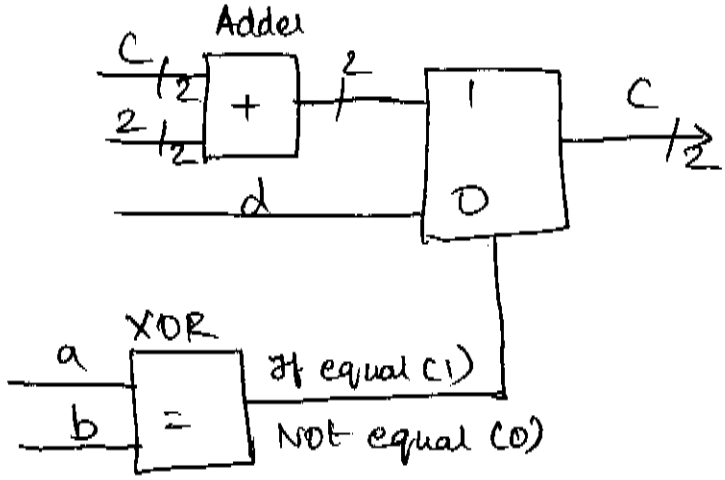
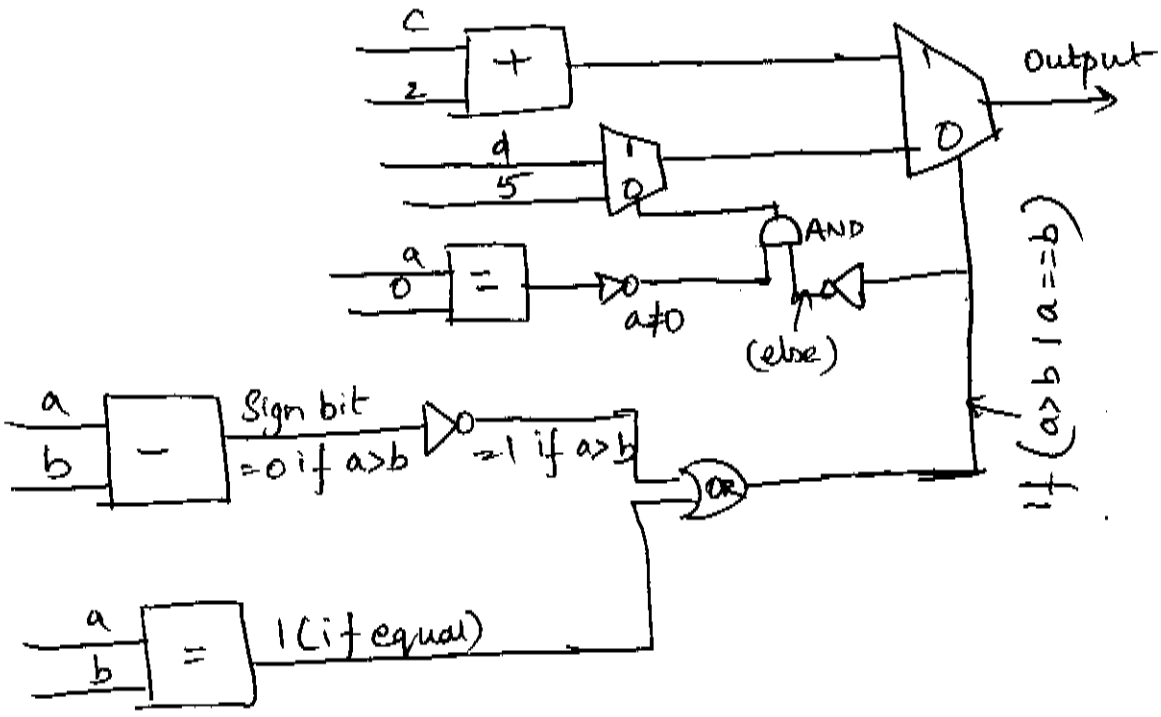
Homework 6

3 a)



