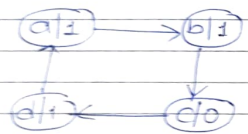
Design sequence generator for sequence 1101

Sequence generator for sequence 1101

State diagram



a = 00
b = 01
c = 10
d = 11

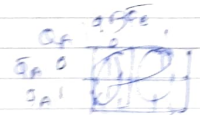
State table

Present state	Next state	
a	b	1
b	c	1
c	d	0
d	a	1

Excitation table

Q_n	Q_{n+1}	J	K
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

	Present state		Next state					
	Q_A	Q_B	Q_{A+1}	Q_{B+1}	J_A	K_A	J_B	K_B
a	0	0	0	1	0	X	1	X
b	0	1	1	0	1	X	X	1
c	1	0	1	1	X	0	1	X
d	1	1	0	0	X	1	X	1



$Y = \bar{Q}_A + \bar{Q}_B$

1101

K-Map J_A

Q_A \ Q_B	$\bar{Q}_B$	Q_B
$\bar{Q}_A$	0 (0)	1 (1)
Q_A	X (2)	X (3)

$J_A = Q_B$

K-Map for K_A

Q_A \ Q_B	$\bar{Q}_B$	Q_B
$\bar{Q}_A$	X (0)	X (1)
Q_A	0 (2)	1 (3)

$K_A = Q_B$

K-Map for J_B

Q_A \ Q_B	$\bar{Q}_B$	Q_B
$\bar{Q}_A$	1 (0)	X (1)
Q_A	1 (2)	X (3)

$J_B = 1$

K-Map for K_B

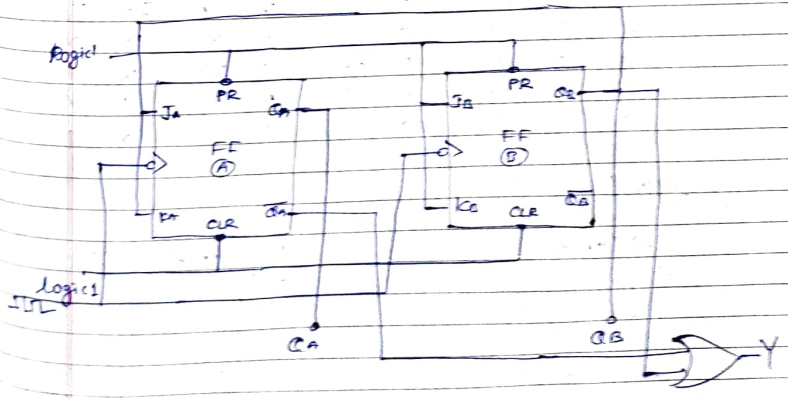
Q_A \ Q_B	$\bar{Q}_B$	Q_B
$\bar{Q}_A$	X (0)	1 (1)
Q_A	X (2)	1 (3)

$K_B = 1$

K-Map for Y

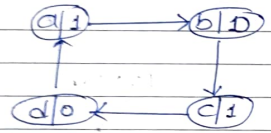
Q_A \ Q_B	$\bar{Q}_B$	Q_B
$\bar{Q}_A$	1 (0)	1 (1)
Q_A	0 (2)	1 (3)

$Y = \bar{Q}_A + Q_B$



Design sequence generator for sequence 1010

Step1 state diagram



a = 00
b = 01
c = 10
d = 11

Step2 state table

	Present	Next
1	a (00)	b (01)
0	b (01)	c (10)
1	c (10)	d (11)
0	d (11)	a (00)

