

[spring questionAnswers](#)

1) What is spring framework? Why Java programmer should use Spring framework

- Very common Spring interview question, Spring is a framework which helps Java programmer in development.
- Spring provides dependency Injection and IOC container, Spring MVC flow and several useful API for Java programmer.

2) What is default scope of bean in Spring framework ?

- The default scope of a Spring bean is [Singleton](#) scope,

3) Does Spring singleton beans are thread-safe ?

- No, Spring singleton beans are not thread-safe. Singleton doesn't mean bean would be [thread-safe](#).

4) What is dependency Injection?

- Dependency Injection is one of the design pattern, which allows injecting dependency on Object, instead of object resolving the dependency.

5) What is Inversion of Control concept, how does Spring support IOC?

6) What is Spring MVC ? Can you explain How one request is processed ?

7) How to you create a controller in Spring ?

8) What is view Resolver pattern ? how it work in Spring MVC

- View Resolver pattern is a J2EE pattern which allows a web application to dynamically choose its view technology
- e.g. HTML, JSP, Tapestry, JSF, XSLT or any other view technology. In this pattern, View resolver holds mapping of different views, controller return name of the view, which is then passed to View Resolver for selecting an appropriate view.
- Spring MVC framework supplies inbuilt view resolver for selecting views.

9) What is Spring Security ?

Spring security is a project under spring framework umbrella, which provides support for security requirements of enterprise Java projects. Spring Security formerly known as aegis security provides out of box support for creating login screen, remember me cookie support, securing URL, authentication provider to authenticate the user from the database, LDAP and in memory, concurrent active session management support and much more. In order to use Spring security in a Spring MVC based project, you need to include spring-security.jar and

configure it in application-Context-security.XML file, you can name it whatever you want, but make sure to supply this to ContextLoaderListener, which is responsible for creating Spring context and initializing dispatcher servlet.

10) How do you control concurrent Session on Java web application using Spring Security?

You can use Spring Security to control a number of active session in Java web application. Spring security framework provides this feature out of the box and when enabled , a user can only have one active session at a time.

11) What types of dependency injection is supported by Spring Framework? When do you use Setter and Constructor Injection, pros and cons?

There are 2 types of dependency injection supported by Spring, constructor based injection, and setter-based injection. Both types have their own advantages and disadvantages, you should use Constructor injection when object's dependencies are not optional and they must be initialized with their dependencies. Also use constructor injection if the order of initialization or dependency matters because in Setter based injection you cannot impose any order. Use setter injection when dependencies are optional.

12) What is the difference between ApplicationContext and BeanFactory in Spring framework?

13) How do you call stored procedure by using Spring framework?

14) What does JdbcTemplate and JmsTemplate class offer in Spring?

15) Can we use more than one configuration file for our Spring project?

16) Explain Spring MVC flow with a simple example e.g. starting from Container receives a request and forward to your Java application ?

17) What is the difference in Spring MVC and Spring core?

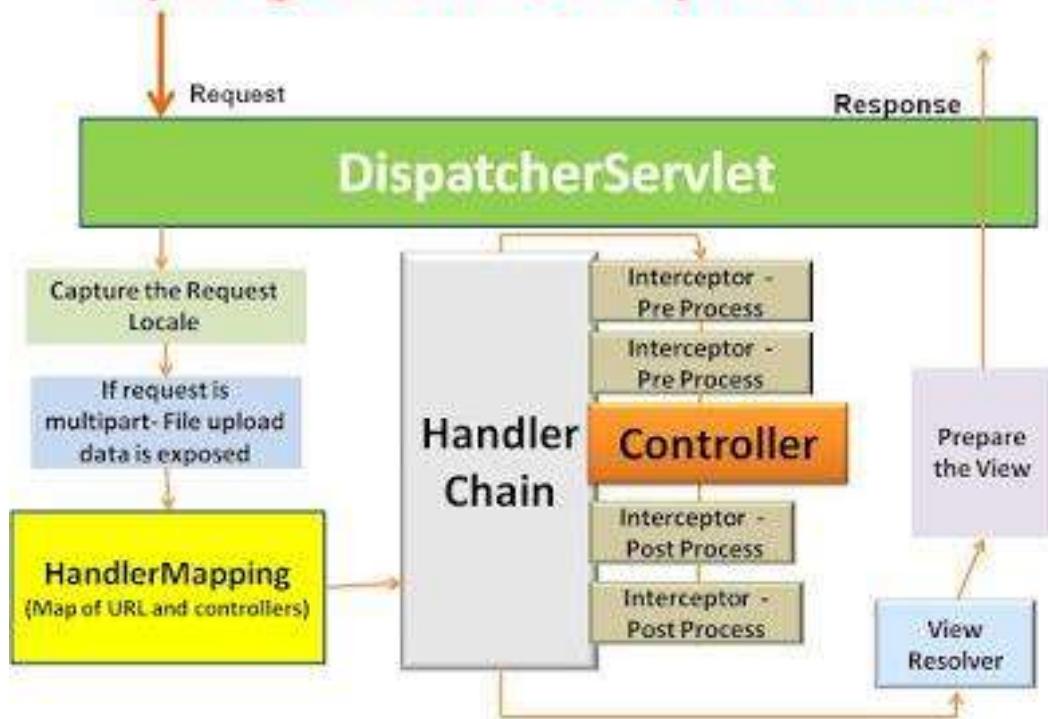
- 18) Can you use Spring MVC framework along with Struts ? I have an existing Java MVC application which is based in Struts, Can I migrate that to use Spring MVC ? How ?
- 19) What is the advantage of Spring MVC framework over Struts 1.0 or Struts 2.0 ? is it worth to convert an existing Struts application to Spring MVC ?
- 20) How do Spring resolves view returned by ModelAndView class ?

