ASSIGNMENT

M Sai Santhosh Kumar
santhoshmandarapu1221@gmail.com
IITH - Future Wireless Communications (FWC)

Contents

1 Question

Consider a 3 bit counter,designed using T flip-flops,as shown below: Assuming the initial state of

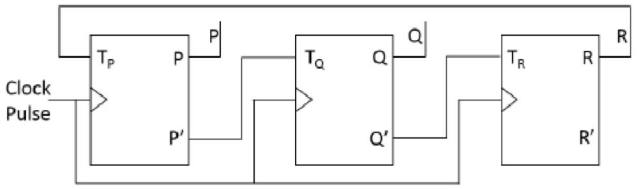


Fig. 1

the counter given by PQR as 000, what are the next three states?

2 Components

Component	values	Qantity
Arduino	UNO	1
Jumperwires	M-M	35
Breadboard		2
LED		3
Resistor	220ohms	3
IC	7476	3

Figure.a

3 Truth Table

T	Q	Q'
0	Q	Q'
1	Q'	Q

Truth table for "T" flipflop

4 Excitation Table

Q	Qn	T
0	0	0
0	1	1
1	0	1
1	1	0

Excitation table of T- flipflop

5 Truth table for next 3 stages

P	Q	R	P+	Q+	R+
0	0	0	0	1	1
0	1	1	1	0	1
1	0	1	0	0	0

Figure :b

6 next 3 stages

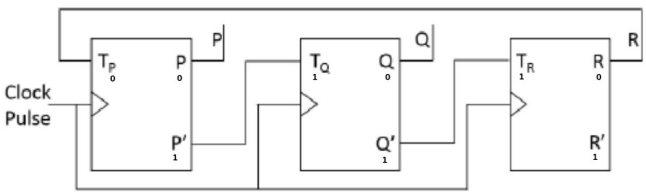


Fig. 2

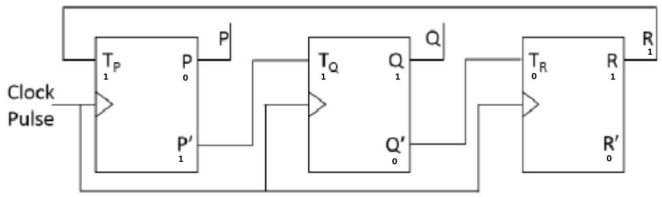


Fig. 3

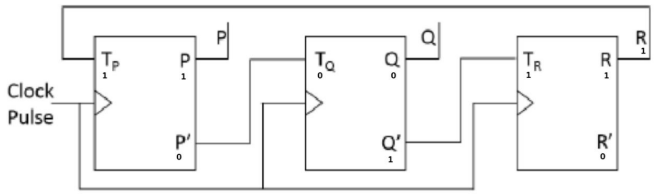
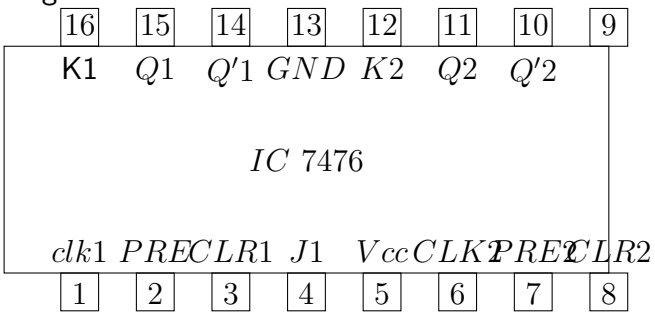


Fig. 4

7 Hardware

The 7476 is a master—slave J-K and the 74LS76 is a negative edge-triggered J-K flip-flop. Both chips have the same pin configuration. Below is the pin diagram of IC7476.



8 Implementation

The connections between Arduino UNO and three IC 7476 is given in below Table

	INPUT			OUTPUT			CLOCK	Vcc	GND
ARDUINO	D2	D3	D4	D5	D6	D7	13	5V	GND
7476	16			15			1	5	13

TABLE I: connections

a) Procedure

1.Connect the circuit as per the above tble.
2.connect the output pins to the LED's
3.Connect inputs to Vcc for logic 1,ground for logic 0
4.Execute the circuit using the below code.

https://github.com/santhosh-1221/ide/blob/main/code/segment.cpp

5.Change the values of Q1,Q2,Q3 in the code and verify the truth table