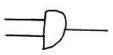
Lab 1

D. Preliminary Work

1. Draw a symbol, determine the IC number and produce a truth table for the following gate.

AND



IC Number : 7408

Truth table 1

INPUT		OUTPUT
A	B	F
0	0	0
0	1	0
1	0	0
1	1	1

NAND

IC Number : 7400

Truth table 2

INPUT		OUTPUT
A	B	F
0	0	1
0	1	1
1	0	1
1	1	0

2. Complete the truth table for the following circuit.

Truth Table 3

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

3. Write the Boolean expression for output C, D and F the following circuit.

$C = A \cdot \bar{B}$

$D = \bar{A} \cdot B$

$F = (A \cdot \bar{B}) + (\bar{A} \cdot B)$

4. Complete the truth table for the circuit in (3) based on the Boolean expression produced for C, D and F.

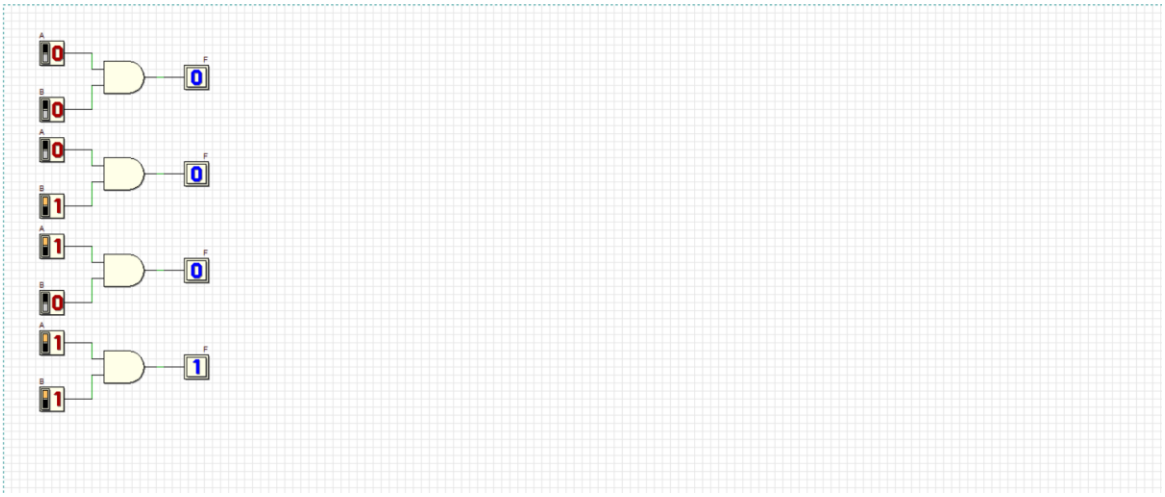
Truth table 4

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

E. Laboratory Work

Part 1

1. Construct Circuit 1 on the breadboard. Connect all inputs (A, B) to a switches and output F to LEDs.



Circuit 1

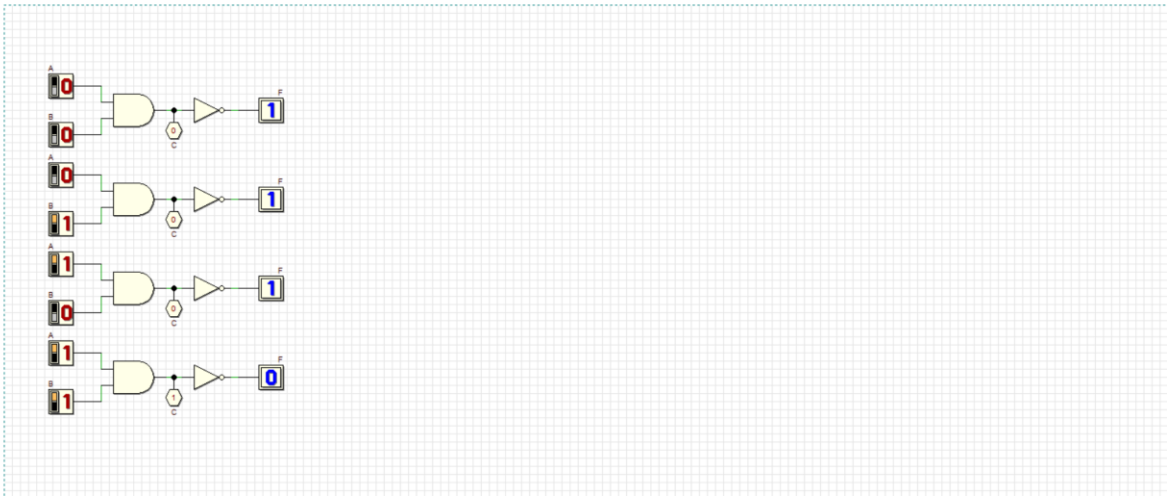
