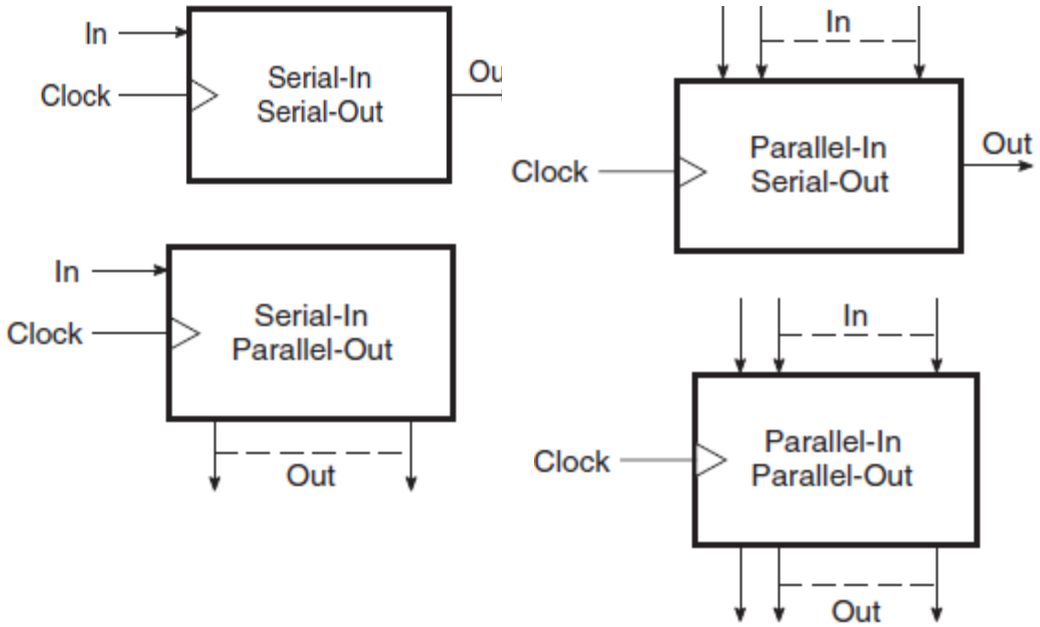
Shift Registers

- Shift register can store data as well as shift data .
- The storage capacity of a shift register equals the total number of bits of digital data it can store , which in turn depends upon the number of flip-flops used to construct the shift register

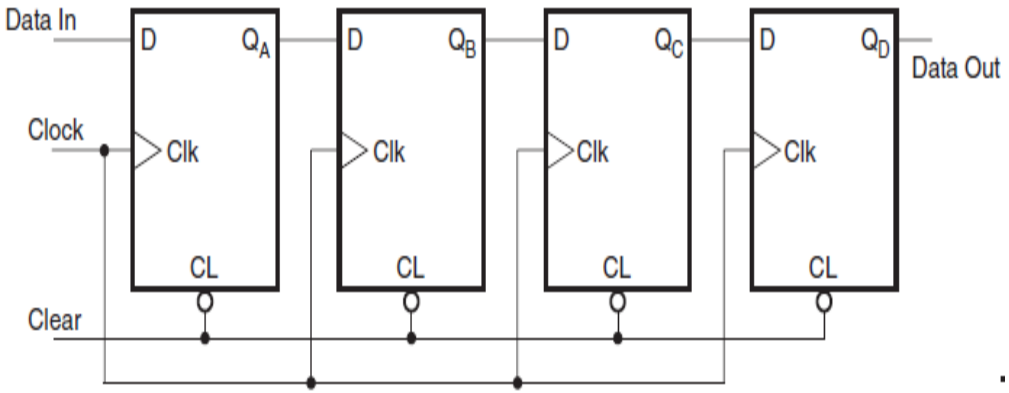
- Basic types of shift registers
- serial-in serial-out (SISO)
- serial-in parallel-out (SIPO)
- parallel-in serial-out (PISO)
- parallel-in parallel-out (PIPO)



