

JAVA FULL STACK

(Core java + Spring boot + SQL)

Syllabus

JAVA Basics and Core Java

Introduction to Java Basics

- 1. Overview and Setup:**
 - History of Java
 - Applications and use cases
 - Installing Java Development Kit (JDK) and IDEs (Eclipse, IntelliJ)
- 2. Basic Syntax:**
 - Variables and data types
 - Operators and expressions
 - Control flow statements:
 - Conditional statements (if, else, switch)
 - Looping statements (for, while, do-while)
- 3. Functions and Methods:**
 - Defining and calling methods
 - Method parameters and return values
 - Method overloading and its significance

Object-Oriented Programming (OOP) in Java

- 1. Classes and Objects:**
 - Creating classes
 - Instantiating objects
 - Constructors and initialization blocks
- 2. Inheritance and Polymorphism:**
 - Extending classes
 - Overriding methods
 - Polymorphism and method signature
- 3. Encapsulation and Abstraction:**
 - Access modifiers
 - Encapsulation principles
 - Abstract classes and abstract methods
 - Interfaces and their implementation

Exception Handling and File I/O

- 1. Exception Handling:**

- Types of exceptions
 - try-catch blocks and multiple catch clauses
 - Throwing and catching custom exceptions
2. **File I/O:**
- Reading and writing to files using FileReader and FileWriter
 - Buffered streams for efficient I/O
 - Serialization and Deserialization

Collections Framework

1. **Introduction to Collections:**
- Overview of List, Set, and Map interfaces
 - Introduction to the Collections framework
2. **ArrayList and LinkedList:**
- Understanding the differences
 - Common operations on ArrayList and LinkedList
3. **HashMap:**
- Key-Value pairs and their significance
 - Iterating over entries using keySet, values, and entrySet

Multithreading and Concurrency

1. **Introduction to Threads:**
- Creating threads using the Thread class and Runnable interface
 - Thread lifecycle: new, runnable, blocked, waiting, terminated
 - Daemon threads and user threads
2. **Synchronization:**
- Solving thread interference and consistency issues
 - Using the synchronized keyword
3. **Thread Communication:**
- Using wait(), notify(), and notifyAll() for inter-thread communication
 - Deadlock prevention and resolution strategies

Advanced Java Basics

1. **String Handling:**
- String manipulation using methods like concat, substring, replace
 - StringBuilder and StringBuffer for efficient string manipulation
 - String formatting and regular expressions
2. **Date and Time:**
- Overview of Date and Calendar classes
 - Introduction to the java.time package in Java 8 for modern date and time handling
3. **Regular Expressions:**
- Understanding regular expressions and their syntax
 - Using java.util.regex package for pattern matching

SPRING BOOT

Introduction to Spring Boot

1. **Overview of Spring Boot:**
 - Introduction to the Spring Framework and its components.
 - Understanding the need for Spring Boot.
2. **Setting Up a Spring Boot Project:**
 - Installing Spring Boot and setting up a new project.
 - Introduction to Spring Initializr.

Building a Simple Spring Boot Application

1. **Creating RESTful APIs:**
 - Building a simple RESTful web service using Spring Boot.
 - Understanding the structure of a Spring Boot application.
2. **Dependency Injection in Spring Boot:**
 - Introduction to Inversion of Control (IoC) and Dependency Injection (DI).
 - Using the `@Autowired` annotation for dependency injection.

Data Access with Spring Boot

1. **Working with Databases:**
 - Configuring database properties in Spring Boot.
 - Using Spring Data JPA for database interactions.
2. **CRUD Operations with Spring Boot:**
 - Implementing CRUD (Create, Read, Update, Delete) operations.
 - Using `JpaRepository` for repository operations.

Spring Boot and Thymeleaf

1. **Introduction to Thymeleaf:**
 - Integrating Thymeleaf, a template engine, with Spring Boot.
 - Building dynamic web pages using Thymeleaf.
2. **Thymeleaf Forms:**
 - Creating forms with Thymeleaf.
 - Handling form submissions in a Spring Boot application.

Spring Boot and RESTful Services

1. **RESTful Web Services with Spring Boot:**
 - Implementing RESTful services.
 - Consuming RESTful services using `RestTemplate`.
2. **Exception Handling in Spring Boot:**

- Handling exceptions in a Spring Boot application.
- Custom error messages and error handling.

Spring Boot and Security

1. **Introduction to Spring Security:**
 - Configuring basic security settings in a Spring Boot application.
 - Authentication and authorization with Spring Security.
2. **Securing RESTful APIs:**
 - Implementing security for RESTful services.
 - Token-based authentication.

Spring Boot and Microservices

1. **Microservices Architecture:**
 - Introduction to microservices and their advantages.
 - Building microservices with Spring Boot.
2. **Service Discovery and Communication:**
 - Using Eureka for service discovery.
 - Communicating between microservices.

Testing in Spring Boot

1. **Unit Testing in Spring Boot:**
 - Writing unit tests for Spring Boot components.
 - Using JUnit and Mockito.
2. **Integration Testing:**
 - Writing integration tests for Spring Boot applications.
 - Testing database interactions.

DATABASE – SQL(MySQL)

Introduction to MySQL and Basic SQL Queries

- Overview of MySQL: Installation and Setup
- Introduction to SQL: SELECT Statement
- Retrieving Data: SELECT * and SELECT column(s)
- Filtering Data: WHERE Clause
- Sorting Results: ORDER BY Clause

Working with Data Types and Operators

- Common Data Types in MySQL
- NULL Values

- Arithmetic and Comparison Operators
- Logical Operators

Data Manipulation Language (DML)

- INSERT Statement
- UPDATE Statement
- DELETE Statement
- Transactions and Rollbacks

Querying Multiple Tables

- INNER JOIN, LEFT JOIN
- CROSS JOIN
- UNION and UNION ALL
- Subqueries

Aggregation and Grouping

- GROUP BY Clause
- Aggregate Functions: COUNT, SUM, AVG, MAX, MIN
- HAVING Clause

Basic Database Design

- Creating Tables: CREATE TABLE Statement
- Primary Key and Foreign Key
- Modifying Tables: ALTER TABLE Statement

Views and Indexing

- Creating Views
- Indexing Basics
- Optimization Strategies