

DIGITAL SYSTEMS LABORATORY WORK

MODUL 8 :

FLIP-FLOP APPLICATION



By :

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INFORMATION TECHNOLOGY

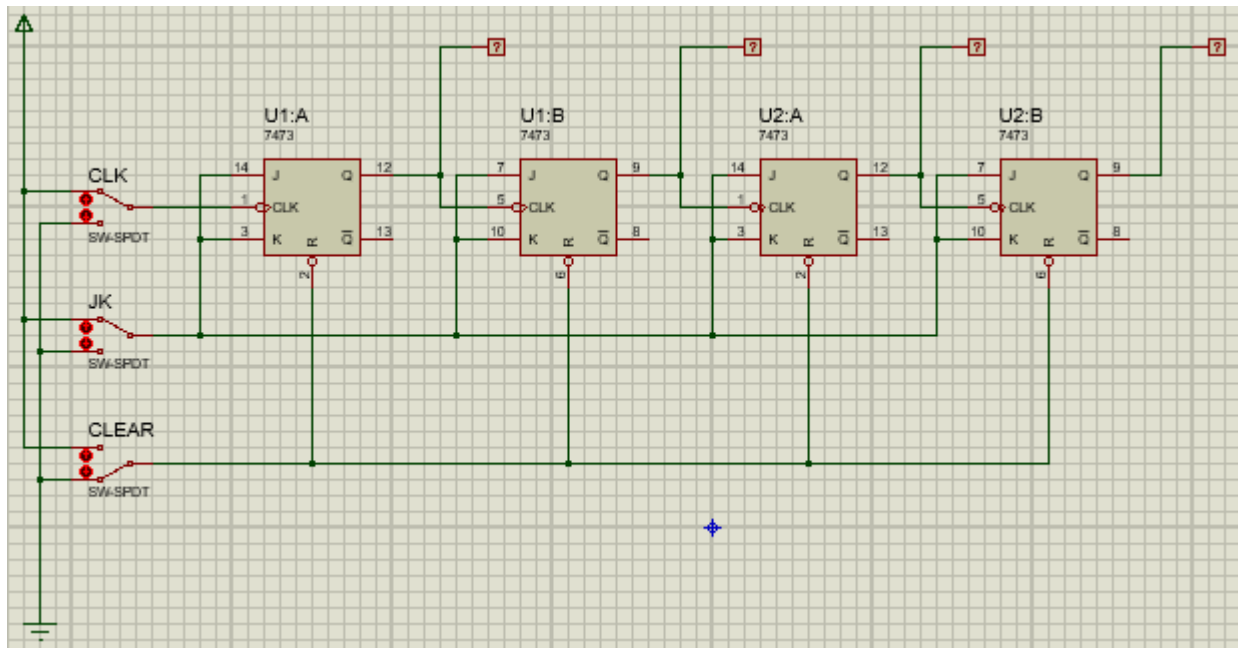
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### Trial 1. Make a jk-ff counter

1. Make a combination of JK flip-flop as in the picture



2. Simulate your circuit!

Click on the switch based on the table and fill in the blank fields in the table!

	INPUT			OUTPUT			
	CLEAR	JK	CLK	A	B	C	D
1	1	1	0	0	0	0	0
2	1	1	1	0	0	0	0
3	1	1	0	0	0	0	1
4	1	1	1	0	0	0	1
5	1	1	0	0	0	1	0
6	1	1	1	0	0	1	0
7	1	1	0	0	0	1	1
8	1	1	1	0	0	1	1
9	1	1	0	0	1	0	0
10	1	1	1	0	1	0	0
11	1	1	0	0	1	0	1
12	1	1	1	0	1	0	1
13	1	1	0	0	1	1	0
14	1	1	1	0	1	1	0

