

## Java SE 8 Programming

**Duration:** 5 Days

### What you will learn

This Java SE 8 Programming training covers the core language features and Application Programming Interfaces (API) you will use to design object-oriented applications with Java Standard Edition 8 (Java SE 8) Platform.

Learn To:

Create Java technology applications with the latest JDK Technology

Develop your object-oriented skills

Identify good practices in the use of the language to create robust Java application

Use Lambda expressions in Java applications

Store and manipulate data using collections

Manipulate files, directories and file systems

Connect to databases using standard SQL queries through JDBC

Create high-performance multi-threaded applications

Benefits to You

You can use this course to further develop your skills with the Java language and prepare for the Oracle Certified Professional, Java SE 8 Programmer Exam!

### Audience

Developer

Java Developers

Java EE Developers

### Related Training

*Required Prerequisites*

Java SE 8 Fundamentals

### Course Objectives

Creating high-performing multi-threaded applications

Creating Java technology applications that leverage the object-oriented features of the Java language, such as encapsulation, inheritance, and polymorphism

Implementing input/output (I/O) functionality to read from and write to data and text files and understand advanced I/O

streams

Executing a Java technology application from the command line

Manipulating files, directories and file systems using the JDK NIO.2 specification

Creating applications that use the Java Collections framework

Performing multiple operations on database tables, including creating, reading, updating and deleting using both JDBC and JPA technology

Searching and filter collections using Lambda Expressions

Implementing error-handling techniques using exception handling

Using Lambda Expression concurrency features

## Course Topics

### Java Platform Overview

Defining how the Java language achieves platform independence  
Differentiating between the Java ME, Java SE, and Java EE Platforms  
Evaluating Java libraries, middle-ware, and database options  
Defining how the Java language continues to evolve

### Java Syntax and Class Review

Creating simple Java classes  
Creating primitive variables  
Using operators  
Creating and manipulate strings  
Using if-else and switch statements  
Iterating with loops: while,do-while,for,enhanced for  
Creating arrays  
Using Java fields, constructors, and methods

### Encapsulation and Subclassing

Using encapsulation in Java class design  
Modeling business problems using Java classes  
Making classes immutable  
Creating and use Java subclasses  
Overloading methods

### Overriding Methods, Polymorphism, and Static Classes

Using access levels: private, protected, default, and public.  
Overriding methods  
Using virtual method invocation  
Using varargs to specify variable arguments  
Using the instanceof operator to compare object types  
Using upward and downward casts  
Modeling business problems by using the static keyword

Implementing the singleton design pattern

### **Abstract and Nested Classes**

Designing general-purpose base classes by using abstract classes

Constructing abstract Java classes and subclasses

Applying final keyword in Java

Distinguish between top-level and nested classes

### **Interfaces and Lambda Expressions**

Defining a Java interface

Choosing between interface inheritance and class inheritance

Extending an interface

Defaulting methods

Anonymous inner classes

Defining a Lambda Expression

### **Collections and Generics**

Creating a custom generic class

Using the type inference diamond to create an object

Creating a collection by using generics

Implementing an ArrayList

Implementing a TreeSet

Implementing a HashMap

Implementing a Deque

Ordering collections

### **Collections Streams, and Filters**

Describing the Builder pattern

Iterating through a collection using lambda syntax

Describing the Stream interface

Filtering a collection using lambda expressions

Calling an existing method using a method reference

Chaining multiple methods together

Defining pipelines in terms of lambdas and collections

### **Lambda Built-in Functional Interfaces**

Listing the built-in interfaces included in java.util.function

Core interfaces - Predicate, Consumer, Function, Supplier

Using primitive versions of base interfaces

Using binary versions of base interfaces

### **Lambda Operations**

Extracting data from an object using map

Describing the types of stream operations

Describing the Optional class

Describing lazy processing

Sorting a stream

Saving results to a collection using the collect method

Grouping and partition data using the Collectors class

### **Exceptions and Assertions**

Defining the purpose of Java exceptions

- Using the try and throw statements
- Using the catch, multi-catch, and finally clauses
- Autoclose resources with a try-with-resources statement
- Recognizing common exception classes and categories
- Creating custom exceptions
- Testing invariants by using assertions

## **Java Date/Time API**

- Creating and manage date-based events
- Creating and manage time-based events
- Combining date and time into a single object
- Working with dates and times across time zones
- Managing changes resulting from daylight savings
- Defining and create timestamps, periods and durations
- Applying formatting to local and zoned dates and times

## **I/O Fundamentals**

- Describing the basics of input and output in Java
- Read and write data from the console
- Using streams to read and write files
- Writing and read objects using serialization

## **File I/O (NIO.2)**

- Using the Path interface to operate on file and directory paths
- Using the Files class to check, delete, copy, or move a file or directory
- Using Stream API with NIO2

## **Concurrency**

- Describing operating system task scheduling
- Creating worker threads using Runnable and Callable
- Using an ExecutorService to concurrently execute tasks
- Identifying potential threading problems
- Using synchronized and concurrent atomic to manage atomicity
- Using monitor locks to control the order of thread execution
- Using the java.util.concurrent collections

## **The Fork-Join Framework**

- Parallelism
- The need for Fork-Join
- Work stealing
- RecursiveTask
- RecursiveTask

## **Parallel Streams**

- Reviewing the key characteristics of streams
- Describing how to make a stream pipeline execute in parallel
- List the key assumptions needed to use a parallel pipeline
- Defining reduction
- Describing why reduction requires an associative function
- Calculating a value using reduce
- Describing the process for decomposing and then merging work
- Listing the key performance considerations for parallel streams

## **Database Applications with JDBC**

Defining the layout of the JDBC API

Connecting to a database by using a JDBC driver

Submitting queries and get results from the database

Specifying JDBC driver information externally

Performing CRUD operations using the JDBC API

## **Localization**

Describing the advantages of localizing an application

Defining what a locale represents

Read and set the locale by using the Locale object

Building a resource bundle for each locale

Calling a resource bundle from an application

Changing the locale for a resource bundle