



CL-1004

Object Oriented Programming

Lab No 7

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
- Static data members

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 and about its functionality.
3. Mention comments where necessary such as comments with variables, loop, classes etc to increase code understandability.
4. Use understandable name of variables.
5. Proper indentation of code is essential.
6. Write a code in C++ language.
7. Make a Microsoft Word file and paste all of your C++ code with all possible screenshots of every task **output in Microsoft Word and submit word file. Do not submit .cpp file.**
8. First think about statement problems and then write/draw your logic on copy.
9. After copy pencil work, code the problem statement on MS Studio C++ compiler.
10. At the end when you done your tasks, attached C++ created files in MS word file and make your submission on Google Classroom. (Make sure your submission is completed).
11. Please submit your file in this format **20F1234_L1**.
12. **Do not submit your assignment after deadline. Late submission is not accepted.**
13. **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, copy constructor)

Write a class Person, having following private data members:

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

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

Make another object that will be initialized with some other object.

Use 3 file structure.

Problem 2: | (Constant keyword) Home Work

Write a menu driven program that will demonstrate the following concepts.

1. Const Variables
2. Constant Function Parameters
3. Constant Return type
4. Const Pointer
5. Pointer to Const Variable
6. Constant Data Members of Class
7. Constant Member Function of Class

Example Run:

Please enter the choice to see the example of above concepts or press -1 to exit:

4

Const Pointer:

If we make a pointer **const**, we cannot change the pointer. This means that the pointer will always point to the same address but we can change the value of that address.

For example

```
int a = 4;
```

```
int* const p = &a; // const pointer p pointing to the variable a
```

Please enter the choice to see the example of above concepts or press -1 to exit:



-1

Problem 3: | Mini Case Study

Imagine a tollbooth at a bridge. Cars passing by the booth are expected to pay a 50 cent toll. Mostly they do, but sometimes a car goes by without paying. The tollbooth keeps track of the number of cars that have gone by, and of the total amount of money collected. Write a program using class to make a system for cars passing from booth.

Problem 4: | (Classes, objects, Constructor, Destructor and Member functions, constant)

You are a programmer for the Home Software Company. You have been assigned to develop a class that models the basic workings of a bank account. The class should perform the following tasks:

- Save the account balance.
- Save the number of transactions performed on the account.
- Allow deposits to be made to the account.
- Allow withdrawals to be taken from the account.
- Calculate interest for the period.
- Report the current account balance at any time.
- Report the current number of transactions at any time.

Private Member Variables

Variable	Description
balance	A double that holds the current account balance.
interestRate	A double that holds the interest rate for the period.
interest	A double that holds the interest earned for the current period.
transactions	An integer that holds the current number of transactions.
count	A static integer that hold the total number of time the program has taken choice

Public Member Functions

Function	Description
Constructor	Takes arguments to be initially stored in the balance and interestRate members. The default value for the balance is zero and the default value for the interest rate is 4.5%.
setInterestRate	Takes a double argument which is stored in the interestRate member.
makeDeposit	Takes a double argument, which is the amount of the deposit. This argument is added to balance.
withdraw	Takes a double argument which is the amount of the withdrawal. This value is subtracted from the balance, unless the withdrawal amount is greater than the balance. If this happens, the function reports an error.
calcInterest	Takes no arguments. This function calculates the amount of interest for the current period, stores this value in the interest member, and then adds it to the balance member.
incCount	increment the value of count
getCount	return the value of count
getInterestRate	Returns the current interest rate (stored in the interestRate member).



getBalance Returns the current balance (stored in the balance member).
getInterest Returns the interest earned for the current period (stored in the interest member).
getTransactions Returns the number of transactions for the current period (stored in the transactions member).

Note: All *get* methods must be constant. Output must in the same format as given on next page.

MENU

A> Display the account balance
B> Display the number of transactions
C> Display interest earned for this period
D> Make a deposit
E> Make a withdrawal
F> Add interest for this period
G> Exit the program

Number of times program has taken choice: 0
Enter your choice: d
Enter the amount of the deposit: 6500

MENU

A> Display the account balance
B> Display the number of transactions
C> Display interest earned for this period
D> Make a deposit
E> Make a withdrawal
F> Add interest for this period
G> Exit the program

Number of times program has taken choice: 1



```
Enter your choice: f
Interest added.

MENU
-----
A) Display the account balance
B) Display the number of transactions
C) Display interest earned for this period
D) Make a deposit
E) Make a withdrawal
F) Add interest for this period
G) Exit the program

Number of times program has taken choice: 2
Enter your choice: a
The current balance is $6792.50

MENU
-----
A) Display the account balance
B) Display the number of transactions
C) Display interest earned for this period
D) Make a deposit
E) Make a withdrawal
F) Add interest for this period
G) Exit the program

Number of times program has taken choice: 3
Enter your choice: c
Interest earned for this period: $292.50

MENU
-----
A) Display the account balance
B) Display the number of transactions
C) Display interest earned for this period
D) Make a deposit
E) Make a withdrawal
F) Add interest for this period
G) Exit the program

Number of times program has taken choice: 4
Enter your choice: e
Enter the amount of the withdrawal: 6985
ERROR: Withdrawal amount too large.

MENU
-----
A) Display the account balance
B) Display the number of transactions
C) Display interest earned for this period
D) Make a deposit
E) Make a withdrawal
F) Add interest for this period
G) Exit the program

Number of times program has taken choice: 5
Enter your choice: b
There have been 1 transactions.
```

Use 3 file structure.



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Proper code indentation will hold extra marks!

Best of luck 😊

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



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