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JEE FULL STACK WITH DEVOPS & CLOUD(AWS)

JEE with DevOps & Cloud(AWS) variant provides exposure to the entire spectrum of Java technologies starting from Core Java to Spring. It focuses on Web Application development using DevOps & AWS and Spring Technology. The following table lists the course structure.

Course	Duration (Days)
Power Skills Touch Point - Foundation – session 1	1
Core Java 8 , Database PostgreSQL , DevOps, JDBC	3
Power Skills Touch Point Session 2	0.2
Core Java 8 , Database PostgreSQL , DevOps, JDBC	4.8
Module 1 MCQ Part 1 Test	0.1
Power Skills Touch Point Session 3	0.2
Core Java 8 , Database PostgreSQL , DevOps, JDBC-(Total duration:7.25)	0.7
Core Java 8 , Database PostgreSQL , DevOps, JDBC ..contd	6.5
Module 1 MCQ Part 2 Test + Coding Assessment	0.5
Power skills (Behavioural) -Foundation – session 4	1
JPA with Hibernate 3.0	2
Spring 5.0	5
Power skills (Behavioural) -Foundation – session 5	1
Spring 5.0	4
Power skills (Behavioural) -Foundation – session 6	0.2
Spring 5.0	0.8
Spring 5.0 + JPA MCQ	0.2
Docker	2.8
Power skills (Behavioural) -Foundation – session 7	0.2
Kubernetes	2.8
AWS with Container Deployment (EKS)	4
Power skills (Behavioural) -Foundation – session 8	1
Docker + Kubernetes + AWS MCQ	0.2
Sprint Implementation	5.8
Power skills (Behavioural) -Foundation – session 9	0.2
Sprint Implementation	1.8
Sprint Evaluation(Coding Assessment)	1
L1 Preparation	1
L1 Assessment (MCQ - Concept & Code-based Qs)	1
Total Training Duration	53

Agile SCRUM

Execution:

Agile Software Development Coursera Course on NEXT platform – 11 Hr

Agile SME connect for 1 Hr. – Day 1 of Sprint 1

Agile Lab 1 Hr – Day 1 of Sprint 1

- **Sprint 1 implementation for backend with code reviews of L&D and BU trainer**
 - Implementing Spring into the project
 - Test case reviews
 - Code reviews
 - Performance monitoring and review during the sprint implementation and sharing the feedback
- **Sprint implementation for Deployment on cloud.**
 - **Code reviews**
 - **Performance monitoring and review during the sprint implementation and sharing the feedback**
- **Complete Project evaluation - 30min/participant**
Core Java 8

Program Duration: 12 days

Contents:

- 🕒 **Declarations and Access Control**
 - Identifiers & JavaBeans
 - Legal Identifiers
 - Sun's Java Code Conventions
 - JavaBeans Standards
 - Declare Classes
 - Source File Declaration Rules
 - Class Declarations and Modifiers
 - Concrete Subclass
 - Declaring an Interface
 - Declaring Interface Constants
 - Declare Class Members
 - Access Modifiers
 - Nonaccess Member Modifiers
 - Constructor Declarations
 - Variable Declarations
 - Declaring Enums
- 🕒 **Object Orientation**
 - Encapsulation
 - Inheritance, Is-A, Has-A