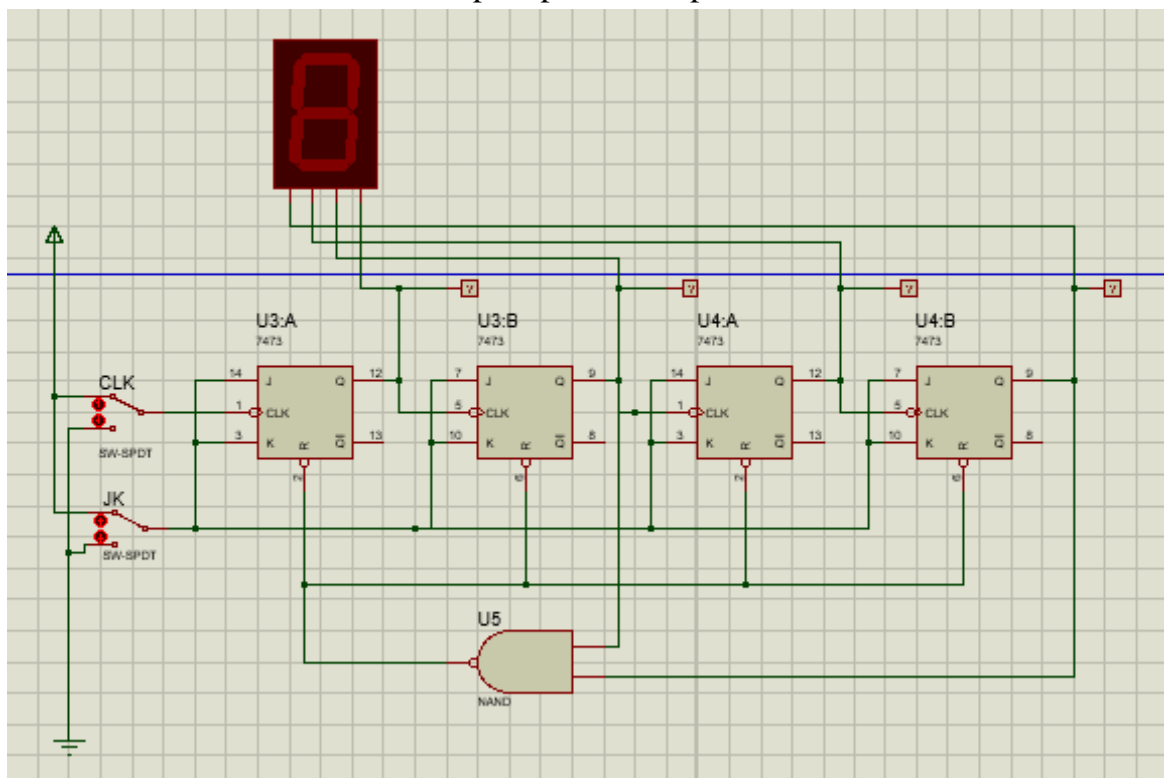
15	1	0	0	0	1	1	0
16	1	0	1	0	1	1	0
17	1	1	0	0	1	1	1
18	1	1	1	0	1	1	1
19	0	1	0	0	0	0	0
20	0	1	1	0	0	0	0

3. What is the function of :
  - A. Clk switch: to save binary
  - B. Jk switch: as the main counter
  - C. Clear switch: to reset the condition of the JK switch.
4. Conclusion:
 

For current flips the condition will change if  $JK = 0$ .

## Trial 2. Counter mod 10

1. Make a combination of JK flip-flop as in the picture



2. Simulate your circuit!
 

Click on the switch based on the table and fill in the blank fields in the table!

	INPUT		OUTPUT			
	JK	CLK	A	B	C	D
1	1	0	0	0	0	0
2	1	1	0	0	0	0
3	1	0	0	0	0	1

4	1	1	0	0	0	1
5	1	0	0	0	1	0
6	1	1	0	0	1	0
7	1	0	0	0	1	1
8	1	1	0	0	1	1
9	1	0	0	1	0	0
10	1	1	0	1	0	0
11	1	0	0	1	0	1
12	1	1	0	1	0	1
13	1	0	0	1	1	0
14	1	1	0	1	1	0
15	1	0	0	1	1	1
16	1	1	0	1	1	1
17	1	0	1	0	0	0
18	1	1	1	0	0	0
19	1	0	1	0	0	1
20	1	1	1	0	0	1
21	0	0	1	0	0	1
22	0	1	1	0	0	1
23	1	0	0	0	0	1
24	1	1	0	0	0	1

