National University of Computer and Emerging Sciences, Lahore Campus

Course:	Data Structures Lab	Course Code:	CL-2001
Program:	BS (Computer Science)	Semester:	Fall 2021
Duration:	120 Minutes	Total Marks:	80
Paper Date:	15-Nov-21	Weight	30 %
Section:	F	Page(s):	2
Exam:	Lab Midterm	Roll No.	

Instruction/Notes:

- Submit the solution on XEON.
- Make sure your submitted file is not corrupted.
- In case of ambiguity, take suitable assumption.
- Plagiarism will result in severe consequences.
- Indentation and commenting holds marks

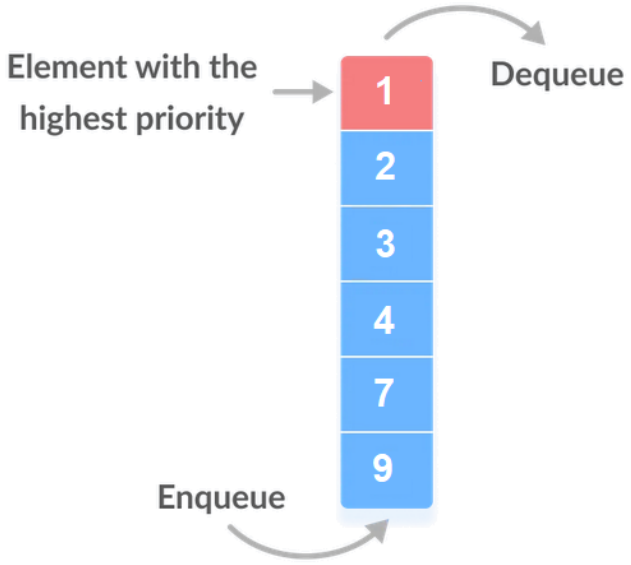
Question No. 01 (Priority Queue): **Marks: 50**

A priority queue is a **special type of queue** in which each element is associated with a **priority value**. And, elements are served on the basis of their priority. That is, higher priority elements are served first. In this question, we say that lower numbers have higher priority. In other words, the nodes with lower values de-queue before the higher value nodes.

You have to implement a priority Queue using linked list data structure. Every Node will have a pointer and a priority value. Implement Queue operations keeping in mind the following Time complexities:

	peek	en-queue	de-queue
	O(1)	O(n)	O(1)

Following is how the queue will look after en-queuing 3, 2, 1, 7, 4, 9:



Question No. 02 (SJF Algorithm): **Marks: 30**

Shortest Job First (SJF) is a scheduling algorithm where CPU executes the shortest process prior to the longer ones. Given are a number of functions and their required completion time in different arrays. You are required to use the priority queue created in Question No. 01 to implement **Shortest Job First** Scheduling algorithm. This algorithm will call the functions in ascending order of completion time. This question should be completed in form of a function.

Read the source.cpp file provided. Design a proper main. In SJF function, en-queue the node with Fun1 address first then Fun2, Fun3 and so on.