Capital University of Science and Technology

Department of Computer Science

CS3613 – Theory of Automata and Formal Languages

ASSIGNMENT NO. 1

Semester: Fall 2022 **Max Marks:** 10

Instructor: Hashim Ayub
Assigned Date: 27 October 2022 **Due Date : 30 October 2022**
Name: **Reg. No.**

Question No.1 [4 Marks]

Design **deterministic finite automata** for each of the following sets:

(a) the set of strings in Σ = {4,8, 1} containing the substring 481

(b) the set of strings in Σ = {a} whose length is divisible by either 2 or 7

(c) the set of strings x ∈ {0, 1} such that 0's or 0(x) is even and 1's or 1(x) is a multiple of three

(d) the set of strings over the alphabet Σ = {a, b} containing at least three occurrences of three consecutive b's, overlapping permitted (e.g., the string bbbbb should be accepted).

Question No.2 [3 Marks]

Write regular expressions for the following languages over the alphabet Σ = *{a, b}*:

(a) All strings that do not end with *aa*.

(b) All strings that contain an even number of *b*'s.

(c) All strings which do not contain the substring *ba*.

Question No.3 [3 Marks]

Draw DFAs for each of the languages from **question 2**. None of your DFAs may contain more than 4 states.