



Object Oriented Programming

Assignment 2

Objectives/ Outcome	To assess the knowledge students has gained in OOP till now
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Note:

1. Please do not use cin in setter and cout in getter
2. Indent your code
3. Comment your code
4. **Use meaningful variable names and follow the naming convention**
5. Plan your code carefully on a piece of paper before you implement it.
6. Name of the program should be same as the task name. i.e. the first program should be Task_1.cpp

Task 1:

```
class Circle
{
    const double PI;
    double radius;
    static int count; //to count the number of circles instantiated

public:
    Circle(double r=0);
    Circle(const Circle&);

    Circle& operator=(const Circle&);
    Circle& operator+=(const double);
    bool operator<(const Circle&);
    Circle operator++(int);
    Circle& operator++();
    Circle operator--(int);
    Circle& operator--();
    Circle operator==(const Circle&);

    ostream& operator<<(ostream&, const Circle&);
    istream& operator>>(istream&, Circle&);

    static void noOfCircles();
    void area();

    ~Circle();
};
```



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Implement the class given above and test that class with the main() function given below to produce the exact output given. **You are not allowed to change anything in the main() function.**

You also have to answer the questions asked in the comments of main() function.

```
int main()
{
    Circle obj1,obj2,obj3,obj4;
    cin >> obj1>> obj2 >> obj3 >> obj4; //If we make >> and << operator non-returning?
    cout << obj1 << obj2 << obj3 << obj4;
    Circle::noOfCircles();
    obj4 = obj4;
    obj1 += 1.5; //Do check if we do not return circle by reference than what happens?
    obj1.area();
    +++obj1; //Do check if we do not return circle by reference than what happens?
    obj1.area();
    if (obj1 < obj2)
    {
        cout << "true\n";
    }
    else
    {
        cout << "false\n";
    }
    return 0;
}
```

Output:

```
Microsoft Visual Studio Debug Console
constructor called
constructor called
constructor called
constructor called
2
2
2
2
Radius: 2
Radius: 2
Radius: 2
Radius: 2
Number of Circles are: 4
Assignment operator called
Approximate area =~ 38.5
Approximate area =~ 95.0714
false
destructor called
destructor called
destructor called
destructor called
```



Task 2:

We are making a software for a departmental store. This departmental store has a single branch and many male and female employees: for female and for male customers, your software should store departmental store's Employees Information.

Departmental store employees have following attributes:

- *id (const int)* //id should be constant because it can never be changed/updated.
- *name (char *)*
- *DOB (Date)*
- *gender (char*)*
- *contactNumber (char*)*
- *salary (double)*
- *shift (char*)*
- *count (static int)* //to count the number of objects created

Now do the following operations on above mentioned class:

1. Write **parameterized constructor with default arguments and copy constructor** (with an output statements to check the life time scope of object). Deep copy shall be done.
2. Write a **destructor** (with an output statement to check the life time scope of object).
3. Write separate setter (mutator) functions for each attribute to set value (**with no memory leakage**).
4. Write separate getter (accessor) functions for each attribute to get value (**which should never return the original memory handler**).
5. Write **static** function to print all the **static** attributes.
6. Write a **print** function **which should not be the member of the class**. You can define it in source.cpp where you have defined the main() function.

Use the const qualifier on member functions wherever it is appropriate.

Write a tester program that demonstrates capabilities of the class. Make a const object and a non-constant object and call print function for them.



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Output:

C:\> Microsoft Visual Studio Debug Console

```
Constructor called.
```

```
ID: 1419
```

```
Imran Khan
```

```
DoB: 17-12-1897
```

```
Contact No: 0300-79999909
```

```
Salary: 80000
```

```
Shift: Morning
```

```
Destructor called.
```

```
C:\Users\asmarahem\Desktop\de
```

```
Press any key to close this wi
```