline{A.B}$
0	0	1
0	1	1
1	0	1
1	1	0

Figure : NAND gate

2) Realization of all basic gates using NAND gate :

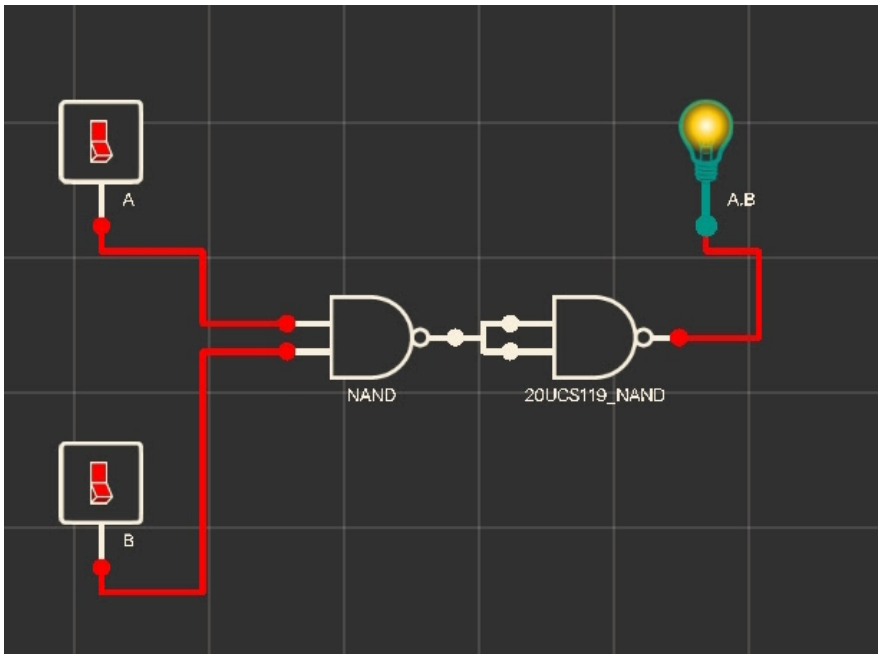
NOT GATE:



Truth Table	
A	A'
0	1
1	0

Figure : NOT gate

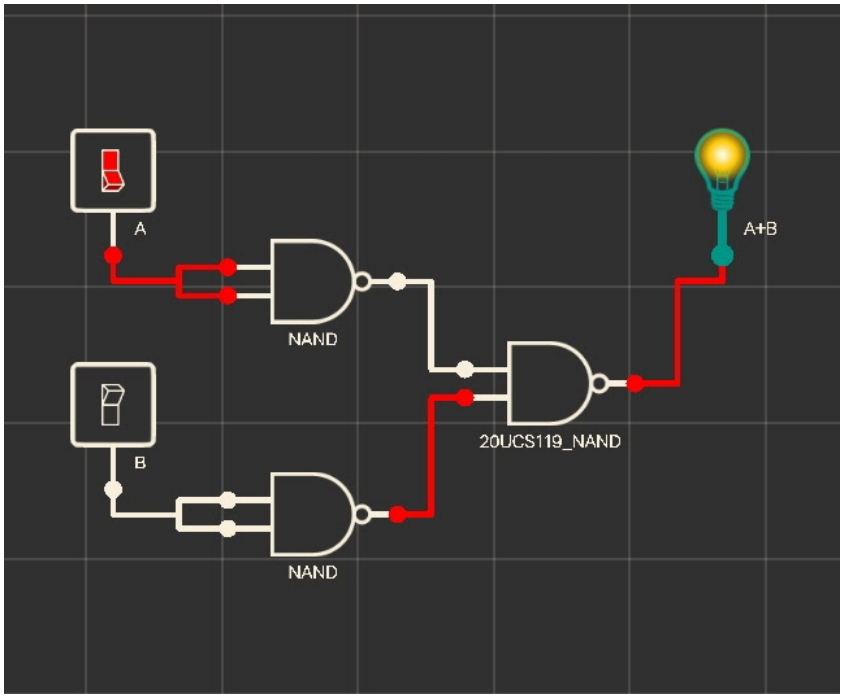
AND GATE:



