Department of Computer Science Engineering

SRMIST, Kattankulathur – 603 203

Sub Code & Name: 18CSS201J - ANALOG AND DIGITAL ELECTRONICS

Experiment No	08
Title of Experiment	Design and implementation of Synchronous sequential circuits using Simulation Package
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Register Number	RA19110030010094
Date of Experiment	10/10/2020

Mark Split Up

S.No	Description	Maximum Mark	Mark Obtained
1	Oral Viva / Online Quiz	5	
2	Execution	10	
3	Model Calculation / Result Analysis	5	
	Total	**20**	

Staff Signature with date

ExperimentNo:8 Date:

Design and implementation of Synchronous sequential circuits using Simulation Package

AIM:

To design and implementation of D Flip Flop usingMultisim.

APPARATUS REQUIRED

S.No	Apparatus	Type	Range	Quantity
1)	IC	IC 7474		1
2)	LED			4
3)	Switch			4
4)	DC Power Source			1
5)	Digital Clock			1

Software Required:

https://www.multisim.com/

THEORY

A D-type flip-flop is a clocked flip-flop which has two stable states. A D-type flip-flop operates with a delay in input by one clock cycle. Thus, by cascading many D-type flip-flops delay circuits can be created, which are used in many applications such as in digital television systems.

A D-type flip-flop is also known as a D flip-flop or delay flip-flop. A D-type flipflop consists of four inputs:

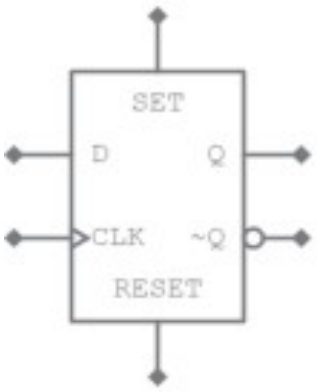
- Datainput
- Clock input
- Set input
- Resetinput

It also has two outputs, with one being logically inverse of other. The data input is either logic 0 or 1, meaning low or high voltage. The clock input helps in synchronizing the circuit to an external signal. The set input and reset input are mostly held low. A D-type flip-flop can have two possible values. When input D = 0, the flip-flop undergoes a reset, which means the output would be set to 0. When input D = 1, the flip-flop does a set, which makes theoutput There are several applications in which a D-type flip-flop is used, such as in frequency dividers and datalatches.