Excitation table

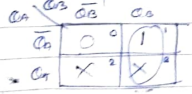
0 0	0 X
0 1	1 X
1 0	X 1
1 1	X 0

Step3 Excitation table

Y	Q_A	Q_B	Q_{AH}	Q_{BH}	J_A	K_A	J_B	K_B
1	0	0	0	1	0	X	1	X
0	0	1	1	0	1	X	X	1
1	1	0	1	1	X	0	1	X
0	1	1	0	0	X	1	X	1

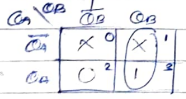
Step 4

K-Map for J_A



$J_A = \overline{Q_B}$

K-Map for K_A

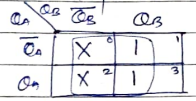


$K_A = Q_B$

K-Map for J_B

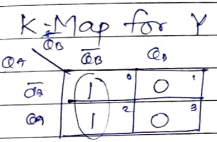
$J_B = 1$

K-Map for K_B

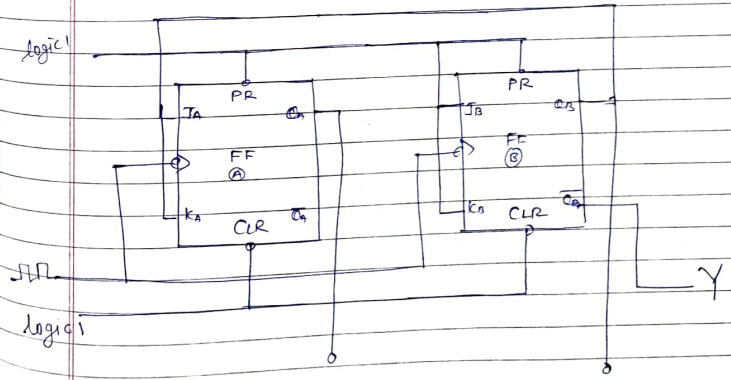


$K_B = 1$

K-Map for Y

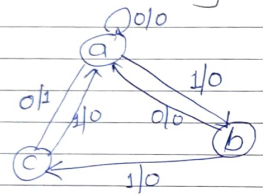


$Y = \overline{Q_B}$



Design a sequence detector for sequence 110 without overlap

Step1 state diagram



Step 2

a = 00 X = I/P = 0 or 1

b = 01 Y = O/P

C = 10

Step 3

Excitation Table

	X=0	X=1	Y
a(00)	a(00)	b(01)	0
b(01)	a(00)	C(10)	0
C(10)	a(00)	a(00)	1

Excitation JK FF			
Q_n	Q_{n+1}	J	K
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

		Present state		Next state					
Y	X	Q_A	Q_B	Q_{A+1}	Q_{B+1}	J_A	K_A	J_B	K_B
0	0	0	0	0	0	0	X	0	X
0	0	0	1	0	0	0	X	X	1
0	0	1	0	0	0	X	1	0	X
0	0	1	1	X	X	X	X	X	X
0	1	0	0	0	1	0	X	1	X
0	1	0	1	1	0	1	X	X	1
1	1	1	0	0	0	X	1	0	X
0	1	1	1	X	X	X	X	X	X

K-Map for J_A

	$\bar{Q}_A\bar{Q}_B$	$\bar{Q}_A Q_B$	$Q_A Q_B$	$Q_A\bar{Q}_B$
$\bar{X}$	0 (0)	0 (1)	X (3)	X (2)
X	0 (4)	1 (5)	X (7)	X (6)

$J_A = X\bar{Q}_B$

K-Map for K_A

	$\bar{Q}_A\bar{Q}_B$	$\bar{Q}_A Q_B$	$Q_A Q_B$	$Q_A\bar{Q}_B$
$\bar{X}$	X (0)	X (1)	X (3)	1 (2)
X	X (4)	X (5)	X (7)	1 (6)

$K_A = 1$

K-Map for J_B

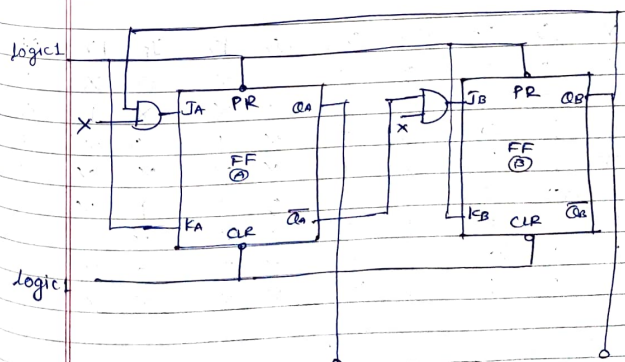
	$\bar{Q}_B$	Q_B	Q_B	$\bar{Q}_B$
$\bar{X}$	0 (0)	X (1)	X (3)	0 (2)
X	1 (4)	X (5)	X (7)	0 (6)

$J_B = X\bar{Q}_A$

K-Map for K_B

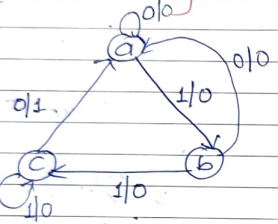
	$\bar{Q}_B$	Q_B	Q_B	$\bar{Q}_B$
$\bar{X}$	X (0)	1 (1)	X (3)	X (2)
X	X (4)	1 (5)	X (7)	X (6)

$K_B = 1$



Design a sequence detector for sequence 110 with overlap.

