GIRIS TECH HUB
...Talent meets opportunity

CORE JAVA WITH DSA

Recorded Course | Detailed Syllabus

Master Core Java programming, object-oriented programming, data structures, collections, multithreading, file handling and Java 8 concepts through structured learning and practical exercises.

Video Duration: 94+ Hours | Learning Mode: Self-Paced

Course Fee: Rs. 3,000

Course Curriculum

Chapter 1: Introduction of Java

Chapter 2: Decision Making Statement

Chapter 3: Looping or Control Statement

Chapter 4: Array with DSA

Chapter 5: Classes and Object (OOP)

Chapter 6: Constructor and Functions (OOP)

Chapter 7: Inheritance, Abstraction and Interface(OOP)

Chapter 8: Exception Handling

Chapter 9: Collection Framework (DSA)

Chapter 10: Wrapper Classes and Strings

Chapter 11: Multithreading

Chapter 12: File Handling / IOStreams

Chapter 13: JDK 1.8 Features

Learning support includes recorded lessons, chapter-wise notes, coding practice and MCQ exercises.

CHAPTER 1

Introduction of Java

Topics Covered

- Introduction to Java
- Java Bytecode
- Creating a Java Application
- Types of Java Applications and Program Execution
- Introduction to Data Types in Java
- Primitive Data Types in Java
- Data Type Ranges in Java
- long Data Type in Java

- Introduction to Operators in Java
- Increment and Decrement Operators in Java
- Introduction to Number Reversal
- Number Reversal in Java - Examples
- Number Reversal in Java - More Examples
- Number Systems and Bitwise Operators
- Number System Conversions
- Converting Decimal 12 to Binary
- Bitwise AND, OR and XOR Operations
- One's Complement of a Binary Number
- Bitwise AND, Left Shift and Right Shift Operators
- Swapping Values Using the XOR Operator in Java

CHAPTER 2

Decision Making Statement

Topics Covered

- Billing Discount Calculation Using if Statement
- Character Case Conversion Using if-else
- Greatest of Three Numbers Using if-else
- Washing Machine Time Calculation Using if-else
- Candy Jar Program Using if-else
- Voting Eligibility Program Using if-else
- Introduction to the switch Statement
- Vowel or Consonant Program Using if-else
- Employee Salary Bonus Calculation Using if-else
- Boolean Conditions and Operator Type Compatibility

CHAPTER 3

Looping or Control Statement

Topics Covered

- Introduction to Loops and while Loop Syntax
- Sum of Numbers from 1 to 10 Using while Loop
- Factorial of a Number Using while Loop
- Power of a Number Using while Loop
- Perfect Number Program Using while Loop
- Counting Digits in a Number Using while Loop
- Reversing a Number Using while Loop

- Number Representation and Duck Number Program Using while Loop
- Duck Number Program Using while Loop
- Fibonacci Series Using Loops
- Introduction to the for Loop
- Square Star Pattern Using Nested Loops
- L-Shaped Star Pattern Using Nested Loops
- Hollow Square Star Pattern Using Nested Loops
- Decreasing Triangle Star Pattern Using Nested Loops
- Alphabet Pattern Using Nested Loops
- Centered Star Pattern Using Nested Loops
- Centered Star Pattern - Conditional Logic
- Increasing Triangle Star Pattern Using Nested Loops
- Inverted Triangle Star Pattern Using Nested Loops
- Hollow Rectangle Star Pattern Using Nested Loops
- Symmetric Star Pattern Using Nested Loops

CHAPTER 4

Array with DSA

Topics Covered

- Introduction to Data Structures
- Applications of Data Structures
- Types of Data Structures - Linear, Non-Linear and Hash-Based
- Array References and Default Values in Java
- Array Memory Allocation and Indexing
- Array Memory Allocation and Address Calculation
- Finding the Maximum Element in an Array
- Finding the Largest and Second-Largest Elements in an Array
- Inserting an Element into an Array
- Removing an Element from an Array
- Introduction to the Brute Force Approach
- Finding Duplicate Elements in an Array
- Maximum Sum Subarray Using Sliding Window
- Maximum Sum Subarray of Fixed Size - Brute Force Approach
- Sliding Window Technique
- Merging Two Sorted Arrays
- Sorting an Array Using Arrays.sort()
- Array Rotation

