

NEUB CSE 222 LAB 4: NAND and NOR Gate Universality

North East University Bangladesh

Department of CSE

Course no: CSE 222

Experiment no: 04

Experiment Name: NAND and NOR gate Universality

CAUTIONS:

1. Don't switch on the supply of the circuit until you have verified the circuit carefully
2. Take readings of apparatus carefully
3. Take care of any bare circuit elements in energized condition
4. Never try to touch bare live wires

Objective

The objective of this experiment is to prove that NAND and NOR gates can be used to make AND, OR, NOT, NOR, & XOR gates.

Theory

NAND and NOR gates can be used to create any logic circuit. One of the basis is that NAND and NOR gate alone can mimic the functionality of the basic three gates AND, OR, NOT, NOR, & XOR gates.

Apparatus Needed

- Trainer Board (Bread board)
- Logic Gate ICs (List in next section)
- Connecting wires
- LEDs
- Push Buttons / DIP switch

Logic Gate Ics

IC number	IC name
7400	Quad 2 input NAND gate
7402	Quad 2 input NOR gate

Procedure

1. Place the IC in the in the breadboard
2. Connect VCC and Ground to the respective pins of IC
3. Connect the inputs switches provided in the IC trainer kit
4. Connect all the internal connections
5. Connect the output of the ICs to LEDs
6. Apply various combinations of inputs according to the tables of result section
7. Observe and write the output of the LED in the corresponding table in result section.
8. Repeat for all the circuits in the result section.

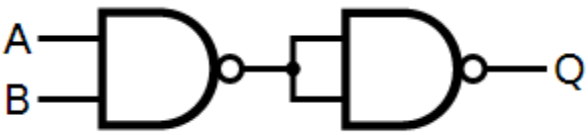
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Result

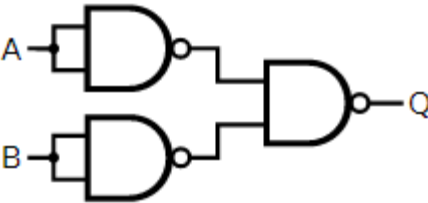
1. Implementation using NAND gates

a. 

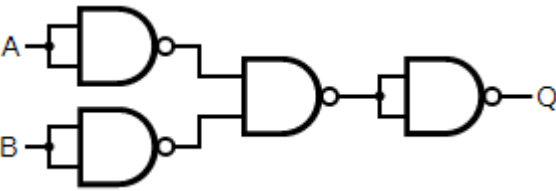
A	Q
0	
1	

b. 

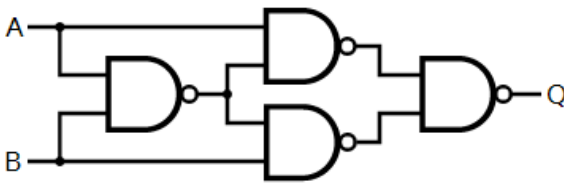
A	B	Q
0	0	
0	1	
1	0	
1	1	

c. 

A	B	Q
0	0	
0	1	
1	0	
1	1	

d. 

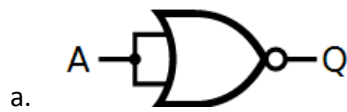
A	B	Q
0	0	
0	1	
1	0	
1	1	

e. 

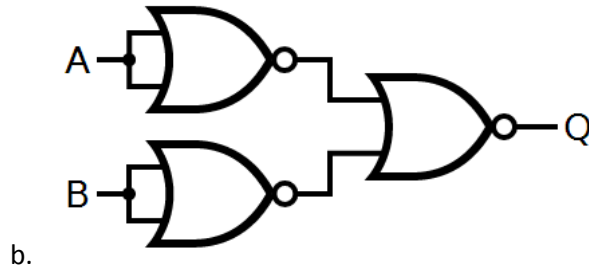
A	B	Q
0	0	
0	1	
1	0	
1	1	

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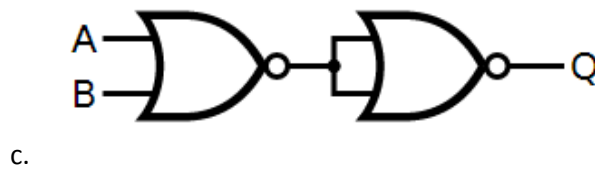
2. Implementation using NOR gates



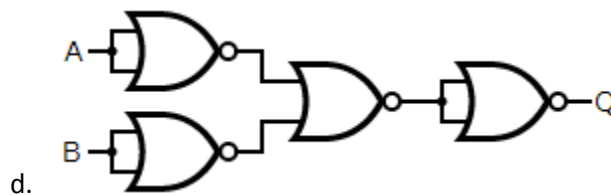
A	Q
0	
1	



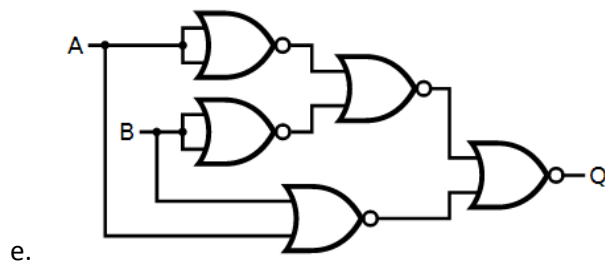
A	B	Q
0	0	
0	1	
1	0	
1	1	



A	B	Q
0	0	
0	1	
1	0	
1	1	



A	B	Q
0	0	
0	1	
1	0	
1	1	



A	B	Q
0	0	
0	1	
1	0	
1	1	

Report

- Carefully fill all the data for tables in this sheet.
- Comment on the learning from this LAB