Step1 State diagram



Step2

a = 00
b = 01
c = 10

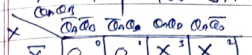
X: 0, 1 ; Y = O/P

	X=0	Y	X=1	Y
a(00)	a(00)	0	b(01)	0
b(01)	a(00)	0	c(10)	0
c(10)	a(00)	1	c(10)	0

Excitation			
Q_n	Q_{n+1}	J_n	K_n
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

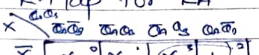
Y	X	Q_A	Q_B	Q_{A+1}	Q_{B+1}	J_A	K_A	J_B	K_B	Y
0	0	0	0	0	0	0	X	0	X	0
0	0	0	1	0	0	0	X	X	1	0
0	1	0	0	0	0	X	1	0	X	1
0	1	1	X	X	X	X	X	X	X	0
1	0	0	0	1	0	X	0	1	X	0
1	0	1	1	0	1	X	1	X	1	0
1	1	0	1	0	X	X	0	0	X	0
1	1	1	X	X	X	X	X	X	X	0

K-Map for J_A



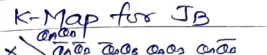
$J_A = X\overline{Q_B}$

K-Map for K_A



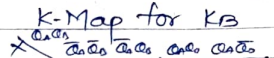
$K_A = \overline{X}Q_A$

K-Map for J_B



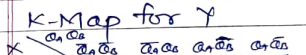
$J_B = X\overline{Q_A}$

K-Map for K_B

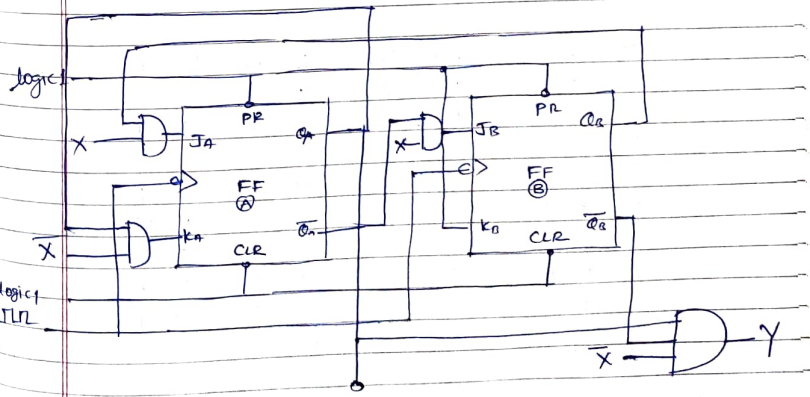


$K_B = 1$

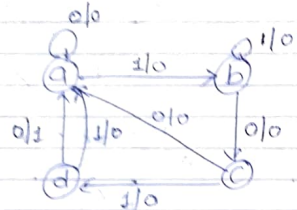
K-Map for Y



$Y = \overline{X}Q_A\overline{Q_B}$



Design a sequence detector ~~generator~~ for sequence 1010 with overlap



step2

a = 00
b = 01
c = 10
d = 11

X → Y

Y = O/P

	X=0	Y	X=1	Y
a(00)	a(00)	0	b(01)	0
b(01)	c(10)	0	b(01)	0
c(10)	a(00)	0	d(11)	0
d(11)	a(00)	1	a(00)	0

