LAB PROJECT

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SECTION: BSE(3A)
COURSE: DATA STRUCTURES

TITLE
LIBRARY MANAGEMENT SYSTEM

INTRODUCTION :

Library management system is a simple console application using linked list in **C++ programming language**. Users can perform basic library management operations like inserting books, searching the issued books and displaying records of the issued books with the user details. Each book in the library has a unique identification number.

Source code

```
#include <iostream>
#include <string>
#include <fstream>

using namespace std;

class book
{
	public:
	string title;
	string author;
	string publisher;
	int year;
	string isbn;
	book* next;
	book(string, string, string, int, string, book*);
};

book::book(string tempTitle, string tempAuthor, string tempPublisher, int tempYear, string tempIsbn,
book* tempNext)
{
	title=tempTitle;
	author=tempAuthor;
	publisher=tempPublisher;
	year=tempYear;
	isbn=tempIsbn;
	next=tempNext;
}

typedef book* bookPtr;

void getline(istream &stream, string &str, char delimiter)
{	char temp[500];
```

```
	stream.get(temp, 500, delimiter);
	stream.ignore(500, delimiter);
	str = temp;
}

void getline(istream &stream, int &num, char delimiter)
{	int temp;

	stream >> temp;
	stream.ignore(500, delimiter);
	num= temp;
}

void readFile(bookPtr &root);
void insert (bookPtr &root);
void delTitle(bookPtr &root);
bookPtr locateNode(bookPtr temp, string titl);
void delIsbn(bookPtr &root);
bookPtr locateNodeIsbn(bookPtr temp, string isb);
void searchIsbn(bookPtr temp);
void printList(bookPtr temp);
void printAuthor(bookPtr temp);
void saveFile(bookPtr temp);
int countNodes(bookPtr temp);


void readFile(bookPtr &root)
{
	int numBooks, yea;
	string titl, aut, pub, isb;
	ifstream infile ("books.txt", ios::in);
	infile >> numBooks;
	infile.ignore(500,'\n');
	for (int count = 0; count < numBooks; count++)
	{
		getline(infile, titl, '\n');
		getline(infile, aut, '\n');
		getline(infile, pub, '\n');
		getline(infile,yea, '\n');
		getline(infile, isb, '\n');

		root = new book (titl, aut, pub, yea, isb, root);
	}
}
```

```
void insert (bookPtr &root)
{
	string titl, aut, pub, isb;
	int yea;

	cout << "Title:\t\t\t";
	cin.ignore(500,'\n');
	getline(cin, titl, '\n');
	cout << "Author:\t\t\t";
	getline(cin, aut, '\n');
	cout << "Publisher:\t\t";
	getline(cin,pub, '\n');
	cout << "Year:\t\t\t";
	getline(cin,yea, '\n');
	cout << "ISBN:\t\t\t";
	getline(cin, isb, '\n');

	root = new book (titl, aut, pub, yea, isb, root);
}

void delTitle(bookPtr &root)
{
	string titl;

	cout << "Book Title:\t\t\t";
	cin.ignore(500,'\n');
	getline(cin, titl, '\n');

	bookPtr p = locateNode(root, titl);

	if (p == NULL)
		cout << "\nDeletion cannot be done.\n\n";
	else if (root == p)
		root = p->next;
	else
	{
		bookPtr q = root;
		while (q->next != p)
			q = q->next;
		q->next = p->next;
	}
	delete p;
}

bookPtr locateNode(bookPtr temp, string titl)
{
```

```
	while (temp != NULL)
	{
		if (temp->title == titl)
		{
			return temp;
		}
		temp = temp->next;
	}
	return NULL;
}

void delIsbn(bookPtr &root)
{
	string isb;

	cout << "Book ISBN:\t\t\t";
	cin.ignore(500,'\n');
	getline(cin, isb, '\n');

	bookPtr p = locateNodeIsbn(root, isb);

	if (p == NULL)
		cout << "\nDeletion cannot be done.\n\n";
	else if (root == p)
		root = p->next;
	else
	{
		bookPtr q = root;
		while (q->next != p)
			q = q->next;
		q->next = p->next;
	}
	delete p;
}

bookPtr locateNodeIsbn(bookPtr temp, string isb)
{
	while (temp != NULL)
	{
		if (temp->isbn == isb)
		{
			return temp;
		}
		temp = temp->next;
	}
	return NULL;
```

