EAST WEST UNIVERSITY
Department of Computer Science and Engineering
B.Sc. in Computer Science and Engineering Program
Assignment - 1, Spring 2021 Semester

Course:	**CSE 207- Data Structures, Section-2**
Instructor:	**Dr. Maheen Islam, Associate Professor, CSE Department**
Full Marks:	**80**
Submission Time:	**April 12,2021**

Question-1:

Write a program that stores two lists (list1 and list2) of elements where each list contains m number of elements. Use dynamic memory allocation to reserve space. Next, create a third list, list3, (using dynamic memory allocation) where each position of this list holds the larger value of the corresponding position values of list1 and list2. For example, if the first list contains 1, 2, 3, 4 and the second list contains 5, 6, 2, 3; then after concatenation, the third list will store 5, 6, 3, 4.

Question-2:

Apply the algorithmic method to change the ((A-B)*X) * (C * (D+E) / F) expression in postfix expression using stack. Show each step of the conversion including stack contents and postfix expression.
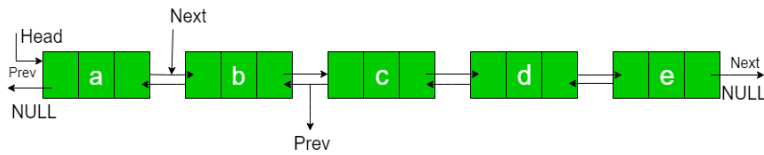
Question-3:

Given a set of integer values stored in a doubly linked list (in unsorted order), write a program to place the median value of the list in the middle position of the list (assume that there are odd number of values is the list). Find the median valued node in the list and then swap it with the middle valued node of the list. Do not swap the values of the nodes in the list, rather swap the nodes in the list. For example, if the input list is 10, 5, 15, 20, 3, then the output list will be 15, 5, 10, 20, 3.

Question-4:

Suppose that, you are given a doubly linked list containing integer values. Write a program to rotate the linked list counter-clockwise by N nodes. Here N is a given positive integer and is smaller than the count of nodes in linked list.
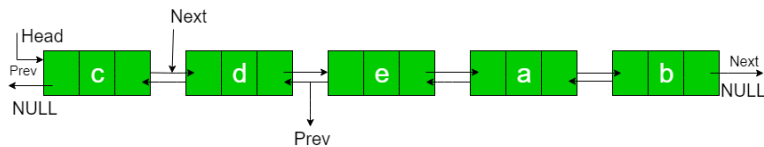
Example:

List:

N = 2

Rotated List:

Question-5:

Write a program to read a list of integers, and each time you get a negative number you must print the five numbers (in reverse order) that come before the negative number and then discard the negative number. Use a stack to solve this problem. Read the numbers and push them into the stack (without printing them) until a negative number is read. When you get a negative value, stop reading and pop five items from the stack and print them. If there are fewer than five items in the stack, print an error message and push the remaining items in the stack. When the end of the file is detected, print a message and the items in the stack. Also, show the output of the program when you provide the input data :1 2 3 4 5 -1 1 2 4 3 4 5 6 7 8 9 10 -2 11 12 -3 1 2 3 4 5

Question-6:

Consider two stacks and two queues, as described below.

• Input stack: used to store all user input

• Input queue: used to store all user input

• Output stack: used to store data deleted from input queued.

• Output queue: used to store data deleted from input stack.

Write a program that implements the followings: If an insert is requested, the system should prompt the user for the integer to be inserted. The data are then inserted into the input stack and input queue. If a delete is requested, the data are deleted from both structures: the data popped from the input stack are enqueued in the output queue, and the data dequeued from the input queue are pushed into the output stack. Finally, print the contents of the output stack while deleting all its data. Then print all the data in the output queue while deleting all its data.

Question-7:

Given queue of integers and an integer k, write a program to remove the first k elements of the queue, reverse their order and append them at the end of the queue, leaving the other elements in the same relative order. Only a stack can be used as an auxiliary space and the following standard operations are allowed on queue.

• enqueue(x) : Add an item x to rear of queue

• dequeue() : Remove an item from front of queue Examples:

Input: Q = 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, k =5

Output: Q = 60, 70, 80, 90, 100, 50, 40, 30, 20, 10

Input: Q = 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, k =2

Output: Q = 30, 40, 50, 60, 70, 80, 90, 100, 20, 10

Question-8:

What would be the contents of queue Q1 after the following code is executed and the following data are entered?

The data are 5, 7, 12, 4, 0, 4, 6, 8, 67, 34, 23, 5, 0, 44, 33, 22, 6, 0.

```
1 Q1 = createQueue
2 S1 = createStack
3 loop (not end of file)
   1 read number
   2 if (number not 0)
      1 pushStack (S1, number)
   3 else
      1 popStack (S1, x)
      2 popStack (S1, x)
      3 loop (not empty S1)
         1 popStack (S1, x)
         2 enqueue (Q1, x)
      4 end loop
   4 end if
4 end loop
```