

实验八 物联网云平台登录实验

1.1 实验目的

通过本实验的学习，应该掌握：物联网终端通过 TCP 连接到服务器的方法和平台的设计。

1.2 实验内容

- (1) 熟悉和使用 java web 服务器搭建开发环境（IntelliJ idea 开发环境）；
- (2) 熟悉多线程 java socket 编程与数据包解析（tcp/ip 协议接收、发送数据）；
- (3) java jdbc 访问 mysql 数据库（创建、增删查改数据库），并掌握 sql 语句的编写；
- (4) 实现数据分析、展示与 UI 设计；

1.3 实验原理

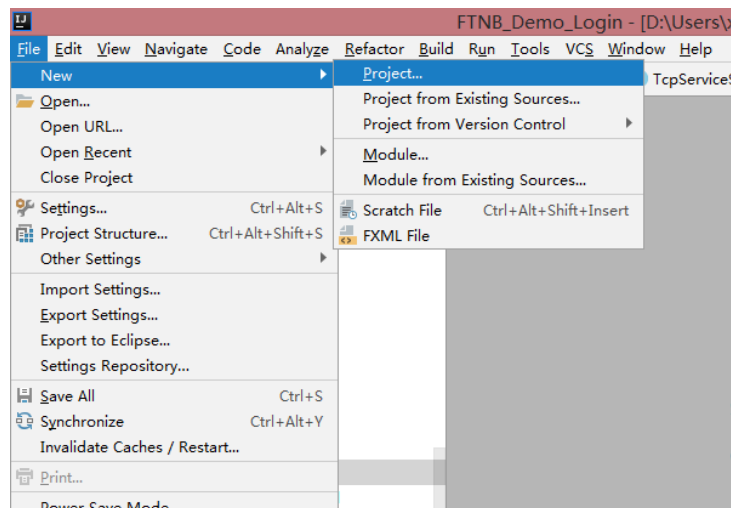
物联网终端通过 TCP 连接到服务器，并实现数据解析，更改数据库的当前状态，并通过 web 查询物联网终端状态和数据展示。

