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### Given: Problem Specification

Draw logic diagram.

## Sequence Recognizer

sequence recognizer - remembers previous  
looks for a special bit pattern in  
input (X):

some input bits, "1101" here.  
- Just one bit coming every one cycle.  
desired pattern

is found

found.  
e.g. if we get sequence 00000|00|000|000|

e.g. if we get sequence  
 $X = 00000100110001000111010110$

~~140~~ 1101

第5个

14 1

State diagram:

State diagram: transitions.

Define States & Diagrams:

A: Initial state None of bits "1101"  
No 1 found yet

B: we got "1" at end. - ١

C: we got "11" at end.

D: we got "110" at end.



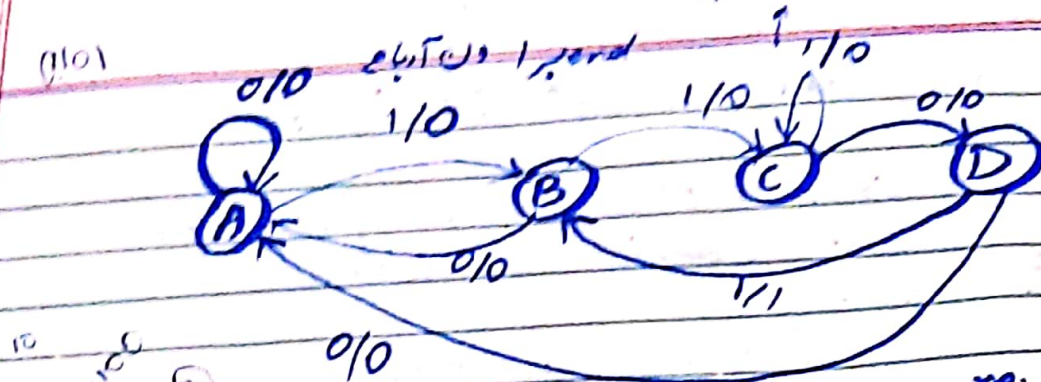
# JK - Flipflop

$Q_0(t)$   $Q_1(t)$   $X$   $Q_0(t+1)$   $Q_1(t+1)$   $Z$

$A = 1101$

2 flip 2 end

A = 00  
B = 01  
C = 10  
D = 11



Total states  $4 = 2^2$  no. of flipflop

Replace A by 00  
B " 01  
C " 10  
D " 11

$Q_0(t)$	$Q_1(t)$	$X$	$Q_0(t+1)$	$Q_1(t+1)$	$Z$
0	0	0	0	0	0
0	0	1	0	1	0
0	1	0	0	0	0
0	1	1	1	0	0
1	0	0	1	1	0
1	0	1	1	0	0
1	1	0	0	0	0
1	1	1	0	1	1

State table drawn by state diagram.

