

PRACTICUM DIGITAL SYSTEM

MODUL 6

DIGITAL SYSTEM



By :

Donny Rizal Adhi Pratama

L200183161

INFORMATION TECHNOLOGY

FACULTY OF COMMUNICATION AND INFORMATICS

MUHAMMADIYAH UNIVERSITY OF SURAKARTA

Experiment 1

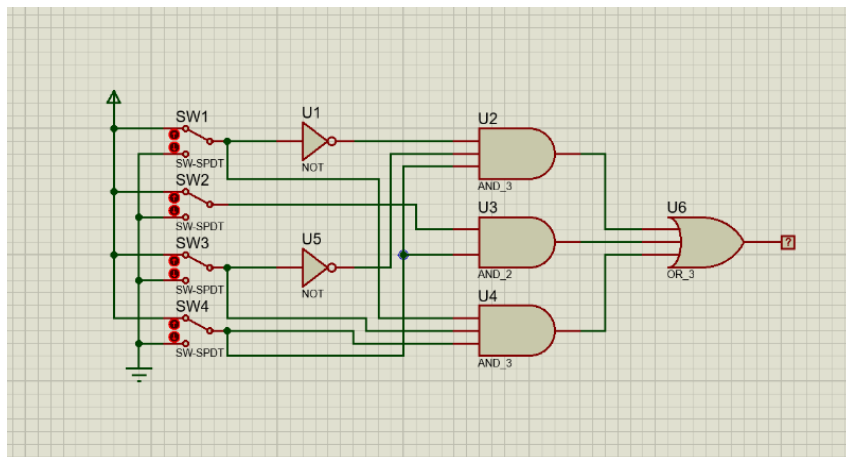
1. Karnaugh Map

		AB			
		00	01	11	10
CD	00	0	0	0	0
	01	1	1	1	0
	11	0	1	1	1
	10	0	0	0	0

2. Boolean function

$$F = \overline{A}\overline{C}D + BD + ACD$$

3. Logic gate combination



Picture 1.1. Logic gate combination based on boolean function

Experiment 2

1. Karnaugh map

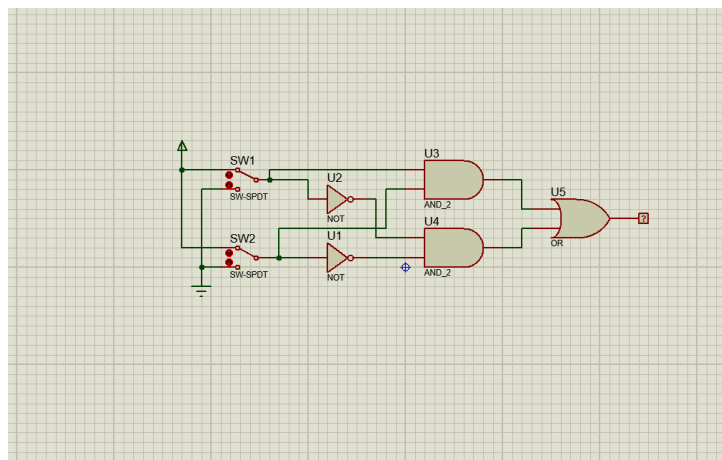
		AB			
		00	01	11	10
CD	00	1	0	0	1
	01	0	1	1	0
	11	0	1	1	0
	10	1	0	0	1

2. Boolean Function

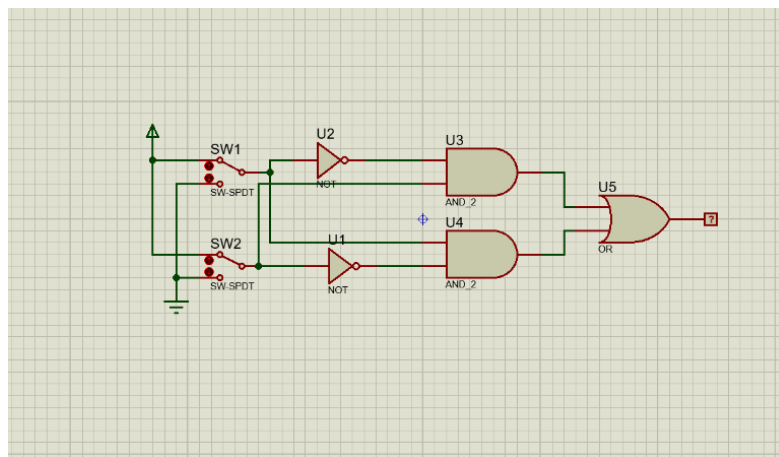
a. $F = BD + \overline{B}\overline{D}$ (AND-OR)

b. $F = \overline{B}D + B\overline{D}$ (OR-AND)

3. Logic gate combination



Picture 2.1. Logic gate combination based on boolean function (AND – OR)



Picture 2.2. Logic gate combination based on boolean function (OR-AND)

BOTH COMBINATION GIVES THE SAME RESULT.