Some Spring MVC questions are tricky e.g. Struts and Spring integration and can be only answered by experienced Java program with 2 to 4-year experience in Spring MVC framework.

21) If a user checked in CheckBox and got a validation error in other fields and then he unchecked the CheckBox, what would be selection status in command object in Spring MVC ? How do you fix this issue?

Since during HTTP post, if the checkbox is unchecked than HTTP does include a request parameter for checkbox, which means updated selection won't be picked up. you can use hidden form field, starting with _ to fix this in Spring MVC. quite a tricky question to answer if you are not aware of HTTP POST behavior and Spring MVC.

Spring 3.0 MVC Request Flow



22) What are different implementations of View interface you have used in Spring MVC?

ULBased View e.g. JSP , JSTLView,

23) How to escape HTML special characters using Spring MVC?

There are some methods in Spring tag library, can't remember now.

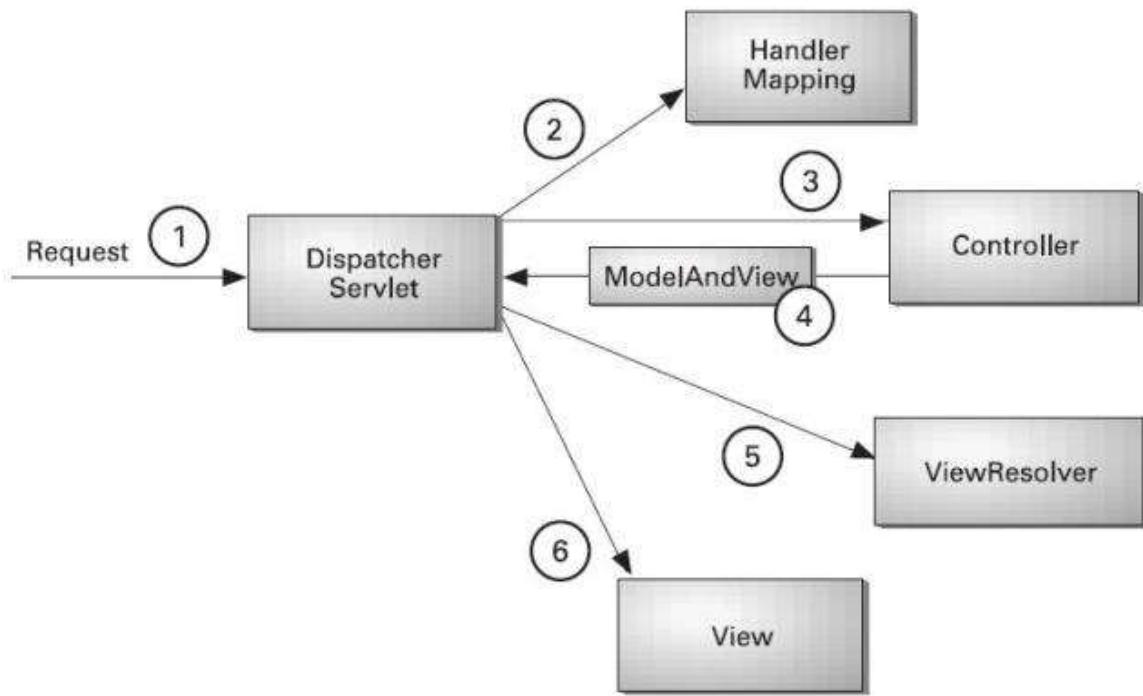
Read more: <http://www.java67.com/2012/08/spring-interview-questions-answers.html#ixzz4jage4JSZ>

What are the benefits of using Spring Framework?

