## Assignment 1

## Problem 1 : Design Combinational Circuit

**1.** 
$$F(W, X, Y, Z) = \sum m(0, 2, 3, 8, 9, 10, 11, 12, 13, 14, 15)$$

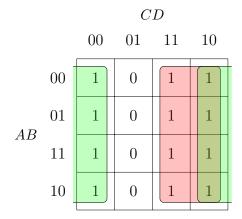
		YZ			
		00	01	11	10
WX	00	1	0	1	1
	01	0	0	0	0
	11	1	1	1	1
	10	1	1	1	1

$$\Rightarrow F = W + X'Z' + X'Y$$

**2.** 
$$F(W, X, Y, Z) = \sum m(3, 9, 11, 12, 13, 14, 15) + \sum d(1, 4, 6)$$

$$\Rightarrow F = WX + X'Z$$

3. F(A, B, C, D) = AC'D' + A'C + ABC + AB'C + A'C'D'

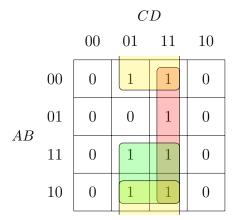


$$\Rightarrow F = C + D'$$

Truth table

A	B	C	D	F
0	0	0	0	1
0	0	0	1	0
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
0	1	0	1	0
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	0
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1

**4.** 
$$F(A, B, C, D) = A'B'C'D + CD + AC'D$$



$$\Rightarrow F = AD + B'D + CD$$

Truth table

	A	B	C	D	F
_	0	0	0	0	0
	0	0	0	1	1
	0	0	1	0	0
	0	0	1	1	1
	0	1	0	0	1 0
	0	1	0	1	0
	0	1	1	0	0
	0	1	1	1	1
	1	0	0	0	1 0
	1	0	0	1	1 0
	1	0	1	0	0
	1	0	1	1	1
	1	1	0	0	0
	1	1	0	1	1
	1	1	1	0	0
	1	1	1	1	1

## Promblem 2 : Design Sequential Circuit

Current State (S)	Next State (S')		Output (Z)
Current State (S)	X=0	X=1	Output (Z)
A	F	В	0
В	A	F	1
С	A	D	1
D	F	Е	0
Е	D	В	1
F	D	Е	0

For the given state table, design the circuit for FSM using JK Flip-Flop.