Experiment 3

1. Boolean Function

$$F = XYZ + XY\bar{Z} + X\bar{Y}Z + \bar{X}YZ + \bar{X}Y\bar{Z} + X\bar{Y}\bar{Z} + \bar{X}\bar{Y}Z$$

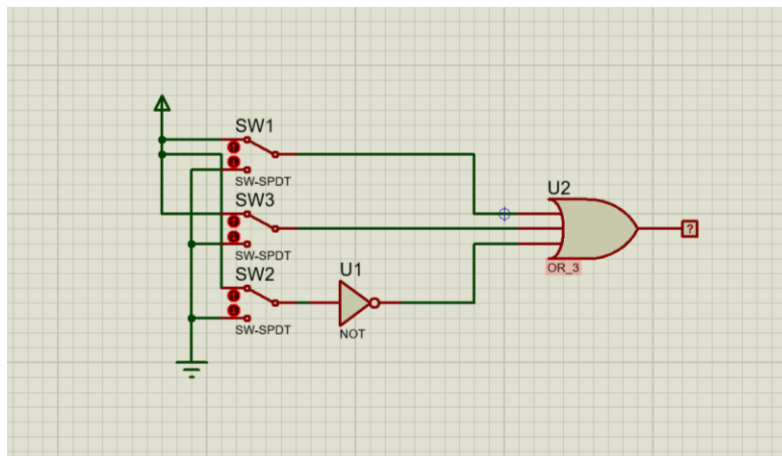
2. Karnaugh map

		XY			
		00	01	11	10
Z	0	1	1	1	1
	1	0	1	1	1

3. Simplification of boolean function

$$F = X + Y + \bar{Z}$$

4. Logic gate combination



Picture 3.1. Logic gate combination based on simplification of boolean function

Experiment 4

1. Boolean function

$$F = \overline{A}\overline{D} + ABC + \overline{A}BC + BCD + \overline{B}\overline{C}\overline{D} + \overline{A}\overline{B}\overline{C}\overline{D}$$

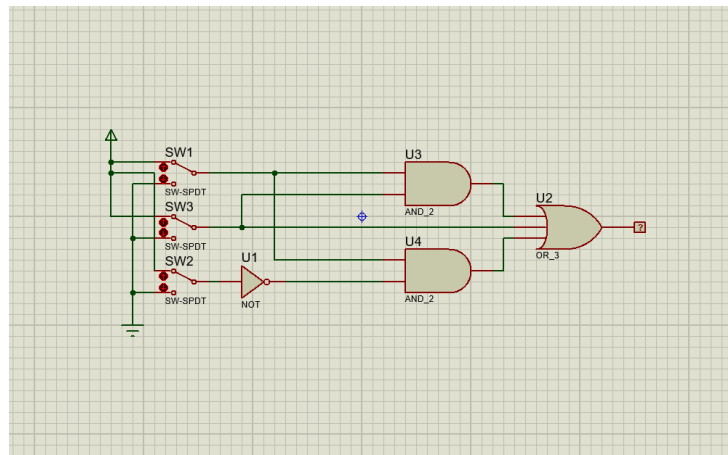
2. Karnaugh map

		AB			
		00	01	11	10
CD	00	0	1	1	1
	01	0	0	1	0
	11	0	1	1	0
	10	0	0	1	1

3. Simplification of boolean function

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

4. Logic gate combination



Picture 4.1. Logic gate combination based on simplification of boolean function

Experiment 5

1. Table of boolean function

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

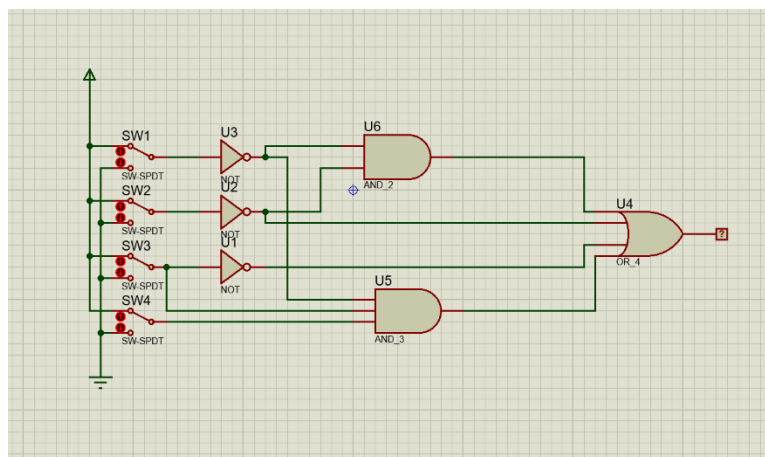
2. Karnaugh Map

		AB			
		00	01	11	10
CD	00	1	0	1	0
	01	1	0	1	1
	11	1	1	0	0
	10	1	0	0	1

3. Simplification of boolean function

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

4. Logic gate combination



Picture 5.1. Logic gate combination based on simplification of boolean function