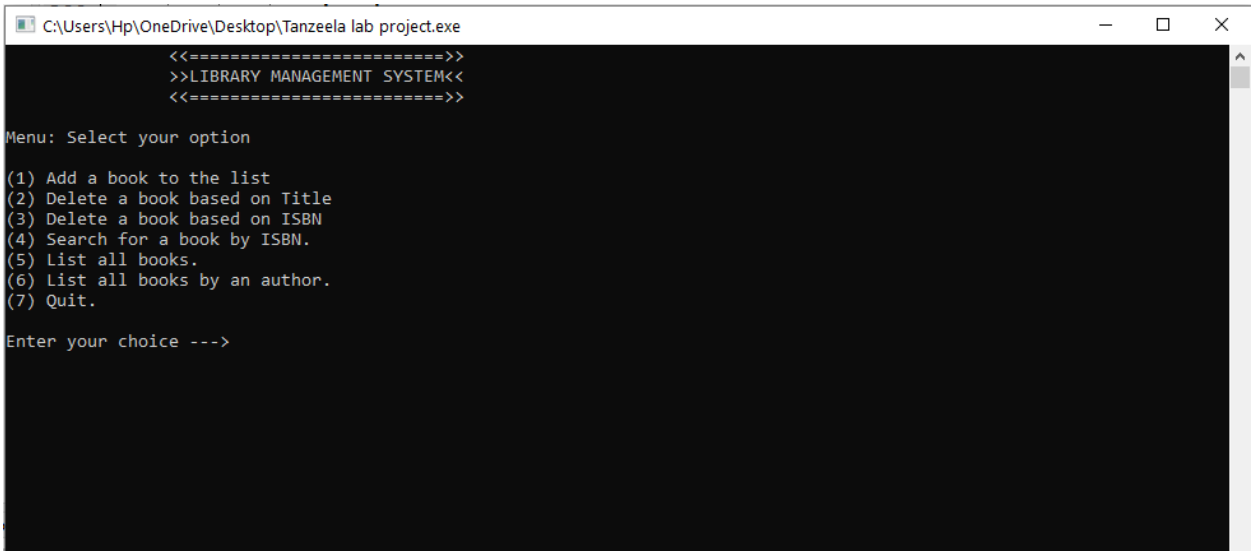
```
}

void searchIsbn(bookPtr temp)
{
	string isb;

	cout << "Book ISBN:\t\t\t";
	cin.ignore(500,'\n');
	getline(cin, isb, '\n');

	while (temp != NULL)
	{
		if (isb == temp->isbn)
		{
			cout << temp->title << "\n";
			cout << temp->author << "\n";
			cout << temp->publisher << "\n";
			cout << temp->year << "\n";
			cout << temp->isbn << "\n\n";
		}
		temp = temp->next;
	}
	cout << "\n";
}

void printList(bookPtr temp)
{
	while (temp != NULL)
	{
		cout << temp->title << "\n";
		cout << temp->author << "\n";
		cout << temp->publisher << "\n";
		cout << temp->year << "\n";
		cout << temp->isbn << "\n\n";
		temp = temp->next;
	}
	cout << "\n";
}

void printAuthor(bookPtr temp)
{
	string aut;

	cout << "Author name:\t\t\t";
	cin.ignore(500,'\n');
	getline(cin, aut, '\n');
```

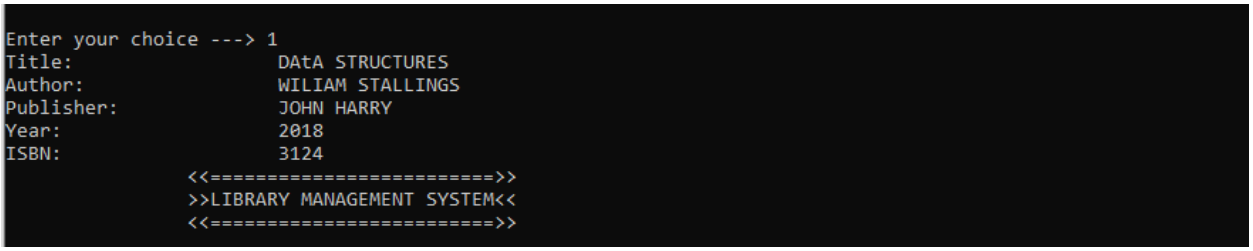
```
	while (temp != NULL)
	{
		if (temp->author == aut)
		{
			cout << temp->title << "\n";
			cout << temp->author << "\n";
			cout << temp->publisher << "\n";
			cout << temp->year << "\n";
			cout << temp->isbn << "\n\n";
		}
		temp = temp->next;
	}
	cout << "\n";
}

void saveFile(bookPtr temp)
{
	int count = countNodes(temp);
	ofstream outFile("saved.txt",ios::out);

	outFile << count << "\n";
	while (temp != NULL)
	{
		outFile << temp->title << "\n";
		outFile << temp->author << "\n";
		outFile << temp->publisher << "\n";
		outFile << temp->year << "\n";
		outFile << temp->isbn << "\n";
		temp = temp->next;
	}
	cout << "\n";
}

int countNodes(bookPtr temp)
{
	int countB = 0;
	while (temp != NULL)
	{
		countB++;
		temp = temp->next;
	}
	return countB;
}
int main()
{
```

