

SpringBoot基础

学习目标：

1. 能够理解Spring的优缺点
2. 能够理解SpringBoot的特点
3. 能够理解SpringBoot的核心功能
4. 能够搭建SpringBoot的环境
5. 能够完成application.properties配置文件的配置
6. 能够完成application.yml配置文件的配置
7. 能够使用SpringBoot集成Mybatis
8. 能够使用SpringBoot集成JUnit
9. 能够使用SpringBoot集成SpringData JPA

一、SpringBoot简介

1.1 原有Spring优缺点分析

1.1.1 Spring的优点分析

Spring是Java企业版（Java Enterprise Edition, JEE, 也称J2EE）的轻量级替代品。无需开发重量级的Enterprise JavaBean (EJB)，Spring为企业级Java开发提供了一种相对简单的方法，通过依赖注入和面向切面编程，用简单的Java对象（Plain Old Java Object, POJO）实现了EJB的功能。

1.1.2 Spring的缺点分析

虽然Spring的组件代码是轻量级的，但它的配置却是重量级的。一开始，Spring用XML配置，而且是很多XML配置。Spring 2.5引入了基于注解的组件扫描，这消除了大量针对应用程序自身组件的显式XML配置。Spring 3.0引入了基于Java的配置，这是一种类型安全的可重构配置方式，可以代替XML。

所有这些配置都代表了开发时的损耗。因为在思考Spring特性配置和解决业务问题之间需要进行思维切换，所以编写配置挤占了编写应用程序逻辑的时间。和所有框架一样，Spring实用，但与此同时它要求的回报也不少。

除此之外，项目的依赖管理也是一件耗时耗力的事情。在环境搭建时，需要分析要导入哪些库的坐标，而且还需要分析导入与之有依赖关系的其他库的坐标，一旦选错了依赖的版本，随之而来的不兼容问题就会严重阻碍项目的开发进度。

1.2 SpringBoot的概述

1.2.1 SpringBoot解决上述Spring的缺点

SpringBoot对上述Spring的缺点进行的改善和优化，基于约定优于配置的思想，可以让开发人员不必在配置与逻辑业务之间进行思维的切换，全身心的投入到逻辑业务的代码编写中，从而大大提高了开发的效率，一定程度上缩短了项目周期。

1.2.2 SpringBoot的特点

- 为基于Spring的开发提供更快的入门体验
- 开箱即用，没有代码生成，也无需XML配置。同时也可以修改默认值来满足特定的需求
- 提供了一些大型项目中常见的非功能性特性，如嵌入式服务器、安全、指标、健康检测、外部配置等
- SpringBoot不是对Spring功能上的增强，而是提供了一种快速使用Spring的方式

1.2.3 SpringBoot的核心功能

- 起步依赖

起步依赖本质上是一个Maven项目对象模型（Project Object Model, POM），定义了对其他库的传递依赖，这些东西加在一起即支持某项功能。

简单的说，起步依赖就是将具备某种功能的坐标打包到一起，并提供一些默认的功能。

- 自动配置

Spring Boot的自动配置是一个运行时（更准确地说，是应用程序启动时）的过程，考虑了众多因素，才决定Spring配置应该用哪个，不该用哪个。该过程是Spring自动完成的。

注意：起步依赖和自动配置的原理剖析会在第三章《SpringBoot原理分析》进行详细讲解

二、SpringBoot快速入门

2.1 代码实现

2.1.1 创建Maven工程

使用idea工具创建一个maven工程，该工程为普通的java工程即可

The screenshot shows the 'New Module' dialog in IntelliJ IDEA. On the left, a list of technologies is shown, with 'Maven' selected and highlighted in blue. The 'Module SDK' dropdown at the top is set to 'Project SDK (9.0)'. Below this, there is a checkbox for 'Create from archetype' and an 'Add Archetype...' button. A list of archetypes is displayed, including 'com.atlassian.maven.archetypes:bamboo-plugin-archetype', 'com.atlassian.maven.archetypes:confluence-plugin-archetype', 'com.atlassian.maven.archetypes:jira-plugin-archetype', 'com.rfc.maven.archetypes:jpa-maven-archetype', 'de.akquinet.jbosscc.jbosscc-seam-archetype', 'net.databinder:data-app', 'net.liftweb:lift-archetype-basic', 'net.liftweb:lift-archetype-blank', 'net.sf.maven-har:maven-archetype-har', 'net.sf.maven-sar:maven-archetype-sar', 'org.apache.camel.archetypes:camel-archetype-activemq', 'org.apache.camel.archetypes:camel-archetype-component', 'org.apache.camel.archetypes:camel-archetype-java', 'org.apache.camel.archetypes:camel-archetype-scala', 'org.apache.camel.archetypes:camel-archetype-spring', 'org.apache.camel.archetypes:camel-archetype-war', 'org.apache.cocoon:cocoon-22-archetype-block', 'org.apache.cocoon:cocoon-22-archetype-block-plain', 'org.apache.cocoon:cocoon-22-archetype-webapp', and 'org.apache.maven.archetypes:maven-archetype-idea-simple'. At the bottom, there are buttons for 'Previous', 'Next', 'Cancel', and 'Help'. The 'Next' button is highlighted with a red box. Red arrows point from the 'Maven' selection and the 'Project SDK (9.0)' dropdown to the 'Next' button.


