Full Stack Web Development – JAVA Spring Boot

Programming in Java: Level 1

Nature of the Course: Theory + Practical
Total Hours per Day: 2 Hours
Course Duration: 2 Weeks

Course Summary

This Level 1 course is targeted for beginners who want to:

- Learn how to think and write meaningful piece of code in Java.
- Learn how to read JAVA code that has been written by somebody else.
- Learn how to map literary description of a problem (requirement) to an application/library coded in Java.

In summary, this course teaches how to program using Java programming language. This is a core basic level course that is essential for anyone who have no prior programming experience but wish to be a professional Java engineer in future

Completion Criteria

After fulfilling all of the following criteria, the student will be deemed to have finished the Module:

1. Has attended 90% of all classes held.
2. Has received an average grade of 80% on all assignments
3. Has received an average of 60% in assessments.
4. The tutor believes the student has grasped all of the concepts and is ready to go on to the next module.

Required Text Books

1. Sagar Naik and Piyu Tripathy, “Software Testing and Quality Assurance”, Wiley.
2. Cem Kaner, Jack Falk and H.Q. Nguyen, “Testing Computer Software”, Wiley.

Prerequisites

- Fundamental understanding of programming, bits/bytes, procedures, classes, and computer architecture. It's absolutely acceptable if you only have a theoretical understanding of programming, but you should be certain about what programming is and what you intend to gain from this session.

- If you are only interested in theory and have no interest/patience in spending at least 10 hours every week throughout the duration of the course, then this course might not be for you.
- If you have absolutely no idea about programming or do not see yourself doing programming in the next six -odd months, then this class may not be for you.

Course Details

OVERVIEW OF JAVA LANGUAGE

- Introduction
- Hardware and Software Requirements
- Installation of JDK

PROGRAMMING WITH JAVA

- Class Declaration
- Members of Classes
- Structure of Java Class
- Main Method
- Command Line Arguments
- Source Code Compilation
- Coding Convention
- Java Packages

CONSTANTS, VARIABLES AND DATA TYPES

- Primitive and Non-Primitive Variables

DECISION AND BRANCHING

- If, Else, Switch, Break, Continue

LOOPING

- For, While, Do-While

FUNDAMENTALS OF LOOPS

- Initializing Objects
- Static Members
- Inheritance
- Polymorphism
- Encapsulation

ABSTRACT CLASS AND INTERFACES

- Defining Interfaces
- Separating Interface and Implementation
- Implementing and Extending Interfaces
- Abstract Classes

EXCEPTION CLASSES

- Exceptions and the Exception Hierarchy
- Throwing Exceptions
- Catching Exceptions
- Chaining Exceptions
- The ‘Finally’ Block

ADVANCE DATA STRUCTURES (JAVA COLLECTION CLASSES)

- Arrays
- List <e> Interface and its Implementation
- Map <k,v> Interface and its Implementation
- Set <e> Interface and its Implementation

JDBC CONNECTION

- JDBC Overview
- Using Driver Manager, Connection, Statement, Prepared Statement and Result Set
- Create, Delete, Insert, Update Statements

LABS

Lab assignments will focus on the practice and mastery of contents covered in the lectures; and introduce critical and fundamental problem-solving techniques to the students.

Programming in Java (Servlet, JSP & Spring Boot): Level 2

Nature of the Course: Theory + Practical
Total Hours per Day: 2 Hours
Course Duration: 4 Weeks

Course Summary

The DTC – Programming in Java – Level 2 course is targeted for trainees who have:

- Some prior beginner level hands-on programming experience in Java programming language.
- Programming experience in some other programming language (e.g., Java, Obj-C, PHP, C, C++, etc.) and want to learn Java.

Completion Criteria

After fulfilling all of the following criteria, the student will be deemed to have finished the Module:

1. Has attended 90% of all classes held
2. Has received an average grade of 80% on all assignments
3. Has received an average of 60% in assessments
4. The tutor believes the student has grasped all of the concepts and is ready to go on to the second module.

Prerequisites

- Fundamental understanding of programming, bits/bytes, procedures, classes, and computer architecture. It's absolutely acceptable if you only have a theoretical understanding of programming, but you should be certain about what programming is and what you intend to gain from this session.
- If you are only interested in theory and have no interest/patience in spending at least 10 hours every week throughout the duration of the course, then this course might not be for you.
- If you have absolutely no idea about programming or do not see yourself doing programming in the next six -odd months, then this class may not be for you.