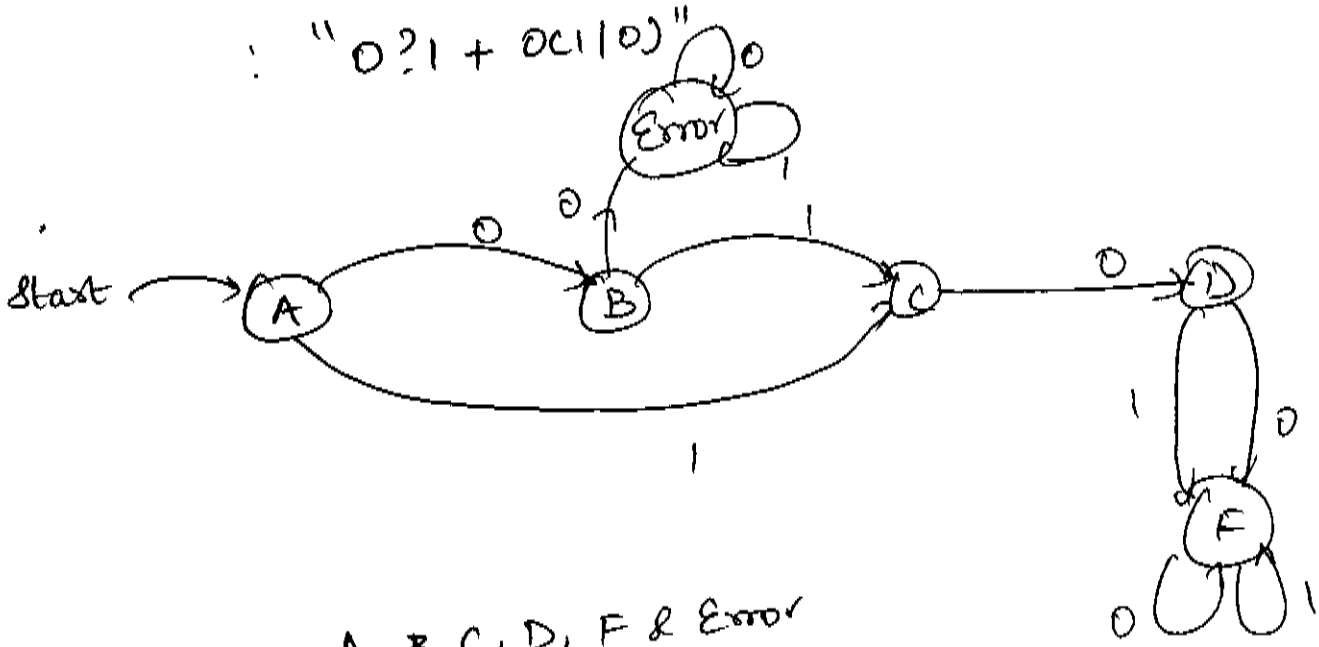
4)



5a) State Transition Diagram

Regular expressions :

"0?1 + 0(1|0)"



States are A, B, C, D, F & Error

Current State	Binary value	Inputs 0	Inputs 1	Accepted	Error
A	000	B	C		
B	001	E	C		
C	010	D	C		
D	011	F	F		1
E	100	E	E		
F	101	F	F	1	

There are 6 states, we need a minimum of 3 bits to represent the states

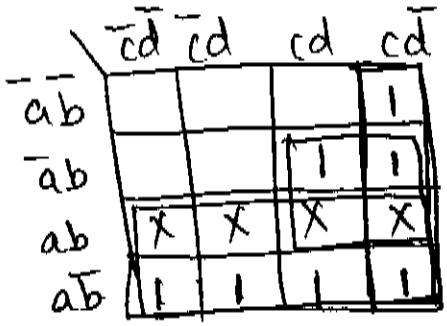
Let $q_2 = a$, $q_1 = b$, $q_0 = c$ & Input = d

