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Java Tutorial

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Java Tutorial

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Tutorial Description

In the past year, the Java programming language has emerged as the primary technology for dynamic Internet programming. Many of the features which recommend Java as an Internet language also make it attractive from a pedagogical perspective. The Java tutorial will introduce Java and provide online WWW materials that can be used in other IS courses.

The salient qualities of Java include the following:

- **Related to C/C++.** Java contains 90% of C++, and vice versa. Students who already know C or C++ will have little problem learning Java. Students who learn Java first, will have little difficulty picking up C or C++.
- **Simple.** The C++ features missing from Java are by and large the most difficult ones to master, such as pointers, preprocessor commands, and multiple inheritance.
- **Safe.** Java was designed to be robust. Eliminating pointers removed one common source of problems. Java also provides exception handling and other methods for creating programs that are unlikely to crash.
- **Free.** Java developers can download the Java Development Kit (JDK) from Sun. Version 2.0 of the Netscape Navigator includes the Java interpreter for most platforms.
- **Cross-platform.** A Java program written for one platform, such as Windows 95, will run on any other Java platform automatically. Java programs are compiled into platform independent byte codes.
- **Object-oriented.** In Java, everything is an object. In fact, there are no functions -- just class methods. Java supports single inheritance. For simplicity, there is no multiple inheritance, but interfaces serve much the same purpose.
- **Client-Server and Network support.** Java applets are client-server programs that run on the Internet. Students will get first-hand exposure to issues in developing distributed applications.
- **Multimedia support.** The standard Java library has support for graphic images, animation, and sound. Video support is in development.
- **Ubiquitous.** Java applications are spreading throughout the Internet. Students learning Java can find numerous examples, as well as employment opportunities.

Given Java's youth, there are few reliable textbooks. Given Java's popularity, there are lots of Java books being written. This tutorial is targeted for the IS professional who wants to learn more about Java for teaching, research, or both.

The tutorial is based on a two-day course on Java we developed and delivered for a New York investment bank. That course made extensive use of online materials and hands-on programming exercises.

The Java tutorial will be available online at:

<http://eldorado.stern.nyu.edu:8000/~sslade/java/course.html>

The Web site comprises introductory material, explanations on how to obtain Java, links to related Java sites, example code, and coding exercises with answers.

We recognize that AIS will not provide a classroom with networked computers for a hands-on course. However, we will nevertheless provide online course materials for the participants with the understanding that many of them will access the online documents after the course, and even make the materials available for their students.

Moreover, we intend to update the online materials through ongoing feedback, adding links to related Java instructional sites, especially those created by the IS community.

Topics

The tutorial will address the following topics:

1. **Introduction to Java: Hype or Exaggeration?**
The press reports focus on the upside of Java. Is there a downside?
2. **Getting Started: Downloading Java Browsers and the Java Development Kit**
All the software you need is available through the Internet.
3. **Tour of Sample Java Programs**
We will demonstrate a spectrum of Java programs.
4. **Writing Java Application Programs**
It is possible to write stand-alone application programs in Java that have nothing to do with the Internet. This is probably the best way to master Java's basic programming style.
5. **The HTML APPLET Tag**
Java code can be embedded in HTML documents using the APPLET tag. It is possible to pass parameters to a Java program within HTML, just as you would give command line arguments to a regular program.
6. **Writing Dynamic Java Applets**
The Java language is supplemented by the standard Java class hierarchy, which includes the AWT (Abstract Windowing Toolkit) for creating applets. The AWT provides convenient ways to include graphics, sounds, and other applet elements.
7. **Advanced Topics: Exceptions, Threads, Packages, Interfaces**
As a modern programming language, Java includes a number of advanced features.
 - Exceptions provide a systematic way to catch error conditions.
 - Threads permit the programmer to develop multiprocessor applications.
 - Packages let the programmer control the name space.
 - Interfaces provide a simpler alternative to multiple inheritance.
8. **Discussion: what role can Java play in IS education?**

Given the time constraints, we will not pursue all topics in equal depth. However, the online tutorial materials will fill in the gaps.

Tutorial objectives

- Understand why Java may be a useful programming language, particularly for IS education.

- Learn the basic language syntax and the structure of the standard library class hierarchy.
- Explore Java applications and applets, using the online tutorial materials.
- Learn where to find more information about Java through both publications and the Internet.