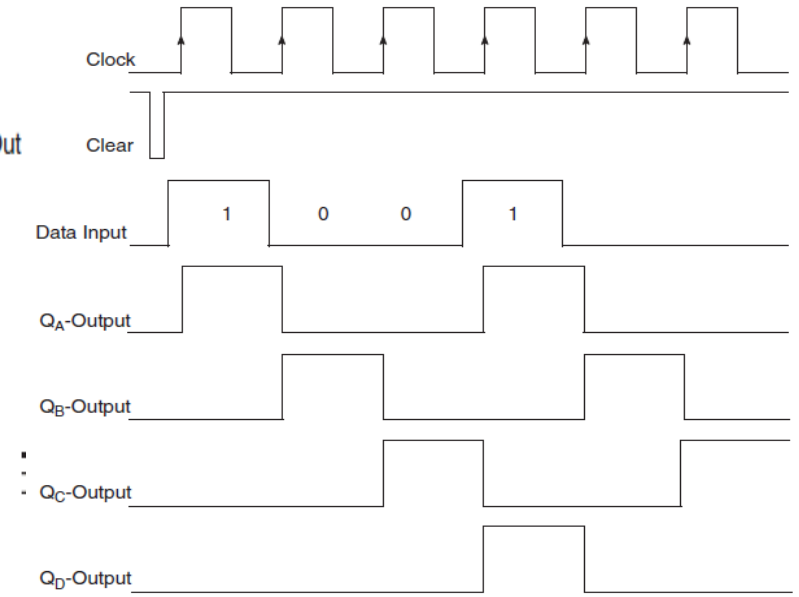
Serial-In Serial-Out Shift Register

- The basic four-bit serial-in serial-out shift register implemented using D flip-flops

- The circuit functions as follows.
  - A reset applied to the CLEAR input of all the flip-flops resets their Q outputs to 0s.
  - During the first clock transition, the QA output goes from logic '0' to logic '1'.

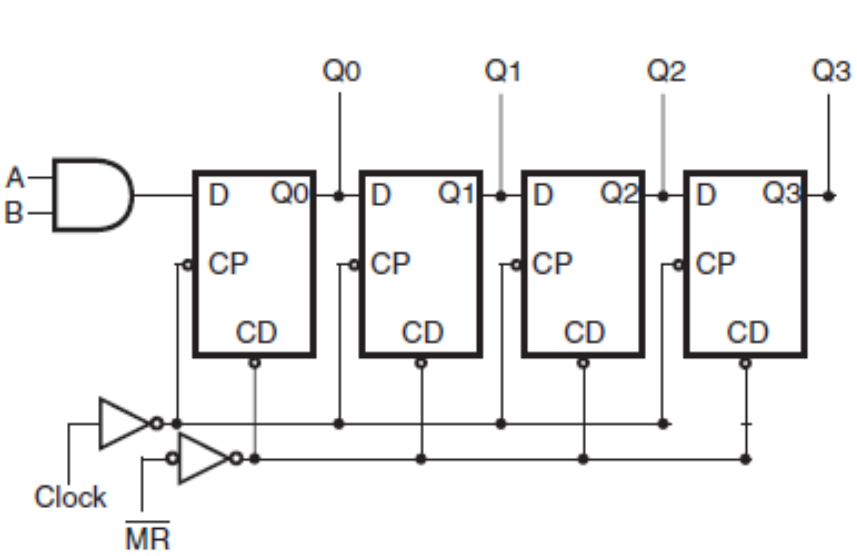


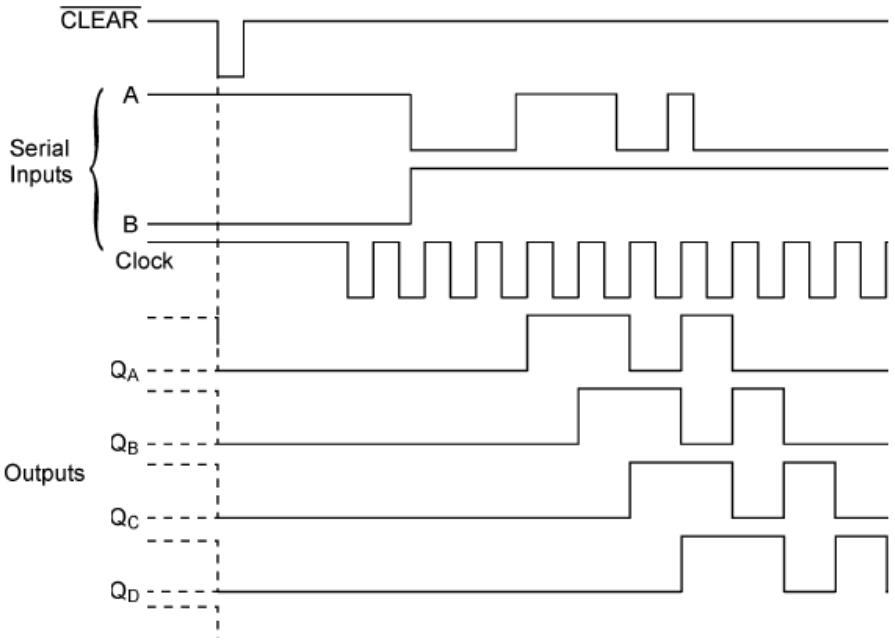
Serial-in, serial-out shift register.



