

Some of the characteristics of a book are the title, author(s), publisher, ISBN, price, and year of publication.

Design the class **Book**. Each object of the class **Book** can hold the following information about a book:

- title,
- authors,
- publisher,
- ISBN,

Include the member functions to perform the various operations on the objects of Book. For example, the typical operations that can be performed on the title are to show the title, set the title. Add similar operations for the publisher, ISBN , and authors. Add the appropriate constructors and a destructor (if one is needed).

- Write the definitions of the member functions of the class **Book**
- Design a **BookstoreManager** class which creates a dynamic array of type **Book** (don't use vectors), and provide implementation for the following operations on books in the array with the given time-complexity
- A starter code and a sample output are provided.
- As shown in the sample output, books are kept sorted by ISBN. Each time a new book is inserted, it'll be inserted in the sorted order.
- You are not allowed to use any existing sorting and searching functions.

Functionalities available in BookstoreManager

Function	Time-complexity
isEmpty() <i>returns true if the array is empty, otherwise false</i>	O(1)
isFull() <i>returns true if the array is full, otherwise false</i>	O(1)
listSize() <i>prints the number of books in the array</i>	O(1)
print() <i>prints the content of the array</i>	O(n)

insert(Book) <i>asks user to enter new book info, and it adds the book to the array in sorted order</i> <i>if array is full, it'll double the size of the array</i>	O(n)
remove(Book) <i>asks user to enter ISBN info, and it removes the book from the array; shifts the other elements up in the array.</i> <i>Prints "Not Found" if search fails.</i>	O(n)
removePublisher(string) <i>asks user to enter publisher name, and it removes all the books with the same publisher from the array; shifts the other elements up in the array.</i> <i>Prints "Not Found" if search fails.</i>	O(n)
search(Book) <i>asks user to enter ISBN or title, and prints the content of the book</i> <i>prints "Not Found", if book is not found</i>	O(logn)

Starter Code:

```
#include <iostream>
#include "Book.h"
#include "BookstoreManager.h"

using namespace std;

int main() {
    BookstoreManager bookstoreManager;

    //prints true if the bookstore is empty
    bookstoreManager.isEmpty();

    //insert 4 books
    string title, authors, publisher;
    int isbn;
    for(int i=0;i<4;i++){
        cout<<"Enter book title:";
        cin>>title;
        cout<<"Enter authors:";
        cin>>authors;
        cout<<"Enter isbn:";
        cin>>isbn;
        cout<<"Enter publisher";
        cin>>publisher;
        Book aBook(title, isbn, authors, publisher);
        bookstoreManager.insert(aBook);
        cout<<endl;
    }

    //print bookstore
    bookstoreManager.print();

    //search for books
    cout<<"Searching..."<<endl;
    cout<<"ISBN:";
    cin>>isbn;
    Book b2(isbn);
    bookstoreManager.search(b2);

    //remove a book
    cout<<"Removing..."<<endl;
    cout<<"ISBN:";
    cin>>isbn;
    Book b1(isbn);
    bookstoreManager.remove(b1);

    //print bookstore
    bookstoreManager.print();

    //remove books from a particular publisher
    cout<<"Removing publisher"<<endl;
    cout<<"Publisher:";
```

```
cin>>publisher;  
bookstoreManager.removePublisher(publisher);  
  
//print bookstore  
bookstoreManager.print();  
  
//prints the number of books  
bookstoreManager.listSize();  
  
}
```

Sample Output:

true

Enter book title:**C++: Programming Basics**

Enter authors:**Nathan Clark**

Enter ISBN:**154296**

Enter publisher:**CreateSpace**

Enter book title:**Data Structures & Algorithm Analysis in C++**

Enter authors:**Mark Weiss**

Enter ISBN:**132847**

Enter publisher:**Pearson**

Enter book title:**Introduction to Programming Using Python**

Enter authors:**Daniel Liang**

Enter ISBN:**147231**

Enter publisher:**Pearson**

Enter book title:**Introduction to Algorithms**

Enter authors:**Thomas H. Cormen , Charles E. Leiserson**

Enter ISBN:**189352**

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132847

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Introduction to Programming Using Python

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Removing all books for a publisher

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1

Sample Code	Sample Output
<pre> #include <iostream> #include "Book.h" #include "BookstoreManager.h" using namespace std; int main() { BookstoreManager bookstoreManager; //prints true if the bookstore is empty bookstoreManager.isEmpty(); //insert 4 books string title, authors, publisher; int isbn; for(int i=0;i<4;i++){ cout<<"Enter book title:"; cin>>title; cout<<"Enter authors:"; cin>>authors; cout<<"Enter isbn:"; cin>>isbn; cout<<"Enter publisher"; cin>>publisher; Book aBook(title, isbn, authors, publisher); bookstoreManager.insert(aBook); cout<<endl; } //print bookstore bookstoreManager.print(); //search for books cout<<"Searching..."<<endl; cout<<"ISBN:"; cin>>isbn; Book b2(isbn); bookstoreManager.search(b2); //remove a book </pre>	<pre> true Enter book title:C++: Programming Basics Enter authors:Nathan Clark Enter ISBN:154296 Enter publisher:CreateSpace Enter book title:Data Structures & Algorithm Analysis in C++ Enter authors:Mark Weiss Enter ISBN:132847 Enter publisher:Pearson Enter book title:Introduction to Programming Using Python Enter authors:Daniel Liang Enter ISBN:147231 Enter publisher:Pearson Enter book title:Introduction to Algorithms Enter authors:Thomas H. Cormen , Charles E. Leiserson Enter ISBN:189352 Enter publisher:MIT Data Structures & Algorithm Analysis in C++ by Mark Weiss 132847 Pearson Introduction to Programming Using Python Daniel Liang 147231 Pearson C++: Programming Basics by Nathan Clark 154296 CreateSpace Introduction to Algorithms Thomas H. Cormen , Charles E. Leiserson 189352 MIT Searching... ISBN: 147231 Introduction to Programming Using Python Daniel Liang 147231 Pearson </pre>

<pre> cout<<"Removing..."<<endl; cout<<"ISBN:"; cin>>isbn; Book b1(isbn); bookstoreManager.remove(b1); //print bookstore bookstoreManager.print(); //remove books from a particular publisher cout<<"Removing publisher"<<endl; cout<<"Publisher:"; cin>>publisher; bookstoreManager.removePublisher(publisher); //print bookstore bookstoreManager.print(); //prints the number of books bookstoreManager.listSize(); } </pre>	<div>Removing...</div> <div>ISBN: 154296</div> <div> Data Structures & Algorithm Analysis in C++ by Mark Weiss 132847 Pearson </div> <div> Introduction to Programming Using Python Daniel Liang 147231 Pearson </div> <div> Introduction to Algorithms Thomas H. Cormen , Charles E. Leiserson 189352 MIT </div> <div>Removing all books for a publisher</div> <div>Publisher: Pearson</div> <div> Introduction to Algorithms Thomas H. Cormen , Charles E. Leiserson 189352 MIT </div> <div>1</div>
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