DIGITAL SYSTEMS PRACTICUM 9

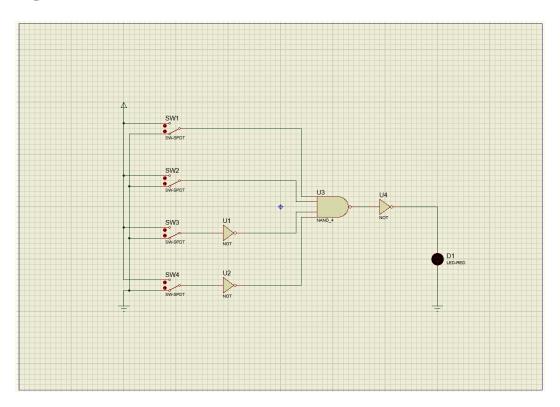


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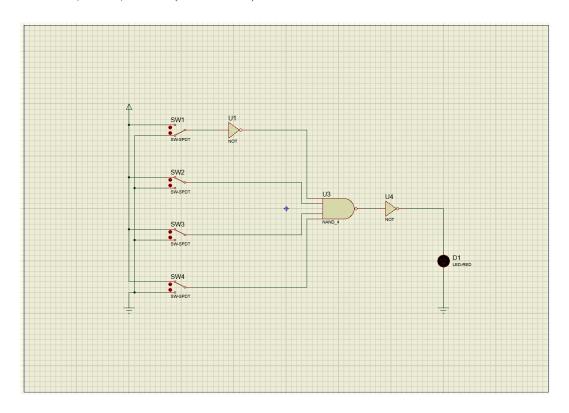
Picture 1.1. Set of decoder

1. Column table

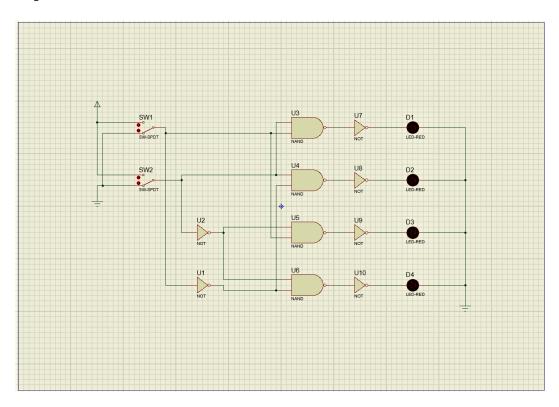
A	В	C	D	F
0	0	0	0	0
1	0	0	0	0
0	1	0	0	0
1	1	0	0	1
0	0	1	0	0
1	0	1	0	0
0	1	1	0	0
1	1	1	0	0
0	0	0	1	0
1	0	0	1	0
0	1	0	1	0
1	1	0	1	0
0	0	1	1	0
1	0	1	1	0
0	1	1	1	0
1	1	1	1	0

2. Decoder (F) only works (ON) when: A = 1, B = 1, C = 0, and D = 0.

3. Set of decoder that has output as a function: F=1, if condition A=0, B=1, C=1, D=1. (F=A'BCD)



Picture 1.2. Set of decoder



Picture 2.1. Logic gate combination

1. Column table

Inj	put	Output LED							
SW1	SW2	D1	D2	D3	D4				
0	0	0	0	0	1				
0	1	0	1	0	0				
1	0	0	0	1	0				
1	1	1	0	0	0				

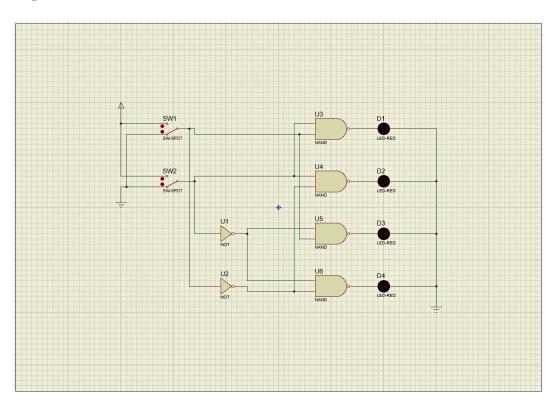
2. Output result from the logic gate combination

a.
$$D1 = SW1 \cdot SW2$$

b.
$$D2 = \overline{SW1} \cdot SW2$$

c.
$$D3 = SW1 \cdot \overline{SW2}$$

d.
$$D4 = \overline{SW1} \cdot \overline{SW2}$$



Picture 3.1. Logic gate combination

1. Column table

In	put	Output LED							
SW1	SW2	D1	D2	D3	D4				
0	0	1	1	1	0				
0	1	1	0	1	1				
1	0	1	1	0	1				
1	1	0	1	1	1				