1.4 实验步骤

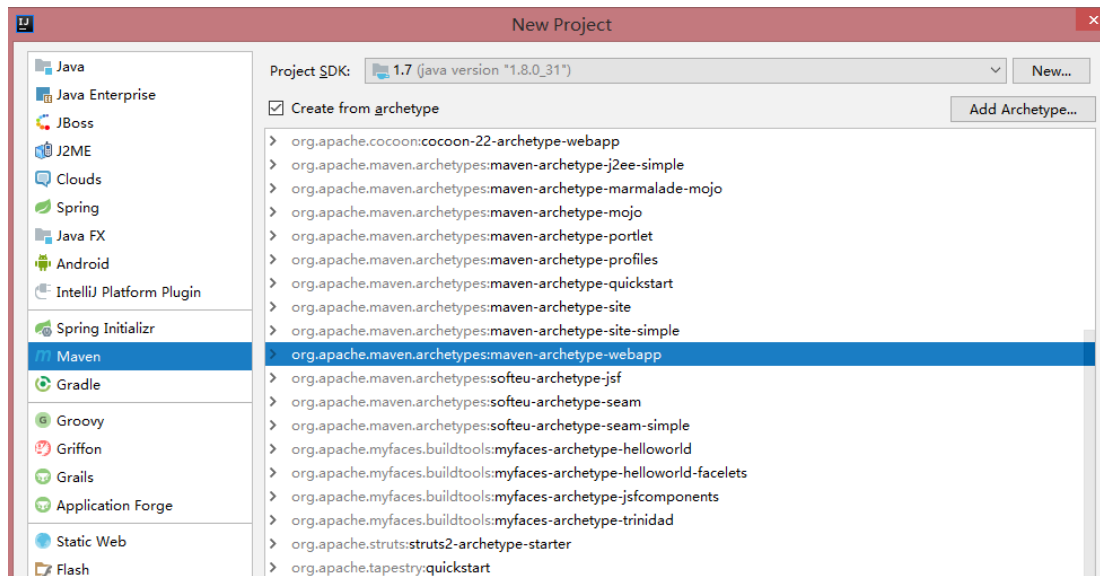
物联网云平台环境搭建参考文档：环境搭建步骤.docx。

1.4.1 创建新工程

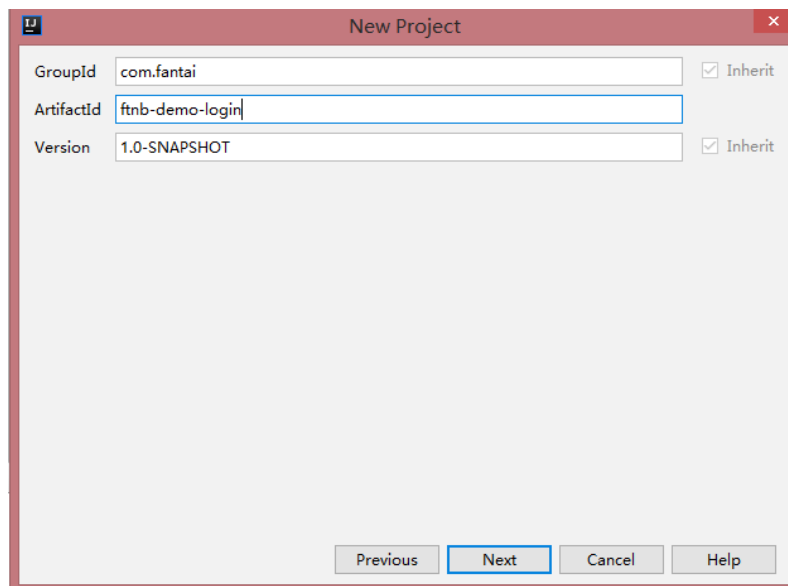
1) 打开 IntelliJ idea，点击“File-New-Project”，如图所示。



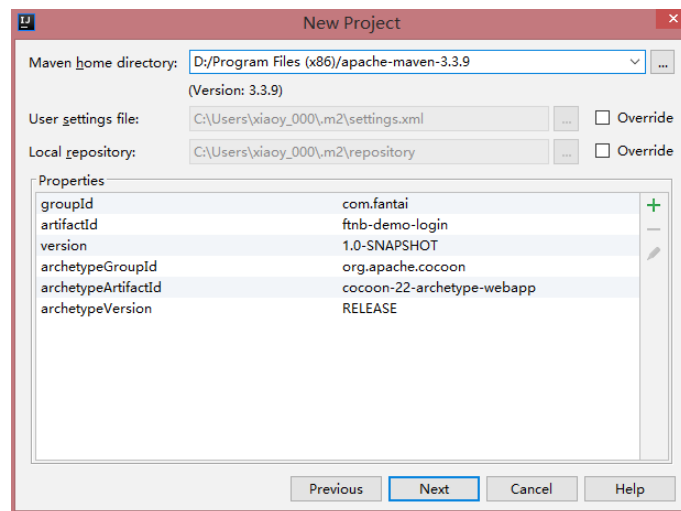
2) 左边菜单选择 Maven，并勾选“Create from archetype”，如图所示。



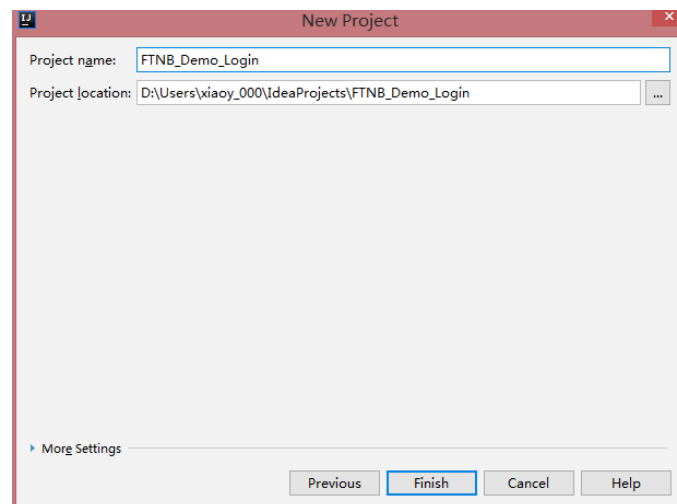
3) 点击 Next，输入 GroupId 和 ArtifactId，如图所示。