New Module ×

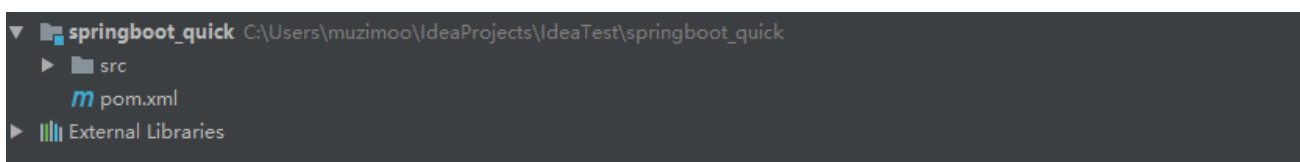
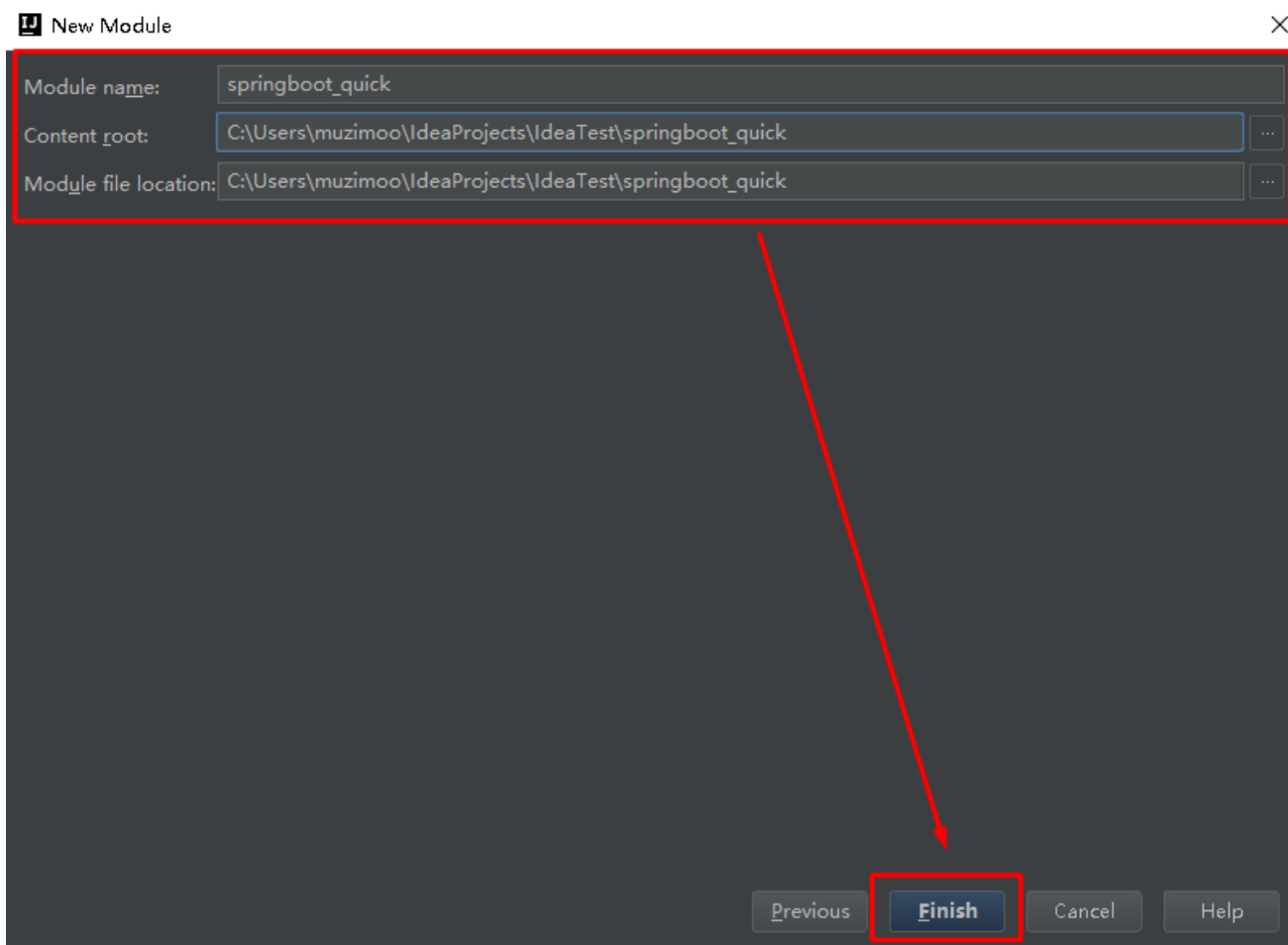
Add as module to <none> ...

Parent <none> ...

GroupId	com.itheima	<input checked="" type="checkbox"/> Inherit
ArtifactId	springboot_quick	
Version	1.0-SNAPSHOT	<input checked="" type="checkbox"/> Inherit

Previous **Next** Cancel Help





2.1.2 添加SpringBoot的起步依赖

SpringBoot要求，项目要继承SpringBoot的起步依赖spring-boot-starter-parent

```
1 <parent>
2   <groupId>org.springframework.boot</groupId>
3   <artifactId>spring-boot-starter-parent</artifactId>
4   <version>2.0.1.RELEASE</version>
5 </parent>
```

SpringBoot要集成SpringMVC进行Controller的开发，所以项目要导入web的启动依赖

```
1 <dependencies>
2   <dependency>
3     <groupId>org.springframework.boot</groupId>
4     <artifactId>spring-boot-starter-web</artifactId>
5   </dependency>
6 </dependencies>
```

2.1.3 编写SpringBoot引导类

要通过SpringBoot提供的引导类起步SpringBoot才可以进行访问

```
1 package com.itheima;
2
3 import org.springframework.boot.SpringApplication;
4 import org.springframework.boot.autoconfigure.SpringBootApplication;
5
6 @SpringBootApplication
7 public class MySpringBootApplication {
8
9     public static void main(String[] args) {
10         SpringApplication.run(MySpringBootApplication.class);
11     }
12
13 }
```

2.1.4 编写Controller

在引导类MySpringBootApplication同级包或者子级包中创建QuickStartController

```
1 package com.itheima.controller;
2
3 import org.springframework.stereotype.Controller;
4 import org.springframework.web.bind.annotation.RequestMapping;
5 import org.springframework.web.bind.annotation.ResponseBody;
6
7 @Controller
8 public class QuickStartController {
9
10     @RequestMapping("/quick")
11     @ResponseBody
12     public String quick(){
13         return "springboot 访问成功!";
14     }
15
16 }
```

2.1.5 测试

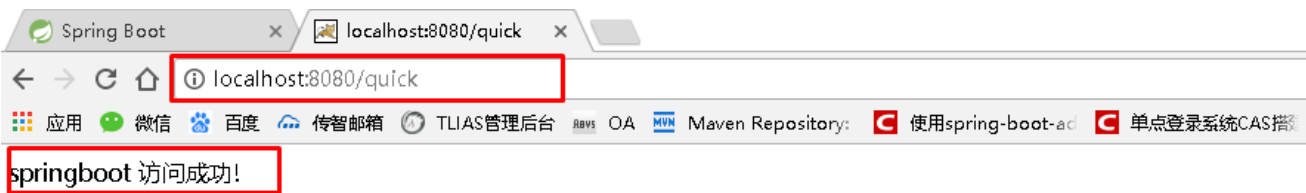
执行SpringBoot起步类的主方法，控制台打印日志如下：

```
1  .   ____          _            __ _ _
2  /\\ / ___'_ __ _ _(_)' __ _    __ \ \ / \
3  ( ( )\___ | '_ | '_| | '_ \  / ___ \\ \ / \
4  \\/ ___) | |_| | | | |_| | | | (__ \) ) ) |
5  ' |___| |___| |___| |___| | \___) / ___/
6  =====|_|=====|__/=/_/_/_/
7  :: Spring Boot ::                (v2.0.1.RELEASE)
8
9  2018-05-08 14:29:59.714 INFO 5672 --- [           main]
   com.itheima.MySpringBootApplication : Starting MySpringBootApplication on
   DESKTOP-RRUNFUH with PID 5672
   (C:\Users\muzimoo\IdeaProjects\IdeaTest\springboot_quick\target\classes started by
   muzimoo in C:\Users\muzimoo\IdeaProjects\IdeaTest)
10 ... ..
11 o.s.w.s.handler.SimpleUrlHandlerMapping : Mapped URL path [/**] onto handler of type
   [class org.springframework.web.servlet.resource.ResourceHttpRequestHandler]
12 2018-05-08 14:30:03.126 INFO 5672 --- [           main]
   o.s.j.e.a.AnnotationMBeanExporter   : Registering beans for JMX exposure on
   startup
13 2018-05-08 14:30:03.196 INFO 5672 --- [           main]
   o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 8080 (http)
   with context path ''
14 2018-05-08 14:30:03.206 INFO 5672 --- [           main]
   com.itheima.MySpringBootApplication : Started MySpringBootApplication in 4.252
   seconds (JVM running for 5.583)
```

