Java FT - Course Contents

Objectives of this Course:

- To understand the web applications that are scalable, maintainable.
- To understand the architecture and design of web applications.
- To understand Servlet Technology for generation of Dynamic response to create Simple Web Applications.
- To understand how to separate the application concerns based on functionality.
- To understand effective and clean division between controllers, models and view using Spring MVC.
- To understand the Data Persistence using Hibernate Framework.
- To create awareness of Quality Unit Tests, Repeatable Automated Process and Security Concerns.
- To understand the Modern Development techniques using JS Frameworks like Angular JS, Node JS and Express JS.

Prerequisites:

- Knowledge of Basic Programming Techniques, Basic Database Functionalities and Basic SDLC.

Course Outline

<p style="text-align:center">**Boot Camp Phase – I**</p>

Day 1 – 4:
DBMS – DBMS Concepts and SQL
- o Introduction to Databases.
- o Database Models.
  - • Relational Model
- o Data Design and Normalization
- o Structured Query Language and its categories
  - • DDL – DML – DQL – DCL – TCL
- o Oracle built in Functions
- o SELECT statement varieties with clauses
  - • WHERE clause
  - • GROUP BY clause
  - • HAVING clause
  - • ORDER BY clause
- o Retrieving data from multiple tables
- o Joining the tables – Join variants
  - • Equi and Non-Equi Joins
  - • Self-Join
  - • Cartesian Product
  - • Outer Join with modern syntax
- o Subqueries
  - • Nested Subqueries
  - • Co-related Subqueries

DBMS – PL / SQL
- o PL/SQL Program Structure.
- o Procedural programming using PL/SQL
  - • Data Types and Scalar / Anchor Declarations
  - • SELECT INTO statement
  - • Use of CURSORS in PL/SQL
- o Scenario Based Learning
- o Modularized programming in PL/SQL
  - • Anonymous v/s Named PL/SQL blocks
  - • Stored Procedures
  - • Functions
  - • Triggers
- o Exception Handling In PL/SQL

Day 5 – 8:
Core Java – Language Fundamentals
- o Different programming paradigms.

- o Transformation from OO to PO Paradigm.
- o Java Architecture
- o A JAVA Program – General Strategy
- o Source Code – Byte Code – Path - Class path
- o Java – Execution Level Essentials - JDK – JRE – JVM
- o Class Loaders and JVM Architecture

Core Java – Object Oriented Programming
- o A Look at OOP.
- o Objects, Classes and Interfaces
- o Influential Reuse Mechanisms in OO Languages
  - • Composition – Inheritance
- o Extending classes - Inheritance Hierarchy
- o super and this
- o Abstract classes and overriding methods
- o Java Modifiers – Access and Non-Access
- o Polymorphism and Polymorphic Behavior
  - • Static Binding v/s Dynamic Binding
- o Creating and Using Packages and Interfaces
- o Scenario based learning

Core Java – Exception Handling
- o What is Exception? Java's exception handling mechanism.
- o try – catch block
- o finally block
- o Exception Propagation and throw keyword
- o throw v/s throws
- o Exception handling with method overriding
- o Custom Exceptions
- o Scenario based learning

Core Java – Threads and Concurrency
- o Multithreaded programming / Lifecycle of Thread.
- o Thread Management
- o Multithreaded programming
- o Extending Thread class – Implementing Runnable Interface
- o Synchronization and Thread Safety

Core Java – Collections and Generics
- o Collections framework
  - • ArrayList
  - • LinkedList
  - • HashMap
  - • HashTable
  - • HashSet
- o Other classes and interfaces in Collection Framework
- o Comparable v/s Comparator

- o Generic Collection

Core Java – Annotations and Reflections
- o Annotations in Java
  - Levels of annotations
- o Built-In Annotations – Custom Annotations
- o Reflection API
- o Modifying the run time behavior of a class

Unit Testing Using JUnit
- o What is test and test case
- o What is unit testing
- o Why we need unit testing
- o How to do unit testing by manual
- o Problem with manual unit testing
- o Introduction about JUnit
- o Advantage of JUnit
- o Unit test cases using JUnit

Advance Java - Java Database Connectivity
- o JDBC Introduction - JDBC architecture - JDBC driver types.
- o JDBC API and various interfaces
  - Connection Interface
  - Statement Interface
  - ResultSet Interface
- o Steps to establish a JDBC Connection
- o Handling parameterized queries using PreparedStatement Interface
- o Embedding PL/SQL objects using CallableStatement interface
- o Transaction Management in JDBC

Day 9:

Assessment and Interviews by internal SMEs

Boot Camp Phase – II

Day 10 - 13:
Web Technologies - Web Concepts
- o Introduction to the Internet and the World Wide Web
- o Understanding the concept of Protocols
- o Why Web Standards?

Web Technologies – HTML
- o Overview of Hypertext Mark-up Language (HTML) and Cascading Style Sheet (CSS)
- o Understanding & using HTML
- o HTML headings
- o HTML Paragraphs
- o HTML Line Breaks & Rules

- Font tags
- Hyperlinks
- The Image Tag and the Src Attribute
- LIST Tags
- Tables
- Forms

Web Technologies - HTML 5
- HTML5 Intro
- HTML5 New Elements
- HTML5 Semantics
- HTML5 Style Guide
- HTML5 Graphics
- HTML5 Canvas
- HTML5 Google Maps
- HTML5 Video
- HTML5 Audio
- HTML5 Plug-ins
- HTML5 YouTube

Web Technologies – Cascading Style Sheet (CSS)
- Introduction to CSS
- Understanding & using CSS
- CSS Syntax
- CSS classes
- CSS IDs
- CSS Margins
- CSS Text Properties
- Font Properties
- CSS links
- CSS Backgrounds
- CSS Border
- Lists