4) 点击 Next，选择自己安装的 Maven 路径，如图所示。

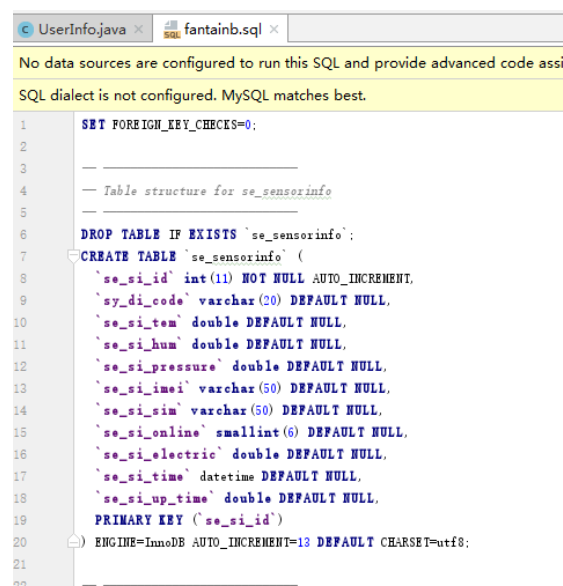


5) 输入项目名称，选择项目路径，点击 Finish，如图所示。



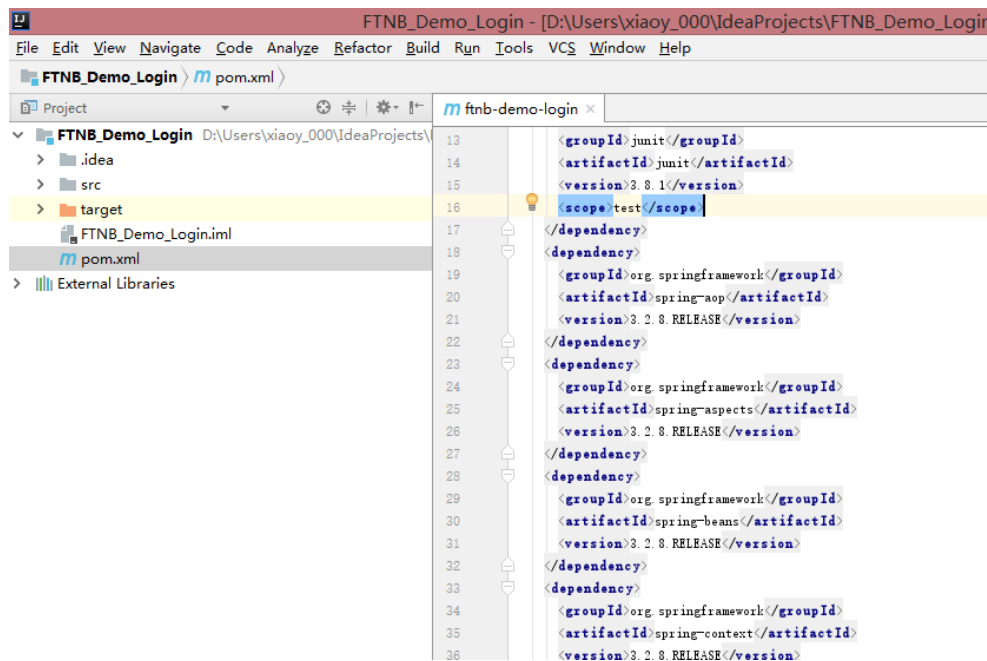
1.4.2 创建数据库

1) 在 mysql 中，创建 fantainb 数据库，如图所示。（详情见源码）

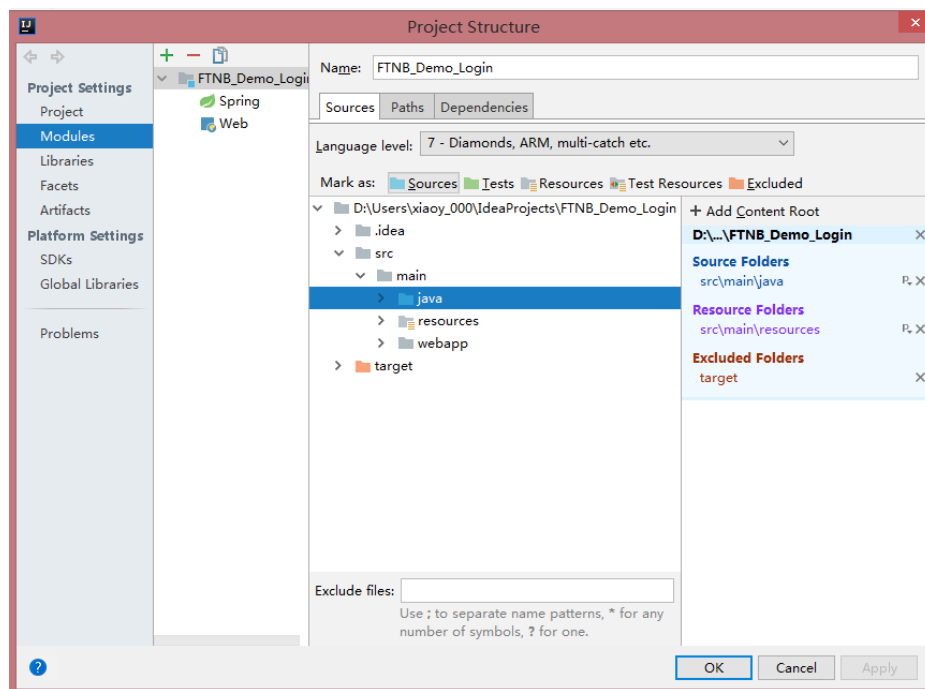


1.4.3 配置 Project

1) 点击 pom.xml 文件，输入需要导入的包，如图所示。（详情见源码）



2) 在 src/main 目录下新建 java 文件夹，并选择 File-Project Structure，配置 Sources，如图所示。



3) 在 resources 目录下创建 applicationContext.xml，如图所示。（详情见源码）

```

17 http://www.springframework.org/schema/mvc http://www.springframework.org/schema/mvc/sp
18
19 <!-- 配置数据源 -->
20 <bean id="ds" class="org.apache.commons.dbcp.BasicDataSource" destroy-method="close">
21   <property name="url" value="jdbc:mysql://localhost:3306/fantainb?useUnicode=true&ch
22   <property name="driverClassName" value="com.mysql.jdbc.Driver"/>
23   <property name="username" value="root"/>
24   <property name="password" value="test123"/>
25 </bean>
26
27 <!-- 配置SqlSessionFactory -->
28 <bean id="sqlSessionFactory" class="org.mybatis.spring.SqlSessionFactoryBean">
29   <property name="dataSource" ref="ds" />
30   <property name="mapperLocations" value="classpath:dao/*.xml"/>
31 </bean>
32
33 <bean class="org.mybatis.spring.mapper.MapperScannerConfigurer">
34   <property name="basePackage" value="com.fantai.dao" />
35   <property name="annotationClass" value="com.fantai.annotation.MyBatisRepository"/>
