Digital Logic Lab 1

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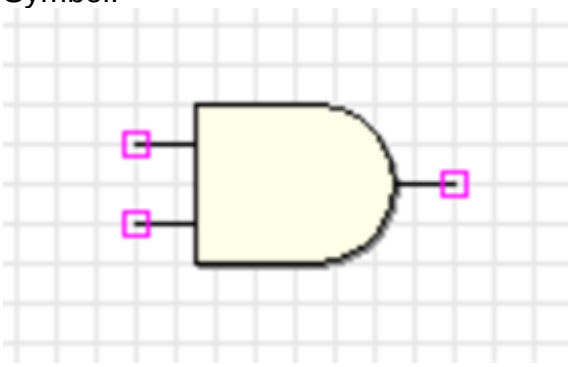
D. Preliminary Work

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

AND

Symbol:



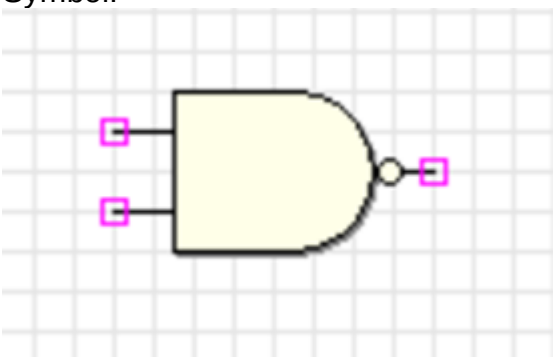
IC Number: 7408

Truth Table 1

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

OR

Symbol:

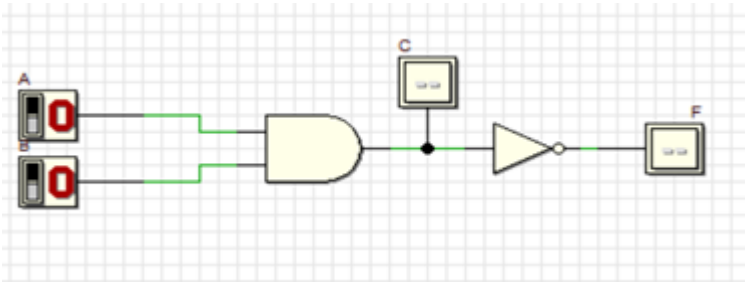


IC Number: 7400

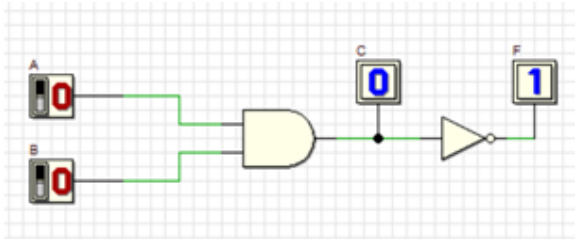
Truth table 2

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

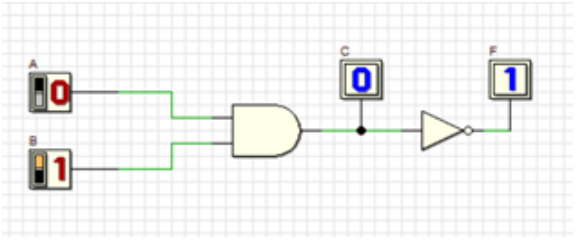
2. Complete the truth table for the following circuit



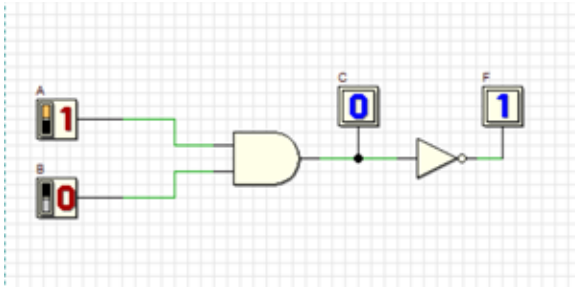
1.



2.



3.



