Phase 1: Core Java (Basic to Advanced)

Java Basics

- Syntax, Data Types, Variables, Operators
- Control Structures (if-else, switch, loops)
- Arrays and Strings

Object-Oriented Programming (OOP)

- Classes and Objects
- Inheritance, Polymorphism, Encapsulation, Abstraction
- Interfaces and Abstract Classes

Advanced Java Concepts

- Collections Framework (List, Set, Map)
- Exception Handling
- Java I/O (File handling)
- Generics
- Multithreading and Concurrency
- Java 8 Features (Lambdas, Streams, Optional)

Phase 2: Spring Framework

Basics of Spring Framework

- Introduction to Spring Framework
- Inversion of Control (IoC) and Dependency Injection (DI)
- Setting up a Spring project

Spring Core

- Beans and Bean Factory
- Application Context
- Spring Configuration: XML and Java-based configuration
- Spring Annotations

Spring AOP (Aspect-Oriented Programming)

- Introduction to AOP
- AOP concepts: Aspect, Join Point, Advice, Pointcut
- Spring AOP implementation

Spring Data Access

- JDBC with Spring
- Introduction to Spring Data JPA

Phase 3: Spring Boot

Introduction to Spring Boot

- Benefits of Spring Boot
- Setting up a Spring Boot project
- Spring Boot CLI

Spring Boot Core Concepts

- Auto-configuration
- Spring Boot Starters
- Spring Boot Annotations (@SpringBootApplication, @Configuration, @ComponentScan)

Building RESTful Web Services with Spring Boot

- Creating REST APIs
- Spring Boot Controllers
- Handling HTTP requests and responses
- Error handling in Spring Boot

Data Persistence with Spring Boot

- Integrating Spring Data JPA with Spring Boot
- Repository Pattern
- Creating and managing entities

Phase 4: Hibernate

Introduction to Hibernate

- ORM concepts
- Setting up Hibernate

Core Hibernate Concepts

- Hibernate configuration
- Mapping entities to database tables
- Hibernate Annotations

Hibernate CRUD Operations

- Basic CRUD operations
- HQL (Hibernate Query Language)
- Criteria API

Advanced Hibernate Concepts

- Hibernate caching

- Transactions and concurrency control
- Relationships (One-to-One, One-to-Many, Many-to-Many)

Phase 5: Microservices

Introduction to Microservices

- Microservices Architecture
- Benefits and challenges

Building Microservices with Spring Boot

- Creating microservices
- Communication between microservices (REST, gRPC)
- Service Discovery (Eureka)

Microservices Patterns

- Circuit Breaker (Hystrix, Resilience4j)
- API Gateway (Spring Cloud Gateway)
- Config Server (Spring Cloud Config)

Containerization and Orchestration

- Docker Basics
- Kubernetes Basics

Phase 6: Testing with JUnit

Introduction to JUnit

- JUnit Basics
- Writing test cases

Advanced JUnit Concepts

- Parameterized tests
- Test suites

Spring Boot Testing

- Unit testing Spring Boot applications
- Integration testing with Spring Boot
- Mocking in tests (Mockito)

Additional Concepts to Learn

Version Control

- Git Basics
- GitHub/GitLab usage

Build Tools

- Maven or Gradle

CI/CD

- Jenkins, GitHub Actions

What to Avoid

Outdated Technologies

- Avoid learning deprecated frameworks or libraries (e.g., older versions of Java EE)
- Avoid spending too much time on XML-based Spring configurations as annotation-based configurations are more common now

Niche Technologies

- Avoid overly specialized libraries or tools unless they are specifically required for your projects

Practical Projects

Simple CRUD Application

- Build a basic CRUD application using Spring Boot and Hibernate
- Implement RESTful APIs for the application

E-commerce Application

- Develop a small e-commerce application
- Include user management, product catalog, and order processing

Microservices Application

- Create a set of microservices for a complex application
- Implement inter-service communication, service discovery, and load balancing

Resources

Books

- "Effective Java" by Joshua Bloch
- "Spring in Action" by Craig Walls
- "Spring Boot in Action" by Craig Walls
- "Java Persistence with Hibernate" by Christian Bauer and Gavin King

Documentation

- Java Documentation
- Spring Framework Documentation
- Spring Boot Documentation