- o Polymorphism
 - o Overridden Methods
 - o Overloaded Methods
 - o Reference Variable Casting
 - o Implementing an Interface
 - o Legal Return Types
 - o Return Type Declarations
 - o Returning a Value
 - o Constructors and Instantiation
 - o Default Constructor
 - o Overloaded Constructors
 - o Statics
 - o Static Variables and Methods
 - o Coupling and Cohesion
- **Assignments**
 - o Stack and Heap—Quick Review
 - o Literals, Assignments, and Variables
 - o Literal Values for All Primitive Types
 - o Assignment Operators
 - o Casting Primitives
 - o Using a Variable or Array Element That Is Uninitialized and Unassigned
 - o Local (Stack, Automatic) Primitives and Objects
 - o Passing Variables into Methods
 - o Passing Object Reference Variables
 - o Does Java Use Pass-By-Value Semantics?
 - o Passing Primitive Variables
 - o Array Declaration, Construction, and Initialization
 - o Declaring an Array
 - o Constructing an Array
 - o Initializing an Array
 - o Initialization Blocks
 - o Using Wrapper Classes and Boxing
 - o An Overview of the Wrapper Classes
 - o Creating Wrapper Objects
 - o Using Wrapper Conversion Utilities
 - o Autoboxing
 - o Overloading
 - o Garbage Collection
 - o Overview of Memory Management and Garbage Collection
 - o Overview of Java's Garbage Collector
 - o Writing Code That Explicitly Makes Objects Eligible for Garbage Collection
- 🕒 **Operators**
 - o Java Operators
 - o Assignment Operators
 - o Relational Operators
 - o instanceof Comparison

- o Arithmetic Operators
- o Conditional Operator
- o Logical Operators

🕒 **Flow Control, Exceptions**

- o if and switch Statements
- o if-else Branching
- o switch Statements
- o Loops and Iterators
- o Using while Loops
- o Using do Loops
- o Using for Loops
- o Using break and continue
- o Unlabeled Statements
- o Labeled Statements
- o Handling Exceptions
- o Catching an Exception Using try and catch
- o Using finally
- o Propagating Uncaught Exceptions
- o Defining Exceptions
- o Exception Hierarchy
- o Handling an Entire Class Hierarchy of Exceptions
- o Exception Matching
- o Exception Declaration and the Public Interface
- o Rethrowing the Same Exception
- o Common Exceptions and Errors

🕒 **Gradle Fundamentals**

- o Introduction
- o Folder Structure
- o Install and Setup Gradle on Windows
- o Dependencies in Build Scripts
- o Gradle Wrapper
- o Lifecycle Tasks: The Base Plug In
- o Using Project Info and the check command
- o Creating Variables and external properties
- o Creating a Build Scan
- o Dependencies

🕒 **TDD with JUnit 5**

- o Types of Tests
- o Why Unit Tests Are Important
- o What's JUnit?
- o JUnit 5 Architecture
- o IDEs and Build Tool Support
- o Setting up JUnit with Maven

- Lifecycle Methods
- Test Hierarchies
- Assertions
- Disabling Tests
- Assumptions
- Test Interfaces and Default Methods
- Repeating Tests
- Dynamic Tests
- Parameterized Tests
- Argument Sources
- Argument Conversion
- What Is TDD?
- History of TDD
- Why Practice TDD?
- Types of Testing
- Testing Frameworks and Tools
- Testing Concepts
- Insights from Testing
- Mocking Concepts
- Mockito Overview
- Mockito Demo
- Creating Mock Instances
- Stubbing Method Calls
- **Strings, I/O, Formatting, and Parsing**
 - String, StringBuilder, and StringBuffer
 - The String Class
 - Important Facts About Strings and Memory
 - Important Methods in the String Class
 - The StringBuffer and StringBuilder Classes
 - Important Methods in the StringBuffer and StringBuilder Classes
 - File Navigation and I/O
 - Types of Streams
 - The Byte-stream I/O hierarchy
 - Character Stream Hierarchy
 - RandomAccessFile class
 - The java.io.Console Class
 - Serialization
 - Dates, Numbers, and Currency
 - Working with Dates, Numbers, and Currencies
 - Parsing, Tokenizing, and Formatting
 - Locating Data via Pattern Matching
 - Tokenizing
- 🕒 **Generics and Collections**
 - Overriding hashCode() and equals()
 - Overriding equals()
 - Overriding hashCode()

