DIGITAL LOGIC DESIGN

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EXPERIMENT 11

EXPERIMENT – 11

AIM: -

Design of 4-bit shift register (shift right).

APPARATUS REQUIRED: -

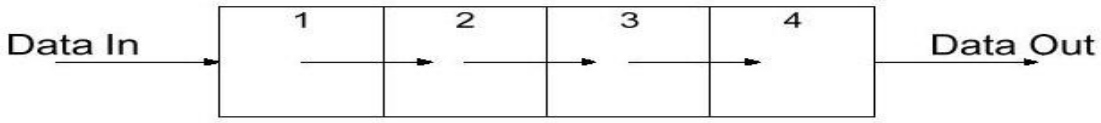
Logic trainer kit, D Flip-flop IC - 7474 wires.

THEORY:

Serial In/Shift Right/Serial Out Operation

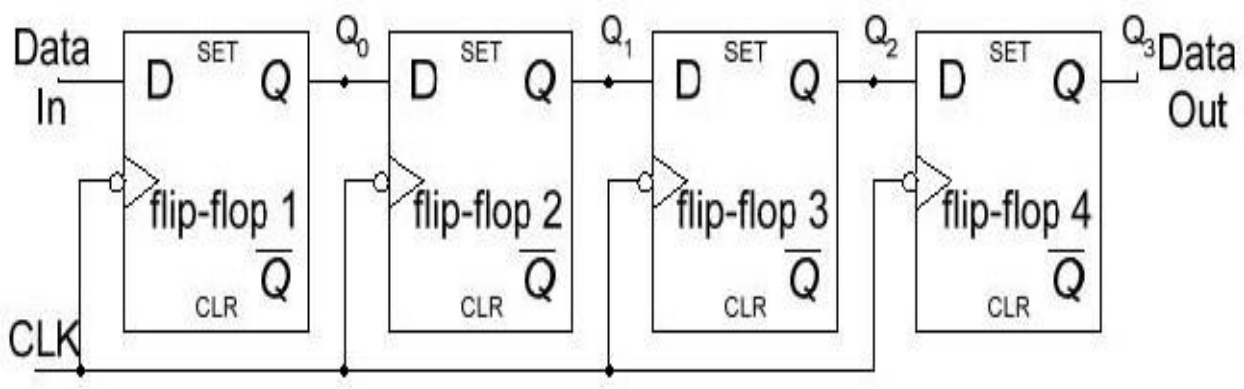
Data is shifted in the right hand direction one bit at a time with each transition of the clock signal. The data enters the shift register serially from the left hand side and after four clock transitions the 4-bit registers has 4-bbits of data. The data is shifted out serially one bit at a time from the right hand side of the register if clock signals are continuously applied. Thus after 8 clock signals the 4-bit data is completely shifted out of the shift register.