Following is the list of few of the great benefits of using Spring Framework –

- With the Dependency Injection(DI) approach, dependencies are explicit and evident in constructor or JavaBean properties.
- IoC containers tend to be lightweight, especially when compared to EJB containers, for example. This is beneficial for developing and deploying applications on computers with limited memory and CPU resources.
- Spring does not reinvent the wheel instead, it truly makes use of some of the existing technologies like several ORM frameworks, logging frameworks, JEE, Quartz and JDK timers, other view technologies.
- Spring is organized in a modular fashion. Even though the number of packages and classes are substantial, you have to worry only about ones you need and ignore the rest.
- Testing an application written with Spring is simple because environment-dependent code is moved into this framework. Furthermore, by using JavaBean-style POJOs, it becomes easier to use dependency injection for injecting test data.
- Spring's web framework is a well-designed web MVC framework, which provides a great alternative to web frameworks such as Struts or other over engineered or less popular web frameworks.
- Spring provides a consistent transaction management interface that can scale down to a local transaction (using a single database, for example) and scale up to global transactions (using JTA, for example).

Understanding the flow of Spring Web MVC



Step 1: First request will be received by DispatcherServlet

Step 2: DispatcherServlet will take the help of HandlerMapping and get to know the Controller class name associated with the given request

Step 3: So request transfer to the Controller, and then controller will process the request by executing appropriate methods and returns ModelAndView object (contains *Model* data and *View* name) back to the DispatcherServlet

Step 4: Now DispatcherServlet send the model object to the ViewResolver to get the actual view page

Step 5: Finally DispatcherServlet will pass the *Model* object to the *View* page to display the result.

1. **What would happen if we have a prototype bean injected into a singleton bean ? How many objects of prototype bean object will be created ?**

When a singleton bean is created , a single instance of the prototype bean object is created. It won't create a new prototype bean.

2. **Are singleton beans in Spring a regular singleton object ?**

- 3. Are Singleton beans thread safe ?**
- 4. A bean can be marked abstract by abstract=true, does not that mean we have to make the corresponding java class abstract ?**
5. No, a bean marked abstract makes the bean not instantiatable, also it makes an ideal situation to use this reference as parent to other child bean definition. Making the corresponding java as abstract is not necessary but can be done
- 6. If an inner bean is defined with an id, can you use this id to fetch the bean from the container ?**
7. No, An bean defined inner bean can't be accessed even if the id attribute has value. so getBean("theInnerId") will fail with NoSuchBeanDefinitionException.
- 8. What is the implementation of List is used when you use the <list> tag in a bean definition ?**
- 9. How do you use a particular implementation of collection in your bean definition ?**
10. You can use the <util:set> <util:list> and <util:map> with set-class to the implementation you want to use. For example <util:list set-class="java.util.LinkedList"> to use linkedList as implementation, and don't forget to include the schema details in the beans tag. Also util tag can let you create id of the collection , thus this can be refered or shared with any other beans by using the regular way , ie the ref tag.

Name some of the design patterns used in Spring Framework?

There are loads of different design patterns used, but there are a few obvious ones:

- Proxy – used heavily in AOP, and remoting.
- Singleton – beans defined in spring config files are singletons by default.
- Template method – used extensively to deal with boilerplate repeated code e.g. [RestTemplate](#), [JmsTemplate](#), [JpaTemplate](#).
- Front Controller – Spring provides DispatcherServlet to ensure an incoming request gets dispatched to your controllers.
- View Helper – Spring has a number of custom JSP tags, and velocity macros, to assist in separating code from presentation in views.

- Dependency injection – Center to the whole BeanFactory / ApplicationContext concepts.
- Factory pattern – BeanFactory for creating instance of an object.

Spring security:

Spring security framework focuses on providing both authentication and authorization in java applications. It also takes care of most of the common security vulnerabilities such as CSRF attack.

