

The Java Tutorials are practical guides for programmers who want to use the Java programming language to create applications. They include hundreds of complete, working examples, and dozens of lessons. Groups of related lessons are organized into "trails".

The Java Tutorials primarily describe features in Java SE 7. For best results, [download JDK 7](#).

What's New

The Java Tutorials are continuously updated to keep up with changes to the Java Platform and to incorporate feedback from our readers. This release of the tutorial coincides with the release of JDK 7u51. Apart from fixing typos and errors, this update includes the following:

- When signing a JAR file, time stamping the signature is recommended. A warning is shown if the signature is not time stamped. See [Signing JAR Files](#) for information.
- The [Type Inference](#) section in the [Generics](#) trail has been updated with the section Target Types, which describes how the Java compiler takes advantage of target typing to infer the type parameters of a generic method invocation in JDK 8.
- You can obtain the names of the formal parameters of any method or constructor in JDK 8 with the method [java.lang.reflect.Executable.getParameters](#). See the section [Obtaining Names of Method Parameters](#).
- The [Interfaces and Inheritance](#) trail has been enhanced with information about [Default Methods](#) in JDK 8, which are methods in an interface



Not sure where to start?
See [Learning Paths](#)

Tutorial Contents

[Really Big Index](#)

Tutorial Resources

- ▶ View the [Java Tutorials](#) Online (Last Updated [1/14/2014](#)).
- ▶ [The Java Tutorials' Blog](#) has news and updates about the Java SE tutorials.
- ▶ [Download the latest Java Tutorials bundle](#).

In Book Form

- ▶ [Download ebook files](#).
- ▶ *The Java Tutorial, Fifth Edition*. [Amazon.com](#).

Other Resources

- ▶ [Java SE Developer Guides](#)
- ▶ [API Documentation](#)
- ▶ [JavaFX 2.0 Documentation](#)
- ▶ [The Java EE 6 Tutorial](#)
- ▶ [NetBeans™ Documentation](#)

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that have an implementation. In addition, you can define static methods in interfaces.

- The [Collections](#) trail has been updated with new Questions and Exercises for [Interfaces](#) and [Aggregate Operations](#) in JDK 8. These updates help you focus on some important points when working with lambda expressions, streams, and aggregate operations.

The previous release of the tutorial, which corresponded to the JDK 7u45 release, included the following:

- The [Collections](#) trail was updated to recommend the preferred method of traversing collections with JDK 8: obtaining a stream and invoking its aggregate operations. Aggregate operations are often used in conjunction with lambda expressions to make programming more expressive, using less lines of code. The [Collection](#), [Set](#), [List](#), and [Map](#) interface pages now contain examples that demonstrate this new language feature.
- Additional manifest entries are described in [Enhancing Security with Manifest Attributes](#). The launchable examples in the Java Tutorial were updated to use these new attributes.
- The [JAXP](#) trail was updated with a new [Processing Limits](#) lesson.

Trails Covering the Basics

These trails are available in book form as *The Java Tutorial, Fifth Edition*. To buy this book, refer to the box to the right.

- » [Getting Started](#) — An introduction to Java technology and lessons on installing Java development software and using it to create a simple program.
- » [Learning the Java Language](#) — Lessons describing the essential

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Software

- ▶ The [Java Development Kit](#) (JDK) for Java SE 7.
- ▶ NetBeans IDE
- ▶ [Java EE SDK](#)

concepts and features of the Java Programming Language.

- » [Essential Java Classes](#) — Lessons on exceptions, basic input/output, concurrency, regular expressions, and the platform environment.
- » [Collections](#) — Lessons on using and extending the Java Collections Framework.
- » [Date-Time APIs](#) — How to use the `java.time` pages to write date and time code.
- » [Deployment](#) — How to package applications and applets using JAR files, and deploy them using Java Web Start and Java Plug-in.
- » [Preparation for Java Programming Language Certification](#) — List of available training and tutorial resources.

Creating Graphical User Interfaces

- » [Creating a GUI with Swing](#) — A comprehensive introduction to GUI creation on the Java platform.
- » [Creating a JavaFX GUI](#) — A collection of JavaFX tutorials.

Specialized Trails and Lessons

These trails and lessons are only available as web pages.

- » [Custom Networking](#) — An introduction to the Java platform's powerful networking features.
- » [The Extension Mechanism](#) — How to make custom APIs available to all applications running on the Java platform.
- » [Full-Screen Exclusive Mode API](#) — How to write applications that more fully utilize the user's graphics hardware.
- » [Generics](#) — An enhancement to the type system that supports operations on objects of various types while providing compile-time type safety. Note that this lesson is

for advanced users. The [Java Language](#) trail contains a [Generics](#) lesson that is suitable for beginners.

- » [Internationalization](#) — An introduction to designing software so that it can be easily adapted (localized) to various languages and regions.
- » [JavaBeans](#) — The Java platform's component technology.
- » [JDBC Database Access](#) — Introduces an API for connectivity between the Java applications and a wide range of databases and data sources.
- » [JMX](#)— Java Management Extensions provides a standard way of managing resources such as applications, devices, and services.
- » [JNDI](#)— Java Naming and Directory Interface enables accessing the Naming and Directory Service such as DNS and LDAP.
- » [JAXP](#) — Introduces the Java API for XML Processing (JAXP) technology.
- » [JAXB](#) — Introduces the Java architecture for XML Binding (JAXB) technology.
- » [RMI](#) — The Remote Method Invocation API allows an object to invoke methods of an object running on another Java Virtual Machine.
- » [Reflection](#) — An API that represents ("reflects") the classes, interfaces, and objects in the current Java Virtual Machine.
- » [Security](#) — Java platform features that help protect applications from malicious software.
- » [Sound](#) — An API for playing sound data from applications.
- » [2D Graphics](#) — How to display and print 2D graphics in applications.
- » [Sockets Direct Protocol](#) — How to enable the Sockets Direct Protocol to take advantage of InfiniBand.

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