

DIGITAL SYSTEMS

PRACTICUM 6



By:

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Experiment 1

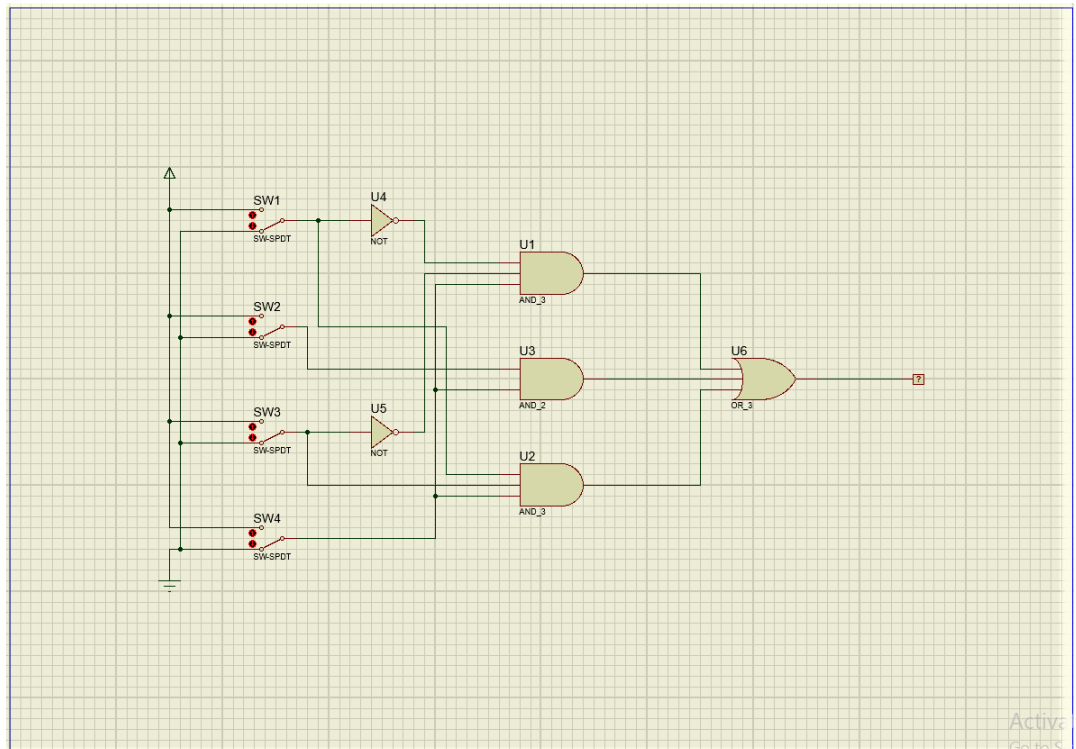
1. Karnaugh map

		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

$$F = A'C'D + BD + ACD$$

3. Logic gate combination



Picture 1.1. Logic gate combination based on boolean function

