

Spring Boot Interview Questions by Module

1. Spring Core (IoC & Dependency Injection)

- What is the Spring Framework and what problem does it solve?
- Explain Inversion of Control (IoC) and how Spring implements it.
- What is Dependency Injection? What are its types?
- What is a Spring Bean?
- What are different bean scopes in Spring?
- What is the difference between BeanFactory and ApplicationContext?
- What is the purpose of @Component, @Service, @Repository, and @Controller annotations?
- What is the difference between @Bean and @Component?
- What is the difference between @Autowired and @Qualifier?
- How do you define and manage bean lifecycle methods?

2. Spring Boot (Auto-Configuration & Starters)

- What is Spring Boot and how is it different from Spring Framework?
- What are Spring Boot Starters?
- How does Spring Boot's auto-configuration work internally?
- What is the role of the @SpringBootApplication annotation?
- What are the main advantages of using Spring Boot?
- How does Spring Boot automatically configure beans?
- What is the difference between application.properties and application.yml?
- How can you disable a specific auto-configuration class?
- What is a Spring Boot Profile and how do you use it?
- What is the use of SpringApplication.run() method?

3. Spring MVC & RESTful API

- What is Spring MVC?
- Explain how the DispatcherServlet works.
- What is the difference between @Controller and @RestController?
- What are @RequestMapping, @GetMapping, @PostMapping used for?
- What is @RequestBody and @ResponseBody used for?
- How do you handle exceptions in Spring Boot REST API?
- What is ResponseEntity and when do you use it?
- How do you perform validation in Spring Boot?
- How to enable CORS in Spring Boot?
- What is Content Negotiation in Spring MVC?

4. Spring Data JPA & Database

- What is Spring Data JPA?
- What is the difference between JPA and Hibernate?
- What is the purpose of JpaRepository and CrudRepository?
- What is the use of @Entity, @Id, @GeneratedValue?
- What is the difference between @OneToMany and @ManyToOne?
- How can you define custom queries in Spring Data JPA?
- What are Derived Query Methods?
- What is Lazy Loading and Eager Loading?

- What is the role of `@Transactional` annotation?
- How can you implement pagination and sorting in Spring Data JPA?

5. Spring Security

- What is Spring Security and how does it work?
- What is the difference between authentication and authorization?
- How do you configure security in Spring Boot?
- How can you create a custom `UserService`?
- What is a `SecurityFilterChain`?
- How do you implement JWT authentication in Spring Boot?
- What is CSRF protection and how does Spring handle it?
- How do you secure Actuator endpoints?
- What is the purpose of `@EnableWebSecurity` annotation?
- How can you exclude specific endpoints from authentication?

6. Spring Boot Actuator & Monitoring

- What is Spring Boot Actuator?
- What are common Actuator endpoints?
- How do you enable or disable specific Actuator endpoints?
- How do you secure Actuator endpoints?
- How can Actuator integrate with Prometheus or Grafana?
- What is the use of Micrometer in Spring Boot?
- How do you customize `/info` and `/health` endpoints?

7. Spring AOP (Aspect-Oriented Programming)

- What is AOP and why is it used?
- What are cross-cutting concerns?
- What are the main concepts of AOP (Aspect, JoinPoint, Advice, Pointcut)?
- What is `@Aspect` annotation used for?
- What are the types of advice in Spring AOP?
- What's the difference between AspectJ and Spring AOP?

8. Spring Boot Testing

- How do you test a Spring Boot application?
- What is the use of `@SpringBootTest` annotation?
- How do you test a REST controller?
- What is `MockMvc`?
- How do you mock dependencies in unit testing?
- What's the difference between `@MockBean` and `@Mock`?
- How do you test JPA repositories?

9. Spring Cloud & Microservices

- What is Spring Cloud?
- What is service discovery and how does Eureka work?
- What is the role of API Gateway (e.g., Spring Cloud Gateway)?
- What is Circuit Breaker and how does it work (e.g., Resilience4j)?
- How do microservices communicate in Spring Cloud?

- What is Spring Cloud Config Server?
- How do you handle distributed tracing (Zipkin, Sleuth)?
- How to secure microservices communication?

10. Scheduler, Caching, and Miscellaneous

- How do you create scheduled tasks in Spring Boot?
- What is `@EnableScheduling` used for?
- How do you implement caching in Spring Boot?
- What is `@Cacheable`, `@CachePut`, `@CacheEvict`?
- How do you externalize configuration in Spring Boot?
- What's the difference between synchronous and asynchronous methods in Spring?