CSE-165-Lab 9

100 Points

Write a separate .cpp file for each of the following tasks. For each question try to come up with various test cases to test your code. You may be evaluated based on test cases provided during demo.

1. Abstract Datatypes (40 Points)

Study the file Object.h. It defines an abstract data type Object with a virtual multiply() function. Complete the implementation of two classes Number and Coord3D which inherit from the Object class. The multiply() function must dynamically create a new object to hold the result of the computation. If the operands of multiply() are both Numbers, then the result should be a Number. If one operand of multiply() is a Coord3D, and the other is a Number, then the Number should multiply each component Coord3D. If both are Coord3Ds, then the result should be a component-wise multiplication. The file Object.cpp provides a basic test.

The expected output is:
x = 4, y = 8, z = 12
x = 4, y = 8, z = 12
x = 1, y = 4, z = 9
num = 16

2. (60 Points) In this problem, you will learn how to create OpenGL window and update OpenGL window using user interface.

Task 1: 3D Graphics

Download the zip folder "OpenGL_UI_Example.zip" and Extact the content. Next open Qt Creator and load the OpenGL_UI_Example.pro. Study my_gl.h,my_gl.cpp, mainwindow.h, mainwindow.cpp and main.cpp. Try to change code and see the changes by running the project.

Task 2: 3D Graphics

Your task is to use "OpenGL_UI_Example.zip". In Task 2, you need to implement the following:

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1. Draw a tetrahedron instead of a cube. Assign unique color to each vertices.
2. Implement 3 sliders for translating object in x, y and z direction.
3. Add a button to quit the application.
4. Add some form of style to your buttons and slider.

Instruction for submission:

1. Create folder for each solution and Zip all your folder together
2. Submit the zip folder to catcourse