Spring BOOT

Andy

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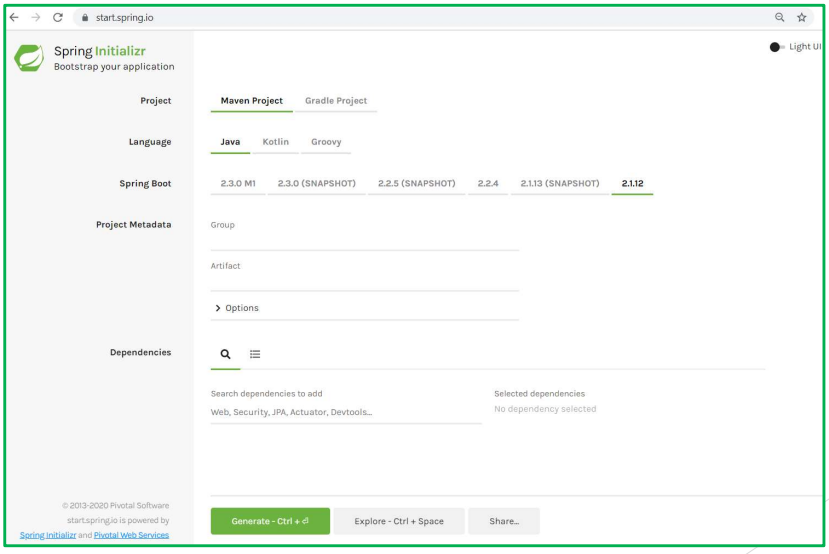
Spring boot: initializer



Create a spring boot project

Add dependency: web, actuator, JPA

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Starter

```xml
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
	xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
	<modelVersion>4.0.0</modelVersion>

	<groupId>com.example</groupId>
	<artifactId>myproject</artifactId>
	<version>0.0.1-SNAPSHOT</version>

	<!-- Inherit defaults from Spring Boot -->
	<parent>
		<groupId>org.springframework.boot</groupId>
		<artifactId>spring-boot-starter-parent</artifactId>
		<version>2.1.0.RELEASE</version>
	</parent>

	<!-- Add typical dependencies for a web application -->
	<dependencies>
		<dependency>
			<groupId>org.springframework.boot</groupId>
			<artifactId>spring-boot-starter-web</artifactId>
		</dependency>
	</dependencies>

	<!-- Package as an executable jar -->
	<build>
		<plugins>
			<plugin>
				<groupId>org.springframework.boot</groupId>
				<artifactId>spring-boot-maven-plugin</artifactId>
			</plugin>
		</plugins>
	</build>
```

Common Starters

spring-boot-starter-data-jpa
spring-boot-starter-security
spring-boot-starter-test
spring-boot-starter-web

Question:
How does Spring boot determine the depdency version?

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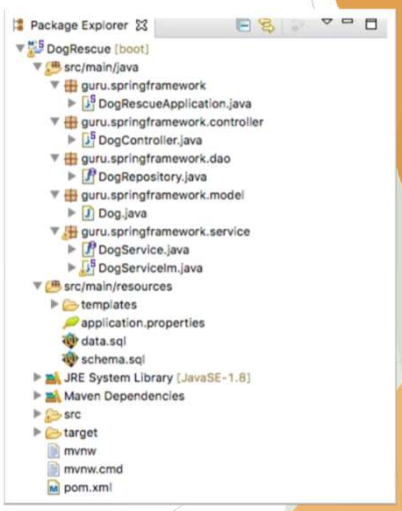
Code Layout

```
com
 +- example
     +- myapplication
         +- Application.java
         |
         +- customer
         |   +- Customer.java
         |   +- CustomerController.java
         |   +- CustomerService.java
         |   +- CustomerRepository.java
         |
         +- order
             +- Order.java
             +- OrderController.java
             +- OrderService.java
             +- OrderRepository.java
```



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Application.java

```
package com.example.myapplication;

import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication
public class Application {

        public static void main(String[] args) {
                SpringApplication.run(Application.class, args);
        }

}
```

How it works:

1. @SpringBootApplication tells this is a spring boot application file and it starts from here
2. Main -> SpringApplication.run() bootstrap spring and application and server/tomcat
3. Application.class – this is the primary spring component

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Annotations

- @SpringBootApplication
  - = @EnableAutoConfiguration
    - + @ComponentScan
      - (@Component vs @Bean)
    - + @Configuration

```
@Configuration
@EnableAutoConfiguration
@ComponentScan
public class Application {
  public static void main(String[] args) {
      SpringApplication.run(Application.class, args);
  }
}
```

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@EnableAutoConfiguration

- Enable auto-configuration of the Spring Application Context, attempting to guess and configure beans that you are likely to need. Auto-configuration classes are usually applied based on your classpath and what beans you have defined.

```
@Configuration
@EnableJpaRepositories
@EnableTransactionManagement
public class ApplicationConfig {
  @Bean
  public DataSource dataSource() {
      ...
  }

  @Bean
  public EntityManagerFactory entityManagerFactory() {
      ..
      factory.setDataSource(dataSource());
      return factory.getObject();
  }

  @Bean
  public PlatformTransactionManager transactionManager() {
      JpaTransactionManager txManager = new JpaTransactionManager();
      txManager.setEntityManagerFactory(entityManagerFactory());
      return txManager;
  }
}
```

```
spring.datasource.url=jdbc:mysql://localhost/test
spring.datasource.username=dbuser
spring.datasource.password=dbpass
spring.datasource.driver-class-name=com.mysql.jdbc.Driver
```