36 </bean>
37
38 <context:component-scan base-package="com.fantai" />
39
40 <mvc:annotation-driven />
41
42 <bean class="org.springframework.web.servlet.view.InternalResourceViewResolver">
43   <property name="prefix" value="/WEB-INF/" />
44   <property name="suffix" value=".jsp" />
45 </bean>
46
47 </beans>

```

4) 修改 webapp/WEB-INF 目录下的 web.xml，如图所示。（详情见源码）

```

1 <?xml version="1.0" encoding="UTF-8"?>
2 <web-app version="3.1" xsi:schemaLocation="http://xmlns.jcp.org/xml/ns/javaee http://
3
4   <display-name>Archetype Created Web Application</display-name>
5
6   <welcome-file-list>
7     <welcome-file>index.jsp</welcome-file>
8   </welcome-file-list>
9
10  <servlet>
11    <servlet-name>SpringMVC</servlet-name>
12    <servlet-class>org.springframework.web.servlet.DispatcherServlet</servlet-class>
13    <init-param>
14      <param-name>contextConfigLocation</param-name>
15      <param-value>classpath:applicationContext.xml</param-value>
16    </init-param>
17    <load-on-startup>1</load-on-startup>
18  </servlet>
19
20  <!-- Spring监听器 -->
21  <listener>
22    <listener-class>org.springframework.web.util.IntrospectorCleanupListener</listener-class>
23  </listener>
24  <listener>
25    <listener-class>org.springframework.web.context.ContextLoaderListener</listener-class>
26  </listener>

