

NEUB CSE 222 LAB 5: Combinational Circuit

North East University Bangladesh

Department of CSE

Course no: CSE 222

Experiment no: 05

Experiment Name: Combinational Circuit

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 design combinational circuit from truth table.

Initially simple circuit and then mathematical circuits like Half adder, Full adder, Half Subtractor and full Subtractor, etc.

Theory

Any logic table (Truth Table) can easily implemented using logic gates. This can be either implemented using all the available gates or by using one type of universal gates (NOR and NAND gates). In this lab combinational circuit has to be designed using either sum of min-terms or product of max-terms.

Apparatus Needed

- Trainer Board (Bread board)
- Logic Gate ICs (You decide what you need)
- Connecting wires
- LEDs
- Push Buttons / DIP switch

Procedure

1. Create a logic function from the truth tables in next sections. If you wish you can simplify the tables. Some the circuits schematics are given for your convenience. For these circuits implement using the schematic. For others, use your design.
2. Place the IC in the in the breadboard
3. Connect VCC and Ground to the respective pins of IC
4. Connect the inputs switches provided in the IC trainer kit
5. Connect all the internal connections
6. Connect the output of the ICs to LEDs
7. Apply various combinations of inputs according to the tables of result section
8. Observe and write the output of the LED in the corresponding table in result section.
9. Repeat for all the truth tables.

NEUB CSE 222 LAB 5: Combinational Circuit

Truth tables

1.

A	B	F
0	0	0
0	1	1
1	0	0
1	1	0

2.

A	B	F
0	0	0
0	1	1
1	0	0
1	1	1

3.

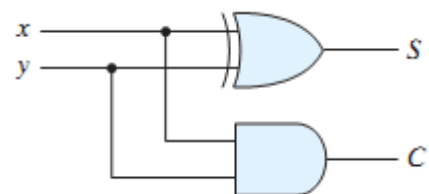
A	B	C	F
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

4.

A	B	C	F
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

5. Half adder

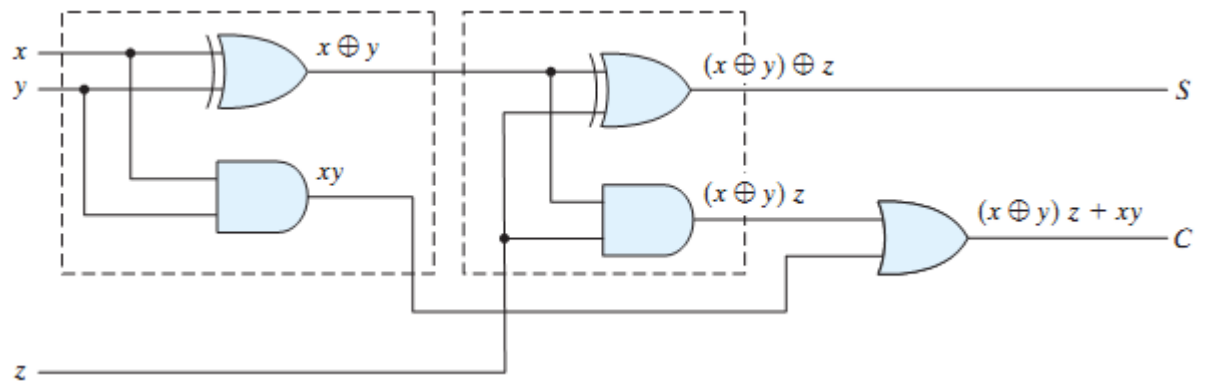
x	y	C	S
0	0	0	0
0	1	0	1
1	0	0	1
1	1	1	0



NEUB CSE 222 LAB 5: Combinational Circuit

6. Full Adder

x	y	z	C	S
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

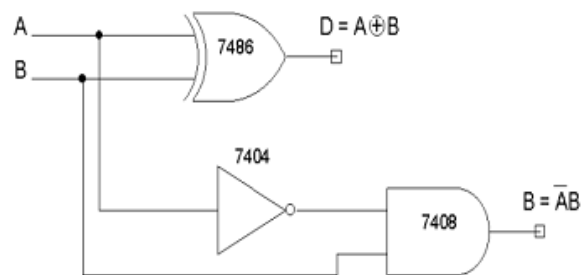


7. Half Subtractor

x	y	B	D
0	0	0	0
0	1	1	1
1	0	0	1
1	1	0	0

$$D = x'y + xy'$$

$$B = x'y$$



8. Full Subtractor

x	y	z	B	D
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	1	0
1	0	0	0	1
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

Report

1. For the parts where schematic is not provided, design a circuit from the truth table.
2. Carefully fill all the data for tables in this sheet.
3. Comment on the learning from this LAB