



spring

# Spring Boot Roadmap

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# What Is Spring & Spring Boot?

**Spring Framework** is an open-source Java framework that simplifies enterprise application development through Dependency Injection and Inversion of Control.

**Spring Boot** is build on top of Spring and it simplifies the development of Spring applications by providing auto-configuration and a set of pre-built libraries.



# Why Spring?

- Dependency Injection: Simplifies code, boosts testability
- Modularity: Vast ecosystem of pick-and-choose libraries
- Integration: Seamless compatibility with Java ecosystem
- Scalability: From simple APIs to enterprise applications, with ease
- Productivity: Rapid development



# Pre-Requisites

- OOP Concepts
- Java Fundamentals
- Build Tool (Maven/Gradle)

## Ready To Master Spring?

This roadmap will guide you from novice to expert



# Core Concepts

- Dependency Injection
- Inversion of Control (IoC)
- IoC Container
- Application Context
- Beans and bean scopes

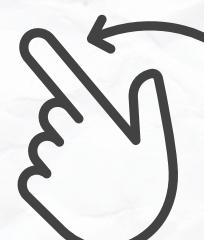
# Configuration

- XML based configuration
- Annotation based configuration
- @ComponentScan
- @Autowire and @Component



# Spring Boot

- Spring Initializr
- Auto-Configuration
- Spring boot starters
- Embedded Servers
- Actuator
- Property configuration
- Profiles (environment specific config)



# Spring MVC

- MVC architecture
- Dispatcher servlet
- Path variables & request parameters
- @Controller
- @RequestMapping annotations
- Data binding and validation
- View technologies (JSP, Thymeleaf)
- Filters and interceptors



# RESTful Services

- REST principles
- REST API design
- HTTP methods (GET, POST, PUT, DELETE)
- @RestController
- Request and response marshalling
- Content type negotiation
- HATEOAS
- Swagger/OpenAPI documentation
- @ExceptionHandler @ControllerAdvice



# Database Access

- JDBC
- Java Persistence API (JPA)
- Hibernate and other ORMs
- Entity mappings with annotations
- Repositories and CRUD operations
- Custom queries (SQL, HQL, JPQL)
- Transactional management
- Connection Pooling (HikariCP)
- Caching



# Spring Security

- Authentication
- Authorization
- Security context
- Security filter chain
- Hashing and password encoding
- Method-level security
- JSON Web Token (JWT)
- OAuth2
- OpenID connect
- CSRF and CORS



# Spring AOP

- Cross-Cutting Concerns
- Aspect
- Advice and advice types
- Pointcut expressions
- AOP Proxies

# Testing

- Junit5
- Mocking with Mockito and Powermock
- Spring test framework



# Microservices (Spring Cloud)

- Microservices architecture
- Spring cloud
- Service discovery
- API gateway and load balancing
- Resiliency Patterns
- Distributed configuration and tracing
- Distributed transactions
- Service mesh
- Event driven architecture



# Other Topics

- Reactive programming (Webflux)
- Spring Batch
- Spring messaging (Kafka, RabbitMQ)
- Spring Integration



# How Can You Improve?

- Understand the fundamentals
- Refer books and online resources
- Build projects with Spring
- Practice, practice, practice



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