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@Component vs @Bean

- @Component (@Component, @Controller, @Service, @Repository) – class level
- @Bean – method level

```
@Configuration
@ComponentScan({"com.logicbig.example.di.cons"})
public class ConstBasedDI_WireByType {

    @Bean(name = "a")
    public OrderService orderServiceByProvider1 () {
        return new OrderServiceImpl1();
    }

    @Bean(name = "b")
    public OrderService orderServiceByProvider2 () {
        return new OrderServiceImpl2();
    }


    public static void main (String... strings) {
        AnnotationConfigApplicationContext context = new AnnotationConfigApplicationContext(
                        ConstBasedDI_WireByType.class);
        OrderServiceClient bean = context.getBean(ConstBasedDI_WireByType.OrderServiceClient.class);
        bean.showPendingOrderDetails();
    }
```

```
@Component
public static class OrderServiceClient {

    private final OrderService orderService1;
    private final OrderService orderService2;

    @Autowired
    OrderServiceClient (@Qualifier("a") OrderService orderService1,
                        @Qualifier("b") OrderService orderService2) {
        this.orderService1 = orderService1;
        this.orderService2 = orderService2;
    }

    public void showPendingOrderDetails () {
        System.out.println(orderService1.getOrderDetails("100"));
        System.out.println(orderService2.getOrderDetails("100"));
    }
}
```

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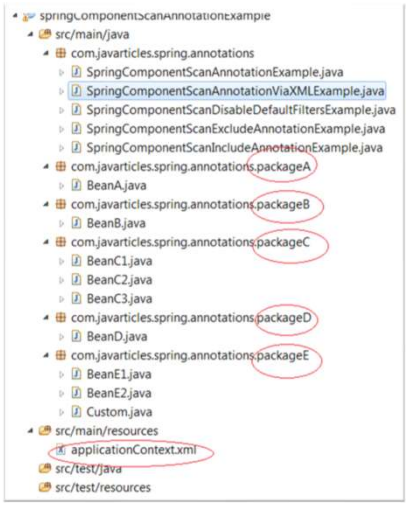
@ComponentScan




```
package com.javarticles.spring.annotations;

import org.springframework.context.annotation.AnnotationConfigApplicationContext;
import org.springframework.context.annotation.ComponentScan;
import org.springframework.context.annotation.Configuration;

import com.javarticles.spring.annotations.packageC.BeanC1;

@Configuration
@ComponentScan(basePackages = {
        "com.javarticles.spring.annotations.packageA",
        "com.javarticles.spring.annotations.packageB",
        "com.javarticles.spring.annotations.packageE" }, basePackageClasses = BeanC1.class)
public class SpringComponentScanAnnotationExample {
    public static void main(String[] args) {
        AnnotationConfigApplicationContext ctx = new AnnotationConfigApplicationContext();
        try {
            ctx.register(SpringComponentScanAnnotationExample.class);
            ctx.refresh();
            System.out.println("SpringComponentScanAnnotationExample: " +
            ctx.getBean("springComponentScanAnnotationExample"));
            System.out.println("BeanA: "
                    + ctx.getBean("beanA"));
            System.out.println("BeanB: "
                    + ctx.getBean("beanB"));
            System.out.println("BeanC1: "
                    + ctx.getBean("beanC1"));
            System.out.println("BeanC2: "
                    + ctx.getBean("beanC2"));
            System.out.println("Contains BeanC3?: "
                    + ctx.containsBean("beanC3"));
            System.out.println("Contains BeanD?: "
                    + ctx.containsBean("beanD"));
            System.out.println("Contains BeanE1?: "
                    + ctx.containsBean("beanE1"));
            System.out.println("Contains BeanE2?: "
                    + ctx.containsBean("beanE2"));
        } finally {
            ctx.close();
        }
    }

}
```

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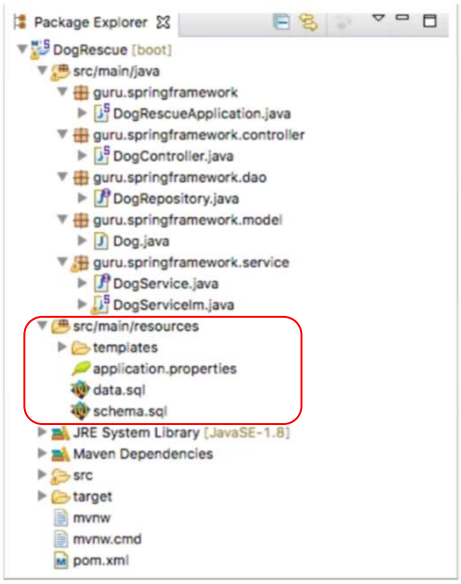
Load properties file



- Application.properties is a default, auto-load file, no special treatment required
- Foo.properties - put in src/main/resources (classpath)\

  To load:

  @Configuration

  @PropertySource({

  "classpath: foo.properties"

  "classpath: foo-${env}.properties"

  })

  public class PropertiesWithJavaConfig {}
- Inject/Use a property

  @Value("${jdbc.url}")

  private String jdbcUrl;

  OR::

  private Environment env;

  String keyValue = env.getProperty(key);

  OR::

  @ConfigurationProperties("app")

  POJO class with each field match the key (app.key) in the properties

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Question

- 1. why use spring boot
- 2. steps to create spring boot project
- 3. what is auto configuration
- 4. what is starter
- 5. spring boot version and java version

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Example

- Build a Spring boot project with Models corresponding to the database table structures for clinical project
- Include the view components into spring boot project and finish controller and service layer

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