- o Collections
- o So What Do You Do with a Collection?
- o List Interface
- o Set Interface
- o Map Interface
- o Queue Interface
- o Using the Collections Framework
- o ArrayList Basics
- o Autoboxing with Collections
- o Sorting Collections and Arrays
- o Navigating (Searching) TreeSets and TreeMaps
- o Other Navigation Methods
- o Backed Collections
- o Generic Types
- o Generics and Legacy Code
- o Mixing Generic and Non-generic Collections
- o Polymorphism and Generics

Threads

- o Defining, Instantiating, and Starting Threads
- o Defining a Thread
- o Instantiating a Thread
- o Starting a Thread
- o Thread States and Transitions
- o Thread States
- o Preventing Thread Execution
- o Sleeping
- o Thread Priorities and yield()
- o Synchronizing Code
- o Synchronization and Locks
- o Thread Deadlock
- o Thread Interaction
- o Using notifyAll() When Many Threads May Be Waiting

• **Concurrent Patterns in Java**

- o Introducing Executors, What Is Wrong with the Runnable Pattern?
- o Defining the Executor Pattern: A New Pattern to Launch Threads
- o Defining the Executor Service Pattern, a First Simple Example
- o Comparing the Runnable and the Executor Service Patterns
- o Understanding the Waiting Queue of the Executor Service
- o Wrapping up the Executor Service Pattern
- o From Runnable to Callable: What Is Wrong with Runnables?
- o Defining a New Model for Tasks That Return Objects
- o Introducing the Callable Interface to Model Tasks
- o Introducing the Future Object to Transmit Objects Between Threads
- o Wrapping up Callables and Futures, Handling Exceptions

- **Concurrent Collections**

- Implementing Concurrency at the API Level
- Hierarchy of Collection and Map, Concurrent Interfaces
- What Does It Mean for an Interface to Be Concurrent?
- Why You Should Avoid Vectors and Stacks
- Understanding Copy On Write Arrays
- Introducing Queue and Deque, and Their Implementations
- Understanding How Queue Works in a Concurrent Environment
- Adding Elements to a Queue That Is Full: How Can It Fail?
- Understanding Error Handling in Queue and Deque
- Introducing Concurrent Maps and Their Implementations
- Atomic Operations Defined by the ConcurrentMap Interface
- Understanding Concurrency for a HashMap
- Understanding the Structure of the ConcurrentHashMap from Java 7
- Introducing the Java 8 ConcurrentHashMap and Its Parallel Methods
- Parallel Search on a Java 8 ConcurrentHashMap
- Parallel Map / Reduce on a Java 8 ConcurrentHashMap
- Parallel ForEach on a Java 8 ConcurrentHashMap
- Creating a Concurrent Set on a Java 8 ConcurrentHashMap
- Introducing Skip Lists to Implement ConcurrentMap
- Understanding How Linked Lists Can Be Improved by Skip Lists
- How to Make a Skip List Concurrent Without Synchronization

- **Lambda Expressions**

- Introduction
- Writing Lambda Expressions
- Functional Interfaces
- Types of Functional Interfaces
- Method reference

- **Stream API**

- Introduction
- Stream API with Collections
- Stream Operations

Introduction to Design Pattern

Self learning with online links and explanation by Trainer with Demos

- Creational Design Pattern
 - Factory Pattern
 - Singleton Pattern
 - Prototype Pattern
- Structural Design Pattern
 - Decorator Pattern
 - Facade Pattern
- Behavioral Design Pattern
 - Chain of Responsibility Pattern

- Iterator Pattern
- Presentation Layer Design Pattern
 - Intercepting Filter Pattern
 - Front Controller Pattern
- Business Layer Design Pattern
 - Business Delegate Pattern
 - Transfer Object Pattern
- Integration Layer Design Pattern
 - Data Access Object Pattern

DevOps (Git, SonarQube, Maven, Jenkins)

Duration : 1 day

Contents:

