# SPRING BOOT

SPRING BOOT & MICRO SERVICES COURSE CONTENT

1. byname
2. constructor
3. **What is Spring Framework**
4. **What is Spring Boot**
5. **Differences between Spring & Spring Boot**
6. **Spring Boot Overview**
7. **Pros & Cons of Spring Boot**
8. **Approaches to create Spring Boot Application**
   1. Spring Initializer (start.spring.io)
   2. Spring Starter Wizard in STS IDE
9. **Introduction to Spring Boot Starters**
   1. Spring Boot Parent Starter
   2. Spring-boot-starter
   3. Spring-boot-starter-web
   4. Spring-boot-starter-webflux
   5. Spring-boot-starter-data-jpa
   6. Spring-boot-devtools
   7. Spring-boot-starter-mail
   8. Spring-boot-actuator
   9. Spring-boot-starter-test etc.
10. **What is Start Class in Spring Boot**
11. **@SpringBootApplication annotation internals**
12. **SpringApplication.run(..) method internals**
13. **Spring Boot Application Boot strapping**
14. **AutoConfiguration in Spring Boot**
15. **IOC container**
16. **Dependency Injection**
    1. Setter Injection
    2. Constructor Injection
    3. Field Injection
17. **Stereotype Annotations**
    1. @Component
    2. @Service
    3. @Repository
    4. @Controller
18. **Base Package Naming convention**
19. **Component Scanning**
20. **Auto wiring**
    1. byType

d) none

1. **@Qualifier annotation**
2. **@Primary annotation**
3. **Introduction to @Configuration annotation**
4. **Details of @Bean annotation**
5. **Bean Life Cycle**
6. **Bean Scopes**
7. **Banner in Spring Boot**
8. **Standalone application development in Spring Boot**
9. **Standalone application with layered architecture**
10. **Runner in Spring Boot**
    1. Application Runner
    2. 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. **CurdRepository introduction**
7. **CurdRepository methods for DB operations**
   1. save( ) method
   2. saveAll( ) method
   3. findById( ) method
   4. findAllById( ) method
   5. findAll( ) method
   6. deleteById( ) method
   7. deleteAllById( ) method
   8. delete( ) method
   9. count( )
   10. 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. **Application Development Using MongoDB**
21. **Profiles in Spring Boot**

# SPRING WEB MVC

1. **Spring Web MVC Introduction**
2. **Spring Web MVC Advantages**
3. **Spring MVC Architecture**
4. **Introduction to Front Controller**
5. **Controllers**
6. **Handler Mappers**
7. **View Resolvers**
8. **Web Application development using Spring Boot**
9. **Embedded HTTP Servers Introduction**
   1. Embedded Tomcat Server
   2. Embedded Jetty Server
   3. Embedded Undertow Server
10. **Making Jetty as Default server**
11. **Web Application Deployment in External Server**
12. **Sending Data From UI to Controller**
    1. Query Param
    2. Path Param
13. **Sending Data From Controller to UI**
    1. Model
    2. ModelAndView
14. **@RequestBody annotation**
15. **@ResponseBody annotation**
16. **Form Based application development using Spring Boot**
17. **Thymeleaf Introduction**
18. **Web Application with Thymeleaf**
19. **Sending Email using Spring Boot**
20. **Exception Handling in Spring Boot Web Application**
21. **Spring Boot Actuators**
    1. Health
    2. Info
    3. Heapdump
    4. Theaddump
    5. Beans
    6. Httptrace
    7. Mappings
    8. Shutdown etc
22. **Unit Testing for Spring Boot Application using Junit with Mocking**

# SPRING REST

1. **Distributed Applications**
2. **Distributed Technologies**
3. **SOAP vs REST**
4. **RESTful Services Introduction**
5. **REST principles**
6. **One Time operations**
7. **Run Time Operations**
   1. Marshalling
   2. Un Marshalling
8. **JAX-B Introduction**
9. **JAX-B Architecture**
10. **Applications development with JAX-B**
11. **JSON Introduction**
12. **XML vs JSON**
13. **JACKSON API**
14. **Converting Java object to JSON and vice versa using Jackson API**
15. **GSON API**
16. **Converting Java Object to JSON and Vice Versa using GSON API**
17. **HTTP Protocol Details**
18. **HTTP Methods**
    1. GET
    2. POST
    3. PUT
    4. DELETE
19. **HTTP Status Codes**
20. **@RestController**
21. **@RequestBody**
22. **@ResponseBody**
23. **@RequestParam**
24. **@PathVariable**
25. **MediaTypes**
26. **Consumes**
27. **Produces**
28. **Accept Header**
29. **Content-Type header**
30. **REST API Development using Spring Boot**
31. **POSTMAN**
32. **SWAGGER & SWAGGER UI**
33. **Exception Handling in REST API**
34. **REST Security**
    1. HTTP Basic Auth
    2. JWT
    3. OAuth2.0
35. **Mono Objects**
36. **Flux Objects**
37. **REST Client Introduction**
38. **RestTemplate**
39. **WebClient**
40. **RestTemplate vs WebClient**
41. **Reactive Programming**
42. **Synchronous vs Asynchronous Calls**
43. **Apache Kafka with Spring Boot**
44. **Redis Cache Integration with Spring Boot**

# MICRO SERVICES

1. **Monolith Architecture Introduction**
2. **Monolith Architecture case study**
3. **Monolith Application Deployment Process**
4. **Load balancer (Cluster) case study**
5. **Load Balancing Algorithms**
   1. Round Robin
   2. IP Hashing
   3. Sticky Session
6. **Monolith Architecture Drawbacks**
7. **Micro services Introduction**
8. **Micro Services Advantages**
9. **Micro Services Dis-Advantages**
10. **Micro Services case study**
11. **Identifying Micro services boundaries**
12. **Micro services Architecture**
13. **Micro services Development**
    1. API – 1
    2. API – 2
14. **Interservice communication case study**
15. **FeignClient**
16. **Cloud Introduction**
    1. AWS
    2. AZURE
    3. PCF
17. **AWS Account Creation**
18. **AWS Services Overview**
19. **Deploying Micro services to AWS**
20. **Auto Scaling**
21. **Service Registry case study (Netflix Eureka)**
22. **API Gateway**
23. **Hystrix (Circuit Breaker)**
24. **Hystrix Dashboard**
25. **Spring Boot Admin Server**
26. **Spring Boot Admin Client**
27. **Distributed Logging**
    1. Sleuth Logging
    2. Zipkin Server
28. **Ribbon case study (Micro services load balancer)**
29. **Implementing Ribbon in Micro services**
30. **ConfigServer Introduction & Implementation**
31. **Micro services Integration with Angular**

# TOOLS

1. **Maven**
2. **Log4J**
3. **Junit & Mocking**
4. **Jenkins**
5. **Docker**
6. **SonarQube**
7. **POST MAN**