Yohandi - 120040025

EIE2050 Assignment 7

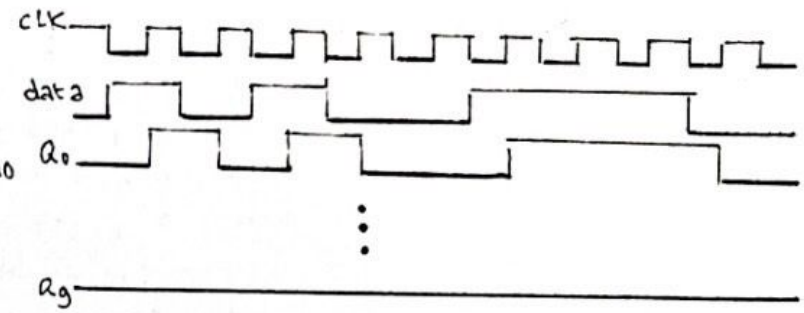
1. the shift register is a 10-bit shift register, which shows that it has 10 stages

initial stage: 0000000000

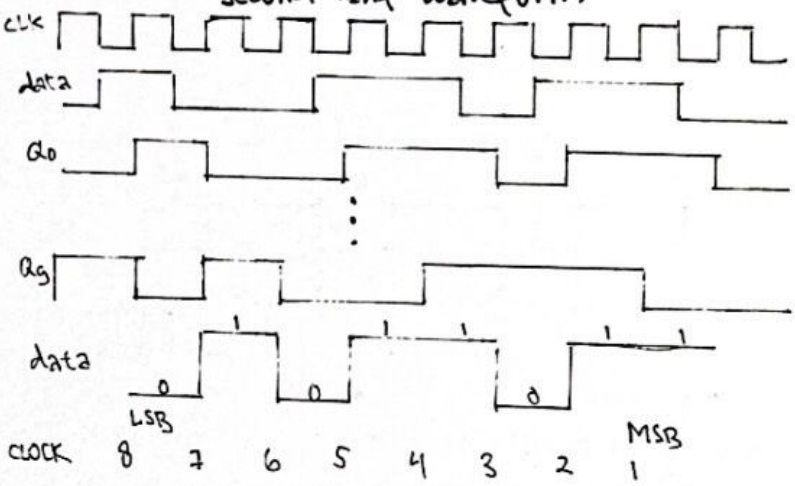
input sequence: 0101001110010011 0110

CLOCK	Q_1	Q_2	Q_3	Q_4	Q_5	Q_6	Q_7	Q_8	Q_9	Q_{10}
0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0
2	1	0	0	0	0	0	0	0	0	0
3	0	1	0	0	0	0	0	0	0	0
4	1	0	1	0	0	0	0	0	0	0
5	0	1	0	1	0	0	0	0	0	0
⋮										
17	0	1	1	0	0	1	0	0	1	1
18	1	0	1	1	0	0	1	0	0	1
19	1	1	0	1	1	0	0	1	0	0
20	0	1	1	0	1	1	0	0	1	0

first half waveform



second half waveform

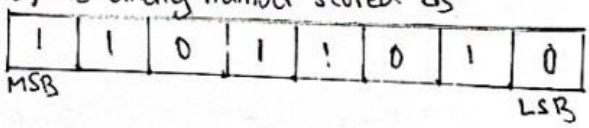


2. -> For leading-edge clocked serial-in / serial-out shift register, one-bit data shifts every time when clock signal goes from 0 to 1