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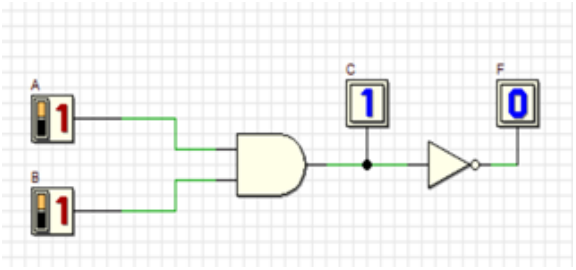
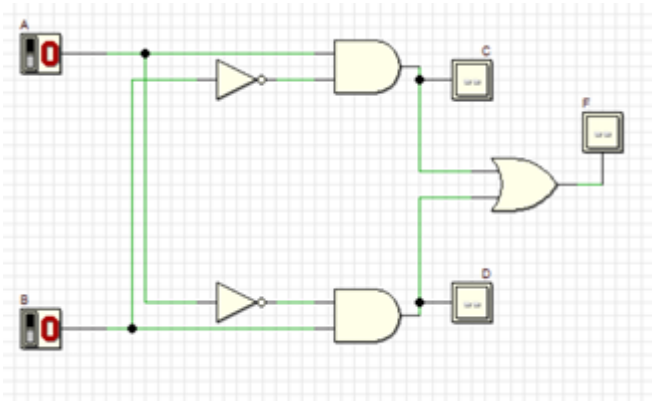


Truth Table 3

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.



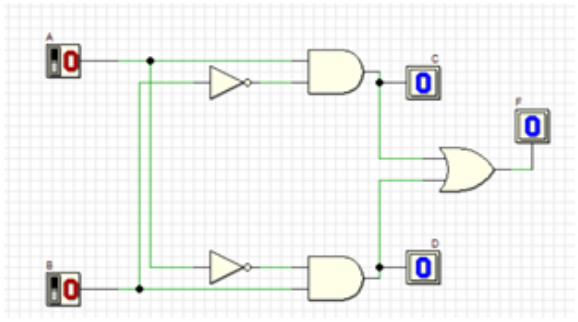
C = A*B’

D = A’*B

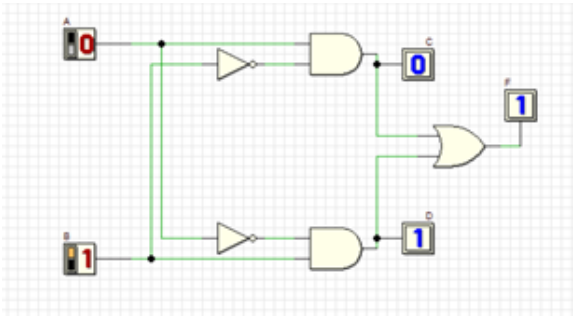
F = C+D

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

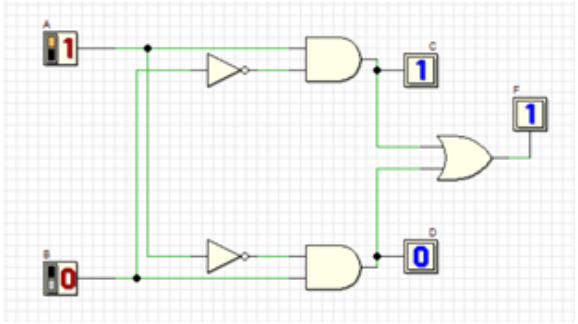
1.



2.



3.



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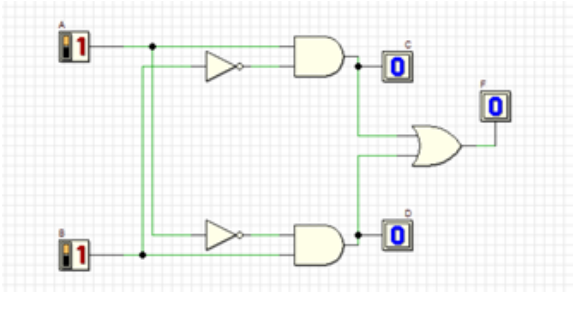


