

SPRING BOOT AND CLOUD WITH MICROSERVICES

Spring Boot

a) Spring Boot - PART-I:

1. Boot Basic and Features

- Need Of Spring Boot
- Spring V/s Boot
- Components in Boot
- Boot Architecture
- Types of Files in Boot
- Advantages of Boot
- Boot Dependencies
- Maven Boot Plug-in
- Parent Project in Boot

2. First Application in Boot

- Basic Annotations in Boot
- Execution Flow
- Boot Starter class
- Application Properties
- Server Port Change
- Managing of Dependencies
- Common Problem in coding
- @SpringBootApplication

3. Customizing the Banner
 - Spring Boot Banner
 - Banner Example
 - Text Banner
 - Custom banner
4. Runners in Spring Boot
 - Command Line Runner
 - Application Runner
 - Multiple Runners with Order
 - Runner Configuration
 - Inputs to Runner
5. Application Properties file
 - Properties file Need
 - XML/Properties
 - Finding Key-values
 - Option-args/Non option-args
 - Default values
6. Application YAML File
 - YAML structure
 - YAML Locations and Order
 - Snake YAML Execution Flow
7. POM structure for Boot
 - Why POM
 - Role of POM Elements
 - Parent Project
 - Properties in POM
 - Version Management
8. Profiles in Spring boot
 - @Profile annotation
 - Customer/Environment Specific coding
 - Profile Properties
 - Profiles YAML
9. Building Application (.jar,.war)
 - What is Build plug-in

- Maven Clean and Install
 - target folder and .jar and .war
10. Spring Boot starter class
 - @SpringBootConfiguration
 - @EnableAutoConfiguration
 - @ComponentScan
 11. Spring Boot stand alone Application
 - Writing Stand alone Application
 - Service Examples
 - Printing Messages
 12. Spring Boot Configuration
 - Writing Application Configuration
 - Java and Annotation Configuration
 - Auto detection of Configuration File
 13. Lombok API
 - @Data
 - @Getter
 - @Setter
 - @ToString
 - @EqualsAndHashCode
 - @NoArgsConstructor
 - @RequiredArgsConstructor
 - @AllArgsConstructor
 - @NonNull
 14. Basic Annotations and Execution flow
 - @Service
 - @Component
 - @Scope
 - @Bean
 - @Configuration
 - @ConfigurationProperties
 - @Order
 - @Profile
 - @Value
 - @PropertySource

b) Spring Boot PART-II:

15. Spring Boot Email
 - Java MAIL API structure
 - Mail Properties
 - Boot Mail Design
 - Simple Email
 - Mime Email with Attachments
16. Spring Boot Web Applications
 - Design of Web Applications
 - Layers in Web Application
 - Spring Boot MVC Model
 - Writing of Controllers
 - JSP UI Design
 - Thymeleaf UI Design
17. Embedded Server and Databases
 - Need of Embedded Components
 - Knowing Servers Configuration
 - Working with Tomcat
 - Working Jetty Servers
 - Working with Undertow
 - H2 Database and Console
 - HSQLDB
 - Apache Derby
18. Spring Boot Jdbc
 - Curd Repository
 - Basic Operations
 - Execution with Different Dbs
 - Database Connection Properties

19. Spring Boot Data JPA
 - JPA Repository
 - JPA DB Operations (CURD)
 - findAll and findBy methods
 - @Query Annotation for HQL
 - JPA Properties Configuration
20. Spring Boot MongoDB
 - Mongo Repository
 - Document and Models Design
 - JSON Format
 - Basic Operation
 - Embedded Mongo Db
 - External Mongo Configuration
 - Mongo DB Security
21. Spring Boot AJAX
 - Synchronous v/s Asynchronous
 - AJAX introduction
 - JQuery AJAX call models
 - Integration with RestController
22. Spring Boot Connection Pooling
 - Types of Temporary Memories
 - Need of Pooling
 - Pooling v/s caching
 - Hikari CP Configuration
23. Spring Boot Pagination and Sorting
 - Pagination Introduction
 - Google Example for Pagination
 - Pagination And Sorting Repository
 - Page and Pageable objects
 - default values for Pagination
 - Sorting Directions

b) Spring Boot PART-III:

24. Message Queue(MQ)
 - Introductions to MQs
 - Need of MQs
 - Coding using Active MQ
 - Rabbit MQ Example
 - Apache Kafka

25. Spring Boot Security
 - Boot Security Design
 - Authentication and Authorizations
 - Roles and AntMatcher ULR Patterns
 - In Memory Authentication
 - Default Form Logins
 - Custom Form Creation
 - Jdbc Authentication
 - JPA/Hibernate(ORM) Authentication
 - OAuth2 Security Design
 - OAuth2 Client Application Design

