

Regular Language Models Part-4



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FA with Output: -

So far we have considered the FA's that recognizes a language i.e. it does not produce any output for any input string, except accept or reject. It is interesting to consider FA's with output which is called Transducers. They compute some function or relation

Two equivalent machines with output are:

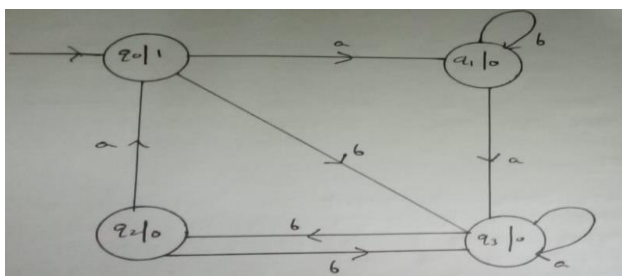
1. Mealy Machine
2. Moore Machine

Moore and Mealy Machine: These machines are DFA'S expect that they are associated with an output symbols with each state or with each transection

- 1) **Moore machine:-** It is a FA when the output is determined by the current state only. The output of Moore Machine is 1 character longer than the I/P that means if I/P is "n" then output will be "n+1". the output of each state is determined with the state itself.

It has 5 component :

- a. Finite set of states: $q_0, q_1, q_2, \dots, q_n$,
- b. Alphabet of input string Σ
- c. alphabet of output string Γ
- d. Transition function/table δ ,
- e. Output table

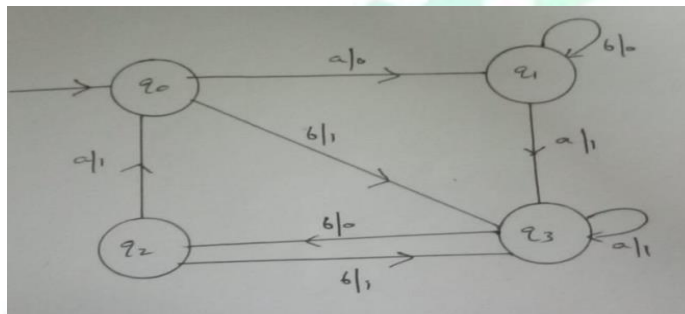


aa ba ba $\rightarrow n=6$

1010111 $\rightarrow m=7$

- There is **no final state** because there is no accept ion and rejection involved.
There we have to see the output.
- So , O/P is always one greater than the I/P string
- Final state always ends with O/P

2. **Mealy Machine:-** It is also an FA where the output of a state is carried by the I/P symbols of that state .That means output is represented in coming edges.



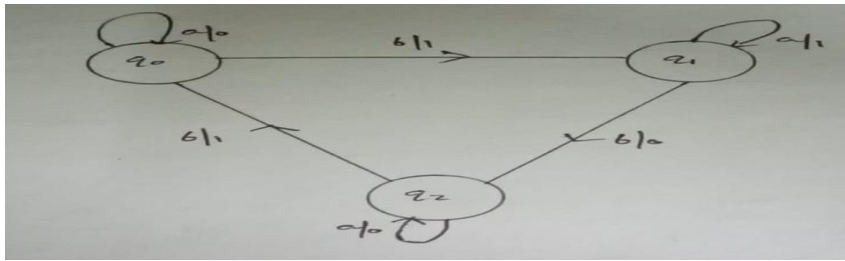
aababa

010111

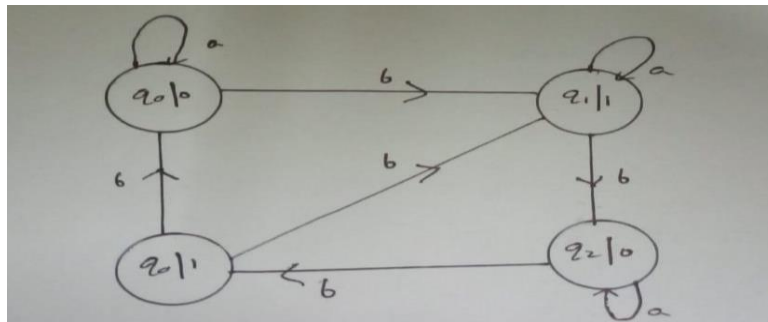
Power of **Moore and mealy machine** is same because we can convert Moore to mealy and mealy to Moore .

