INSTITUTE OF INFORMATION TECHNOLOGY

JAHANGIRNAGAR UNIVERSITY

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Submitted To

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Answer to the question no-1

Application of theory of Automation.

1. Software for desiging and checking the behavior of digital circuits.
2. Lexical analyzer of a typical compiler
3. Software for scanning large bodies of text for Pattern finding.
4. Software for verifying systems of all types that have finite number of state.
5. Used to model real life compting machines and Problems.
6. Used to final limitation of computing machines like halting Problem.
7. Super recevive Algorithm in theory of Computation Present the future of Computing devices.

Answer to the question no-2

Finite Automata: Finite Automata is the simplest machine to Recognize Patterns. The finite automata or finite state machine is an abstract machine that has five elements as tuples it has a set of states and rules for moving from one state to another but it depends on upon the applied input symbol. Basically it is an abstract model of a digital computer.

Formal Definition: A finite automation is a collection of 5 types $(Q, \Sigma, \delta, q_0, f)$

where:
- Q : finite set of states
- Σ: finite set of the input symbol
- q : Initial states
- F: Set of final states
- δ : Tranition function

Answer to the question no-3

Central Concepts of Automata theory

- Alphabets
- Strings
- Languages

Alphabets: Alphabets are finite set of symbols. It is denoted by Σ.

Example: $\Sigma = \{a, b\}$

$\Sigma = \{A, B, C, D\}$

$\Sigma = \{0, 1, 2\}$

$\Sigma = \{\alpha, \beta, \gamma\}$

Strings: A finite collection of symbols from the alphabet. The string is denoted by w. if $\Sigma = \{a, b\}$ various String can be genanated from Σ are $\{a, aa, aaa, bb, bbb, ba, aba \ldots\}$

A string with zero occurence of symboles is known as empty string. It is represented by ϵ.

The number of symbls in a string w is called the lengthe of a string. It is denoted by $|w|$.

Example: $w = 010$

Number of string $|w| = 3$

Language: A language is a collection of appropriate string. A language which is formal over Σ can be finite or infinite.

Example: $L_1 = \{$ set of string of length 2$\}$

$= \{aa, ab, ba, bb\}$

[Finite language]

$L_2 = \{$Set of all string starts with 'a'$\}$

$= \{a, aa, aaa, aab, abb, ababb \ldots\}$

[Infinite language]