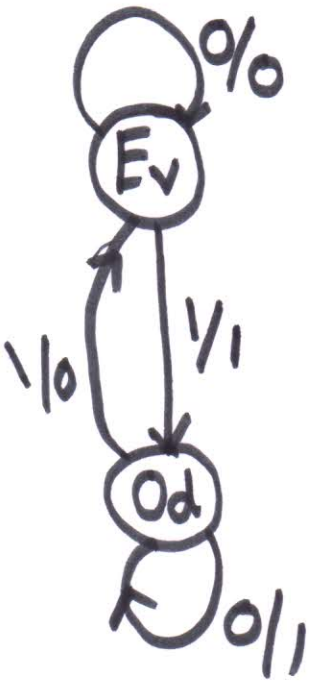
Odd-Even Parity Checker:

1. Using Mealy Machine



State Diagram

Ev : Even state

Od : Odd state

z = 0 if Sequence is even

= 1 if Sequence is odd.

State Transition table

Present States	input x=0	input x=1	Next States x=0	Next States x=1	output x=0	output x=1
Ev	Ev		Ev	Od	0	1
Od			Od	Ev	1	0

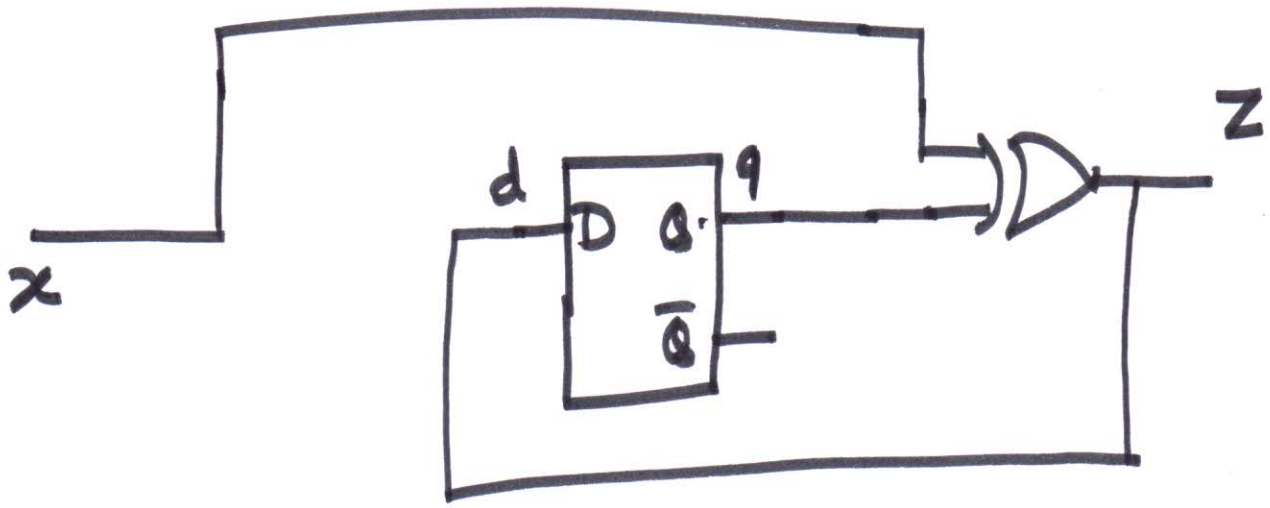
Ev → '0'

Od → '1'

Present State q	I/p x	Next States $q+$	I/p to FF d	O/p z
0	0	0	0	0
0	1	1	1	1
1	0	1	1	1
1	1	0	0	0