It's very beneficial and easy to use Spring security in web applications, through the use of annotations such as `@EnableWebSecurity`.

Explain Bean lifecycle in Spring framework?

Following is sequence of a bean lifecycle in Spring –

- **Instantiate** – First the spring container finds the bean's definition from the XML file and instantiates the bean..
- **Populate properties** – Using the dependency injection, spring populates all of the properties as specified in the bean definition.
- **Set Bean Name** – If the bean implements BeanNameAware interface, spring passes the bean's id to setBeanName() method.
- **Set Bean factory** – If Bean implements BeanFactoryAware interface, spring passes the beanfactory to setBeanFactory() method.
- **Pre Initialization** – Also called postprocess of bean. If there are any bean BeanPostProcessors associated with the bean, Spring calls postProcesserBeforeInitialization() method.

- **Initialize beans** – If the bean implements InitializingBean, its afterPropertiesSet() method is called. If the bean has init method declaration, the specified initialization method is called.
- **Post Initialization** – If there are any BeanPostProcessors associated with the bean, their postProcessAfterInitialization() methods will be called.
- **Ready to use** – Now the bean is ready to use by the application.
- **Destroy** – If the bean implements DisposableBean, it will call the destroy() method.

<https://www.javacodegeeks.com/2014/05/spring-interview-questions-and-answers.html>

1. What is Spring?

Spring is an open source development framework for [Enterprise Java](#). The core features of the Spring Framework can be used in developing any Java application, but there are extensions for building web applications on top of the Java EE platform. Spring framework targets to make Java EE development easier to use and promote good programming practice by enabling a [POJO-based programming model](#).

2. What are benefits of Spring Framework?

- **Lightweight:** Spring is lightweight when it comes to size and transparency. The basic version of spring framework is around 2MB.
- **Inversion of control (IOC):** Loose coupling is achieved in Spring, with the [Inversion of Control technique](#). The objects give their dependencies instead of creating or looking for dependent objects.
- **Aspect oriented (AOP):** [Spring supports Aspect oriented programming](#) and separates application business logic from system services.
- **Container:** Spring contains and manages the life cycle and configuration of application objects.
- **MVC Framework:** Spring's web framework is a well-designed [web MVC framework](#), which provides a great alternative to web frameworks.

- **Transaction Management:** Spring provides a consistent transaction management interface that can scale down to a local transaction and scale up to global transactions (JTA).
- **Exception Handling:** Spring provides a convenient API to translate technology-specific exceptions (thrown by JDBC, Hibernate, or JDO) into consistent, unchecked exceptions.

3. Which are the Spring framework modules?

The basic modules of the Spring framework are :

- Core module
- Bean module
- Context module
- Expression Language module
- [JDBC module](#)
- [ORM module](#)
- OXM module
- Java Messaging Service(JMS) module
- Transaction module
- Web module
- Web-Servlet module
- Web-Struts module
- Web-Portlet module

4. Explain the Core Container (Application context) module

This is the basic Spring module, which provides the fundamental functionality of the Spring framework. BeanFactory is the heart of any spring-based application. Spring framework was built on the top of this module, which makes the Spring container.

5. BeanFactory – BeanFactory implementation example

A BeanFactory is an implementation of the factory pattern that applies Inversion of Control to separate the application's configuration and dependencies from the actual application code.

The most commonly used BeanFactory implementation is the XmlBeanFactory class.

6. XMLBeanFactory

The most useful one is org.springframework.beans.factory.xml.XmlBeanFactory, which loads its beans based on the definitions contained in an XML file. This

container reads the configuration metadata from an XML file and uses it to create a fully configured system or application.

7. Explain the AOP module

The AOP module is used for developing aspects for our Spring-enabled application. Much of the support has been provided by the AOP Alliance in order to ensure the interoperability between [Spring and other AOP frameworks](#). This module also introduces metadata programming to Spring.

8. Explain the JDBC abstraction and DAO module

With the [JDBC abstraction and DAO module](#) we can be sure that we keep up the database code clean and simple, and prevent problems that result from a failure to close database resources. It provides a layer of meaningful exceptions on top of the error messages given by several database servers. It also makes use of Spring's AOP module to provide transaction management services for objects in a Spring application.

9. Explain the object/relational mapping integration module

Spring also supports for using of an [object/relational mapping \(ORM\) tool](#) over straight JDBC by providing the ORM module. Spring provides support to tie into several popular ORM frameworks, including [Hibernate](#), JDO, and [iBATIS SQL Maps](#). Spring's transaction management supports each of these ORM frameworks as well as JDBC.

