Servlet综合练习

本节目标

> -

介绍

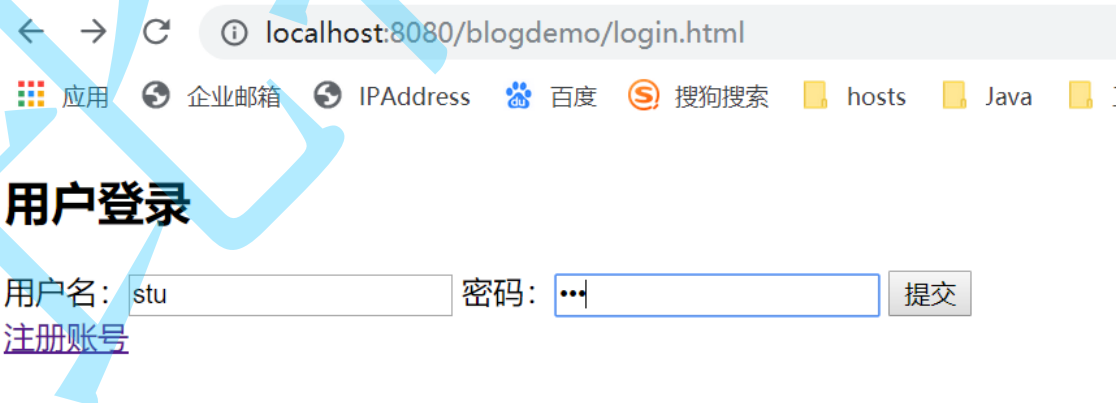
功能简介

实现一个简易的博客功能，包括用户登录、注册，发表新文章，显示文章详情，显示文章列表，显示文章列表接口访问量。

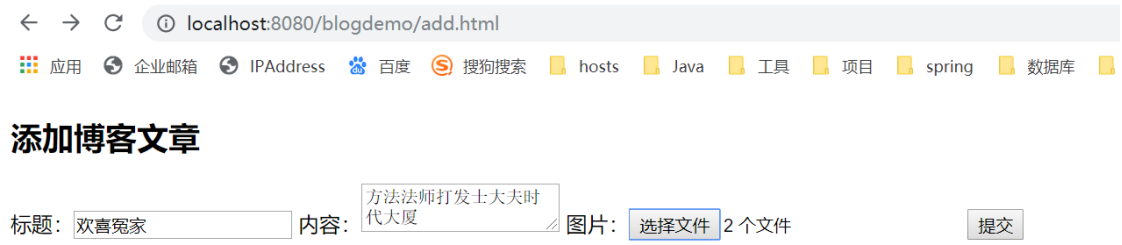
业务流程

- 用户注册页面：需要注册后才可以登录并操作

- 用户登录页面：登录后才可以发表新文章

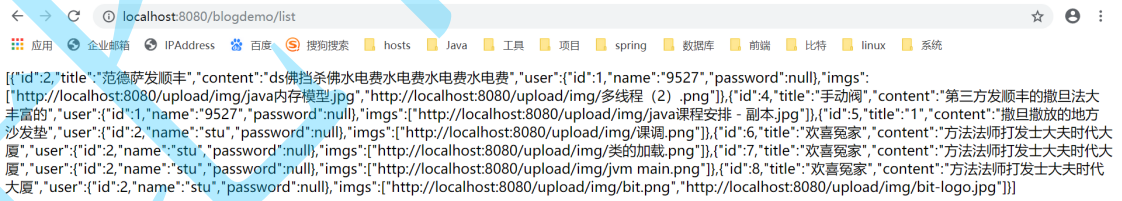


- 发表文章：如果没有登录，就退出到登录页面，只有登录的用户才可以发表新文章

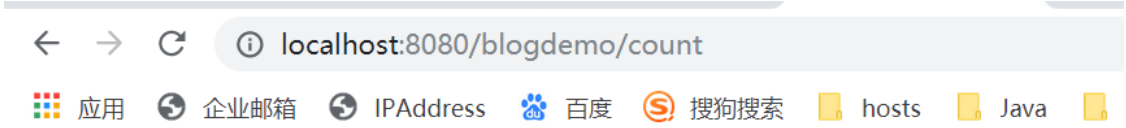


- 显示文章详情：发表文章成功后跳转到文章详情。也可以单独访问文章详情

- 显示文章列表：url输入地址后访问，显示所有文章信息



- 显示文章列表访问量：统计服务器启动后，新增文章接口的访问次数



list接口的访问次数为：1

使用的技术

maven：使用maven来管理依赖，打包项目

mysql：使用MySQL作为业务数据的存储

html：使用HTML来编写前端页面

tomcat：使用Tomcat作为Web项目部署的服务器

servlet：每个页面调用后台接口都需要使用Servlet来完成业务。

session：在登录后才可以访问新增文章接口，否则直接返回到登录页面

jackson：jackson是java对象与JSON字符串数据进行序列化、反序列化的工具。

多线程：synchronized、volatile关键字，在多线程下访问Servlet共享变量，需要保证线程安全

项目准备

需要的资源

Maven、IDEA、MySQL、Chrome浏览器、Fiddler4抓包工具

创建Web项目

1. 在IDEA中，点击 File -> New -> Module，选择Maven -> Next。
2. 在GroupId和ArtifactId中分别输入组织名和项目名，注意上面的两项Add as module to和Parent都设置为none。完成以后Next。
3. 设置项目名和本地保存路径，完成后点击Finish
4. 在弹出的项目pom.xml文件中配置：

```
<?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.bit</groupId>
    <artifactId>blogdemo</artifactId>
    <version>1.0-SNAPSHOT</version>
    <!-- web项目需要配置为war，表示打包为war文件 -->
    <packaging>war</packaging>
```

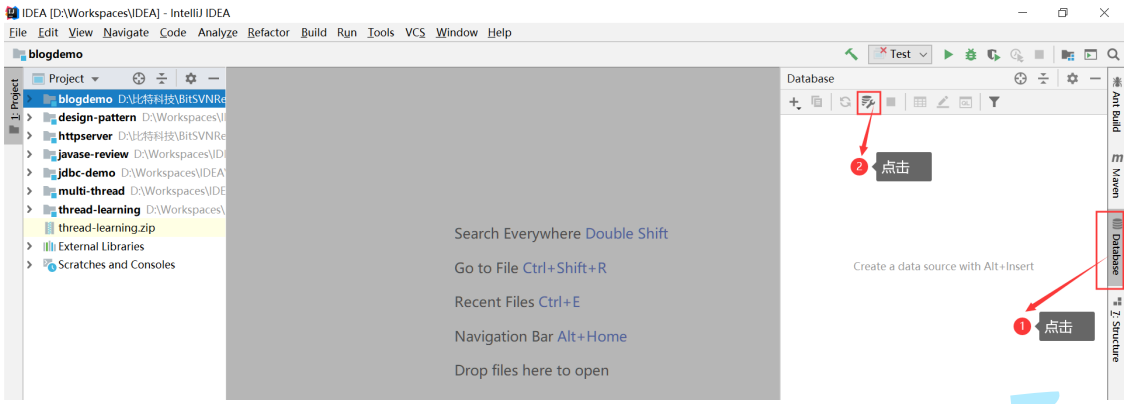
```
    <dependencies>
        <!-- MySQL数据库JDBC驱动包 -->
        <dependency>
            <groupId>mysql</groupId>
            <artifactId>mysql-connector-java</artifactId>
            <version>5.1.38</version>
        </dependency>
        <!--jackson：提供Java对象与JSON数据格式进行序列化
                    及反序列化的支持 -->
        <dependency>
            <groupId>com.fasterxml.jackson.core</groupId>
            <artifactId>jackson-databind</artifactId>
            <version>2.8.9</version>
        </dependency>

        <!-- 使用官方的servlet依赖，并配置为scope=provided，表示在打包时不打入war包
中 -->
        <dependency>
            <groupId>javax.servlet</groupId>
            <artifactId>javax.servlet-api</artifactId>
            <version>3.0.1</version>
            <scope>provided</scope>
        </dependency>

        <!-- 日志记录框架：logback -->
        <dependency>
            <groupId>ch.qos.logback</groupId>
            <artifactId>logback-classic</artifactId>
            <version>1.2.3</version>
        </dependency>
    </dependencies>

    <build>
        <!-- 最后使用mvn package命令打包的文件名称 -->
        <finalName>${project.artifactId}</finalName>
        <plugins>
            <plugin>
                <artifactId>maven-compiler-plugin</artifactId>
                <version>3.8.1</version>
                <configuration>
                    <source>1.8</source>
                    <target>1.8</target>
                    <encoding>UTF-8</encoding>
                </configuration>
            </plugin>
        </plugins>
    </build>
</project>
```

