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| **Operating Systems Lab (CL2006)** |
| Date: 18/10/2024 |
| **Course Instructor(s)** |
| Mr. Muhammed Monis |

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| **Lab Mid Exam (A)** |
| **Total Time: 90 minutes** |
| **Total Marks: 25** |
| **Total Questions**: **03** |
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| **Semester:** FL-2024 |
| **Campus:** Karachi |
| **Dept:** Computer Science |

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***CLO # 1: Understand and Analyze Command Line tools for Linux OS and Shell scripts for system level programming to automate tasks such as file management, system backups and software installations.***

**Q1**. [7 marks]   
Create a shell script file with the following properties

1. The file should take your roll number as input the greet you with your roll number.

2. Then the script should ask how many folder you want to create, specify the amount and create the folder using loops. Note that the folder name must start with a special character like % or = and end with a number and this should be different for each folder.

3. Then navigate to any one of the folder and create a .C file where your code should print the factorial using nested recursion. Note: You do have to compile it within the terminal and execute it as well.

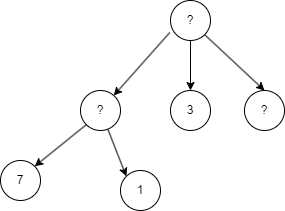
4. Finally Delete all the folder with the special characters except the one where the .C file is created and copy the .C file to the desktop then delete it from the original folder.

**Note:** Create the C Files in the first place.

***CLO # 2: Understand how to configure and customize Linux Kernel for installations, applying patches and performance optimizations for system calls.***

**Q2**. [4+4.5 marks]

Implement the following tree. The catch is that the leave nodes have values, and the parent node values are missing. To get the parent node values both the values from the child nodes must be subtracted to get the parent value. Subsequently you must repeat this until the value of the root node is achieved. Use an appropriate method to communicate some value.



***CLO # 3: Gain hands on experience in writing code that interacts with operating system services related process and files system, multi-thread programing and different synchronization primitives.***

**Q3** [4 + 6 marks]

Consider a scenario where there is a manager and three team members. The manager will send an instruction, and each team member will acknowledge receiving the instruction in order (T1, T2, T3). After acknowledging, each team member will respond with their update, and the manager will individually confirm each response.

Manager = Start Project

T1 = Received Start Project,

T2 = Received Start Project,

T3 = Received Start Project,

T1 = Task 1 done, Manager = Confirmed Task 1 done

T2 = Task 2 done, Manager = Confirmed Task 2 done

T3 = Task 3 done, Manager = Confirmed Task 3 done

Manager = Status Update T1, Status Update T2, Status Update T3

T1 = Received Status Update T1,

T2 = Received Status Update T2,

T3 = Received Status Update T3

**Note:** You would require using 4 files to accomplish this task. Use the appropriate IPC Method.