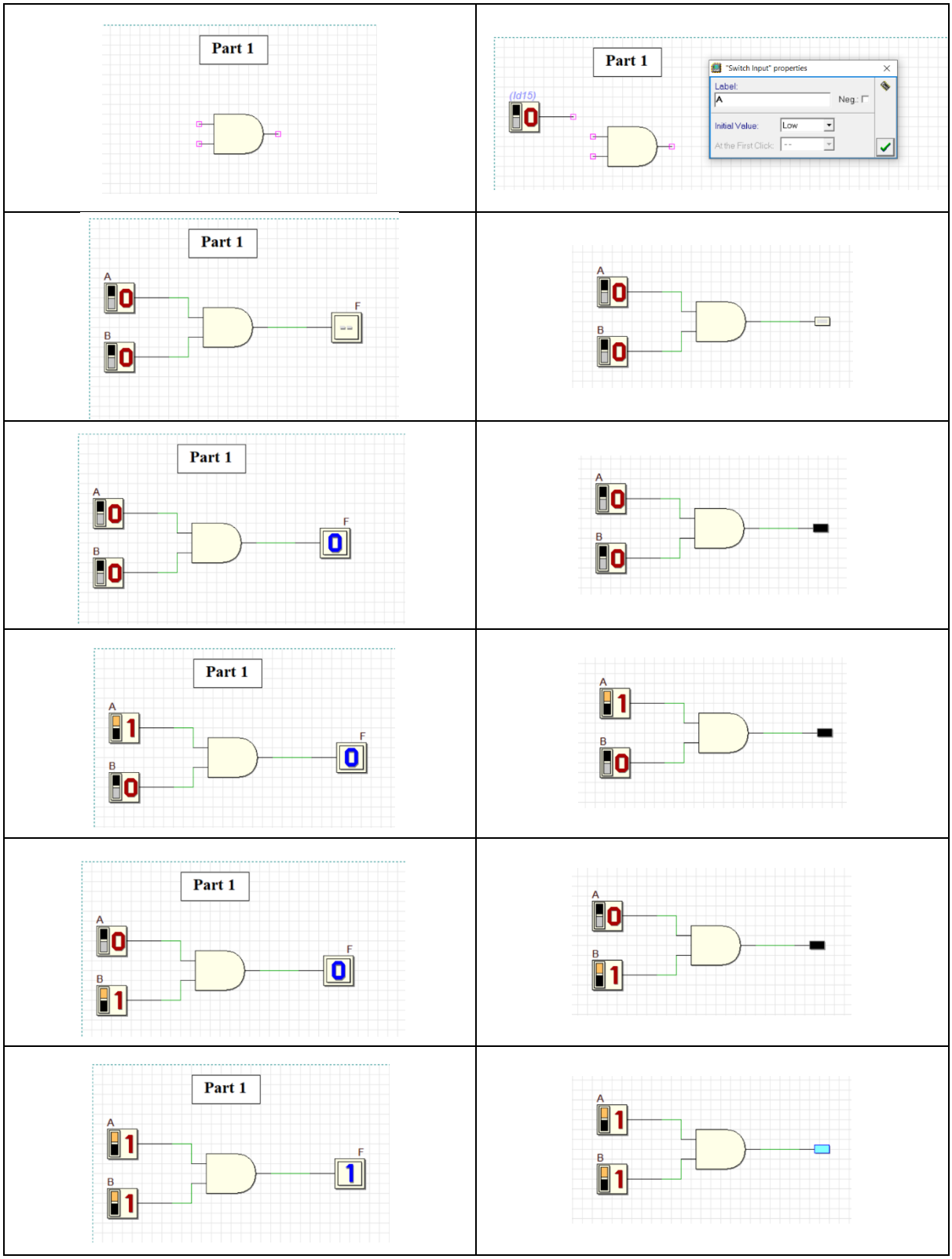
Truth Table 4

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.