Conversion of Mealy to Moore:-

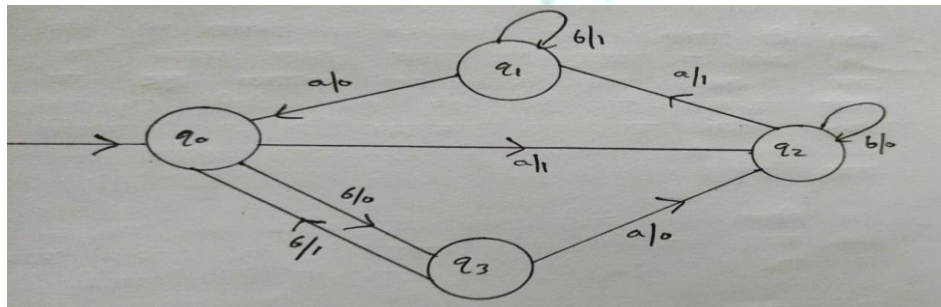
Q. Mealy Machine



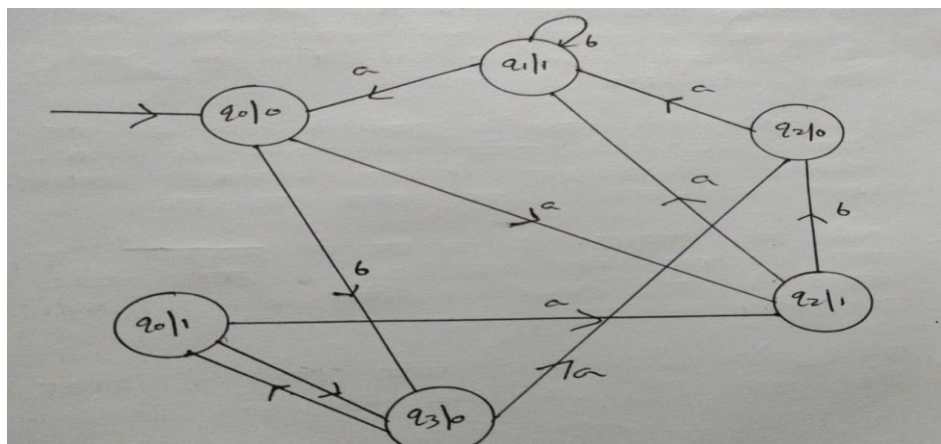
Equivalent Moore Machine:



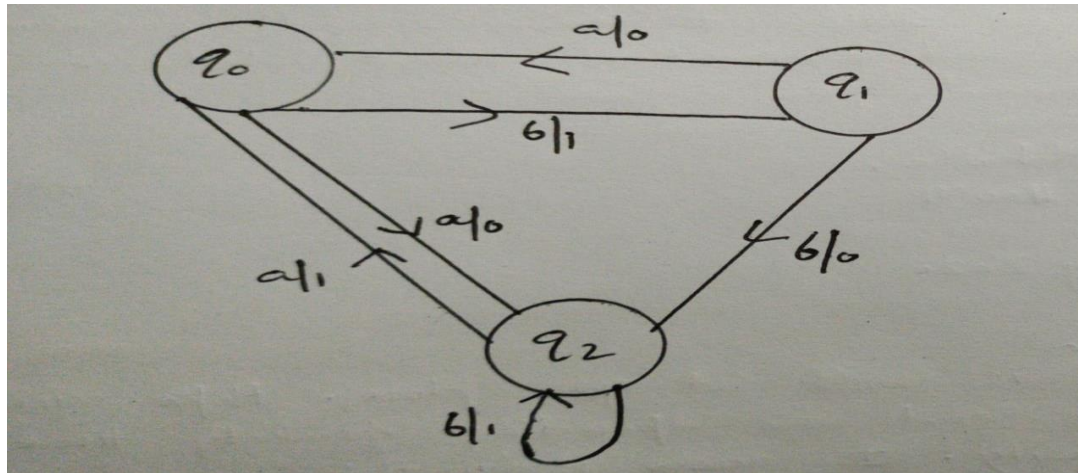
Q. Mealy Machine :



