CS3520 – Programming in C++
Fall 2015
Assignment 4

Assignment

Write the implementation for several related classes for a basic shape library. The `Vector` and `Matrix` classes should conceptually be value types, with a number of overloaded operators defined. The `IShape`, `Circle` and `Triangle` classes should conceptually be reference types, with the concrete `Circle` and `Triangle` types overriding abstract member functions of the `IShape` interface.

A stub implementation is provided; complete the implementation, as described by the comments in the files, by filling in the areas commented `TODO`. You should not change the included header files or change member variables from the stub implementation. `main.cpp` contains example usage of the classes. You may change `main.cpp` as you like to try out your implementation.

Submission

Your submission should be a single zip file named `[LastnameFirstname]4.zip` including the following files:

```
Makefile
Vector.hpp
Vector.cpp
Matrix.hpp
Matrix.cpp
IShape.hpp
IShape.cpp
Circle.hpp
Circle.cpp
Triangle.hpp
Triangle.cpp
```

For purposes of grading, assignments will be built and run on the CCIS Linux environment using `g++`. Assignments should include a makefile that builds the main program executable by default, and a `clean` target that removes everything but the source files and makefile. Assignments that are missing a makefile or a have makefile that does not build the program will lose style points.

Grading

Grading is broken down as:

- 50% - Functionality: Does the code handle inputs correctly? Does it handle error cases gracefully? Are corner cases accounted for? Does the program not crash?
- 40% - Implementation: Are the data structures and memory set up correctly? Is memory properly used and deallocated?
- 10% - Style: Is the code well-structured with appropriate functions? Are the variable names suitably descriptive? Does the code have explanatory comments? Is there a working makefile?