

National University of Computer and Emerging Sciences



Laboratory Manual *for* Data Structures Lab

Course Instructor	
Lab Instructor(s)	
Section	
Date	
Semester	Fall 2021

Department of Computer Science

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Question No. 01:

Create a queue using singly linked list. Each node of your queue should store the process id and the execution time of that process in mili seconds. Your task is to provide the implementation of following functions:

- enqueue (function to insert the element into a queue)
- dequeue (function to remove the element from the queue)
- getLength (function to return the total elements in the queue)
- getRear (function to return the last elements from the queue)
- isEmpty (function to check whether the queue is empty or not)
- getMin (function to return the process id with least execution time)
- getMax (function to return the process id with maximum execution time)
- getCountofSimilar (function to return the count of processes with same execution time)
- show (this function should only display the process id and execution of time processes in the queue).

Your program should only accept positive values where process id should be unique for each process. Display a message if the process id already exist in the queue.

Ideal scenario:

Display a menu to the user and get his choice for available operations. Your program should only terminate if the user enters q or Q.

Question No. 02:

Create a circular queue using fixed size array. Each index of your queue should store the execution time of the process. Your task is to provide the implementation of following functions:

- constructor should receive the array size and create a dynamic array.
- enqueue (function to insert the element into a queue)
- dequeue (function to remove the element from the queue)
- isEmpty (function to check whether the queue is empty or not)
- isFull (function to check whether the queue is full or not)
- getLength (function to return the total elements in the queue)
- getSize (function to return the size of queue)
- reSize (This function should receive the new size as a parameter and resize the queue as per the new size)
- getRear (function to return the last elements from the queue)
- getMin (function to return the index with least execution time)
- getMax (function to return the index with maximum execution time)
- getCountofSimilar (function to return the processes with same execution time)
- show (this function should only display the process id and execution of time processes in the queue).

Assume that there is uni-tasking system. Provide a function that calculates the total time required by the processes in the queue to complete their execution.

Destructor (delete all the elements from the queue)

Your program should not accept any negative value.