- **Introduction to DevOps**
 - Introduction of DevOps
 - Dev And Ops
 - Agile Vs DevOps
 - Continuous Integration & Delivery pipeline
 - Tools For DevOps
 - Use-case walkthrough
- **GIT Hub**
 - Working locally with GIT
 - Working remotely with GIT
 - Branching, merging & rebasing with GIT
 - Use Case walkthrough
- **Jenkins:**
 - Introduction to Jenkins
 - Jenkins Objective
 - Introduction to continuous integration deployment & Jenkins-ci
 - Continuous Deployment & distribution builds with Jenkins
- **Sonar**
 - Introduction to Sonar
 - Code quality Monitoring- Sonar
 - Use Case walkthrough

Database Using PostgreSQL and JDBC

Duration : 2.5 days

Contents:

- 🕒 **Introduction**
 - o The Relational Model
 - o What is PostgreSQL?
 - o PostgreSQL – Data Types
 - o Arrays Functions and Operators
- 🕒 **Understanding Basic PostgreSQL Syntax**
 - o The Relational Model
 - o Basic SQL Commands - SELECT
 - o Basic SQL Commands - INSERT
 - o Basic SQL Commands - UPDATE
 - o Basic SQL Commands – DELETE
- 🕒 **Querying Data with the SELECT Statement**
 - o Wildcards (% , _)
 - o The SELECT List
 - o SELECT List Wildcard (*)
 - o The FROM Clause
 - o How to Constrain the Result Set
 - o DISTINCT and NOT DISTINCT
- 🕒 **Arrays Functions and Operators**
 - o array_append
 - o array_cat
 - o array_lower
 - o array_to_string
 - o array_agg
 - o every, Count, sum, avg
 - o Array Operators
- 🕒 **Filtering Results with the Where Clause**
 - o WHERE Clause
 - o Boolean Operators
 - o The AND Keyword
 - o The OR Keyword
 - o Other Boolean Operators BETWEEN, LIKE, IN, IS, IS NOT
- 🕒 **Shaping Results with ORDER BY and GROUP BY**
 - o ORDER BY
 - o Set Functions
 - o Set Function And Qualifiers
 - o GROUP BY
 - o HAVING clause
- 🕒 **Matching Different Data Tables with JOINS**
 - o Table Aliases
 - o CROSS JOIN
 - o INNER JOIN
 - o OUTER JOINS

- o LEFT OUTER JOIN
- o RIGHT OUTER JOIN
- o FULL OUTER JOIN
- o SELF JOIN
- o Natural Join
- 🕒 **Creating Database Tables**
 - o CREATE DATABASE
 - o CREATE TABLE
 - o NULL Values
 - o PRIMARY KEY
 - o CONSTRAINT
 - o ALTER TABLE
 - o DROP TABLE
- 🕒 **PostgreSQL Transactions**
 - o BEGIN, COMMIT, ROLLBACK
- 🕒 **PostgreSQL Constraints**
 - o CHECK, UNIQUE, NOT NULL
 - **Introduction to JDBC**
 - o Connection, Statement, PreparedStatement, ResultSet

JPA Using PostgreSQL

Program Duration: 2 days

Contents:

- **Introduction to JDBC**
- **Introduction**
 - Introduction & overview of data persistence
 - Overview of ORM tools
 - Understanding JPA
 - JPA Specifications
- **Entities**
 - Requirements for Entity Classes
 - Persistent Fields and Properties in Entity Classes
 - Persistent Fields
 - Persistent Properties
 - Using Collections in Entity Fields and Properties
 - Validating Persistent Fields and Properties
 - Primary Keys in Entities
- **Managing Entities**
 - The EntityManager Interface