通过日志发现，Tomcat started on port(s): 8080 (http) with context path ""

tomcat已经起步，端口监听8080，web应用的虚拟工程名称为空

打开浏览器访问url地址为：<http://localhost:8080/quick>



2.2 快速入门解析

2.2.2 SpringBoot代码解析

- @SpringBootApplication：标注SpringBoot的启动类，该注解具备多种功能（后面详细剖析）
- SpringApplication.run(MySpringBootApplication.class) 代表运行SpringBoot的启动类，参数为SpringBoot启动类的字节码对象

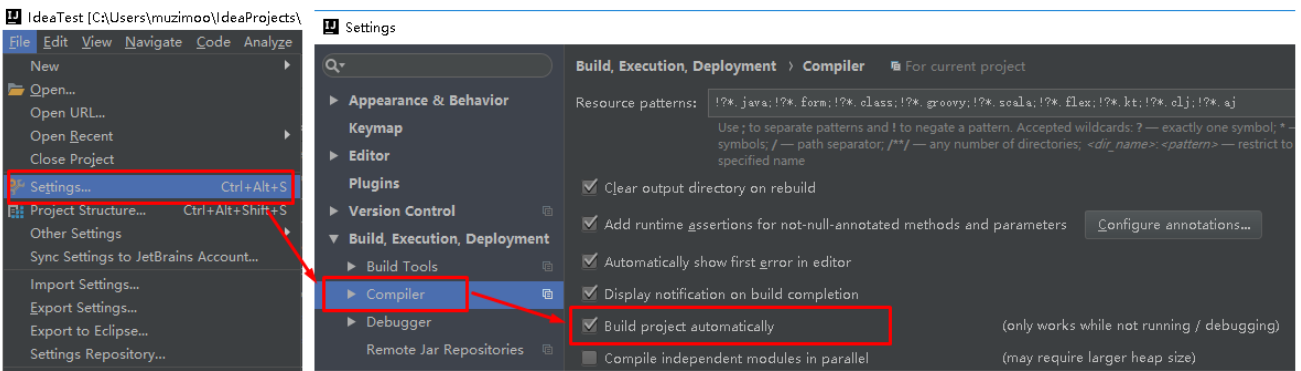
2.2.3 SpringBoot工程热部署

我们在开发中反复修改类、页面等资源，每次修改后都是需要重新启动才生效，这样每次启动都很麻烦，浪费了大量的时间，我们可以在修改代码后不重启就能生效，在 pom.xml 中添加如下配置就可以实现这样的功能，我们称之为热部署。

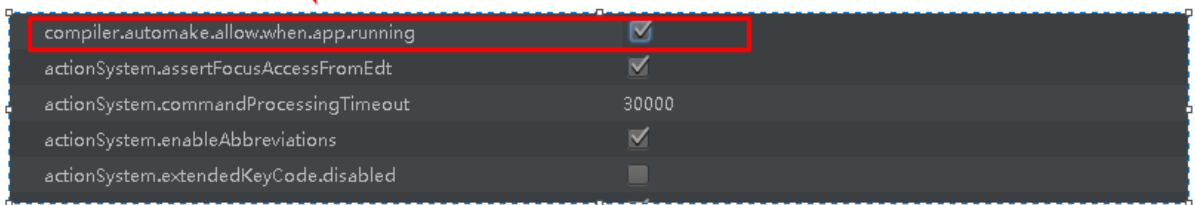
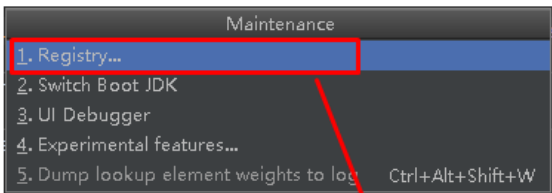
```
1 <!--热部署配置-->
2 <dependency>
3   <groupId>org.springframework.boot</groupId>
4   <artifactId>spring-boot-devtools</artifactId>
5 </dependency>
```

注意：IDEA进行SpringBoot热部署失败原因

出现这种情况，并不是热部署配置问题，其根本原因是因为IntelliJ IDEA默认情况下不会自动编译，需要对IDEA进行自动编译的设置，如下：



然后 Shift+Ctrl+Alt+/, 选择Registry



2.2.4 使用idea快速创建SpringBoot项目

Module SDK: Project SDK (9.0) New...

Choose Initializr Service URL.

Default: <https://start.spring.io>

Custom: +

Make sure your network connection is active before continuing.

Spring初始化

Spring Initializr

Maven

Gradle (Kotlin DSL)

Gradle

Groovy

Griffon

Grails

Application Forge

Static Web

Flash

Kotlin

Previous **Next** Cancel Help

Project Metadata

Group:

Artifact:

Type: Maven Project (Generate a Maven based project archive) ▼

Language: Java ▼

Packaging: Jar ▼

Java Version: 9 ▼

Version:

Name:

Description:

Package:

Previous **Next** Cancel Help

Dependencies

Core

Web

Template Engines

SQL

NoSQL

Integration

Cloud Core

Cloud Config

Cloud Discovery

Cloud Routing

Cloud Circuit Breaker

Cloud Tracing

Cloud Messaging

Cloud AWS

Cloud Contract

Pivotal Cloud Foundry

Azure

Spring Cloud GCP

I/O

Ops

Web

Reactive Web

Rest Repositories

Rest Repositories HAL Browser

HATEOAS

Web Services

Jersey (JAX-RS)

Websocket

REST Docs

Vaadin

Apache CXF (JAX-RS)

Ratpack

Mobile

Keycloak

Web

Full-stack web development with Tomcat and Spring MVC

[Building a RESTful Web Service](#)

<https://spring.io/guides/tutorials/bookmarks/>

[Building REST services with Spring](#)

[Reference doc](#)

Selected Dependencies

Web

Web ✕

Previous **Next** Cancel Help

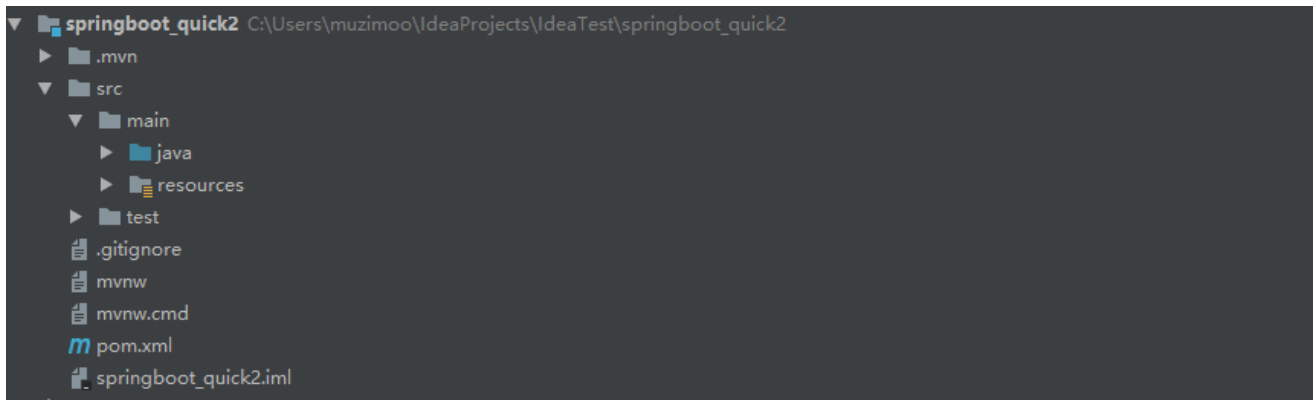
选择SpringBoot需要的启动依赖

Module name:

