Java SE 19(LTS17) EE & Spring

Course Content

Mentor : Sreedhar Kosaraju

No of Hours: 105

==========Course Modules (105 Hours) ==========

S.NO	Topic	No of Hours
1	Java SE	45
2	SQL Vitals	12
3	Web Programming Vitals (JS, XML & JSON, Ajax & JQuery)	13
4	JDBC & Servlets	12
5	Spring Vitals	23

==========Detailed Course Content==========

Java SE (45 Hours)

- **Java SE & Java Language Intro**
  - Introduction to Applications
  - Types of S/W Applications
  - API Concepts & Role of OS API
  - Java SE 19(17 LTS) & Java Overview
  - How Platform Independency works
  - JDK, JRE & JVM Concepts
  - Java APIs overview
  - REPL & JShell Overview
  - Java IDE's
  - Using Eclipse
- **Lang Basics**
  - Data Types
  - Primitive Types & Ref Types
  - Operators
  - Input & Output
  - Command line Args
  - Type Casting
  - Control Structures

- Arrays
- Functions

- **OOP Concepts & Classes**
  - OOPs Concepts
  - Class & Object
  - Encapsulation
  - Different Programming Paradigms
  - Why OOP & Bottom-Up Approach
  - Creating Classes & Objects
  - Stack & Heap Memory Allocation
  - Constructors-Class & Static
  - Overloading of Methods & Constructors
  - Instance & Static Members
  - Instance & Static Methods
  - Static Blocks
  - Passing Objects as Arguments
  - Wrapper Classes
  - Imp Instance & Static methods of Wrapper Classes
  - Boxing & Unboxing
  - Strings & String Functions
  - Mutability & String Pool Concept
  - String Builder vs String Buffer
  - Enums

- **Inheritance & Polymorphism**
  - Inheritance Concepts
  - IS-A & HAS-A Relationship
  - Types of Inheritance
  - Constructor Calling Sequence
  - Overriding

- Up & Down Casting
- Static & Dynamic Binding
- Super Cosmic Class
- Object class & Imp methods
- Final classes & methods
- Passing sub class objects through super class parameter
- Polymorphism with Inheritance

❖ **Abstract Classes & Interfaces**

- Abstract Classes
- Context of Abstract Classes
- Interface Concept
- Interface References
- Abstract Classes vs Interfaces
- Static Members
- Interfaces as Parameters
- Polymorphism Implementation
- Dynamic Polymorphism

❖ **Nested & Inner Classes**

- Nested Classes
- Static & Non static Nested Classes
- Local & Anonymous Inner classes
- Anonymous Inner classes with Interfaces

❖ **Exception Handling**

- Errors & Exceptions
- Exception Architecture
- Exception Propagation & Hierarchy
- Understanding System Exceptions

- Handling Exceptions
- Finally block
- Checked & Unchecked Exceptions
- User Defined Exceptions
- Control Transfer with UDEs
- Exception Chaining
- Exception Wrapping & Enrichment
- Multi-Exception Catch statements
- Debugging in Eclipse

❖ **Memory Management**

- JVM Memory Structure
- Understanding Object Lifetime
- Java Memory Models
- Garbage Collection Types
- Memory Monitoring Utilities

❖ **Modules & Services**

- Concept of Modules & Modularization
- Understanding JPMS
- Module Structure
- Modules & Packages
- Module Types
- Module Dependencies
- Building Modules
- Creating JAR File
- Services API
- Creating Services & service Discovery
- Service Providers & Consumers
- Deploying Services

- **Date & Time**
  - Date & Time API
  - Calendar & Date
  - Time Measurement
  - Instant & Duration
  - Local & Time zone
  - Date Formatting
- **Functional Programming**
  - Functional Programming Concepts
  - Imperative vs Declarative
  - Functions as First class Citizens
  - Pure functions
  - Higher Order Functions
  - Functional Interfaces
  - Lambdas
  - Composition of Functions
  - Applying Functions to Collections
  - Applying Functions to Mondas
  - Data Processing with Streams
- **Multithreading**
  - Understanding Processes & Threads
  - How Multithreading Works
  - Creating threads using Runnable
  - Thread States & Life Cycle
  - Join & Yield Concepts
  - Thread Priorities
  - Thread Communication
- **Concurrent Threads**

- Concurrency Models
- Concurrency vs Parallelism
- Thread Synchronization
- Synchronized Methods & Blocks
- Volatile & Atomic Variables
- Race Conditions & Critical Sections
- Dead Lock
- Lock & Reentrant Lock

❖ **Collections & Generics**

- Understanding Data Structures
- Working With Collections
- Types of Collections
- Understanding Generics
- Generic Methods & Generic Classes
- Wild Card in Generics
- Generic based Collections
- Collection Interfaces & Hierarchy
- List, Set & Map
- Iterating through Collections
- Array List, Dictionary
- Sorted List & Sorted Map
- Stack & Queue
- hashCode & equals
- Custom Sorting of Objects
- Using Collections class methods
- Collections with Streams

- **Concurrent Collections**
  - Concurrent Collections
  - Blocking & Non-Blocking Queues
  - Concurrent Map
  - Copy On Write Collections
  - Thread Pool Concept
- **Reflection**
  - Reflection & Introspection
  - Class Loader & Dynamic Loading
  - Understanding Class & its methods
  - Reading Properties & Methods of an Object
  - Invoking Methods using Reflection
- **IO Streams Overview & Files**
  - IO Streams Overview
  - Byte Streams vs Character Streams
  - Working with Directories & Files
  - File Reader & File Writer
  - Random Access Files
  - Data Input & Data Output Streams
  - Object Input & Output Streams
  - Serialization & Deserialization

SQL Vitals (12 Hours)