2. Test Circuit 1 and fill in Truth Table 5 for the circuit response to all possible input combinations. The Truth Table 5 should match the Truth Table 1 prepared in Preliminary Work.

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

Truth Table 5

Part 2

3. Construct Circuit 2 on the breadboard. Connect all inputs (A, B) to a switches and output C and F to LEDs.



Circuit 2

4. Test Circuit 2; fill in Truth Table 6, for the circuit to response to all possible input combinations.

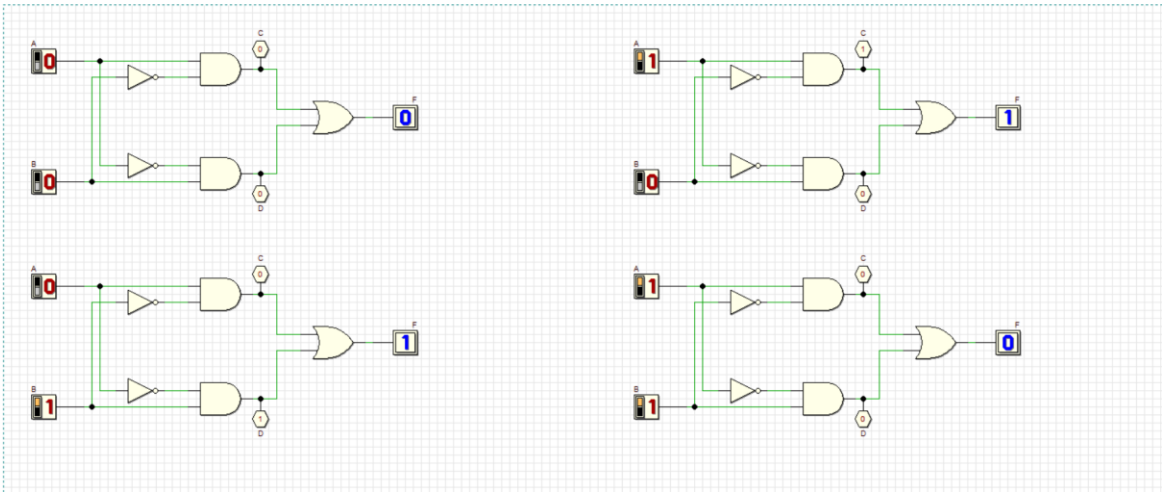
A	B	C	F
0	0	0	1
0	1	0	1
1	0	0	1
1	1	1	0

Truth Table 6

5. Compare the Truth Table 6 to Truth Table 2. What conclusion can you make?
   - Both truth tables contradict each other. Thus, an inverter inverts the values in inputs

Part 3

6. Construct Circuit 3 on the breadboard. Connect all inputs (A, B) to a switches and output C, D and F to LEDs.



Circuit 3

7. Test Circuit 3; fill in Truth Table 7 for the circuit outputs (C, D and F) for all possible input combinations.

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

Truth Table 7

8. What single gate does Circuit 3 represent?
   - Circuit 3 represents XOR gate.