5. 在

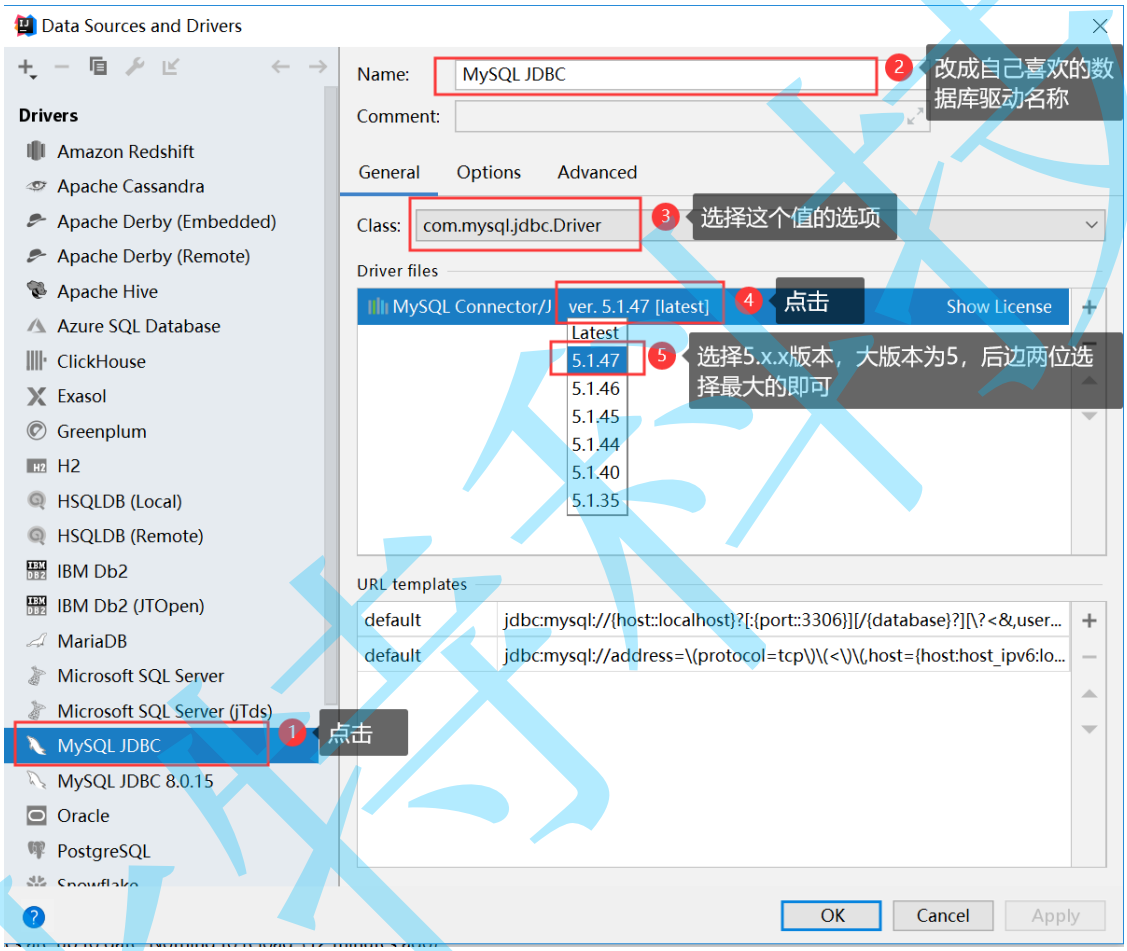
项目及IDEA配置

- idea中的数据库连接配置

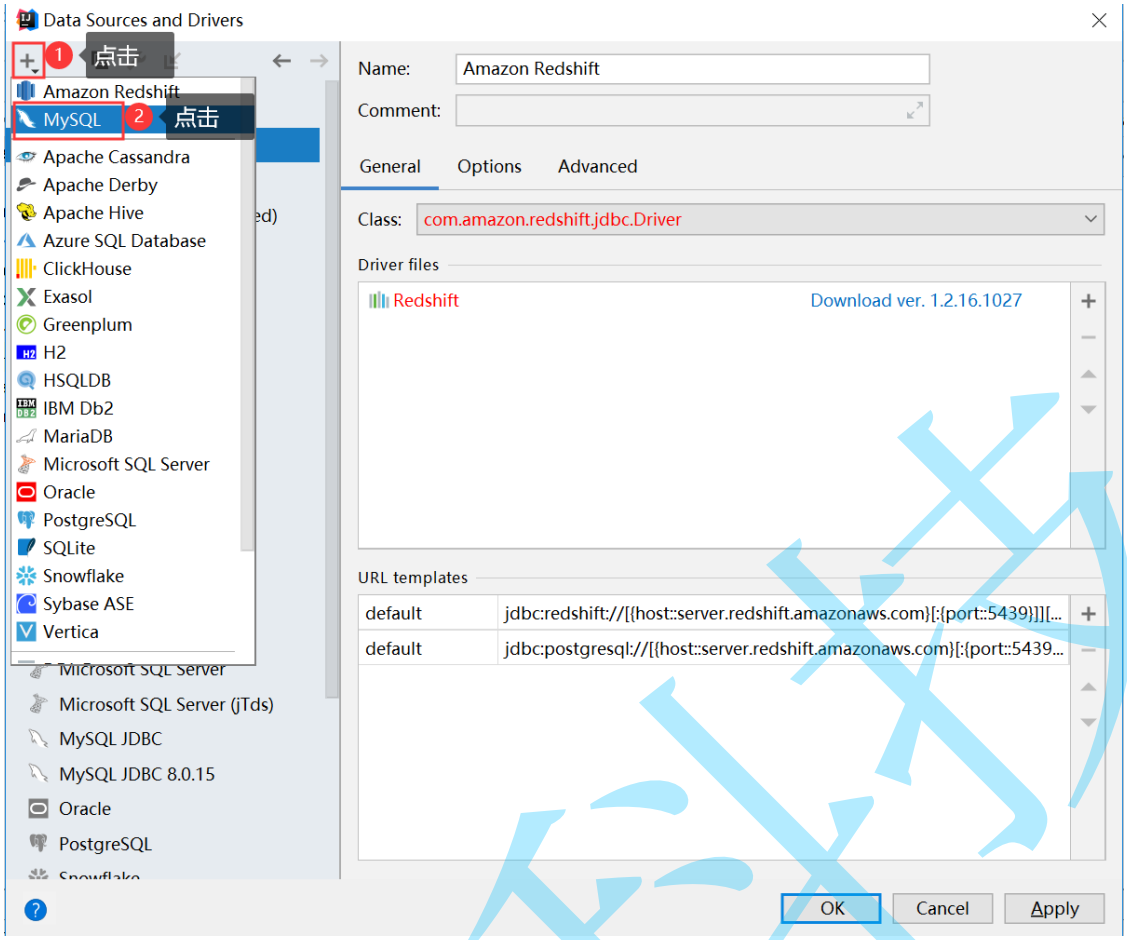
  （1）从idea的database面板打开数据库驱动配置



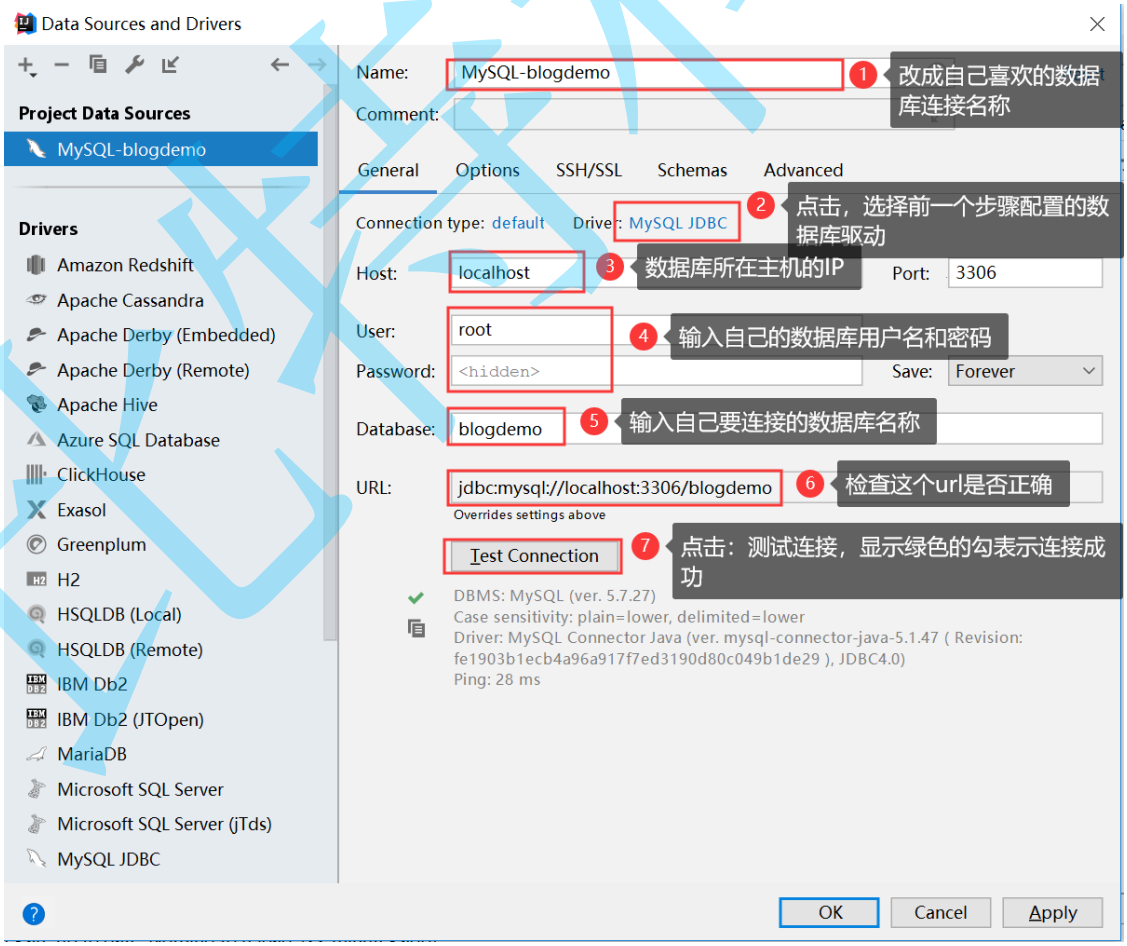
（2）配置数据库驱动



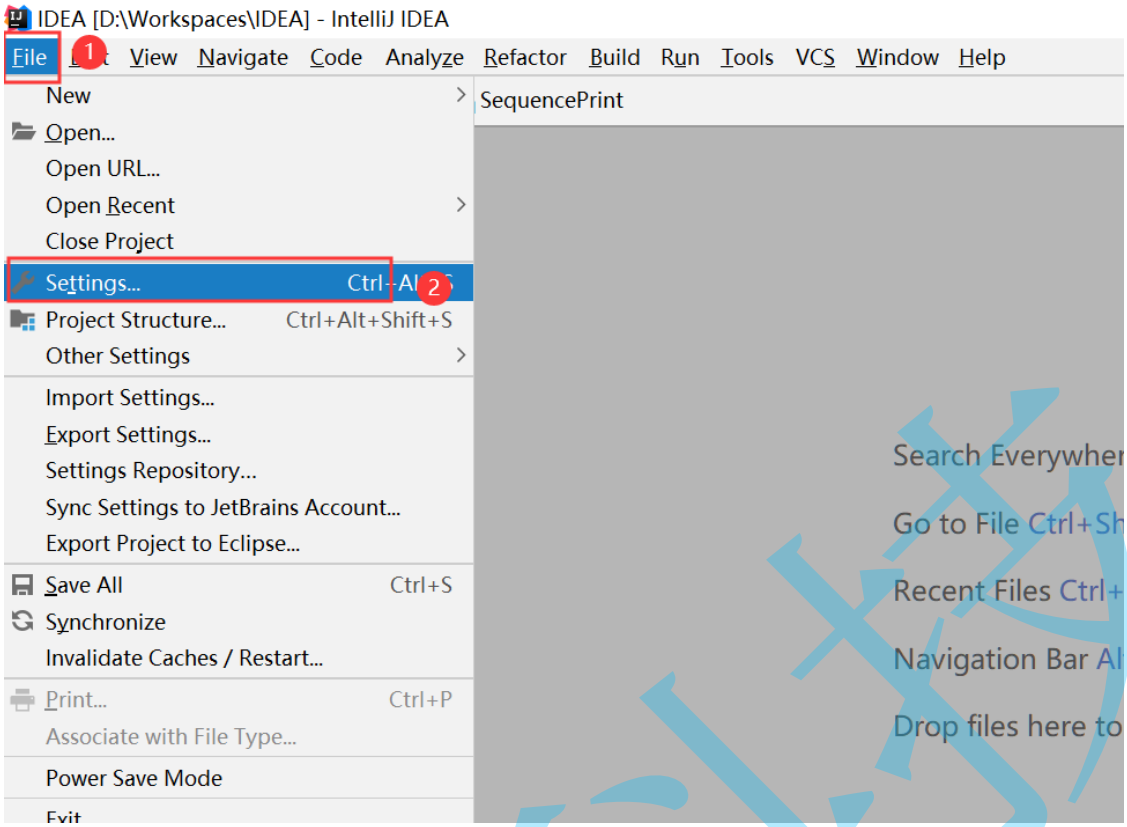
（3）打开数据库连接配置

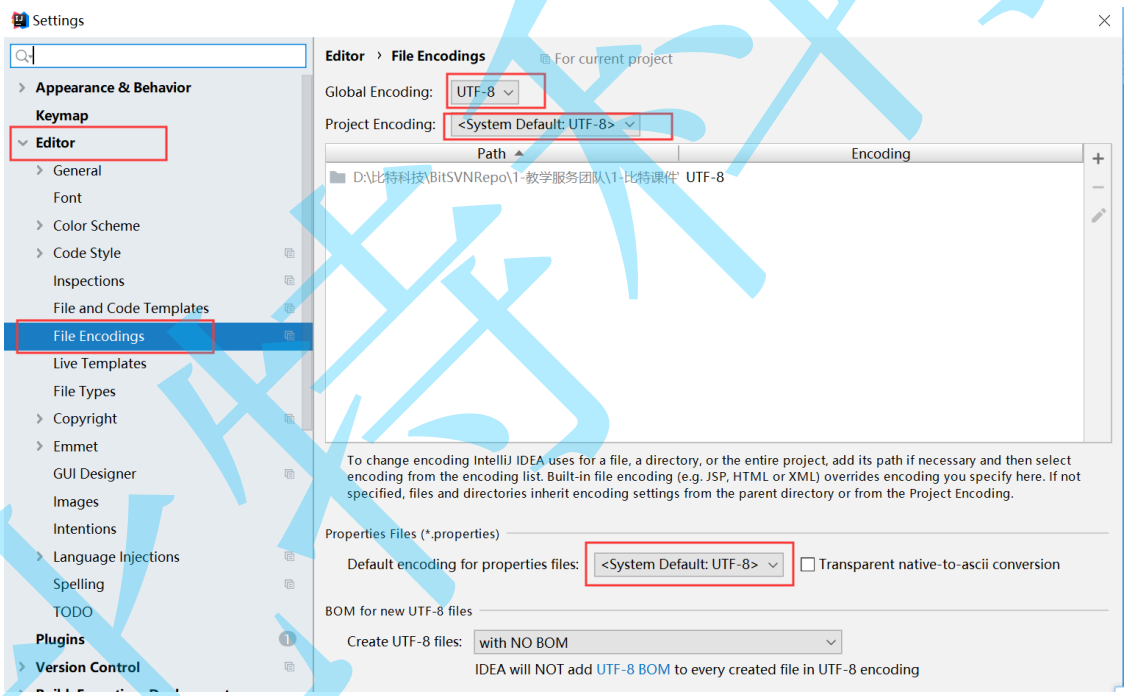


（4）配置数据库连接

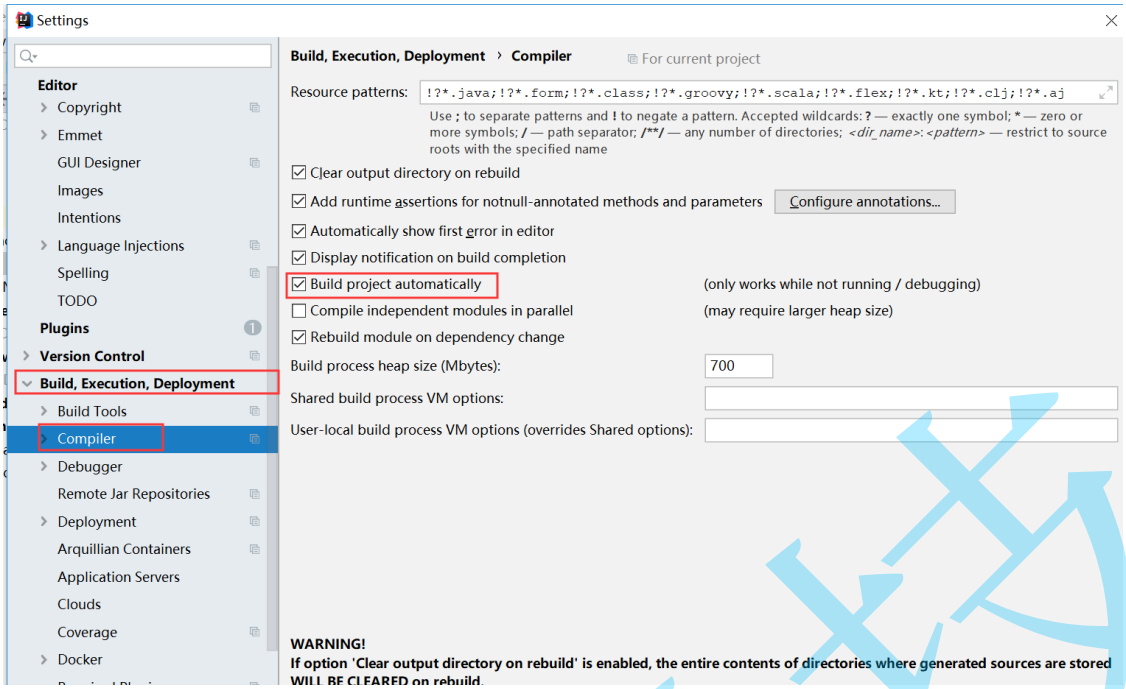


- IDEA编码设置

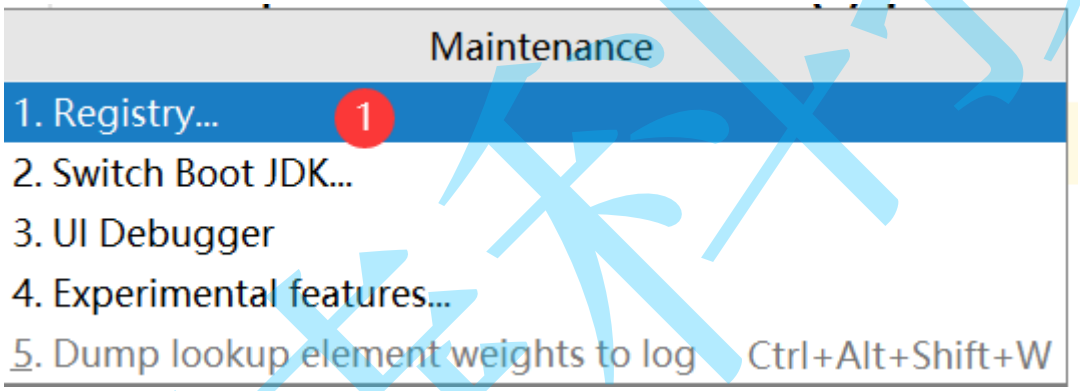

IDEA [D:\Workspaces\IDEA] - IntelliJ IDEA
File
1
View
Navigate
Code
Analyze
Refactor
Build
Run
Tools
VCS
Window
Help
New
Open...
Open URL...
Open Recent
Close Project
Settings...
2
Project Structure... Ctrl+Alt+Shift+S
Other Settings
Import Settings...
Export Settings...
Settings Repository...
Sync Settings to JetBrains Account...
Export Project to Eclipse...
Save All Ctrl+S
Synchronize
Invalidate Caches / Restart...
Print... Ctrl+P
Associate with File Type...
Power Save Mode
Exit
SequencePrint
Search Everywher
Go to File Ctrl+Sh
Recent Files Ctrl+
Navigation Bar Al
Drop files here to

