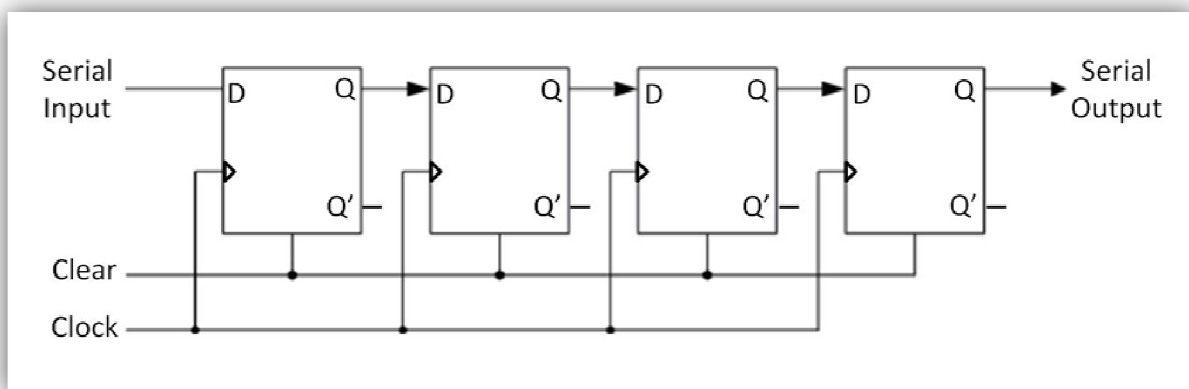


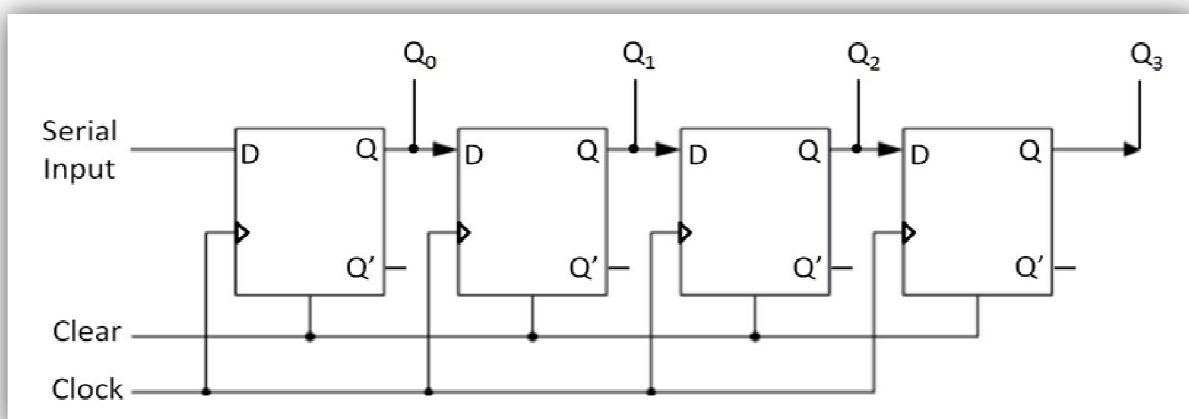
Serial In – Serial Out Shift Registers: A basic 4-bit Serial In – Serial Out shift register can be constructed using four D flip-flops, as shown below. The operation of the circuit is as follows.

The register is first cleared, forcing all four outputs to zero. The input data is then applied sequentially to the D input of the first flip-flop on the left. During each clock pulse, one bit is transmitted from left to right. Assume a data word to be 1001. The least significant bit of the data has to be shifted through the register from left to right.



Here as we see in this diagram, there is only one serial input and only one serial output making it the perfect shift register.

Serial In – Parallel Out Shift Registers: For this kind of register, data bits are entered serially in the same manner as in Serial In - Serial Out. The difference is the way in which the data bits are taken out of the register. Once the data are stored, each bit appears on its respective output line, and all bits are available simultaneously. A construction of a 4-bit serial in - parallel out register is shown below.



Here in this diagram, the input is only one but output is a set of four lines- $Q_0Q_1Q_2Q_3$. These four lines collectively are the parallel output.

Assignments:

1. Construct a 6-bit SISO register.
2. How is parallelism achieved in output keeping the input serial? Explain in brief.