Java SE 21: Programming I Training

Duration: **5 Day**

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Overview

Based on the **Official Oracle Curriculum**, this entry-level {*training} is designed for developers new to the Java programming language. It covers core Java concepts including syntax, data types, control structures, object-oriented programming (OOP), lambda expressions, and modular programming.

Throughout the course, students use **Java SE 21** and apply their learning through hands-on labs that reinforce each topic.

Prerequisites

Basic understanding of any programming language or introductory Java knowledge is recommended

Who Should Attend

- Developers new to Java
- Application developers
- System integrators and administrators
- Anyone interested in learning Java language fundamentals

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What You Will Learn

By the end of this {*training}, you will have gained knowledge and skills in the following areas:

- Use variables, arrays, conditional statements, and loops to build programs
- Create simple Java classes and access fields/methods using object references
- Write and execute Java applications from the command line
- Begin working with Java's Collections API
- Use Predicate Lambda expressions in basic scenarios
- Handle exceptions with Java's exception handling mechanisms
- Apply foundational OOP principles: encapsulation, inheritance, and polymorphism
- Understand basic modular programming and define modules using `module-info.java`
- Navigate Java API documentation and work with Strings effectively
- Understand the basics of file access using NIO
- Practice coding interactively using JShell

Outline

1. Introduction to Java Programs

- Key Java language features
- Setting up the development environment
- Creating and running a Java Main class

2. Java Classes and the Main Method

- Defining and adding a `main()` method
- Basic structure of a Java class

3. Variables and Data Types

- Declaring variables
- Working with numbers and strings
- Performing numeric operations

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4. Conditions and Lists

- Using IF/ELSE statements
- Managing item lists and processing them

5. Objects and Classes

- Declaring fields and methods
- Creating and initializing objects
- Accessing members using references

6. Data Formatting and String Operations

- Using the `String` and `StringBuilder` classes
- Referencing Java API documentation
- Type casting and promotion for primitives

7. Creating and Using Methods

- Defining methods with parameters and return types
- Static methods and variables
- Method overloading

8. Encapsulation

- Access modifiers (private, public, protected)
- Encapsulating fields
- Constructor overloading

9. Advanced Conditionals

- Relational and logical operators
- Implementing switch-case structures
- Introduction to the NetBeans debugger

10. Advanced Arrays and Loops

- Using dates and parsing `args[]`
- Working with two-dimensional arrays
- Nested loops and loop alternatives

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- Introduction to ArrayList

11. Inheritance

- Creating subclasses and superclasses
- Overriding methods
- Defining and using abstract classes

12. Interfaces and Polymorphism

- Understanding polymorphism in Java
- Creating and implementing interfaces
- Using var for local variable inference
- Using List and Lambda expressions

13. Exception Handling

- Differences between checked and unchecked exceptions
- Throwing and catching exceptions
- Multi-catch blocks and error handling

14. Packaging and Modules

- Working with JAR files
- Java application architecture
- Declaring modules using module-info.java
- Overview of the modular JDK

15. Using JShell

- Writing interactive Java code with JShell
- JShell commands and IDE integration