Object-Oriented Programming
Assignment 1 (5 Marks)

Cairo University, Faculty of
Computers and Artificial Intelligence

Instructions

1- Students will form teams of **2** students **from the same group.**
2- **Note that you will pair with the same student for the next assignment.**
3- Deadline of submission is **Saturday NOV.26 at 11:55 pm.**
4- Submission on Blackboard.
5- 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 (4 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:

```
#ifndef USER_H
#define USER_H

#include<cstring>
#include<iostream>
using namespace std;

class User
{
private:
    string name;
    int age;
    int id; // Make sure that the id is incremental. First id is 1, second is 2 and so on
    string password;
    string email;
public:
    static int count;
    User();
    User(string name, int age, string email, string password);
    User(copy User&user);
    bool operator==(const User& user);
    void setName(string name);
    string getName() const;
    void setPassword(string password);
    string getPassword();
    void setEmail(string email);
    string getEmail();
```

```cpp
    void setAge(int age);
    int getAge();
    void setId(int id);
    int getId();
    friend ostream &operator<<(ostream &output, const User &user );
    friend istream &operator>>( istream  &input, User &user );
};

#endif // USER_H
```

Notes:

1- Two users are considered equal if they have the same email, name, age and id

2- Make sure to initialize the user name with empty string.

2- Feel free to add any attribute, function to the class. Make sure to add a comment to explain any new member function/attribute you add to the interface.

```cpp
#ifndef BOOK_H
#define BOOK_H

#include<cstring>
#include<iostream>
#include "User.h"

using namespace std;

class Book
{
private:
    string title;
    string isbn;
    int id; // Make sure that the id is incremental. First id is 1, second is 2 and so on
    string category;

    // this variable should contain the average rating for the book, rateBook function
    // should update this attribute with the new average rating for the book
    double averageRating;

    User author;
public:
```

```
        static int count;
        Book();
        Book(string title, string isbn, string category);
        Book(const Book& book);
        void setTitle(string title);
        string getTitle();
        void setISBN(string isbn);
        string getISBN();
        void setId(int id);
        int getId();
        void setCategory(string category);
        string getCategory();
        void setAuthor(User user);
        User getAuthor();
        // this function should update averageRating attribute as a new rating is
        // introduced to the book so the average rating should be affected.
        // Check the main screenshot to know more information
        void rateBook(int rating);
        bool operator==(const Book& book);
        friend ostream &operator<<(ostream &output, const Book &book );
        friend istream &operator>>( istream  &input, Book &book );
};

#endif // BOOK_H
```

Note:

1- Two books are considered as equal if they have the same title, isbn, category, id and author

2- Print the book info only if the book has an author

General Note:

1- Please make sure to adhere to the provided classes' interfaces.

2- Check the following screenshot. Please make sure to develop a demo program (main function) that provide the same experience as the screenshot

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```
Let's add a user
Enter the user information in this order
Name Age Email Password (Space separated)
Mohamed 21 mohamed@gmail.com 123

========User 1 info ========
Name: Mohamed|Age: 21|Id:1|Email:mohamed@gmail.com
======================================

Let's add another user
Enter the user information in this order
Name Age Email Password (Space separated)
Ahmed 22 ahmed@gmail.com 456

========User 2 info ========
Name: Ahmed|Age: 22|Id:2|Email:ahmed@gmail.com
======================================

Let's add a book
Enter the book information in this order
Title ISBN Category(Space separated)
T1 IS1 Cat1
========Book 1 info ========
Title: T1|ISBN: IS1|Id: 1|Category: Cat1|Avg Rating: 0
======================================

Let's add another book
Enter the book information in this order
Title ISBN Category(Space separated)
T2 IS2 Cat3
========Book 2 info ========
Title: T2|ISBN: IS2|Id: 2|Category: Cat3|Avg Rating: 0
======================================

Let's assign an author for the first book, set the first user as an author
Let's rate the first book with 3 and 4 ratings and print the book info
========Book 1 info ========
Title: T1|ISBN: IS1|Id: 1|Category: Cat1|Avg Rating: 3.5

========User 1 info ========
Name: Mohamed|Age: 21|Id:1|Email:mohamed@gmail.com
======================================


======================================

Let's add a new rating for b1 with 5 and print the book info
========Book 1 info ========
Title: T1|ISBN: IS1|Id: 1|Category: Cat1|Avg Rating: 4

========User 1 info ========
Name: Mohamed|Age: 21|Id:1|Email:mohamed@gmail.com
======================================


======================================


Process returned 0 (0x0)   execution time : 71.093 s
Press ENTER to continue.
```

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Object-Oriented Programming
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Task 2 - Writing Good Quality Code (1 mark)

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.

Grading criteria (Total 5 marks)

Task 1 (4 marks)

- **User class (1.5 mark)**
    - Default & Parameterized constructor
                                (0.25 mark)
    - Copy constructor   (0.25 mark)
    - Operator==   (0.25 mark)
    - Setter and getter   (0.25 mark)
    - Operator >> and operator << (0.5 mark)

- **Book class (1.5 mark)**

Object-Oriented Programming
Assignment 1 (5 Mark)

- Default&Parameterized constructor

  (0.25 mark)
- Copy constructor   (0.25 mark)
- Operator==   (0.25 mark)
- Setter and getter   (0.25 mark)
- Operator >> and operator << (0.25 mark)
- Rate book function   (0.25 mark)

- General Checks and Main (1 mark)
    - Creating 2 users objects in the main (0.25 mark)
    - Creating 2 books objects in the main (0.25 mark)
    - Follow the classes' interfaces (0.5 mark)

Task 2 (1 mark)
- Following CPP coding styles and naming convention
(0.5 mark)

- Separate header and implementation for each class (0.5 mark)

Submission Instructions

1- Only 1 member of the team will submit into **Blackboard** a zip file. <u>**Carefully follow the mentioned steps to create your zip file:**</u>
   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.