- **Databases Overview**
  - Database & RDBMS Overview
  - SQL vs NoSQL vs New SQL
  - Local & Remote Connections

- Basic SQL Statements

❖ Database Modeling & Integrity

- DB Design Basics
- ER Modeling & Normalization Overview
- Different Integrities
- Diff Constraints
- Candidate & Surrogate Keys
- Self-Referential Integrity

❖ Queries

- How Select Statement works
- Where & Group by
- Usage of Group Functions
- Working with Having Clause
- Order by sorting
- Sub Queries
- Different Type of Joins

❖ Transactions, Locks & Views

- Transaction Concepts
- ACID Properties
- Isolation Levels
- TCL Statements
- Query Blocking Scenarios @ Real-time
- Locks Overview
- Views

❖ PL/SQL Concepts

- Why PL/SQL
- Stored Procedures & Functions Overview
- In, Out & In out Parameters

- Cursors Overview
- How Cursors works
- Simple Example of Stored Procedures with Cursors

Web Programming Vitals (13 Hours)

❖ Introduction

- Web Applications Overview
- Static vs Dynamic Web pages
- Modern Web Applications
- Web Application Layers
- Scripting Languages & Frameworks

❖ Java Script Overview

- ECMA/ES 5/ES 6 Concepts
- JS Language Basics
- DOM API
- DOM Traversing
- DOM Manipulation
- Form Validations
- Debugging Javascript & Web scripting

❖ XML & JSON Overview

- What is XML & Why it is used
- XML Schemas
- DTDs vs XSDs
- JSON Overview
- XML vs JSON
- JSON Parsing

❖ AJAX

- Synchronous vs Asynchronous
- What is AJAX & Why AJAX
- Making AJAX Calls
- Handling Callbacks
- Partial Rendering
- Client Side vs Server side tables Concept

❖ **API Call Consumption**

- REST APIs as Resources
- Http Operations on REST API
- Testing API through postman
- GET,POST,PUT & Delete API Calls
- Processing JSON Output
- Calling APIs with Keys

❖ **JQuery Overview**

- What is jQuery & Why jQuery
- jQuery Selectors
- jQuery Events
- DOM Manipulation using jQuery
- Ajax calls using jQuery

JDBC & Servlets (12 Hours)

❖ **JDBC**

- Why JDBC/ODBC
- JDBC Architecture
- JDBC Drivers
- JDBC API
- Working with SQL Statements

- Transactions
- Parameterized Statements
- SQL Exceptions
- Batch Executions
- JDBC Meta Data
- Result Set Concepts
- Scrollable & Updatable Result Sets
- Add/Edit & Delete on Result sets
- Result Set Concurrency

❖ **Servlets Introduction**

- Servlets Overview
- Servlets Architecture & Container
- Servlets Life Cycle
- Servlets API
- Understanding Tomcat Server
- Servlet Configuration
- Servlet Invocation Methods
- Request Dispatcher
- Session Management
- Servlet Concurrency & Multithreaded Servlets
- Filters
- Filter Configurations
- Http Events & Listeners

Spring Framework (23 Hours)

❖ **Spring Introduction**

- Spring Framework 5.x Overview
- Design Patterns Overview

- AOP Concepts
- Spring Modules
- Understanding Spring Core
- Spring Project Setup
- Understanding Spring Beans
- POJO Classes
- Different Configurations
- Understanding Maven

❖ **Spring Architecture**

- Understanding the role of Reflection
- Understanding Bean Factory
- Spring Container & Application Context
- Loose Coupling with DI
- Dependency Injection & IOC
- Different DI Types
- Bean Scope & Life Cycle
- Auto Wiring

❖ **Spring Boot**

- Spring Boot Overview
- Spring vs Spring Boot
- Spring Boot Starters
- Setting Up Spring Boot Project
- Using Initializr
- Dependency Management
- Auto Configuration
- Overriding Auto Configuration
- Using Actuators
- Using DevTools

❖ Spring with JDBC & JPA

- ➢ Understanding Data Sources
- ➢ JDBC Persistence
- ➢ DAO Pattern
- ➢ JDBC Templates
- ➢ DAO with JDBC
- ➢ JDBC Transactions
- ➢ ORM Concepts
- ➢ ORM With JPA
- ➢ Using Spring Data
- ➢ JPA Configuration
- ➢ Creating JPA Repositories
- ➢ CRUD Operations
- ➢ Spring Transaction Management

❖ Spring MVC

- ➢ MVC In Web Appln
- ➢ Java EE & Spring MVC
- ➢ Dispatcher Servlet as FrontController
- ➢ Request Response Life cycle
- ➢ Setting up Spring MVC Project
- ➢ Creating Controllers
- ➢ Request Mapping
- ➢ Parameter Binding
- ➢ Data Models
- ➢ Using SPEL
- ➢ View Resolvers
- ➢ Spring Form Tags & Binding
- ➢ Validations on Form Tags
- ➢ CRUD Operations using MVC

- Session Management

- **Spring API**
  - REST Principles
  - RMM Standards
  - Creating REST API
  - Project Setup
  - Controllers and Actions
  - Creating REST Operations
  - Consuming REST API through AJAX

- Security Overview
  - Authentication & Authorization
  - Form vs Basic Authentication
  - Understanding Spring Security Module
  - Securing MVC
  - Securing REST API

- Spring Testing Overview
  - Unit Testing in Spring
  - Using Junit 5.x
  - Using Spring Test Context Framework

Point of Contacts

Mr. Vidya Sagar K
Admin & Ops Manager
NKXGEN PARADIGMS Pvt. Ltd.,
IVth Floor, 71c Arunodaya Complex,
1st Lane, Dwaraka Nagar
Visakhapatnam 530016, India
Email: admin@nkxgen.com
M: +91 90009 23366