

## Assignment - I

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EN19CS301110

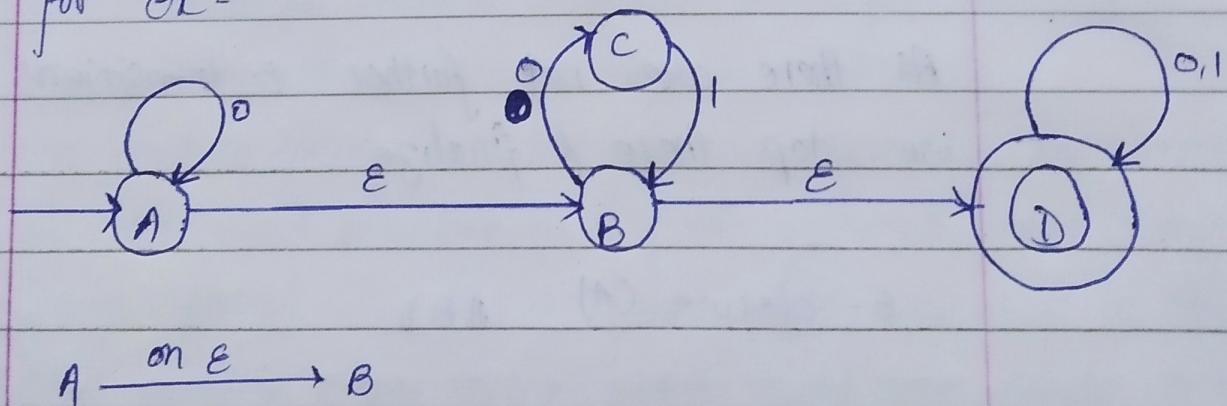
- Define  $\epsilon$ -closure with an example?

Ans

$\epsilon$  means present state can go to other state without any input. This can happen only if the present state have  $\epsilon$ -transition to other state.

$\epsilon$ -closure is finding all the states which can be reached from the present state on one or more ~~epsilon~~  $\epsilon$ -transition.

for ex -



$\epsilon$ -closure(A) = AB at this state

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further B can reach D without any input.

$$B \xrightarrow{\text{on } E} D$$

Qo, A can reach B without any input & B can reach D without any input.

we can conclude that A can reach D without any input.

$$\text{Now, } \epsilon\text{-closure}(A) = ABD$$

★ Any closure should contain itself because it is current state & don't need any input to reach itself.

As there are not further  $\epsilon$ -transitions from D we stop there & finalize.

$$\epsilon\text{-closure}(A) = ABD$$

If there are further  $\epsilon$ -transition from the states which are in  $\epsilon$ -closure we should

continue the process. The procedure to find the  $\epsilon$ -closure ( $A$ ) .

Similarly, if we do this for other states:

$$\epsilon\text{-closure}(\Theta) = BD$$

$$\epsilon\text{-closure}(C) = C$$

$$\epsilon\text{-closure}(D) = D$$

2 State the diff b/w NFA & DFA?

Ans

	NFA	DFA
a	NFA stands for Nondeterministic Finite Automata.	DFA stands for Deterministic Finite Automata.
b.	No need to specify how does the NFA react according to some symbol.	for each symbolic representation of the alphabet, there is only one state transition in DFA.
c	NFA can use empty string transition.	DFA can't use Empty string transition.
d	NFA is easier to construct.	DFA is more difficult to construct

- e Time needed for executing an input string is more.
- f Not all NFA are DFA.
- g. NFA req<sup>n</sup> less space than DFA req<sup>n</sup> more space DFA.
- Time needed for executing an input string is less.  
All DFA are NFA.

3 Construct a DFA for the language over  $\{0, 1\}^*$  such that it contains "000" as a substring is not accepted?

Ans

$$\{0, 1\}^* = \{0, 1, 00, 11, \underline{000}, 111 \dots\}$$

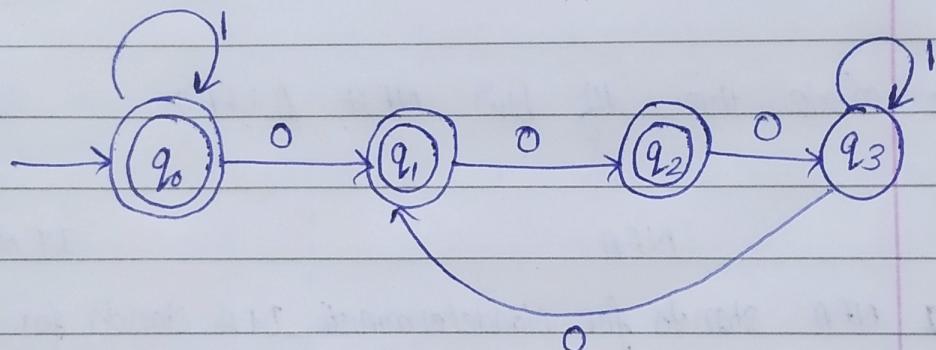


Fig 2.

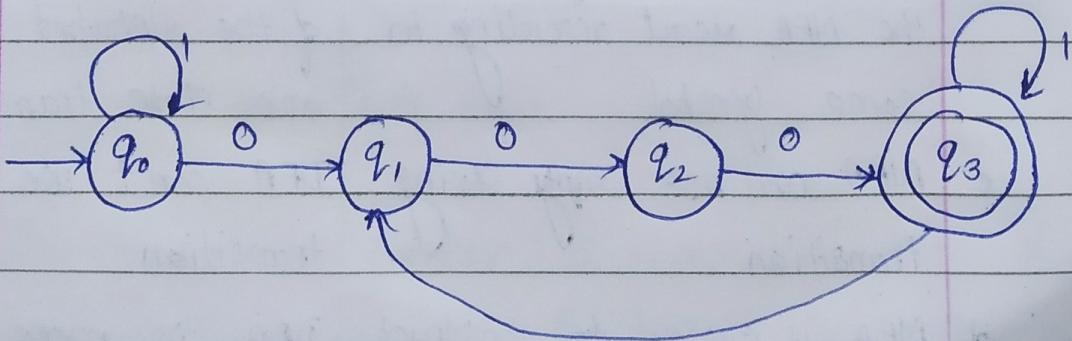


Fig 1.