National University of Computer and Emerging Sciences

Programming Fundamentals Lab

CL-1002

Date: Dec 02nd 2024

Course Instructor(s)

Mr. Muhammad Aashir, Shaheer Ahmed

Final Exam paper B

Total Time: 2 hrs. 15 min.

Includes submission

Total Marks: 50

Total Questions: 04

Semester: Fall-2024

Campus: Karachi

Dept: Computer Science

Submission Instructions:

- **Name the file for each question according to Roll No e.g. k24-xxxx_Q1.c, k24-xxxx _Q2.c etc.**
- ***Submission is via a client software so open the application present on the Desktop.***
- **Enter your username as 24K-xxxx and its assigned password (Default is Fast1234).**
- **Submission is timed so after that time no submission will be accepted.**
- **Submissions should have 4 .c files.**
- **In case of failure to submit a .c file, you will be penalized.**

Important:

You are allowed to use static or const in the entire paper anywhere needed. However, declaration of global variables is prohibited. You can use a different function signature but the returned values should be exactly as required.

LLO #:03 **[12.5 marks - 25 minutes]**

Q1: Create a recursive function that a concatenated string using a pointer (the two strings are passed by reference) and then returns the concatenated strings' starting address. You are not allowed to use concat() function.

Suggested function declaration: char* recursiveConcat(char *dest, char *src);

National University of Computer and Emerging Sciences

LLO #:03 **[12.5 marks - 20 minutes]**

Q2: Create a C program that manages a structure dynamically. Use the same structure as question 4, however, the variable should be allocated Dynamically using Calloc. Give the user the option to set the size in the beginning and resizing as well depending upon the number of insertions.

LLO #:03 **[10 marks - 15 minutes]**

Q3: Write a C program that calculates the sum of the elements along the border of a given square matrix of size n × n where n is an odd number.

The program should:

- Take an input from the user to create a 2D array/matrix.
- Calculate the sum of the elements along the border (including corners).
- Display the calculated sum to the user.

Expected Input: (as a 2D matrix) 1 2 3
4 5 6
7 8 9

(1 + 2 + 3) + (1 + 4 + 7) + (7 + 8 + 9) + (3 + 6 + 9).

Expected Output: Sum: 60

LLO #:04 **[15 marks - 45 minutes]**

Q4: You are required to implement the functionalities of a Team record management system for a number of players, each with the following attributes:

- **Team ID (integer)**
- **Name (string, max length 50)**
- **Total wins (int)**
- **Total losses (int)**

Your program should implement the following functions:

Add a New Team: Append a new team record to the file.

Update a Team's Record: Update an existing team's new match played by searching with the team ID and update with either another win or loss (increment by 1).

Read the team's Record: Read and print all the team with the highest wins and the team with the highest win percentage (wins/ total matches) where total matches = wins + losses.

Create a menu-driven program that allows the user to add and update a team's record, or print the data.

Note: Use an array of structures, filing, switch statements, and functions. *You are not allowed to use Global variables.*