Experiment 2

1. Karnaugh map

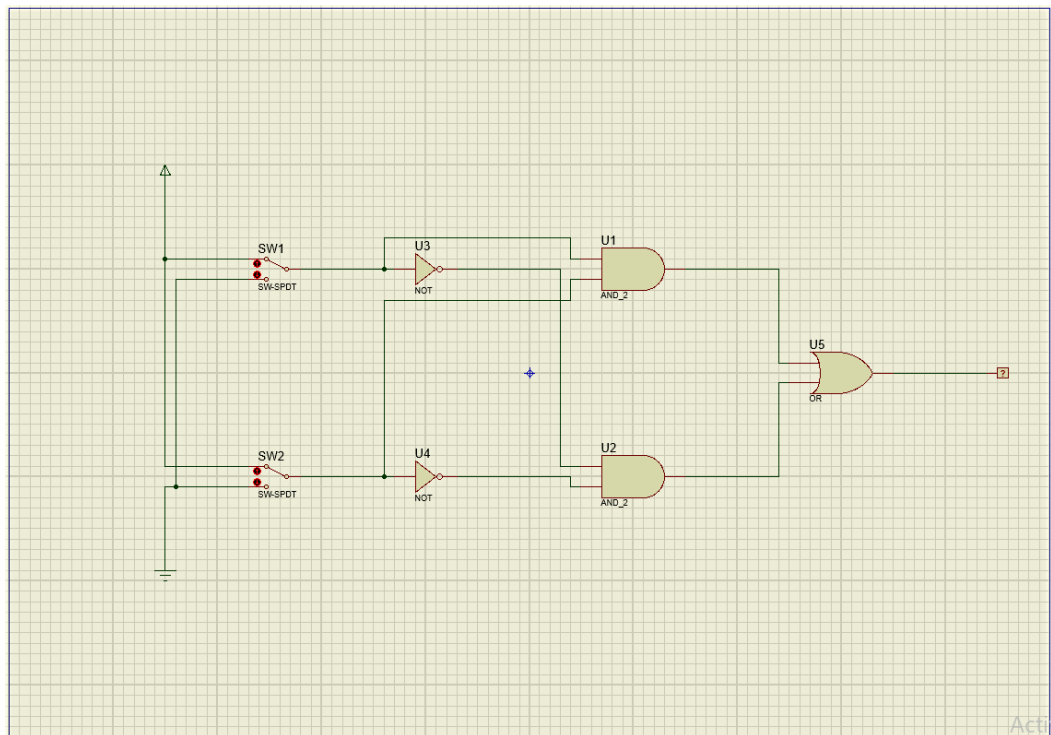
		AB			
		00	01	11	10
CD	00	1	0	0	1
	01	0	1	1	0
	11	0	1	1	0
	10	1	0	0	1

2. Boolean Function

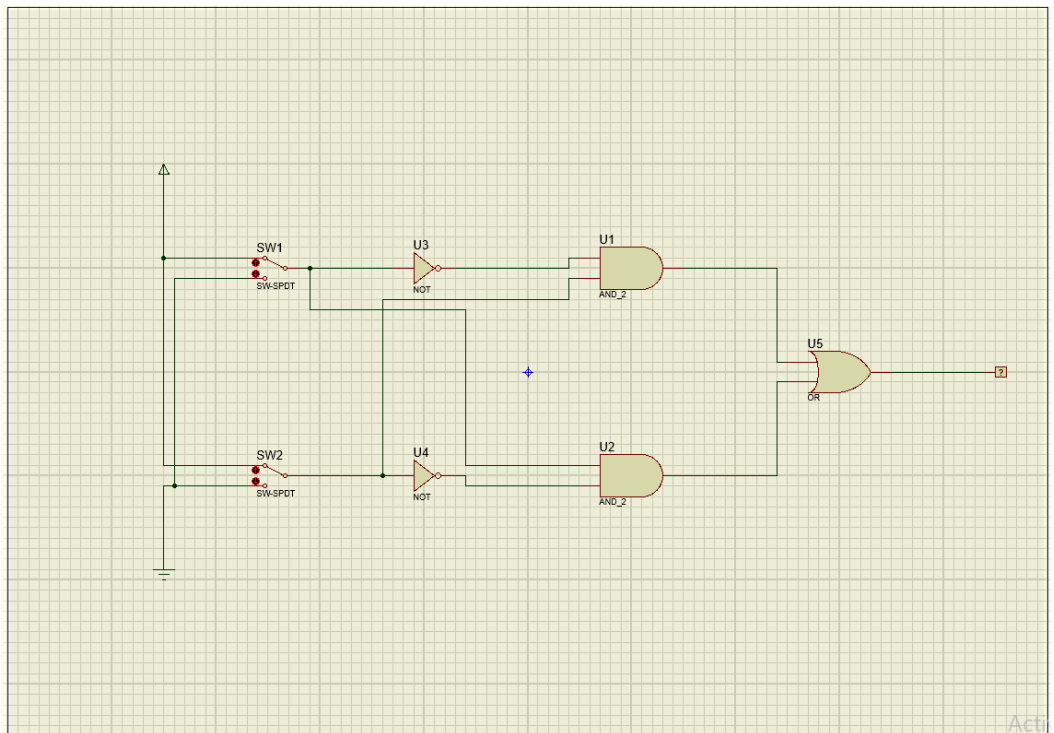
a. $F = BD + B'D'$ (AND-OR)

b. $F = B'D + BD'$ (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)