State table

$q_{current}$: Input	q q_2	q_1	q_0	Input	q_{next}	q_{next} a_2 a	a_1 b	a_0 c	Output f	e
A : 0	0	0	0	0	B	0	0	1		
A : 1	0	0	0	1	C	0	1	0		
B : 0	0	0	1	0	E	1	0	0		
B : 1	0	0	1	1	C	0	1	0		
C : 0	0	1	0	0	D	0	1	1		
C : 1	0	1	0	1	C	0	1	0		
D : 0	0	1	1	0	F	1	0	1		
D : 1	0	1	1	1	E	1	0	1		1
E : 0	1	0	0	0	E	1	0	0		1
E : 1	1	0	0	1	E	1	0	0		
F : 0	1	0	1	0	F	1	0	1	1	
F : 1	1	0	1	1	F	1	0	1	1	
G : 0	1	1	0	0	X	x	x	x		
G : 1	1	1	0	1	X	x	x	x		
H : 0	1	1	1	0	X	x	x	x		
H : 1	1	1	1	1	X	x	x	x		

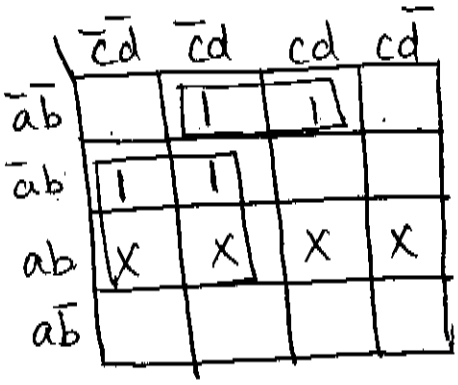
Don't care states

Q_2 K Map



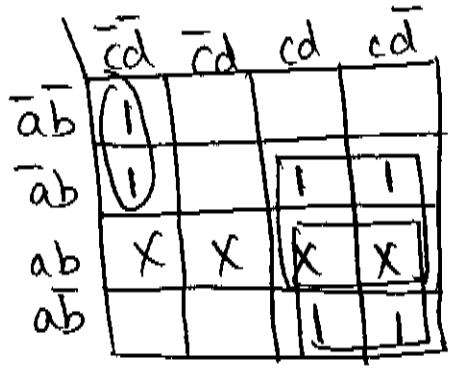
$Q_2 = a + bc + c\bar{d}$

Q_1 K Map



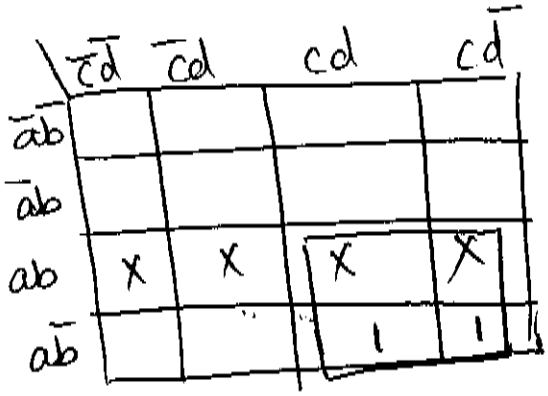
$Q_1 = b\bar{c} + \bar{a}\bar{b}d$

Q_2 K Map



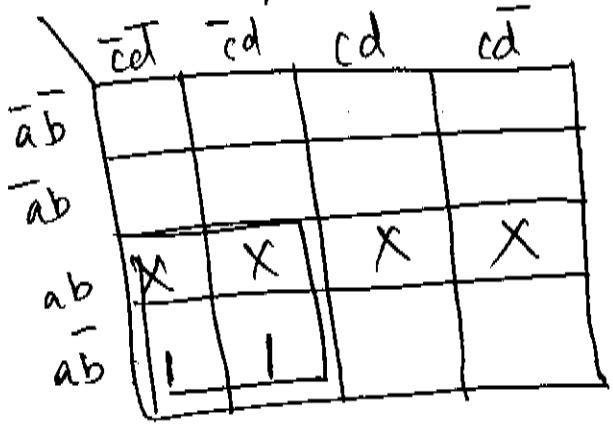
$Q_2 = \bar{a}\bar{c}\bar{d} + bc + ac$

f K Map (Accepted State)



$f = ac$

Error K-Map (Error Condition)



$Error = a\bar{c}$