CS1580 - Introduction to Programming Lab (FS2024)
Lab 11

Lab Objectives

In this lab, you will be implementing the following topics:

- Classes
- Constructor
- Operator Overloading
- Friend Function

Lab Task:

Create a class named **Dimensions** with the following member variables and functions:

- Member Variables (should be in private section)
  - `int length`
  - `int width`

- Member functions:
  - `Dimensions(const double length, const double width);`
    The constructor of the Dimensions class.

  - `Dimensions& operator +=(const Dimensions &dim)`
    Allows adding two objects and makes changes to the calling Dimensions object

  - `Dimensions operator + (const Dimensions &dim)`
    Allows adding two objects but makes no changes to the calling Dimensions object

  - `Dimensions& operator -=(const double val)`
    Subtracts a constant integer from both `length` and `width` of the calling Dimensions object and makes changes to it

  - `Dimensions operator -(const double val)`
    Subtracts a constant integer from both `length` and `width` of the calling Dimensions object but makes no changes to it

  - `friend ostream &operator<<(ostream &output, const Dimensions &dim)`
    Prints the `(length, width)` of the given Dimensions object

In main(),

1. Create 4 objects of class Rectangle: `obj1(50, 40), obj2(10, 5), obj3, obj4`
2. Do `obj1 += obj2,` and print `length` and `width` of `obj1`
3. Do `obj3 = obj1 + obj2,` and print `obj3`
4. Subtract 5 from `obj1` using `obj1 -= 5` and print `obj1`
5. Do `obj4 = a - 10` and print `obj4`

Please document all the functions.
Follow proper coding standards (indentations, variable names)

Sample Output

```
Initial values of obj1 and obj2:
length: 50, width: 40
length: 10, width: 5

After performing obj1 += obj2, obj1 is
length: 60, width: 45

After performing obj3 = obj1 + obj2, obj3 is
length: 70, width: 50

After performing obj1 -= 5, obj1 is
length: 55, width: 40

After performing obj4 = obj1 - 10, obj4 is
length: 45, width: 30
```

Gitlab Cloning Instructions

- Open the browser and go to https://git-classes.mst.edu/. Click on the Lab11 repository named *2024-FS-303-lab11-<your_username>*
- Click on 'Clone' button and copy the HTTPS link.
- Open Putty and
    - Change the directory to SDRIVE: `cd SDRIVE`
    - Clone the repository: `git clone <copy_the_HTTPS_link_here>`
    - Change the directory to cloned repository: `cd 2024-FS-303-lab11<your_username>`
- Start coding by opening a new file in nano: `nano main.cpp`

Compiling Instructions

- To run your code, `fg++ main.cpp`
- To get the output, `./a.out`

Submission Instructions

Push your code to your gitlab account.

- Add all your files to the repository, `git add .`
- Commit your changes, `git commit -m "<your_message_goes_here>"`
- Push the changes, `git push`