Excitation Table

0 0	0 X
0 1	1 X
1 0	X 1
1 1	X 0

X	Q_A	Q_B	Q_{A+1}	Q_{B+1}	J_A	K_A	J_B	K_B	Y
0	0	0	0	0	0	X	0	X	0
0	0	1	1	0	1	X	X	1	0
0	1	0	0	0	X	1	0	X	0
0	1	1	0	0	X	1	X	1	1
1	0	0	0	1	0	X	1	X	0
1	0	1	0	1	0	X	X	0	0
1	1	0	1	1	X	0	1	X	0
1	1	1	0	0	X	1	X	1	0

Step3

K-Map for J_A

X \ $Q_A Q_B$	00	01	11	10
$\bar{X}$	0	1	X	X
X	0	0	X	X

$J_A = \bar{X} Q_B$

K-Map for K_A

X \ $Q_A Q_B$	00	01	11	10
$\bar{X}$	X	X	1	1
X	X	X	1	0

$K_A = \bar{X} + Q_B$

K-Map for J_B

X \ $Q_A Q_B$	00	01	11	10
$\bar{X}$	0	X	X	0
X	1	X	X	1

$J_B = X$

K-Map for K_B

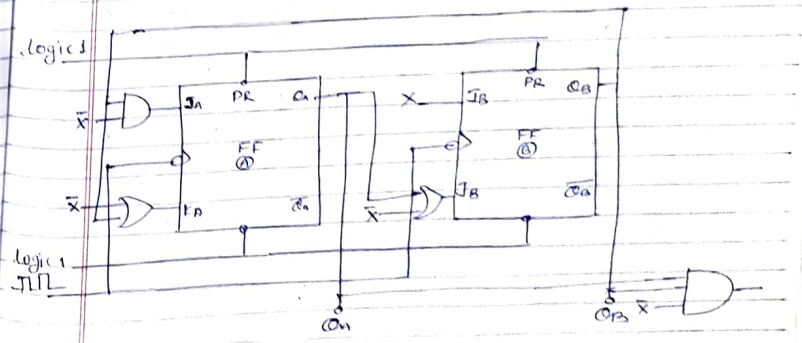
X \ $Q_A Q_B$	00	01	11	10
$\bar{X}$	X	1	1	X
X	X	0	1	X

$K_B = \bar{X} + Q_A$

K-Map for Y

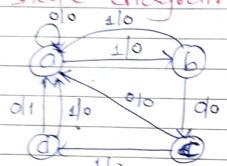
X \ $Q_A Q_B$	00	01	11	10
$\bar{X}$	0	0	1	0
X	0	0	0	0

$Y = \bar{X} Q_A Q_B$



Design a sequence detector for sequence 1010 without overlap.

Step 1 state diagram



a = 00
b = 01
c = 10
d = 11

Step 2

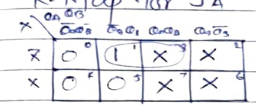
	X=0	Y	X=1	Y
a (00)	a (00)	0	b (01)	0
b (01)	c (10)	0	a (00)	0
c (10)	a (00)	0	d (11)	0
d (11)	a (00)	1	a (00)	0

Excitation			
Q_A	Q_{AN}	J_A	K_A
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

X	Q_A	Q_B	Q_{AN}	Q_{BN}	J_A	K_A	J_B	K_B	Y
0	0	0	0	0	0	X	0	X	0
0	0	1	1	0	1	X	X	1	0
0	1	0	0	0	X	1	0	X	0
0	1	1	0	0	X	1	X	1	1
1	0	0	0	1	0	X	1	X	0
1	0	1	0	0	0	X	X	1	0
1	1	0	1	1	X	0	1	X	0
1	1	1	0	0	X	1	X	1	0

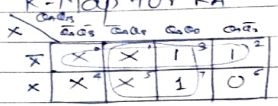
Step 3

K-Map for J_A



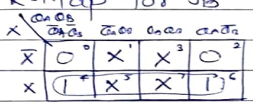
$J_A = \bar{X} Q_B$

K-Map for K_A



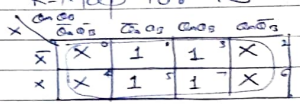
$K_A = \bar{X} + Q_B$

K-Map for J_B



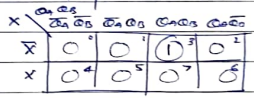
$J_B = X$

K-Map for K_B



$K_B = 1$

K-Map for Y



$Y = \bar{X} Q_A Q_B$