Module 3

Module 3

Classes

This module introduces the concept of classes. A class is very similar to a C struct, except we can have both data and function members. This mechanism allows us to associate certain functions with the data that they manipulate. With it we can achieve information hiding and prevent unprivileged program components from accessing critical data structures in unexpected ways.

Several other important concepts are introduced:

- Constructors are initialization functions that are called automatically whenever a class variable is created.
- Name overloading allows us to define multiple functions with the same name, as long as there is some way for the compiler to distinguish them.
- Operator overloading allows us to create new versions of operators; for instance, we can create a new version of the + operator to add distances.
- Name and operator overloading allow us to write clearer, more maintainable code using mathematically natural notation. If poorly used, however, they can have the opposite effect.

Learning Objectives

- Data members and member functions
- Public and private scope
- Constructors
- Name and operator overloading
- Defaultable formal parameters
- ***const*** declarations
- Overloading comparison operators

Lectures

Presentation

- **3.1: Comments on Reading Assignments for Module 2 (https://onlinelearning.berkeley.edu/courses/2291660/pages/topic-3-dot-1)**
- **3.2: Examples: Fundamentals of Classes (https://onlinelearning.berkeley.edu/courses/2291660/pages/topic-3-dot-2)**
- **3.3: Message Passing Paradigm (https://onlinelearning.berkeley.edu/courses/2291660/pages/topic-3-dot-3)**
- **3.4: Accessing the Invoking Object (https://onlinelearning.berkeley.edu/courses/2291660/pages/topic-3-dot-4)**
- **3.5: Inline Functions (https://onlinelearning.berkeley.edu/courses/2291660/pages/topic-3-dot-5)**
- **3.6: More on Input and Output (https://onlinelearning.berkeley.edu/courses/2291660/pages/topic-3-dot-6)**
- **3.7: Default Formal Parameters (https://onlinelearning.berkeley.edu/courses/2291660/pages/topic-3-dot-7)**

- **3.8: The Use of const (https://onlinelearning.berkeley.edu/courses/2291660/pages/topic-3-dot-8)**
- **3.9: Overloading the ++ Operator (https://onlinelearning.berkeley.edu/courses/2291660/pages/topic-3-dot-9)**

Reading

The reading for this Module is C review. Depending on your C background, you may be able to move through this material quickly.

Required Readings

- *C++ Primer Plus*, Chapters 5–9

Recommended Readings

- *Thinking in C++ Volume One*, Chapter 3: The C in C++
- *The C++ Programming Language* (refer to as necessary)

Discussion

Module 3 Discussion (https://onlinelearning.berkeley.edu/courses/2291660/discussion_topics/14351916)

Assignment

Module 2: Short Answers 3
(https://onlinelearning.berkeley.edu/courses/2291660/assignments/33623146)

Module 3: Programming Assignment 3
(https://onlinelearning.berkeley.edu/courses/2291660/assignments/33623144)

Source Code

In each module of this course, you will be required to submit a programming assignment. For each module, I have prepared sample source code for your reference. Please take a few minutes to download and install all of these programming examples. The files have been compressed into one zip. You will need a zip utility to decompress the file.

sources.zip
(https://onlinelearning.berkeley.edu/courses/2291660/files/313890817/download?wrap=1)