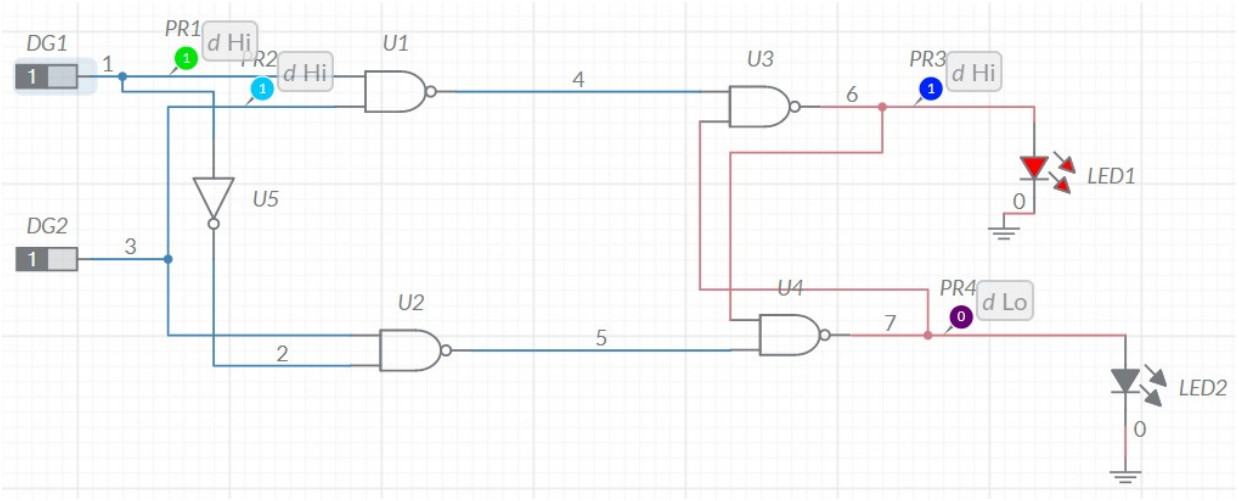
PROCEDURE

1. Log in Multisim Live Online Circuit Simulator.
2. Click create circuit button.
3. Click search for component and type components. Select it and drag to the Schematic window
4. Select the entire apparatus given in table to complete the circuit.
5. Click schematic connector and select junction drag to the Schematic window and left click at the point and drag to the other point to make the wire connection. Complete the connection according to the diagram.
6. Click analysis and annotation and select digital probe and drag to the schematic window and place at the output side.
7. Save the file by clicking the file navigation menu at the left top and save with a file name.
8. Run the simulation change the value of the switches to verify the truthtable.

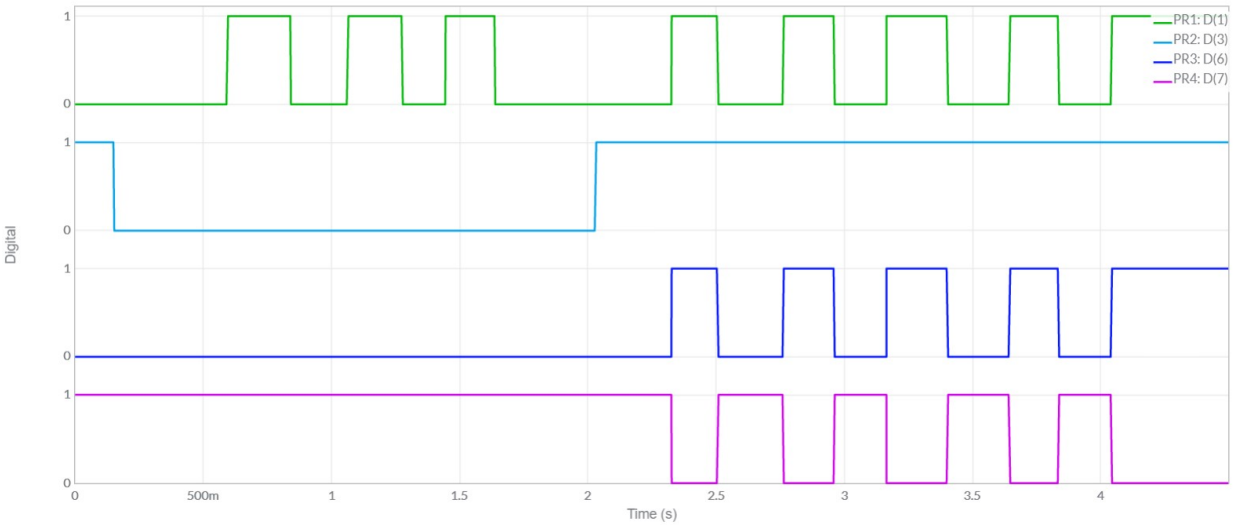
PIN DIAGRAM:



CIRCUIT DIAGRAM:



Timing Diagram



Truth(Characteristic) Table:

CLK	D	Q_n	Q_{n+1}	Q'_{n+1}
0	0	0	0	1
0	0	1	1	0
0	1	0	0	1
0	1	1	1	0
1	0	0	0	1
1	0	1	0	1
1	1	0	1	0
1	1	1	1	0

