

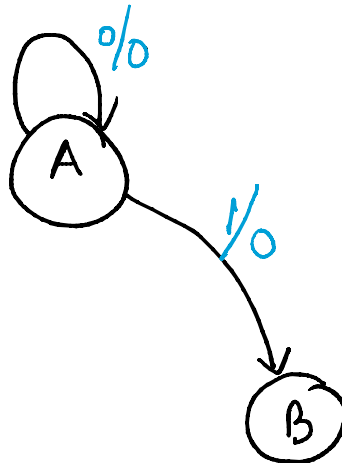
Sequence = 110 \rightarrow 3 bits \rightarrow 3 states

Every state we need to select i/p '0' and '1'

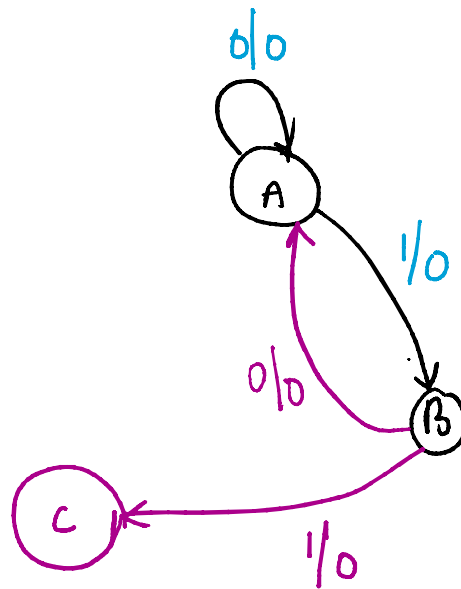
States \rightarrow A, B, C

110

Step 1



Step 2

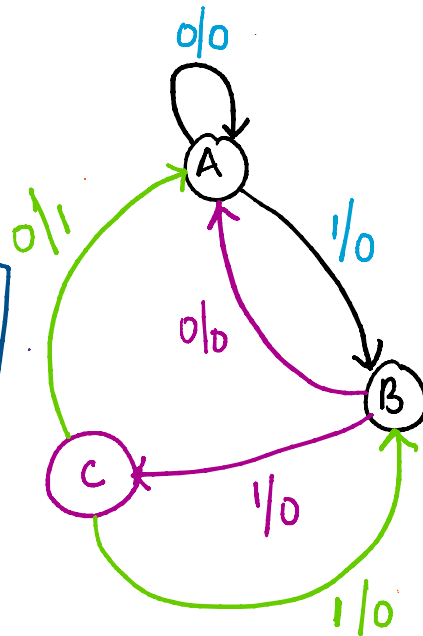


110

Step 3

State table

PS	NS		Y	
	x=0	x=1	x=0	x=1
A	A	B	0	0
B	A	C	0	0
C	A	B	1	0



State table

PS	x	NS	o/p
A	0	A	0
B	0	A	0
C	0	A	1
A	1	B	0
B	1	C	0
C	1	B	0

fig: Sequence detector for 110

State Assignment

$$A = 00$$

$$B = 01$$

$$C = 10$$

$N=3$ states

$$2^n \geq N$$

$$2^2 \geq 3$$

2 flip flops

A & B flip flops

Excitation table for sequence detector 110

Decim	Input	Present state	Next state					o/p Y
	X	A B	A _{n+1} B _{n+1}	J _A	K _A	J _B	K _B	
0	0	00 = A	00 = A	0	X	0	X	0
1	0	01 = B	00 = A	0	X	X	1	0
2	0	10 = C	00 = A	X	1	0	X	1
4	1	00 = A	01 = B	0	X	1	X	0
5	1	01 = B	10 = C	1	X	X	1	0
6	1	10 = C	01 = B	X	1	1	X	0

Excitation table for JK

PS A	NS A _{n+1}	J _A	K _A
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

K-map for output (Y)

Z	AB			
	00	01	11	10
0	0	0	X	1
1	0	0	X	0

→ $Y = \bar{X}A$

K-map simplification from excitation table

for J_A

Σ \ AB	00	01	11	10
0	0	0	X	X
1	0	1	X	X

$J_A = X B$

for K_A

Σ \ AB	00	01	11	10
0	X	X	X	X
1	1	X	X	1

$K_A = X$

for J_B

Σ \ AB	00	01	11	10
0	0	X	X	0
1	1	X	X	1

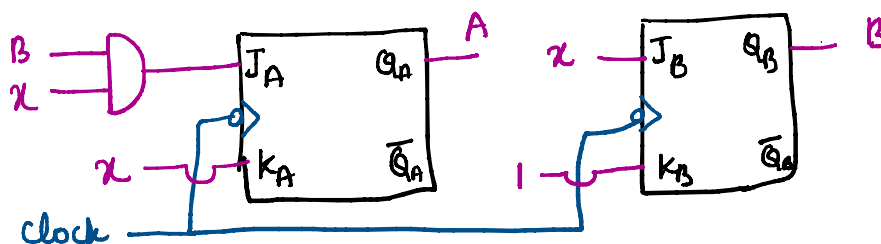
$J_B = X$

for K_B

Σ \ AB	00	01	11	10
0	X	1	1	X
1	X	1	X	X

$K_B = 1$

Logic diagram



$Q_A = A$
 $Q_B = B$

$\bar{X} = A \text{ (output)}$