LIBRARY MANAGEMENT SYSTEM

Code:

```
#include <iostream>
#include <vector>
#include <map>
#include <ctime>

using namespace std;

struct Book {
   string title;
   string author;
   string ISBN;
   bool isAvailable = true;
};

struct Borrower {
   string name;
   string borrowedISBN;
   time_t borrowDate;
};

vector<Book> books;
map<string, Borrower> borrowers;
```

```
void addBook() {
    Book newBook;
    cout << "Enter book title: ";
    cin.ignore();
    getline(cin, newBook.title);
    cout << "Enter book author: ";
    getline(cin, newBook.author);
    cout << "Enter book ISBN: ";
    getline(cin, newBook.ISBN);
    newBook.isAvailable = true;
    books.push_back(newBook);
    cout << "Book added successfully!\n";
}

void searchBook() {
    int choice;
    cout << "Search by: 1. Title 2. Author 3. ISBN\nChoose an option: ";
    cin >> choice;

    string searchTerm;
    cout << "Enter search term: ";
    cin.ignore();
    getline(cin, searchTerm);

    for (const auto& book : books) {
```

```
        if ((choice == 1 && book.title == searchTerm) ||
            (choice == 2 && book.author == searchTerm) ||
            (choice == 3 && book.ISBN == searchTerm)) {
            cout << "Book found: " << book.title << " by " << book.author
                << ". ISBN: " << book.ISBN
                << ". Status: " << (book.isAvailable ? "Available" : "Checked out") << endl;
            return;
        }
    }
    cout << "Book not found.\n";
}

void checkoutBook() {
    string ISBN, borrowerName;
    cout << "Enter ISBN of the book to check out: ";
    cin >> ISBN;
    cin.ignore();

    for (auto& book : books) {
        if (book.ISBN == ISBN && book.isAvailable) {
            cout << "Enter borrower's name: ";
            getline(cin, borrowerName);
            borrowers[ISBN] = {borrowerName, ISBN, time(0)};
            book.isAvailable = false;
            cout << "Book checked out successfully!\n";
            return;
```

```
        }
    }
    cout << "Book not available or doesn't exist.\n";
}

void returnBook() {
    string ISBN;
    cout << "Enter ISBN of the book to return: ";
    cin >> ISBN;

    auto it = borrowers.find(ISBN);
    if (it != borrowers.end()) {
        time_t now = time(0);
        double days = difftime(now, it->second.borrowDate) / (60 * 60 * 24);
        double fine = days > 14 ? (days - 14) * 1.0 : 0.0;

        for (auto& book : books) {
            if (book.ISBN == ISBN) {
                book.isAvailable = true;
                cout << "Book returned successfully!\n";
                if (fine > 0)
                    cout << "Fine due: $" << fine << endl;
                borrowers.erase(it);
                return;
            }
        }
```

```
    } else {
        cout << "This book was not borrowed.\n";
    }
}

void displayMenu() {
    cout << "\nLibrary Management System\n";
    cout << "1. Add Book\n";
    cout << "2. Search Book\n";
    cout << "3. Checkout Book\n";
    cout << "4. Return Book\n";
    cout << "5. Exit\n";
    cout << "Choose an option: ";
}

int main() {
    vector<int> tasks;
    int choice;

    while (true) {
        displayMenu();
        cin >> choice;

        switch (choice) {
            case 1: addBook(); break;
            case 2: searchBook(); break;
```

```
            case 3: checkoutBook(); break;
            case 4: returnBook(); break;
            case 5: cout << "Goodbye!\n"; return 0;
            default: cout << "Invalid choice! Try again.\n"; break;
        }
    }
}
```

Output:

```
Library Management System
1. Add Book
2. Search Book
3. Checkout Book
4. Return Book
5. Exit
Choose an option: 1
Enter book title: sports
Enter book author: suraj
Enter book ISBN: 123
Book added successfully!

Library Management System
1. Add Book
2. Search Book
```

3. Checkout Book

4. Return Book

5. Exit

Choose an option: 2

Search by: 1. Title 2. Author 3. ISBN

Choose an option: 2

Enter search term: suraj

Book found: sports by suraj. ISBN: 123. Status: Available

Library Management System

1. Add Book

2. Search Book

3. Checkout Book

4. Return Book

5. Exit

Choose an option: 3

Enter ISBN of the book to check out: 123

Enter borrower's name: mohan

Book checked out successfully!

Library Management System

1. Add Book

2. Search Book

3. Checkout Book

4. Return Book

5. Exit

Choose an option: 2

Search by: 1. Title 2. Author 3. ISBN

Choose an option: 2

Enter search term: suraj

Book found: sports by suraj. ISBN: 123. Status: Checked out

Library Management System

1. Add Book

2. Search Book

3. Checkout Book

4. Return Book

5. Exit

Choose an option: 4

Enter ISBN of the book to return: 123

Book returned successfully!

Library Management System

1. Add Book

2. Search Book

3. Checkout Book

4. Return Book

5. Exit

Choose an option: 5

Goodbye!

=== Code Execution Successful ===