Content root:

Module file location:

Previous **Finish** Cancel Help



通过idea快速创建的SpringBoot项目的pom.xml中已经导入了我们选择的web的起步依赖的坐标

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <project xmlns="http://maven.apache.org/POM/4.0.0"
3     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
4     xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
5     http://maven.apache.org/xsd/maven-4.0.0.xsd">
6     <modelVersion>4.0.0</modelVersion>
7
8     <groupId>com.itheima</groupId>
9     <artifactId>springboot_quick2</artifactId>
10    <version>0.0.1-SNAPSHOT</version>
11    <packaging>jar</packaging>
12
13    <name>springboot_quick2</name>
14    <description>Demo project for Spring Boot</description>
15
16    <parent>
17        <groupId>org.springframework.boot</groupId>
18        <artifactId>spring-boot-starter-parent</artifactId>
19        <version>2.0.1.RELEASE</version>
20        <relativePath/> <!-- lookup parent from repository -->
21    </parent>
22
23    <properties>
24        <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
25        <project.reporting.outputEncoding>UTF-8</project.reporting.outputEncoding>
26        <java.version>9</java.version>
27    </properties>
28
29    <dependencies>
30        <dependency>
31            <groupId>org.springframework.boot</groupId>
32            <artifactId>spring-boot-starter-web</artifactId>
33        </dependency>
34
35        <dependency>
36            <groupId>org.springframework.boot</groupId>
37            <artifactId>spring-boot-starter-test</artifactId>
38            <scope>test</scope>
```

```

37     </dependency>
38 </dependencies>
39
40 <build>
41     <plugins>
42         <plugin>
43             <groupId>org.springframework.boot</groupId>
44             <artifactId>spring-boot-maven-plugin</artifactId>
45         </plugin>
46     </plugins>
47 </build>
48
49
50 </project>
51

```

可以使用快速入门的方式创建Controller进行访问，此处不再赘述

三、SpringBoot原理分析

3.1 起步依赖原理分析

3.1.1 分析spring-boot-starter-parent

按住Ctrl点击pom.xml中的spring-boot-starter-parent，跳转到了spring-boot-starter-parent的pom.xml，xml配置如下（只摘抄了部分重点配置）：

```

1 <parent>
2   <groupId>org.springframework.boot</groupId>
3   <artifactId>spring-boot-dependencies</artifactId>
4   <version>2.0.1.RELEASE</version>
5   <relativePath>../../spring-boot-dependencies</relativePath>
6 </parent>

```

按住Ctrl点击pom.xml中的spring-boot-starter-dependencies，跳转到了spring-boot-starter-dependencies的pom.xml，xml配置如下（只摘抄了部分重点配置）：

```

1 <properties>
2   <activemq.version>5.15.3</activemq.version>
3   <antlr2.version>2.7.7</antlr2.version>
4   <appengine-sdk.version>1.9.63</appengine-sdk.version>
5   <artemis.version>2.4.0</artemis.version>
6   <aspectj.version>1.8.13</aspectj.version>
7   <assertj.version>3.9.1</assertj.version>
8   <atomikos.version>4.0.6</atomikos.version>
9   <bitronix.version>2.1.4</bitronix.version>
10  <build-helper-maven-plugin.version>3.0.0</build-helper-maven-plugin.version>

```

```

11     <byte-buddy.version>1.7.11</byte-buddy.version>
12     ... ..
13 </properties>
14 <dependencyManagement>
15     <dependencies>
16         <dependency>
17             <groupId>org.springframework.boot</groupId>
18             <artifactId>spring-boot</artifactId>
19             <version>2.0.1.RELEASE</version>
20         </dependency>
21         <dependency>
22             <groupId>org.springframework.boot</groupId>
23             <artifactId>spring-boot-test</artifactId>
24             <version>2.0.1.RELEASE</version>
25         </dependency>
26         ... ..
27     </dependencies>
28 </dependencyManagement>
29 <build>
30     <pluginManagement>
31         <plugins>
32             <plugin>
33                 <groupId>org.jetbrains.kotlin</groupId>
34                 <artifactId>kotlin-maven-plugin</artifactId>
35                 <version>${kotlin.version}</version>
36             </plugin>
37             <plugin>
38                 <groupId>org.jooq</groupId>
39                 <artifactId>jooq-codegen-maven</artifactId>
40                 <version>${jooq.version}</version>
41             </plugin>
42             <plugin>
43                 <groupId>org.springframework.boot</groupId>
44                 <artifactId>spring-boot-maven-plugin</artifactId>
45                 <version>2.0.1.RELEASE</version>
46             </plugin>
47             ... ..
48         </plugins>
49     </pluginManagement>
50 </build>

```

从上面的spring-boot-starter-dependencies的pom.xml中我们可以发现，一部分坐标的版本、依赖管理、插件管理已经定义好，所以我们的SpringBoot工程继承spring-boot-starter-parent后已经具备版本锁定等配置了。所以起步依赖的作用就是进行依赖的传递。

3.1.2 分析spring-boot-starter-web

按住Ctrl点击pom.xml中的spring-boot-starter-web，跳转到了spring-boot-starter-web的pom.xml，xml配置如下（只摘抄了部分重点配置）：

```

1 <?xml version="1.0" encoding="UTF-8"?>
2 <project xsi:schemaLocation="http://maven.apache.org/POM/4.0.0

```

