Lab Mini Project

Problem: Create a student Record Management system that can perform the following operations using Binary Search Tree Data Structure.:
- Insert Student record
- Delete student record
- Show student record
- Search student record

The student record should contain the following items

- Name of Student
- Roll Number of Student (Randomly generated integer number)
- Course in which Student is Enrolled
- Total Marks of Student
- CGPA of a student

Approach: With the basic knowledge of operations on double Linked Lists like insertion, deletion of elements in the Linked list, the student record management system can be created. Below are the functionalities explained that are to be implemented:

- **Check Record:** It is a utility function of creating a record it checks before insertion whether the Record Already Exists or not. It uses the concept of checking for a Node with given Data in a linked list.
- **Create Record:** It is as simple as creating a new node in the Empty Linked list or inserting a new node in a non-Empty linked list.
- **Search Record:** Search a Record is similar to searching for a key in the linked list. Here in the student record key is the roll number as the roll number is unique for every student.
- **Delete Record:** Delete Record is similar to deleting a key from a linked list. Here the key is the roll number. Delete record is an integer returning function it returns **-1** if no such record with a given roll number is found otherwise it deletes the node with the given key and returns **0**.
- **Show Record:** It shows the record is similar to printing all the elements of the Linked list.

Exception Handling

Although the implementation of exception handling is quite simple few things must be taken into consideration before designing such a system:

- Roll Number must be used as a **key** to distinguish between two different records so while inserting a record check whether this record already exists in our database or not if it already exists then immediately report to the user that the record already exists and insert that record in the database.
- The record should be inserted in sorted order for this to make the roll number a key and use the inserting node in the sorted linked list.