

National University of Computer and Emerging Sciences, Lahore Campus



Course:	Theory of Automata	Course Code:	
Program:	BS (Computer Science)	Semester:	Fall 2024
Topic:	Finite Automata	Total Marks:	100
Due Date:	13 th September, 2024 (Google Classroom)	Weight	%
Section:	A, B & C	Page(s):	1
Exam:	Assignment 1	Reg. No	

Instruction/Notes:

This is handwritten assignment which is to be submitted in google classroom.

Problem # 1: Draw deterministic finite automata and give regular expression of the following languages over alphabets $\Sigma = \{a,b\}$. Also enumerate each language.

- $\{x \mid x \in \Sigma^* \text{ \& } x \text{ does not contain the substring } abaa\}$
- The language of all strings containing even number of a's and each a is followed by at least three b's.
- $\{x \mid x \in \Sigma^* \text{ \& } |x| \text{ is some multiple of } 3 \text{ \& } x \text{ has even number of a's}\}$
- The language of all strings in which every pair of adjacent b's appear before any pair of adjacent a's.
- The language of all strings containing at least two a's and at most one b.
- The language of all strings whose first two letters are the reverse of last two letters.

Problem 2:

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

$L1 = \{x \mid x \in \Sigma^*, \text{ where } x \text{ has at least three a's and all strings containing no more than one occurrence of the substring } bb. \text{ (The string } bbb \text{ should be viewed as containing two occurrences of } bb)\}$

- Give regular expression
- Construct deterministic finite automata (DFA) for the language given above.
- Process the string abbbaa on DFA

Problem # 3:

- Develop DFA of problem 2.12 (e,f) (from book)
- Question 2.10