Truth Table		
A	B	A.B
0	0	0
0	1	0
1	0	0
1	1	1

Figure : AND gate

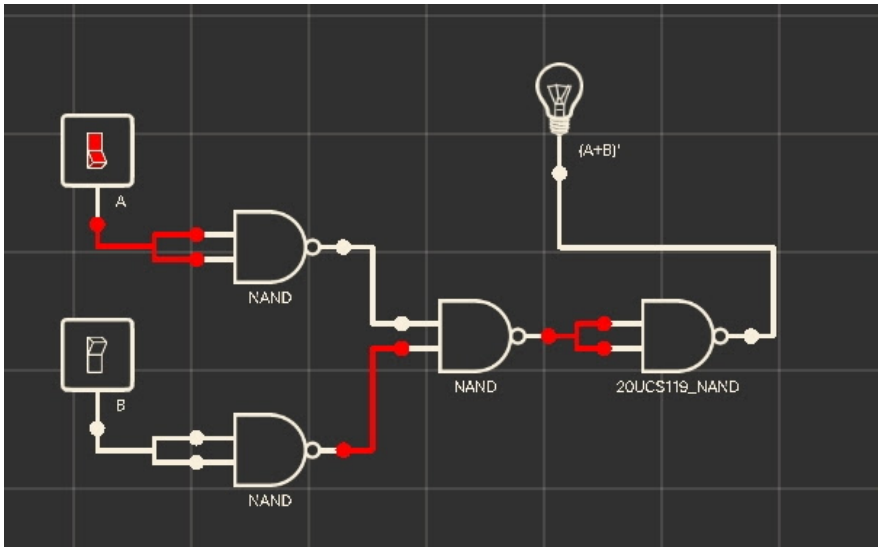
OR GATE:



Truth Table		
A	B	A+B
0	0	0
0	1	1
1	0	1
1	1	1

Figure : OR gate

NOR GATE:

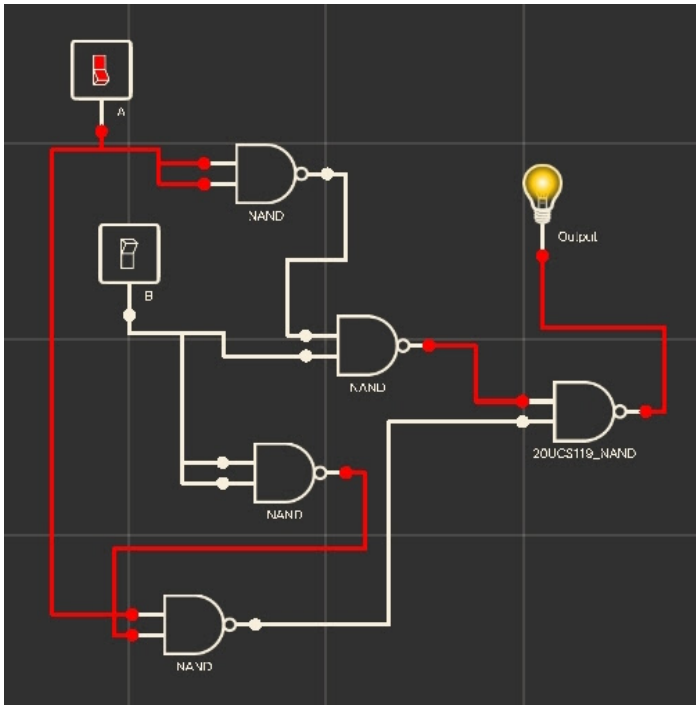


Truth Table		
A	B	$\overline{A+B}$
0	0	1
0	1	0
1	0	0
1	1	0

Figure : NOR gate

3)Realization of XOR and XNOR gates using NAND and NOR gates :

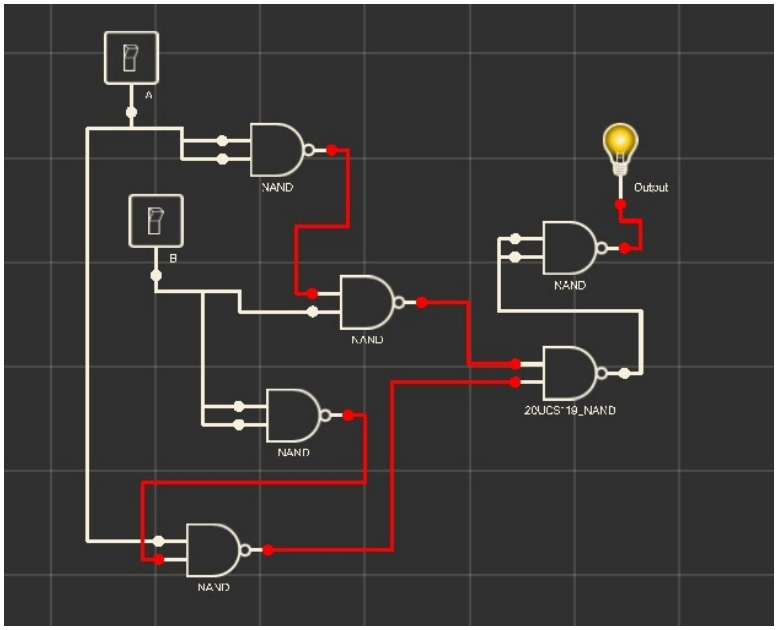
BASIC CONFIGURATION OF XOR GATE using NAND :