10. Explain the web module

The [Spring web module](#) is built on the application context module, providing a context that is appropriate for web-based applications. This module also contains support for several web-oriented tasks such as transparently handling multipart requests for file uploads and programmatic binding of request parameters to your business objects. It also contains integration support with Jakarta Struts.

11. Explain the Spring MVC module

MVC framework is provided by Spring for building web applications. Spring can easily be integrated with other MVC frameworks, but [Spring's MVC framework](#) is a better choice, since it uses IoC to provide for a clean separation of controller logic from business objects. With Spring MVC you can declaratively bind request parameters to your business objects.

12. Spring configuration file

Spring configuration file is an XML file. This file contains the classes information and describes how these classes are configured and introduced to each other.

13. What is Spring IoC container?

The Spring IoC is responsible for creating the objects, managing them (with dependency injection (DI)), wiring them together, configuring them, as also managing their complete lifecycle.

14. What are the benefits of IOC?

IOC or dependency injection minimizes the amount of code in an application. It makes easy to test applications, since no singletons or JNDI lookup mechanisms are required in unit tests. Loose coupling is promoted with minimal effort and least intrusive mechanism. IOC containers support eager instantiation and lazy loading of services.

15. What are the common implementations of the ApplicationContext?

The **FileSystemXmlApplicationContext** container loads the definitions of the beans from an XML file. The full path of the XML bean configuration file must be provided to the constructor.

The **ClassPathXmlApplicationContext** container also loads the definitions of the beans from an XML file. Here, you need to set CLASSPATH properly because this container will look bean configuration XML file in CLASSPATH.

The **WebXmlApplicationContext**: container loads the XML file with definitions of all beans from within a web application.

16. What is the difference between Bean Factory and ApplicationContext?

Application contexts provide a means for resolving text messages, a generic way to load file resources (such as images), they can publish events to beans that are registered as listeners. In addition, operations on the container or beans in the container, which have to be handled in a programmatic fashion with a bean factory, can be handled declaratively in an application context. The application context implements MessageSource, an interface used to obtain localized messages, with the actual implementation being pluggable.

17. What does a Spring application look like?

- An interface that defines the functions.
- The implementation that contains properties, its setter and getter methods, functions etc.,
- [Spring AOP](#)
- The Spring configuration XML file.
- Client program that uses the function

Dependency Injection

18. What is Dependency Injection in Spring?

[Dependency Injection](#), an aspect of Inversion of Control (IoC), is a general concept, and it can be expressed in many different ways. This concept says that you do not create your objects but describe how they should be created. You don't directly connect your components and services together in code but describe which services are needed by which components in a configuration file. A container (the IOC container) is then responsible for hooking it all up.

19. What are the different types of IoC (dependency injection)?

- **Constructor-based dependency injection:** Constructor-based DI is accomplished when the container invokes a class constructor with a number of arguments, each representing a dependency on other class.
- **Setter-based dependency injection:** Setter-based DI is accomplished by the container calling setter methods on your beans after invoking a no-argument constructor or no-argument static factory method to instantiate your bean.

20. Which DI would you suggest Constructor-based or setter-based DI?

You can use both Constructor-based and Setter-based Dependency Injection. The best solution is using constructor arguments for mandatory dependencies and setters for optional dependencies.

Spring Beans

21. What are Spring beans?

The [Spring Beans](#) are Java Objects that form the backbone of a Spring application. They are instantiated, assembled, and managed by the Spring IoC container. These beans are created with the configuration metadata that is supplied to the container, for example, in the form of XML <bean/> definitions. Beans defined in spring framework are singleton beans. There is an attribute in bean tag named "singleton" if specified true then bean becomes singleton and if set to false then the bean becomes a prototype bean. By default it is set to true. So, all the beans in spring framework are by default singleton beans.

22. What does a Spring Bean definition contain?

A Spring Bean definition contains all configuration metadata which is needed for the container to know how to create a bean, its lifecycle details and its dependencies.

23. How do you provide configuration metadata to the Spring Container?

There are three important methods to provide configuration metadata to the Spring Container:

- XML based configuration file.
- Annotation-based configuration
- [Java-based configuration](#)

24. How do you define the scope of a bean?

When defining a <bean> in Spring, we can also declare a scope for the bean. It can be defined through the scope attribute in the bean definition. For example, when Spring has to produce a new bean instance each time one is needed, the bean's scope attribute to be prototype. On the other hand, when the same instance of a bean must be returned by Spring every time it is needed, the the bean scope attribute must be set to singleton.

