

## 1. Introduction to Spring Boot

- Built on top of Spring Framework
- Simplifies dependency management & project setup
- Auto-configuration, embedded servers (Tomcat/Jetty)
- No XML configuration required

Features:

- Starter Dependencies
- Auto Configuration
- Embedded Server
- Spring Boot CLI
- Spring Initializr

## 2. Spring Boot Setup

Using Spring Initializr:

- Website: <https://start.spring.io>
- Project: Maven
- Language: Java
- Dependencies: Spring Web, Spring Boot DevTools

Generate → Unzip → Import in IDE (STS, IntelliJ, Eclipse)

## 3. Project Structure & Annotations

Typical Structure:

com.example.demo

■■■ DemoApplication.java

■■■ controller

■■■ service

■■■ repository

■■■ model

■■■ application.properties

Common Annotations:

- @SpringBootApplication
- @RestController
- @RequestMapping / @GetMapping / @PostMapping
- @Autowired
- @Service / @Repository
- @Entity
- @Value

## 4. REST API + CRUD Example

Example: Customer API

Customer.java (Entity)

CustomerRepository.java (extends JpaRepository)

CustomerService.java (business logic)

CustomerController.java (REST endpoints)

## 5. Database & JPA Integration

Dependencies:

- spring-boot-starter-data-jpa
- H2 or MySQL driver

application.properties:

- datasource config
- spring.jpa.hibernate.ddl-auto=update
- spring.h2.console.enabled=true

## 6. Validation

Add: spring-boot-starter-validation

Use @NotBlank, @Email, etc.

Use @Valid in controller methods.

## 7. Exception Handling

Use @ControllerAdvice with @ExceptionHandler

Example:

```
@ExceptionHandler(ResourceNotFoundException.class)
public ResponseEntity handle(ResourceNotFoundException ex)
```

## 8. Testing

Add: spring-boot-starter-test

Use:

@SpringBootTest

@Test

assertNotNull, assertEquals, etc.

## 9. Spring Boot Actuator

Add: spring-boot-starter-actuator

Enable endpoints:

management.endpoints.web.exposure.include=\*

Access health: <http://localhost:8080/actuator/health>

## 10. Spring Security (Optional)

Add: spring-boot-starter-security

Default login form added

Can customize with SecurityConfig