26. Rest Web services and Operations
 - Need of JSON
 - JSON and It's Auto Conversion
 - Testing Using POSTMAN
 - Types of HTTP Methods
 - PUT
 - GET
 - DELETE
 - POST
 - Parameters (HeaderParam, Request Param..)
 - ResponseEntity Format
 - @RequestBody and @ResponseBody Format

27. Spring Boot with Swagger
 - What is API Endpoints
 - Swagger Introduction
 - Design of SwaggerUI

- Coding for RestController
 - Testing Swagger Operations
28. Spring Boot Profiles
- Need of Profiles
 - Environments and Profiles
 - Defining Profiles
 - Execution Of profiles
29. Spring Boot DevTools
- What are DevTools
 - Dependency for DevTools
 - Working with DevTools
30. Spring Boot Task Scheduling
- Schedulers Introduction
 - Task Management
 - fixedDelay and fixedRate
 - cron expression
31. Spring Boot Actuator
- Production REST Endpoints
 - Sensitive and Insensitive end points
 - Dependency for Actuator
 - Executing endpoints
 - finding logs
 - Beans in container
 - Health check
 - Current Environment
32. Spring Boot batch API
- Batch API Introduction
 - Item Reader, Writer and Processor Design
 - StepConfiguration
 - JobConfiguration
 - JobExecutionListener
 - CSV to MySQL Batch Programming

Microservice:

1. Monolithic Applications
 - Introduction of Layers Application
 - Modules Integration
 - Implementation of Monolithic Applications
2. Drawbacks of Monolithic applications
 - Problems in Design
 - Load Balancing
 - Parallel Coding and Testing
3. SOA Introduction
 - What is SOA
 - SOA as Design Pattern
 - Components of SOA
 - Consumer and Producers
 - Registry and Discovery Component
4. Microservices Introduction
 - Importance of microservices
 - Services in Application
 - Monolithic to Microservices
 - Architecture and Implementation styles
5. Design of Microservices
 - Eureka Server as Registry and Discovery
 - Registry server
 - Consumer Discovery
6. Intra Communication of Microservices
 - Provider and Consumer Integration
 - Sending/Receiving Data
 - HTTP Methods Examples
7. Data passing types (JSON,XML)
 - HTTP Parameters
 - HTTP Body for Data passing
 - Object to JSON Format

- Object to XML Format
8. Need of Load balancing
 - What is Load balancing
 - Types of Load Balancing
 - Ribbon for Client Load balancing
 - Zuul for Server Load Balancing
 9. API creation for Microservices
 - Defining Consumer for RestController
 - Paths and Parameters
 - Using API for Integration

Spring Cloud:

1. Spring cloud Architecture
 - Components
 - Service Registry
 - API Gateway
 - Config Server
 - Config Client
 - Load Balancer
 - PCF
 - Circuit Breaker
 - Cloud Integrations
2. Discovery and Registry server
 - Netflix Eureka Server Example
 - Application Properties
 - Dependencies Introduction
 - Spring Boot version and Cloud version
3. Provider and Consumer Microservices
 - RestTemplate Introduction
 - Eureka server Registry
 - Provider Creation and Register with Eureka
 - Consumer Application and Register with Eureka

- Application Configuration for RestTemplate
 - Consumer and Provider Integration
4. Config server and Config Client
 - Need of Config Servers
 - Local File System
 - Git Config Servers
 - Eureka with Config server
 - Provider and Consumers with Config Client
 5. API for Gateway Proxy
 - What is API Gateway
 - Netflix Zuul Gateway example
 - Zuul project Properties
 - Integration with Eureka and PC App
 6. Loading Balancing
 - Need Of load Balancing
 - Netflix Ribbon Example
 - Provider Load Balancing
 - Ribbon with Eureka - PC APP
 7. Fallback methods and Circuit Breaker
 - Exception Handling in Cloud
 - Fallback methods
 - Hystrix Circuit Breakers
 - Hystrix Dashboard
 8. Securing API
 - Security Design
 - Securing End Points
 - OAuth 2.0 Introduction
 - OAuth2.0 Implementation
 9. Zipkin and Sleuth
 - Logging and Tracing in Microservices
 - Log4J for Microservices
 - Need of Sleuth
 - Zipkin UI Tracer

10. Pivotal Cloud Foundry (PCF)
 - What is PCF
 - Register and Validate Account
 - Installing PCF in system
 - Push Microservice to PCF
 - Service Dashboard
 - PCF Basic Commands

11. Admin UI
 - Admin UI usage
 - Configure Dependency
 - Actuator with Admin UI

Case study [Employee Module]

- ✓ Spring Boot Design and Coding
- ✓ Converting to Microservices
- ✓ Deploy in PFC
- ✓ Integrate with Spring Apps

Spring Boot with Tools

- Eclipse, STS
- Maven
- Gradle
- Github
- start.spring.io
- JUnit With Mocking
- Logging
- Reference Documents
- Docker
- FAQs