```
3 http://maven.apache.org/xsd/maven-4.0.0.xsd"
4 xmlns="http://maven.apache.org/POM/4.0.0"
5   xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
6     <modelVersion>4.0.0</modelVersion>
7     <parent>
8       <groupId>org.springframework.boot</groupId>
9       <artifactId>spring-boot-starters</artifactId>
10      <version>2.0.1.RELEASE</version>
11    </parent>
12    <groupId>org.springframework.boot</groupId>
13    <artifactId>spring-boot-starter-web</artifactId>
14    <version>2.0.1.RELEASE</version>
15    <name>Spring Boot Web Starter</name>
16
17    <dependencies>
18      <dependency>
19        <groupId>org.springframework.boot</groupId>
20        <artifactId>spring-boot-starter</artifactId>
21        <version>2.0.1.RELEASE</version>
22        <scope>compile</scope>
23      </dependency>
24      <dependency>
25        <groupId>org.springframework.boot</groupId>
26        <artifactId>spring-boot-starter-json</artifactId>
27        <version>2.0.1.RELEASE</version>
28        <scope>compile</scope>
29      </dependency>
30      <dependency>
31        <groupId>org.springframework.boot</groupId>
32        <artifactId>spring-boot-starter-tomcat</artifactId>
33        <version>2.0.1.RELEASE</version>
34        <scope>compile</scope>
35      </dependency>
36      <dependency>
37        <groupId>org.hibernate.validator</groupId>
38        <artifactId>hibernate-validator</artifactId>
39        <version>6.0.9.Final</version>
40        <scope>compile</scope>
41      </dependency>
42      <dependency>
43        <groupId>org.springframework</groupId>
44        <artifactId>spring-web</artifactId>
45        <version>5.0.5.RELEASE</version>
46        <scope>compile</scope>
47      </dependency>
48      <dependency>
49        <groupId>org.springframework</groupId>
50        <artifactId>spring-webmvc</artifactId>
51        <version>5.0.5.RELEASE</version>
52        <scope>compile</scope>
53      </dependency>
54    </dependencies>
55  </project>
```

从上面的spring-boot-starter-web的pom.xml中我们可以发现，spring-boot-starter-web就是将web开发要使用的spring-web、spring-webmvc等坐标进行了“打包”，这样我们的工程只要引入spring-boot-starter-web起步依赖的坐标就可以进行web开发了，同样体现了依赖传递的作用。

3.2 自动配置原理解析

按住Ctrl点击查看启动类MySpringBootApplication上的注解@SpringBootApplication

```

1 @SpringBootApplication
2 public class MySpringBootApplication {
3     public static void main(String[] args) {
4         SpringApplication.run(MySpringBootApplication.class);
5     }
6 }

```

注解@SpringBootApplication的源码

```

1 @Target(ElementType.TYPE)
2 @Retention(RetentionPolicy.RUNTIME)
3 @Documented
4 @Inherited
5 @SpringBootConfiguration
6 @EnableAutoConfiguration
7 @ComponentScan(excludeFilters = {
8     @Filter(type = FilterType.CUSTOM, classes = TypeExcludeFilter.class),
9     @Filter(type = FilterType.CUSTOM, classes =
10     AutoConfigurationExcludeFilter.class) })
11 public @interface SpringBootApplication {
12     /**
13      * Exclude specific auto-configuration classes such that they will never be
14      * applied.
15      * @return the classes to exclude
16      */
17     @AliasFor(annotation = EnableAutoConfiguration.class)
18     Class<?>[] exclude() default {};
19     ... ..
20
21 }

```

其中，

@SpringBootConfiguration：等同与@Configuration，既标注该类是Spring的一个配置类

@EnableAutoConfiguration：SpringBoot自动配置功能开启

按住Ctrl点击查看注解@EnableAutoConfiguration

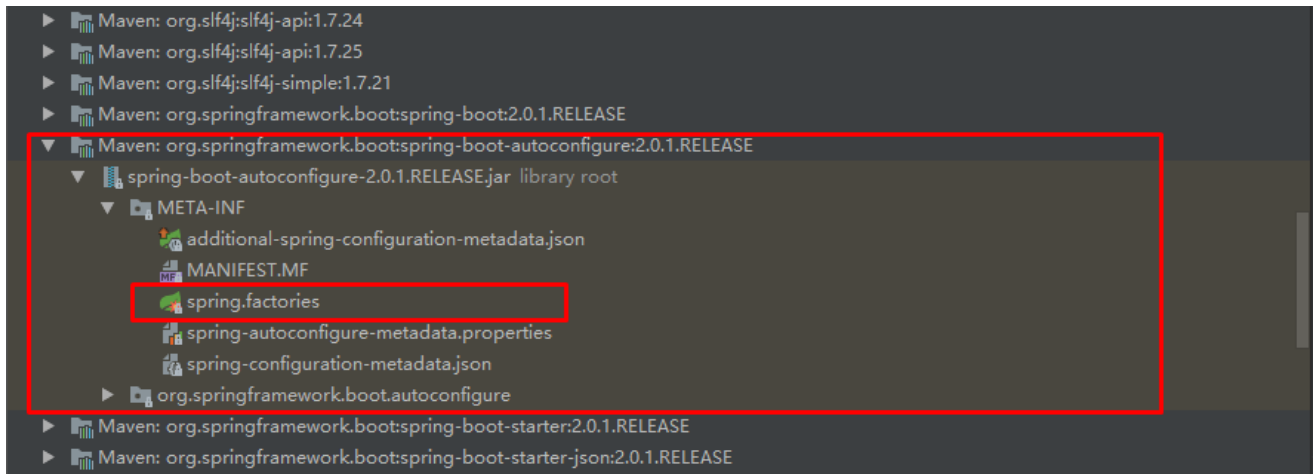
```
1 @Target(ElementType.TYPE)
2 @Retention(RetentionPolicy.RUNTIME)
3 @Documented
4 @Inherited
5 @AutoConfigurationPackage
6 @Import(AutoConfigurationImportSelector.class)
7 public @interface EnableAutoConfiguration {
8     ... ..
9 }
```

其中, @Import(AutoConfigurationImportSelector.class) 导入了AutoConfigurationImportSelector类

按住Ctrl点击查看AutoConfigurationImportSelector源码

```
1 public String[] selectImports(AnnotationMetadata annotationMetadata) {
2     ... ..
3     List<String> configurations = getCandidateConfigurations(annotationMetadata,
4                                                             attributes);
5     configurations = removeDuplicates(configurations);
6     Set<String> exclusions = getExclusions(annotationMetadata, attributes);
7     checkExcludedClasses(configurations, exclusions);
8     configurations.removeAll(exclusions);
9     configurations = filter(configurations, autoConfigurationMetadata);
10    fireAutoConfigurationImportEvents(configurations, exclusions);
11    return StringUtils.toStringArray(configurations);
12 }
13
14
15 protected List<String> getCandidateConfigurations(AnnotationMetadata metadata,
16                                                  AnnotationAttributes attributes) {
17     List<String> configurations = SpringFactoriesLoader.loadFactoryNames(
18         getSpringFactoriesLoaderFactoryClass(), getBeanClassLoader());
19
20     return configurations;
21 }
22
```

其中, SpringFactoriesLoader.loadFactoryNames 方法的作用就是从META-INF/spring.factories文件中读取指定类对应的类名称列表



spring.factories 文件中有关自动配置的配置信息如下:

```
1  ... ..
2
3  org.springframework.boot.autoconfigure.web.reactive.function.client.WebClientAutoConf
4  igation,\
5  org.springframework.boot.autoconfigure.web.servlet.DispatcherServletAutoConfiguration
6  ,\
7  org.springframework.boot.autoconfigure.web.servlet.ServletWebServerFactoryAutoConfigu
8  ration,\
9  org.springframework.boot.autoconfigure.web.servlet.error.ErrorMvcAutoConfiguration,\
10 org.springframework.boot.autoconfigure.web.servlet.HttpEncodingAutoConfiguration,\
11 org.springframework.boot.autoconfigure.web.servlet.MultipartAutoConfiguration,\
12 ... ..
```

上面配置文件存在大量的以Configuration为结尾的类名称, 这些类就是存有自动配置信息的类, 而SpringApplication在获取这些类名后再加载

我们以ServletWebServerFactoryAutoConfiguration为例来分析源码:

