

Synthesis using JK Flip-Flop

Q. Design a circuit that detects three or more consecutive zeros

EXCITATION TABLE

$Q(t)$	$Q(t+1)$	J	K
0	0	0	X
0	1	1	X
1	0	X	1
1	1	X	0

STATE TABLE

present state		input x
A	B	
0	0	0
0	0	0
0	1	0
0	1	0
1	0	0
1	0	0
1	1	0
1	1	0
1	1	1
1	1	1

Next state

A(t+1)	B(t+1)
0	1
0	1
0	1
0	1
1	0
1	0
1	0
1	0
1	1
1	1

Input to FFs

J_A	K_A	J_B	K_B
0	X	1	X
0	X	0	X
1	X	X	1
0	X	X	1
X	0	1	X
X	0	0	X
X	1	0	X
X	0	X	0
X	1	X	1

J_A

A \ B \bar{A}	00	01	11	10
0	0	0	0	1
1	X	X	X	X

$$J_A = B\bar{A}$$

K_A

A \ B \bar{A}	00	01	11	10
0	X	X	X	X
1	0	1	1	0

$$K_A = X$$

J_B

$A \backslash B$	00	01	11	10
0	1	0	x	x
1	1	0	x	x

$$J_B = \bar{x}$$

$A \backslash B$	00	01	11	10
0	x	x	1	1
1	x	x	1	0

$$K_B = \bar{A} + x$$

$$J_A = B\bar{x}$$

$$K_A = x$$

$$J_B = \bar{x}$$

$$K_B = \bar{A} + x$$

