Data Structures and Algorithms Lab

Instructions

Work on this lab individually. You can use your books, notes, handouts etc. but you are not allowed to borrow anything from your peer student.

Marking Criteria

Show your work to the instructor before leaving the lab to get some or full credit.

What you have to do

Implement the **BookList** class which stores **Books** in unsorted order. Your class declarations should look like:

```
class Book
{
	friend class BookList;

private:
	int id;			//id of a book.
	string title;		//name of a book.
	float price;		//price of a book.
	Book *next;		//address of the next available object.
public:
	Book(int id, string title, float price, Book *next);	//parameterized constructor
};

class BookList
{
private:
	Book *head;		//start of the list
	Book *cursor;		//current item of the list
public:
	BookList();		//default constructor
	~BookList();		//destructor
};
```

The **BookList** class should also have the following public member functions:

void insert (const Book &newItem)

Inserts **newItem** into a list. If the list is not empty, then inserts **newItem** after the **cursor**. Otherwise, inserts **newItem** as the first (and only) data item in the list. In either case, moves the cursor to **newItem**.

void remove ()

Remove the data item marked by the **cursor** from a list. If the resulting list is not empty, then moves the **cursor** to the data item that followed the deleted data item. If the deleted data item was at the end of the list, then moves the **cursor** to the beginning of the list.

void search (string title) const

This function searches for **book(s)** based on its **title** in the book list. It should dispaly all the information about the **book(s)** if found otherwise display an appropriate message.

void replace (const Book &newItem)

Replace the data item marked by the cursor with **newItem**. The **cursor** remains at **newItem**.

bool isEmpty () const

Returns **true** if a list is empty. Otherwise, returns **false**.

void gotoBeginning ()

Moves the cursor to the beginning of the list

void gotoEnd ()

Moves the cursor to the end of the list.

bool gotoNext ()

If the cursor is not at the end of the list, then moves the cursor to mark the next data item in the list and returns **true**, otherwise returns **false**

bool gotoPrior ()

If the cursor is not at the beginning of the list, then moves the cursor to mark the preceding data item in the list and returns **true**, otherwise returns **false**

Book getCursor ()

Returns a copy of the data item marked by the cursor.

void showStructure () const

Outputs the data items in a list. If the list is empty, outputs "Empty list".

In the **main** function, your program should take the data of books from a text file **input.txt** and store the info of each book into the book list. The file is in the following format: **id**; line break, **title**; line break, **price** and then a blank line followed by the data of next book, exactly in the same order as described above.

Test the functionality of your **BookList** class by creating some of its objects.

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