```
1  @Configuration
2  @AutoConfigureOrder(Ordered.HIGHEST_PRECEDENCE)
3  @ConditionalOnClass(ServletRequest.class)
4  @ConditionalOnWebApplication(type = Type.SERVLET)
5  @EnableConfigurationProperties(ServerProperties.class)
6  @Import({ ServletWebServerFactoryAutoConfiguration.BeanPostProcessorsRegistrar.class,
7           ServletWebServerFactoryConfiguration.EmbeddedTomcat.class,
8           ServletWebServerFactoryConfiguration.EmbeddedJetty.class,
9           ServletWebServerFactoryConfiguration.EmbeddedUndertow.class })
10 public class ServletWebServerFactoryAutoConfiguration {
11     ... ..
12 }
13
```

其中,

@EnableConfigurationProperties(ServerProperties.class) 代表加载ServerProperties服务器配置属性类

进入ServerProperties.class源码如下：

```
1 @ConfigurationProperties(prefix = "server", ignoreUnknownFields = true)
2 public class ServerProperties {
3
4     /**
5      * Server HTTP port.
6      */
7     private Integer port;
8
9     /**
10     * Network address to which the server should bind.
11     */
12     private InetAddress address;
13
14     ... ..
15
16 }
```

其中，

prefix = "server" 表示SpringBoot配置文件中的前缀，SpringBoot会将配置文件中以server开始的属性映射到该类的字段中。映射关系如下：



四、SpringBoot的配置文件

4.1 SpringBoot配置文件类型

4.1.1 SpringBoot配置文件类型和作用

SpringBoot是基于约定的，所以很多配置都有默认值，但如果想使用自己的配置替换默认配置的话，就可以使用 application.properties 或者 application.yml (application.yaml) 进行配置。

SpringBoot默认会从Resources目录下加载 application.properties 或 application.yml (application.yaml) 文件

其中，application.properties文件是键值对类型的文件，之前一直在使用，所以此处不在对properties文件的格式进行阐述。除了properties文件外，SpringBoot还可以使用yaml文件进行配置，下面对yaml文件进行讲解。

4.1.2 application.yml配置文件

4.1.2.1 yaml配置文件简介

YML文件格式是YAML (YAML Ain't Markup Language)编写的文件格式，YAML是一种直观的能够被电脑识别的的数据序列化格式，并且容易被人类阅读，容易和脚本语言交互的，可以被支持YAML库的不同的编程语言程序导入，比如：C/C++，Ruby，Python，Java，Perl，C#，PHP等。YML文件是以数据为核心的，比传统的xml方式更加简洁。

YML文件的扩展名可以使用.yml或者.yaml。

4.1.2.2 yaml配置文件的语法

4.1.2.2.1 配置普通数据

- 语法：key: value
- 示例代码：

```
1 name: haohao
```

- 注意：value之前有一个空格

4.1.2.2.2 配置对象数据

- 语法：
key:
key1: value1
key2: value2
或者：
key: {key1: value1, key2: value2}
- 示例代码：

```
1 person:  
2   name: haohao  
3   age: 31  
4   addr: beijing  
5  
6 #或者  
7  
8 person: {name: haohao, age: 31, addr: beijing}
```

- 注意：key1前面的空格个数不限定，在yaml语法中，相同缩进代表同一个级别

4.1.2.2.2 配置Map数据

同上面的对象写法

4.1.2.2.3 配置数组 (List、Set) 数据

- 语法:

key:

- value1

- value2

或者:

key: [value1,value2]

- 示例代码:

```
1  city:
2    - beijing
3    - tianjin
4    - shanghai
5    - chongqing
6
7  #或者
8
9  city: [beijing,tianjin,shanghai,chongqing]
10
11 #集合中的元素是对象形式
12 student:
13   - name: zhangsan
14     age: 18
15     score: 100
16   - name: lisi
17     age: 28
18     score: 88
19   - name: wangwu
20     age: 38
21     score: 90
```

- 注意: value1与之间的 - 之间存在一个空格

4.1.3 SpringBoot配置信息的查询

上面提及过, SpringBoot的配置文件, 主要的就是对配置信息进行修改的, 但在配置时的key从哪里去查询呢? 我们可以查阅SpringBoot的官方文档

文档URL: <https://docs.spring.io/spring-boot/docs/2.0.1.RELEASE/reference/htmlsingle/#common-application-properties>

常用的配置摘抄如下:

```
1  # QUARTZ SCHEDULER (QuartzProperties)
2  spring.quartz.jdbc.initialize-schema=embedded # Database schema initialization mode.
3  spring.quartz.jdbc.schema=classpath:org/quartz/impl/jdbcjobstore/tables_@@platform@@.
   sql # Path to the SQL file to use to initialize the database schema.
4  spring.quartz.job-store-type=memory # Quartz job store type.
```

```

5  spring.quartz.properties.*= # Additional Quartz Scheduler properties.
6
7  # -----
8  # WEB PROPERTIES
9  # -----
10
11 # EMBEDDED SERVER CONFIGURATION (ServerProperties)
12 server.port=8080 # Server HTTP port.
13 server.servlet.context-path= # Context path of the application.
14 server.servlet.path=/ # Path of the main dispatcher servlet.
15
16 # HTTP encoding (HttpEncodingProperties)
17 spring.http.encoding.charset=UTF-8 # Charset of HTTP requests and responses. Added to
the "Content-Type" header if not set explicitly.
18
19 # JACKSON (JacksonProperties)
20 spring.jackson.date-format= # Date format string or a fully-qualified date format
class name. For instance, `yyyy-MM-dd HH:mm:ss`.
21
22 # SPRING MVC (WebMvcProperties)
23 spring.mvc.servlet.load-on-startup=-1 # Load on startup priority of the dispatcher
servlet.
24 spring.mvc.static-path-pattern=/** # Path pattern used for static resources.
25 spring.mvc.view.prefix= # Spring MVC view prefix.
26 spring.mvc.view.suffix= # Spring MVC view suffix.
27
28 # DATASOURCE (DataSourceAutoConfiguration & DataSourceProperties)
29 spring.datasource.driver-class-name= # Fully qualified name of the JDBC driver. Auto-
detected based on the URL by default.
30 spring.datasource.password= # Login password of the database.
31 spring.datasource.url= # JDBC URL of the database.
32 spring.datasource.username= # Login username of the database.
33
34 # JEST (Elasticsearch HTTP client) (JestProperties)
35 spring.elasticsearch.jest.password= # Login password.
36 spring.elasticsearch.jest.proxy.host= # Proxy host the HTTP client should use.
37 spring.elasticsearch.jest.proxy.port= # Proxy port the HTTP client should use.
38 spring.elasticsearch.jest.read-timeout=3s # Read timeout.
39 spring.elasticsearch.jest.username= # Login username.
40

```

我们可以通过配置application.properties 或者 application.yml 来修改SpringBoot的默认配置

例如:

application.properties文件

```

1  server.port=8888
2  server.servlet.context-path=demo

```

application.yml文件

```
1 server:
2   port: 8888
3   servlet:
4     context-path: /demo
```

4.2 配置文件与配置类的属性映射方式

4.2.1 使用注解@Value映射

我们可以通过@Value注解将配置文件中的值映射到一个Spring管理的Bean的字段上

例如:

application.properties配置如下:

