1. What is Spring Boot?

Answer: Spring Boot is a Java-based framework for creating digital services that are testable,

easily maintainable and manageable by a small team, fill business needs and can be independently deployed without a larger application.

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2. What is Spring?

Answer: Spring is a powerful, lightweight application development framework for

enterprise Java development.

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3. What is Spring vs Spring Boot?

Answer: Spring is a framework for web applications. The framework has tools and libraries

that you can use to create custom applications. Spring Boot is a module of Spring that you

can use to create a Spring application or project that can only run.

==> Spring:

\* Definition:

Spring is a powerful, lightweight application development framework for enterprise Java development.

\* Modules:

It is modular and consists of various modules like Spring Core, Spring MVC, Spring Security, etc.

\* Configuration:

Requires manual configuration and setup for different components.

\* Boilerplate Code:

Developers may need to write more boilerplate code for common tasks.

\* Project Type:

Suitable for large-scale enterprise applications with complex configurations.

==> Spring Boot:

\* Definition:

Spring Boot is a project within the Spring ecosystem that simplifies the development of Spring applications.

\* Objective:

Focuses on convention over configuration and providing defaults to get applications up and running quickly.

\* Configuration:

Emphasizes autoconfiguration, reducing the need for manual setup.

\* Boilerplate Code:

Significantly reduces boilerplate code through defaults and starter dependencies.

\* Project Type:

Ideal for microservices, web applications, and projects with rapid development needs.

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4. Discuss the advantages of using Spring Boot.

Answer: There are several advantages to using Spring Boot, including ease of use. It also helps reduce the time and resources required for creating microservices, which increases your overall profitability. In my experience with Spring Boot, I used it to convert ChemCal Corp to microservices architecture. I handled all aspects of development, and using Spring Boot's autoconfigured starters allowed me to do this quickly and resource efficiently.

1. Rapid prototyping: With Spring Boot's automatic configuration, you can focus more on

writing your business logic and less on configuration, making it faster to get a working prototype up and running.

2. Stand-alone applications: Spring Boot applications are stand-alone, meaning they can be

started and run on their own without needing to be deployed on an external server, simplifying the deployment process.

3. Embedded server: Spring Boot comes with embedded servers (like Tomcat or Jetty), so you don't have to worry about setting up a server yourself.

4. Simplified dependency management: Spring Boot manages dependencies for you,

reducing the chances of version conflicts.

5. Actuator module: This provides production-ready features like health checks and metrics

gathering right out of the box.

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5. What is autoconfiguration?

Answer: Autoconfiguration in Spring Boot automatically sets up your application by analyzing dependencies, saving you from writing extensive configuration code. It provides sensible defaults based on the project's classpath, making it quick and easy to start a new project.

or

Answer: Autoconfiguration is an important feature of Spring Boot that was created out of a need to reduce the complexity of configuration in the Spring framework. Autoconfiguration does this by offering different starters, and depending on which starter you use, it configures the application differently. This saves developers time and makes Spring Boot easier to use than Spring.

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6. How do you disable autoconfiguration in Spring Boot?

Answer: The exclude feature of the @EnableAutoConfiguration annotation allows you to

disable autoconfiguration. Do this by using it within an applicable string of code.

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7. What is the process of registering a custom autoconfiguration with Spring Boot?

Answer: Custom autoconfiguration is a class in Spring Boot that can be registered. To do this,

the full name of the autoconfiguration should be entered into the META-NF/spring.factories file in the EnableAutoConfiguration key. However, if it is in Maven, it should be registered in the Maven directory file.

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1. What is a Spring Boot Starter?

Answer: A Spring Boot Starter is a pre-defined set of dependencies that simplifies the inclusion of commonly used libraries and configurations in a Spring Boot application. These starters provide a convenient way to add functionality like web development, data access, messaging, etc., without manually managing dependencies.

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9. Can you list the available Spring Boot starters?

Answer: Some common starters are spring-boot-starter, spring-boot-starter-aop and

spring-boot-starter-data-jpa. Spring-boot-starter is a core starter that has autoconfiguration

support and more. Spring-boot-starter-aop is used for aspect-oriented programming, and

spring-boot-starter-data-jpa is compatible with Hibernate. These are a few top starters,

although there are more depending on your use case.

spring-boot-starter

spring-boot-starter-web

spring-boot-starter-data-jpa

spring-boot-starter-security

spring-boot-starter-test

spring-boot-starter-logging

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10. Explain your experience with Spring Boot.