25. Explain the bean scopes supported by Spring

There are five scoped provided by the Spring Framework supports following five scopes:

- In **singleton** scope, Spring scopes the bean definition to a single instance per Spring IoC container.
- In **prototype** scope, a single bean definition has any number of object instances.
- In **request** scope, a bean is defined to an HTTP request. This scope is valid only in a web-aware Spring ApplicationContext.

- In **session** scope, a bean definition is scoped to an HTTP session. This scope is also valid only in a web-aware Spring ApplicationContext.
- In **global-session** scope, a bean definition is scoped to a global HTTP session. This is also a case used in a web-aware Spring ApplicationContext.

The default scope of a Spring Bean is Singleton.

26. Are Singleton beans thread safe in Spring Framework?

No, singleton beans are not thread-safe in Spring framework.

27. Explain Bean lifecycle in Spring framework

- The spring container finds the bean's definition from the XML file and instantiates the bean.
- Spring populates all of the properties as specified in the bean definition (DI).
- If the bean implements BeanNameAware interface, spring passes the bean's id to setBeanName() method.
- If Bean implements BeanFactoryAware interface, spring passes the beanfactory to setBeanFactory() method.
- If there are any bean BeanPostProcessors associated with the bean, Spring calls postProcesserBeforeInitialization() method.
- If the bean implements IntializingBean, its afterPropertySet() method is called. If the bean has init method declaration, the specified initialization method is called.
- If there are any BeanPostProcessors associated with the bean, their postProcessAfterInitialization() methods will be called.
- If the bean implements DisposableBean, it will call the destroy() method.

28. Which are the important beans lifecycle methods? Can you override them?

There are two important bean lifecycle methods. The first one is setup which is called when the bean is loaded in to the container. The second method is the teardown method which is called when the bean is unloaded from the container. The bean tag has two important attributes (init-method and destroy-method) with which you can define your own custom initialization and destroy methods. There are also the correspondive annotations(@PostConstruct and @PreDestroy).

29. What are inner beans in Spring?

When a bean is only used as a property of another bean it can be declared as an inner bean. Spring's XML-based configuration metadata provides the use of <bean/> element inside the <property/> or <constructor-arg/> elements of a bean definition, in order to define the so-called inner bean. Inner beans are always anonymous and they are always scoped as prototypes.

30. How can you inject a Java Collection in Spring?

Spring offers the following types of [collection configuration elements](#):

- The <list> type is used for injecting a list of values, in the case that duplicates are allowed.
- The <set> type is used for wiring a set of values but without any duplicates.
- The <map> type is used to inject a collection of name-value pairs where name and value can be of any type.
- The <props> type can be used to inject a collection of name-value pairs where the name and value are both Strings.

31. What is bean wiring?

Wiring, or else bean wiring is the case when beans are combined together within the Spring container. When wiring beans, the Spring container needs to know what beans are needed and how the container should use dependency injection to tie them together.

32. What is bean auto wiring?

The Spring container is able to [autowire relationships](#) between collaborating beans. This means that it is possible to automatically let Spring resolve collaborators (other beans) for a bean by inspecting the contents of the BeanFactory without using <constructor-arg> and <property> elements.

33. Explain different modes of auto wiring?

The autowiring functionality has five modes which can be used to instruct Spring container to use autowiring for dependency injection:

- **no:** This is default setting. Explicit bean reference should be used for wiring.
- **byName:** When autowiring byName, the Spring container looks at the properties of the beans on which autowire attribute is set to byName in the XML configuration file. It then tries to match and wire its properties with the beans defined by the same names in the configuration file.

- **byType:** When autowiring by datatype, the Spring container looks at the properties of the beans on which autowire attribute is set to byType in the XML configuration file. It then tries to match and wire a property if its type matches with exactly one of the beans name in configuration file. If more than one such beans exist, a fatal exception is thrown.
- **constructor:** This mode is similar to byType, but type applies to constructor arguments. If there is not exactly one bean of the constructor argument type in the container, a fatal error is raised.
- **autodetect:** Spring first tries to wire using autowire by constructor, if it does not work, Spring tries to autowire by byType.

