Theory of Automata and Formal Language

Lecture-8

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Deterministic Finite Automata (DFA)

Regular language:

A language L is said to be regular language iff there exists some deterministic finite automata M such that

$$L = L(M).$$

Construction of DFA for a given language

Example: Construct DFA for the following language:-
$L = \{a^m b \mid m \geq 0\}$

Example: Construct DFA for the following language:-
$L = \{a^m b^n \mid m, n \geq 1\}$

Deterministic Finite Automata (DFA)

Example: Construct DFA that recognizes the set of all strings on $\Sigma = \{a,b\}$ starting with the prefix ab.

Example: Construct DFA that recognizes the set of all strings on $\Sigma = \{0,1\}$ except those containing the substring 001.

Deterministic Finite Automata (DFA)

Example: Show that the language

$$\mathrm{L} = \{awa \,!\, w \in \{a, b\}^*\}$$

is regular.

Example: If $\mathrm{L} = \{awa \,!\, w \in \{a, b\}^*\}$, then show that L^2 is regular.

Note: If L is regular, then L^2, L^3,L^4 ..... are also regular.

Exercise

For $\Sigma = \{a,b\}$, construct DFA's that accept the sets consisting of

1. all strings with exactly one a.
2. all strings with at least one a.
3. all strings no more than three a's.
4. all strings with at least one a and exactly two b's.
5. all strings with exactly two a's and more than two b's.