Moore :— Six tuple $(Q, \Sigma, \Delta, \delta, \lambda, q_0)$

(i) Q → Finite ~~set of state~~
(ii) Σ → ——— input alphabet
(iii) Δ → output alphabet
(iv) δ → transition function $\Sigma \times Q$ into Q;
(v) λ → output function mapping Q into Δ
(vi) q_0 → initial state.

———

Mealy :—

only diff in.

$$\lambda = Q \times \Sigma \rightarrow \Delta$$

Moore :→

Σ	state 0	state 1	output
→ q_0	q_3	q_1	0
q_1	q_1	q_2	1
q_2	q_2	q_3	0
q_3	q_3	q_0	0

Input string : 0 1 1 1

$q_0 \xrightarrow{0} q_3 \xrightarrow{1} q_0 \xrightarrow{1} q_1 \xrightarrow{1} q_2 \xrightarrow{1} q_0$

output : 0 0 0 1 0

Sol

Mealy :→

Σ	$q = 0$ state	$q = 0$ output	$q = 1$ state	$q = 1$ output
→ q_1	q_3	0	q_2	0
q_2	q_1	1	q_4	0
q_3	q_2	1	q_1	1
q_4	q_4	1	q_3	0

Input string : 0 0 1 1

$q_1 \xrightarrow{0} q_3 \xrightarrow{0} q_2 \xrightarrow{1} q_4 \xrightarrow{1} q_3 \xrightarrow{1}$

output : 0 1 0 0

Procedure for Transforming a Mealy into Moore :

Que :- Mealy

State	input $a=0$		input $a=1$	
	State	output	State	output
$\rightarrow q_1$	q_3	0	q_2	0
q_2	q_1	1	q_4	0
q_3	q_2	1	q_1	1
q_4	q_4	1	q_3	0

Sol :-

$q_1 \rightarrow 1$

$q_{20} \rightarrow 1$

$q_{21} \rightarrow 0$

$q_3 \rightarrow 0$

$q_{40} \rightarrow 1$

$q_{41} \rightarrow 0$

then.

Σ	$a=0$		$a=1$	
$\rightarrow q_1$	q_3	0	q_{21}	0
q_{20}	q_1	1	q_{41}	0
q_{21}	q_1	1	q_{41}	0
q_3	q_{20}	1	q_1	1
q_{40}	q_{40}	1	q_3	0
q_{41}	q_{40}	1	q_3	0

Then

Σ	input $a=0$	$a=1$	output
q_1	q_3	q_{21}	1
q_{20}	q_1	q_{41}	1
q_{21}	q_1	q_{41}	0
q_3	q_{20}	q_1	0
q_{40}	q_{40}	q_3	1
q_{41}	q_{40}	q_3	0

Then

Σ	next state $a=0$	$a=1$	output
→ q_0	q_3	q_{21}	0
q_1	q_3	q_{21}	1
q_{20}	q_1	q_{41}	1
q_{21}	q_{40}	q_{41}	0
q_3	q_{20}	q_1	0
q_{40}	q_{40}	q_3	1
q_{41}	q_{40}	q_3	0

Conversion of Moore into Mealy :-

Q:- Moore

state / Σ	q=0	q=1	output
→ q_0	q_3	q_1	0
q_1	q_1	q_2	1
q_2	q_2	q_3	0
q_3	q_3	q_0	0

Sol:-

$q_0 \rightarrow 0$
$q_1 \rightarrow 1$
$q_2 \rightarrow 0$
$q_3 \rightarrow 0$

then

Mealy

State / Σ	State output q=0		State output q=1	
→ q_0	q_3	0	q_1	1
q_1	q_1	1	q_2	0
q_2	q_2	0	q_3	0
q_3	q_3	0	q_0	0

Note:- We can reduce the number of states in any model if states are identical, for eg:-

Ques:- Moore

State	next state		output
	$a=0$	$a=1$	
→ q_1	q_1	q_2	0
q_2	q_1	q_3	0
q_3	q_1	q_3	1

Sol:-

$q_1 \rightarrow 0$

$q_2 \rightarrow 0$

$q_3 \rightarrow 1$

Mealy

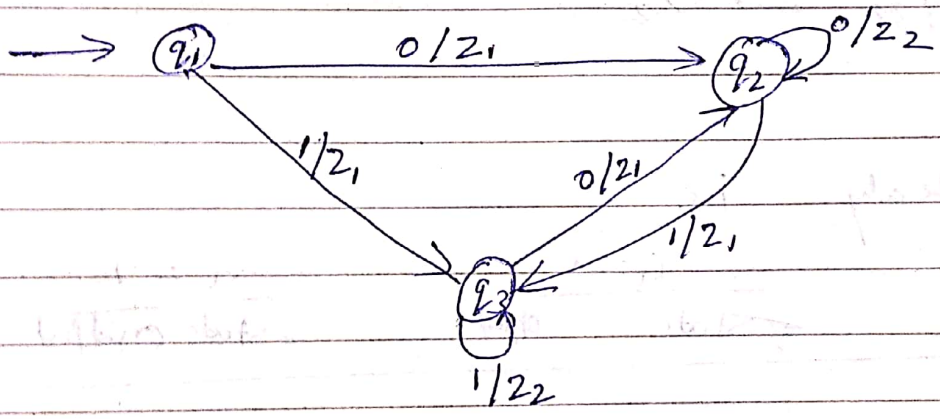
State	next state			
	$a=0$		$a=1$	
	state	o/p	state	o/p
→ q_1	q_1	0	q_2	0
q_2	q_1	0	q_3	1
q_3	q_1	0	q_3	1

We have delete q_3 state and replace q_3 by q_2

Mealy

State	$a=0$ State	output	$a=1$ State	output
$\rightarrow q_1$	q_1	0	q_2	0
q_2	q_1	0	q_2	1

Que :- Consider a mealy machine as shown in fig. , Constract a moore machine



Sol!- By Transition of diagram the Transition table is

Present state	$a=0$ State	output	$a=1$ State	output
$\rightarrow q_1$	q_2	z_1	q_3	z_1
q_2	q_2	z_2	q_3	z_1
q_3	q_2	z_1	q_3	z_2

By above Transition table of mealy. the Transition table of moore is.

$q_2 \rightarrow z_1, z_2$

$q_3 \rightarrow z_1, z_2$

$q_1 \rightarrow \wedge$

$q_{21} \rightarrow z_1$

$q_{22} \rightarrow z_2$

$q_{31} \rightarrow z_1$

$q_{32} \rightarrow z_2$

then.

Mealy is.

present state	q=0		q=1	
	state	output	state	output
$\rightarrow q_1$	q_{21}	z_1	q_{31}	z_1
q_{21}	q_{22}	z_2	q_{31}	z_1
q_{22}	q_{22}	z_2	q_{31}	z_1
q_{31}	q_{21}	z_1	q_{32}	z_2
q_{32}	q_{21}	z_1	q_{32}	z_2

Then moore is

Moore is.

present state	q=0 next state	q=1 next state	output
→ q_1	q_{21}	q_{31}	∧
q_{21}	q_{22}	q_{31}	z_1
q_{22}	q_{22}	q_{31}	z_2
q_{31}	q_{21}	q_{32}	z_1
q_{32}	q_{21}	q_{32}	z_2

The By above transition table the diagram is.