AWS Development, AWS DevOps, Java, Spring Boot, Microservices

Program Duration: 128 hours

Prerequisites:

Good knowledge on Java and OOP

• Good knowledge on Basics of Cloud

Content Content Breakdown:

Java: 20 Hours

Spring Boot: 20 Hours

• Microservices: 48 Hours

• AWS Development: 28 Hours

• AWS DevOps: 12 Hours

Java (20 Hours)

Day 1 1. Introduction to Java

- Java Basics

- Setting up Development Environment

- Writing First Java Program-

Lab: Basic Java Programs

Day 2 2. Object-Oriented Programming

- Classes and Objects
- Inheritance
- Polymorphism
- Encapsulation and Abstraction
- -Lab: Inheritance, Polymorphism



- List, Set, Map
- Iterators and Streams
- Lab: 1) create read update and delete operation on java collections
- 2) Use streams on collections

Day 4 4. Exception Handling and Multithreading

- Try-Catch Blocks
- Custom Exceptions
- Threads and Concurrency

Lab: 1) Create exception and use it

2) Multithreading in java with share object

Day 5 5. Java writing unit test

- unit test with test driven development
- Junit
- Mockito
- Lab: Writing unit test and use of Mockito

Spring Boot (20 Hours)

Day 6 1. Introduction to Spring Boot

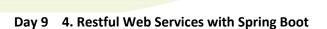
- Spring Boot Basics
- Setting up Spring Boot Project
- Lab: Creating a Basic Spring Boot Application with maven and start with command line

Day 7 2. Dependency Injection and Inversion of Control

- Beans and Components
- Auto wiring
- -Lab: Create Spring boot application with Dependency Injection with
- 3. Spring Boot Unit Test
 - Unit test annotation
 - Mocking with spring boot
 - Unit test coverage
 - Lab: Create Spring boot application with unit test and its coverage

Day 8 3.1 Spring Boot Data Access

- Spring Data JPA
- CRUD Operations
- Lab: Building a Spring Boot JPA Application and store the student data in mysql



- Creating REST APIs
- Consuming REST APIs
- Hands-on: Create spring boot application with rest Api for Create, Read, Update and

Delete with student record from Data base

Day 10 5. Spring Boot Security

- Basic Authentication and Authorization
- JWT
- Hands-on: Create Application to restrict Api with Role based authentication with basic

security

Microservices (48 Hours)

Day 11 1. Introduction to Microservices

- Monolithic vs Microservices
- Principles of Microservices Architecture
- 12 factor app

Day 12 2. Docker Introduction

What is docker

Docker volume

Docker network

Lab: Use of different docker commands and its uses

Day 13 3. Docker with Microservice

Docker image

Docker container

Create docker file

Lab: Create image and container for spring boot messaging microservice

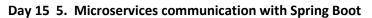
Day 14 4. Running docker container with docker compose

Running docker container

Docker composes as a tool

Docker compose command

Lab: Create Docker-compose for messaging microservice



- Setting up Microservices
- Synchronous Communication between Microservices
- Lab Creating Microservices Rest communication with Spring boot and run in docker

container

Day 16 6. Microservice message broker

- Active MQ
- SQS
- RabbitMQ
- Use of message broker in microservice
- Lab: Run message broker in docker active mq

Day 17 7. Inter-Service Communication

- Asynchronous Communication between Microservices
- message communication between microservice
- Lab: Create two microservice with message exchange between them

Day 18 8. Component test for microservice

- Component test infrastructure
- Component test with spring boot
- Mocking in component test
- Lab: Wite component test for message broker

Day 19 9. API Gateway and Service Discovery

- Netflix Zuul
- Eureka
- -Lab: Create Spring boot microservice and use ereca service discovery with student

application

Day 20 10. Data Management in Microservices

- Database per Microservice
- Spring Data
- MySQL



- Lab: Spring boot microservice CRUD with MySQL with spring data

Day 21 11. Monitoring and Logging

- Logging framework in microservice
- log back
- Hierarchy of logging
- Enable disable logging in spring boot
- Hands-on: Implementing Monitoring and Logging with spring boot

Day 22 12. Case Study and Project

- End-to-end Microservices Project
- Lab: Create microservice project with unit test component test and data storage with

logging

- Deploy and run in docker container

AWS Development (28 Hours)

Day 23 1. Introduction to AWS

- Overview of AWS Services
- Setting up AWS Account
- AWS Global Infrastructure

Day 24 2. Compute Services- ECS

- Farget cluster Overview
- Use case of ECS
- ECS Setup and Configuration
- ECS Management

Cluster Management: Updating, scaling, and maintaining EKS clusters.

Monitoring and Logging: Integrating with AWS CloudWatch,

- Hands-on: Creating ECS service task and management

Day 25 3. Compute Services- EKS

- EKS fundamental
- EKS Setup and Configuration
- EKS Management

Cluster Management: Updating, scaling, and maintaining EKS clusters.

Monitoring and Logging: Integrating with AWS CloudWatch,

- Hands-on: Creating EKS service task and management





Day 26 4. Compute Services- EKS with microservice

Deploying Applications: Deploying sample applications on EKS.

Managing Workloads: Practical exercises on managing Kubernetes workloads.

Troubleshooting: Common issues and troubleshooting steps for EKS.

Logging

- Hands-on: Deploy Spring boot microservice in EKS

Day 27 5. Database Services

Introduction to DynamoDB: Overview, benefits, and use cases.

Core Concepts: Tables, items, and attributes.

Data Types: Scalar types, document types, and set types.

Primary Keys: Partition keys, composite keys (partition key and sort key).

Secondary Indexes: Local secondary indexes (LSI) and global secondary indexes (GSI).

Query and Scan: Differences between query and scan operations, use cases, and performance considerations.

- Lab: RDS Instance Creation and DynamoDB Table Management.

Day 28 6. Messaging and communication

- SQS
- SNS
- Lab: Setting up SNS and SQS, Aws command line to access sqs and SNS, Spring boot application to publish and suscribe sqs

Day 29 7. Case Study and Project

- End-to-end Microservices Project with sqs message publish
- **Lab**: Deploy the spring boot microservice end to end project in EKS with logging and monitoring

AWS DevOps (12 Hours)

Day 30 1. Introduction to DevOps on AWS

- DevOps Principles
- DevOps Tools on AWS

Day 31 2. Infrastructure as Code

- CloudFormation



- Terraform (Basic Introduction)
- Lab: Writing CloudFormation Templates to deploy spring boot in ECS and EC2

Day 32 3. Continuous Integration and Continuous Deployment

- CodePipeline
- Code Build
- Code Deploy
- Hands-on: CI/CD Pipeline Creation4. Configuration Management
- OpsWorks
- Systems Manager
- Lab: Configuring OpsWorks Stacks