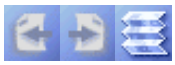

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About the Java Language Tutorial

This document was last updated: 12 Dec 95

The Java Language Tutorial: Object−Oriented Programming for the Internet is a practical, on−line guide to writing programs in the Java language.

Note: This document reflects the Java Developer's Kit (Version 1.0 Beta2) release.

- This is a DRAFT!
- Copyright
- Where is it?
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This is a DRAFT!

This tutorial is a **DRAFT**: it's incomplete, buggy, and may contain bad links. We're making this tutorial available to you for two reasons:

1. So you can learn from it −− some of the information in this tutorial is not documented anywhere else.
2. So we can get feedback on this tutorial.

To help us with #2, please let us know what's confusing in these lessons, what seems unnecessary, and whether the lessons helped you at all. Write us at java@java.sun.com or Submit a Bug Report.

Copyright

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Where is it?

The Java Language Tutorial lives at our website along with all of our other documentation. You can read it "over−the−wire" by clicking on this link to the tutorial's Trail Map or you can download the tutorial in HTML or PostScript formats.

What's ?

12 Dec 95 −− Updated the Second DRAFT

- Made the few changes necessary to reflect Beta2 instead of Beta.
- Fixed various typos, bugs and broken links.
- Jan Kärrman from Uppsala University, Sweden, gave us a new version of the Perl script, html2ps, that we use to generate PostScript files from HTML. This new version supports images, page breaks and page numbers. So, now there is only one PostScript file per lesson. You can download the PostScript files or the HTML versions.
- Added a new lesson, Handling Errors using Exceptions, in the Writing Java Programs trail.

13 Nov 95 −− Updated the Second DRAFT

- Made the few changes necessary to reflect Beta instead of Pre−Beta.
- Changed the name of this document from "The Java Programmer's Guide" to "The Java Language Tutorial: Object−Oriented Programming for the Internet." Why the long name? This document is going to be published as a book, and we wanted to make sure the title was as descriptive as possible, without requiring much prior knowledge of the potential buyer.
- Added ALT text to our link graphics, so that people using non−graphical browsers can understand the information the graphic was conveying.

- Added a new lesson, Using Layout Managers, in the Creating a User Interface trail.

2 Oct 95 –– Released the Second DRAFT

- Everything was updated to reflect the new APIs (except for *The "run:" Protocol Handler* and *The "text/plain" Content Handler* in the Getting Started trail).
- We fixed many typos, clarified many obfuscations, fixed broken links and miscommunications.
- We got a face–lift with new icons and a new page design.
- And, we added these trails and lessons:
    - The Writing Applets trail has a new lesson: The Anatomy of an Applet which describes how applets work and how you use the Applet class to create an applet.
    - The new Creating a User Interface trail has two new lessons: Overview of UI Elements which introduces you to the objects that the Java development environment provides for building UIs, and Arranging Components within a Container which tells you how to use each of the Components provided in the AWT.
    - We've added a trail The Java Development Environment that provides a tour of the packages provided with the development environment, talks about the different tools including the new prototype debugger. This trail includes a lesson on Using System Resources.
    - We've also added the Integrating Native Methods into Java Programs trail that shows you how to integrate native methods into your Java programs. Currently, this trail contains two lessons. The first, Step By Step, walks you through an example showing you each step you take to implement a native method. The second, A Comprehensive Example, which is largely unfinished, is an example that implements a "character–replacement" program using native methods.
    - And finally, two new lessons have been added to the Writing Java Programs trail: Threads of Control and Object–Oriented Programming Concepts: A Primer.

18 May 95 –– Released the First DRAFT

About the Applet References in the Tutorial

Applet references in these pages actually contain references to two different versions of the applet:

- a 1.0alpha3 compatible version which you can view these using the 1.0alpha3 version of the HotJava browser
- a Beta–compatible version which you can view these using the appletviewer or other Beta–compatible browser

Note to 1.0alpha3 Developers: This programmer's tutorial doesn't contain any information on how to upgrade your 1.0alpha3 Java applets to the 1.0 Beta release. For more information on how to do this please refer to Converting Applets.

Downloading the Java Language Tutorial

UNIX

UNIX users can download a compressed tar file containing the tutorial in HTML format or in PostScript format. Note that our PostScript files are generated from HTML using Jan Kärrman's wonderful html2ps script.

HTML format

Approximate size when compressed: 900K

Approximate size when uncompressed: 1,840K

PostScript format

Approximate size when compressed: 940K

Approximate size when uncompressed: 5M

Windows/DOS

Windows/DOS users can download a zip file containing the tutorial in HTML format or in PostScript format.

