

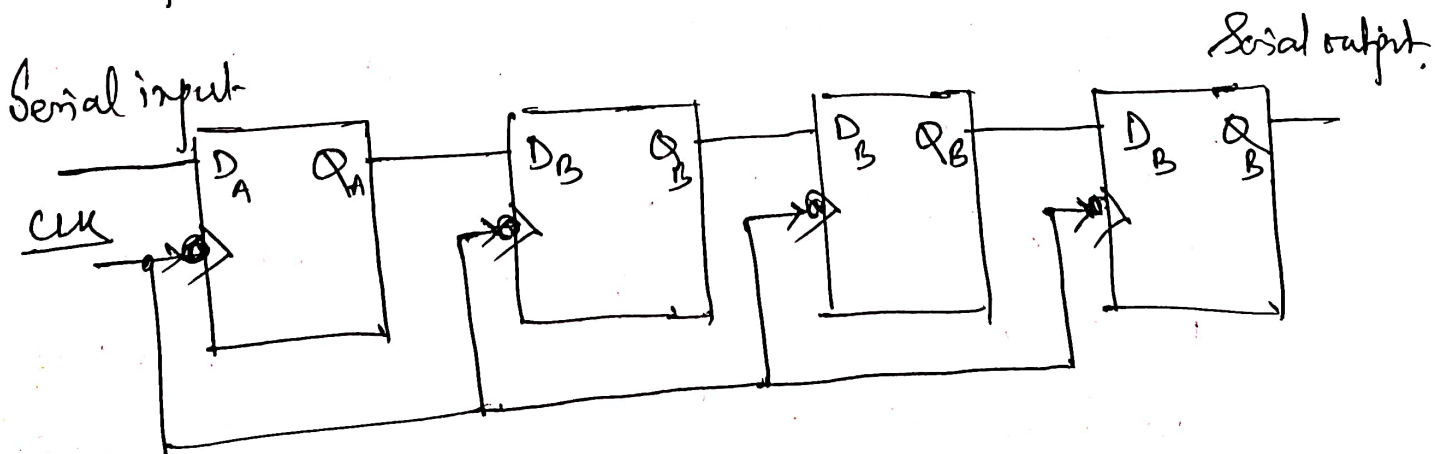
⑤

Exp: Design and Construct a 4 bit Serial in-Serial out using D flip-flop.

Theory: Serial-in-Serial out (SISO) shift register consists of flip-flops which store digital information into the flip-flops in form of bits.

Four flip-flops are used for 4 bit SISO register. Bits are serially loaded into the register for each clock pulse. Four clock pulses are required to load the entire register. The output data is possible only after four clock pulse.

Design of SISO of each storage unit using D flip-flop with edge triggered clock input as shown in the figure (1.1).



Figure(1.1), SISO

(2)

The functional table of a SISO is shown in the table (1.1).

Serial input	Before the clock pulse				After the clock pulse					
	Clock no	Q _A	Q _B	Q _C	Q _D	Clock no	Q _A	Q _B	Q _C	Q _D
1	1	X	X	X	X	1	1	X	X	X
1	2	1	X	X	X	2	1	1	X	X
0	3	1	1	X	X	3	0	1	1	X
1	4	0	1	1	X	4		0	1	1

Table (1.1), SISO functional table.

Design procedure :

Dual D-flip flop (7474) is used to design a SISO register. To make a 4 bit SISO register we would require two 7474 A for its construction.

To provide a clock we need a de-bouncer circuit constructed out of NAND gates as shown in the combined figure (1.2).

Conclusion:

- ① Manual clock can be constructed using NAND logic gates, but it can also be provided from signal generators.
- ② 7474A is a positive edge triggered Dual D-type flip-flop. If the preset and clear inputs are not used, then the terminals must be tied together and connected to logic high.
- ③ Connecting the unused clear and preset inputs to logic high will de-activate it.
- ④ All the integrated chips must be connected to positive dc supply regulated to +5V.
- ⑤ Smaller strands of jumpers are used for connecting the integrated circuits on the bread board for avoiding short circuit.