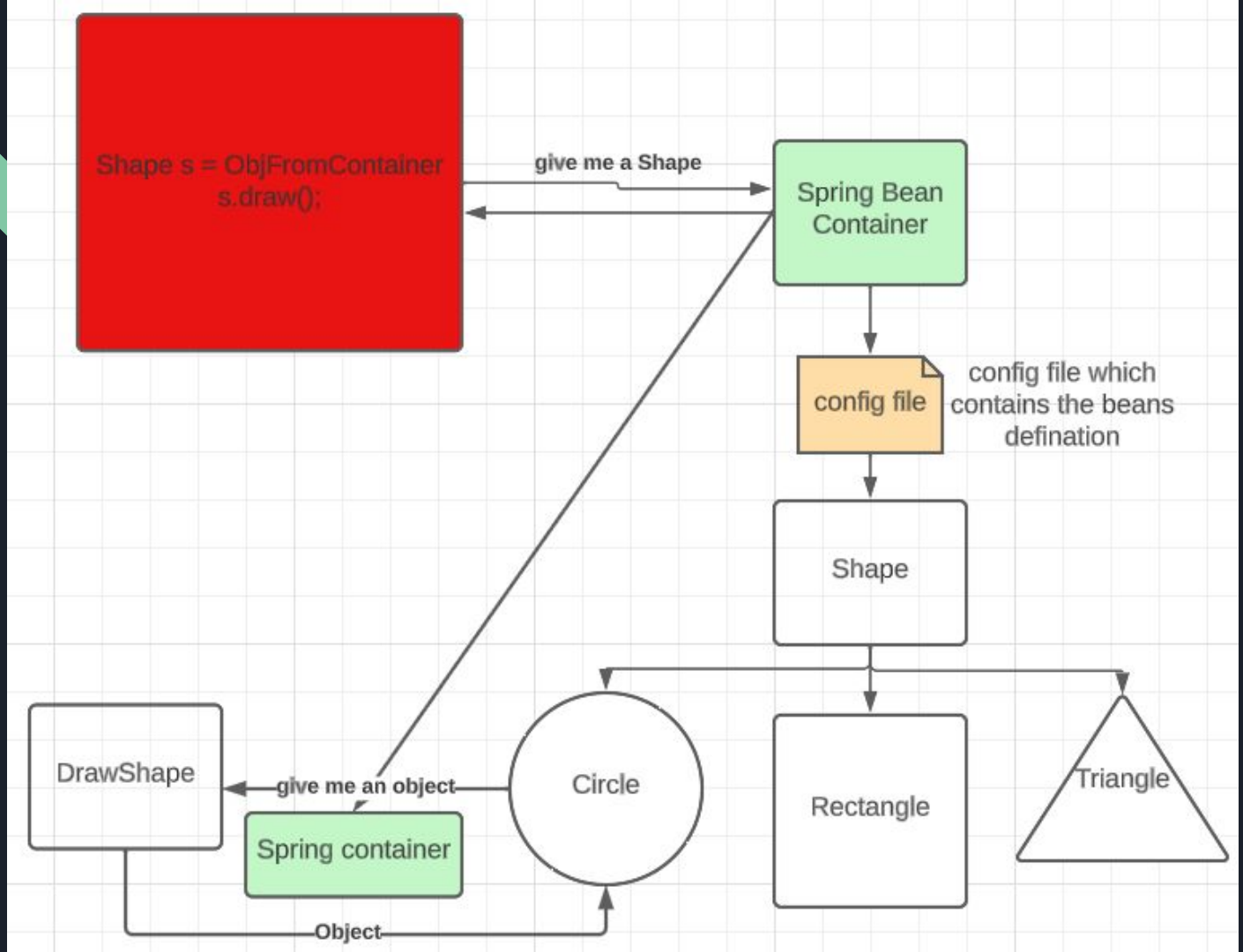
Spring Framework

Beans Lifecycle and Annotations

Table of Content

Dependency Injection

is a technique where the dependencies of a class (i.e., the objects it relies on) are injected into the class rather than the class creating or managing its dependencies


Shape s = ObjFromContainer
s.draw();
give me a Shape
Spring Bean Container
config file
config file which contains the beans defination
Shape
DrawShape
give me an object
Circle
Rectangle
Triangle
Spring container
Object

Injection Types

We will cover the two most common (without annotations)

- Constructor Injection
- Setter Injection

We will talk about “auto-wiring” in the Annotations section later

Spring Dependency Injection with Annotations and Autowiring

Let’s see the old code of constructor injection using XML

What is Spring AutoWiring?