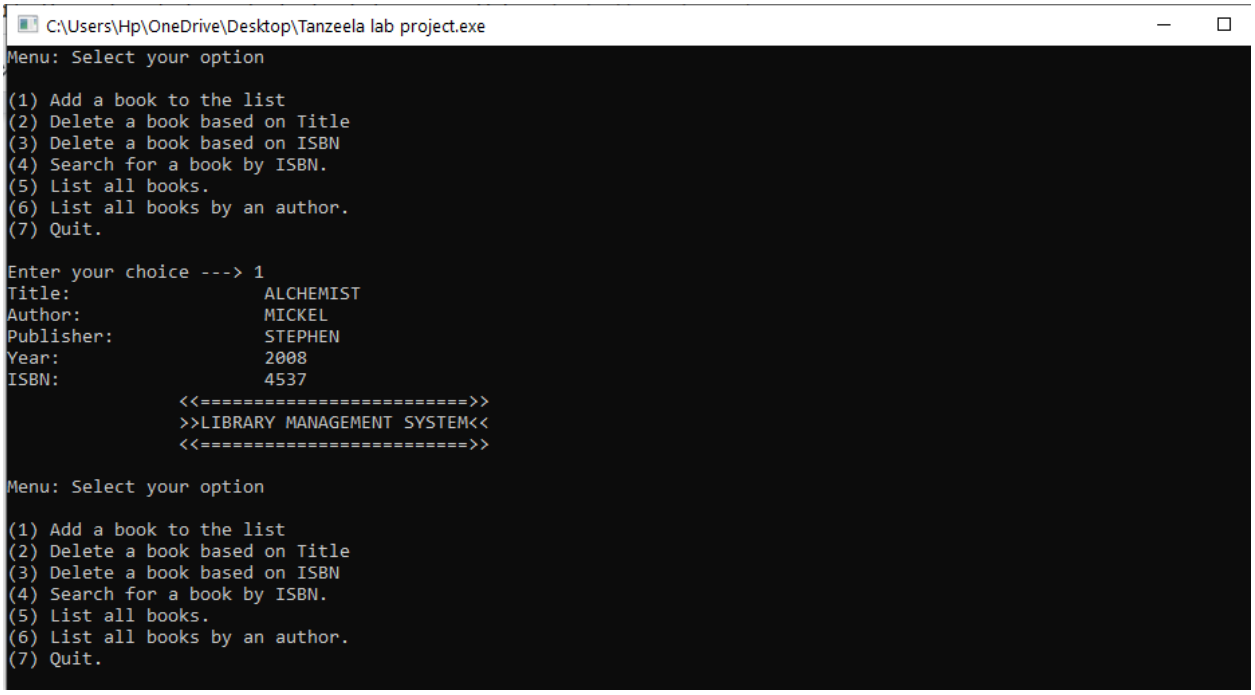
```
int choice;
bookPtr root = NULL;
readFile(root);

do
{
	cout << "\t\t<<==========================>>";
	cout << "\n\t\t>>LIBRARY MANAGEMENT SYSTEM<<";
	cout << "\n\t\t<<==========================>>";
	cout << "\n\nMenu: Select your option\n\n";
	cout << "(1) Add a book to the list\n";
	cout << "(2) Delete a book based on Title\n";
	cout << "(3) Delete a book based on ISBN\n";
	cout << "(4) Search for a book by ISBN.\n";
	cout << "(5) List all books.\n";
	cout << "(6) List all books by an author.\n";
	cout << "(7) Quit.\n\n";
	cout << "Enter your choice ---> ";

	cin >> choice;

	if (1 <= choice && choice <= 6)
	{
		switch (choice)
		{
		case 1:
			insert(root);
			break;
		case 2:
			delTitle(root);
			break;
		case 3:
			delIsbn(root);
			break;
		case 4:
			searchIsbn(root);
			break;
		case 5:
			printList(root);
			break;
		case 6:
			printAuthor(root);
			break;
		default:
			cout << "Invalid choice.  Enter again.\n\n";
			break;
```

