Course duration

- 5 days

Course Benefits

- Learn how Java works.
- Understand the "write once, run anywhere" concept.
- Understand and learn how to create basic Java objects.
- Learn how to implement flow-control concepts in Java.
- Understand Java's package concept and create packages of Java classes.
- Understand Java arrays and write code to create and use arrays.
- Learn how to write Java classes using inheritance.
- Learn how to create and use interfaces.
- Understand and use the concept of polymorphism in an application
- Understand how Java's exception-handling mechanism works and learn how to apply exception-handling to Java applications.
- Understand and use inner classes.
- Learn how to use elements from the Java API library, including the Collections classes.

Available Delivery Methods

Public Class
Public expert-led online training from the convenience of your home, office or anywhere with an internet connection. Guaranteed to run .

Private Class
Private classes are delivered for groups at your offices or a location of your choice.

Self-Paced
Learn at your own pace with 24/7 access to an On-Demand course.

Course Outline

1. Java Introduction
    1. Conventions in These Notes
    2. The Java Environment - Overview
    3. Writing a Java Program
    4. Obtaining The Java Environment

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5. Setting up Your Java Environment
6. Creating a Class that Can Run as a Program
    1. The main() Method
7. Useful Stuff Necessary to Go Further
    1. System.out.println()
8. Using an Integrated Development Environment
9. Exercise: Running a Simple Java Program
10. Using the Java Documentation

2. Java Basics
    1. Basic Java Syntax
        1. General Syntax Rules
        2. Java Statements
        3. Blocks of Code
        4. Comments
    2. Variables
        1. Declaring Variables
        2. Advanced Declarations
    3. Data
        1. Primitive Data Types
        2. Object Data Types
        3. Literal Values
    4. Constants and the final Keyword
    5. Mathematics in Java
        1. Basic Rules
        2. Expressions
        3. Operator Precedence
        4. Multiple Assignments
        5. Order of Evaluation
        6. Bitwise Operators
        7. Compound Operators
        8. Expressions that Mix Data Types: Typecasting
    6. Creating and Using Methods
        1. Creating Methods
    7. Variable Scope
    8. Exercise: Method Exercise
3. Java Objects
    1. Objects
    2. Object-oriented Languages
    3. Object-oriented Programs
    4. Encapsulation
        1. OOP as a Messaging System
    5. Exercise: Object Definition
        1. Creating and Using an Instance of an Object
    6. References
        1. Reference Example
        2. Reference Expressions
    7. Defining a Class

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    1. Access to Data
8. More on Access Terms
9. Adding Data Members to a Class
    1. Adding Method Members (Functions) to a Class
10. Standard Practices for Fields and Methods
    1. Order of Elements within a Class
11. Java Beans
12. Bean Properties
13. Exercise: Payroll01: Creating an Employee Class
14. Constructors
15. Instantiating Objects Revisited
16. Important Note on Constructors
17. Exercise: Payroll02: Adding an Employee Constructor
18. Method Overloading
19. Exercise: Payroll03: Overloading Employee Constructors
20. The this Keyword
21. Using this to Call Another Constructor
22. Exercise: Payroll04: Using the this Reference
23. static Elements
24. The main Method
25. Exercise: Payroll05: A static field in Employee
26. Garbage Collection
27. Java Packages
28. Compiling and Executing with Packages
29. Working with Packages
30. Exercise: Payroll06: Creating an employees package
31. Variable Argument Lists (varargs)
    1. Keyboard I/O Using the Console Class
    2. Keyboard Input Without the Console
32. Exercise: Payroll07: Using KeyboardReader in Payroll
33. String, StringBuffer, and StringBuilder
34. Creating Documentation Comments and Using javadoc
    1. Javadoc Comments
35. Exercise: Payroll08: Creating and Using javadoc Comments
36. Primitives and Wrapper Classes
    1. Autoboxing and Unboxing

4. Comparisons and Flow Control Structures
    1. Boolean-valued Expressions
    2. Comparison Operators
    3. Comparing Objects
    4. Conditional Expression Examples
    5. Complex boolean Expressions
    6. Simple Branching
    7. The if Statement
    8. if Statement Examples
        1. Absolute Value
        2. Random Selection

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9. Exercise: Game01: A Guessing Game
10. Exercise: Payroll-Control01: Modified Payroll
11. Two Mutually Exclusive Branches
    1. The if . else Statement
    2. Nested if . else Statements - Comparing a Number of Mutually Exclusive
    3. Options
12. Exercise: Game02: A Revised Guessing Game
13. Comparing a Number of Mutually Exclusive options - The switch Statement.175
    1. The switch Statement
    2. switch Statement Examples
14. Exercise: Game03: Multiple Levels
15. Comparing Objects
    1. Testing Strings for Equivalence
16. Conditional Expression
    1. while and do . . . while Loops
    2. for Loops
    3. For-Each Loops
17. Exercise: Payroll-Control02: Payroll With a Loop
18. Exercise: Game04: Guessing Game with a Loop
19. Additional Loop Control: break and continue
20. Breaking Out of a Loop
21. Continuing a Loop
22. Classpath, Code Libraries, and Jar Files
    1. Using CLASSPATH
    2. Creating a jar File (a Library)
23. Exercise: Creating and Using an External Library
24. Compiling to a Different Directory

