National University of Computer & Emerging Sciences, Karachi

FALL- 2022

School of Computing

Lab Midterm

17 October, 2022, 10:45 to 12:15

Paper I

Course Code: CL1002	**Course Name: Programing Fundamentals**
Instructor Name / Names: Mr. Fahad Hussain, Ms. Aqsa Zahid	
Student Roll No:	**Section:**

Instructions:

- Return the question paper by the end of the exam.
- Read each question completely before answering it. There are **3 questions and 2 pages**.
- In case of any ambiguity, you may make assumption. But your assumption should not contradict any statement in the question paper.
- You are **not allowed to write** anything on the question paper (except your ID and group).
- For Exam submission: Create a folder named **"your student-id" i.e. (K21-0100).** Paste the .c file for each question named as **Q1.c, Q2.c** and on so in that folder.

Total Time: 90 minutes **Maximum Points**: 30

Question # 01 [30 mins, 10 Points]

FAST DECS society plans to arrange a PICNIC party 2022. All FAST students, faculty members and staff can go for PICNIC after buying the tickets. The tickets are divided into three categories:

- Faculty **(F)** can book only three tickets for free and will pay Rs. 1200/ticket for the additional tickets.
- Staff **(S)** can book only two tickets for free and will pay Rs. 1700/ticket for the additional tickets.
- Students **(T)** can buy a ticket for Rs. 2500 and will pay Rs. 2600/ticket for the additional tickets.

Your task is to design a C-program for the mentioned scenario. The program should ask the user about the category and quantity of the tickets and calculate the total cost.

Note: Use Switch statement.

Question # 02 [30 mins, 10 Points]

Judy is trying to design a password verification system, in which there are several constraints which should be applied to verify if a password is valid or not, the constraints are mentioned below:

- This password should be numeric.
- The length of the password should be between 8 to 15.
- Password must have at least 4 odd numbers and 4 even numbers.
- The sum of the password digit must be greater than 10.

You need to write a C program for the above-mentioned password verification system.

Question # 03 [30 mins, 10 Points]

Your teacher wants to conduct your quiz online and he wants to randomize the questions out of pool of 100 questions. He wants to randomly pick 10 questions from pool of 100 questions and show on your screen. For this purpose, he wants to generate random numbers in the range of 100. One way to generate the random numbers is to use the following equation.

$$x_n = (a * x_{n-1} + c) mod\ m$$

Note:

- Here m should be 101 because your range is 100.
- **'a'** should be first digit of your roll number, if it is 21k9224, then **'a'** would be 9.
- At the start take x_{n-1}(usually called as seed) should be 3.
- **'c'** would be second digit of your roll number, here you can take '**c**' = 2
- For the next numbers $\boldsymbol{x_n}$ would be previously generated random number.

Samples:

$x_n = (a * x_{n-1} + c)\ mod\ m$ $x_1 = (9 * 2 + 2)\ mod\ 101$	$x_1 = 20$ This would be x_n for next one.
$x_n = (a * x_{n-1} + c)\ mod\ m$ $x_2 = (9 * 20 + 2)\ mod\ 101$	$x_2 = 81$ This would be x_n for next one.
$x_n = (a * x_{n-1} + c)\ mod\ m$ $x_3 = (9 * 81 + 2)\ mod\ 101$	$x_3 = 24$ This would be x_n for next one.