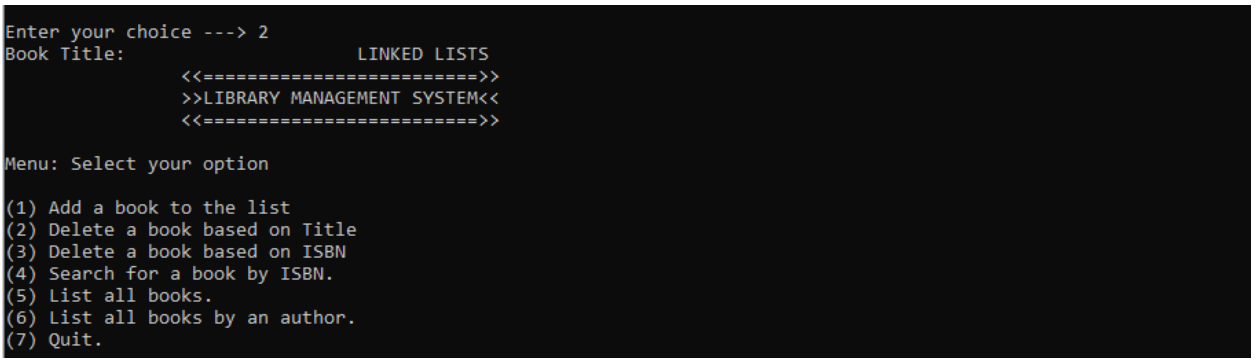
```
                    }
                }
        }
        while (choice != 7);
        saveFile(root);
        return 0;
```

Output:






C:\Users\Hp\OneDrive\Desktop\Tanzeela lab project.exe
Menu: Select your option
(1) Add a book to the list
(2) Delete a book based on Title
(3) Delete a book based on ISBN
(4) Search for a book by ISBN.
(5) List all books.
(6) List all books by an author.
(7) Quit.
Enter your choice ---> 1
Title: ALCHEMIST
Author: MICKEL
Publisher: STEPHEN
Year: 2008
ISBN: 4537
<<==========>>
>>LIBRARY MANAGEMENT SYSTEM<<
<<==========>>
Menu: Select your option
(1) Add a book to the list
(2) Delete a book based on Title
(3) Delete a book based on ISBN
(4) Search for a book by ISBN.
(5) List all books.
(6) List all books by an author.
(7) Quit.


Enter your choice ---> 2
Book Title: LINKED LISTS
<<==========>>
>>LIBRARY MANAGEMENT SYSTEM<<
<<==========>>
Menu: Select your option
(1) Add a book to the list
(2) Delete a book based on Title
(3) Delete a book based on ISBN
(4) Search for a book by ISBN.
(5) List all books.
(6) List all books by an author.
(7) Quit.


(1) Add a book to the list
(2) Delete a book based on Title
(3) Delete a book based on ISBN
(4) Search for a book by ISBN.
(5) List all books.
(6) List all books by an author.
(7) Quit.
Enter your choice ---> 3
Book ISBN: 6789
Deletion cannot be done.

```
(1) Add a book to the list
(2) Delete a book based on Title
(3) Delete a book based on ISBN
(4) Search for a book by ISBN.
(5) List all books.
(6) List all books by an author.
(7) Quit.

Enter your choice ---> 4
Book ISBN:                      4537
ALCHEMIST
MICKEL
STEPHEN
2008
4537
```

```
C:\Users\Hp\OneDrive\Desktop\Tanzeela lab project.exe

(1) Add a book to the list
(2) Delete a book based on Title
(3) Delete a book based on ISBN
(4) Search for a book by ISBN.
(5) List all books.
(6) List all books by an author.
(7) Quit.

Enter your choice ---> 5
ALCHEMIST
MICKEL
STEPHEN
2008
4537

DAtA STRUCTURES
WILIAM STALLINGS
JOHN HARRY
2018
3124
```

```
(7) Quit.

Enter your choice ---> 7


--------------------------------
Process exited after 825.2 seconds with return value 0
Press any key to continue . . .
```