Serial-In Parallel-Out Shift Register

- A serial-in parallel-out shift register is architecturally identical to a serial-in serial-out shift register
- except that in the case of the former all flip-flop outputs are also brought out on the IC terminals

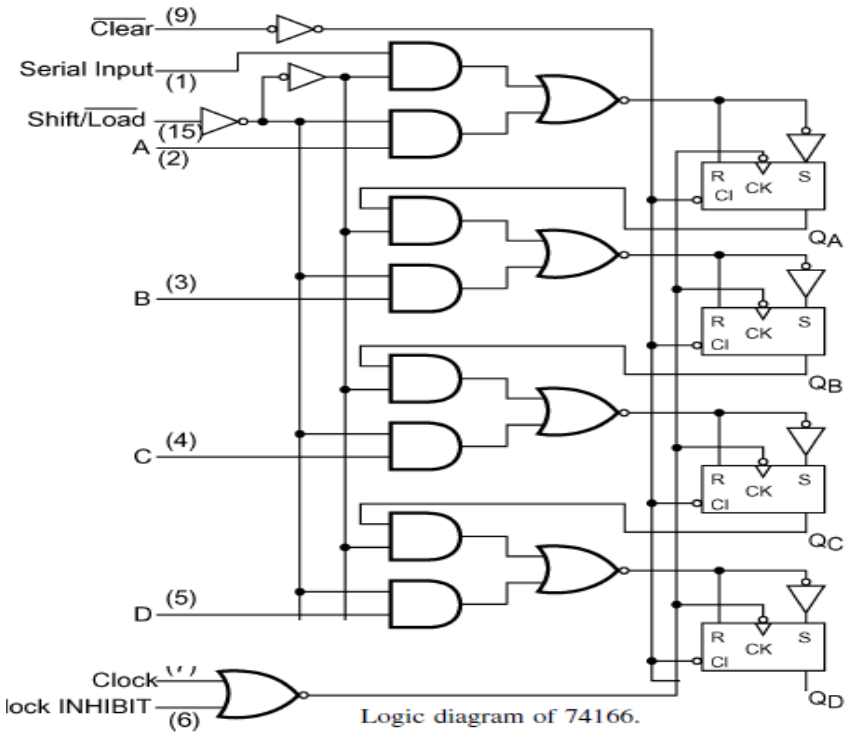




Parallel-In Serial-Out Shift Register

- A logic diagram is that of IC 74166, which is an eight-bit parallel/serial-in, serial-out shift register belonging to the TTL family of devices.

- The parallel-in or serial-in modes are controlled by a SHIFT/LOAD input.

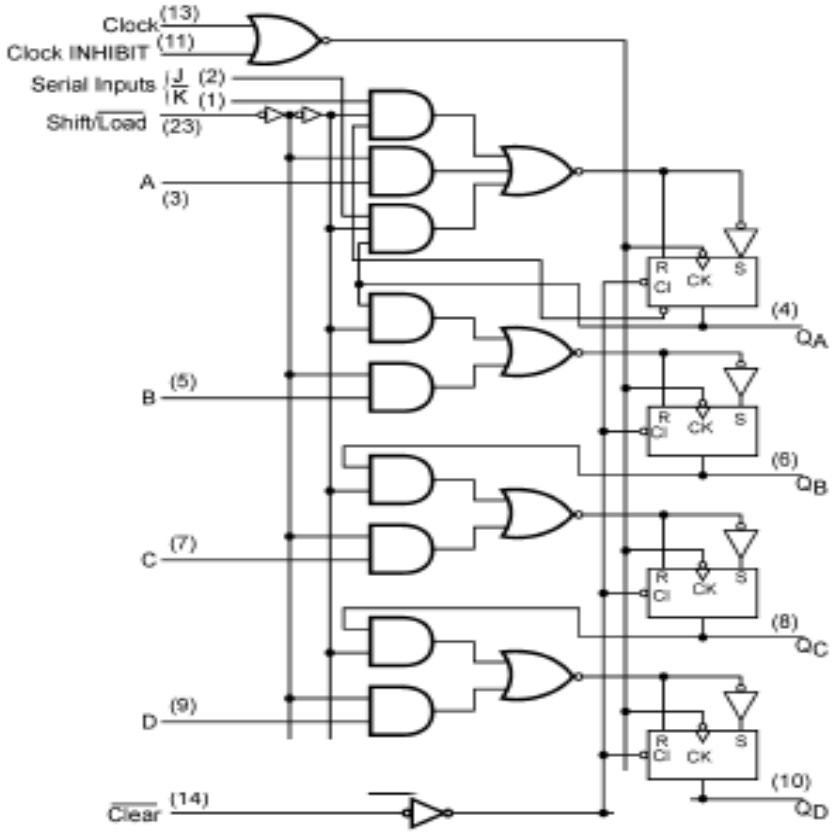


Logic diagram of 74166.

Parallel-In Parallel-Out Shift Register

- hardware of a parallel-in parallel-out shift register is similar to that of a parallel-in serial-out shift register

- The parallel-in or serial-in modes are controlled by a SHIFT/LOAD input.



Logic diagram of IC 74199