

Exercise 9: Dynamic Queue and stack

Q1: Write a C++ program to use linked list to implement a dynamic queue. You should implement set of functions to enqueue, dequeue elements of the queue. Also, implement a function to display all elements of the queue. Also, implement a function to get the value of the peak element of the queue. Also, implement a function to count the number of elements in the queue. The main program should repeatedly ask the user to choose one the previous function each time.

Q2: Write a C++ program to use linked list to implement a priority queue. You should implement set of functions to enqueue, dequeue elements of the queue according to their priorities. Also, implement a function to display all elements of the queue. Also, implement a function to get the value of the peak element of the queue. Also, implement a function to count the number of elements in the queue. The main program should repeatedly ask the user to choose one the previous function each time.

Q3: Apply the stack evaluation algorithm to evaluate the following postfix expressions. Also, Draw the steps of what happens inside the stack with each step. Assume $A = 1$, $B = 2$, $C = 3$, to evaluate the result.

1- $AB + C - BA + C / -$

2- $ABC + * CBA - + *$

Assignment delivered to the instructor. You should use the stack code you implemented in the previous tutorial.

Write a C++ program to solve the Towers of Hanoi problem. You should use three stacks to represent the three towers. One of the stacks should be initialized with three ordered values that represent the disks. Later you should move all the disks from one tower to another and using the third as an intermediate stop. You must obey the following three rules:

- Only one disk can be moved at a time.
- Each move consists of taking the upper disk from one of the stacks and placing it on top of another stack i.e. a disk can only be moved if it is the uppermost disk on a stack.
- No disk may be placed on top of a smaller disk.