ASSEMBLY ASSIGNMENT

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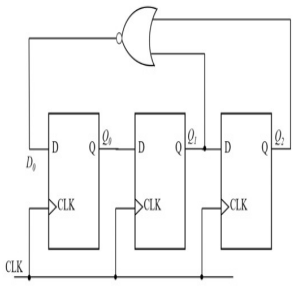
IITH - Future Wireless Communication

CONTENTS

I. QUESTION

The digital circuit shown ____



II. ANSWER

The above question can be solved by using Truth Table and karnaugh-map.

A. Truth Table

Present State			Flip-Flop i/p			Next State		
Q_0	Q_1	Q_2	D_0	D_1	D_2	Q_0'	Q_1'	Q_2'
0	0	0	1	0	0	1	0	0
1	0	0	1	1	0	1	1	0
1	1	0	0	1	1	0	1	1
0	1	1	0	0	1	0	0	1
0	0	1	0	0	0	0	0	0

Therefore, given circuit is Divide by 5 circuit.

B. K-Map Implentation

Q_1Q_2

Q_0	00	01	11	10
0	1	0	0	0
1	1	0	0	0

$$D_0 = \overline{Q}_1 \cdot \overline{Q}_2$$

Q_1Q_2

Q_0	00	01	11	10
0	0	0	0	0
1	1	0	0	1

$$D_1 = Q_0 \cdot \overline{Q}_2$$

Q_1Q_2

Q_0	00	01	11	10
0	0	0	1	0
1	0	0	0	1

$$D_2 = \overline{Q}_0 \cdot Q_1 \cdot Q_2 + Q_0 \cdot Q_1 \cdot \overline{Q}_2$$

III. Components

Components	Values	Quantity
Arduino	Uno	1
Jumper Wires	M-M	25
Breadboard		1
LED		3
Resistor	$\geq 220\Omega$	3
Flip Flop	7474	2

IV. Implementation

	INPUT			OUTPUT			CLOCK		5V			
	Q0	Q1	Q2	Q0'	Q1'	Q2'						
Arduino	D9	D10	D11	D2	D3	D4	A5					
7474	5	9		2	12		CLK1	CLK2	1	4	10	13
7474			9			12	CLK1	CLK2	1	4	10	13

Connections

Procedure

1. Connect the circuit as per the above table.
2. Connect LEDs to the output pins of the Arduino to see output.
3. Execute the circuit using the below code.

   https://github.com/koushikkalyani/FWC/blob/main/Assembly/assembly.asm

4. Visit for video demonstration .

   https://github.com/koushikkalyani/FWC/blob/main/Assembly/AssemblyDemo.mp4