$$d = q \oplus x$$

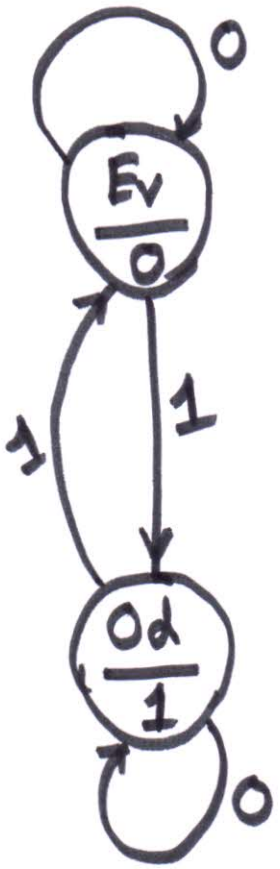
$$z = q \oplus x = d$$



x: 0 1 0 1 1 0 0 0 0 1 0 0 1

z: 0 1 1 0 1 1 1 1 0 0

2. Using Moore Machine



Ev : Even state

Od : Odd state

State Transition Table

Present States	Next States x=0	Next States x=1	output
Ev	Ev	Od	0
Od	Od	Ev	1

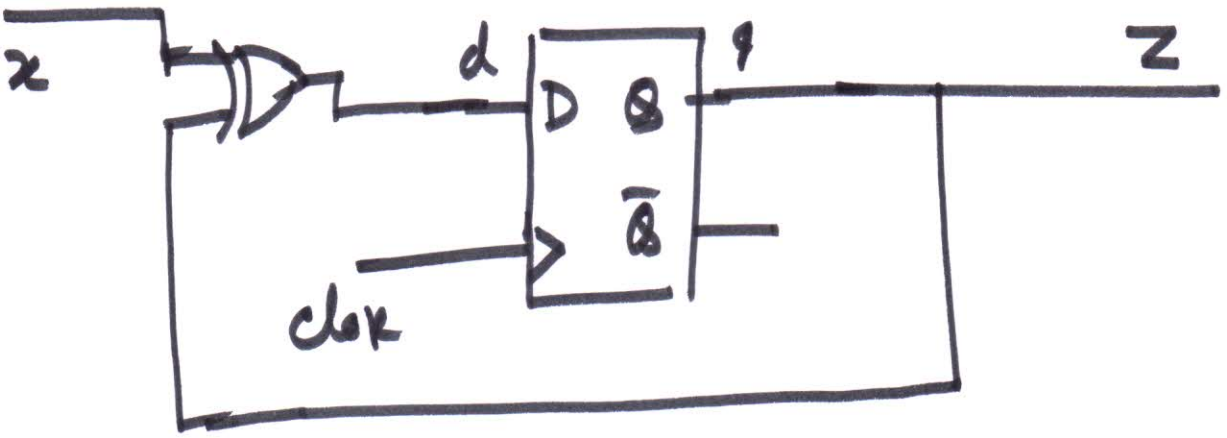
Ev → '0'

Od → '1'

Present State (q)	Input (x)	Next state (q+)	I/p to FF (d)	output (z)
0	0	0	0	0
0	1	1	1	0
1	0	1	1	1
1	1	0	0	1

$$d = q \oplus x$$

$$z = q$$

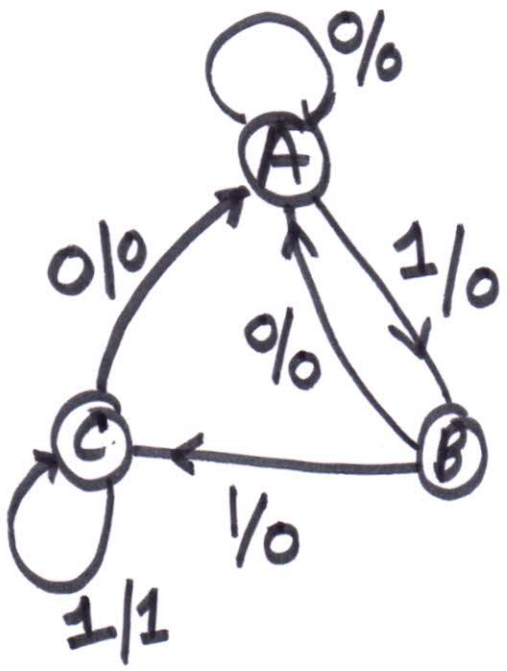


x : 0 | 0 0 | 1 | 1 | 0 | 1 | 0 0

z : 0 0 | 1 | 1 | 0 | 1 | 0

More examples of Mealy and Moore machines

1. A Mealy system with one input x and one output z such that z=1 iff x has been 1 for three consecutive clock times.



A: no 1's

B: One 1

C: Two or more 1's

State Transition table

Present States	Next States x=0	Next States x=1	Output (z) x=0	Output (z) x=1
A	A	B	0	0
B	A	C	0	0
C	A	C	0	1

q_1 q_0

A: 0 0

B: 0 1

C: 1 1

II

Present States		I/p	Next States		I/p to FF		Output
q_1	q_0	(x)	q_1^+	q_0^+	d_1	d_0	(z)
0	0	0	0	0	0	0	0
0	0	1	0	1	0	1	0
0	1	0	0	0	0	0	0
0	1	1	1	1	1	1	0
1	0	0	x	x	x	x	0
1	0	1	x	x	x	x	0
1	1	0	0	0	0	0	0
1	1	1	1	1	1	1	1

d_1

q_1q_0 \ x	0	1
00		
01		1
11		1
10	x	x

d_0

q_1q_0 \ x	0	1
00		1
01		1
11		1
10	x	x

$d_1 = q_0x$ $\qquad$ $d_0 = x$

$z = q_1q_0x$

x: 0 1 0 1 1 1 1 0 1 1 0 1 1 1 0

z: 0 0 0 0 0 1 1 0 0 0 0 0 0 1 0