### 3. Conclusion:

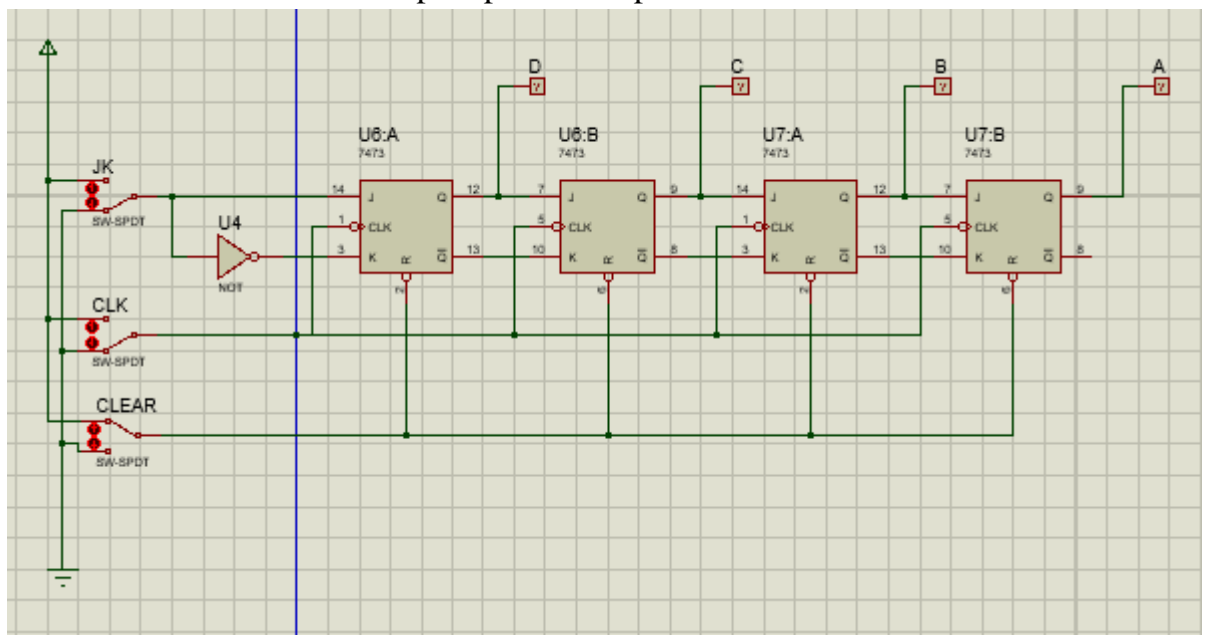
If  $jk = 1$  and  $clk = 0$  it will save the previous data.

If  $jk = 1$  and  $clk = 1$  it will save the previous data and add one so that the data will change.

If  $jk = 0$  and  $clk = 0$  or  $1$  then the result will be 0.

### Trial 3. Make a register JK-FF

1. Make a combination of JK flip-flop as in the picture



2. Simulate your circuit!

Click on the switch based on the table and fill in the blank fields in the table!

	<b>CLR</b>	<b>JK</b>	<b>CLK</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
1	<b>0</b>	<b>X</b>	<b>-</b>	0	0	0	0
2	<b>1</b>	<b>1</b>	<b>-</b>	0	0	0	0
3	<b>1</b>	<b>1</b>	<b>1</b>	0	0	0	1
4	<b>1</b>	<b>1</b>	<b>2</b>	0	0	1	1
5	<b>1</b>	<b>1</b>	<b>3</b>	0	1	1	1
6	<b>1</b>	<b>0</b>	<b>4</b>	1	1	1	0
7	<b>1</b>	<b>0</b>	<b>5</b>	1	1	0	0
8	<b>1</b>	<b>0</b>	<b>6</b>	1	0	0	0
9	<b>1</b>	<b>0</b>	<b>7</b>	0	0	0	0
10	<b>1</b>	<b>0</b>	<b>8</b>	0	0	0	0
11	<b>1</b>	<b>1</b>	<b>9</b>	0	0	0	1
12	<b>1</b>	<b>0</b>	<b>10</b>	0	0	1	0
13	<b>1</b>	<b>0</b>	<b>11</b>	0	1	0	0
14	<b>1</b>	<b>0</b>	<b>12</b>	1	0	0	0
15	<b>1</b>	<b>0</b>	<b>13</b>	0	0	0	0

3. Conclusion :

For the JK value = 1 and the CLOCK IN then can calculate.

The happen exchange of the value if 2x click.

Clear = RESET, if he value Clear = 0. So, the value can change.