Syllabus

Lesson 1: Introduction and Java Review

Now that you've done some Java programming, you may be wondering, "What's next?" In this first lesson, you'll get a taste of what you'll learn before the course is over. To make sure everyone is on the same page, we'll do a short review of the Java skills you should already have—this will get your wheels turning if you haven't worked with Java in a while! You'll also find out about a few different development environments you can use to create and run your own Java programs.

Lesson 2: Arrays, Loops, and Using Multiple Classes

The *array* is one of the most commonly used data structures in any programming language. In this lesson, we'll go over how arrays work, including their internal structure. You'll find out how to create arrays, how to store and access data in them, and how to process them efficiently using loops. Along the way, you'll also learn the difference between a class that's a complete program and one that isn't. You'll see how to write classes that use other classes in their processing, which is helpful when you're working with a lot of information.

Lesson 3: File Input and Output

Computers can do an incredible amount of work, but it's often all for nothing if you can't save the results after the program finishes. That's where data files come into play. Today's lesson shows you how to read and write computer data files using Java. This process takes place many times every day in all kinds of programs, so it's a very useful and important one to understand.

Lesson 4: Inheritance and Class Hierarchies

Have you ever wondered exactly what the big deal is about object-oriented programming (OOP)? Why does is matter whether a language is object-oriented or not? In this lesson, we'll look at exactly what object orientation means to Java through the topic of inheritance. One of the primary features of an OOP language is how its classes inherit features from other classes in the class hierarchy. You'll find out how Java's class hierarchy is organized, and you'll learn how to use the different types of classes (interfaces, abstract classes, and concrete classes) to your advantage.

Lesson 5: Stand-Alone GUI Applications

We'll explore Java's GUI tools in today's lesson. Just about every program we use on computers today has a graphical user interface, or GUI. That just means the program appears in a window with menus, icons, buttons, and so on. Java has hundreds of GUI tools we can use to build our own applications to run in any windowed operating system that supports Java (Windows, Linux, and Mac OS X, among others). You'll learn how to set up a stand-alone application using Java's GUI tools, including labels, buttons, dialogs, and more.

Lesson 6: Layouts and Multiple GUI Components

Today you'll continue learning about Java's GUI capabilities. You'll explore several ways that Java can organize multiple GUI components in a window, and you'll find out how to split windows into smaller areas called panels, which you can organize in different ways. You'll see how to set up Java's scroll bars in a window or part of a window so that users can scroll up, down, left, and right through the display.

Lesson 7: GUI Menus

What do almost all modern-day programs have in common? They have menus. Menus are probably the best-known and most widely used GUI programming feature. In this lesson, you'll learn how to create menus using Java's menu bar, menu, and menu item components. You'll be able to create as many menus in an application as you need, each with all the menu items and submenus necessary to perform the task you're programming.

Lesson 8: A Working GUI Application: Part 1

By this time, you'll have spent three lessons learning about different Java GUI programming techniques and tools. Today, you'll learn how to put the pieces together into a complete, reasonably complex Java application. You'll see how to combine menu options, graphics, check boxes, radio buttons, and text entry fields into a windowed program that can actually perform a useful task: It allows someone to order a pizza! (How much more useful can it get?)

Lesson 9: A Working GUI Application: Part 2

Today, we'll take what we started in Lesson 8, where you learned how to design and build a GUI interface to order a pizza, and we'll make it functional. You already have all the GUI components displayed nicely in the window, so now you'll learn how to make your program gather all the data from the different components in the window, and then put that information together into a useful pizza order. (I'm afraid it won't actually deliver the pizza, though.) You'll get an idea of what you can create with Java's GUI capabilities.

Lesson 10: Java Collections: Part 1

Most programmers don't write computer programs to deal with individual data items. Usually, they write programs to deal with groups of items. In this lesson, you'll learn all about Java's collection classes, a group of data structures designed to work with many items at once. You'll discover the difference between lists, queues, sets, maps, and other types of collections. We'll explore how to work with a list to load a group of items from a file into a list, and how to display items from the list in a GUI window. Along the way, you'll learn another useful technique in GUI programming: how to use Java's file chooser dialog to select a file to open and process.

Lesson 11: Java Collections: Part 2

To explore more of Java's collections, today we'll continue working on the program we began in Lesson 10. You'll find out how to navigate through a list (forward and backward), displaying each list item as you go. You'll also see how to set up a window with multiple display formats, and switch between them by clicking tabs that describe the different views. You'll also learn how to create items that Java can compare, even if Java doesn't know the details of what is in the items. You'll use that capability to build a list and sort its items in a specified sequence. That's a very useful and important capability when you're dealing with large numbers of items.

Lesson 12: Java Collections: Part 3

In our last lesson, we'll delve even deeper into the topic of collections. (You can see that it's a large and important subject!) You'll find out how to use maps, which are Java collections that let you store and retrieve data items quickly based on a unique data element of each item (its key). Think of looking up a telephone number in a large telephone book like New York City's. Finding a single number would be impossible if the data weren't properly organized. We'll see how to use the same type of search to quickly find any data item we need in a collection. And while we're doing that, you'll also learn a bit more about Java's other features, including Java's wrapper class, which is one more important data feature of the Java language that you'll use quite often. By the end of this lesson, you'll be amazed at what you're able to do with Java!