CodeCruise

SAIL SMOOTH IN TECH OCEAN

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Java Spring Boot

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This course is designed to equip students with a solid foundation in **Java** programming and the **Spring Boot framework.** The course provides a comprehensive understanding of both core and advanced Java concepts, along with practical applications in building robust, scalable, and efficient applications using Spring Boot. Learn from an **experienced industry trainer** who will guide you through real-world scenarios and best practices, ensuring you gain practical skills that are immediately applicable in the workplace.

Tech Stack To Be Covered

| Java | Spring Boot | MY-SQL | POSTMAN | REST API |

SWAGGER API

Java Spring Boot

Session 1: Introduction to Java

- **Overview of Java:**
    - History and evolution
    - Features and advantages
    - JVM, JRE, and JDK
- **Setting up the Environment:**
    - Installing JDK
    - Setting up an IDE (IntelliJ IDEA, Eclipse)
    - Writing and running your first Java program
- **Basic Syntax:**
    - Data types, variables, and operators
    - Control flow statements (if-else, switch, loops)
    - Methods and recursion

Session 2: Fundamentals of Design Principles and OOP

- **Design Principles:**
    - DRY, KISS, YAGNI
    - SOLID principles
- **Object-Oriented Programming:**
    - Classes and Objects
    - Inheritance, polymorphism, abstraction, and encapsulation
    - Constructors and initialization blocks
    - Static vs. instance members

Session 3: Exception Handling and Garbage Collection

- **Exception Handling:**
    - Types of exceptions (checked and unchecked)
    - Try-catch-finally block
    - Throw, throws, and custom exceptions
- **Garbage Collection:**
    - How GC works in Java

- Types of garbage collectors
- Best practices for efficient memory management

Session 4: Introduction to J2EE

- **Overview of J2EE:**
  - Architecture and components
  - Role of J2EE in enterprise applications

Session 5: Annotations, Regex, and Design Patterns

- **Annotations:**
  - Built-in annotations
  - Creating custom annotations
  - Use cases in modern frameworks
- **Regular Expressions:**
  - Syntax and patterns
  - Using regex in Java (Pattern and Matcher classes)
- **Design Patterns:**
  - Introduction to design patterns
  - Creational, Structural, and Behavioral patterns
  - Practical examples in Java

Session 6: JDBC

- **Introduction to JDBC:**
  - JDBC architecture
  - Setting up a database (MySQL/PostgreSQL)
- **CRUD Operations:**
  - Connecting to a database
  - Executing queries (Select, Insert, Update, Delete)
  - Handling transactions

Session 7: Java Collections

- **Overview of Collections Framework:**
  - Core interfaces (List, Set, Map, Queue)
  - Common implementations (ArrayList, HashSet, HashMap)

- **Advanced Collections:**
  - Comparators and sorting
  - Concurrent collections
  - Best practices for choosing the right collection

Session 8: File I/O

- **Basics of File I/O:**
  - Streams and Readers/Writers
  - Reading and writing files
- **Advanced File I/O:**
  - Buffered streams
  - Serialization and deserialization
  - NIO package and file operations

Session 9: Multithreading

- **Introduction to Multithreading:**
  - Thread lifecycle and states
  - Creating and managing threads
- **Concurrency:**
  - Synchronization and locks
  - Executors framework
  - Common concurrency issues and solutions

Session 10: Introduction to Spring Boot

- **Overview of Spring Framework:**
  - Inversion of Control and Dependency Injection
  - Introduction to Spring Boot and its advantages
- **Setting up a Spring Boot Project:**
  - Using Spring Initializr
  - Project structure and configuration
- **Building a Simple REST API:**
  - Controllers, Services, and Repositories
  - Running and testing the application

Session 11: Introduction to Microservices

- **Microservices Architecture:**
  - Benefits and challenges
  - Comparison with monolithic architecture
- **Building Microservices with Spring Boot:**
  - Creating and managing multiple microservices
  - Communication between microservices (REST, messaging)

Session 12: Spring Cloud Config and Client-Side Load Balancing

- **Spring Cloud Config:**
  - Centralized configuration management
  - Setting up Spring Cloud Config Server and Client
- **Client-Side Load Balancing:**
  - Introduction to Ribbon
  - Configuring and using Ribbon in Spring Boot applications

Session 13: Service Discovery, Circuit Breaker, and Rate Limiting

- **Service Discovery:**
  - Introduction to Eureka
  - Setting up Eureka Server and Client
- **Circuit Breaker:**
  - Introduction to Hystrix/Resilience4j
  - Implementing circuit breakers in microservices
- **Rate Limiting:**
  - Importance of rate limiting
  - Implementing rate limiting using Spring Boot

Session 14: Prompt Engineering with ChatGPT

- **Introduction to AI and ChatGPT:**
  - Basics of natural language processing (NLP)
  - Overview of ChatGPT and its capabilities
- **Prompt Engineering:**
  - Crafting effective prompts
  - Use cases of ChatGPT in software development
- **Integrating ChatGPT with Java Applications:**
  - Using OpenAI API

- Practical examples and best practices