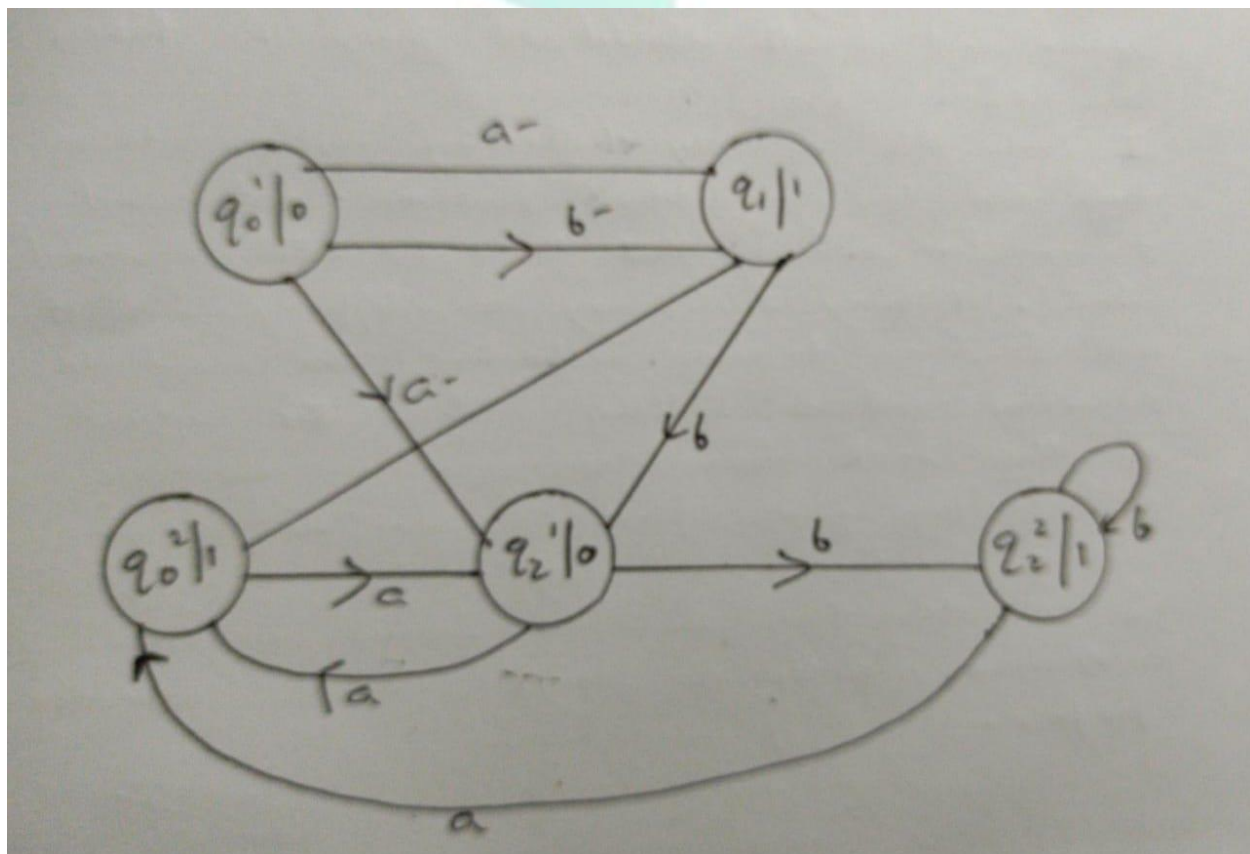
Moore Machine:



Mealy Machine:



Moore Machine :





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