

Object-Oriented Programming

Assignment 2 (20 Marks)

Instructions

- 1- Students will be the same groups of assignment 1.
- 2- Deadline of submission is **Dec 23rd at 11:55 pm.**
- 3- Please submit only work that you did yourself. If you copy work from your friend or book or the internet, you will lose the marks of this assignment.

Task 1 (17 Marks)

Online library system

Using classes and arrays, the team will develop a set of functions for online library system. A system is represented by the following structure:

class UserList (7 marks)

```
{
    private:
        User* users;
        int capacity;
        int usersCount;

    public:
        UserList(int capacity);
        void addUser(User user); // at the end of the array.
        User& searchUser(string name);
        User& searchUser(int id);
        void deleteUser(int id);
        friend ostream &operator<<( ostream &output, UserList &userList )//to display all
        books
        ~UserList();
};
```

class BookList (10 marks)

```
{
    private:
        Book* books;
        int capacity;
        int booksCount;

    public:
        BookList(const BookList& anotherList);
        BookList(int capacity);
        Book& searchBook(string name);
        Book& searchBook(int id);
};
```

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```
void deleteBook(int id); //delete a book
Book getTheHighestRatedBook();
Book* getBooksForUser(User); // get all books of this author
Book & operator [ ] (int position);
friend ostream &operator<<( ostream &output, BookList &booklist ); //to display all books
~BookList();
};
```

//Note: when you **delete a book**, the book could be in the middle of the array, which will leave a gap in your array of books. You should fill the gap by shifting all the books to the right of the deleted book one place to the left.

The same scenario should happen when **deleting a user**.

B1 id=1	B2 id=2	B3 id=3	B4 id=4	B5 id=5		
B1 id=1	B3 id=3	B4 id=4	B5 id=5			

deleteBook(2)



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General Notes:

- 1- Please make sure to adhere to the provided classes' interfaces.
- 2- You can add any required functions to help you to get the outputs.
- 3- Submission will include 4 classes and their implementation (Book, User, BookList, UserList) and a main function that provides the same experience as the screenshots provided.

Task 2 (3 Marks)

- Team should write a **demo program** to demonstrate the use of these functions.
- Team should test the entire program and make sure that it works correctly in full.
- All team members must fully understand all parts of the program.

Task 3 - Writing Good Quality Code

No program stays the same. It will need to change to fix bugs, add new features, etc. So, it is very important to write high quality readable code, so that you or other developers can be able to review and modify this code in the future. In this task, you will:

- 1- Add a header to your program saying who the author is, the purpose of the program, etc.
- 2- Add a header for every function explaining what it does, what parameters it takes and what value it returns.
- 3- Write the code following C++ coding style.
<http://geosoft.no/development/cppstyle.html>
- 4- Add comments to any part that is difficult to understand.

Note: if you didn't do it you will lose 1 mark.

Grading criteria (Total 20 marks)

Task 1 [17 marks]

- User class (7 marks)
- Parameterized constructor (1 mark)
- add user (1 mark)
- two searching methods (2 mark)
- delete user (1 mark)
- Operator << (1 mark)

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- destructor(1 mark)
- Book class (10 mark)
- Parameterized constructor (1 mark)
- Copy constructor (1 mark)
- two searching methods (2 mark)
- delete book (1 mark)
- Operator << and operator [] (2 mark)
- highest Rate book function (1 mark)
- get book for user (1 mark)
- destructor (1 mark)
- **Task 2 - General Checks and Main** [3 mark]
- Creating userlist object in the main (1 mark)
- Creating booklist object in the main (1 mark)
- Follow the classes' interfaces (1 mark)

Submission Instructions

1- Only 1 member of the team will submit into **Blackboard** a zip file. **Carefully follow the mentioned steps to create your zip file:** **a.** Go to the folder of your project and create a new text file (names.cpp) with the names and IDs of the team. **b.** Delete the exe file of the project found in the bin directory **c.** Zip the whole folder of the project and name it in the following form ID1_ID2, where ID1 is id of the first student and ID2 is the id of the second student. Ex. (20192222_20198888)

2- **All team members must understand the details** of the entire program and be able to explain it or even modify it if needed.

3- TA can ask any team member about any of the programs developed and its code.

By failing to follow the submission instructions of the assignment, you are risking your assignment's grade.

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A Sample Run

