AVR-GCC

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I QUESTION

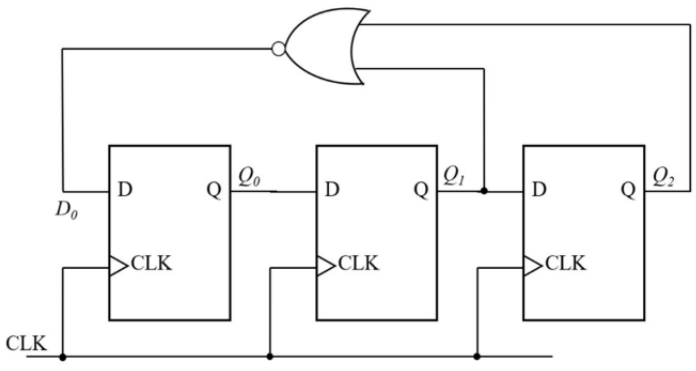
Verify the correct operation of a divide-by-5 counter implemented using a 7474 IC where the binary count is displayed using seven segment display.

II COMPONENTS

Component	Values	Quantity
Arduino	UNO	1
Jumper Wires	M-M	30
Breadboard		1
Seven Segment Display	Common Anode	1
Resistor	220 ohms	1
IC	7474	2
IC	7447	1

List of items required

III LOGICAL DIAGRAM



A. Boolean Equation

From the circuit diagram we can conclude:

$$D0 = \overline{(Q1 + Q2)} \tag{1}$$
$$D1 = Q0 \tag{2}$$
$$D2 = Q1 \tag{3}$$

IV TRUTH TABLE

Q2	Q1	Q0	D2	D1	D0	Q2′	Q1′	Q0′
0	0	0	0	0	1	0	0	1
0	0	1	0	1	1	0	1	1
0	1	1	1	1	0	1	1	0
1	1	0	1	0	0	1	0	0
1	0	0	0	0	0	0	0	0

Truth table for the given circuit

V IMPLEMENTATION

I Make the connections between the seven segment display and the 7447 IC as shown below.

7447	$\overline{a}$	$\overline{b}$	$\overline{c}$	$\overline{d}$	$\overline{e}$	$\overline{f}$	$\overline{g}$
Display	a	b	c	d	e	f	g

II Connect the Arduino, 7447 and the two 7474 ICs according to below table.

	INPUT			OUTPUT			CLOCK		5V			
	Q0	Q1	Q2	Q0′	Q1′	Q2′						
Arduino	D6	D7	D8	D2	D3	D4	D13					
7474	5	9		2	12		CLK1	CLK2	1	4	10	13
7474			5			2	CLK1	CLK2	1	4	10	13
7447				7	1	2			16			

III Hence we have implemented the divide by 5 counter digital circuit. Execute the circuit using below code.

https://github.com/shr-eyas/FWC/blob/main/Embedded%20C/counter.c