



Complete Beginner to Advanced

Module 1: Java Fundamentals

Build a solid understanding of computer fundamentals, Java architecture, and program execution.

Topics Covered:

- Computer Fundamentals (I/O Devices, CPU & Memory)
- Computer Organization & Operating Systems
- Why Programming Languages?
- Introduction to Java
- Writing Your First Java Program

Module 2: Variables & Data Types

Learn how Java stores and manages data using variables, primitive and reference data types.

Topics Covered:

- Variables & Naming Conventions
- Primitive Data Types
- Non-Primitive Data Types
- Wrapper Classes
- Autoboxing & Unboxing
- Type Conversion
- Swapping Variables



Module 3: Input & Output

Understand user input, formatted output, and console interactions in Java.

Topics Covered:

- Input using Scanner
- Output using System.out
- Escape Sequences
- Console Formatting

Module 4: Operators

Master arithmetic, logical, relational, assignment, and bitwise operators through practical problem-solving.

Topics Covered:

- Arithmetic & Logical Operators
- Relational & Assignment Operators
- Bitwise Operators
- Last Digit of a Number
- Sum of N Natural Numbers
- Days Before N Days
- Arithmetic Progression
- Geometric Progression



Module 5: Decision Making & Flow Control

Develop logical thinking using conditional statements and branching techniques.

Topics Covered:

- if-else Statements
- switch Statement
- Even & Odd Numbers
- Largest of Three Numbers
- Leap Year
- Calculator Program

Module 6: Loops & Pattern Programming

Master iterative programming and solve mathematical and pattern-based coding problems.

Topics Covered:

- for Loop
- while Loop
- do-while Loop
- break & continue
- Number Tables
- Square, Triangle & Pyramid Patterns
- GCD & LCM
- Practice Problems



Module 7: Functions & Methods

Learn modular programming using Java methods and understand parameter passing.

Topics Covered:

- Methods in Java
- Applications of Methods
- Command Line Arguments
- Number-based Programming Problems

Module 8: Arrays & Multi-Dimensional Arrays

Learn array operations, traversal techniques, and multidimensional data handling.

Topics Covered:

- Introduction to Arrays
- Array Declaration & Initialization
- Array Working & Types
- Maximum Element
- Sum & Average
- Sorted Array Check
- Multidimensional Arrays
- Passing 2D Arrays to Methods



Module 9: Arrays Utility Class

Leverage Java's built-in Arrays utility class for efficient array manipulation.

Topics Covered:

- Arrays Class Overview
- fill()
- binarySearch()
- equals()
- compare()
- mismatch()
- asList()
- toString()

Module 10: Strings

Master string manipulation using String, StringBuilder, and StringBuffer.

Topics Covered:

- String Fundamentals
- String Operations
- StringBuilder & StringBuffer
- Common String Methods
- Palindrome Check
- Reverse String
- Binary ↔ Decimal Conversion
- String-based Coding Problems



Module 11: Object-Oriented Programming (OOP)

Build scalable applications by mastering Java's object-oriented programming concepts.

Topics Covered:

- Classes & Objects
- Constructors
- this Reference
- Static Members
- final Keyword
- Encapsulation
- Access Modifiers
- Inheritance
- super Keyword
- Polymorphism
- Method Overriding
- Abstraction
- Abstract Classes
- Interfaces
- Interfaces vs Abstract Classes

Module 12: Java Collections Framework

Learn Java's powerful Collections Framework for efficient data storage and manipulation.

Topics Covered:

- Collections Framework Overview
- Collection Hierarchy



- Generics
- Wildcards
- Collection Interface
- Iterators
- toArray()
- Bulk Operations
- Collection Traversal

Module 13: ArrayList

Work with Java's most commonly used dynamic collection.

Topics Covered:

- List Interface
- ListIterator
- ArrayList
- Internal Working of ArrayList
- ArrayList Methods
- Traversing ArrayLists
- Practical Coding Problems

Module 14: Comparator & Comparable

Understand custom sorting techniques using Java interfaces.

Topics Covered:

- Comparable Interface
- Comparator Interface
- Comparator Methods
- Custom Sorting Examples



Module 15: Collections Utility Class

Perform advanced collection operations using Java's Collections utility methods.

Topics Covered:

- Collections Class
- fill()
- reverse()
- binarySearch()
- max() & min()
- frequency()
- Sorting Utilities

Module 16: Exception Handling

Develop robust and reliable Java applications through structured exception handling.

Topics Covered:

- Introduction to Exceptions
- Exception Hierarchy
- try-catch
- Method Call Stack
- Multiple Exceptions
- throw & throws
- User-defined Exceptions



Module 17: Multithreading

Learn concurrent programming concepts to build high-performance Java applications.

Topics Covered:

- Introduction to Multithreading
- Thread Lifecycle
- Creating & Managing Threads
- Multithreading in Java

Module 18: Lambda Expressions & Functional Programming

Write concise, readable, and modern Java code using functional programming features.

Topics Covered:

- Lambda Expressions
- Lambda Syntax
- Method References
- Functional Programming Concepts

Module 19: Java Streams API

Process and manipulate collections efficiently using Java Streams.

Topics Covered:



- Introduction to Streams
- Stream Hierarchy
- Stream Operations
- Intermediate & Terminal Operations
- Stream-based Applications
- Practical Examples

Module 20: File Handling

Learn file management techniques for reading, writing, and processing files in Java.

Topics Covered:

- Command Line Arguments
- File Handling Fundamentals
- Creating Files
- Retrieving File Information
- Reading Files
- Writing Files