```
Select one of the following choices:
1- Books Menu
2- Users Menu
3- Exit
2
How many users will be added?
5
USERS MENU
1- Create a USER and add it to the list
2- Search for a user
3- Display all users
4- Back to the main menu
1
Enter the user information in this order
Name Age Email Password (Space separated)
Ahmed 30 ahmed@gmail.com 123456
USERS MENU
1- Create a USER and add it to the list
2- Search for a user
3- Display all users
4- Back to the main menu
1
Enter the user information in this order
Name Age Email Password (Space separated)
Nada 27 nada@gmail.com 123456
USERS MENU
1- Create a USER and add it to the list
2- Search for a user
3- Display all users
4- Back to the main menu
3
```

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```
=====User 1 info =====
Name: Ahmed
Age: 30
Id: 1
Email: ahmed@gmail.com
=====
=====User 2 info =====
Name: Nada
Age: 27
Id: 2
Email: nada@gmail.com
=====
USERS MENU
1- Create a USER and add it to the list
2- Search for a user
3- Display all users
4- Back to the main menu
2
SEARCH FOR A USER
1- Search by name
2- Search by id
3- Return to Users Menu
1
Enter Name
Nada
=====User 2 info =====
Name: Nada
Age: 27
Id: 2
Email: nada@gmail.com
=====
1- Delete user
2- Return to Users Menu
1
```

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```
SEARCH FOR A USER
1- Search by name
2- Search by id
3- Return to Users Menu
3
USERS MENU
1- Create a USER and add it to the list
2- Search for a user
3- Display all users
4- Back to the main menu
4
=====
Select one of the following choices:
1- Books Menu
2- Users Menu
3- Exit
1
How many books will be added?
10
BOOKS MENU
1- Create a book and add it to the list
2- Search for a book
3- Display all books (with book rating)
4- Get the highest rating book
5- Get all books of a user
6- Copy the current Book List to a new Book List and switch to it
7- Back to the main menu
1
Enter the book information in this order
Title ISBN Category(Space separated)
AdventureBook 12345 Adventure
1- Assign author
2- Continue
1
Enter author (user) id:
2
No Author Found with id = 2
```

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```
1- Assign author
2- Continue
1
Enter author (user) id:
1
BOOKS MENU
1- Create a book and add it to the list
2- Search for a book
3- Display all books (with book rating)
4- Get the highest rating book
5- Get all books of a user
6- Copy the current Book List to a new Book List and switch to it
7- Back to the main menu
1
Enter the book information in this order
Title ISBN Category(Space separated)
SpaceBook 23456 Science
1- Assign author
2- Continue
2
BOOKS MENU
1- Create a book and add it to the list
2- Search for a book
3- Display all books (with book rating)
4- Get the highest rating book
5- Get all books of a user
6- Copy the current Book List to a new Book List and switch to it
7- Back to the main menu
3
```


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```
=====Book 1 info =====
Title: AdventureBook
ISBN: 12345
Id: 1
Category: Adventure
Avg Rating:0
=====Author info =====
Name: Ahmed
Age: 30
Id: 1
Email: ahmed@gmail.com
=====

