CL-1004
Object Oriented Programming

Lab No 8

Objectives:

- Classes and objects
- Data members
- Member function
- Data encapsulation
- Member access specifier (private , public , protected)
- Constructor, Destructor
- Copy Constructor
- This pointer
- Constant data members
- Deep vs shallow copy

Note: Carefully read the following instructions (*Each instruction contains a weightage*)

1. There must be a block of comments at start of every question's code by students; the block should contain brief description about functionality of code.
2. Comment on every function about its functionality.
3. Use understandable name of variables.
4. Proper indentation of code is essential
5. Write a C++ statement(s) for each of the following task one after the other, in the same order.
6. Make a Microsoft Word file and paste all of your C++ code with all possible screenshots of every **task outputs in MS word and do not submit .cpp file with word file**.
7. First think about statement problems and then write/draw your logic on copy.
8. After copy pencil work, code the problem statement on MS Studio C++ compiler.
9. At the end when you done your tasks, attached C++ created files in MS word file and make your submission on Microsoft teams. (Make sure your submission is completed).
10. Please submit your file in this format 19F1234_L8.
11. Do not submit your assignment after deadline.
12. Do not copy code from any source otherwise you will be penalized with negative marks.

Problem 1: | (Classes, objects, Constructor, Destructor and Member functions, constant)

Write a class Person, having following private data members:

1. Name
2. Data of birth (a constant data member)
3. Count (a static data member)
4. CNIC (a constant data member)

Count should keep track of how many person objects are created. Set the value of count before any object is created. Display it at the end of the program.

Public member functions:

1. Constant member function to access the Date of Birth of each person (get DoB)
2. Constant member function to access the CNIC of each person (get CNIC)
3. Display function for Person record output (const)

Display a person record Mr. X with DoB 1st January 2001 having CNIC xxxxx-xxxxxxx-x

Problem 2: (Classes, objects, Public data members)

You have to maintain the data of an online shopping system of a book store. A customer can add any number of books to the cart. However, each customer can make purchases up to the total of Rs. 3000 at a time. There is a class named **Cart** which has following private data members:

- a string ***cName*** to store the name of the customer (which can contain space to separate first and last name)
- ***total*** of float type to contain total price of all the selected items
- and an integer data member ***cartValue*** to store total amount, a customer can purchase upto (i.e. Rs. 3000)

1. Write default and copy constructor for this class and initializes data member to appropriate values.
2. Write setters and getters for your class and use them in your code where appropriate.
3. Write a function: float addItem (float itemPrice) to add the new item price in the cart. This function calculates the total price of all the items by adding itemPrice in total and returns total.
    - Every time a customer wanted to add an item, he/she gives you the amount of that particular item (via addItem method) and you have to inform the customer whether

he/she can buy a particular item of not. Update the total data member on successful purchase (using setter).

4. Remember that each object of this class will represent a new customer. Also write a function **void print ( )** which displays the customer name and total price of all the items in the cart.
5. Write a default destructor.

Problem 3: Classes , Objects, Copy constructor

1. Define a class person with data members Name (string), Age (int*), Employment status (Boolean) and favorite sports (string).
2. Write a default constructor to initialize the data members to the following values:
    a. Name = null
    b. Age =0
    c. Employment status = 1/true (for employed)
    d. Favorite sports = swimming
3. Create an object p1.
4. Copy p1 object to p2 object using a copy constructor.
5. Output the values of p2 object.

Problem 4: Classes , Objects, Copy constructor

Some of the characteristics of a book are the title, author(s), publisher, ISBN, price, and year of publication. Design a class bookType that defines the book as an ADT.

- Each object of the class bookType can hold the following information about a book: title, up to four authors, publisher, ISBN, price, and number of copies in stock. To keep track of the number of authors, add another member variable.
- Include the member functions to perform the various operations on objects of type bookType. For example, the usual operations that can be performed on the title are to show the title, set the title, and check whether a title is the same as the actual title of the book. Similarly, the typical operations that can be performed on the number of copies in stock are to show the number of copies in stock, set the number of copies in stock, update the number of copies in stock, and return the number of copies in stock. Add similar operations for the publisher, ISBN, book price, and authors. Add the appropriate constructors and a destructor (if one is needed).

Write the definitions of the member functions of the class bookType.

Write a program that uses the class bookType and tests various operations on the objects of the class bookType. Declare an array of 100 components of type bookType. Some of the operations that you should perform are to search for a book by its title, search by ISBN, and update the number of copies of a book. Make class diagram of this problem

Proper code indentation will hold extra marks!

Best of luck 

You are done with your exercise, submit on Teams at given time.