

Assignment 1 (Theory of Automata)

Instructions:

1. Only **Handwritten solutions** are acceptable.
2. Submission will be in class only.
3. **Plagiarism** will result in 0 marks.

Construct a DFA for the given languages

$L = \{w \in \{a,b\}^* \mid w \text{ ends with } abb\}$

$L = \{w \in \{a,b\}^* \mid w \text{ contain substring } abbaab\}$

$L = \{w \in \{a,b\}^* \mid w \text{ contains atleast three } a\text{'s}\}$

$L = \{w \in \{0,1,2\}^* \mid \text{sum of digits in } w \text{ are divisible by three}\}$

$L = \{w \in \{0,1,2\}^* \mid \text{The number is divisible by three}\}$

The language of all strings containing no more than one occurrence of the string aa . (The string aaa contains two occurrences of aa .)

The language of all strings in which every a (if there are any) is followed immediately by bb .

The language of all strings containing both bb and aba as substrings.

The language of all strings containing both aba and bab as substrings.

$L = \{w \in \{0,1\}^* \mid \text{every } 0 \text{ in } w \text{ is followed by at least one } 1\}$

$L = \{x \text{ over } \{0, 1\} \mid 3^{\text{rd}} \text{ last element must be } 1\}$

$L = \{x \text{ over } \{0,1\} \mid x \text{ as a binary number divisible by } 3\}$

$L = \{x \text{ over } \{0, 1\} \mid x \text{ contains } 01 \text{ but does not contain the } 010 \text{ as a substring}\}$

$L = \{w \in \{0,1, 2,3\}^* \mid \text{sum of digits in } w \text{ are either divisible by } 4 \text{ or } 6\}$

$L = \{w \in \{0,1,2,3,4,5,6,7,8,9\}^* \mid w \text{ is divisible by } 5 \text{ and } 6\}$

$L = \{w \in \{a,b\}^* \mid w \text{ contains odd number of } a\text{'s and even number } b\text{'s}\}$

$L = \{w \in \{a,b,c\}^* \mid n_a(w) \text{ and } n_b(w) \text{ are even but } n_c(w) \text{ are odd}\}$