- Container-Managed Entity Managers
- Application-Managed Entity Managers
- Finding Entities Using the EntityManager
- Managing an Entity Instance's Lifecycle
- Persisting Entity Instances
- Removing Entity Instances
- Synchronizing Entity Data to the Database
- Persistence Units
- **Querying Entities**
 - Java Persistence query language (JPQL)
 - Criteria API
- **Entity Relationships**
 - Direction in Entity Relationships
 - Bidirectional Relationships
 - Unidirectional Relationships
 - Queries and Relationship Direction
 - Cascade Operations and Relationships

Spring 5.0

Program Duration: 10 days

Contents:

1. Spring Core

Spring Core Introduction / Overview

- Shortcomings of Java EE and the Need for Loose Coupling
- Managing Beans, The Spring Container, Inversion of Control
- The Factory Pattern
- Configuration Metadata - XML, @Component, Auto-Detecting Beans
- Dependencies and Dependency Injection (DI) with the BeanFactory
- Setter Injection

Spring Container

- The Spring Managed Bean Lifecycle
- Autowiring Dependencies

Dependency Injection

- Using the Application Context
- Constructor Injection
- Factory Methods
- Crucial Namespaces 'p' and 'c'
- Configuring Collections

Metadata / Configuration

- Annotation Configuration @Autowired, @Required, @Resource
- @Component, Component Scans. Component Filters

- Life Cycle Annotations
- Java Configuration, @Configuration, XML free configuration
- The Annotation Config Application Context

2. Spring Boot

SPRING BOOT Introduction

- Spring Boot starters, CLI, Gradle plugin
- Application class
- @SpringBootApplication
- Dependency injection, component scans, Configuration
- Externalize your configuration using application.properties
- Context Root and Management ports
- Logging

Using Spring Boot

- Build Systems, Structuring Your Code, Configuration, Spring Beans and Dependency Injection, and more.

Spring Boot Essentials

- Application Development, Configuration, Embedded Servers, Data Access, and many more
- Common application properties
- Auto-configuration classes
- Spring Boot Dependencies

○ JSP

▪ Writing Java Server Page

- Developing a Simple Java Server Page

▪ JSP Scripting Elements

- Forms of Scripting Elements
- Predefined Variables
- Examples using Scripting Elements

▪ JSP Directives

- Page directive
- Include directive

▪ JSP Actions

.....

▪ JSP Standard Template Library (JSTL)

- What is JSTL?
- Installing JSTL
- Using the Expression Language
- Using JSTL Core Libraries

Introduction / Developing Web applications with Spring MVC

- Model View Controller
- Front Controller Pattern
- DispatcherServlet Configuration

- Controllers, RequestMapping
- Working with Forms
- Getting at the Request, @RequestParam
- ModelAndView
- Spring form tags and Model Binding, @ModelAttribute
- Data Validation

3. Spring Data JPA

- Spring Data JPA Intro & Overview
- Core Concepts, @RepositoryRestResource
- Defining Query methods
- Query Creation
- Using JPA Named Queries
- Defining Repository Interfaces
- Creating Repository instances
- JPA Repositories
- Persisting Entities
- Transactions

4. Microservices

Microservices Overview

- Microservices architecture
- Core characteristics of microservice
- Use cases and Benefits
- Design standards
- Monolithic Architecture
- Distributed Architecture
- Service oriented Architecture
- Microservice and API Ecosystem
- Microservices in nutshell
- Point of considerations
- SOA vs. Microservice
- Microservice & API

Environment Management with Centralized Configuration

- Role of Configuration in microservices
- Spring cloud config
- Creating a configuration server
- Consuming configurations in apps

Performance Issues Using Distributed Tracing

- Role of tracing in microservices
- What is Spring Cloud Sleuth?
- Adding Spring Cloud Sleuth to a project
- Visualizing latency with Zipkin
- Adding Zipkin to a solution

Locating Services at Runtime Using Service Discovery

- Role of service discovery in microservices
- Describing spring cloud Eureka
- Creating Eureka Server
- Registering Services with Eureka
- Configuring health information
- Actuator & Profiles