Answer: I have four years of experience using Spring Boot to resolve bandwidth issues as

my company scaled to more users on its proprietary software platform.

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11. What are the most important skills for a Spring Boot programmer to have?

Answer: I pride myself on a deep knowledge of architecture and am CompTIA Security+ certified. My ability to create microservices architecture securely is an asset to the companies where I may work."

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12. What is IOC container ?

Answer: Inversion of Control (IoC) is a principle where the control of object creation and lifecycle is shifted from the application code to a container. The core of Spring provides the IoC container that manages the objects and their dependencies.

It is the core of the spring framework, It manages & controls the lifycycle of java objects.

This is a principle where the control flow of a program is inverted: instead of the client controlling the flow of control (what to do and when to do), this responsibility is given to an external entity.

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13. What is dependency injection ?

Answer: Dependency Injection (DI) is a design pattern in software development that focuses on providing objects (dependencies) to a class rather than having the class create or manage its own dependencies. The primary goal of dependency injection is to achieve loose coupling between classes, making the system more modular, maintainable, and testable.

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14. What are some of the problems the Spring Framework solves?

Answer: Here are some of the problems that the Spring Framework helps to solve:

1. Boilerplate Code:

Spring reduces boilerplate code through features like dependency injection, declarative

configuration, and aspects, leading to more concise and maintainable code.

2. Tight Coupling:

Spring promotes loose coupling through features like dependency injection, allowing

components to be wired together without explicit dependencies. This enhances flexibility,

testability, and maintainability.

3. Aspect-Oriented Programming (AOP):

Spring's AOP support enables the modularization of cross-cutting concerns. Aspects can be defined separately from the core business logic, reducing code duplication and improving maintainability.

4. Inversion of Control (IoC):

Spring's IoC container manages the lifecycle of objects and their dependencies. It promotes a more flexible and modular design by allowing components to be wired together through configuration rather than being instantiated within code.

5. Exception Handling:

Spring provides a comprehensive exception-handling mechanism, allowing developers to handle exceptions using declarative annotations or configure global exception handling strategies.

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15. What is Spring Boot Actuator and why is it used??

Answer: Spring Boot Actuator is a module that provides production-ready features to monitor and manage your Spring Boot application. It offers various endpoints and metrics that can be used for monitoring, health checks, auditing, and managing your application.

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16. What are Spring beans?

Answer: Spring Bean is nothing special, any object in the Spring framework that we

initialize through Spring container is called Spring Bean.

Spring beans are Java objects managed by the Spring framework. They are defined and configured in the Spring IoC container, allowing for centralized control over their instantiation, configuration, and lifecycle. Beans are the building blocks of a Spring application and are typically wired together to form the application's architecture.

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17. Explain the differences between @RequestMapping and @RestController annotations.

Answer: @RequestMapping is used to map URLs to methods in Spring, handling various

HTTP methods. @RestController is a specialized version mainly for building RESTful APIs,

combining @Controller and @ResponseBody to simplify response handling. If you're building

an API, @RestController is often more convenient.

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18. What is the difference between @RequestMapping and @GetMapping?

Answer: @GetMapping is a specialized and more concise annotation specifically designed

for handling HTTP GET requests, whereas @RequestMapping is a more general-purpose

annotation that can handle requests for various HTTP methods.

@RequestMapping: Requires specifying the HTTP method explicitly using the method

attribute if you want to restrict it to a specific HTTP method.

@GetMapping: Focuses specifically on the GET method, and there is no need to explicitly

mention the HTTP method.

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19. What is dependency management?

Answer: Dependency management in Spring Boot is like having pre-packaged sets of

tools (starters) for common tasks. It makes adding and handling external pieces

(dependencies) in your project easy, saving you from dealing with version headaches.

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20. How do you set up a Spring Boot project?

