**Homework 1**

**ECE 309 Fall 2019**

**Due: August 28, 2019**

Upload an electronic copy of your answers to Moodle under HW1.

*This is a shared google document. This means (1) it may change to clarify content, and (2) other people can view your comments on this file. If you have questions, you are encouraged to comment directly on this document, but* ***do not add your answers here****. Make a copy into your private Google Drive and then edit the document.*

*DO NOT ADD ANSWERS TO THE SHARED DOC! THAT’S CONSIDERED CHEATING!*

# **1. Programming Review**

Complete the following exercises in your ZyBook:

* [10 points] Lab 3.25
* [10 points] Lab 4.21
* [10 points] Lab 4.25
* [10 points] Lab 5.17
* [10 points] Lab 5.24

There’s no restriction on which functions or libraries you may use to solve these problems, as long as they pass the tests. For example, you may use C or C++ functions, like printf and scanf, or you may use C++ features like string, vector, cin, and cout.

You do not need to include anything in this document. Your answers will be checked in the ZyBook.

# 

# 

# 

# 

# **2. Classes**

Consider the following C struct that represents a line, using the standard y = mx + b formula:

struct line {

double m;

double b;

};

(a) [20 points/5 points each] Change this struct into a class. Make the member variables private, and add the following to the class:

* A default constructor that initializes the slope (m) and y-intercept (b).
* A constructor that allows initialization of both members to any double value.
* A public member function that evaluates the y value given an x value.
* A public member function that will determine if a lines intersects with another line, and if they do, return the x-value for the intercept coordinates.

(b) [10 points] Implement a main function that demonstrates how to use your class.

# 

# **3. Evaluate expressions using C++ objects**

(20 points; divided evenly among all expressions)

Consider the following class definition:

class Pizza {

private:

double radius;

int slices;

double area() { return 3.14\*(radius)\*(radius); }

public:

bool sauce;

bool cheese;

bool pepperoni;

public:

Pizza(double diameter=16,

int nslice=8,

bool has\_sauce=true,

bool has\_cheese=true,

bool has\_pepp=true) {

radius = diameter/2.0;

slices = nslice;

sauce = has\_sauce;

cheese = has\_cheese;

pepperoni = has\_pepp;

}

int getSlices() { return slices; }

double getDiameter() { return radius\*2; }

double areaPerSlice() {

return area() / slices;

}

};

Consider these variables declared within a function:

Pizza large;

Pizza xlarge(22,12);

Pizza personal(6, 4,true,true,false);

Pizza medium(12);

Pizza small(10.0,6);

Evaluate the following expressions. Or, if the expression is illegal, explain why.

|  |  |  |
| --- | --- | --- |
| **#** | **Expression** | **Evaluate or if illegal write “Syntax error” and explain why** |
| 1 | large.getDiameter() |  |
| 2 | small.getDiameter() |  |
| 3 | xlarge.areaPerSlice() > large.areaPerSlice() |  |
| 4 | personal.pepperoni |  |
| 5 | large.getSlices() |  |
| 6 | large.diameter |  |
| 7 | large.sauce = true |  |
| 8 | xlarge.areaPerSlice() |  |
| 9 | medium.getSlices() |  |
| 10 | personal.area() |  |