

SECR1013 DIGITAL LOGIC

Lab 1 Combinational Logic

Lecturer Name: Mr Firoz bin Yusuf Patel Dawoodi Section 08

Prepared by: Group 5

NAME	MATRIC NO
WONG HUI SHI	A20EC0169
TEOH WEI JIAN	A20EC0229

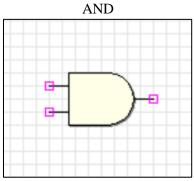
Submission Date: 21 DEC 2020

Lab 1 Combination Logic

D. Preiminary Work

Question 1

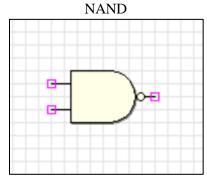
Draw a symbol, determine the IC number and produce a truth table for the following gate.



IC Number: 7408

Truth Table 1

Input		Output
A	В	F
0	0	0
0	1	0
1	0	0
1	1	1



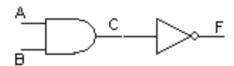
IC Number: 7400

Truth Table 2

Input		Output
A	В	F
0	0	1
0	1	1
1	0	1
1	1	0

Question 2

Complete the truth table for the following circuit.

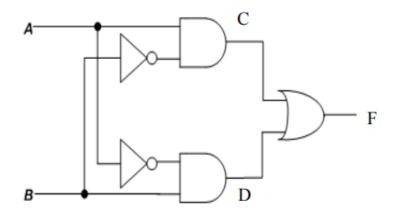


Truth Table 3

A	В	С	F
0	0	0	1
0	1	0	1
1	0	0	1
1	1	1	0

Question 3

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



$$C = A\overline{B}$$

$$D = \overline{A}B$$

$$F = A\overline{B} + \overline{A}B$$

Question 4

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

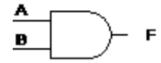
Truth Table 4

A	В	С	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

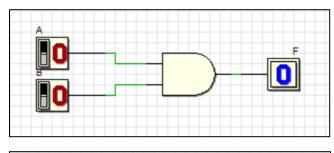
<u>Part 1</u>

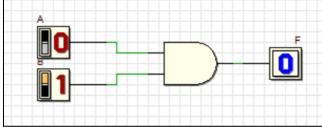
1. Construct Circuit 1 on the breadboard. Connect all inputs (A, B) to a switches and output F to LEDs.

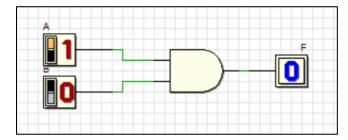


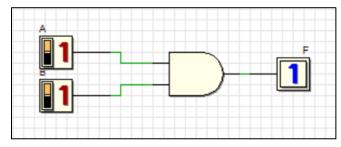
Circuit 1

Screenshots for result Circuit 1 by using Deeds-DcS:









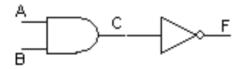
2. Test Circuit 1 and fill in Truth Table 5 for the circuit response to all possible input combinations. The Truth Table 5 should match the Truth Table 1 prepared in the Preliminary Work.

Truth Table 5

Input		Output
A	В	F
0	0	0
0	1	0
1	0	0
1	1	1

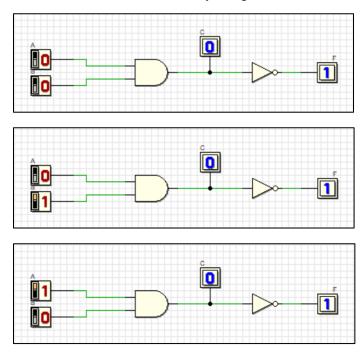
Part 2

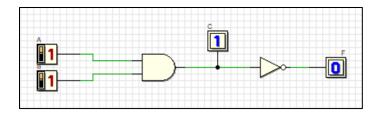
3. Construct Circuit 2 on the breadboard. Connect all inputs $(A,\,B)$ to a switches and output C and F to LEDs



Circuit 2

Screenshots for result Circuit 2 by using Deeds-DcS:





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

Truth Table 6

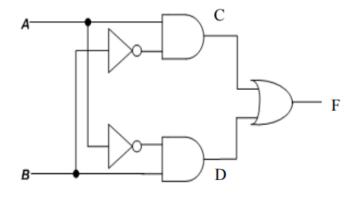
A	В	С	F
0	0	0	1
0	1	0	1
1	0	0	1
1	1	1	0

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

The result of the truth table for both Truth Table 2 and Truth Table 6 are the same, the conclusion is circuit 2 represents NAND gate.

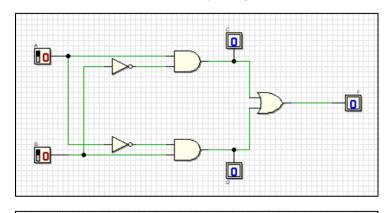
Part 3

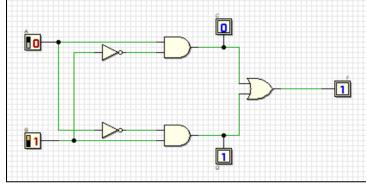
6. Construct circuit 3 on the breadboard. Connect all inputs (A, B) to a switches and output C, D and F to LEDs.

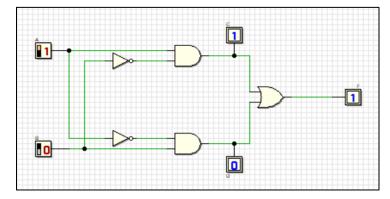


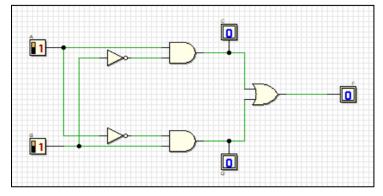
Circuit 3

Screenshots for result Circuit 3 by using Deeds-DcS:









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

Truth Table 7

A	В	С	D	F
0	0	0	0	0
0	1	0	1	1
1	0	1	0	1
1	1	0	0	0

8. What single gate does Circuit 3 represent?

Circuit 3 represent XOR gate.