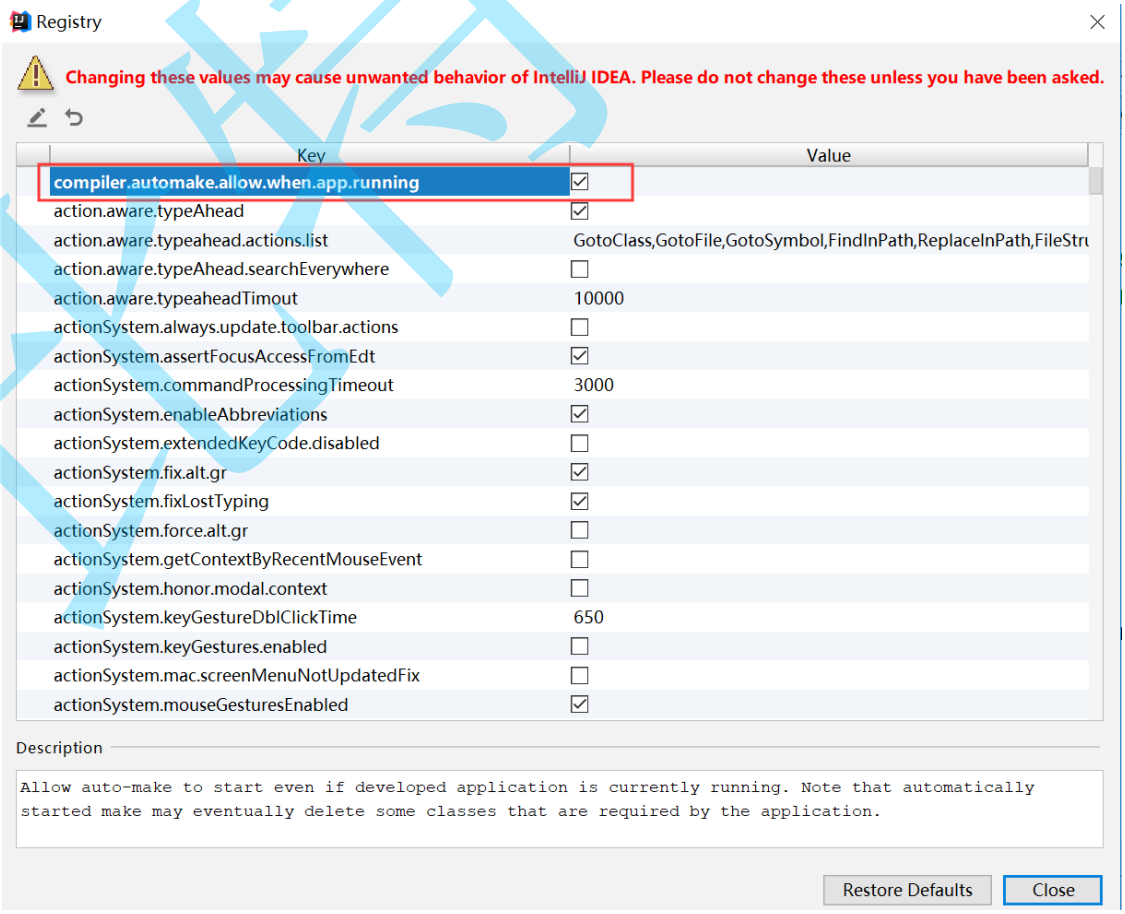

Settings
Appearance & Behavior
Keymap
Editor
General
Font
Color Scheme
Code Style
Inspections
File and Code Templates
File Encodings
Live Templates
File Types
Copyright
Emmet
GUI Designer
Images
Intentions
Language Injections
Spelling
TODO
Plugins
Version Control
Editor › File Encodings
For current project
Global Encoding: UTF-8
Project Encoding: <System Default: UTF-8>
Path
Encoding
D:\比特科技\BitSVNRepo\1-教学服务团队\1-比特课件 UTF-8
To change encoding IntelliJ IDEA uses for a file, a directory, or the entire project, add its path if necessary and then select encoding from the encoding list. Built-in file encoding (e.g. JSP, HTML or XML) overrides encoding you specify here. If not specified, files and directories inherit encoding settings from the parent directory or from the Project Encoding.
Properties Files (*.properties)
Default encoding for properties files: <System Default: UTF-8>
Transparent native-to-ascii conversion
BOM for new UTF-8 files
Create UTF-8 files: with NO BOM
IDEA will NOT add UTF-8 BOM to every created file in UTF-8 encoding

