

Duration: 120 Hours

Live Class: 6 Months

Month 1: Java Core Fundamentals

Week 1: Introduction to Java

- Overview of Java: History, Features, and Setup (JDK, IDE)
- Basic Syntax: Data Types, Variables, Operators, Control Flow
- Loops (For, While, Do-While) and Conditional Statements (If-Else, Switch)
- Introduction to Object-Oriented Programming (OOP)

Week 2: Functions and Arrays

- Functions: Definition, Parameters, Return Types
- Recursion in Java
- Arrays: Single and Multi-Dimensional Arrays
- Basic Sorting and Searching Algorithms (Bubble Sort, Linear Search)

Week 3: Object-Oriented Programming (OOP)

- Classes and Objects, Constructors
- Encapsulation, Abstraction, Inheritance
- Method Overloading, Method Overriding
- Hands-on Project: Simple Library Management System (Using OOP)

Week 4: Advanced OOP Concepts

- Polymorphism (Dynamic and Static)
- Abstract Classes and Interfaces
- Introduction to Packages and Access Modifiers
- Mini Project: Bank Account Management System

Month 2: Java Advanced Concepts

Week 1: Exception Handling

- Understanding Java Exceptions: Try, Catch, Finally, Throw, Throws
- Built-in Exceptions and Custom Exceptions
- Best Practices for Exception Handling
- Hands-on Practice: Error Logging and Handling in Java

Week 2: Collections Framework

- Introduction to Java Collections: List, Set, Map, Queue
- ArrayList, LinkedList, HashSet, TreeSet, HashMap, TreeMap
- Iterators and Streams
- Solving Problems Using Collections

Week 3: Java I/O and File Handling

- File Handling in Java (FileReader, FileWriter, BufferedReader, BufferedWriter)
- Serialization and Deserialization
- Handling CSV and JSON Files
- Project: Build a File-Based Data Storage System

Week 4: Multithreading and Concurrency

- Introduction to Multithreading in Java
- Creating Threads: Extending Thread Class and Implementing Runnable Interface
- Synchronization and Inter-Thread Communication
- Hands-on Project: Building a Multithreaded Banking Application

Month 3: Introduction to Spring Framework

Week 1: Introduction to Spring Framework

- Introduction to Spring, Spring Core Concepts
- Inversion of Control (IoC), Dependency Injection (DI)
- Spring Bean Lifecycle, Bean Scopes, and Autowiring
- Setting Up a Spring Application

Week 2: Spring Boot Introduction

- Introduction to Spring Boot: Why Spring Boot?
- Setting up a Spring Boot Project with Maven/Gradle
- Creating RESTful APIs with Spring Boot
- Hands-on Project: Simple REST API for To-Do List Management

Week 3: Spring Boot with Databases

- Introduction to JDBC and Spring Data JPA
- CRUD Operations with Spring Data JPA (MySQL/PostgreSQL)
- Relationships in JPA: One-to-One, One-to-Many, Many-to-Many
- Hands-on Project: Employee Management System with Database Integration

Week 4: Spring Boot RESTful Services

- Building RESTful Services with Spring Boot
- Handling HTTP Methods (GET, POST, PUT, DELETE)
- Exception Handling and Validation in REST APIs
- Project: Building a Product Catalog REST API

Month 4: Advanced Spring Boot Concepts

Week 1: Spring Boot Security

- Introduction to Spring Security
- Implementing Basic Authentication and Authorization
- Role-Based Access Control
- Hands-on Project: Implementing Security in a REST API

Week 2: Spring Boot and JWT (JSON Web Token)

- Introduction to JWT for API Security
- Generating JWT Tokens and Securing REST Endpoints
- Token Expiration and Refresh Mechanism
- Project: Securing REST APIs with Spring Security and JWT

Week 3: Spring Boot with Microservices

- Introduction to Microservices Architecture
- Setting Up Microservices with Spring Boot
- Inter-Service Communication (REST, gRPC)
- Hands-on Project: Building Microservices for E-Commerce Application

Week 4: Spring Boot with API Gateway

- Introduction to API Gateway (Zuul or Spring Cloud Gateway)
- Routing and Load Balancing with API Gateway
- API Versioning and Throttling
- Hands-on Practice: Implementing API Gateway in a Microservices Project

Month 5: Spring Boot Advanced Topics

Week 1: Spring Boot with Hibernate

- Introduction to ORM and Hibernate
- Configuring Hibernate with Spring Boot
- Performing CRUD Operations with Hibernate
- Hands-on Project: Integrating Hibernate into a Web Application

Week 2: Spring Boot Caching and Performance Optimization

- Introduction to Spring Caching
- Cache Abstraction and Cache Providers (EhCache, Redis)
- Performance Optimization Techniques in Spring Boot
- Hands-on Project: Caching in an E-Commerce Application

Week 3: Spring Boot Testing

- Introduction to Unit Testing with JUnit and Mockito
- Testing Spring Boot Applications (Controller, Service, Repository Layers)
- Integration Testing with Spring Boot
- Hands-on Project: Writing Test Cases for a Spring Boot Application

Week 4: Spring Boot with Cloud

- Deploying Spring Boot Applications to Cloud
- Hands-on Project: Deploying a Spring Boot Microservice to Cloud

Month 6: Capstone Project and Interview Preparation

Week 1: Capstone Project (Part 1)

- Finalizing Project Idea (Real-World Enterprise Application)
- Defining Requirements and Setting Up Architecture
- Building the Backend Services and Database Design
- Integrating Spring Boot REST APIs with Frontend (React/Angular)

Week 2: Capstone Project (Part 2)

- Implementing Security Features (JWT, Role-Based Access)
- Performance Optimization and Caching Implementation
- Testing and Debugging the Application
- Preparing Project Documentation

Week 3: Mock Interviews and Problem Solving

- Solving Common Java and Spring Boot Interview Problems
- Mock Technical Interviews (Coding and System Design)
- Behavioral Interview Preparation

Week 4: Career Guidance and Project Presentation

- Final Project Presentation and Peer Reviews
- Resume Building and LinkedIn Profile Optimization
- Job Search Strategies and Networking Tips

Key Features:

- **Industry-Relevant Projects:** Real-world projects like e-commerce applications, employee management systems, and more.
- **Hands-on Experience:** Each concept is reinforced with practical coding exercises and mini-projects.
- **Interview Preparation:** Mock interviews and problem-solving sessions to prepare for job interviews.
- **Capstone Project:** End-of-course project to demonstrate all learned skills.