```

5) 在 webapp/WEB-INF 目录下，创建新的目录 lib，将一些未下载成功的 jar 文件，放入到此文件夹下，如图所示。

```

lib
├── antlr-2.7.7.jar
├── c3p0-0.9.2.1.jar
├── json-lib-2.4-jdk15.jar
└── mchange-commons-java-0.2.3.4.jar

```

1.4.4 程序编写

1) 创建实体类，如图所示。（详情见源码）

```

UserInfo.java ×
package com.fantai.entity;

public class UserInfo {

    private String sy_ui_id;
    private String sy_ui_name;
    private String sy_ui_pwd;
    private String sy_ui_phone;
    private String sy_ui_email;
    private Integer sy_ui_role;
    private Integer sy_si_id;

    public String getSy_ui_id() { return sy_ui_id; }
    public void setSy_ui_id(String sy_ui_id) { this.sy_ui_id = sy_ui_id; }

    public String getSy_ui_name() { return sy_ui_name; }
    public void setSy_ui_name(String sy_ui_name) { this.sy_ui_name = sy_ui_name; }

    public String getSy_ui_pwd() { return sy_ui_pwd; }
    public void setSy_ui_pwd(String sy_ui_pwd) { this.sy_ui_pwd = sy_ui_pwd; }

    public String getSy_ui_phone() { return sy_ui_phone; }
    public void setSy_ui_phone(String sy_ui_phone) { this.sy_ui_phone = sy_ui_phone; }

    public String getSy_ui_email() { return sy_ui_email; }
    public void setSy_ui_email(String sy_ui_email) { this.sy_ui_email = sy_ui_email; }

    public Integer getSy_ui_role() { return sy_ui_role; }
    public void setSy_ui_role(Integer sy_ui_role) { this.sy_ui_role = sy_ui_role; }

    public Integer getSy_si_id() { return sy_si_id; }

```

```

DeviceInfo.java ×
1 package com.fantai.entity;
2
3 import java.sql.Timestamp;
4
5 public class DeviceInfo {
6
7     private Integer sy_di_id;
8     private String sy_di_code;
9     private String sy_di_identify;
10    private Integer sy_di_type;
11    private Integer sy_di_status;
12    private Timestamp sy_di_reg_time;
13    private String sy_ui_id;
14    private Timestamp sy_di_con_time;
15    private Integer sy_di_con_num;
16    private Integer sy_di_con_type;
17    private String sy_di_ip;
18    private String sy_di_port;
19    private Double sy_di_gps_num;
20    private String sy_di_gps_value;
21    private String sy_di_gps_other;
22    private Timestamp sy_di_gps_time;
23
24    public Integer getSy_di_id() { return sy_di_id; }
25    public void setSy_di_id(Integer sy_di_id) { this.sy_di_id = sy_di_id; }
26
27    public String getSy_di_code() { return sy_di_code; }
28    public void setSy_di_code(String sy_di_code) { this.sy_di_code = sy_di_code; }
29
30    public String getSy_di_identify() { return sy_di_identify; }
31    public void setSy_di_identify(String sy_di_identify) { this.sy_di_identify = sy_di_identify; }
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```