- 自动编译设置

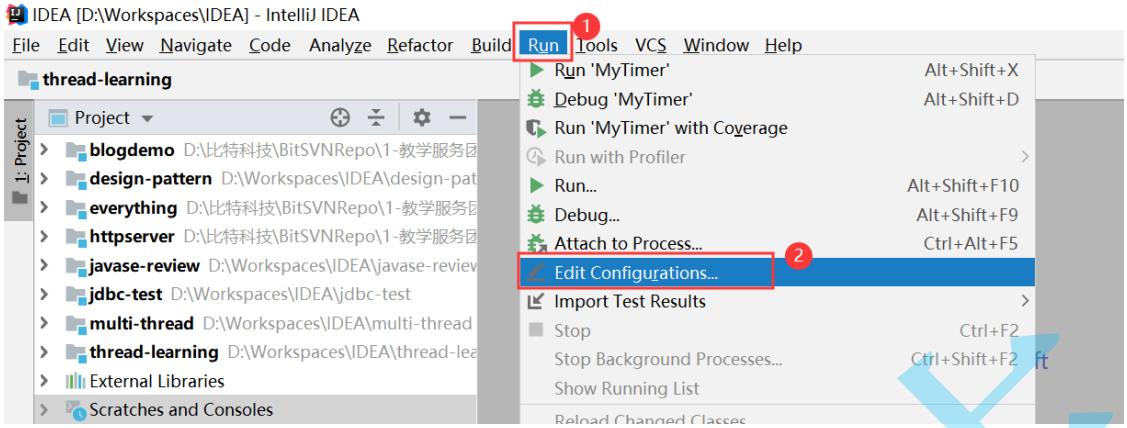


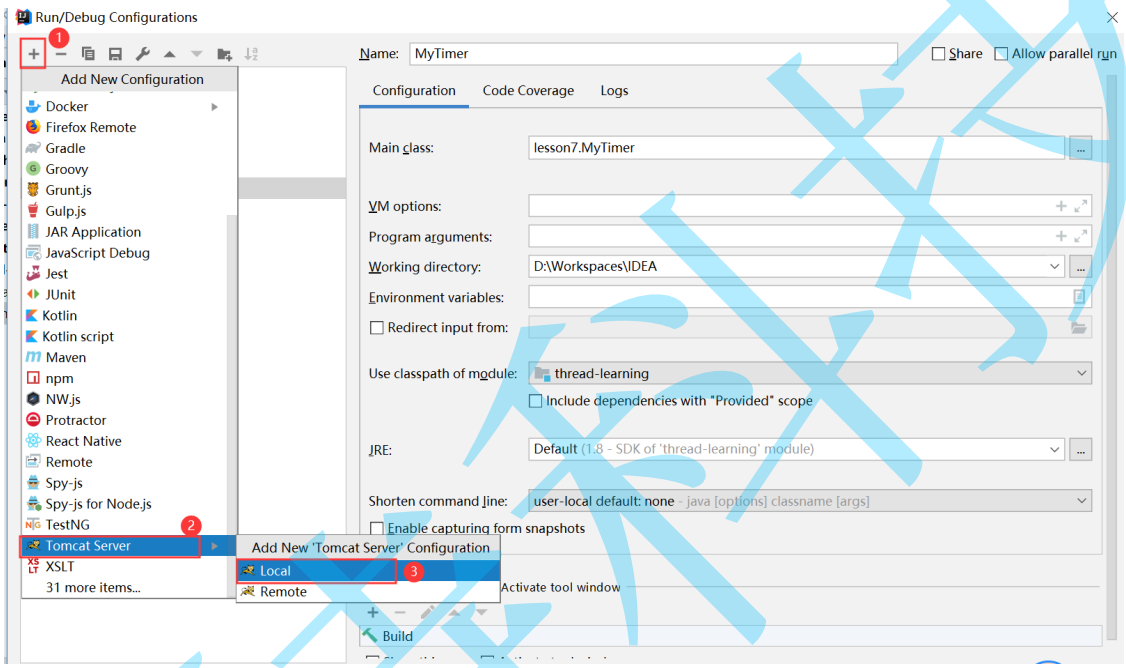
再点击shift+ctrl+alt+/键，弹出窗点击如下

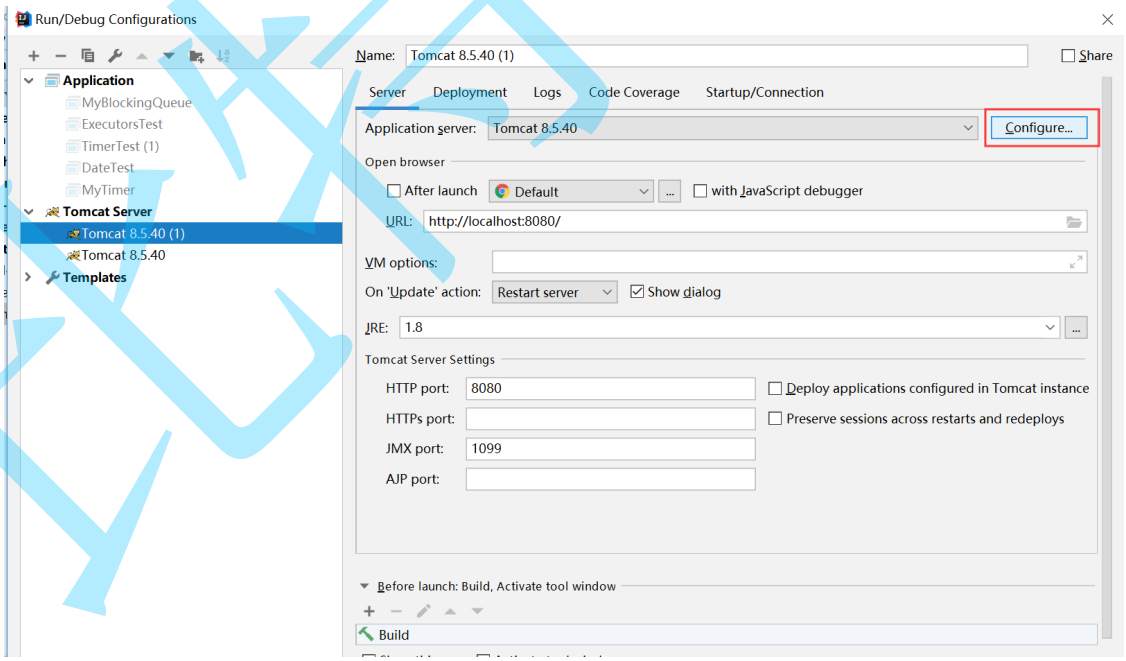


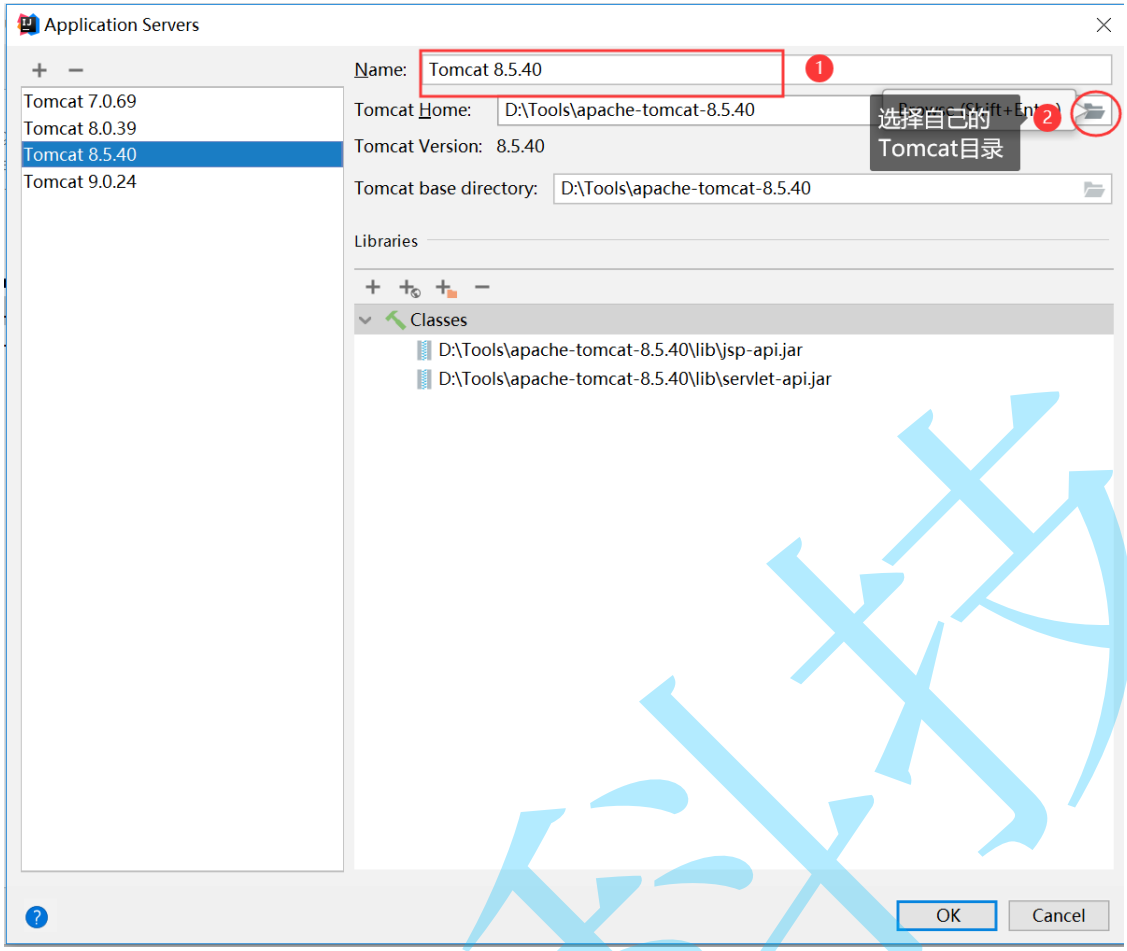


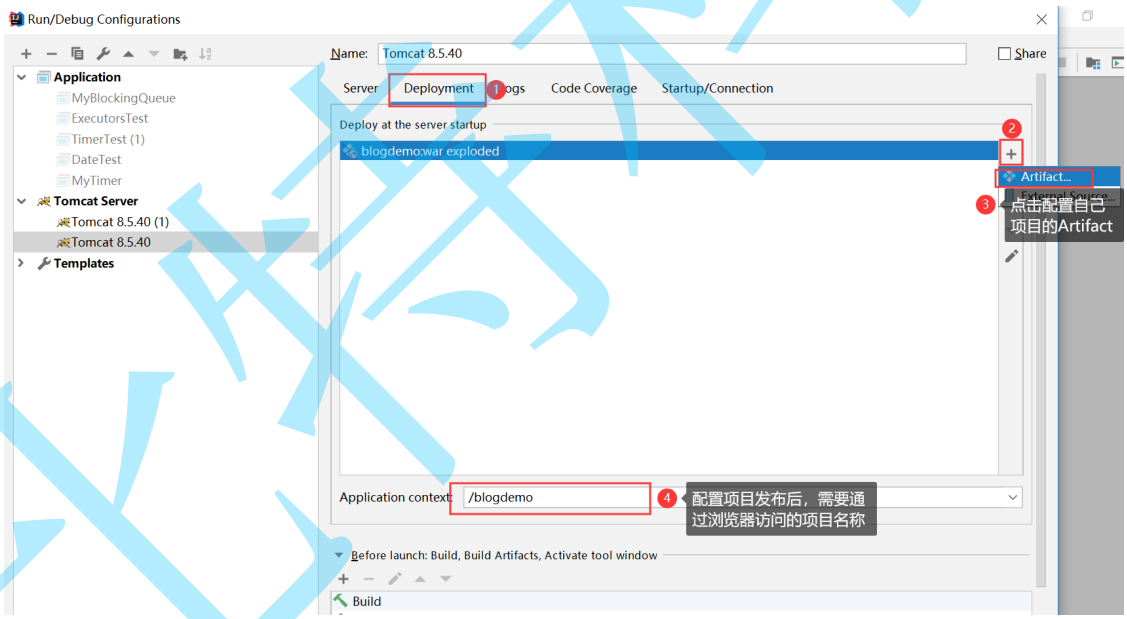
- tomcat部署项目自动发布设置

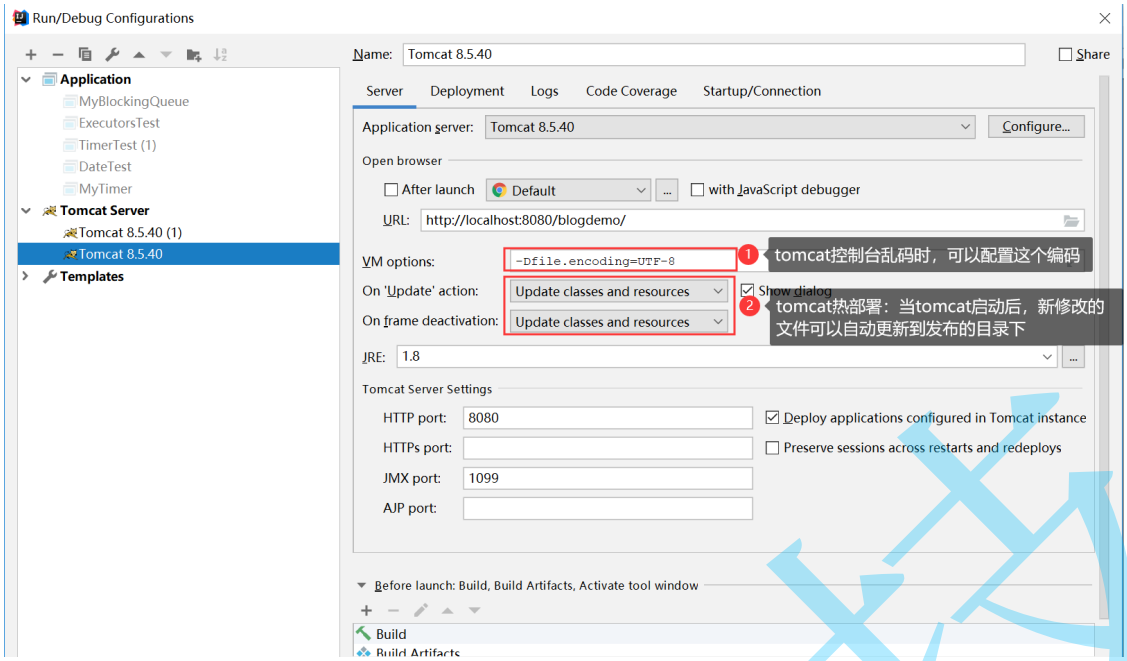




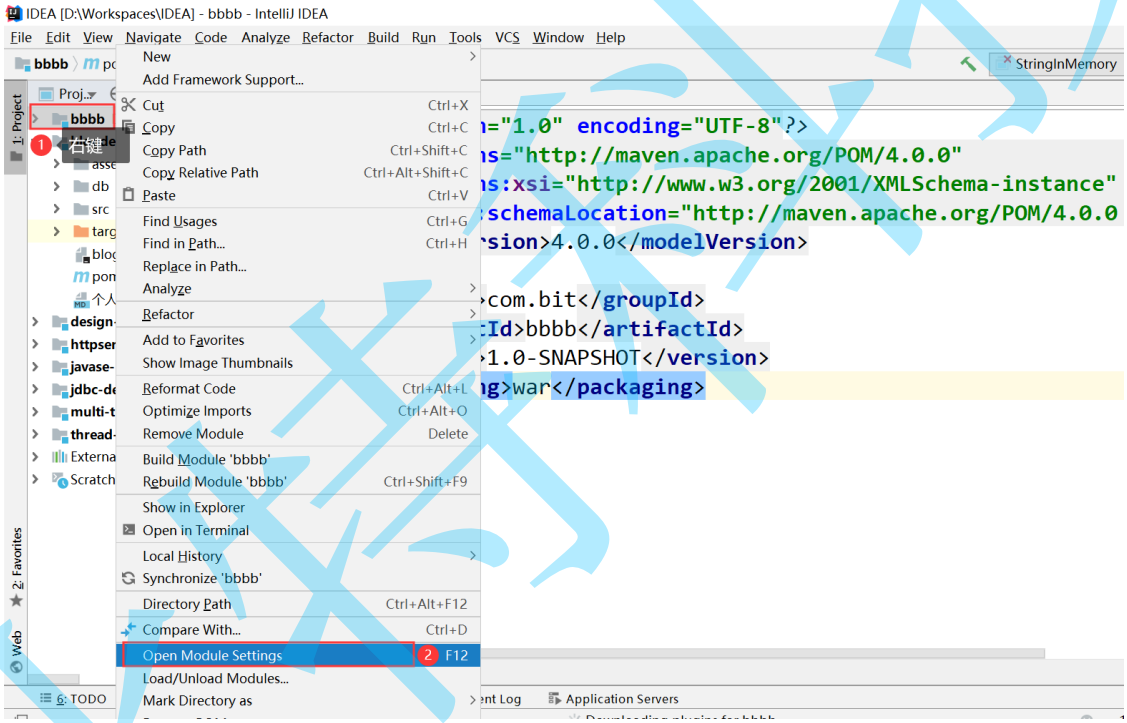