34. Are there limitations with autowiring?

Limitations of autowiring are:

- **Overriding:** You can still specify dependencies using <constructor-arg> and <property> settings which will always override autowiring.
- **Primitive data types:** You cannot autowire simple properties such as primitives, Strings, and Classes.
- **Confusing nature:** Autowiring is less exact than explicit wiring, so if possible prefer using explicit wiring.

35. Can you inject null and empty string values in Spring?

Yes, you can.

Spring Annotations

36. What is Spring Java-Based Configuration? Give some annotation example.

[Java based configuration](#) option enables you to write most of your Spring configuration without XML but with the help of few Java-based annotations. An example is the @Configuration annotation, that indicates that the class can be used by the Spring IoC container as a source of bean definitions. Another example is the @Bean annotated method that will return an object that should be registered as a bean in the Spring application context.

37. What is Annotation-based container configuration?

An alternative to XML setups is provided by annotation-based configuration which relies on the bytecode metadata for wiring up components instead of

angle-bracket declarations. Instead of using XML to describe a bean wiring, the developer moves the configuration into the component class itself by using annotations on the relevant class, method, or field declaration.

38. How do you turn on annotation wiring?

Annotation wiring is not turned on in the Spring container by default. In order to use annotation based wiring we must enable it in our Spring configuration file by configuring <context:annotation-config/> element.

39. @Required annotation

This annotation simply indicates that the affected bean property must be populated at configuration time, through an explicit property value in a bean definition or through autowiring. The container throws BeanInitializationException if the affected bean property has not been populated.

40. @Autowired annotation

The @Autowired annotation provides more fine-grained control over where and how autowiring should be accomplished. It can be used to autowire bean on the setter method just like @Required annotation, on the constructor, on a property or on methods with arbitrary names and/or multiple arguments.

41. @Qualifier annotation

When there are more than one beans of the same type and only one is needed to be wired with a property, the @Qualifier annotation is used along with @Autowired annotation to remove the confusion by specifying which exact bean will be wired.

Spring Data Access

42. How can JDBC be used more efficiently in the Spring framework?

When using the Spring JDBC framework the burden of resource management and error handling is reduced. So developers only need to write the statements and queries to get the data to and from the database. JDBC can be used more efficiently with the help of a template class provided by Spring framework, which is the JdbcTemplate (example [here](#)).

43. JdbcTemplate

JdbcTemplate class provides many convenience methods for doing things such as converting database data into primitives or objects, executing prepared and callable statements, and providing custom database error handling.

44. Spring DAO support

The [Data Access Object \(DAO\) support in Spring](#) is aimed at making it easy to work with data access technologies like JDBC, Hibernate or JDO in a consistent way. This allows us to switch between the persistence technologies fairly easily and to code without worrying about catching exceptions that are specific to each technology.

45. What are the ways to access Hibernate by using Spring?

There are two ways to access Hibernate with Spring:

- Inversion of Control with a Hibernate Template and Callback.
- Extending HibernateDAOsupport and Applying an AOP Interceptor node.

46. ORM's Spring support

Spring supports the following ORM's:

- Hibernate
- iBatis
- JPA (Java Persistence API)
- TopLink
- JDO (Java Data Objects)
- OJB

47. How can we integrate Spring and Hibernate using HibernateDaoSupport?

Use Spring's SessionFactory called LocalSessionFactory. The integration process is of 3 steps:

- Configure the Hibernate SessionFactory
- Extend a DAO Implementation from HibernateDaoSupport
- Wire in Transaction Support with AOP

48. Types of the transaction management Spring support

Spring supports two types of transaction management:

- **Programmatic transaction management:** This means that you have managed the transaction with the help of programming. That gives you extreme flexibility, but it is difficult to maintain.
- **Declarative transaction management:** This means you separate [transaction management from the business code](#). You only use annotations or XML based configuration to manage the transactions.

49. What are the benefits of the Spring Framework's transaction management?

- It provides a consistent programming model across different transaction APIs such as JTA, JDBC, Hibernate, JPA, and JDO.
- It provides a simpler API for programmatic transaction management than a number of complex transaction APIs such as JTA.
- It supports declarative transaction management.
- It integrates very well with Spring's various data access abstractions.

50. Which Transaction management type is more preferable?

Most users of the Spring Framework choose declarative transaction management because it is the option with the least impact on application code, and hence is most consistent with the ideals of a non-invasive lightweight container. Declarative transaction management is preferable over programmatic transaction management though it is less flexible than programmatic transaction management, which allows you to control transactions through your code.

