- For output, look into the next state and output column of the newly constructed Mealy machine. For a state as a next state ($let q_i$) in the new constructed Mealy Machine if output is 0 then for the state (q_i) as a present state in the constructing Moore Machine; the output will be 0.

- For the Moore machine, the output depends only on the present state. This means that from the beginning state for $\wedge$ input, we can get an output. If the output is 1, the newly constructed Moore machine can accept zero length string, which was not accepted by the given Mealy machine. To make the Moore machine not to accept $\wedge$ string, we have to add an extra state q_b (new beginning state), whose state transactions will be identical with those of the existing beginning state, but with output as 0.

  (For a Mealy machine with m number of states and n number of outputs, the Moore machine will be of n number of outputs but not more than $mn + 1$ number of states. The following examples (Example 3.18 to 3.20) describe the previous method.

  Example 3.18 Convert the given Mealy machine to an equivalent Moore machine.

	I/P = 0		I/P = 1	
Present State	Next State	O/P	Next State	O/P
$\rightarrow q_0$	q_0	1	q_1	0
q_1	q_3	1	q_3	1
q_2	q_1	1	q_2	1
q_3	q_2	0	q_0	1

Solution: Look into the next state and output columns of the given Mealy machine. For I/P 0 for q_1 as a next state, the output is 1. For I/P 1 for q_1 as a next state, the output is 0. The same thing happens for q_2 as a next state for input 0 and input 1. So the state q_1 is broken as q_10 and q_11, and the state q_2 is broken as q_20 and q_21 . After breaking, the modified Mealy machine becomes

	I/P = 0		I/P = 1	
Present State	Next State	O/P	Next State	O/P
$\rightarrow q_0$	q_0	1	q_{10}	0
q_{10}	q_3	1	q_3	1
q_{11}	q_3	1	q_3	1
q_{20}	q_{11}	1	q_{21}	1
q_{21}	q_{11}	1	q_{21}	1
q_3	q_{20}	0	q_0	1

For the present state q_0 for input 1, the next state is q_10, because there is no q_1 in the modified Mealy machine. It has been broken into q_10 and q_11 depending on the output 0 and 1, respectively. For the present state q_0 for input 1, the output is 0. So the next state is q_10. The same cases occur for the others also. For the broken states, the next states and outputs are the same as the original, from where the broken states have come.

From this, the Moore machine becomes

Present State	Next State I/P = 0	Next State I/P = 1	O/P
$\rightarrow q_0$	q_0	q_{10}	1
q_{10}	q_3	q_3	0
q_{11}	q_3	q_3	1
q_{20}	q_{11}	q_{21}	0
q_{21}	q_{11}	q_{21}	1
q_3	q_{20}	q_0	1

For Moore machine the beginning state is q_0 and the corresponding output is 1. That means, with null length input (no input), we are getting an output of 1. That is, the Moore machine accepts 0 length sequence [because here output depends only on the present state] which is not acceptable for the Mealy machine. To overcome this situation, we must add a new beginning state q_b with the same transactions as q_0, but with output as 0. By including the new state, the Moore machine is

Present State	Next State I/P = 0	Next State I/P = 1	O/P
$\rightarrow q_b$	q_0	q_{10}	0
q_0	q_0	q_{10}	1
q_{10}	q_3	q_3	0
q_{11}	q_3	q_3	1
q_{20}	q_{11}	q_{21}	0
q_{21}	q_{11}	q_{21}	1
q_3	q_{20}	q_0	1

Example 3.19 Convert the given Mealy machine to an equivalent Moore machine.