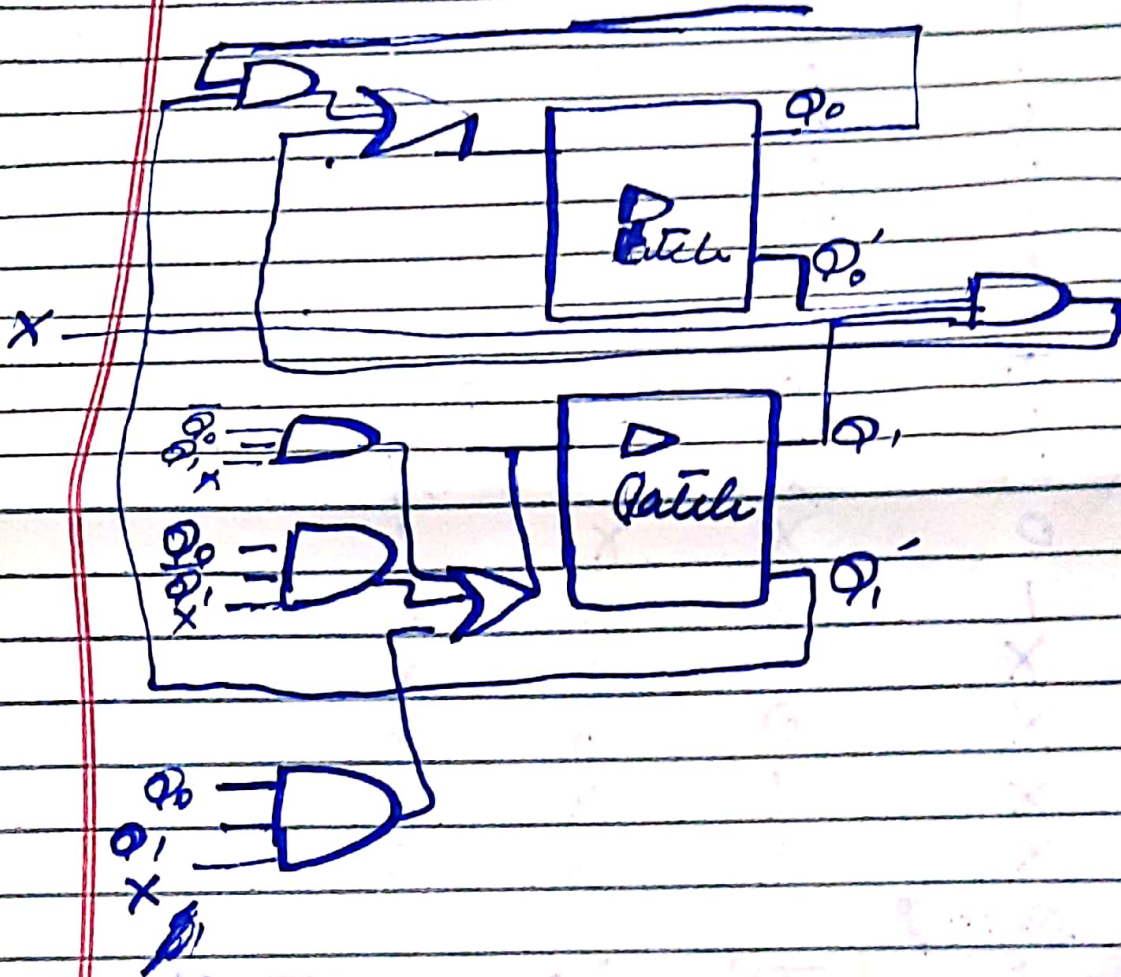
$Q_0(t+1) = Q_0(t) \cdot Q_1(t) + \dots$

$Q_0(t) \quad Q_1(t) \quad X$



$$Q_0(t+1) = \overline{Q_0(t)} \overline{Q_1(t)} X + Q_0(t) Q_1(t) \overline{X}$$

$$+ Q_0(t) \overline{Q_1(t)} X$$





# JK - Flipflop

$Q_0(t)$	$Q_1(t)$	$X$	$Q_0(t+1)$	$Q_1(t+1)$	$Z$
0	0	0	0	0	0
0	0	1	0	1	0
0	1	0	0	0	0
0	1	1	1	0	0
1	0	0	1	1	0
1	0	1	0	0	0
1	1	0	0	0	0
1	1	1	0	1	1

$J_0$	$K_0$	$J_1$	$K_1$
0	X	0	X
0	X	1	X
0	X	X	1
1	X	X	1
X	0	1	X
X	0	0	X
X	1	X	1
X	1	X	0

$J_0 = Q_0$

$Q_0(t+1)$				
			1	
X	X	X	X	

$K_0 = \bar{Q}_1$

	X	X	X	X

$J_1 = Q_1(t) X$

$K_1 = Q_0$

$J_1$

		1	X	X
			X	X

$K_1$

X	X		1	1
X	X			

$J_1 = Q_0 \bar{X} + Q_0 X$

$K_1 = \bar{X} + Q_0$