Spring Aspect Oriented Programming (AOP)

51. Explain AOP

[Aspect-oriented programming](#), or AOP, is a programming technique that allows programmers to modularize crosscutting concerns, or behavior that cuts across the typical divisions of responsibility, such as logging and transaction management.

52. Aspect

The core construct of AOP is the aspect, which encapsulates behaviors affecting multiple classes into reusable modules. It is a module which has a set of APIs providing cross-cutting requirements. For example, a logging module would be

called AOP aspect for logging. An application can have any number of aspects depending on the requirement. In Spring AOP, aspects are implemented using regular classes annotated with the @Aspect annotation (@AspectJ style).

53. What is the difference between concern and cross-cutting concern in Spring AOP

The Concern is behavior we want to have in a module of an application. A Concern may be defined as a functionality we want to implement.

The cross-cutting concern is a concern which is applicable throughout the application and it affects the entire application. For example, logging, [security](#) and data transfer are the concerns which are needed in almost every module of an application, hence they are cross-cutting concerns.

54. Join point

The join point represents a point in an application where we can plug-in an AOP aspect. It is the actual place in the application where an action will be taken using Spring AOP framework.

55. Advice

The advice is the actual action that will be taken either before or after the method execution. This is actual piece of code that is invoked during the program execution by the Spring AOP framework.

Spring aspects can work with five kinds of advice:

- **before:** Run advice before the a method execution.
- **after:** Run advice after the a method execution regardless of its outcome.
- **after-returning:** Run advice after the a method execution only if method completes successfully.
- **after-throwing:** Run advice after the a method execution only if method exits by throwing an exception.
- **around:** Run advice before and after the advised method is invoked.

56. Pointcut

The pointcut is a set of one or more joinpoints where an advice should be executed. You can specify pointcuts using expressions or patterns.

57. What is Introduction?

An Introduction allows us to add new methods or attributes to existing classes.

58. What is Target object?

The target object is an object being advised by one or more aspects. It will always be a proxy object. It is also referred to as the advised object.

59. What is a Proxy?

A proxy is an object that is created after applying advice to a target object. When you think of client objects the target object and the proxy object are the same.

60. What are the different types of AutoProxying?

- BeanNameAutoProxyCreator
- DefaultAdvisorAutoProxyCreator
- Metadata autoproxying

61. What is Weaving? What are the different points where weaving can be applied?

Weaving is the process of linking aspects with other application types or objects to create an advised object.

Weaving can be done at compile time, at load time, or at runtime.

62. Explain XML Schema-based aspect implementation?

In this implementation case, aspects are implemented using regular classes along with XML based configuration.

63. Explain annotation-based (@AspectJ based) aspect implementation

This implementation case (@AspectJ based implementation) refers to a style of declaring aspects as regular Java classes annotated with Java 5 annotations.

Spring Model View Controller (MVC)

64. What is Spring MVC framework?

Spring comes with a [full-featured MVC framework for building web applications](#). Although Spring can easily be integrated with other MVC frameworks, such as Struts, Spring's MVC framework uses IoC to provide a clean separation of controller logic from business objects. It also allows to declaratively bind request parameters to business objects.

65. DispatcherServlet

The Spring Web MVC framework is designed around a DispatcherServlet that handles all the HTTP requests and responses.

66. WebApplicationContext

The WebApplicationContext is an extension of the plain ApplicationContext that has some extra features necessary for web applications. It differs from a normal ApplicationContext in that it is capable of resolving themes, and that it knows which servlet it is associated with.

67. What is Controller in Spring MVC framework?

Controllers provide access to the application behavior that you typically define through a service interface. Controllers interpret user input and transform it into a model that is represented to the user by the view. Spring implements a controller in a very abstract way, which enables you to create a wide variety of controllers.

68. @Controller annotation

The @Controller annotation indicates that a particular class serves the role of a controller. Spring does not require you to extend any controller base class or reference the Servlet API.

69. @RequestMapping annotation

@RequestMapping annotation is used to map a URL to either an entire class or a particular handler method.

70. What are the types of the transaction management Spring supports?

Spring supports two types of transaction management –

- **Programmatic transaction management** – This means that you have managed the transaction with the help of programming. That gives you extreme flexibility, but it is difficult to maintain.

- **Declarative transaction management** – This means you separate transaction management from the business code. You only use annotations or XML based configuration to manage the transactions