CSE-165 Lab 07

Points: 100

Write a separate file for each of the following tasks.

Zip all your files together and submit the zip file to CatCourses.

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1. **References in C++ (10 points)**

Study the file refs.cpp. It makes use of a function named triple, which takes in an integer and multiplies its value by 3. Implement this function and submit your modified refs.cpp. Your function should not use a return statement and you should not modify main().

Example Output:

```
Enter a number: 12
36
```

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2. **References in C++ II (10 points)**

Study the file refs2.cpp. It makes use of a function named initialize_pint, which takes in a pointer to an integer and an integer. The function should initialize the pointer and set its value to n. Implement this function and submit your modified refs2.cpp. Your function should not use a return statement and you should not modify main().

Example Output:

```
Enter a number: 25
25
```

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3. **Polymorphism (20 points)**

Study the files catsDogs.cpp, Cat.h, Dog.h and Animal.h. The program does not compile in its current form because a piece of code is missing from Animal.h. Identify what the missing code is, implement it, and submit the new Animal.h.

Expected Output:

Meow, meow!
Woof, woof!

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4. **Virtual Methods (60 points)**

Create the following 3 classes:

1. AppWindow class, containing:

- A protected instance of a rectangle class Rect defining the AppWindow's position (x,y) and size (w,h). (You may use the Rect class you developed in the previous lab. In main(), the width and height are assumed to be public and called "w" and "h".)

- The following constructors to initialize the dimensions:

AppWindow(); // initialize member rect's dimensions to 0

AppWindow(float x, float y, float w, float h); // initialize member rect's dimensions with the 4 floats

AppWindow(const Rect& r); // initialize member rect's dimensions with r's dimensions

- A method to retrieve the member rectangle:

const Rect& get_rect();

- A virtual method called resize(). When this method is called, your implementation is supposed to change the dimensions of the internal rectangle of the window.

virtual void resize(int w, int h);

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2. CircleWin class, which inherits from AppWindow, containing:

- A protected float called "radius". For this class, radius is the maximum dimension among w and h of the rectangle.

- The same three constructors as AppWindow. You should only initialize the value of radius in this class, after using AppWindow's constructor to initialize the inherited rectangle. (Recall the initializer list.)

- An overridden resize() method such that it will recompute the radius and print it out like this: "radius: <max>", where <max> is the maximum dimension. Remember to still change the dimensions of the internal rectangle.

3. RectWin class, which also inherits from AppWindow, containing:

- A protected float called "area". The area is equal to w * h.

- The same three constructors as AppWindow. You should only initialize the value of area in this class, after using AppWindow's constructor to initialize the inherited rectangle. (Again, recall the initializer list.)

- An overridden resize() method such that it will recompute the area and print it out like this: "area: <area>". Remember to still change the dimensions of the internal rectangle.

Upload your three classes in a single header file named App.h. Your code will be tested for correctness using the file virtualMethods.cpp.

Example Output:

```
radius: 4
radius: 10
area: 12
area: 40
```