2024 - Java / Design patterns + TDD / QA

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| **Document status** | **REVIEWED** |
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| **Delivered by** | Vinsys |
| **Theme** | Build  Architecture |
| **Sub theme** | Local development  Microservices architecture |
| **Module** | Java / Design patterns  TDD / QA |
| **Duration** | 4 days |

# Pre-requisites

N/A

# Learning Objectives

Upon completion of this module, the participant will be able to:

* Understand basics of Java coding, debugging and code optimization Understand the Java coding best practices
* Understand SOLID principles
* Understand some of the key creational, structural and behavioral patterns as defined by GoF book Understand how the patterns are implemented in core Java libraries
* Expanding from Microservices to APIs
* Gain an understanding of the Microservices architecture and pros/cons of this architecture approach Gain an understanding of Monolith versus Microservices versus Serverless architecture styles Understand common design patterns used in Microservices development
* Understand some of the popular tools and frameworks in use for Microservices development
* High level approach to Testing and Software Quality Rationale of developer writing test cases
* TDD: Process and its pitfall
* Basic understanding of other practices like BDD and how it differed from TDD Testing Framework (Mockito, Wiremock, etc.)
* What is QA ?
* What is Software Testing? Definition, Basics & Types Basic of MTS (Minimum Testing Standards)

# Day 1

* Java evolution
* where is Java good to use where not to use Java
* Core libraries (io, database, collections)
* Debugging
* Functional programming
* Java 8 Features- Lambdas and Streams

# Day 2

* Concurrency
* Program Documentation
* SOLID principles
* GoF patterns - Some common Creational, Structural, Behavioral Design Principles
  + *Singleton, Factory ,Builder, Bridge, Decorator, Proxy, Command, Template and Strategy*
* Java Do’s and Don’ts/ best practices -> checklist is at https://mydb.intranet.db.com/docs/DOC-514588
* Introduction to Java reflection and annotation processing

# Day 3

* Software quality and basic of Unit testing
* Definition of Unit and technique to test Unit in isolation. Example of testing simple math like units
* Introduce JUnit framework and basic hands on examples. BDD Orientation
* Introduction to Sonar
* Introduction to Spring framework
* Getting started with Spring Boot, Creating REST application with 3 tier architecture
* Spring boot Actuator, Key challenges Monitoring/Alerting

# Day 4

* Introduction to Microservices
* Understanding the Monolith application and its challenges What are Microservices
* Basic building blocks of Microservices
* How do Microservices solve the challenges with Monolith?
* Microservices in action
* How to build, deploy and test Microservices Common design patterns for creating Microservices REST and JSON
* Popular frameworks in use Key benefits
* Introduction to Spring cloud
* Messaging with rabbitMQ/ActiveMQ

# Pre-reading, Resources, Hands-on sessions / exercises

2024 - Java / Design patterns + TDD / QA Execute Full GC for JVM instance via JMX How to update Java on DAP instance tc0322 How to update Java on DAP instance tc0235 How to update Java on SMMP **Assignments and Evaluations (optional)** N/A