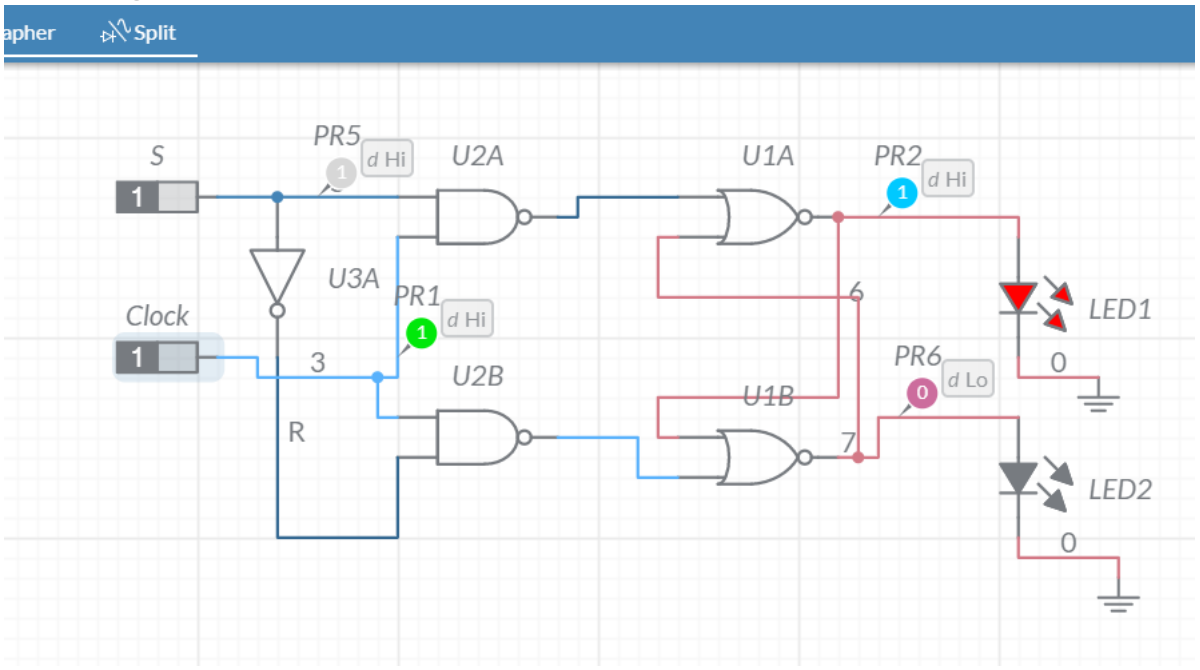
Characteristic Equation:

D \ Q_n	0	1
0	0 (0)	0 (1)
1	1 (2)	1 (3)

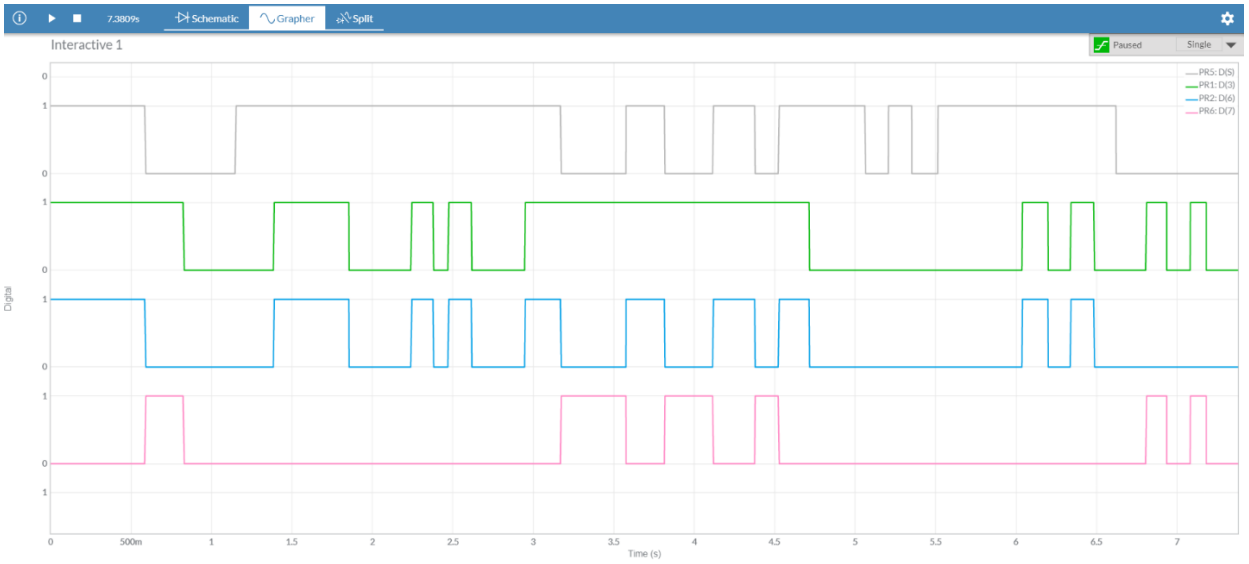
$Q_{n+1} = D$

SIMULATION RESULTS

Circuit Diagram



Timing Diagram



RESULT

Thus, the implementation of D flip flop using Multisim is verified