SOFTWARE DEVELOPMENT USING JAVA

COURSE DESCRIPTION

This training course covers the fundamentals of developing a full-stack web application using Java, the Spring Framework, and SQL.

Participants will learn to use Java, object-oriented programming principles, the Spring framework, and SQL databases to create complex back ends. Participants will also learn to use Spring Boot, and RESTful services to deliver web pages and data, as well as use jQuery to make those pages responsive.

This course also includes an introduction to production support and financial concepts.

LEARNING OUTCOMES

By the end of this course, participants will be able to:

- Use Git to manage the source code for a project.
- Build applications using the MVC pattern.'
- Create a full test suite for the Service Layer and DAOs in an application.
- Use SQL to retrieve data from a relational database.
- Design, develop, and test a full-stack Java application.
- Explain market and financial concepts at a high level.
- Explain ITIL principles, DevOps, SRE, and Disaster Recovery at a high level.

TECHNOLOGY AND TOOLS

Participants in this course will learn how to use the following tools:

- Java
- NetBeans
- Git/GitHub
- Maven

PREREQUISITE SKILLS

Participants should have basic experience writing software using a modern programming language such as Java, C#, or Python, including especially the ability to apply object-oriented concepts when writing a software application.

COURSE OUTLINE

PRODUCTION SUPPORT AND FINANCIAL CONCEPTS

- Information Technology Infrastructure Library (ITIL)
- Monitoring
- DevOps
- Introduction to Site Reliability Engineering (SRE)
- Disaster Recovery
- Financial Markets
- Equity Trading
- FIX Protocol
- Fixed Income
- Derivatives
- Currency
- Treasury
- Regulation and Risk

INTRODUCTION TO JAVA AND OBJECT-ORIENTED PROGRAMMING

Participants will have the opportunity to review the following introductory concepts using Java:

- The Life Cycle of a Java Program
- Programs, Statements, and Variables
- Scanner
- Debugging
- Boolean Expressions and Controlling Program Flow
- Random
- Methods
- Arrays
- Object-Oriented Concepts
- Classes, Objects, and Creating New Types
- References, Storage, and Memory Management
- Interfaces Composition, and Inheritance
- Collections and Maps
- Data Marshaling and Unmarshaling
- Simple File I/O
- MVC and Tiered Application Design Concepts for CRUD Applications
- The Software Development Lifecycle (SDLC)
- Dependency Injection
- Exceptions

INTERMEDIATE JAVA
- The Service Layer
- Unit Testing
- Enums
- The Java DateTime API
- BigDecimal
- Lambdas and Streams

ADVANCED JAVA
- The Spring Framework and Spring DI
- Maven

RELATIONAL DATABASES AND SQL
- Introduction to Relational Databases
- ACID Compliance
- Normalization
- Entity Relationship Diagrams
- MySQL Server and MySQL Workbench
- SQL SELECT Queries
- Data Definition Language (DDL)
- Data Manipulation Language (DML)
- JOIN Queries
- Sorting
- Grouping and Aggregates
- Subqueries and Views

SPRING BOOT REST WITH JDBC TEMPLATE
- How the Web Works
- JDBC

- JDBC Template
- JDBC Template and Complex Relationships
- JDBC Template and Testing
- HTTP, REST, and JSON
- MVC With Spring Boot
- Spring Boot REST Service
- Spring Boot REST Service with JDBC Template

REST WEB SERVICES VIA JQUERY

- Web Services: REST vs. SOAP
- Introduction to jQuery
- JSON
- REST API Design

SPRING BOOT FULL STACK WEB APPS

- Spring Boot with Thymeleaf
- Spring Boot with JDBC Template
- DAO Implementations and Testing
- Controllers and Front End
- Input Validation
- Spring MVC
- Java Persistence API (JPA)
- Spring Boot with JPA