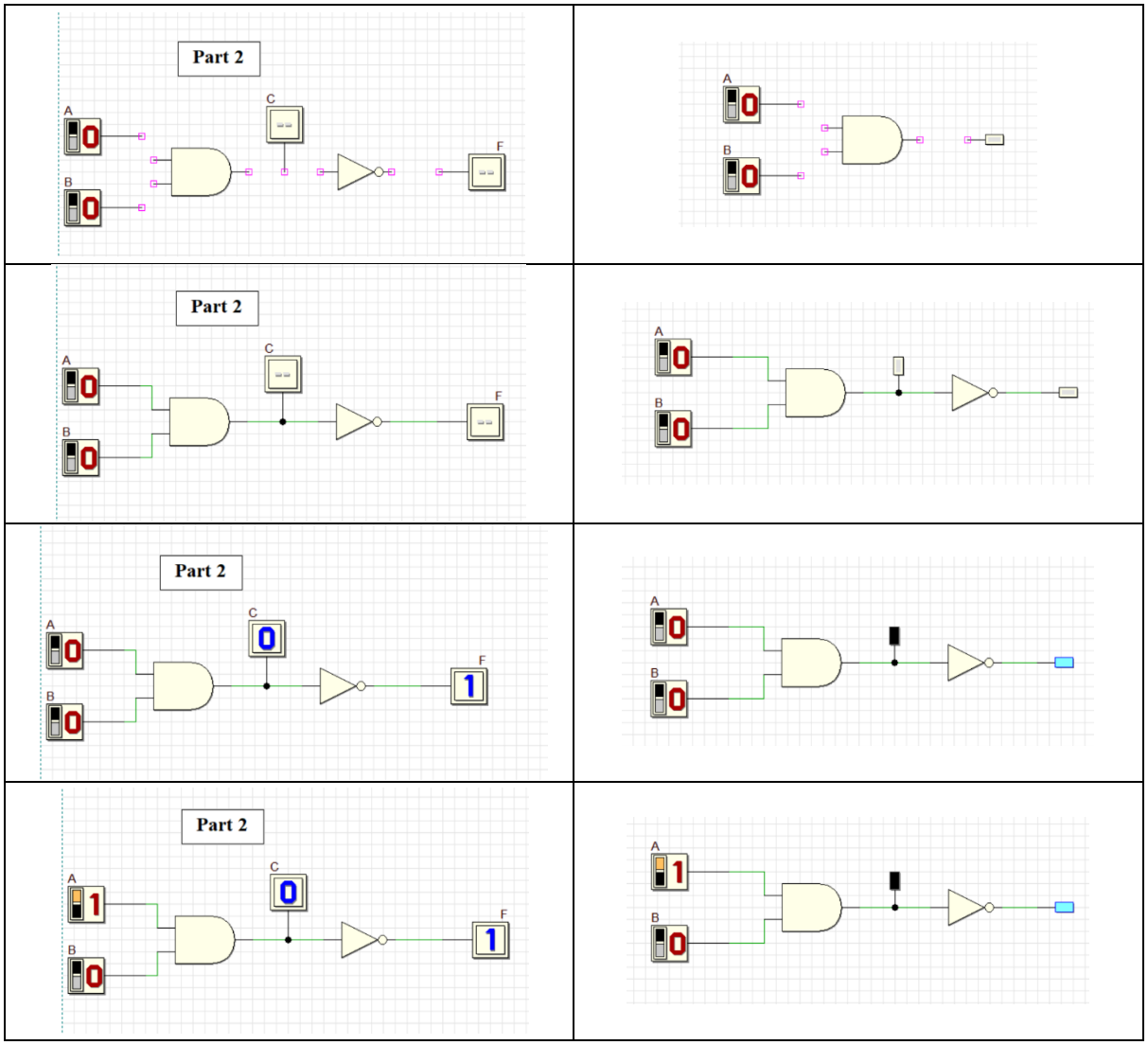
2. Test Circuit 1 and fill in Truth table 5 for the circuit response to all possible input combinations. The Truth Table 5 should match the Truth Table 1 prepared in the Preliminary Work.