```
1 person:
2   name: zhangsan
3   age: 18
```

或者, application.yml配置如下:

```
1 person:
2   name: zhangsan
3   age: 18
```

实体Bean代码如下:

```
1 @Controller
2 public class QuickStartController {
3
4     @Value("${person.name}")
5     private String name;
6     @Value("${person.age}")
7     private Integer age;
8
9
10    @RequestMapping("/quick")
11    @ResponseBody
12    public String quick(){
13        return "springboot 访问成功! name="+name+",age="+age;
14    }
15
16 }
```

浏览器访问地址: <http://localhost:8080/quick> 结果如下:



4.2.2 使用注解@ConfigurationProperties映射

通过注解@ConfigurationProperties(prefix="配置文件中的key的前缀")可以将配置文件中的配置自动与实体进行映射

application.properties配置如下:

```
1 person:
2   name: zhangsan
3   age: 18
```

或者, application.yml配置如下:

```
1 person:
2   name: zhangsan
3   age: 18
```

实体Bean代码如下:

```
1 @Controller
2 @ConfigurationProperties(prefix = "person")
3 public class QuickStartController {
4
5     private String name;
6     private Integer age;
7
8     @RequestMapping("/quick")
9     @ResponseBody
10    public String quick(){
11        return "springboot 访问成功! name="+name+",age="+age;
12    }
13
14    public void setName(String name) {
15        this.name = name;
16    }
17
18    public void setAge(Integer age) {
19        this.age = age;
20    }
21 }
```

浏览器访问地址: <http://localhost:8080/quick> 结果如下:



注意: 使用@ConfigurationProperties方式可以进行配置文件与实体字段的自动映射, 但需要字段必须提供set方法才可以, 而使用@Value注解修饰的字段不需要提供set方法

五、SpringBoot与整合其他技术

5.1 SpringBoot整合Mybatis

5.1.1 添加Mybatis的起步依赖

```
1 <!--mybatis起步依赖-->
2 <dependency>
3     <groupId>org.mybatis.spring.boot</groupId>
4     <artifactId>mybatis-spring-boot-starter</artifactId>
5     <version>1.1.1</version>
6 </dependency>
```

5.1.2 添加数据库驱动坐标

```
1 <!-- MySQL连接驱动 -->
2 <dependency>
3     <groupId>mysql</groupId>
4     <artifactId>mysql-connector-java</artifactId>
5 </dependency>
```

5.1.3 添加数据库连接信息

在application.properties中添加数据库的连接信息

```
1 #DB Configuration:
2 spring.datasource.driverClassName=com.mysql.jdbc.Driver
3 spring.datasource.url=jdbc:mysql://127.0.0.1:3306/test?
  useUnicode=true&characterEncoding=utf8
4 spring.datasource.username=root
5 spring.datasource.password=root
```

5.1.4 创建user表

在test数据库中创建user表

```
1  -----
2  -- Table structure for `user`
3  -----
4  DROP TABLE IF EXISTS `user`;
5  CREATE TABLE `user` (
6    `id` int(11) NOT NULL AUTO_INCREMENT,
7    `username` varchar(50) DEFAULT NULL,
8    `password` varchar(50) DEFAULT NULL,
9    `name` varchar(50) DEFAULT NULL,
10   PRIMARY KEY (`id`)
11  ) ENGINE=InnoDB AUTO_INCREMENT=10 DEFAULT CHARSET=utf8;
12
13  -----
14  -- Records of user
15  -----
16  INSERT INTO `user` VALUES ('1', 'zhangsan', '123', '张三');
17  INSERT INTO `user` VALUES ('2', 'lisi', '123', '李四');
```

5.1.5 创建实体Bean

```
1  public class User {
2      // 主键
3      private Long id;
4      // 用户名
5      private String username;
6      // 密码
7      private String password;
8      // 姓名
9      private String name;
10
11     //此处省略getter和setter方法 ... ..
12
13 }
```

5.1.6 编写Mapper

```
1  @Mapper
2  public interface UserMapper {
3      public List<User> queryUserList();
4  }
```

注意：@Mapper标记该类是一个mybatis的mapper接口，可以被spring boot自动扫描到spring上下文中

5.1.7 配置Mapper映射文件

在src\main\resources\mapper路径下加入UserMapper.xml配置文件"

```

1 <?xml version="1.0" encoding="utf-8" ?>
2 <!DOCTYPE mapper PUBLIC "-//mybatis.org//DTD Mapper 3.0//EN"
  "http://mybatis.org/dtd/mybatis-3-mapper.dtd" >
3 <mapper namespace="com.itheima.mapper.UserMapper">
4   <select id="queryUserList" resultType="user">
5     select * from user
6   </select>
7 </mapper>

```

5.1.8 在application.properties中添加mybatis的信息

```

1 #spring集成Mybatis环境
2 #pojo别名扫描包
3 mybatis.type-aliases-package=com.itheima.domain
4 #加载Mybatis映射文件
5 mybatis.mapper-locations=classpath:mapper/*Mapper.xml

```

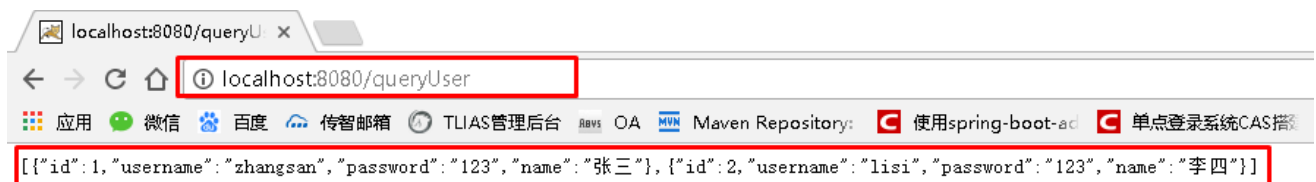
5.1.9 编写测试Controller

```

1 @Controller
2 public class MapperController {
3
4     @Autowired
5     private UserMapper userMapper;
6
7     @RequestMapping("/queryUser")
8     @ResponseBody
9     public List<User> queryUser(){
10         List<User> users = userMapper.queryUserList();
11         return users;
12     }
13
14 }

```

5.1.10 测试



5.2 SpringBoot整合Junit

5.2.1 添加Junit的起步依赖

```
1 <!--测试的起步依赖-->
2 <dependency>
3     <groupId>org.springframework.boot</groupId>
4     <artifactId>spring-boot-starter-test</artifactId>
5     <scope>test</scope>
6 </dependency>
```

5.2.2 编写测试类

```
1 package com.itheima.test;
2
3 import com.itheima.MySpringBootApplication;
4 import com.itheima.domain.User;
5 import com.itheima.mapper.UserMapper;
6 import org.junit.Test;
7 import org.junit.runner.RunWith;
8 import org.springframework.beans.factory.annotation.Autowired;
9 import org.springframework.boot.test.context.SpringBootTest;
10 import org.springframework.test.context.junit4.SpringRunner;
11
12 import java.util.List;
13
14 @RunWith(SpringRunner.class)
15 @SpringBootTest(classes = MySpringBootApplication.class)
16 public class MapperTest {
17
18     @Autowired
19     private UserMapper userMapper;
20
21     @Test
22     public void test() {
23         List<User> users = userMapper.queryUserList();
24         System.out.println(users);
25     }
26
27 }
```

其中,

SpringRunner继承自SpringJUnit4ClassRunner, 使用哪一个Spring提供的测试引擎都可以