=====Book 2 info =====
Title: SpaceBook
ISBN: 23456
Id: 2
Category: Science
Avg Rating:0
BOOKS MENU
1- Create a book and add it to the list
2- Search for a book
3- Display all books (with book rating)
4- Get the highest rating book
5- Get all books of a user
6- Copy the current Book List to a new Book List and switch to it
7- Back to the main menu
2
SEARCH FOR A BOOK
1- Search by name
2- Search by id
3- Return to Books Menu
1
Enter name
AdventureBook
```

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```
=====Book 1 info =====
```

```
Title: AdventureBook
```

```
ISBN: 12345
```

```
Id: 1
```

```
Category: Adventure
```

```
Avg Rating: 0
```

```
Author: Ahmed
```

```
1- Update author
```

```
2- Update name
```

```
3- Update Category
```

```
4- Delete Book
```

```
5- Rate book
```

```
6- Get back to books menu
```

```
2
```

```
Enter new Name:
```

```
NewBook
```

```
1- Update author
```

```
2- Update name
```

```
3- Update Category
```

```
4- Delete Book
```

```
5- Rate book
```

```
6- Get back to books menu
```

```
5
```

```
Enter Rating Value:
```

```
4
```

```
1- Update author
```

```
2- Update name
```

```
3- Update Category
```

```
4- Delete Book
```

```
5- Rate book
```

```
6- Get back to books menu
```

```
6
```

```
BOOKS MENU
```

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```
BOOKS MENU
1- Create a book and add it to the list
2- Search for a book
3- Display all books (with book rating)
4- Get the highest rating book
5- Get all books of a user
6- Copy the current Book List to a new Book List and switch to it
7- Back to the main menu
3
=====Book 1 info =====
Title: NewBook
ISBN: 12345
Id: 1
Category: Adventure
Avg Rating:4
=====Author info =====
Name: Ahmed
Age: 30
Id: 1
Email: ahmed@gmail.com
=====

=====Book 2 info =====
Title: SpaceBook
ISBN: 23456
Id: 2
Category: Science
Avg Rating:0

BOOKS MENU
1- Create a book and add it to the list
2- Search for a book
3- Display all books (with book rating)
4- Get the highest rating book
5- Get all books of a user
6- Copy the current Book List to a new Book List and switch to it
7- Back to the main menu
4
```

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```
=====Book 1 info =====
Title: NewBook
ISBN: 12345
Id: 1
Category: Adventure
Avg Rating:4
=====Author info =====
Name: Ahmed
Age: 30
Id: 1
Email: ahmed@gmail.com
=====
BOOKS MENU
1- Create a book and add it to the list
2- Search for a book
3- Display all books (with book rating)
4- Get the highest rating book
5- Get all books of a user
6- Copy the current Book List to a new Book List and switch to it
7- Back to the main menu
5
Enter User ID
1
=====Book 1 info =====
Title: NewBook
ISBN: 12345
Id: 1
Category: Adventure
Avg Rating: 4
Author: Ahmed
BOOKS MENU
1- Create a book and add it to the list
2- Search for a book
3- Display all books (with book rating)
4- Get the highest rating book
5- Get all books of a user
6- Copy the current Book List to a new Book List and switch to it
7- Back to the main menu
6
```

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```
Copied current list (2 books) to a new List and switched to it
BOOKS MENU
1- Create a book and add it to the list
2- Search for a book
3- Display all books (with book rating)
4- Get the highest rating book
5- Get all books of a user
6- Copy the current Book List to a new Book List and switch to it
7- Back to the main menu
3
=====Book 1 info =====
Title: NewBook
ISBN: 12345
Id: 1
Category: Adventure
Avg Rating:4
=====Author info =====
Name: Ahmed
Age: 30
Id: 1
Email: ahmed@gmail.com
=====

=====Book 2 info =====
Title: SpaceBook
ISBN: 23456
Id: 2
Category: Science
Avg Rating:0
```

```
BOOKS MENU
1- Create a book and add it to the list
2- Search for a book
3- Display all books (with book rating)
4- Get the highest rating book
5- Get all books of a user
6- Copy the current Book List to a new Book List and switch to it
7- Back to the main menu
7
=====
Select one of the following choices:
1- Books Menu
2- Users Menu
3- Exit
3
```