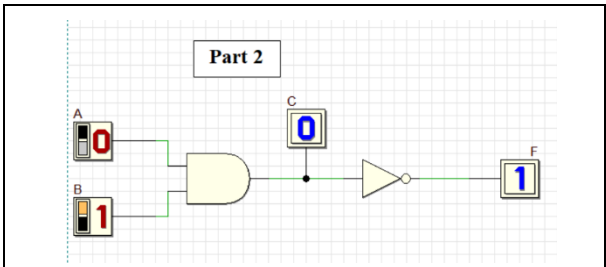
Input		Output
A	B	C
0	0	F
0	1	F
1	0	F
1	1	F

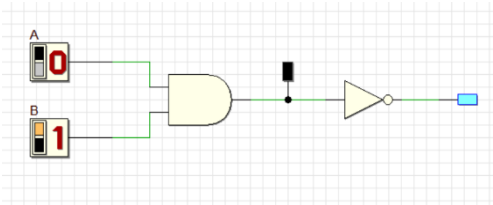
Truth Table 5

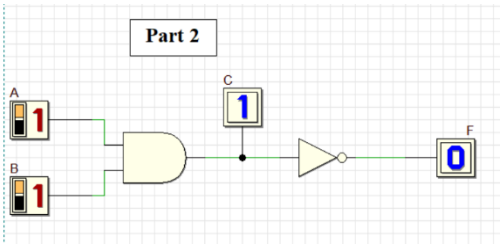
Part 2

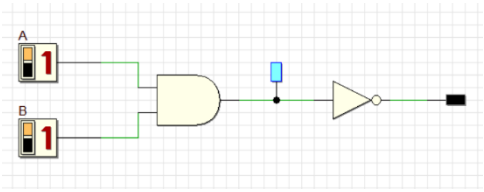
3. Construct Circuit 2 on the breadboard. Connect all inputs (A, B) to a switches and output C and F to LEDs.











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

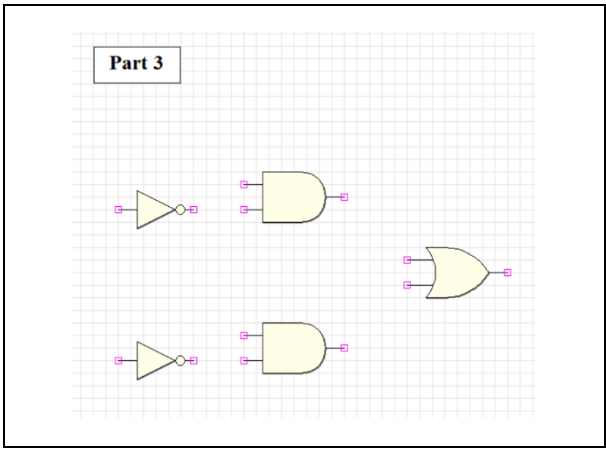
Input		Output	
A	B	C	F
0	0	F	T
0	1	F	T
1	0	F	T
1	1	T	F

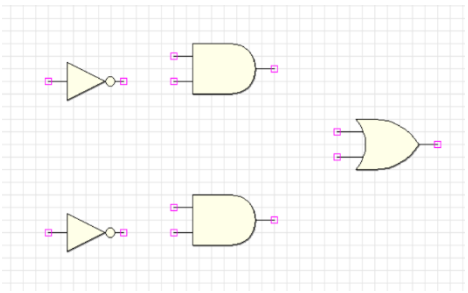
Truth Table 6

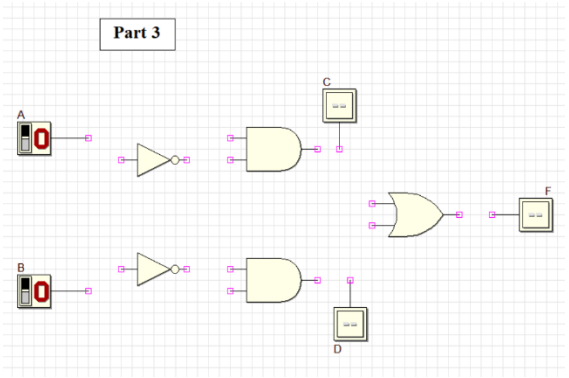
5. Compare Truth Table 6 to Truth Table 2. What conclusion can you make?

