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| **National University of Computer and Emerging Sciences, Lahore Campus** | | | | |
| C:\Users\saif\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\final design.jpg | **Course:** | **Theory of Automate** | **Course Code:** |  |
| **Program:** | **BS(Computer Science)** | **Semester:** | **Fall 2021** |
| **Topic:** | **Languages & Deterministic Finite automata** | **Total Marks:** |  |
| **Due Date:** | **3rd October 2021 (Google Classroom)** | **Weight** | **%** |
| **Section:** | **B, C** | **Page(s):** |  |
| **Exam:** | **Assignenmt1 and Practice Questions** | **Reg. No** |  |
| **Instruction/Notes:** | This is handwritten assignment which is to be submitted in google classroom. | | | |

**Assignment # 1(a) + Practice Questions**

**INSTRUCTIONS:**

**All the questions in red font are to be submitted as hand written assignment.**

**All the questions in black color font are for practice**

**Problem 1:**

**For languages L1 to L10 over alphabets {a,b} do the following**

1. **Enumerate some elements**
2. **Draw a Deterministic Finite Automata**

* L1: The language of all strings containing even number of a’s and each a is followed by at least one b.
* L2:The language that has even length and odd number of a’s.
* L3:The language of all strings in which every pair of adjacent b’s appear before any pair of adjacent a’s.
* L4:The language of all strings containing no more than one occurrence of the string aa. (the string aaa should be viewed as containing 2 occurrences of aa)
* L6: The language of all strings that begins and end with a triple letter( aaa or bbb)
* L7: The language of all strings containing at least two a’s and at most one b.

**Problem 2a:**

**For languages L1 to L10 over alphabets {0,1} do the following**

1. **Enumerate some elements**
2. **Draw a Deterministic Finite Automata**

* L1: strings over {0,1} such that their decimal equivalent is multiple of 5

Eg: {0, 101,1010…..}

* L2: all strings over {0,1} that start with 0 and end with 010 and do not have 000 as part of a string.
* L3: all the string x in which n0(x)%3=0 and n1(x)%3!=0
* L4: all the string x in which n0(x)%3=0 and n1(x)%3=0
* L5: L4 U L3
* L6= L1’

**Problem 2a:**

Run DFA of L1 of problem 2 for following strings, and answer which ones are accepted and which are rejected

{000111, 101000, 10110100,0000100000}