Bosch Global Software Technologies
alt_future

hub

Java Advanced

Ver. Rel. No.	Release Date	Prepared. By	Reviewed By	Approved By	Remarks/Revision Details
V 1.0		Saravana Kumar			

Document History

Course Title: Java Basics

1.Course Summary:

This course covers following topics.

- Java Generics, Annotations and Reflection
- Serialization, Java NIO, Multi Threading
- Java 8, Java 11 and Java 17 Features
- JUnit, JNI and JNA

2. Pre-Requisite

- Good knowledge on Java Programming
- Familiarity on Java IDE (IntelliJ / Eclipse)

3. Audience

- Java Developers

4. Hardware & Network Requirements

- Laptop / Desktop with 8 GB RAM and 50 GB Storage
- Open internet connection with good speed

5. Software Requirements

- Windows / Linux / Mac OS
- Java 17 and above
- Java IDE – Intellij IDEA or Eclipse latest version
- Git Client latest version
- MySQL Server and Workbench latest version

6.Learning Outcomes:

- Understand Java Generics, Annotations and Reflection
- How to work with Serialization and Java NIO
- How to build multi threaded application using Multi Threading concepts
- Understand on New Features introduced as part of Java 8, 11 and 17 releases
- How to unit test Java application using JUnit
- How to integrate with native libraries from Java app using JNI and JNA

7.Course Content (day wise):

Day 1

Module 1: Java Generics

- Quick recap on Java Basics
- Generics Overview
- Benefits and Usecases
- Generic Method
- Type Inference
- Bounded Type Parameters
- Generic Class
- Type Erasure
- PECS (Producer Extends Consumer Super)
- Lower and Upper Bounds

Module 2: Java Annotations

- Annotations Overview
- Benefits and Usecases
- Standard Annotations
- Meta Annotations
- Custom Annotations

Module 3: Java Reflection

- Reflection Overview
- Accessing classes, methods, and fields at runtime
- Using reflection for debugging and testing

Day 2

Module 4: Serialisation and Java NIO

- Serialization Overview
- Object InputStream vs Output Stream
- Transient
- Serialize and De-serialize Java objects
- Intro to NIO
- NIO Benefits and Usecases
- Reading and Writing data with File using NIO

Day 3

Module 5: Multi-Threading

- Threading Concepts
- Synchronizing Threads
- Inter communication of Threads
- Critical Factor in thread Deadlock
- Thread Executor framework
- Intro to Fork and Join Model
- Completeable Future

Day 4

Module 6: Java 8 Features

- Fundamentals of Functional Programming
- Lambda Expressions
- Functional Interfaces
- Method References
- Default Methods
- Optional Class
- Stream API Overview
- Streaming Sources
- Intermediate Operations
- Terminal Operations
- Serial vs Parallel Stream
- New Date/Time API

Day 5

Module 7: Java 11/17 Features

- Module System Overview
- Reactive Streams Overview
- JShell
- Local Variable Type Inference
- String API / Stream API Enhancements
- New File Methods
- New HTTP client
- Switch Case Expression
- Pattern Matching
- Record
- Sealed Classes

Module 8: Intro to JDBC

- Databases & RDBMS Overview
- SQL Overview
- JDBC Overview
- JDBC Drivers and Sample program

Day 6

Module 9: Intro to JUnit

- Unit Testing Overview
- JUnit Overview
- Writing tests in JUnit 5
- Annotations
- Test Classes and Methods
- Assertions
- Test lifecycle
- Running Tests
- Test Mocks with Mockito

Day 7

Module 10: Intro to JNI and JNA

- Overview of JNI and its purpose
- When and why to use JNI
- Understanding the JNI architecture and components
- Creating a simple Java class with native methods
- Writing the corresponding C/C++ implementation
- Compiling the native code and generating the shared library
- Loading native libraries
- Managing native method calls and memory
- Data Types and Conversions
- Exception Handling

- Overview of JNA and its purpose
- Advantages of using JNA over JNI
- Understanding how JNA works
- Creating a simple Java class to call native functions
- Mapping C functions to Java methods
- Loading native libraries
- Working with Struts and Callbacks
- Exception Handling

8.Course Structure:

Activity	Indicative Number of Hours
Pre-Read Hours	12
Teaching Hours	28
Hands on Sessions Hours	28
Assignments & Tutorial Hours	12
Mock Project Hours	20

9.Course Structure:

Method of Assessment	Yes/No	Weightage
Pre-Assessment	Yes	
Mid-Assessment	Yes	
Post-Assessment	Yes	
Project Work	Yes (Assignments)	

10.Course Resources:

11.Recommended Reading Links:

12.Course Owner (s):

Employee Name	Employee Mail ID	Business Unit