Experiment 3

1. Boolean Function

$$F = XYZ + XYZ' + XY'Z + X'YZ + X'YZ' + XY'Z' + X'Y'Z'$$

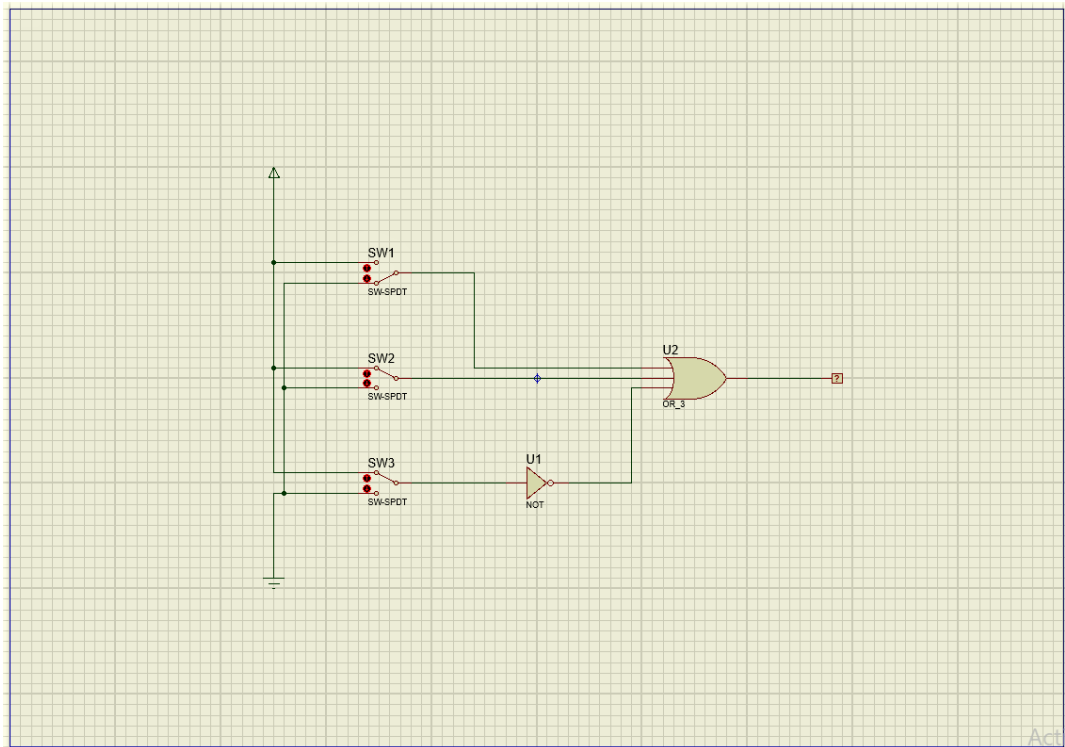
2. Karnaugh map

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

3. Simplification of boolean function

$$F = Z' + Y + X$$

4. Logic gate combination



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

Experiment 4

1. Boolean function

$$F = AD' + ABC + ABC' + BCD + BC'D' + AB'CD'$$