HTML format

Approximate size when compressed: 825K

Approximate size when uncompressed: 1,840K

PostScript format

Approximate size when compressed: 655K

Approximate size when uncompressed: 5M

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Trail Map: The Java Language Tutorial

This document was last updated: 12 Dec 95

Welcome to The Java Language Tutorial: Object–Oriented Programming for the Internet
The Java Language Tutorial is a practical, on–line guide to writing programs in the Java language. For information about the structure and organization of this tutorial please refer to About this Tutorial.

Note: This draft reflects the API distributed in the 1.0 Beta2 Java Developers Kit (JDK). For information on how the API has changed and how to get the JDK, see the JDK home page. For the change history of the tutorial, how to download the tutorial in PostScript and HTML formats, and other information about this document, see About the Java Language Tutorial.

Copyright

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Getting Started

The most common Java programs are applications and applets. *Applications* are stand–alone programs, such as the HotJava browser. *Applets* are similar to applications, but they don't run on their own. Instead, applets adhere to a set of conventions that lets them run within a Java–compatible browser. If you're using a browser that can view applets, then you should see an animation just below this paragraph –– that's an applet embedded in this HTML page.

The "Hello World" Application –– Start here if you want to create stand–alone Java applications.

The "Hello World" Applet –– Start here if you are interested in writing applets only.

Besides applications and applets, you can also write two types of *handlers* –– programs that the HotJava browser loads when it encounters a protocol or content type that it hasn't seen yet. Each *protocol handler* understands a particular protocol (such as http: or doc:) and translates it into a form that your Java–compatible browser can display. Similarly, each *content handler* understands

and translates a particular MIME type/subtype combination, such as text/plain or image/jpeg.

The "run:" Protocol Handler –– A step–by–step example of writing a protocol handler.

The "text/plain" Content Handler –– A step–by–step example of writing a content handler.

What Next?

Now that you've seen how to write a Java program, you can proceed with any of the topics below.

Writing Java Programs –– These lessons discuss techniques and concepts that any Java programmer can use.

Writing Applets –– These lessons discuss techniques and concepts that are specific to writing Java applets.

Creating a User Interface –– Here's the information you need to create the user interface of your applet or application.

The Java Development Environment –– Take a look here for information about the Java development environment, tools, how to structure and manage your programming environment, debugging techniques and memory management techniques.

Integrating Native Methods into Java Programs –– These lessons show you everything you need to know to write native methods in the Java language. A native method is a Java method whose implementation is provided in another programming language such as C. This lesson includes step–by–step instructions and a comprehensive example program.

Networking These lessons will have the information you'll need if your program deals with the network.

Extending the HotJava Browser −− These lessons will have information on writing protocol handlers and content handlers −− loadable modules that extend the capabilities of the HotJava browser.

How the Java Language Differs from C and C++ −− This trail points out the differences between the Java language and C and C++.

Troubleshooting −− Follow this trail to find all of the pages that discuss troubleshooting.

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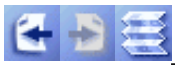 *Table of Contents*

About this Tutorial

The Java Language Tutorial is a practical, on–line guide to writing programs in the Java language. Java programs can be standalone applications, or they can execute within a Java–enabled browser such as HotJava.

Documentation Trails

This tutorial consists of a series of intersecting *trails*––programming lessons grouped together based on topic. To learn about a certain area of Java programming, go to the *Trail Map* and decide which trail is of interest to you and follow the link to the *trail head* for that trail. For example, if you are interested in information about writing applets, select the link to the *Writing Applets* trail, marked with this signpost.

The trail head is the first page on a trail and it lists, describes, and provides links to all of the lessons on the trail. Selecting a link from the trail head takes you to the *lesson head* for the lesson that you chose. The lesson head is the first page in the lesson and introduces the lesson, and typically provides an outline or overview of the lesson. Usually, several *lesson pages* comprise the entire lesson.

The Control Panel

Each page in **The Java Language Tutorial** has a control panel at the top with the following five elements:

The "Previous" link which takes you to the previous page in the lesson.

The "Next" link which takes you to the next page in the lesson.

This link transports you to the top of the tutorial: to the *Trail Map*.

This is a trail marker and is a link to the trail head of the current trail. Each trail has its own

identifying *trail marker*––the symbol shown here is represents the *Creating a User Interface* trail.

Lesson Title And finally, this right–aligned (supposedly) link is the title of the current lesson and is linked to the lesson head (the first page in the lesson) of the current lesson.

In–Line Links

Links within the text of the tutorial have one of the following forms:

- Links to pages within the current lesson are text links.
- Links to pages within a different lesson, but on the same trail as the current lesson are also text links but they have an icon that indicates which trail the lesson is on. Both the text and the icon are links.
- Links to pages in a different trail are also text links but they have an icon that indicates which trail the lesson is on. Both the text and the icon are links.

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