National University of Modern Languages, Islamabad

Faculty of Engineering & Computer Science
Department of Computer Science

First Quiz

BS CS (6 A/B) Morning-Fall-2022
Automata Theory
Faculty Name: Farhad Muhammad Riaz

Maximum Time Allowed: 20 minutes **Maximum Points: 05**

Name: _____

Instruction:

- **Please don't write unnecessary information, be specific.**
- **Write your answer within the space you provide.**

QNO1. Construct a regular expression for all words in which 0 appears tripled, if at all. This means that every clump of 0's contains 3 or 6 or 9 or 12... 0's over the Σ = {0,1}. [01]

(000+ 1)* or (1 + 000)*

QNO2. Construct a regular expression for all words that contain exactly two 1's or exactly three 1's, not more over the Σ = {0,1}. [01]

a*ba*ba* + a*ba*ba*ba*

QNO3. Let Σ = {0, 11, 101, 01001}

a. Is 0110100101? [01]

(0)(11)(01001)01 can't be factored into substrings from Σ , so it is not in the language

b. Does any word in Σ * have an odd total number of 1's? [01]

It is not possible to have an odd no of 1's. The reason is that even 1's +even 1's = even 1's

QNO4. Defining the language L, of strings beginning and ending in different letters, defined over Σ= {0, 1} by using the recursive definition [01]

Rule 1: 0 and 1 are in L
Rule 2: (0)s(1) and (1)s(0) are also in L, where s belongs to Σ *
Rule 3: No strings except those constructed in above, are allowed to be in L