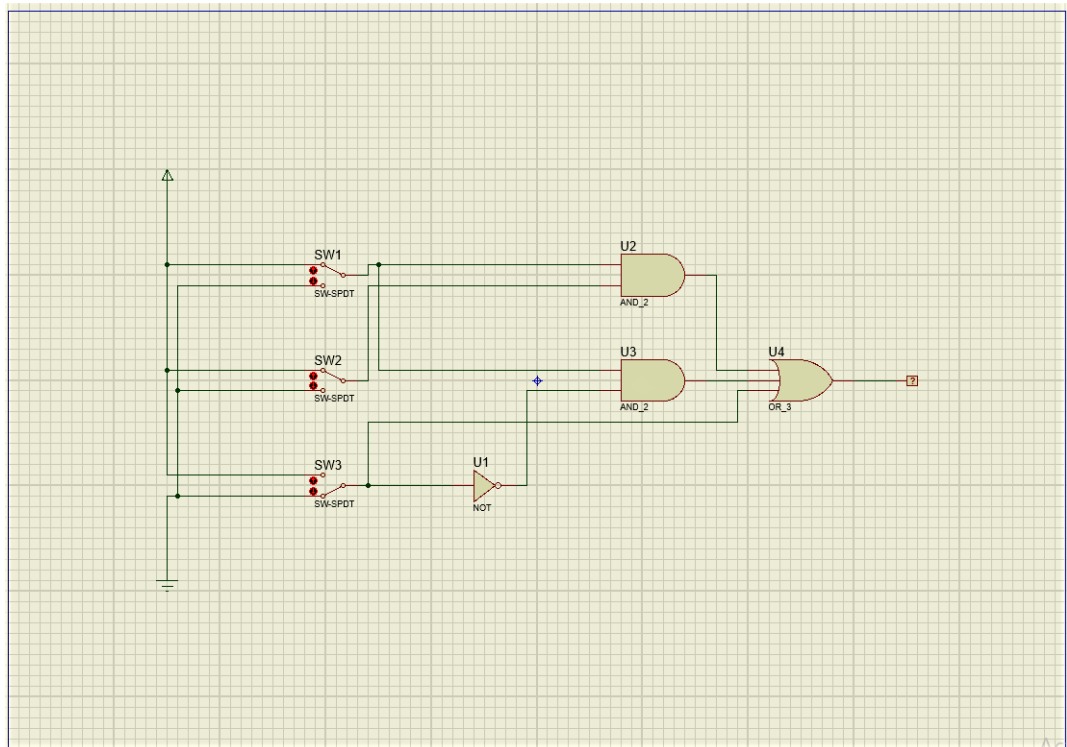
2. Karnaugh map

		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

$$F = AB + AD' + B$$

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

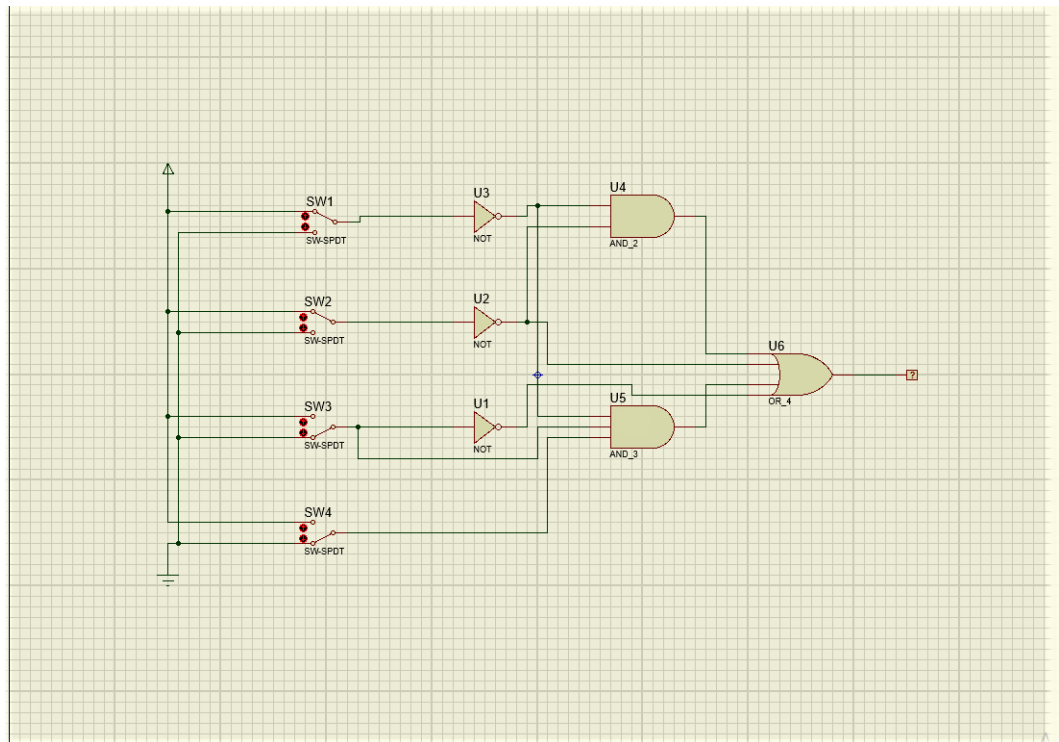
2. Karnaugh Map

		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

$$F = A'B' + B' + A'CD + C'$$

4. Logic gate combination



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