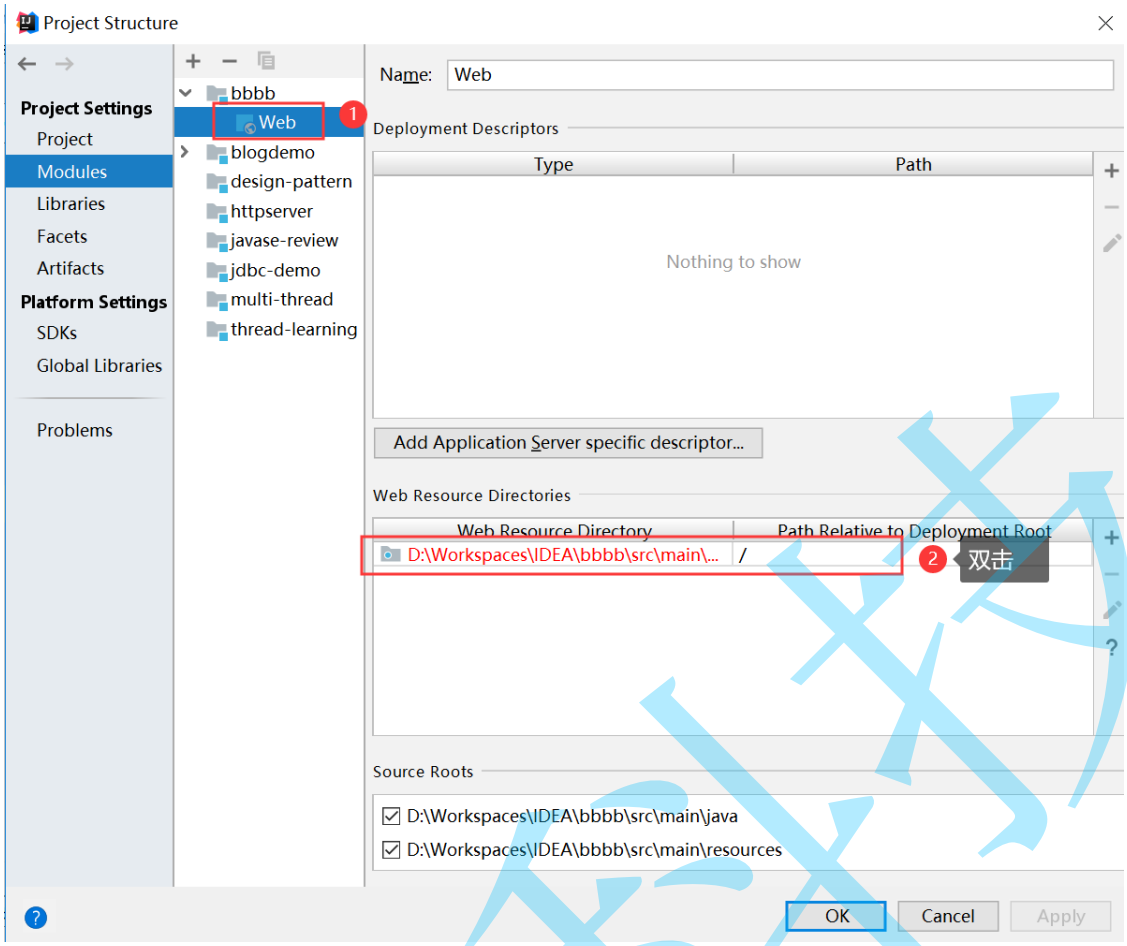

Application Servers
Tomcat 7.0.69
Tomcat 8.0.39
Tomcat 8.5.40
Tomcat 9.0.24
Name: Tomcat 8.5.40
1
Tomcat Home: D:\Tools\apache-tomcat-8.5.40
选择自己的
Tomcat目录
2
Tomcat Version: 8.5.40
Tomcat base directory: D:\Tools\apache-tomcat-8.5.40
Libraries
Classes
D:\Tools\apache-tomcat-8.5.40\lib\jsp-api.jar
D:\Tools\apache-tomcat-8.5.40\lib\servlet-api.jar
OK
Cancel