```
1 public final class SpringRunner extends SpringJUnit4ClassRunner
```

@SpringBootTest的属性指定的是引导类的字节码对象

5.2.3 控制台打印信息

```
1 test passed - 400ms
2018-05-10 09:20:24.377 INFO 7796 --- [main] o.s.w.s.handler.SimpleUrlHandlerMapping
2018-05-10 09:20:24.808 INFO 7796 --- [main] com.itheima.test.MapperTest
2018-05-10 09:20:24.938 INFO 7796 --- [main] com.zaxxer.hikari.HikariDataSource
2018-05-10 09:20:25.188 INFO 7796 --- [main] com.zaxxer.hikari.HikariDataSource
[User{id=1, username='zhangsan', password='123', name='张三'}, User{id=2, username='lisi', password='123', name='李四'}]
2018-05-10 09:20:25.228 INFO 7796 --- [Thread-1] o.s.w.c.s.GenericWebApplicationContext
2018-05-10 09:20:25.228 INFO 7796 --- [Thread-1] com.zaxxer.hikari.HikariDataSource
2018-05-10 09:20:25.228 INFO 7796 --- [Thread-1] com.zaxxer.hikari.HikariDataSource
```

5.3 SpringBoot整合Spring Data JPA

5.3.1 添加Spring Data JPA的起步依赖

```
1 <!-- springBoot JPA的起步依赖 -->
2 <dependency>
3     <groupId>org.springframework.boot</groupId>
4     <artifactId>spring-boot-starter-data-jpa</artifactId>
5 </dependency>
```

5.3.2 添加数据库驱动依赖

```
1 <!-- MySQL连接驱动 -->
2 <dependency>
3     <groupId>mysql</groupId>
4     <artifactId>mysql-connector-java</artifactId>
5 </dependency>
```

5.3.3 在application.properties中配置数据库和jpa的相关属性

```
1 #DB Configuration:
2 spring.datasource.driverClassName=com.mysql.jdbc.Driver
3 spring.datasource.url=jdbc:mysql://127.0.0.1:3306/test?
  useUnicode=true&characterEncoding=utf8
4 spring.datasource.username=root
5 spring.datasource.password=root
6
7 #JPA Configuration:
8 spring.jpa.database=MySQL
9 spring.jpa.show-sql=true
10 spring.jpa.generate-ddl=true
11 spring.jpa.hibernate.ddl-auto=update
12 spring.jpa.hibernate.naming_strategy=org.hibernate.cfg.ImprovedNamingStrategy
```

5.3.4 创建实体配置实体

```
1 @Entity
```

```

2 public class User {
3     // 主键
4     @Id
5     @GeneratedValue(strategy = GenerationType.IDENTITY)
6     private Long id;
7     // 用户名
8     private String username;
9     // 密码
10    private String password;
11    // 姓名
12    private String name;
13
14    //此处省略setter和getter方法... ...
15 }

```

5.3.5 编写UserRepository

```

1 public interface UserRepository extends JpaRepository<User,Long>{
2     public List<User> findAll();
3 }

```

5.3.6 编写测试类

```

1 @RunWith(SpringRunner.class)
2 @SpringBootTest(classes=MySpringBootApplication.class)
3 public class JpaTest {
4
5     @Autowired
6     private UserRepository userRepository;
7
8     @Test
9     public void test(){
10        List<User> users = userRepository.findAll();
11        System.out.println(users);
12    }
13
14 }

```

5.3.7 控制台打印信息

```

1 test passed - 302ms
2018-05-10 10:12:51.109 INFO 1604 --- [main] com.itheima.test.JpaTest : Started Jp
2018-05-10 10:12:51.289 INFO 1604 --- [main] o.h.h.i.QueryTranslatorFactoryInitiator : HHH000397:
Hibernate: select user0 .id as id1 0 , user0 .name as name2 0 , user0 .password as password3 0 , user0 .userna
[User{id=1, username='zhangsan', password='123', name='张三'}, User{id=2, username='lisi', password='123', nam
2018-05-10 10:12:51.441 INFO 1604 --- [Thread-1] o.s.w.c.s.GenericWebApplicationContext : Closing or
2018-05-10 10:12:51.451 INFO 1604 --- [Thread-1] j.LocalContainerEntityManagerFactoryBean : Closing JP

```

注意：如果是jdk9，执行报错如下：

```
Caused by: java.lang.ClassNotFoundException: javax.xml.bind.JAXBException
    at java.base/jdk.internal.loader.BuiltinClassLoader.loadClass(BuiltinClassLoader.java:582)
    at java.base/jdk.internal.loader.ClassLoaders$AppClassLoader.loadClass(ClassLoaders.java:185)
    at java.base/java.lang.ClassLoader.loadClass(ClassLoader.java:496)
    ... 50 more
```

原因: jdk缺少相应的jar

解决方案: 手动导入对应的maven坐标, 如下:

```
1 <!--jdk9需要导入如下坐标-->
2 <dependency>
3     <groupId>javax.xml.bind</groupId>
4     <artifactId>jaxb-api</artifactId>
5     <version>2.3.0</version>
6 </dependency>
```

5.4 SpringBoot整合Redis

5.4.1 添加redis的起步依赖

```
1 <!-- 配置使用redis启动器 -->
2 <dependency>
3     <groupId>org.springframework.boot</groupId>
4     <artifactId>spring-boot-starter-data-redis</artifactId>
5 </dependency>
```

5.4.2 配置redis的连接信息

```
1 #Redis
2 spring.redis.host=127.0.0.1
3 spring.redis.port=6379
```

5.4.3 注入RedisTemplate测试redis操作

```
1 @RunWith(SpringRunner.class)
2 @SpringBootTest(classes = SpringbootJpaApplication.class)
3 public class RedisTest {
4
5     @Autowired
6     private UserRepository userRepository;
7
8     @Autowired
9     private RedisTemplate<String, String> redisTemplate;
10
11     @Test
12     public void test() throws JsonProcessingException {
13         //从redis缓存中获得指定的数据
```

```
14     String userListData = redisTemplate.boundValueOps("user.findAll").get();
15     //如果redis中没有数据的话
16     if(null==userListData){
17         //查询数据库获得数据
18         List<User> all = userRepository.findAll();
19         //转换成json格式字符串
20         ObjectMapper om = new ObjectMapper();
21         userListData = om.writeValueAsString(all);
22         //将数据存储到redis中,下次在查询直接从redis中获得数据,不用在查询数据库
23         redisTemplate.boundValueOps("user.findAll").set(userListData);
24         System.out.println("=====从数据库获得数据=====");
25     }else{
26         System.out.println("=====从redis缓存中获得数据=====");
27     }
28
29     System.out.println(userListData);
30
31 }
32
33 }
```