2. Output result from the logic gate combination

a.
$$D1 = SW1 . SW2$$

b.
$$D2 = \overline{SW1} \cdot SW2$$

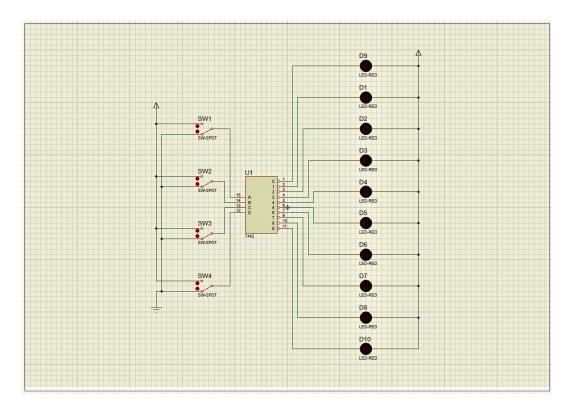
c.
$$D3 = SW1 \cdot \overline{SW2}$$

d.
$$D4 = \overline{SW1} \cdot \overline{SW2}$$

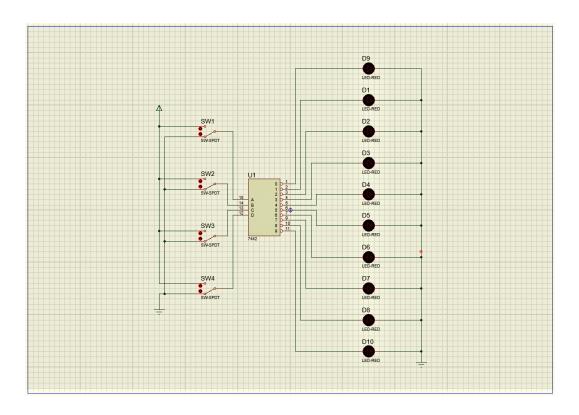
3. Conclusion from experiment 2 and 3

in the second experiment there is a NOT gate located after the NAND gate, while in the third experiment there is no NOT gate

located after the NAND gate. so the output results in experiments 2 and 3 are very different $\,$



Picture 4.1. Common anode LED circuit



Picture 4.2. Common cathode LED circuit

1. Column table

a. Common anode LED

	Input				Output								
SW 1	SW 2	SW 3	SW 4	1	2	3	4	5	6	7	8	9	1 0
0	0	0	0	1	0	0	0	0	0	0	0	0	0
1	0	0	0	0	1	0	0	0	0	0	0	0	0
0	1	0	0	0	0	1	0	0	0	0	0	0	0
1	1	0	0	0	0	0	1	0	0	0	0	0	0
0	0	1	0	0	0	0	0	1	0	0	0	0	0
1	0	1	0	0	0	0	0	0	1	0	0	0	0
0	1	1	0	0	0	0	0	0	0	1	0	0	0
1	1	1	0	0	0	0	0	0	0	0	1	0	0
0	0	0	1	0	0	0	0	0	0	0	0	1	0
1	0	0	1	0	0	0	0	0	0	0	0	0	1
0	1	0	1	0	0	0	0	0	0	0	0	0	0
1	1	0	1	0	0	0	0	0	0	0	0	0	0
0	0	1	1	0	0	0	0	0	0	0	0	0	0
1	0	1	1	0	0	0	0	0	0	0	0	0	0
0	1	1	1	0	0	0	0	0	0	0	0	0	0
1	1	1	1	0	0	0	0	0	0	0	0	0	0

b. Common cathode LED

	Input					Output								
SW 1	SW 2	SW 3	SW 4	1	2	3	4	5	6	7	8	9	1 0	
0	0	0	0	0	1	1	1	1	1	1	1	1	1	
1	0	0	0	1	0	1	1	1	1	1	1	1	1	
0	1	0	0	1	1	0	1	1	1	1	1	1	1	
1	1	0	0	1	1	1	0	1	1	1	1	1	1	
0	0	1	0	1	1	1	1	0	1	1	1	1	1	
1	0	1	0	1	1	1	1	1	0	1	1	1	1	
0	1	1	0	1	1	1	1	1	1	0	1	1	1	
1	1	1	0	1	1	1	1	1	1	1	0	1	1	
0	0	0	1	1	1	1	1	1	1	1	1	0	1	
1	0	0	1	1	1	1	1	1	1	1	1	1	0	
0	1	0	1	1	1	1	1	1	1	1	1	1	1	
1	1	0	1	1	1	1	1	1	1	1	1	1	1	
0	0	1	1	1	1	1	1	1	1	1	1	1	1	
1	0	1	1	1	1	1	1	1	1	1	1	1	1	
0	1	1	1	1	1	1	1	1	1	1	1	1	1	
1	1	1	1	1	1	1	1	1	1	1	1	1	1	