Syllabus

Lesson 1: Introducing Java

Java is one of the most widely used programming languages in the world, on machines from microprocessors in DVRs and microwaves to supercomputers. This lesson will introduce you to computer programming in general and to Java in particular. I'll get you set up with the downloads and installations you'll need for the rest of the course, and I'll walk you through the process of editing, compiling, and running computer programs written in Java.

Lesson 2: Writing Your First Java Program

Now that you have the software downloaded and installed, you're ready to start programming!In this lesson you'll write your first Java program. Along the way, you'll learn to create projects and classes in BlueJ. You'll use the editor to enter your program, and you'll find out more about how to compile it and run it. We'll also look at some of the basics of Java syntax (or form), some of its naming conventions, and its basic data types.

Lesson 3: Working With Java's Primitive Data Types

This lesson is about Java's primitive data types—the building blocks you need to use before you can build more complex types. I'll show you how to use them in some simple programs, and we'll look at how they relate to each other. Beyond that, we'll look at how to use a few of the classes in the Java libraries.

Lesson 4: Working With Objects

This lesson introduces classes and objects. We'll revisit the HelloWorld application and rewrite it in Java's OOP (object-oriented programming) structure. While we're doing that, we'll look at how to declare classes, objects, attributes, and methods to Java.

Lesson 5: Creating a Program That Makes Calculations

In this lesson, we'll go over how to declare our data variables to Java and how to use variables in arithmetic expressions to calculate new results. We'll also talk about data input, which means getting information into our programs from an outside source. Then we'll write a program that incorporates all these features.

Lesson 6: Computer Logic: Writing Programs That Make Decisions

Making decisions is one of the most important and powerful things a computer language can do. Without decision-making, computers would be big, bulky calculators. We're going to look at the decision-making process in detail and see how Java does it. When you're done with this lesson, you'll know how to write Java programs that make decisions based on the principles of computer logic.

Lesson 7: Writing Programs With Loops

In this lesson, you'll learn to repeat actions using a control structure called a loop. Loops in Java involve decisions, just as branches do. But in a loop structure, if the condition is met, the branch is backward instead of forward, allowing us to repeat actions. We'll also finish our temperature program.

Lesson 8: Fixing Errors in Java

In this lesson, we'll discuss how Java generates exceptions and how we can prevent them from crashing our programs. We'll also look class methods and how to call them without creating any objects. Last, you'll find out about a debugger, which lets us look at what's going on inside our program as it runs.

Lesson 9: Three Tools: Debugger, Enumeration, and Switch

This lesson is a grab bag of tools and topics. BlueJ's debugger lets you watch your program's internal actions as it runs. Enumeration lets you set up new data types with built-in limits on their values. Finally, Java's switch structure lets you replace a series of nested if statements with a single value-based structure. You'll find all these items useful in future programming!

Lesson 10: Formatting Output and the Java Application Program Interface

How can you make numbers and other output look the way you want them to in Java? In this lesson, I'll show you. We'll also look at Java's application program interface(API). That's the documentation of all the classes that Java includes when you install the JDK, plus explanations of how to use them. The interface has several thousand classes, and it's important to know how to find things within it.

Lesson 11: Creating Windows and Adding Graphics in Java

So far in this course, everything has been text-based. Through this lesson, I'll introduce you to the world of Java windows, and we'll begin to look at GUI (graphical user interface) programming in Java. We'll look at the basic components of a Java window and then add some simple graphics to it.

Lesson 12: Java 2-D Animation

In our final lesson together, we'll continue our short exploration of Java 2-D graphics with a look at some simple animation. We'll use the same technique cartoonists have used for a hundred years now: redrawing an image in a slightly different location and repeating that process many times a second so the image appears to move. You'll learn to create a self-contained object that "knows" its own size, color, shape, location, and how to draw itself into our window. This is a fun lesson.