Present State	I/P = 0 Next State	I/P = 0 O/P	I/P = 1 Next State	I/P = 1 O/P
$\rightarrow q_0$	q_2	z_0	q_1	z_1
q_1	q_0	z_0	q_2	z_0
q_2	q_0	z_1	q_2	z_1

Solution: For q_0 for input 0, the output differs. For q_2 for inputs 0 and 1, the output differs. So the states are broken as $q_0 0$, $q_0 1$ and $q_2 0$, $q_2 1$. According to the new states, the modifi ed Mealy machine becomes

Present State	I/P = 0 Next State	I/P = 0 O/P	I/P = 1 Next State	I/P = 1 O/P
$\rightarrow q_{00}$	q_{20}	z_0	q_1	z_1
q_{01}	q_{20}	z_0	q_1	z_1

	I/P = 0		I/P = 1	
Present State	Next State	O/P	Next State	O/P
q_1	q_{00}	z_0	q_{20}	z_0
q_{20}	q_{01}	z_1	q_{21}	z_1
q_{21}	q_{01}	z_1	q_{21}	z_1

From this modified Mealy machine, the Moore machine is

	Next State		
Present State	I/P = 0	I/P = 1	O/P
$\rightarrow q_{00}$	q_{20}	q_1	z_0
q_{01}	q_{20}	q_1	z_1
q_1	q_{00}	q_{20}	z_1
q_{20}	q_{01}	q_{21}	z_0
q_{21}	q_{01}	q_{21}	z_1

Example 3.20 Convert the given Mealy machine to an equivalent Moore machine.

	I/P = 0		I/P = 1	
Present State	Next State	O/P	Next State	O/P
$\rightarrow q_0$	q_2	0	q_1	0
q_1	q_0	1	q_3	0
q_2	q_1	1	q_0	1
q_3	q_3	1	q_2	0

Solution: In the next state column of the given Mealy machine, the output differs for q_1 and q_3 as the next state. So, the states are divided as $q_1 0$, $q_1 1$ and $q_3 0$,$q_3 1$, respectively. After dividing the states, the modified Mealy machine becomes

	I/P = 0		I/P = 1	
Present State	Next State	O/P	Next State	O/P
$\rightarrow q_0$	q_2	0	q_{10}	0
q_{10}	q_0	1	q_{30}	0
q_{11}	q_0	1	q_{30}	0
q_2	q_{11}	1	q_0	1
q_{30}	q_{31}	1	q_2	0
q_{31}	q_{31}	1	q_2	0

In the next state column of the modifi ed Mealy machine, when q_0 is a next state, the output is 0. So, in the constructing Moore machine, for the present state q_0, the output is also 0. Similarly, for the present state q_2, the output is 0. For the divided states like $q_1 0$, $q_1 1$, there is no need to mention the output as they were divided according to the distinguished output. So, the constructing Moore machine is

Present State	Next State		O/P
	I/P = 0	I/P = 1	
→ q_0	q_2	q_{10}	1
q_{10}	q_0	q_{30}	0
q_{11}	q_0	q_{30}	1
q_2	q_{11}	q_0	0
q_{30}	q_{31}	q_2	0
q_{31}	q_{31}	q_2	1

To get rid of the problem of the occurrence of null string, we need to include another state, q_a, with same transactions as of q_0 but with output 0. The modified final Moore machine equivalent to the given Mealy machine becomes

Present State	Next State		O/P
	I/P = 0	I/P = 1	
→ q_a	q_2	q_{10}	0
q_0	q_2	q_{10}	1
q_{10}	q_0	q_{30}	0
q_{11}	q_0	q_{30}	1
q_2	q_{11}	q_0	0
q_{30}	q_{31}	q_2	0
q_{31}	q_{31}	q_2	1

3.13.2 Transitional Format From the transitional diagram of a Moore or Mealy machine, conversion can be done easily. That process is described here.

textit3.13.2.1 Moore Machine to Mealy Machine

Let us assume that a Moore machine Mo is to be converted to an equivalent Mealy machine MC. There are certain steps for this conversion.

Step I: For a Moore machine, each state is labelled with the output, because for a Moore machine, output depends only on the present state. For the conversion, let us take a state S, which is labelled with output O. Look into the incoming edges to the state S. These incoming edges are labelled by the input alphabets of the Moore machine. These incoming edges are relabelled by the input alphabet as well as the output of the state S. The output for the state must be removed.

Step II: Keep the outgoing edges from the state S as it was. (The outgoing edge of a state must be the incoming edge of some other state.)