North South University
Department of Electrical and Computer Engineering
Assignment 02–Summer 2023
CSE 225 - Data Structures and Algorithms

1. Write the "DeleteItem(int item)" and "RetriveItem(int& item, bool& found)" Operations for the 'Sorted List' data structure. Use a **linked list** data structure to implement the sorted list. Calculate the time complexity of both the algorithms. (20)
2. When using a linked list, explain why you might need a tail pointer. (5)
3. Implement a circular linked list, using the knowledge from Singly Linked list implementation. (10)
4. Why is the Mod operator used in "Enqueue" operation of Queue data structure? (5)

```
void QueType::Enqueue(ItemType newItem)
{
  if (IsFull())
    throw FullQueue();
  else
  {
    rear = (rear +1) % maxQue;
    items[rear] = newItem;
  }
}
```

5. Discuss the differences between the Stack and Queue data structures, from your understanding. Give a few real-life examples of when to use which data structure. (10)
6. Explain what a complete binary tree is, and what a full binary tree is. Give examples. (10)

7. If the number of nodes in a BST is “n”, calculate its height. (5)
8. The In-Order and Pre-Order traversal of a Binary Search tree is given. Construct the tree. (15)

   In-order traversal: 77, 90, 126, 127, 129, 137, 142, 150, 199, 278, 282, 287, 291, 300, 309

   Pre-Order traversal: 199, 90, 77, 126, 129, 127, 150, 137, 142, 278, 282, 291, 287, 300, 309

   After constructing the tree, write the Post-Order Traversal.