Spring will look for a class that matches the property

(matches by type: class or interface)

Spring will inject it automatically … hence it is autowired

Autowiring Injection Types

- Constructor Injection
- Setter Injection
- Field Injections

Dev Process - Constructor Injection (annotations)

1. Define the dependency class
2. Create a constructor in your class for injections
3. Configure the dependency injection with @Autowired Annotation

Step 1: Define the dependency class

```java
@Component
public class Draw2D
{
    public void draw(String shapeName) { System.out.println("Drawing a 2d for " + shapeName); }
}
```

Step 2: Create a constructor in your class for injections

```
@Component
public class CircleShape implements Shape
{

   public Draw2D draw2D;

   //constructor injection
    public CircleShape(Draw2D draw2D) { this.draw2D = draw2D; }


    @Override
    public void drawShape2d() { draw2D.draw( shapeName: "circle"); }

}
```

Step 3: Configure the dependency injection with @Autowired Annotation

```
@Component
public class CircleShape implements Shape
{

   public Draw2D draw2D;

   //constructor injection
    @Autowired
    public CircleShape(Draw2D draw2D) { this.draw2D = draw2D; }


    @Override
    public void drawShape2d() { draw2D.draw( shapeName: "circle"); }

}
```

Let’s write some code

Dev Process - Setter Injection (annotations)

1. Define the dependency class
2. Create a Setter in your class for injections
3. Configure the dependency injection with @Autowired Annotation

Step 1: Define the dependency class

```
@Component
public class Draw2D
{
    public void draw(String shapeName) { System.out.println("Drawing a 2d for " + shapeName); }
}
```

Step 2: Create a Setter in your class for injections

```
@Component
public class RectangleShape implements Shape
{
    public Draw2D draw2D;

    //setter method for setter injection
    @Autowired
    public void setDrawShapeFor2d(Draw2D drawShape2d) {
        this.draw2D = drawShape2d;
    }

    @Override
    public void drawShape2d() { draw2D.draw( shapeName: "rectangle"); }
}
```

Step 3: Configure the dependency injection with @Autowired Annotation

```
@Component
public class CircleShape implements Shape
{

   public Draw2D draw2D;

   //constructor injection
    @Autowired
    public CircleShape(Draw2D draw2D) { this.draw2D = draw2D; }


    @Override
    public void drawShape2d() { draw2D.draw( shapeName: "circle"); }

}
```

Dev Process - field Injection (annotations)

You can Inject dependencies by setting field values on your

```
@Component
publ @Component
     public class TriangleShape implements Shape {
         @Autowired
         public Draw2D draw2D;

         @Override
         public void drawShape2d() { draw2D.draw( shapeName: "triangle"); }

}
```

Let’s write some code

5 minutes Break

Bean Scope with annotations

Let’s see the old code of bean scope

Explicitly Specify Bean Scope

```
@Component
@Scope("singleton")
public class CircleShape implements Shape
{
    int radius;

    public int getRadius() { return radius; }

    public void setRadius(int radius) { this.radius = radius; }
```

Bean Lifecycle with Annotations

Init/destroy: methods configuration

```java
//this is the init method
@PostConstruct
public void connectToDatabase()
{
    System.out.println("the connection to db established ......");
}

//this is the destroy method
@PreDestroy
public void disconnectFromDatabase() { System.out.println("the connection to db ended ......"); }
```

Spring Configu

File: applicationContext.xml

```xml
<beans ...>

   <bean id="circle"
       class="com.example1.CircleShape">
   </bean>

</beans>
```

```java
@Configuration
@ComponentScan("com.dependencyInjection")
public class Config
{

}
```

```xml
<!--    Enable Component Scanning-->
<context:component-scan base-package="com.usingAnnotations"/>
```

Dev process - Config class (No more XML)

1. Create a Java class and annotate as @Configuration
2. Add component scanning support: @ComponentScan (optional)
3. Read Spring Java configuration class
4. Retrieve bean from Spring container

1-Create a Java class and annotate as @Configuration

```
@Configuration
public class Config
{

}
```

2-Add component scanning support: @ComponentScan (optional)

```
@Configuration
@ComponentScan("com.dependencyInjection")
public class Config
{

}
```

3-Read Spring Java configuration class

```
ApplicationContext context = new AnnotationConfigApplicationContext(Config.class);
```

4-Retrieve bean from Spring container

```
Shape circleShape = context.getBean( name: "circleShape" , Shape.class);
circleShape.drawShape2d();
```

Read configs from properties file (annotations)

Development Steps

Step 1: Create Properties File

Step 2: Load Properties file in Spring config file

Step 3: Reference Values from Properties File

Step 1: Create Properties File

application.properties

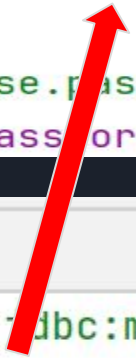
```
database.url = jdbc:mysql://localhost:3306/test
database.username = root
database.password = MyPassWord123
```

Step 2: Load Properties file in Spring config file

```
@Configuration
@ComponentScan("InjectLiterialValues")
@PropertySource("classpath:application.properties")
public class Config
{

}
```

Step 3: Reference Values from Properties File

```java
@Value("${database.url}")
private String url;

@Value("${database.username}")
private String username;

@Value("${database.password}")
private String password;
```



application.properties

```
1  database.url = jdbc:mysql://localhost:3306/test
2  database.username = root
3  database.password = MyPassWord123
4
```

Questions ?

THANK YOU