Web Technologies - CSS 3
- CSS3 Introduction
- CSS3 Modules
- Selectors
- Box Model
- Backgrounds and Borders
- Text Effects
- 2D/3D Transformations
- Animations
- Multiple Column Layout
- User Interface
- Borders
  - border-radius

- box-shadow
- border-image
  - CSS3 Backgrounds
    - background-size
    - background-origin
  - CSS3 Text Effects
    - text-shadow
    - word-wrap

Web Technologies – JavaScript
  - What is JavaScript?
  - Setting up Variables in JavaScript
  - Javascript Conditional Statements
  - JavaScript Loops
  - Arrays
  - Javascript Events and Functions
  - JavaScript Form Validation

Web Technologies – jQuery
  - Introduction To jQuery
  - Selection and DOM Traversal
  - Working with JavaScript Events

Advanced Web Technologies – Angular JS
  - AngularJS - AJS Introduction
  - AJS Expressions, Directives, Controllers
  - AJS HTML DOM / AJS HTML Events
  - AJS Modules, Forms
  - AAjax, Data, and Angular
  - Testing in Angular
  - AJS Application
  - Services and Factories
  - Custom Directives
  - Internalization

Day 14 - 15:
Advance Java - Servlet
  - Describe web applications
  - Define Model-View-Controller (MVC) architecture
  - Describe Java Servlet technology
  - Describe the web container behavior
  - Develop a simple HTTP Servlet
  - Configure and deploy a Servlet
  - Design a controller component
  - Describe MVC Architecture from Servlet perspective.
  - Create an HTML form and discuss how HTML form data is sent in an HTTP request

Advance Java - Servlet Technology in Detail
- o Sharing Application Resources Using the Servlet Context
    - Describe the purpose and features of the Servlet Context
- o Developing Web Applications Using Session Management
    - Describe the purpose of session management
    - Design a web application that uses session management
    - Develop Servlets using session management
    - Describe the cookies implementation of session management
- o Describe the URL-rewriting implementation of session management

Using Filters in Web Applications
- o Describe the web container request cycle
- o Describe the Filter API
- o Develop a filter class
- o Configure a filter in the web.xml file
- o Understanding authentication mechanisms
    - HTTP Basic authentication
    - HTTP Digest authentication
    - HTTP Client authentication
- o Defining authentication mechanisms for web applications

Day 16 - 17:
Developing Java Server Pages
- o Describe JSP page technology
- o Write JSP code using scripting elements
- o Write JSP code using the page directive
- o Write JSP code using standard tags
- o Using JavaBeans with JSP actions
    - using <jsp:useBean>
    - using <jsp:setProperty>
    - using <jsp:getProperty>
    - using <jsp:include>
    - using <jsp:forward>
- o Effective use of JSP

Day 18:
Assessment

Day 19 – 22:
Introduction to Hibernate Framework
- Object Persistence
    - Object/Relational Paradigms
    - O/R Mismatch
    - Object Relational Mapping (ORM)
    - Java ORM/Persistent Frameworks
- Hibernate Architecture

- Hibernate Architecture and API
- Hibernate Installation/Setup
- Configuration
- Configuration Properties
- Mapping Files

- Persistent Classes
  - POJOs
  - JavaBeans - Basic Mapping
  - Class to Table Mappings - Property Mapping
  - Identifiers – Generators - Natural Keys
  - Identifier Exposure
- Quoting SQL Tables and Columns

  o Working with Persistent Objects
    - Entity Lifecycle
    - Transient State - Persistent State
    - Persistent Object Updates and Automatic Dirty Checking
    - Detached State - Deleted
    - Object Identifiers Revisited
    - Merge
  o Associations
    - Many-to-one - Bidirectional Many-to-one
    - Many-to-one List - Many-to-one Map
    - Many-to-one Bag - Many-to-one Array
  o Other Associations
    - One-to-one - Bidirectional One-to-one
    - Many-to-many - Bidirectional Many-to-many
    - Many-to-many Identifier Bag
  o Value Type Collections
  o Inheritance
  o Transitive Persistence
    - Custom Mapping

Day 23 - 27:
Introduction to Spring Framework
  o Spring Overview
    - Spring Philosophy
    - Spring Architecture and Modules
  o A First Spring Application
    o Dependency Injection
      o Spring Containers
      o BeanFactory
      o ApplicationContext
      o Bean Definitions & Property Injection
    o Bean Lifecycle
    o Wiring Alternatives

- ▪ Autowiring
- ▪ Autowiring Collections
- o Pros and Cons of Autowiring

Spring MVC with Spring JDBC Template

- • Spring MVC Architecture
  - ▪ Spring MVC Configuration and Setup
  - ▪ DispatcherServlet
  - ▪ Context Configuration
  - ▪ Context Loaders
  - ▪ InternalResourcesViewResolver - BeanNameViewResolver
  - ▪ XMLViewResolver - ResourcebundleViewResolver
  - ▪ Using Multiple View Resolvers
- • Annotation Based Controllers
- • Validation
  - ▪ JSR-303 Validation
- • Spring Views
- • Form Tag Library
  - ▪ Binding Form Data
  - ▪ Annotation Driven Formatting
- • Formatting
  - ▪ Formatting Annotations

Integrating Hibernate with Spring MVC

Integration of AngularJS with Spring MVC

Assessment

Day 28 - 37:
Introduction to Agile (Scrum)

Project Gladiator
Project Evaluation by SMEs

Day 38 - 39:
Brain bench Test Preparation & Test