

Theory of Computation

Finite Automata (DFA) part - 1

DPP-04

[MCQ]

1. Consider following two statements:

S₁: Every DFA can be converted into equivalent NFA**S₂:** NFA design is easy because NFA help us to write a program.

Which of the following is correct?

- (a) S₁ only.
- (b) S₂ only.
- (c) Both S₁ and S₂ are correct.
- (d) Both are incorrect.

[MSQ]

2. Which of the following statements is/are correct about finite automaton?

- (a) Finite automata represent only finite language.
- (b) Finite automata represents only infinite language.
- (c) Transition function in NFA is $Q \times \sum \cup \{\epsilon\} = 2^Q$
- (d) Every regular language is finite.

[MCQ]

3. From each state, how many transition are possible in DFA for each input symbol?

- (a) Exactly 1
- (b) At least 1
- (c) Exactly 2
- (d) At least 2

[MCQ]

4. Consider following two statements:

S₁: If every state is final state in DFA, then $L(DFA) = \Sigma^*$ **S₂:** If every state is non-final state in DFA, then $L(DFA) = \{\epsilon\}$

- (a) S₁ only.
- (b) S₂ only.
- (c) Both S₁ and S₂ are correct.
- (d) Both are incorrect.

[MCQ]5. For $L = \{(a + b)^2\}$, how many states are required in minimal DFA?

- (a) 2
- (b) 3
- (c) 4
- (d) 1

Answer Key

1. (a)
2. (c)
3. (a)

4. (a)
5. (c)



Hints and solutions

1. (a)

- Every DFA can be converted into equivalent and Vice versa.
- DFA help us to write a program.

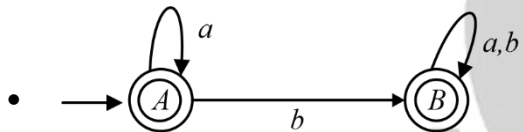
2. (c)

- Finite automata represents regular set, regular set can be finite or infinite.
- Transition function in NFA is $Q \times \sum | \cup \{\epsilon\} = 2^Q$
- Regular language can be finite or infinite.

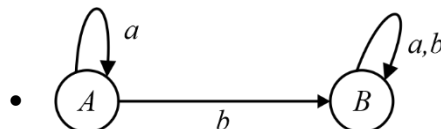
3. (a)

From each state, exactly one transition is possible in the DFA for each input symbol.

4. (a)



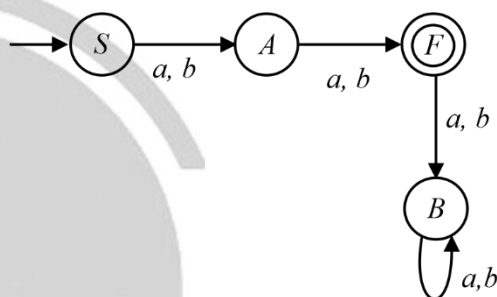
$$L(DFA) = \sum^* = (a + b)^*$$



$$L(DFA) = \phi = \{ \}$$

Hence, only statement (1) is correct.

5. (c)



Number of states = 4.



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