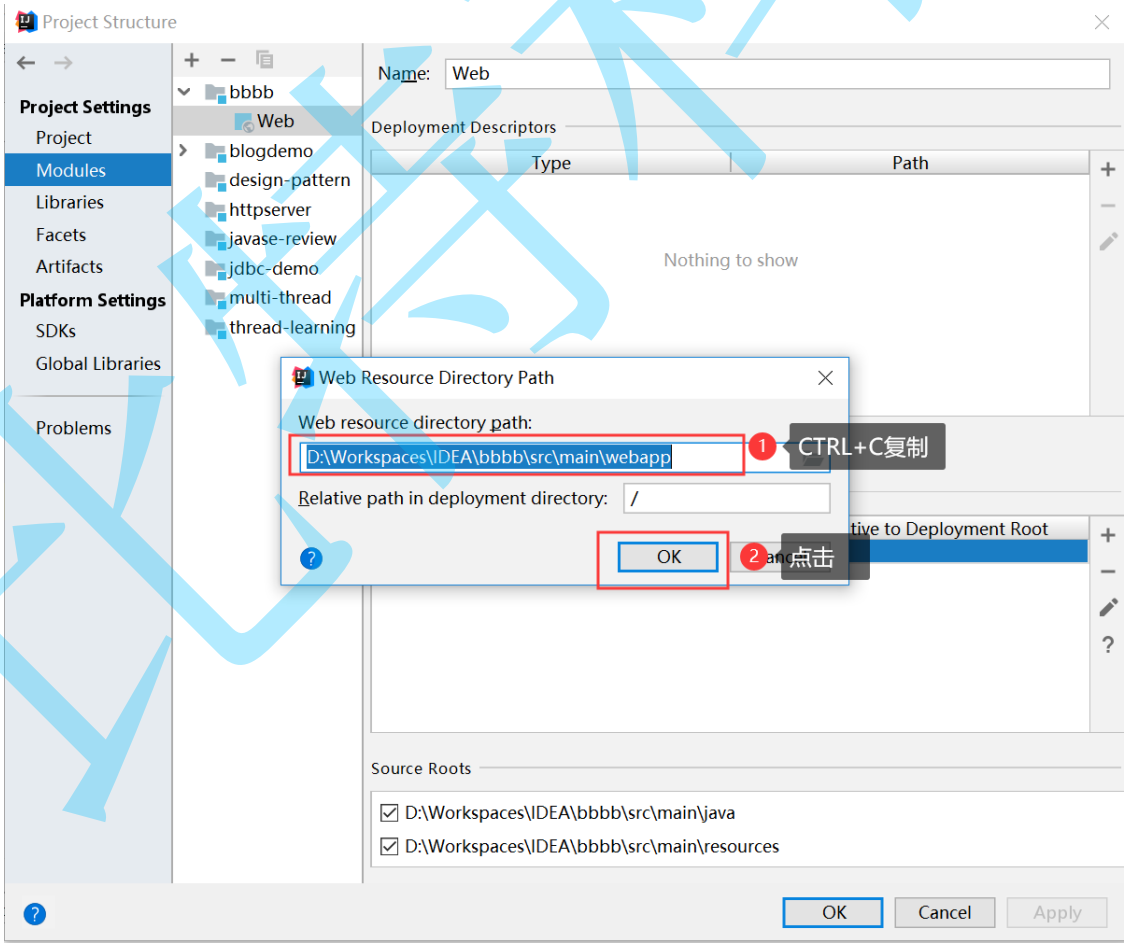

Run/Debug Configurations
Application
MyBlockingQueue
ExecutorsTest
TimerTest (1)
DateTest
MyTimer
Tomcat Server
Tomcat 8.5.40 (1)
Tomcat 8.5.40
Templates
Name: Tomcat 8.5.40
Share
Server
Deployment
Logs
Code Coverage
Startup/Connection
Deploy at the server startup
blogdemo:war exploded
2
Artifact...
3
点击配置自己
项目的Artifact
Application context: /blogdemo
4
配置项目发布后，需要通
过浏览器访问的项目名称
Before launch: Build, Build Artifacts, Activate tool window
Build