Course Details

WEB APPLICATION BASICS

- How the Web Works
- HTTP Overview, Brief HTML Review
- Overview of Java EE, Servlets & Web Applications

SEVLET AND JSP

- HTML Forms
- HTTP: Request-Response, Headers, GET, POST
- Overview: How Servlets Work
- Requests and Responses
- HTTP Servlets: HTTP Servlet Request, HTTP Servlet Response and HTTP Servlet
- Deployment Descriptor
- Accessing Parameters

ADDITIONAL SERVLET CAPABALITIES

- Request Dispatcher: Including and Forwarding
- Sharing Data with Request Object Attributes

USING CUSTOM TAGS

- Custom Tags to Reduce JSP Complexity
- The JSTL
- Using Custom Tags
- The C:URL, C: PARAM, C: FOREACH, C: OUTTAGS

SPRING BOOT

- Technical Requirements
- Setting up the Environment and Tools
    - Installing IntelliJ
    - The Basics of Gradle and Maven
    - Creating the Project with Spring Initializer
    - How to Run the Project
    - Spring Boot Development Tools
    - Logs and Problem Solving
    - Installing MariaDB and MongoDB

CREATE A RESTFUL WEB SERVICE WITH SPRING BOOT

- Technical Requirements
- Creating RESTful Web Service with Spring Boot
- Basics of REST
- Creating a RESTful Web Service
- Using Spring Data REST

SECURING AND TESTING YOUR BACKEND

- Technical Requirements
- Spring Security
- Securing your Backend using JWT
- Testing in Spring Boot
- Creating Unit Tests

LABS

Lab assignments will focus on the practice and mastery of contents covered in the lectures; and introduce critical and fundamental problem-solving techniques to the students.

Full-Stack Development in JAVA with Spring Boot and React: Level 3

Nature of the Course: Theory + Practical
Total Hours per Day: 2 Hours
Course Duration: 3 Weeks

Course Summary

This course builds on the foundation laid by DTC – Programming in Java – Level 3 to prepare trainees for a career as full-stack Java software engineer.

Completion Criteria

After fulfilling all of the following criteria, the student will be deemed to have finished the Module:

1. Has attended 90% of all classes held
2. Has received an average grade of 80% on all assignments
3. Has received an average of 60% in assessments
4. The tutor believes the student has grasped all of the concepts and is ready to go on to the second module.

Prerequisites

- Fundamental understanding of programming, bits/bytes, procedures, classes, and computer architecture. It's absolutely acceptable if you only have a theoretical understanding of programming, but you should be certain about what programming is and what you intend to gain from this session.
- If you are only interested in theory and have no interest/patience in spending at least 10 hours every week throughout the duration of the course, then this course might not be for you.
- If you have absolutely no idea about programming or do not see yourself doing programming in the next six -odd months, then this class may not be for you.

Course Details

SETTING UP THE ENVIRONMENT AND TOOLS

- Technical Requirements
- Installing NodeJS
- Installing VS Code
- Creating and Running a React App
- Modifying a React App

GETTING STARTED WITH REACT

- Technical Requirements
- Basic React Components
- Basics of ES6
- Understanding Constants
- Arrow Functions
- Template Literals
- Classes and Inheritance
- JSX and Styling
- Props and State
- Component Life Cycle Methods
- Handling Lists with React
- Handling Events with React
- Handling Forms with React

CONSUMING THE REST API WITH REACT

- Technical Requirements
- Using Promises
- Using the Fetch API
- Practical Examples

USEFUL THIRD-PARTY COMPONENTS FOR REACT

- Technical Requirements
- Using Third-Party React Components
- React Table
- The Modal Window Component
- Material UI Component Library
- Routing

SETTING UP THE FRONTEND FOR SPRING BOOT RESTFUL WEB SERVICE

- Technical Requirements
- Mocking Up the User Interface
- Preparing the Spring Boot Backend
- Creating the React Project for the Frontend

ADDING CRUD FUNCTIONALITIES

- Creating a List Page
- The Delete Functionality
- The Add Functionality
- The Edit Functionality
- Other Functionalities

STYLING THE FRONTEND

- Technical Requirements
- Using the Button Component
- Using the Grid Component
- Using the TextField Components
- Using the AppBar Component
- Using the SnackBar Component

DEPLOYING YOUR APPLICATION

- Technical Requirements
- Deploying the Backend
- Deploying the Frontend
- Using Docker Containers

LABS

Lab assignments will focus on the practice and mastery of contents covered in the lectures; and introduce critical and fundamental problem-solving techniques to the students.

Learning Outcomes

- Understand how to build complex UIs using Spring Boot.
- Learn how to build a simple MVC application using Spring Boot.
- Learn to build RESTful web applications using Spring.