

Course Name:	Digital Design Laboratory	Semester:	III
Date of Performance:		Batch No:	E2
Faculty Name:		Roll No:	16010123325
Faculty Sign & Date:		Grade/Marks:	___/25

Experiment No: 6
Title: Shift Register

Aim and Objective of the Experiment:
To implement the SISO, SIPO, PISO, PIPO shift register using Universal IC 74194

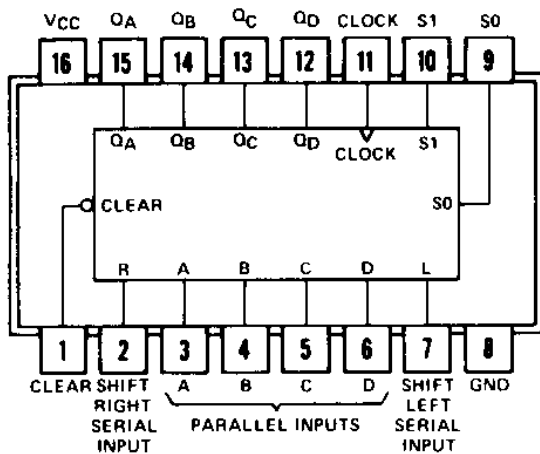
COs to be achieved:
CO3: Design synchronous and asynchronous sequential circuits.

Tools used:
Trainer kits

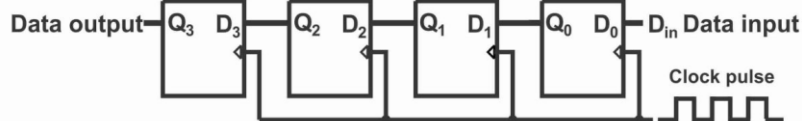
Theory:
<p>A register is capable of shifting its binary information in one or both directions is known as shift register. The logical configuration of shift register consist of a D-Flip flop cascaded with output of one flip flop connected to input of next flip flop. All flip flops receive common clock pulses which causes the shift in the output of the flip flop. The simplest possible shift register is one that uses only flip flop. The output of a given flip flop is connected to the input of next flip flop of the register. Each clock pulse shifts the content of register one bit position to right.</p> <p>The basic types of shift registers are</p> <ul style="list-style-type: none"> • Serial In - Serial Out • Serial In - Parallel Out • Parallel In - Serial Out • Parallel In - Parallel Out • Bidirectional shift registers.

Pin diagram of IC 74194 and Function table

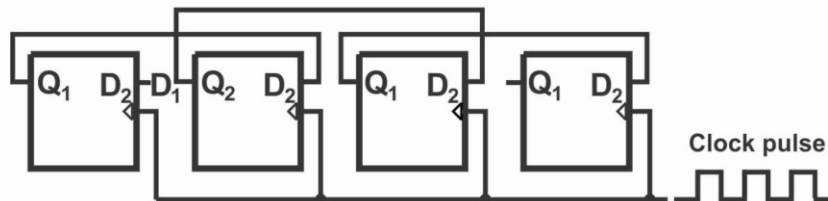
74194



Circuit diagram: Serial left shift



Circuit diagram: Serial right shift



Truth Table

SISO

* 1010

Clock	Pulse no.	QA	QB	QC	QD	SR
0	0	0	0	0	0	0
1	1	0	0	0	0	0
2	2	0	1	0	0	1
3	3	0	0	1	0	0
4	4	1	0	1	0	1
5	5	0	1	0	1	-
6	6	0	0	1	0	-
7	7	1	0	0	1	-
8	8	0	0	0	0	-

M T W T F S S

SIPO

Clock	Pulse no.	Q _A	Q _B	Q _C	Q _D	SR
0	0	0	0	0	0	0
1	1	0	0	0	0	0
2	0	1	0	0	0	0
3	0	0	1	0	0	1
4	0	1	0	1	0	1

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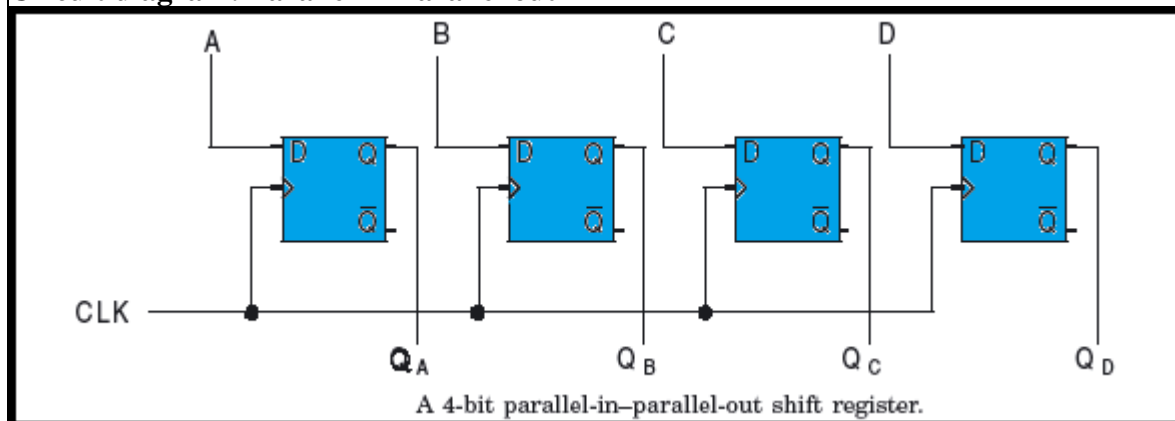
PIPO

Clock	Pulse	Q _A	Q _B	Q _C	Q _D
0	0	0	0	0	0
1	1	1	0	1	0

PISO

Clock	Pulse	Q _A	Q _B	Q _C	Q _D
0	0	0	0	0	0
1	0	1	0	1	0
2	0	0	1	0	1
3	0	0	0	1	0
4	0	0	0	0	1
5	0	0	0	0	0

Circuit diagram: Parallel in Parallel out



Implementation Details

Procedure

- 1) Locate IC 74196 on Digital trainer kit
- 2) Apply various inputs to appropriate pins as per the mode of operation with reference to the pin configuration of the IC.
- 3) Connect a pulsar switch to the clock input.
- 4) Verify the respective truth tables for different modes with reference to the truth table given in the data sheet of IC 74194.

Post Lab Subjective/Objective type Questions:

1. What is a universal shift register?

A Universal shift register is a register which has both the right shift and left shift with parallel load capabilities. Universal shift registers are used as memory elements in computers.

2. Prepare a truth table for 3 bit SISO left shift with data 011 along with clock pulse

CLK	a_2	a_1	a_0
0	0	0	0
1	1	0	0
2	1	1	0
3	0	1	1

3. Can a shift register be used as a counter? Give any one application.

No, a shift register cannot function as a counter. While both shift registers and counters use

flip-flops, they have different purposes and operations:

- Shift registers

Move data through their stages. They are used for data manipulation and transfer, such as converting between serial and parallel interfaces.

- Counters

Increment or decrement a value based on input pulses. They are designed for counting events or pulses.

Shift registers are commonly used in digital circuits for a variety of applications, including data storage, serial-to-parallel and parallel-to-serial data conversion, shift and rotate operations, and frequency division.

4. How many clock pulses are required to enter a byte of data serially into an 8-bit shift register?

8

Conclusion:

Implemented the SISO, SIPO, PISO, PIPO shift register using **Universal IC 74194**

Signature of faculty in-charge with Date: