



CSCI 2911 Computer Science I

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The Java Programming Language¹

A History of Java

In 1991 a team was formed at Sun Microsystems to speculate about the important technological trends that might emerge in the near future. The team, which was named the Green Team, concluded that computers would merge with consumer appliances. Their first project was to develop a hand-held device named *7 (pronounced star seven) that could be used to control a variety of home entertainment devices. In order for the unit to work, it had to use a programming language that could be processed by all the devices it controlled. This presented a problem because different brands of consumer devices use different processors, each with its own machine language.

Because no such universal language existed, James Gosling, the team's lead engineer, created one. Programs written in this language, which was originally named Oak, were not translated into the machine language of a specific processor, but were translated into an intermediate language known as byte code. Another program would then translate the byte code into machine language that could be executed by the processor in a specific consumer device.

Unfortunately, the technology developed by the Green Team was ahead of its time. No customers could be found, mostly because the computer-controlled consumer appliance industry was just beginning. But rather than abandoning their hard work and moving on to other projects, the team saw another opportunity: the Internet. The Internet is a perfect environment for a universal programming language such as Oak. It consists of numerous different computer platforms connected together in a single network.

To demonstrate the effectiveness of their language, which was renamed Java, the team used it to develop a Web browser. The browser, named HotJava, was able to download and run small Java programs known as applets. This gave the browser the capability to display animation and interact with the user. HotJava was demonstrated at the 1995 SunWorld conference before a wowed audience. Later the announcement was made that Netscape would incorporate Java technology into its Navigator browser. Other Internet companies rapidly followed, increasing the acceptance and the influence of the Java language. Today, Java is very popular for developing not only applets for the Internet, but stand-alone applications as well.

Java Applications and Applets

There are two types of programs that may be created with Java: applications and applets. An application is a stand-alone program that runs on your computer. You have probably used several applications already, such as word processors, spreadsheets, database managers, and graphics programs. Although Java may be used to write these types of applications, other languages such as C, C++, and Visual Basic are also used.

In the previous section you learned that Java may also be used to create applets. The term "applet" refers to a small application, in the same way that the term "piglet" refers to a small pig. Unlike applications, an applet is designed to be transmitted over the Internet from a Web server, and then executed in a Web browser. Applets are important because they can be used to greatly extend the capabilities of a Web page.

Web pages are normally written in Hypertext Markup Language (HTML). HTML is limited, however, because it merely describes the content and layout of a Web page. HTML does not have sophisticated abilities such as performing math calculations and interacting with the user. A Web designer can write a Java applet to perform operations that are normally performed by an application, and embed it in a Web site. When someone visits the Web site, the applet is downloaded to the visitor's browser and executed.

Security

Any time content is downloaded from a Web server to a visitor's computer, security is an important concern. Because Java is a full-featured programming language, you might at first be suspicious of any Web site that transmits an applet to your computer. After all, couldn't a Java applet do harmful things, such as deleting the contents of the hard drive or transmitting private information to another computer? Fortunately, the answer is no. Web browsers run Java applets in a secure environment within your computer's memory and do not allow them to access resources, such as a disk drive, that are outside that environment.

¹"Starting Out with Java 5 from control structures to objects" p. 9, Tony Gaddis, Scott Jones 2005