Truth Table		
A	B	XOR
0	0	0
1	0	1
0	1	1
1	1	0

Figure : XOR Gate using NAND

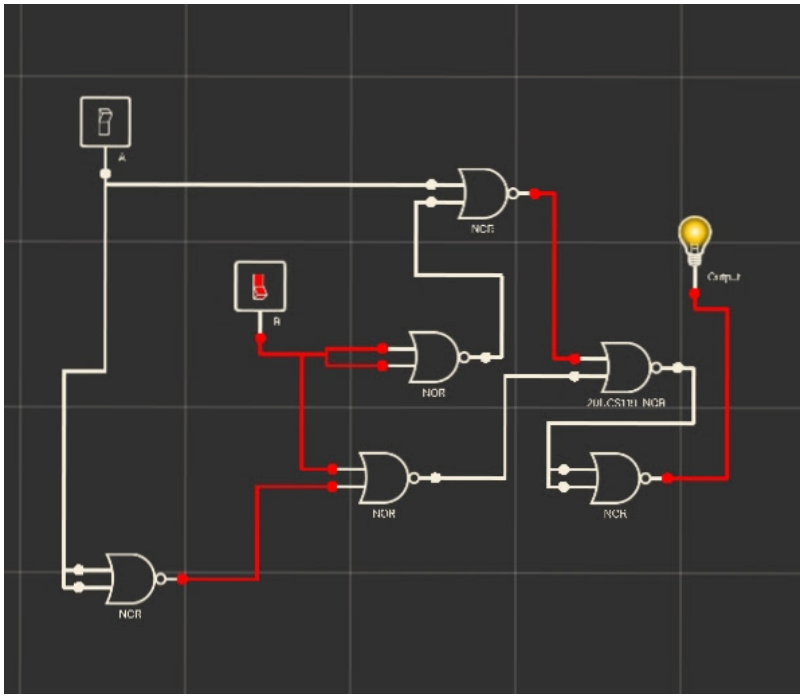
BASIC CONFIGURATION OF XNOR GATE using NAND :



Truth Table		
A	B	XNOR
0	0	1
1	0	0
0	1	0
1	1	1

Figure : XNOR Gate using NAND

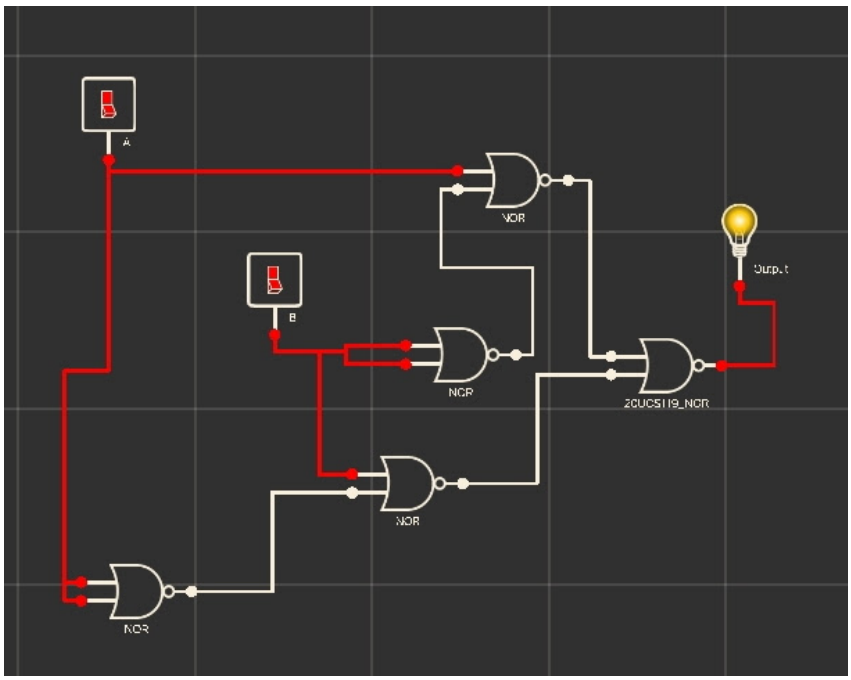
BASIC CONFIGURATION OF XOR GATE using NOR :



Truth Table		
A	B	XOR
0	0	0
1	0	1
0	1	1
1	1	0

Figure : XOR Gate using NOR

BASIC CONFIGURATION OF XNOR GATE using NOR :



Truth Table		
A	B	XNOR
0	0	1
1	0	0
0	1	0
1	1	1

Figure : XNOR Gate using NOR

Conclusion:

The truth tables for various digital gates like AND,OR ,NAND XNOR, and NOR are verified using the universal gates.