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SHIFT REGISTERS

Register

- Registers like counters are clocked sequential circuits
- A register is a group of flip-flops
 - Each flip-flop capable of storing one bit of information
 - An n-bit register
 - consists of n flip-flops
 - capable of storing n bits of information
 - besides flip-flops, a register usually contains combinational logic to perform some simple tasks
 - In summary
 - flip-flops to hold information
 - combinational logic to control the state transition



SHIFT REGISTERS

Shift Register

- The Shift Register is sequential logic circuit that can be used for the storage or the transfer of binary data.
- It loads the data present on its inputs and then moves or “shifts” it to its output once every clock cycle, hence the name Shift Register.
- A shift register basically consists of several single bit “D-Type Data Latches”
- Shift register IC’s are generally provided with a clear or reset connection so that they can be “SET” or “RESET” as required.
- Generally, shift registers operate in one of four different modes with the basic movement of data through a shift register being

1. Serial-in to Parallel-out (SIPO)

The register is loaded with serial data, one bit at a time, with the stored data being available at the output in parallel form.

2. Serial-in to Serial-out (SISO)

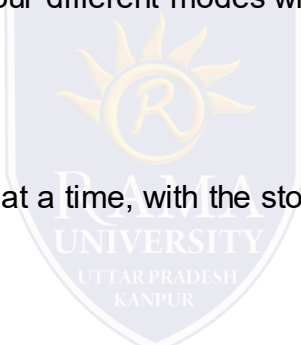
The data is shifted serially “IN” and “OUT” of the register, one bit at a time in either a left or right direction under clock control.

3. Parallel-in to Serial-out (PISO)

The parallel data is loaded into the register simultaneously and is shifted out of the register serially one bit at a time under clock control.

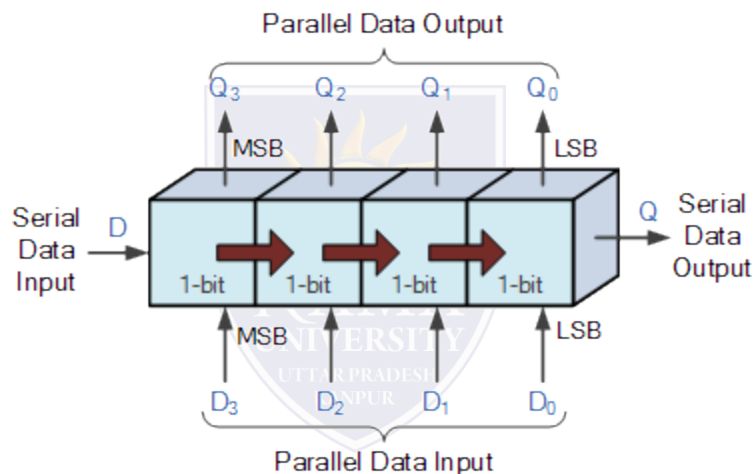
4. Parallel-in to Parallel-out (PIPO)

The parallel data is loaded simultaneously into the register, and transferred together to their respective outputs by the same clock pulse.



SHIFT REGISTERS

The effect of data movement from left to right through a shift register can be presented graphically as:



Also, the directional movement of the data through a shift register can be either to the left, (left shifting) to the right, (right shifting) left-in but right-out, (rotation) or both left and right shifting within the same register thereby making it bidirectional. In this tutorial it is assumed that all the data shifts to the right, (right shifting).