

Aim - Implementing SISO, SIPO and PIPO shift registers.

Component Required - IC4013, connecting wire, bread board, trainer kit.

Theory :

Register - A register is a collection of flip flop. A flip flop is used to store single bit digital data. For storing a large number of bits, the storage capacity is increased by grouping more than one flipflop. If we want to store an n -bit word we have to use an n -bit register containing n number of flipflops.

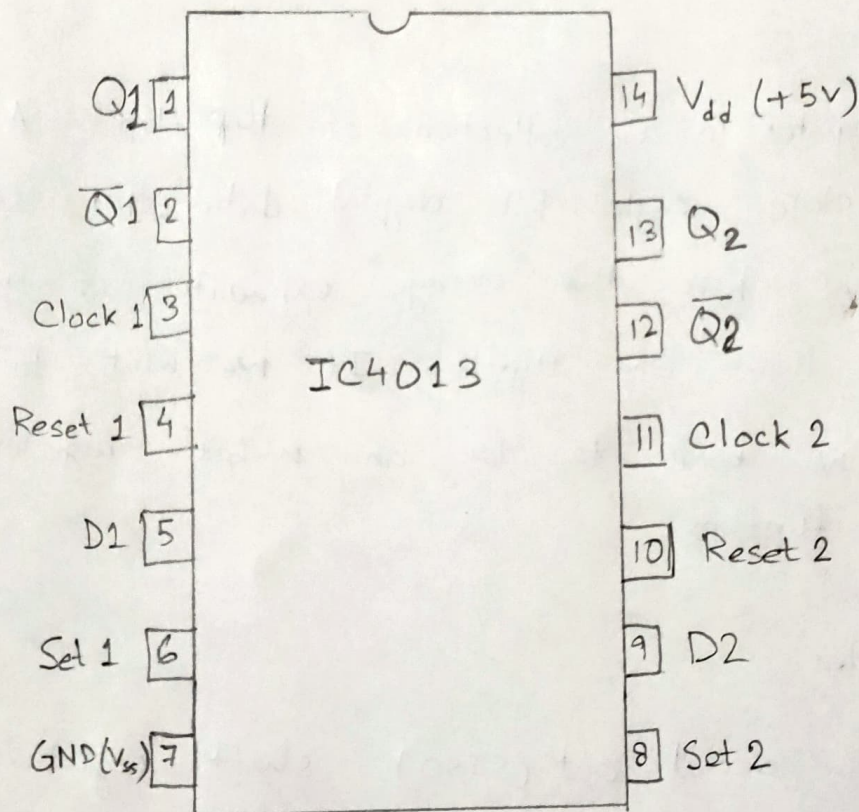
Types of Register -

SISO - Serial in serial out (SISO) shift register are kind of shift register where both data loading as well as data retrieval to / from shift register occurs in serial-mode.

SIPO - A serial in parallel out shift register is similar to the serial in, serial out shift register is that it shifts data into internal storage element and shifts data out at the serial out, data out, pin. It is different in that it makes all the internal stages available as output.

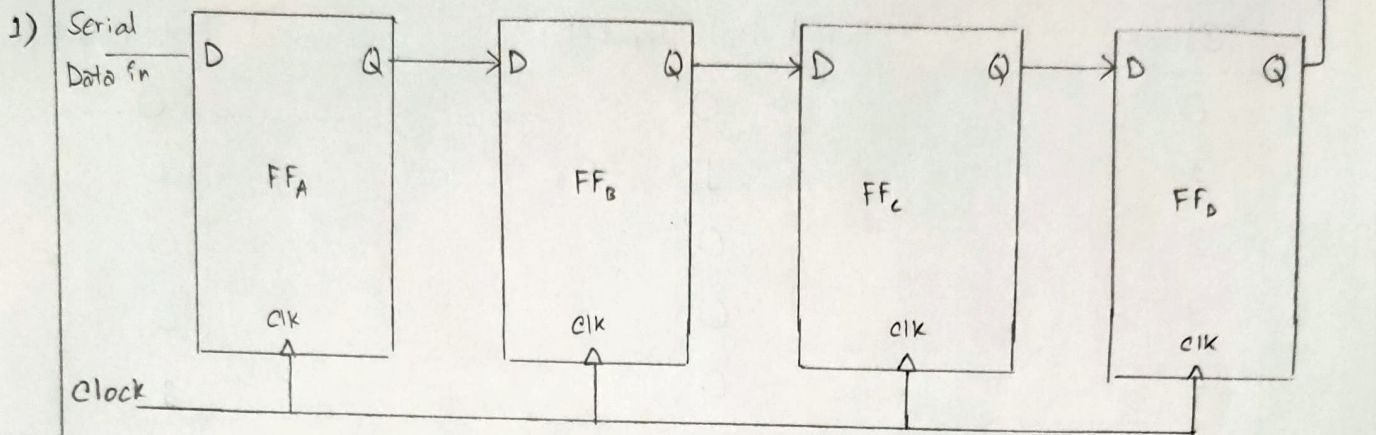
PIPO - The shift register which has parallel input and generates parallel output is known as the parallel input parallel output (PIPO) shift register. The shift register includes three connections only: the PI (parallel I/P), PO (parallel O/P) & the clock signal.

