

**Objectives:** You will gain experience:

- using C++ classes and objects
- implementing C++ classes

Download the following file to your desktop: <http://www.cs.uni.edu/~fienu/cs052s10/labs/lab1.zip>  
Extract this file by right-clicking on lab1.zip icon and selecting Extract All.

**Part A:** Yesterday in class we considered several versions of a simple Rectangle class from Chapter 13. The lab1.zip file you downloaded and extracted contains a PartA folder with a Visual Studio C++ project file: PartA.sln inside. Double-click on it to open this project in Visual Studio.

The current main program (in main.cpp) assumes that a house is a rectangle and uses a single rectangle object to calculate its square footage. Since a house is not always rectangular, your task for Part A is to modify the main program to determine the square footage of a house by summing a set of rectangular rooms. Hint: use a loop to input the dimensions and calculate the square footage of each room.

**After you have debugged your program, raise your hand and demonstrate your program.**

**Part B:** Create a new class named Circle with a private member variable named radius. Your Circle class should include:

- A default constructor that initializes the radius to 0.0 (radius should of type double)
- An overloaded constructor that accepts an argument and assigns its value to the radius member variable
- A getRadius accessor function that returns the radius value
- A setRadius mutator function that returns the radius value
- A getArea function that returns the area of the circle based on the calculation:  
$$3.14 * radius * radius$$
- An **in-line** getDiameter function that returns the diameter of the circle based on the calculation:  
$$2 * radius$$

Write a simple test program that demonstrates the Circle class by asking the user for the circle's radius, creating a Circle object, and then reporting the circle's radius, area, and diameter.

**After you have debugged your program, raise your hand and demonstrate your program.**

**Part C:** Modify your Circle class such that:

- Both constructors print a unique message to the console (e.g., "In default constructor", "In other constructor")
- Add a destructor that only prints a message to the console (e.g., "In destructor")

Write a simple test program that:

- defines an array of five Circle objects. Let the default constructor execute for each array element.
- write a for-loop that displays the radius of each Circle objects in the array
- defines another array of **pointers** to six Circle objects. Use a for-loop to dynamically construct 6 six Circle objects with radiuses of 1, 2, 3, 4, 5, and 6.
- write a for-loop that displays the radius of each Circle objects in the array

**After you have debugged your program, raise your hand and demonstrate your program.**

**If you complete all parts of the lab, nothing needs to be turned in for this lab. If you do not get done today, you can show me the completed lab in next week's lab period. Make sure that you log off the computer before you leave.**