Serial In/Serial Right/Serial Out Operation

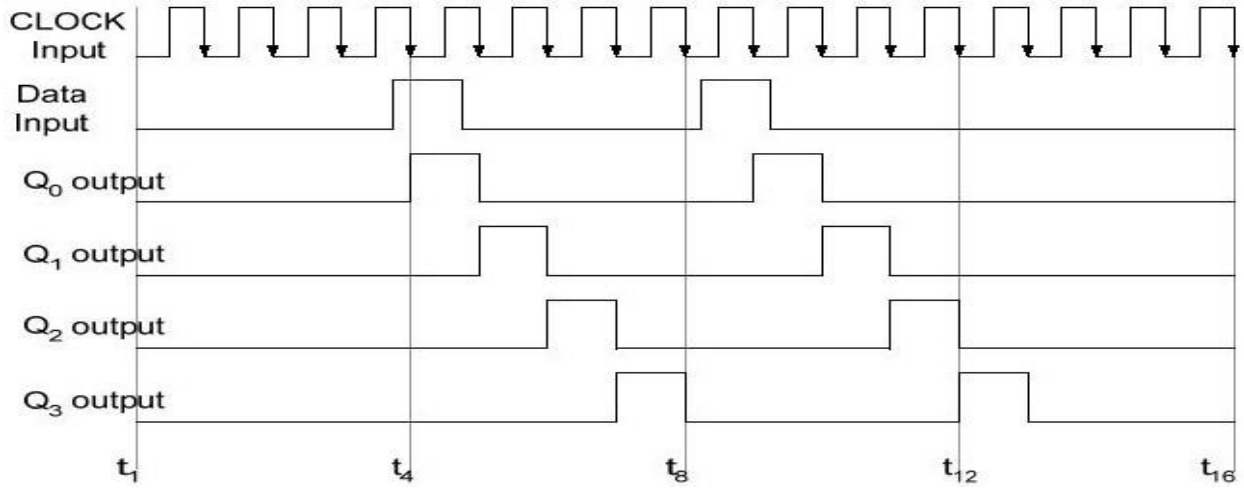


Serial shift registers can be implemented using any type of flip-flops. A serial shift register implemented using D flip-flops with the serial data applied at the D input of the first flip-flop and serial data out obtained at the Q output of the last flip-flop is shown in figure. At each clock transition 1 bit of serial data is shifted in and at the same instant 1-bit of serial data is shifted out. For a 4-bit shift register, 8 clock transitions are required to shift in 4-bit data and completely shift out the 4-bit data. As the data shifted out 1-bit at a time, a logic 0 value is usually shifted in to fill up the vacant bits in the shift register.

Serial In/Shift Right/Serial Out Register



Timing diagram of a Serial In/Shift Right/Serial Out Register



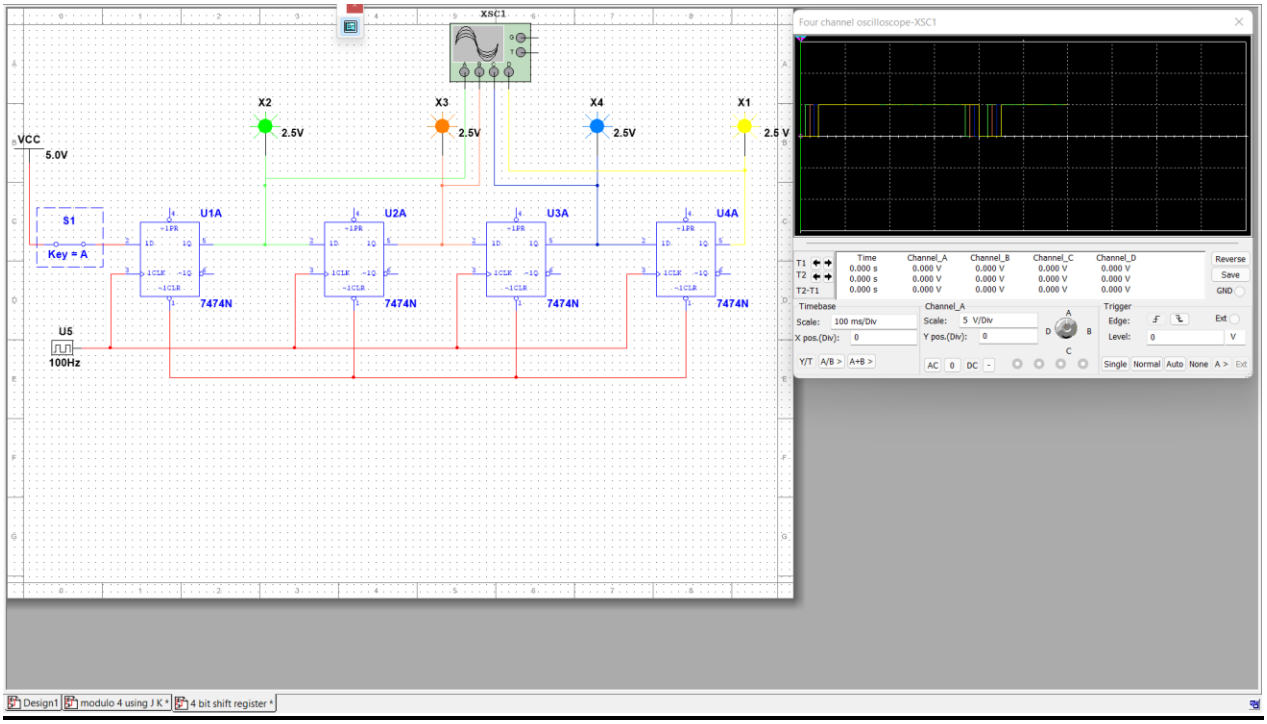
Shift Register Truth Table

Outputs	Q_0	Q_1	Q_2	Q_3
Reset	0	0	0	0
CK Pulse 1	1	0	0	0
CK Pulse 2	0	1	0	0
CK Pulse 3	0	0	1	0
CK Pulse 4	0	0	0	1

PROCEDURE:

(i) Connections are given as per circuit diagram.
(ii) Logical inputs are given as per circuit diagram.
(iii) Observe the output and verify the truth table.

DESIGN:



RESULT:

Thus the Shift register was designed and their truth table is verified.

PRECATIONS:

- All connections should be made neat and tight.
- Digital lab kits and ICs should be handled with utmost care.
- While making connections main voltage should be kept switched off.
- Never touch live and naked wires.