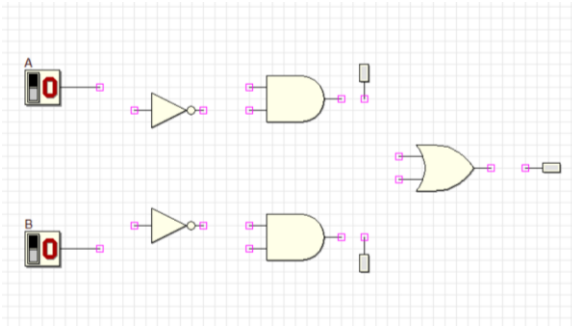
Part 3

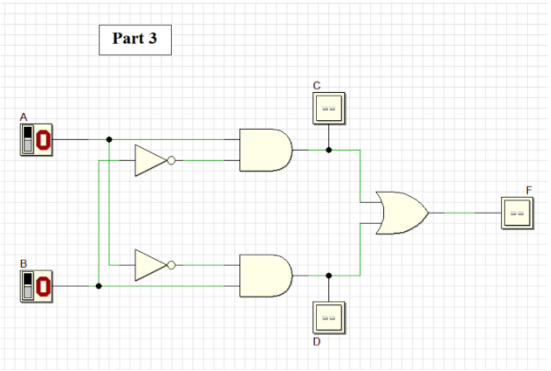
6. Construct circuit 3 on the breadboard. Connect all inputs (A, B) to a switches and output C, D and F to LEDs.