5. Arrays
    1. Defining and Declaring Arrays
    2. Instantiating Arrays
    3. Initializing Arrays
    4. Working With Arrays
    5. Enhanced for Loops - the For-Each Loop
    6. Array Variables
    7. Copying Arrays
    8. Exercise: Using the args Array
    9. Exercise: Game-Arrays01: A Guessing Game with Random Messages222
    10. Arrays of Objects
    11. Exercise: Payroll-Arrays01: An Array of employees
    12. Multi-Dimensional Arrays
    13. Multidimensional Arrays in Memory
    14. Example - Printing a Picture
    15. Typecasting with Arrays of Primitives
6. Inheritance
    1. Inheritance
    2. Inheritance Examples
    3. Payroll with Inheritance

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4. Derived Class Objects
5. Polymorphism
    1. Inheritance and References
    2. Dynamic Method Invocation
6. Creating a Derived Class
7. Inheritance Example - A Derived Class
8. Inheritance and Access
9. Inheritance and Constructors - the super Keyword
10. Derived Class Methods that Override Base Class Methods
11. Inheritance and Default Base Class Constructors
12. The Instantiation Process at Runtime
    1. Inheritance and static Elements
13. Example - Factoring Person Out of Employee
14. Exercise: Payroll-Inheritance01: Adding Types of Employees
15. Typecasting with Object References
16. More on Object Typecasts
17. Typecasting, Polymorphism, and Dynamic Method Invocation
    1. More on Overriding
    2. Changing Access Levels on Overridden Methods
18. Redefining Fields
19. Object Typecasting Example
20. Checking an Object's Type: Using instanceof
21. Typecasting with Arrays of Objects
22. Exercise: Payroll-Inheritance02: Using the Employee Subclasses
23. Other Inheritance-related Keywords
    1. abstract
    2. final
24. Exercise: Payroll-Inheritance03: Making our base classes abstract
25. Methods Inherited from Object

7. Interfaces
    1. Interfaces
    2. Creating an Interface Definition
    3. Implementing Interfaces
    4. Implementing Interfaces - Example
    5. Reference Variables and Interfaces
    6. Calling an Interface Method
    7. Interfaces and Inheritance
    8. Exercise: Exercise: Payroll-Interfaces01
    9. Some Uses for Interfaces
    10. Interfaces and Event-Handling
    11. Interfaces and "Pluggable Components"
    12. Marker Interfaces
    13. Annotations
    14. Annotation Details
    15. Using Annotations
8. Exceptions
    1. Handling Exceptions

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2. Exception Objects
3. Attempting Risky Code - try and catch
    1. try . catch Blocks and Variable Scope/Initialization
    2. Example - An Exception You Must Handle
    3. Using Multiple catch Blocks
4. Guaranteeing Execution of Code - The finally Block
5. Letting an Exception be Thrown to the Method Caller
6. Throwing an Exception
7. Exercise: Payroll-Exceptions01: Handling NumberFormatException in
8. Payroll
9. Exercise: Payroll-Exceptions01, continued
10. Exceptions and Inheritance
    1. Exception Class Constructors and Methods
11. Creating and Using Your Own Exception Classes
12. Exercise: Payroll-Exceptions02
13. Rethrowing Exceptions
14. Initializer Blocks
    1. Static Initializer Blocks
15. Logging
    1. Creating a Logger
    2. Logger Hierarchy and Naming
    3. Log Handlers
    4. Log Formatters
16. Log Properties
17. Assertions

9. Collections
    1. Collections
    2. Using the Collection Classes
    3. Using the Iterator Interface
    4. Creating Collectible Classes
        1. hashCode and equals
        2. Comparable and Comparator
    5. Generics
    6. Bounded Types
    7. Extending Generic Classes and Implementing Generic Interfaces
    8. Generic Methods
    9. Variations on Generics - Wildcards
    10. Exercise: Payroll Using Generics
10. Inner Classes
    1. Inner Classes, aka Nested Classes
    2. Inner Class Syntax
    3. Instantiating an Inner Class Instance from within the Enclosing Class
    4. Inner Classes Referenced from Outside the Enclosing Class
    5. Referencing the Outer Class Instance from the Inner Class Code
    6. static Inner Classes
    7. Better Practices for Working with Inner Classes
    8. Enums

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1. Why Another Syntax Element for a Set of Constants?
2. Defining an enum Class
3. More Complex Enums

Class Materials

Each student will receive a comprehensive set of materials, including course notes and all the class examples.

Class Prerequisites

Experience in the following *is required* for this Java class:

- Some prior programming experience in a procedural or object-oriented language.

Experience in the following *would be useful* for this Java class:

- Knowledge of Object-oriented Analysis and Design (OOAD) is extremely helpful in Java (and other) programming. We recommend learning OOAD, but you can do so at any stage of your learning. It will make you a better programmer, especially in a team environment.

Follow-on Courses

- Intermediate/Advanced Java (Java 11+) Training
- Advanced Java Programming
- Developing Java Web Applications

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