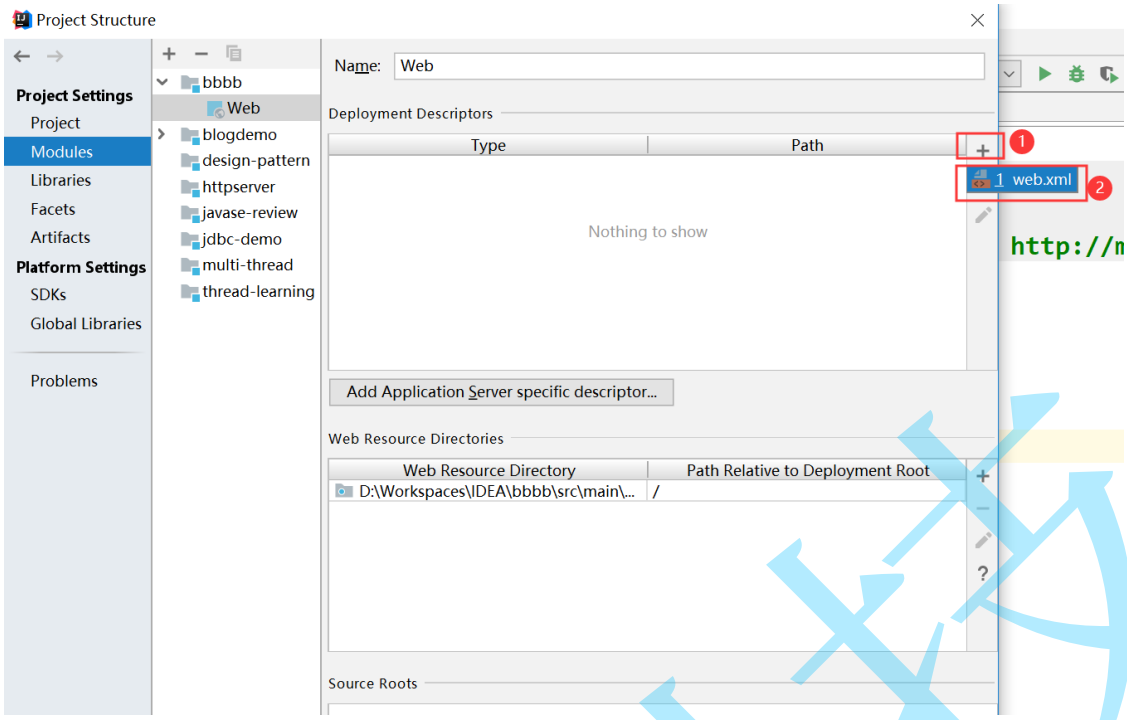


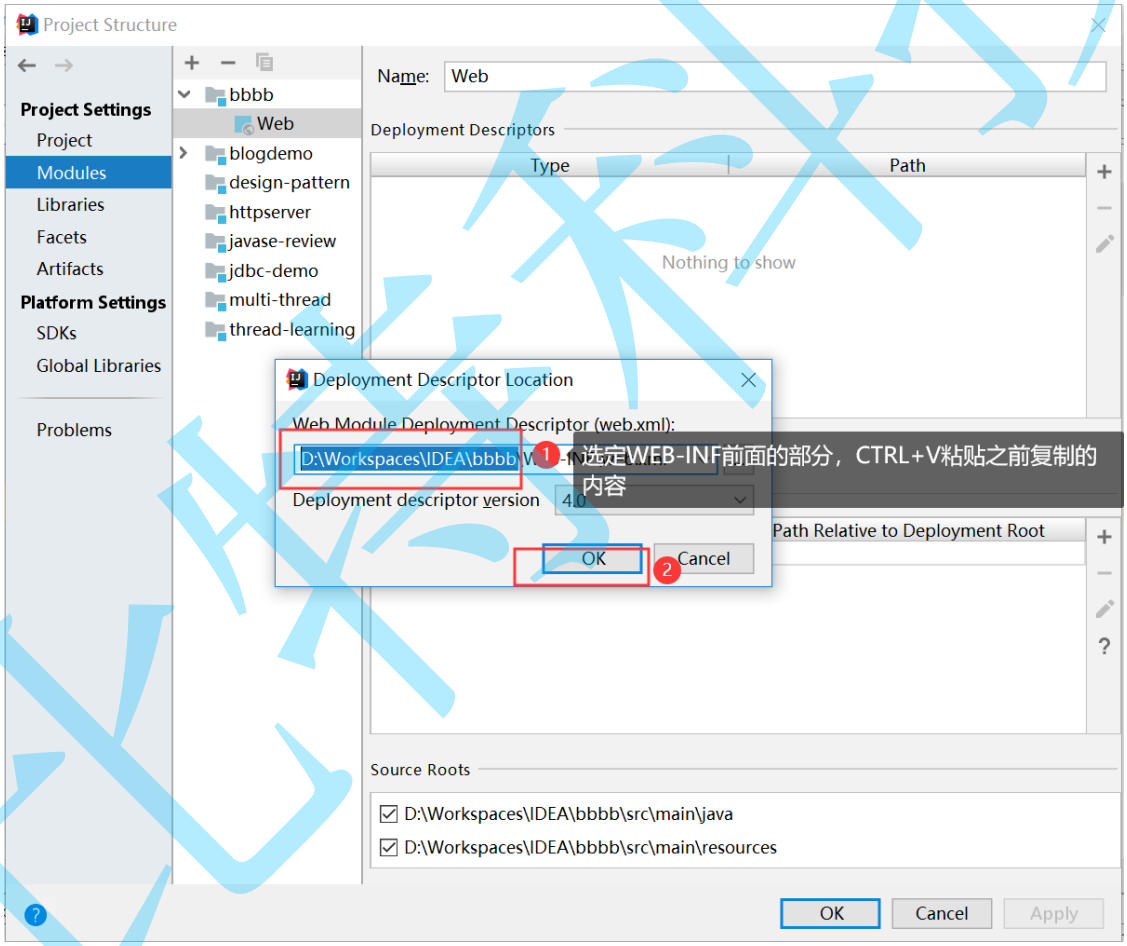
- 项目的web.xml生成

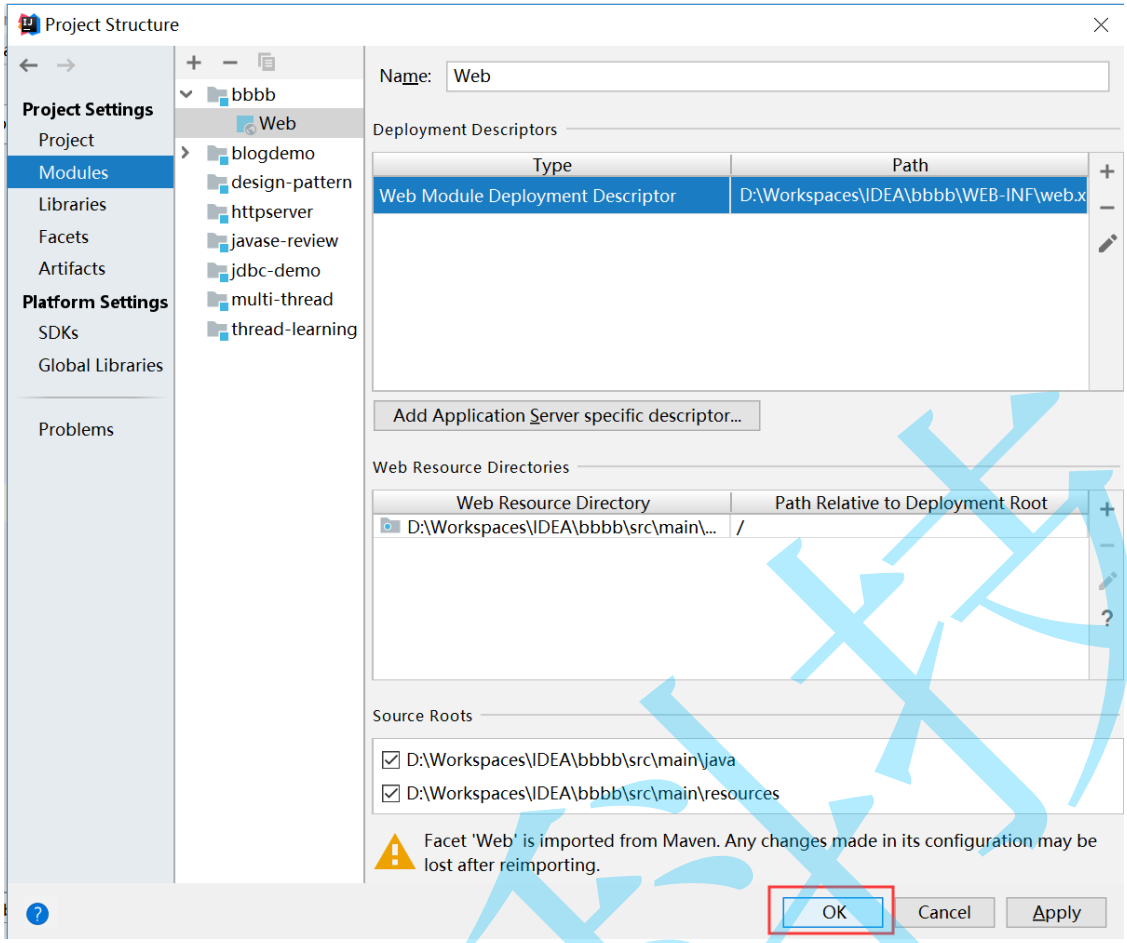



Project Structure
Project Settings
Project
Modules
Libraries
Facets
Artifacts
Platform Settings
SDKs
Global Libraries
Problems
bbbb
Web
blogdemo
design-pattern
httpserver
javase-review
jdbc-demo
multi-thread
thread-learning
Name: Web
Deployment Descriptors
Type
Path
Nothing to show
Add Application Server specific descriptor...
Web Resource Directories
Web Resource Directory
Path Relative to Deployment Root
D:\Workspaces\IDEA\bbbb\src\main\...
/
1
2 双击
Source Roots
D:\Workspaces\IDEA\bbbb\src\main\java
D:\Workspaces\IDEA\bbbb\src\main\resources
OK
Cancel
Apply


Project Structure
Project Settings
Project
Modules
Libraries
Facets
Artifacts
Platform Settings
SDKs
Global Libraries
Problems
bbbb
Web
blogdemo
design-pattern
httpserver
javase-review
jdbc-demo
multi-thread
thread-learning
Name: Web
Deployment Descriptors
Type
Path
Nothing to show
Web Resource Directory Path
Web resource directory path:
D:\Workspaces\IDEA\bbbb\src\main\webapp
1 CTRL+C复制
Relative path in deployment directory:
/
OK
2 点击
Source Roots
D:\Workspaces\IDEA\bbbb\src\main\java
D:\Workspaces\IDEA\bbbb\src\main\resources
OK
Cancel
Apply


Project Structure
Project Settings
Project
Modules
Libraries
Facets
Artifacts
Platform Settings
SDKs
Global Libraries
Problems
bbbb
Web
blogdemo
design-pattern
httpserver
javase-review
jdbc-demo
multi-thread
thread-learning
Name: Web
Deployment Descriptors
Type
Path
Nothing to show
1
web.xml
2
Add Application Server specific descriptor...
Web Resource Directories
Web Resource Directory
Path Relative to Deployment Root
D:\Workspaces\IDEA\bbbb\src\main\...
/
Source Roots


Project Structure
Project Settings
Project
Modules
Libraries
Facets
Artifacts
Platform Settings
SDKs
Global Libraries
Problems
bbbb
Web
blogdemo
design-pattern
httpserver
javase-review
jdbc-demo
multi-thread
thread-learning
Name: Web
Deployment Descriptors
Type
Path
Nothing to show
Deployment Descriptor Location
Web Module Deployment Descriptor (web.xml):
D:\Workspaces\IDEA\bbbb\W
1
选定WEB-INF前面的部分，CTRL+V粘贴之前复制的内容
Deployment descriptor version
4.0
OK
2
Cancel
Path Relative to Deployment Root
Source Roots
D:\Workspaces\IDEA\bbbb\src\main\java
D:\Workspaces\IDEA\bbbb\src\main\resources
OK
Cancel
Apply



数据库设计

- 创建数据库
- 设计用户表

  需要id、姓名、密码字段
- 设计文章表

  需要id、文章标题、文字内容字段，且需要关联用户表，关系表现为1个用户多篇文章，所以在文章表建立外键user_id关联用户表的主键id
- 设计文章图片表

  需要id，图片地址，且需要关联文章表，一篇文章对应多张图片，所以建立外键article_id关联文章表主键id

```
drop database if exists blogdemo;
create database blogdemo default charset utf8mb4;

user blogdemo;

-- ----------------------------
-- Table structure for user
-- ----------------------------
DROP TABLE IF EXISTS user;
CREATE TABLE user  (
  id int(255) PRIMARY KEY AUTO_INCREMENT,
  name varchar(255) NOT NULL UNIQUE,
  password varchar(255) NOT NULL
);
```

```
-- ----------------------------
-- Table structure for article
-- ----------------------------
DROP TABLE IF EXISTS article;
CREATE TABLE article  (
  id int(11) PRIMARY KEY AUTO_INCREMENT,
  title varchar(255) NOT NULL,
  content mediumtext NOT NULL,
  user_id int(11) NOT NULL,
  CONSTRAINT fk_article_user_id FOREIGN KEY (user_id) REFERENCES user (id)
);

-- ----------------------------
-- Table structure for img
-- ----------------------------
DROP TABLE IF EXISTS img;
CREATE TABLE img  (
  id int(11) PRIMARY KEY AUTO_INCREMENT,
  article_id int(11) NOT NULL,
  path varchar(255) NOT NULL,
  CONSTRAINT fk_img_article_id FOREIGN KEY (article_id) REFERENCES article
(id)
);
```

开发步骤

pom.xml配置

- web项目需要打包为war
- 引入依赖
- 使用jdk1.8版本来编译项目

```
<?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.bit</groupId>
    <artifactId>blogdemo</artifactId>
    <version>1.0-SNAPSHOT</version>
    <!-- web项目需要配置为war，表示打包为war文件 -->
    <packaging>war</packaging>

    <dependencies>
        <!-- MySQL数据库JDBC驱动包 -->
        <dependency>
            <groupId>mysql</groupId>
            <artifactId>mysql-connector-java</artifactId>
            <version>5.1.38</version>
        </dependency>
        <!--jackson：提供Java对象与JSON数据格式进行序列化
                    及反序列化的支持 -->
        <dependency>
            <groupId>com.fasterxml.jackson.core</groupId>
```

```
            <artifactId>jackson-databind</artifactId>
            <version>2.8.9</version>
        </dependency>

        <!-- 使用官方的servlet依赖，并配置为scope=provided，表示在打包时不打入war包中 --
>
        <dependency>
            <groupId>javax.servlet</groupId>
            <artifactId>javax.servlet-api</artifactId>
            <version>3.0.1</version>
            <scope>provided</scope>
        </dependency>

        <!-- 日志记录框架：logback -->
        <dependency>
            <groupId>ch.qos.logback</groupId>
            <artifactId>logback-classic</artifactId>
            <version>1.2.3</version>
        </dependency>
    </dependencies>

    <build>
        <!-- 最后使用mvn package命令打包的文件名称 -->
        <finalName>${project.artifactId}</finalName>
        <plugins>
            <plugin>
                <artifactId>maven-compiler-plugin</artifactId>
                <version>3.8.1</version>
                <configuration>
                    <source>1.8</source>
                    <target>1.8</target>
                    <encoding>UTF-8</encoding>
                </configuration>
            </plugin>
        </plugins>
    </build>
</project>
```

设计数据库实体类

- 用户类，对应数据库用户表
- 文章类，对应数据库文章表，且文章图片表不做单独使用，需要配合文章来使用，所以可以不创建文章图片类，而直接再文章类中建立关联

设计数据库连接工具类

- 使用DataSource作为数据库连接的创建方式
- 设计释放jdbc资源的方法

设计用户注册、登录功能

原理：需要先注册用户才能登陆访问，登录后需要建立用户的session信息，用来在访问文章新增等功能判断用户是否登录。

目标：注册后在数据库建立用户，登录后创建用户session数据，并跳转到新增文章页面

设计用户新增文章功能

原理：在新增文字页面中，访问新增文章接口，上传文章标题、内容和图片文件

目标：用户没有登录时，跳转到用户登录页面。登录后允许访问，新增文章成功，保存数据到文章表，文章图片表。图片文件需要上传到指定的目录下，数据库记录图片在服务器的访问地址。新增文章成功后，跳转到文章详情页面。

设计文章详情功能

原理：显示文章的信息，包括标题、具体内容，图片

目标：可以单独输入url访问，也可以从新增文章成功后跳转进入

设计文章列表功能

原理：显示所有的文章信息，以json类型的数据返回，并展示

目标：后台需要获取数据库中的所有文章数据，并序列化为json格式，并返回给客户端浏览器显示

设计文章列表统计访问量功能

原理：统计文章列表的访问次数，当每次访问文章列表接口时，次数加1

目标：需要保证在多线程环境下访问文章列表时，设置次数的线程安全性，在访问统计访问量接口后，显示总的访问量