Lab – 05

16/02/2025

List ADT – Circular and Doubly Linked List

Note:

1. Use only visual studio code type your program and run your code.
2. Always follow industry coding best practices.

A. Write a C++ menu-driven program to implement List ADT using a doubly linked list **with a tail.** Maintain proper boundary conditions and follow good coding practices. The List ADT has the following operations,

1. Insert Beginning
2. Insert End
3. Insert Position
4. Delete Beginning
5. Delete End
6. Delete Position
7. Search
8. Display
9. Exit

What is the time complexity of each of the operations? **(K4)**

B. Write a C++ menu-driven program to implement List ADT using a circular linked list. Maintain proper boundary conditions and follow good coding practices. The List ADT has the following operations,

1. Insert Beginning
2. Insert End
3. Insert Position
4. Delete Beginning
5. Delete End
6. Delete Position
7. Search
8. Display
9. Exit

What is the time complexity of each of the operations? **(K4)**

C. An operating system allocates a fixed time slot CPU time for processes using a round-robin scheduling algorithm. The fixed time slot will be initialized before the start of the menu-driven program. Implement the round-robin scheduling algorithm using the circular linked list.

Implement the program by including the appropriate header file. It consists of the following operations.

1. Insert Process
2. Execute
3. Exit

The "Insert Process" will get an integer time from the user and add it to the queue.

The "Execute" operation will execute a deletion in the beginning operation and subtract the fixed time from the process. If the processing time falls below 0 then the process is considered to have completed its execution, otherwise, the remaining time after subtraction is inserted at the end of the circular linked list.

What is the time complexity of each of the operations? **(K4)**