Kathmandu University

Department of Electrical and Electronics Engineering

Digital logic laboratory experiments

Experiment: Design a door lock system having three inputs where door opens only when:

 (a) Input combination includes two inputs as high (b) Next input is complement of previous input of that combination

Components Required:

- IC 7402
- IC 7404
- Breadboard
- Resistor (1kΩ)
- LED
- Multi meter
- Power Source (5V DC)

Theory:

Door lock system is implementation of digital logic to control instantaneous operation based on instantaneous values of input this system can be designed with the use of NOR gate.

The set conditions for door to open are:-

- When any two inputs are high.
- When next input is complement of previous input.
- Otherwise door remain closed.

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Truth Table:

Inputs			Outputs	
A	**B**	**C**	**Open(O)**	**Close(Cl)**
0	0	0	0	1
0	0	1	0	1
0	1	0	1	0
0	1	1	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	0

Figure:Truth table

Procedure:

1. Collect required components.
2. Test the power source using multimeter and test IC using IC tester.
3. Test components using multimeter, power source, bread board and some wires.
4. Consider +5Volts DC as Logic high value (1) and Ground as Logic low value (0).
5. Connect components on breadboard as per Boolean expression.
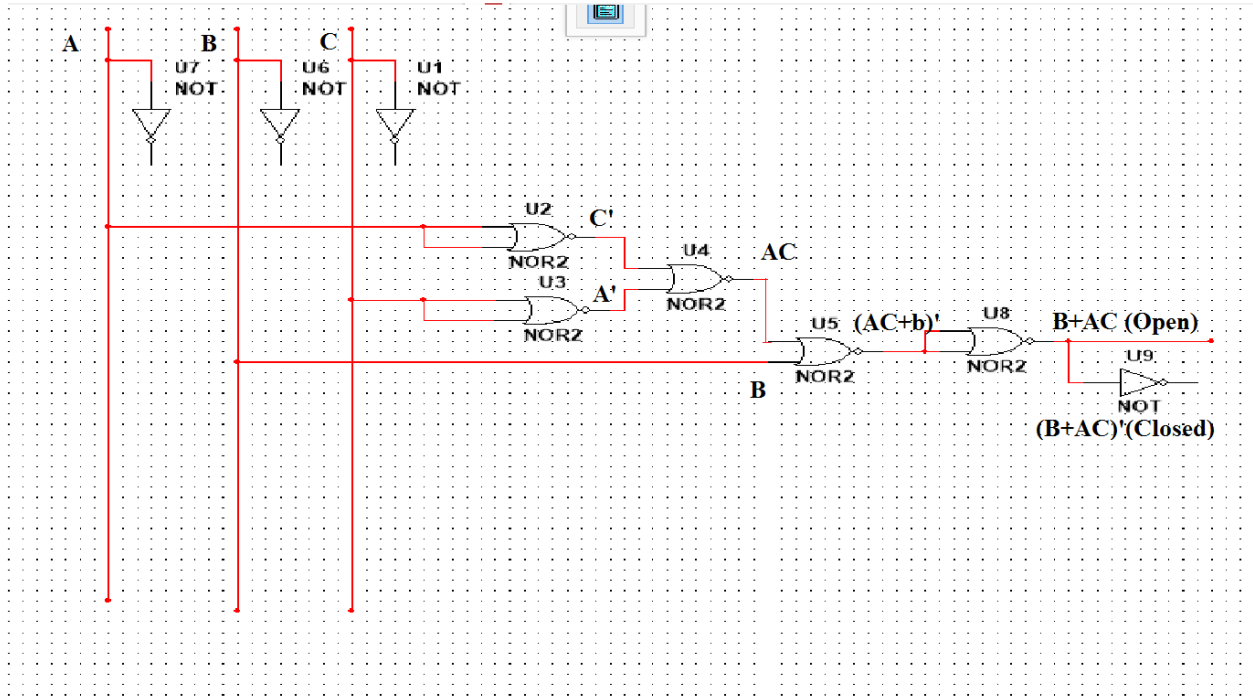6. Connect led to validate output.

Logic Circuit:

Figure: Logic ckt for Door Lock system implementating NOR gate only

Discussion and conclusion

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