

# Core Java to Advance Java

## 1. **\*\*Introduction to Java\*\***

- What is Java?
- History and features of Java
- Installing JDK and setting up the environment
- Writing and running your first Java program

## ### 2. **\*\*Java Basics\*\***

- Variables and Data Types
- Operators (Arithmetic, Logical, Relational, Bitwise)
- Control Statements (if-else, switch-case)
- Loops (for, while, do-while)
- Arrays

## ### 3. **\*\*Object-Oriented Programming (OOP) Concepts\*\***

- Classes and Objects
- Constructors
- Methods (static and non-static)
- `this` keyword

- Encapsulation
- Inheritance
- Polymorphism (Method Overloading and Overriding)
- Abstraction
- Interfaces
- Packages and Access Modifiers

### ### 4. \*\*Exception Handling\*\*

- Types of exceptions
- try-catch block
- throw, throws, and finally
- Custom exceptions

### ### 5. \*\*Strings in Java\*\*

- String Class
- String Methods
- StringBuilder and StringBuffer
- String Manipulation and Formatting

### ### 6. \*\*Collections Framework\*\*

- Introduction to Collections
- List (ArrayList, LinkedList, Vector)
- Set (HashSet, LinkedHashSet, TreeSet)
- Map (HashMap, LinkedHashMap, TreeMap)
- Queue (PriorityQueue, Deque)
- Iterator and ListIterator

### ### 7. \*\*Java I/O (Input/Output)\*\*

- File Handling (File, FileReader, FileWriter)
- Byte Streams vs Character Streams
- Serialization and Deserialization
- BufferedReader and BufferedWriter

### ### 8. \*\*Multithreading\*\*

- Introduction to Threads
- Creating and running threads (Thread class, Runnable interface)
- Thread lifecycle
- Synchronization and Inter-thread communication
- Deadlock, Daemon Threads

### ### 9. **\*\*Java Networking\*\***

- Basics of networking in Java
- Socket programming (TCP/UDP)
- URL and HTTP communication
- Java RMI (Remote Method Invocation)

### ### 10. **\*\*Java 8 Features\*\***

- Lambda Expressions
- Functional Interfaces
- Streams API
- Default and Static Methods in Interfaces
- Optional Class
- Date and Time API

### ### 11. **\*\*Java Memory Management\*\***

- Memory Areas in JVM
- Garbage Collection
- Strong, Soft, Weak, and Phantom References
- Java Performance Tuning

### ### 12. **\*\*JDBC (Java Database Connectivity)\*\***

- Introduction to JDBC
- Connecting Java with databases
- CRUD operations using JDBC
- PreparedStatement and CallableStatement
- Transactions in JDBC

### ### 13. **\*\*Java Annotations\*\***

- Introduction to Annotations
- Built-in Annotations (`@Override`, `@Deprecated`, `@SuppressWarnings`)
- Custom Annotations

### ### 14. **\*\*Generics in Java\*\***

- Introduction to Generics
- Generic Classes and Interfaces
- Generic Methods
- Bounded Type Parameters
- Wildcards

### ### 15. \*\*Java Design Patterns\*\*

- Introduction to Design Patterns
- Singleton, Factory, Abstract Factory
- Observer, Decorator, Strategy, etc.
- Practical implementation examples

### ### 16. \*\*Java Swing (Optional)\*\*

- Introduction to Java Swing
- Creating GUIs with Swing
- Event Handling
- Layout Managers
- Advanced Swing Components (JTable, JTree, JTabbedPane)

### ### 17. \*\*Advanced Java Topics (Optional)\*\*

- JavaFX
- Java Web Technologies (Servlets, JSP)
- RESTful Web Services using Java
- Microservices with Spring Boot

