

# **SPRING BOOT & MICRO SERVICES COURSE CONTENT**

## **SPRING BOOT**

- 1) What is Spring Framework
- 2) What is Spring Boot
- 3) Differences between Spring & Spring Boot
- 4) Spring Boot Overview
- 5) Pros & Cons of Spring Boot
- 6) Approaches to create Spring Boot Application
  - a) Spring Initializer (start.spring.io)
  - b) Spring Starter Wizard in STS IDE
- 7) Introduction to Spring Boot Starters
  - a) Spring Boot Parent Starter
  - b) Spring-boot-starter
  - c) Spring-boot-starter-web
  - d) Spring-boot-starter-webflux
  - e) Spring-boot-starter-data-jpa
  - f) Spring-boot-devtools
  - g) Spring-boot-starter-mail
  - h) Spring-boot-actuator
  - i) Spring-boot-starter-test etc.
- 8) What is Start Class in Spring Boot
- 9) @SpringBootApplication annotation internals
- 10) SpringApplication.run(..) method internals
- 11) Spring Boot Application Boot strapping
- 12) AutoConfiguration in Spring Boot
- 13) IOC container
- 14) Dependency Injection
  - a) Setter Injection
  - b) Constructor Injection
  - c) Field Injection
- 15) Stereotype Annotations
  - a) @Component
  - b) @Service
  - c) @Repository
  - d) @Controller
- 16) Base Package Naming convention
- 17) Component Scanning
- 18) Auto wiring
  - a) byType
  - b) byname
  - c) constructor
  - d) none
- 19) @Qualifier annotation
- 20) @Primary annotation
- 21) Introduction to @Configuration annotation
- 22) Details of @Bean annotation
- 23) Bean Life Cycle
- 24) Bean Scopes
- 25) Banner in Spring Boot
- 26) Standalone application development in Spring Boot
- 27) Standalone application with layered architecture
- 28) Runner in Spring Boot
  - a) Application Runner
  - b) CommandLine Runner

## **SPRING DATA JPA**

- 1) What is Persistence Layer
- 2) Best practises to follow in persistence layer
- 3) ORM Basics
- 4) Spring Data JPA Introduction

- 5) Differences between Spring ORM and Spring Data
- 6) CrudRepository introduction
- 7) CrudRepository methods for DB operations
  - a) save( ) method
  - b) saveAll( ) method
  - c) findById( ) method
  - d) findAllById( ) method
  - e) findAll( ) method
  - f) deleteById( ) method
  - g) deleteAllById( ) method
  - h) delete( ) method
  - i) count( )
  - j) existsById( )
- 8) Custom findByXXX method syntax
- 9) Custom Queries Execution in Data JPA
- 10) JpaRepository introduction
- 11) JpaRepository methods for DB operations
- 12) Pagination Using Data JPA methods
- 13) Sorting Using Data JPA Methods
- 14) Query By Example Executor
- 15) Generators
- 16) Custom Generators in Spring Data
- 17) Embedded Database Introduction
- 18) Application Development using Embedded Database (H2)
- 19) Application Development Using MYSQL Database
- 20) Profiles in Spring Boot

## **SPRING WEB MVC**

- 21) Spring Web MVC Introduction
- 22) Spring Web MVC Advantages
- 23) Spring MVC Architecture
- 24) Introduction to Front Controller
- 25) Controllers
- 26) Handler Mappers
- 27) View Resolvers
- 28) Web Application development using Spring Boot
- 29) Embedded HTTP Servers Introduction
  - a) Embedded Tomcat Server
  - b) Embedded Jetty Server
- 30) Making Jetty as Default server
- 31) Web Application Deployment in External Server
- 32) Sending Data From UI to Controller
  - a) Query Param
  - b) Path Param
- 33) Sending Data From Controller to UI
  - a) Model
  - b) ModelAndView
- 34) @RequestBody annotation
- 35) @ResponseBody annotation
- 36) Form Based application development using Spring Boot
- 37) Thymeleaf Introduction
- 38) Web Application with Thymeleaf
- 39) Sending Email using Spring Boot
- 40) Exception Handling in Spring Boot Web Application
- 41) Spring Boot Actuators
  - a) Health
  - b) Info
  - c) Heapdump
  - d) Threaddump
  - e) Beans

- f) Httptrace
- g) Mappings
- h) Shutdown etc

## **SPRING REST**

- 42) Distributed Applications
- 43) Distributed Technologies
- 44) SOAP vs REST
- 45) RESTful Services Introduction
- 46) REST principles
- 47) One Time operations
- 48) Run Time Operations
  - a) Marshalling
  - b) Un Marshalling
- 49) JAX-B Introduction
- 50) JAX-B Architecture
- 51) Applications development with JAX-B
- 52) JSON Introduction
- 53) XML vs JSON
- 54) JACKSON API
- 55) Converting Java object to JSON and vice versa using Jackson API
- 56) GSON API
- 57) Converting Java Object to JSON and Vice Versa using GSON API
- 58) HTTP Protocol Details
- 59) HTTP Methods
  - a) GET
  - b) POST
  - c) PUT
  - d) DELETE
- 60) HTTP Status Codes
- 61) @RestController
- 62) @RequestBody
- 63) @ResponseBody
- 64) @RequestParam
- 65) @PathVariable

- 66) MediaTypees
- 67) Consumes
- 68) Produces
- 69) Accept Header
- 70) Content-Type header
- 71) REST API Development using Spring Boot
- 72) POSTMAN
- 73) SWAGGER & SWAGGER UI
- 74) Exception Handling in REST API
- 75) REST Security
  - a) HTTP Basic Auth
  - b) JWT
  - c) OAuth2.0
- 76) Mono Objects
- 77) Flux Objects
- 78) REST Client Introduction
- 79) RestTemplate
- 80) WebClient
- 81) RestTemplate vs WebClient
- 82) Reactive Programming
- 83) Synchronous vs Asynchronous Calls
- 84) Apache Kafka with Spring Boot
- 85) Redis Cache Integration with Spring Boot

## **MICRO SERVICES**

- 86) Monolith Architecture Introduction
- 87) Monolith Architecture case study
- 88) Monolith Application Deployment Process
- 89) Load balancer (Cluster) case study
- 90) Load Balancing Algorithms
  - a) Round Robin
  - b) IP Hashing
  - c) Sticky Session

- 91) Monolith Architecture Drawbacks
- 92) Micro services Introduction
- 93) Micro Services Advantages
- 94) Micro Services Dis-Advantages
- 95) Micro Services case study
- 96) Identifying Micro services boundaries
- 97) Micro services Architecture
- 98) Micro services Development
  - a) API – 1
  - b) API – 2
- 99) Interservice communication case Study (FeignClient )
- 100) Cloud Introduction
- 101) AWS Account Creation
- 102) AWS Services Overview
- 103) Deploying Micro services to AWS
- 104) Service Registry case study (Netflix Eureka)
- 105) API Gateway
- 106) Hystrix (Circuit Breaker)
- 107) Spring Boot Admin Server
- 108) Spring Boot Admin Client
- 109) Distributed Logging
  - a) Sleuth Logging
  - b) Zipkin Server
- 110) Ribbon case study (Micro services load balancer)
- 111) Implementing Ribbon in Micro services
- 112) ConfigServer Introduction & Implementation
- 113) Micro services Integration with Angular

## **TOOLS**

- 114) Maven
  - 115) Log4J
  - 116) Junit 5
  - 117) Jenkins Deployment
  - 118) Docker
  - 119) POSTMAN
  - 120) Swagger
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