Protecting Systems with Circuit Breakers

- Role of circuit breakers in microservices
- Describing Resilience4j
- Creating a Resilience4j service

Routing Your Microservices Traffic

- Role of routing in microservices
- Describing Spring Cloud LoadBalancer
- Configuring Spring Cloud LoadBalancer
- Describing Spring Cloud Gateway

Spring Security & Outh2

- Spring Security
- Spring Security with Spring boot
- Outh2
- Outh2 with Spring Boot

Docker

Program Duration: 3 days

Contents

- Introduction to Docker
 - Limitation of VM
 - Introduction to Container
 - Container Vs VM
 - What is Docker
 - Docker Community
 - Docker Architecture
 - Docker Installation
- Docker Platform overview
 - Docker Platform
 - Docker Engine
 - Docker Images
 - Docker containers
 - Registry
 - Repositories
 - Docker Hub
- **Deploying a Containerized App**

Module Overview
Warp Speed Run-through
Containerizing an App
Hosting on a Registry
Running a Containerized App
Managing a Containerized App
Multi-container Apps with Docker Compose
Taking Things to the Next Level with Docker Swarm
Microservices and Docker Services
Multi-container Apps with Docker Stacks
Docker Swarm

- Introduction to images and Repository naming , Automated build, Private distribution

Kubernetes

Program Duration: 3 days

Contents

- **Introduction of Kubernetes**
 - What Is Kubernetes?
 - Kubernetes What and Why
- **Kubernetes Architecture**
 - Module Overview
 - Kubernetes Big Picture View
 - Kubernetes Masters
 - Kubernetes Nodes
 - The Declarative Model and Desired State
 - Kubernetes Pods
 - Stable Networking with Kubernetes Services
 - Game Changing Deployments
 - The Kubernetes API and API Server
 - Api Server
 - Scheduler
 - Controller Manager
 - etcd - the cluster brain
- **Getting Kubernetes**
 - Module Overview
 - Getting kubectl
 - Getting K8s in the Cloud
- **Working with Pods**
 - Module Overview
 - App Deployment Workflow

- Creating a Pod Manifest
- Deploying a Pod
- Deployment vs StatefulSet
- Pod Identity
- Scaling database applications: Master and Worker Pods
- Pod state, Pod Identifier
- 2 Pod endpoints
- **Kubernetes Deployments**
 - Module Overview
 - Kubernetes Deployment Theory
 - Creating a Deployment YAML
 - Deploying a Deployment
 - Self-healing and Scaling
 - Rolling Updates and Rollbacks
- **ClusterIP Services**
 - Service Communication
 - Multi-Port Services
 - Headless Services
 - NodePort Services
 - LoadBalancer Services
- **Helm - Package Manager**
 - Package Manager and Helm Charts
 - Templating Engine
 - Use Cases for Helm
 - Helm Chart Structure
 - Values injection into template files

AWS

Program Duration: 4 days

Contents:

- **Cloud Basics**
 - What is and Why Cloud?
 - Why Cloud Computing
 - Key characteristics of Cloud
 - Cloud Computing Architecture
 - Cloud Deployment and Service Model Selection criteria
 - Cloud APIs
 - Cloud benefits and Challenges
 - Different Cloud implementer
 - Latest trend
- **Cloud Native Concepts**

- Cloud technology
- Cloud Native Approach
- Purpose of Cloud Native
- What are Cloud Native companies doing differently to improve IT agility
- Benefits of Cloud native
- Hybrid cloud
- AWS Basics of different services
 - AWS history
 - Cloud Computing and Amazon Web Services
 - Functionality offered by AWS
 - The Differences that Distinguish AWS
 - Features of AWS service
 - Different AWS web services in Cloud
 - AWS global infrastructure
- Compute services
 - Amazon EC2

Container Deployment Service EKS

- Creation of an EKS cluster
- Configure kubectl using AWS CLI
- Serverless pods
- Scaling the cluster