National University of Computer and Emerging Sciences, Lahore Campus

	Course:	**Operating Systems**	**Course Code:**	**CS 2001**
	Program:	**BS(Computer Science)**	**Semester:**	**Fall 2021**
	Due Date	**09-Oct-2021 at 11:59 pm**	**Total Marks:**	**30**
	Type:	**Assignment 1**	**Page(s):**	**1**

Important Instructions:

1. Submit your code in a zip file named as your roll number.
2. You are not allowed to copy solutions from other students. We will check your code for plagiarism using plagiarism checkers. If any sort of cheating is found, negative marks will be given to all students involved.
3. Late submission of your solution is not allowed.

Question 1:

Implement a class (template) SortedSet which is actually a singly linked list with head and tail pointers. It will store data in ascending order while disallowing duplicate data. Implement the following member functions for this class.

[1 mark]
1. Default Constructor. `SortedSet();`

[5 marks]
2. An insert function that will insert the data such that resultant set is in ascending order. Duplicate data will not be allowed. `void insert(T const data);`

[5 marks]
3. A delete function that will delete the element at the given index. `void delete(int const index);`

[3 marks]
4. A print function that will print the contents of the sorted set. `void print() const;`

[8 marks]
5. A union function that will be passed another sorted set. This function will take union of two sets and store the result in the first set. `void union(SortedSet<T>const &otherSet);`
   For example:
   SortedSet a; (suppose it has 1, 2, 3, 4, 10, 50)
   SortedSet b; (suppose it has 6, 10, 11)
   a.union(b); (a will now contain 1, 2, 3, 4, 6, 10, 11, 50)

[8 marks]
6. An intersection function that will be passed another sorted set. This function will take intersection of two sets and store the result in the first set. `void intersect(SortedSet<T>const & otherSet);`

You can create any other helper member functions for SortedSet if you want. There should not be any function that is not a member of SortedSet. Also write a main.cpp file in which you will test all these functions.