PIN DIAGRAM (D Flipflop)

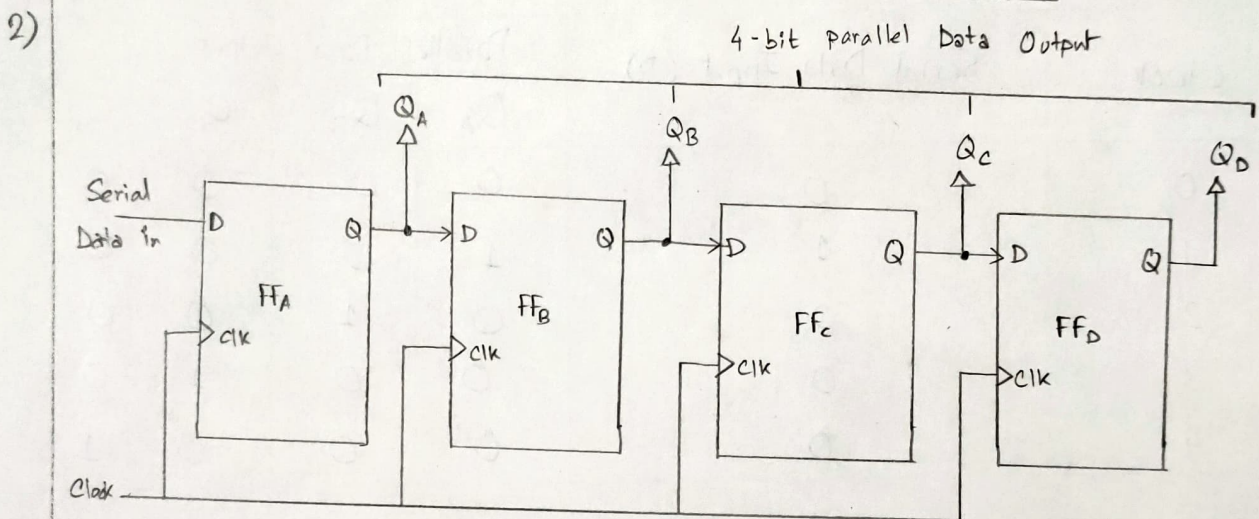


Dual D flipflop

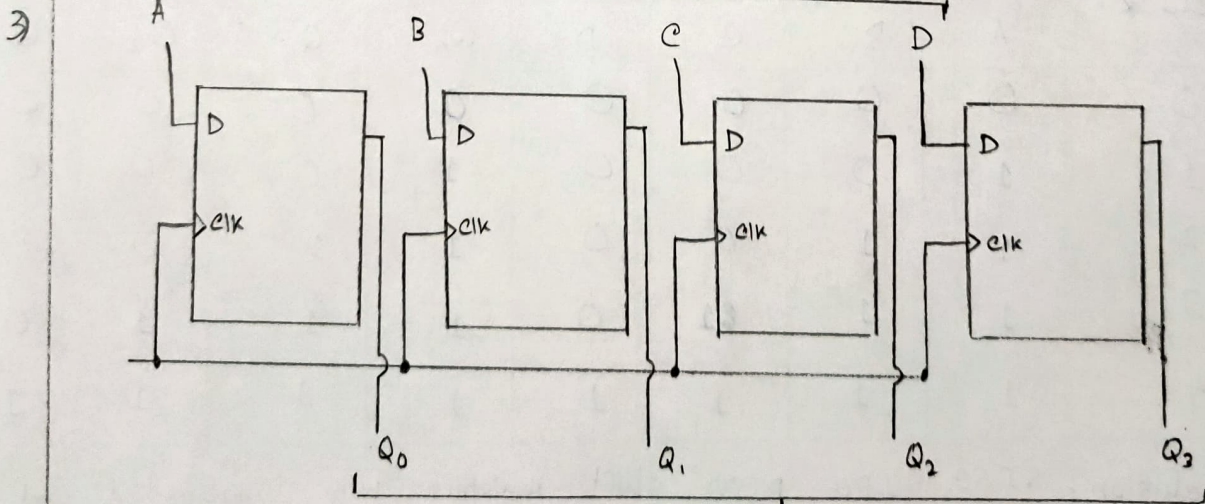
Circuit Diagram -



4 bit SISO register Using D - flipflop



4 bit SIPO register Using D Flipflop



4 bit PISO Register Using D flipflop

Observation Table:

SISO:

Clock	Serial Data Input (D)	Serial Data Output (Q)
0	0	0
1	1	0
2	0	0
3	0	0
4	0	1

SIPO:

Clock	Serial Data Input (D)	Parallel Data Output			
		Q _A	Q _B	Q _C	Q _D
0	0	0	0	0	0
1	1	1	0	0	0
2	0	0	1	0	0
3	0	0	0	1	0
4	0	0	0	0	1

PIPO:

Clock	Parallel Data Input (D)				Parallel Data Output (Q)			
	A	B	C	D	Q ₀	Q ₁	Q ₂	Q ₃
0	0	0	0	0	0	0	0	0
1	1	0	0	0	1	0	0	0
2	1	1	0	0	1	1	0	0
3	1	1	1	0	1	1	1	0
4	1	1	1	1	1	1	1	1

Conclusion: SISO, SIPO, PIPO shift registers were implemented and ~~the~~ truth table is verified.