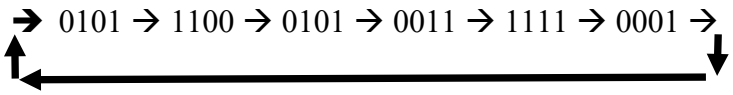
Problem 1
Using D flip flops, design a circuit to generate the following sequence.

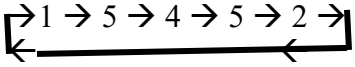


Your design should be race free.

Problem 2
Design a Mod 6 ring counter using D flip-flops. Is the design race free? Why?

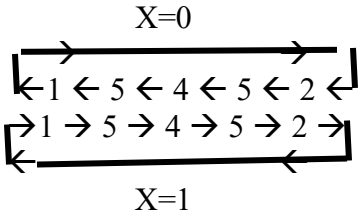
Problem 3
Design a Mod 8 Johnson counter using D flip-flops. Is the design race free? Why?

Problem 4
Using JK flip-flops, design a Mealy based state machine to generate the given sequence.



Problem 5
Repeat problem 4 for D flip-flops and Moore machine

Problem 6
Using T flip-flops, design a Moore based state machine to generate the given sequence.



Problem 7
Using D flip-flops and Multiplexers, design a 4-bit register with the following functionality

S1	S0	Function
0	0	Clear
0	1	load
1	0	Shift right
1	1	Shift left