- Two-Dimensional Array Memory Allocation
- Two-Dimensional Array Input, Traversal and Sum
- Two-Dimensional Arrays and Matrix Representation
- Matrix Transpose Using Two-Dimensional Arrays
- Matrix Multiplication Using Two-Dimensional Arrays
- Column Operations on a Two-Dimensional Array
- Jagged Arrays in Java
- Counting Subarrays with a Target Sum
- Sliding Window Technique
- Linear Search Algorithm
- Binary Search
- Array Sorting Using Nested Loops and Swapping
- Bubble Sort Algorithm - Step-by-Step Example
- Bubble Sort with Optimization
- Introduction to Stack and Stack Operations

CHAPTER 5

Classes and Object (OOP)

Topics Covered

- Introduction to Classes and Class Members
- Objects and Object Creation in Java
- Instance Variables and Methods
- Accessing Instance Variables Through Objects
- Multiple Objects and Object References
- Instance Variables and Methods - Practical Example
- Object Memory Allocation - Stack and Heap
- Passing Arrays to Methods
- Array References and Method Calls
- Returning Arrays from Methods
- Object References and Memory Behavior
- Finding the Maximum Value in an Array Using a Method
- Arrays as Class Members
- Private Data Members and Encapsulation
- Class Relationships Using Employee and Company Objects
- Class Relationships Using Product and Shop Objects
- Array of Objects - Library and Book Example
- Object-Oriented Design - Voting Application Example

- Array of Employee Objects - Practical Example
- Static and Instance Variables in Java
- Static Methods and Class-Level Access
- Introduction to Encapsulation in Java
- Encapsulation - Product and Shop Application

CHAPTER 6

Constructor and Functions (OOP)

Topics Covered

- Introduction to Constructors in Java
- Default and Implicit Constructors
- Initializing Arrays Using Constructors
- Constructor Overloading and Constructor Chaining with this()
- Constructors with Array Instance Variables
- Private Constructors in Java
- Private Constructors and Utility Classes

CHAPTER 7

Inheritance, Abstraction and Interface(OOP)

Topics Covered

- Introduction to Inheritance and Dynamic Polymorphism
- Hierarchical Inheritance - Practical Example
- Constructor Chaining in Inheritance Using super()
- Multilevel Inheritance in Java
- Inheritance, final Keyword and Method Overriding
- Method Overriding - Practical Example
- Method Overriding Rules in Java
- Using super in Inheritance
- Runtime Polymorphism Using Parent References
- Method Overriding and Runtime Polymorphism - Practice
- final Keyword and Constructor Rules in Inheritance
- Restricting Inheritance and Overriding with final
- Introduction to Abstraction in Java
- Abstract Classes and Abstract Methods - Practical Example
- Hierarchical and Multiple Inheritance Concepts
- Multiple Inheritance, the Diamond Problem and Interfaces
- Interface Methods and Access Modifier Rules

- Interface vs Abstract Class and Loose Coupling

CHAPTER 8

Exception Handling

Topics Covered

- Introduction to Exception Handling in Java
- Exception Handling - try, catch and finally
- User-Defined Exceptions in Java
- throw, throws and Exception Propagation in Java

CHAPTER 9

Collection Framework (DSA)

