Learning Java beyond basics

**Duration:** 5 days

**Prerequisites:** participants should have good knowledge of:

OOP concepts

Java basics

Class structure

Garbage collection

String handling

Inheritance

Polymorphism

interfaces

primitives vs wrappers

Exception handling

**Topics:**

**Day 1:**

* + Quick review of OOPs concepts and java basics (half day)
  + More about interfaces
    - Interface based design approach
    - default methods
    - why default methods
    - static methods
    - how static methods of interfaces differ from static methods of classes
  + Exceptions deep dive
    - Review of exception handling
    - Why checked and unchecked exceptions
    - Exception propagation
    - Exception as a way of communication
    - Situation where exceptions are mandatory
  + Collections and generics
    - Generic classes
    - Generic collections and Map
    - Comparable and Comparator
    - Comparator lambdas
    - Concurrent collections

**Day 2:**

* + Multi threading
    - Thread operations
    - synchronize
    - inter thread communication
    - Concurrency with thread pool
    - Runnable vs Callable
    - ThreadLocal variables and their importance
    - Atomic datatypes
  + Lambda expressions
    - Functional interfaces
    - lambda expressions
    - Built-in functional interfaces
    - Functional programming
    - compose, andThen to create composite functions
  + Stream operations
    - Intermediate and terminal operations
    - Sequential and parallel streams
    - Lambda vs method reference
    - Collectors class

**Day 3:**

* + Maven projects
    - Maven introduction
    - ArtifactId and groupId
    - mvn command
    - how to create maven project in eclipse
    - resolving dependencies
    - maven repository
  + Database operations
    - Legacy JDBC
    - Java Persistence
    - ORM to map java classes with database
    - Structure of JPA application
    - EntityManager API
    - JPQL
    - Relationship mapping
  + Modules in java
    - Developing modules
    - Why modules
    - classpath vs modulepath
    - Services
    - Service interface
    - Service implementation

**Day 4:**

* + New features of java
    - Sealed classes
    - Switch expressions
    - Pattern matching in switch
    - Records
    - var keyword
    - Text blocks
    - String new methods
    - readString and writeString
  + Performance optimization
    - JVM settings
    - Memory leaks
    - Static variable memory leak
    - ThreadLocal memory leaks
    - Heap memory settings
    - Understanding class loading
    - Custom class loaders
    - Java profilers to monitor performance
  + Code optimization
    - Using recursion
    - Breaking methods
    - Primitives vs wrappers
    - Multi threading issues
    - String vs StringBuilder vs StringBuffer
    - Understanding collections usage

**Day 5:**

# Guice as DI tool

* + Guice setup
  + Creating injector
  + Basic binding
  + Named binding
  + Constructor binding
  + Types of injection
  + scopes
  + DropWizard for REST applications
    - Overview
    - Jetty, Jackson and Jersey support
    - Project configuration
    - Configuration class
    - YAML file
    - Application class
    - Resource class with Jakarta RS annotations