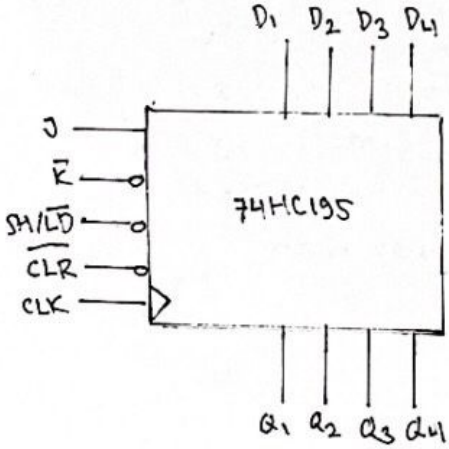
-> First bit comes out is MSB

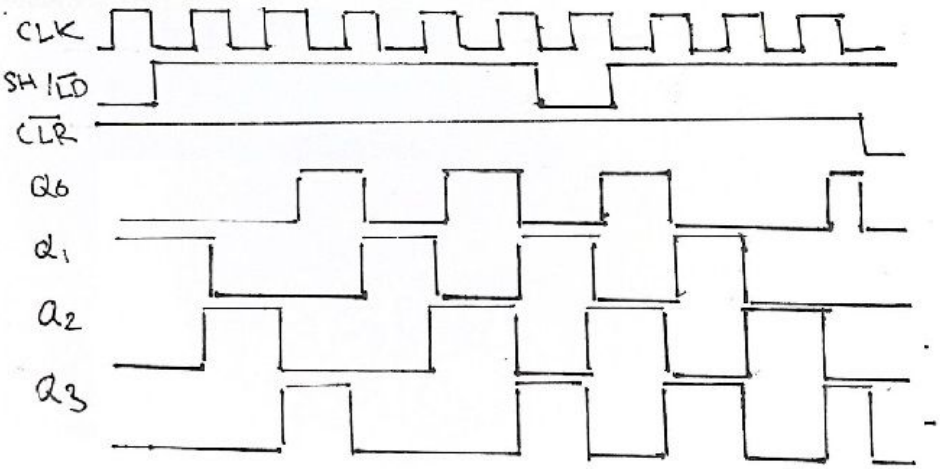
-> Last bit comes out is LSB

⇒ So, the binary number stored as



3.





-> Q_3 is used as a serial out pin

-> J & K inputs are used to input data serially

-> SH/LD is used to load the parallel data and to allow shift operations on the clock transition

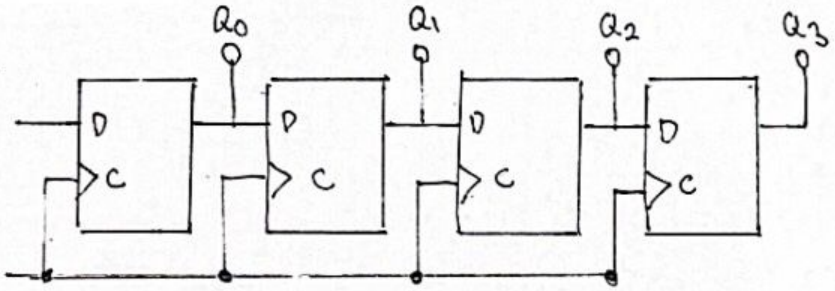
-> CLR input is used to clear the register asynchronously

4.

CLOCK	Q_0	Q_1	Q_2	Q_3	Q_4	Q_5	Q_6	Q_7	Q_8	Q_9
0	0	0	0	0	1	0	0	0	1	0
1	0	0	0	0	0	1	0	0	0	1
2	1	0	0	0	0	0	1	0	0	0
3	0	1	0	0	0	0	0	1	0	0
4	0	0	1	0	0	0	0	0	1	0
5	0	0	0	1	0	0	0	0	0	1
⋮										
12	1	0	0	0	1	0	0	0	0	0
13	0	1	0	0	0	1	0	0	0	0
14	0	0	1	0	0	0	1	0	0	0
15	0	0	0	1	0	0	0	1	0	0

preset value of the ring counter is 0000100010

5.



the given register is a 4-bit serial in parallel out shift register each stage output of the register is referred as Q_0, Q_1, Q_2, and Q_3 the given waveform shows that the 4 flip-flops were initially RESET with the first clock pulse, the first flip-flop stores 1 as the input data waveform and Q_0 shows 1. with this way, the register shifts 1 bit every clock and store one serial input data bit into first flip-flop. However, since the Q_3 waveform is not in proper way. Starting from the first clock pulse, it switched into SET stat, which remains in this state. Therefore, it can be concluded that the third D flip-flop is the most likely problem, that is, it is faulty.