Topics Covered

- Introduction to the Java Collections Framework
- Collection Framework Interfaces and Marker Interfaces
- Collection Interface - Core Concepts and Operations
- ArrayList - Basic Operations and Element Search
- Vector - Capacity and Internal Growth
- Vector - Storing, Fetching and Displaying Elements
- Iterator, ListIterator and Enumeration
- Using Iterator with Vector
- Collection-Based Application Design - Model and Service Layers
- Book Management Using ArrayList
- Searching and Managing Book Objects in ArrayList
- LinkedList Internal Structure and Operations
- Stack Class and LIFO Operations
- HashSet and LinkedHashSet - Concepts and Practical Usage
- TreeSet and NavigableSet
- Collections Utility Class Methods
- Sorting Custom Objects Using Collections.sort() and Comparator
- Introduction to Map and Key-Value Pairs
- Map put(), get() and putAll() Operations
- Map Entries, Frequency Counting and Nested Maps
- HashMap Internal Structure, Capacity and Load Factor
- HashMap Hashing and Bucket Index Calculation
- Introduction to Generics in Java
- Generic Collections with Custom Employee Objects

- Types of Generics and Generic Collections
- Type Safety Problems Without Generics
- Bounded Generics and Wildcards
- Generic Collections with Bounded Types
- Object Class and Common Object Methods
- Employee Object Creation and Encapsulation
- Object Identity, Reference Equality and hashCode()
- equals() and hashCode() with HashSet Objects
- Cloning Objects - Shallow Copy and Deep Copy

CHAPTER 10

Wrapper Classes and Strings

Topics Covered

- Introduction to Wrapper Classes and Type Conversion
- Wrapper Class Hierarchy in Java
- Converting Wrapper Objects to Primitive Values
- Converting Strings to Primitive Values
- String Object Creation and the String Constant Pool
- Introduction to the String Class in Java
- String Character Access and String Processing
- String Methods - startsWith() and endsWith()
- Comparing Strings - equals() and compareTo()
- String Comparison Without Built-in Methods
- Character Frequency in a String Using LinkedHashMap
- Reversing Words in a String
- StringBuffer and StringBuilder in Java
- StringBuilder delete() and Related Methods
- String vs StringBuilder and String Reversal
- Character Processing and ASCII Values in Strings

CHAPTER 11

Multithreading

Topics Covered

- Creating Threads Using Thread and Runnable
- Thread join() Method and Thread Coordination
- Working with Multiple Threads
- Creating Threads Using the Runnable Interface

- Introduction to Thread Synchronization
- Thread Synchronization - Bank Account Example
- wait(), notify(), sleep() and Thread Communication
- Thread Monitoring and Thread Execution Behavior
- Thread Priority in Java
- Thread Pools and Task Queues
- ExecutorService, ThreadPoolExecutor and ThreadFactory
- volatile Keyword and Variable Visibility Between Threads
- Thread Life Cycle and Thread States
- Runnable, Waiting and Blocked Thread States

CHAPTER 12

File Handling / IOStreams

Topics Covered

- Introduction to File Handling, Streams and the File Class
- File Class Methods for Files and Directories
- Writer Classes and Character Output Streams
- FileWriter Constructors and Writing to Files
- FileReader and Character Input Methods
- FileOutputStream write() Methods
- FileOutputStream - Writing Byte Arrays and File Operations
- Reading Files Using FileInputStream
- Serialization and Deserialization in Java

CHAPTER 13

JDK 1.8 Features

Topics Covered

- Java 8 Interface Features - Default and Static Methods
- Functional Interfaces in Java 8
- Introduction to Lambda Expressions in Java 8
- Lambda Expressions - Syntax and Practical Examples
- Consumer Functional Interface in Java 8
- Consumer Interface and forEach Method
- Using forEach with Collections in Java 8
- forEach with Custom Objects in Java 8
- Consumer Interface with Custom Objects
- Introduction to Predicate Functional Interface

- Predicate Interface - test and Default Methods
- Using Predicate with Collections
- Predicate Chaining - and, or and negate
- Predicate Interface - Practical Examples
- Function Functional Interface in Java 8
- Supplier Functional Interface and Introduction to Streams
- Java 8 Streams - Introduction and map Method
- Java 8 Streams - map and flatMap Operations
- Java 8 Streams - filter Method
- Java 8 Streams - Filtering Custom Objects
- BiFunction Functional Interface in Java 8