Answer: There are several ways to set up a project in Spring Boot. One way is to use the Spring Initialzr with Eclipse and Maven. First, launch the Initializr and choose the Group, Artifact and dependencies. Then, select Generate Project. Finally, you can choose to import your existing Maven project from Eclipse.

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1. What is the purpose of the @SpringBootApplication annotation in Spring Boot?

Answer: The @SpringBootApplication annotation is used to mark the main class of a Spring Boot application. It combines three annotations: @Configuration, @ComponentScan, and @EnableAutoConfiguration, enabling auto-configuration and component scanning within the package and its sub-packages.

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1. What are the key features of Spring Boot?

Answer: Some key features of Spring Boot include:

* (Auto-configuration) It automatically configures application components based on project dependencies.
* (Embedded web server support) Spring Boot includes embedded servers like Tomcat, Jetty, and Undertow, making it easy to deploy web applications.
* (Spring Boot Starter) Pre-defined templates for common use cases, simplifying dependency management.
* Production-ready metrics, health checks, and externalized configuration.
* Spring Boot CLI (Command Line Interface) for rapid application development.

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1. How does Spring Boot support externalized configuration?

Answer: Spring Boot allows you to externalize configuration properties using properties files (e.g., application.properties or application.yml). These properties can be stored outside the application code and changed without recompiling the application. Spring Boot also supports environment-specific configuration through profile-specific property files (e.g., application-dev.properties for development).

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23. How can you secure a Spring Boot application?

Answer: You can secure a Spring Boot application using various methods, such as:

Spring Security: Utilize Spring Security to configure authentication and authorization.

OAuth2: Implement OAuth2 for token-based authentication and authorization.

JWT (JSON Web Tokens): Use JWTs for stateless authentication.

HTTPS: Enable HTTPS for secure communication.

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1. What is Spring Boot DevTools, and how does it help in development?

Answer: Spring Boot DevTools is a module that provides development-time features, such as automatic application restart, live reloading of changes, and improved error reporting. It enhances the developer experience and accelerates development by reducing the need for manual application restarts and recompilations.

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1. Explain the Spring Boot project structure?

Answer: A typical Spring Boot project follows a specific directory structure:

- src/main/java: Contains the Java source code.

 - src/main/resources: Contains configuration files, templates, and other non-Java resources.

 - src/test/java: Houses test cases and test-related code.

 - src/test/resources: Stores test-specific resources.

 - pom.xml: The project's Maven build file that manages dependencies and build settings.

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1. How do you handle exceptions in a Spring Boot application?

Answer: In Spring Boot, you can handle exceptions using the @ControllerAdvice annotation and creating a global exception handler class. This class can have methods annotated with @ExceptionHandler, which handle specific exceptions and return appropriate error responses. Additionally, Spring Boot provides default error handling for common HTTP errors.

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1. Explain the Spring Boot Data JPA module?

Answer: Spring Boot Data JPA is a module that simplifies data access using the Java Persistence API (JPA). It provides features like automatic repository creation, CRUD operations, and query generation based on entity classes. Spring Boot Data JPA works seamlessly with various JPA providers (e.g., Hibernate) and allows developers to work with databases using a higher-level, object-oriented approach.

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16. What is Spring Boot caching support, and why is it useful?

Answer: Spring Boot provides caching support through annotations like @Cacheable, @CacheEvict, and @CachePut. Caching is used to improve application performance by storing frequently accessed data in memory. Spring Boot simplifies the setup and management of caching mechanisms, such as Ehcache, Caffeine, and Redis, making it easier to implement caching strategies.

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1. How can you create and schedule tasks in a Spring Boot application?

Answer: You can create and schedule tasks in Spring Boot using the @Scheduled annotation in combination with a method in a Spring-managed bean. This annotation allows you to define the execution interval or cron expressions to specify when the task should run. It's commonly used for background jobs, batch processing, and periodic tasks.

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18. What is Spring Boot support for WebSocket communication?

Answer: Spring Boot provides WebSocket support through the Spring WebSocket module. You can use annotations like @ServerEndpoint and @ClientEndpoint to create WebSocket endpoints in your application. WebSocket communication is useful for real-time, bidirectional communication between clients and servers, such as chat applications and live updates.

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1. Explain the Spring Boot Actuator endpoints commonly used for monitoring and management.