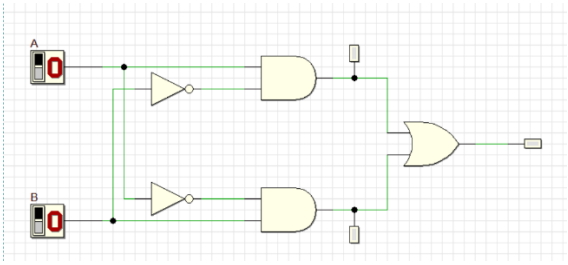


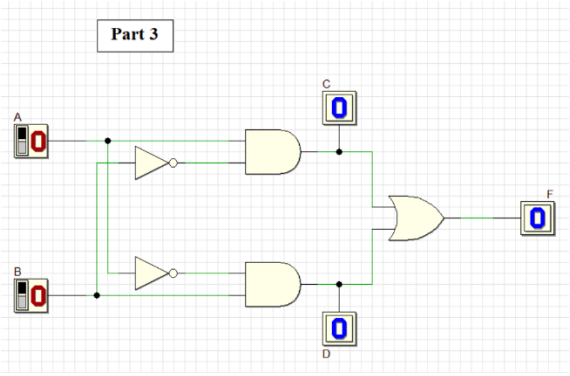


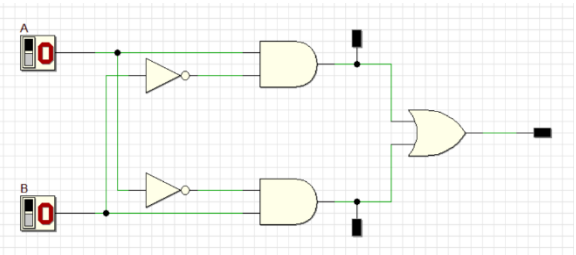

Part 3
A
0
B
0
C
D
F

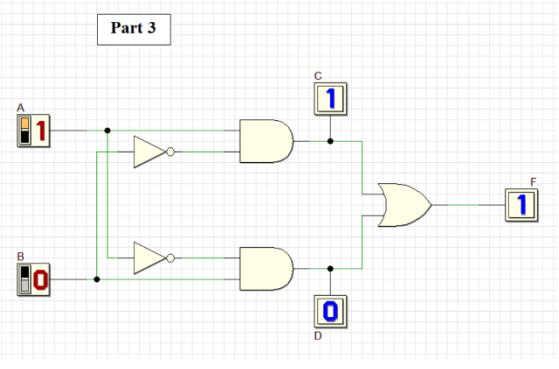

A
0
B
0

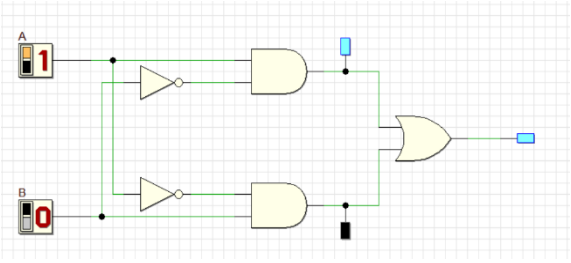

Part 3
A
0
B
0
C
D
F

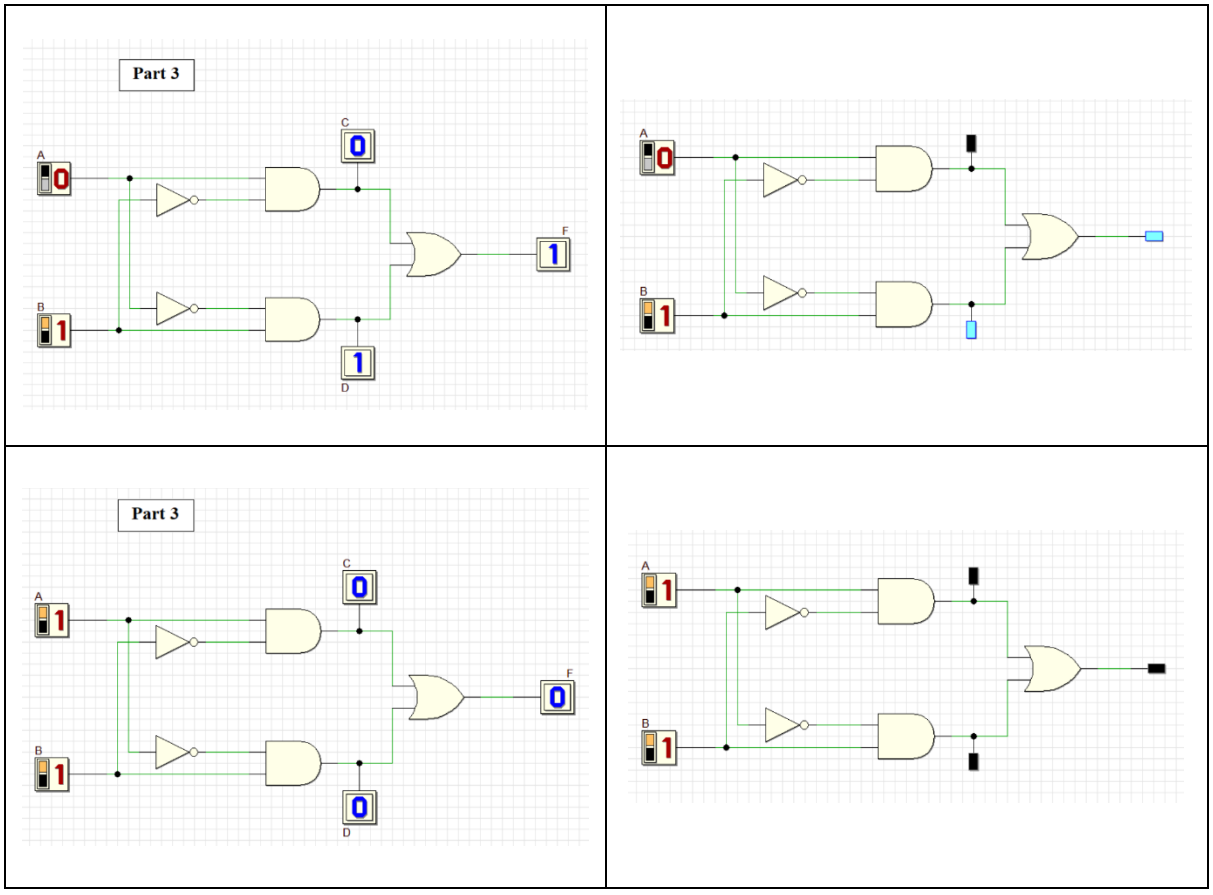

A
0
B
0


Part 3
A
0
B
0
C
0
D
0
F
0


A
0
B
0


Part 3
A
1
B
0
C
1
D
0
F
1


A
1
B
0



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

Input		Output		
A	B	C	D	F
0	0	F	F	F
0	1	T	F	T
1	0	F	T	T
1	1	F	F	F

Truth Table 7

8. What single gate does Circuit 3 represent?

Circuit 3 represent XOR gate