COMSATS University
Wah Campus

Course Name: *Data Structures and Algorithms* **Topic:** *Stack, Queue*

Assignment # *2* **Total Marks:** 25

Note :
Do as directed and attempt all the questions. Your answers must be to the point. Give examples must where necessary. Paste the screenshots of every program and its output must. Copy Paste will be marked zero.

Question # 01. 05 Marks

Write a C++ program that employs recursion to find the nth Fibonacci number. Additionally, implement recursive C++ functions to calculate the sum of all elements in a linked list and to reverse the linked list.

Question # 02. 05 Marks

You are implementing a program for a KFC order management system. The orders need to be processed in a first-come-first-serve basis. Write a C++ program to implement a queue-based order management system that can handle multiple orders simultaneously.

Question # 03. 05 Marks

You are implementing a text editor program and need to implement an undo functionality. One way to do this is to use a stack to keep track of the previous states of the document. Write a C++ program to implement a stack-based undo functionality, where each change in the document is pushed onto the stack, and the previous state can be retrieved by popping the stack.

Question # 04. 05 Marks

Implement a C++ program for a YouTube playlist management system. The videos in the playlist can be played in a specific order or shuffled for a randomized playback experience. Implement a program that utilizes a circular queue-based playlist management system to handle both shuffling and ordered playback.

Question # 05. **05 Marks**

Implement a C++ program to use a deque as a data structure for managing items in a shopping cart. Your program should allow both front and rear operations for efficient management of items. You should be able to add items to the front and rear of the shopping cart, remove items from both ends, and display the current contents of the cart. Your program should provide the following functionality:

1. Add an item to the front of the cart.
2. Add an item to the rear of the cart.
3. Remove an item from the front of the cart.
4. Remove an item from the rear of the cart.
5. Display the current contents of the shopping cart.
6. Exit the program.