Answer: Spring Boot Actuator provides various endpoints for monitoring and managing applications. Commonly used endpoints include.

/actuator/health: Provides application health status.

/actuator/info: Offers custom application information.

/actuator/metrics: Exposes application metrics (e.g., memory usage, request counts).

/actuator/env: Displays environment properties.

/actuator/loggers: Allows dynamic log-level configuration.

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1. What is Spring Boot support for creating RESTful APIs using Spring MVC?

Answer: Spring Boot integrates Spring MVC to simplify the creation of RESTful APIs. You can use annotations like @RestController, @RequestMapping, @GetMapping, @PostMapping, etc., to define endpoints, handle requests, and return responses in a RESTful manner. Spring Boot also offers automatic serialization/deserialization of JSON and XML data.

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1. How can you implement authentication and authorization in a Spring Boot application?

Answer: Authentication and authorization can be implemented in a Spring Boot application using Spring Security. You can configure authentication providers, define access control rules, and secure endpoints using annotations like @Secured, @PreAuthorize, or @RolesAllowed. OAuth2 and JWT are also commonly used for implementing authentication in RESTful APIs.

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1. Explain the Spring Boot testing framework and its advantages?

Answer: Spring Boot provides a testing framework that simplifies unit, integration, and end-to-end testing. It includes annotations like @SpringBootTest for integration tests, @DataJpaTest for JPA repository tests, and @WebMvcTest for testing MVC components. Spring Boot's testing framework offers features like auto-configuration and test slices, making it easier to write and execute tests.

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23. What is Spring Boot support for building microservices?

Answer: Spring Boot is well-suited for building microservices due to its lightweight nature and support for various communication protocols like REST, WebSocket, and messaging. Spring Cloud, an extension of Spring Boot, provides tools and libraries for implementing microservices patterns like service discovery, load balancing, and centralized configuration management.

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1. How can you manage database transactions in a Spring Boot application?

Answer: Spring Boot simplifies database transaction management using the @Transactional annotation. You can annotate service methods with @Transactional, and Spring Boot will automatically handle transaction boundaries. Additionally, Spring Boot integrates with various data sources and JPA providers for seamless transaction management.

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1. What is Spring Boot support for internationalization and localization?

Answer: Spring Boot supports internationalization (i18n) and localization (l10n) through resource bundles and message properties files. You can define these files for different languages and regions and use the MessageSource bean to retrieve localized messages based on the user's locale.

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1. How can you monitor and manage Spring Boot applications in a production environment?

Answer: In a production environment, you can monitor and manage Spring Boot applications using tools like Spring Boot Actuator, which provides endpoints for health checks, metrics, and logging. Additionally, you can integrate monitoring solutions like Prometheus and Grafana or use commercial solutions for in-depth application monitoring and management.

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1. Explain the purpose of the Spring Boot CLI (Command Line Interface)?

Answer: The Spring Boot CLI is a command-line tool that allows developers to quickly create, run, and manage Spring Boot applications. It provides features like application generation, embedded server support, and easy dependency management. The CLI is especially useful for rapid prototyping and development.

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1. How can you secure RESTful APIs in Spring Boot using OAuth2?

Answer: To secure RESTful APIs in Spring Boot using OAuth2, you can configure OAuth2 providers and clients using the @EnableOAuth2Sso or @EnableResourceServer annotations. OAuth2 providers (e.g., GitHub, Google) can be integrated for authentication, and you can define access control rules using OAuth2 scopes and authorities.

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29. What are Spring Boot profiles, and how are they useful?

Answer: Spring Boot profiles are used to define sets of configuration properties for different environments or scenarios. Profiles allow you to customize application behavior for development, testing, production, etc., by providing different property files (e.g., application-dev.properties, application-prod.properties). Spring Boot will activate the appropriate profile based on the active environment.

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30. How does Spring Boot handle dependency injection, and what is the @Autowired annotation used for?

Answer: Spring Boot uses the concept of Inversion of Control (IoC) to handle dependency injection. The @Autowired annotation is used to inject dependencies into Spring-managed beans. It tells Spring to find a suitable bean of the required type and inject it into the annotated field, constructor, or method parameter.