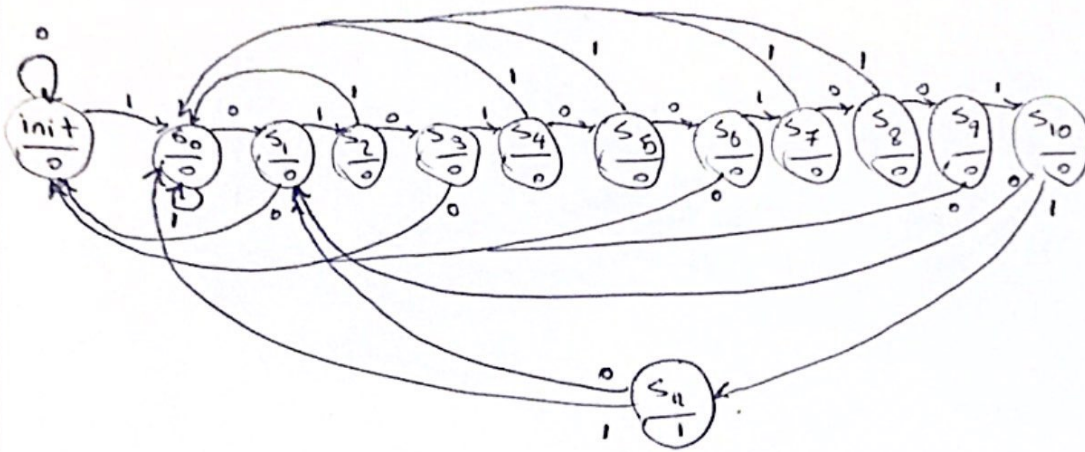


101010010011  
01234567891011



	$Q_3 Q_2 Q_1 Q_0$	$X=0$	$X=1$	$Z$
init	0000	0000	0001	0
s <sub>0</sub>	0001	0010	0001	0
s <sub>1</sub>	0010	0000	0011	0
s <sub>2</sub>	0011	0100	0001	0
s <sub>3</sub>	0100	0000	0101	0
s <sub>4</sub>	0101	0110	0001	0
s <sub>5</sub>	0110	0111	0001	0
s <sub>6</sub>	0111	0000	1000	0
s <sub>7</sub>	1000	1001	0001	0
s <sub>8</sub>	1001	1010	0001	0
s <sub>9</sub>	1010	0000	1011	0
s <sub>10</sub>	1011	0000	1100	0
s <sub>11</sub>	1100	0010	0001	1

32

10	00	01	11	10
00	0	0	0	1
01	0	0	X	1
11	0	0	X	0
10	0	0	X	0

$X=0$

32

10	00	01	11	10
00				
01			X	
11	1	X	1	
10			X	1

$X=1$

$D_{3+}$  K map

$$D_{3+} = X Q_3 Q_1 + X Q_2 Q_1 Q_0 + \bar{X} Q_3 \bar{Q}_2 \bar{Q}_1$$

32

10	00	01	11	10
00				
01		1	X	
11	1		X	
10		1	X	

$X=0$

32

10	00	01	11	10
00		1		
01			X	
11			X	1
10			X	

$X=1$

$D_{2+}$  K map

$$D_{2+} = X Q_3 Q_1 Q_0 + \bar{X} Q_2 \bar{Q}_1 Q_0 + \bar{X} Q_2 Q_1 \bar{Q}_0 + \bar{X} Q_3 \bar{Q}_2 Q_1 Q_0$$

32

10	00	01	11	10
00			1	
01	1	1	X	1
11			X	
10		1	X	

$X=0$

32

10	00	01	11	10
00				
01			X	
11			X	
10	1		X	1

$X=1$

$D_{1+}$  K map

$$D_{1+} = X Q_3 Q_1 \bar{Q}_0 + X \bar{Q}_3 \bar{Q}_2 Q_1 Q_0 + \bar{X} Q_1 Q_0 + \bar{X} Q_2 Q_1 \bar{Q}_0$$

32

10	00	01	11	10
00				1
01			X	
11			X	
10		1	X	

$X=0$

32

10	00	01	11	10
00	1	1	1	1
01	1	1	X	1
11	1		X	
10	1	1	X	1

$X=1$

$D_{0+}$  K map

$$D_{0+} = X \bar{Q}_1 + X Q_1 \bar{Q}_0 + X \bar{Q}_3 \bar{Q}_2 + Q_3 \bar{Q}_2 \bar{Q}_1 \bar{Q}_0 + \bar{Q}_3 Q_2 Q_1 \bar{Q}_0$$

32

10	00	01	11	10
00			1	
01			x	
11			x	
10			x	

$$Z = Q_3 Q_2$$