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Section:- 2D.  
Assignment 06.

# ① State Diagram

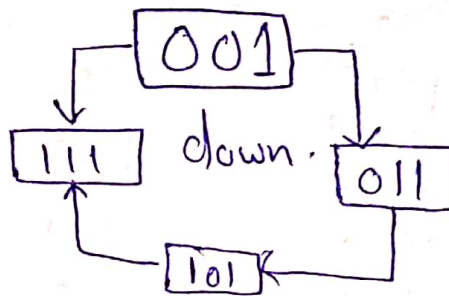
First 4 odd numbers 1, 3, 5, 7.

1-001

3-011

5-101

7-111



y:	O <sub>2</sub>	O <sub>1</sub>	O <sub>0</sub>	O <sub>2</sub>	O <sub>1</sub>	O <sub>0</sub>
0	0	0	0	1	1	1
0	0	0	1			
0	0	1	0			
0	0	1	1	0	0	1
0	1	0	0			
0	1	0	1	0	1	1
0	1	1	0			
0	1	1	1	1	0	1

y=1 up state

1	0	0	0	0	1	1
1	0	0	1			
1	0	1	0			
1	0	1	1	1	0	1

$y$	$O_2$	$O_1$	$O_0$	$O_2$	$O_1$	$O_0$
1	1	0	0	1	1	1
1	1	0	1			
1	1	1	0			
1	1	1	1	0	0	1

## Transition Table.

$J_2 K_2$	$J_1 K_1$	$J_0 K_0$
1 x	1 x	x 0
0 x	x 1	x 0
x 1	1 x	x 0
x 0	1 x	x 0

For  $y = 1$  (up)

0 x	1 x	x 0
1 x	x 1	x 0
x 0	1 x	x 0
x 1	x 1	x 0

K-Map.

$Q_1$	$Q_2 Q_3$	00	01	11	10
00			1	0	
01			X	X	
11			X	X	
10			0	1	

$$J_2 = \bar{y} \bar{Q}_1 Q_0 + y Q_1 Q_0$$

$Q_2 Q_0$	$Q_1$	00	01	11	10
00			X	X	
01			1	0	
11			0	1	
10			X	X	

$$K_2 = \bar{Q}_1 Q_0 \bar{y} + Q_1 Q_0 y$$

$Q_1$	$Q_2 Q_3$	00	01	11	10
00			1	X	
01			1	1	
11			1	X	
10			1	X	

$$J_1 = Q_0$$

For  $K_1$

$Q_1 Q_0$	00	01	11	10
00		X	1	
01		X	X	
11		X	1	
10		X	1	

$$K_1 = 0$$

For  $J_0$

$Q_1 Q_0$	00	01	11	10
00		X	X	
01		X	X	
11		X	X	
10		X	X	

$$J_0 = 0$$

For  $K_0$

$Q_1 Q_0$	00	01	11	10
00		0	0	
01		0	0	
11		0	0	
10		0	0	

$$K_0 = 0$$



# Logical Expression.

$$\textcircled{i} \quad J_2 = \bar{y}\bar{Q}_1Q_0 + yQ_1Q_0 = Q_0(y \oplus Q_1)$$

$$\textcircled{ii} \quad J_1 = Q_0$$

$$\textcircled{iii} \quad J_0 = 0$$

$$K_0 = 0$$

$$K_1 = Q_0$$

$$K_2 = \bar{Q}_1Q_0y + Q_1Q_0y = Q_0(y \oplus Q_1)$$

## Circuit Diagram.

