Library Management System

1.1 Overview

This project is a simple Library Management System implemented in C++. The system uses Binary Search Trees (BST) to manage books and students. It allows students to issue and return books, and to check the availability of books in the library.

1.2 Classes and Methods

- **student:** Represents a student with attributes for `id`, `name`, and `issued` books count.
  - Constructors:
    - student(): Default constructor.
    - student(int num, string m): Parameterized constructor.
  - Methods:
    - string getName(): Returns the student's name.
    - int getID(): Returns the student's ID.
- **nodeS :** Node class for the student BST.
  - Attributes:
    - student stu: The student data.
    - nodeS* right: Pointer to the right child.
    - nodeS* left: Pointer to the left child.
  - Constructor:
    - nodeS(student s): Parameterized constructor.
- **bst_student :** BST class for managing students.
  - Attributes:
    - nodeS* root: Root node of the BST.
  - Methods:
    - nodeS* insertID(nodeS* root, student s): Inserts a student into the BST.
    - nodeS* searchID(nodeS* root, int id): Searches for a student by ID.
    - nodeS* deleteID(nodeS* root, int targetID): Deletes a student by ID.
- **book:** Represents a book with attributes for bookID, bookName, quantity, and issuedSt (BST of students who have issued this book).
  - Constructor:
    - book(int id, string name, int q): Parameterized constructor.
  - Methods:
    - int getID(): Returns the book's ID.
    - string getBookName(): Returns the book's name.
    - bool isPresent(): Checks if the book is available.
    - void updateAvailablity(): Updates the availability status of the book.

        - void issueBook(student s): Issues the book to a student.
        - void returnBook(student s): Returns the book from a student.

- **nodeB:** Node class for the book BST.
    - Attributes:
        - book bk: The book data.
        - nodeB* right: Pointer to the right child.
        - nodeB* left: Pointer to the left child.
    - Constructor:
        - nodeB(book b): Parameterized constructor.

- **bst_book:** BST class for managing books.
    - Attributes:
        - nodeB* root: Root node of the BST.
    - Methods:
        - nodeB* insertBook(nodeB* root, book s): Inserts a book into the BST.
        - nodeB* searchID(nodeB* root, int id): Searches for a book by ID.
        - nodeB* deleteID(nodeB* root, int targetID): Deletes a book by ID.

- **studentRequest:** Handles student requests for issuing and returning books.
    - Attributes:
        - student st: The student making the request.
    - Constructor:
        - studentRequest(int id): Initializes the request with the student's ID.
    - Methods:
        - void checkAvailaiblity(int id): Checks the availability of a book.
        - void requestIssue(int id): Issues a book to the student.
        - void requestReturn(int id): Returns a book from the student.

1.3 Creating the Library: The createLIB function initializes the library with a set of books and students.

1.4 Main Function: The main function handles the interaction with the user. It prompts the user for their student ID and provides options to check book availability, issue books, and return books.

1.5 Notes

- Each student can issue a maximum of 2 books.
- The availability of books is updated dynamically based on the issue and return actions.
- The BSTs ensure efficient management and retrieval of students and books.