```

LockInfo.java ×
1 package com.fantai.entity;
2
3 import java.sql.Timestamp;
4
5 public class LockInfo {
6
7     private Integer sl_li_id;
8     private String sy_di_code;
9     private String sl_li_imei;
10    private String sl_li_sim;
11    private Double sl_li_electric;
12    private Integer sl_li_status;
13    private Integer sl_li_online;
14    private Timestamp sl_li_time;
15
16    public Integer getSl_li_id() { return sl_li_id; }
17    public void setSl_li_id(Integer sl_li_id) { this.sl_li_id = sl_li_id; }
18
19    public String getSy_di_code() { return sy_di_code; }
20    public void setSy_di_code(String sy_di_code) { this.sy_di_code = sy_di_code; }
21
22    public String getSl_li_imei() { return sl_li_imei; }
23    public void setSl_li_imei(String sl_li_imei) { this.sl_li_imei = sl_li_imei; }
24
25    public String getSl_li_sim() { return sl_li_sim; }
26    public void setSl_li_sim(String sl_li_sim) { this.sl_li_sim = sl_li_sim; }
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```

```

SensorInfo.java ×
1 package com.fantai.entity;
2
3 import java.sql.Timestamp;
4
5 public class SensorInfo {
6
7     private Integer se_si_id;
8     private String sy_di_code;
9     private Double se_si_tem;
10    private Double se_si_hum;
11    private Double se_si_pressure;
12    private String se_si_imei;
13    private String se_si_sim;
14    private Integer se_si_online;
15    private Double se_si_electric;
16    private Timestamp se_si_time;
17
18    public Integer getSe_si_id() { return se_si_id; }
19    public void setSe_si_id(Integer se_si_id) { this.se_si_id = se_si_id; }
20
21    public String getSy_di_code() { return sy_di_code; }
22    public void setSy_di_code(String sy_di_code) { this.sy_di_code = sy_di_code; }
23
24    public Double getSe_si_tem() { return se_si_tem; }
25    public void setSe_si_tem(Double se_si_tem) { this.se_si_tem = se_si_tem; }
26
27    public Double getSe_si_hum() { return se_si_hum; }
28    public void setSe_si_hum(Double se_si_hum) { this.se_si_hum = se_si_hum; }
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```

```

CarInfo.java ×
1 package com.fantai.entity;
2
3 import java.sql.Timestamp;
4
5 public class CarInfo {
6
7     private Integer st_ci_id;
8     private String sy_di_code;
9     private String st_ci_nfc;
10    private String st_ci_carnum;
11    private String st_ci_imel;
12    private String st_ci_sim;
13    private Integer st_ci_status;
14    private Double st_ci_money;
15    private Integer st_ci_online;
16    private Double st_ci_electric;
17
18    public Integer getSt_ci_id() { return st_ci_id; }
19    public void setSt_ci_id(Integer st_ci_id) { this.st_ci_id = st_ci_id; }
20
21    public String getSy_di_code() { return sy_di_code; }
22    public void setSy_di_code(String sy_di_code) { this.sy_di_code = sy_di_code; }
23
24    public String getSt_ci_nfc() { return st_ci_nfc; }
25    public void setSt_ci_nfc(String st_ci_nfc) { this.st_ci_nfc = st_ci_nfc; }
26
27 }

```

2) 创建注解类，如图所示。

```

@ MyBatisRepository.java ×
1 package com.fantai.annotation;
2
3 public @interface MyBatisRepository {
4 }
5

```

3) 创建 Dao 接口，如图所示。

```

UserInfoMapper.java ×
1 package com.fantai.dao;
2
3 import ...
4
5
6
7
8 @MyBatisRepository
9 public interface UserInfoMapper {
10
11     UserInfo findById(String id);
12
13     List<UserInfo> findByThing();
14
15 }

```

```

DeviceInfoMapper.java ×
1 package com.fantai.dao;
2
3 import ...
4
5
6
7
8 @MyBatisRepository
9 public interface DeviceInfoMapper {
10
11     List<DeviceInfo> findByThing();
12
13     List<DeviceInfo> findByCode(String code);
14
15 }

```



```

1 package com.fantai.dao;
2
3 import ...
4
5 @MyBatisRepository
6 public interface LockInfoMapper {
7
8     List<LockInfo> findByUser (String uid);
9
10    LockInfo findByCode (String code);
11
12 }
13
14
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1008
1009
1010
1011
1012
1013
1014
1015
1016
1017
1018
1019
1020
1021
1022
1023
1024
1025
1026
```

4) 创建 Dao 接口对应的 xml，如图所示。（详情见源码）

```

1  <?xml version="1.0" encoding="UTF-8" ?>
2  <!DOCTYPE mapper PUBLIC "-//ibatis.apache.org/DTD Mapper 3.0//EN"
3      "http://ibatis.apache.org/dtd/ibatis-3-mapper.dtd">
4
5  <mapper namespace="com.fantai.dao.UserInfoMapper">
6
7      <!-- findById -->
8      <select id="findById" parameterType="string" resultType="com.fantai.entity.UserInfo">
9          select u.sy_ui_id,u.sy_ui_name,u.sy_ui_phone,u.sy_ui_email,u.sy_ui_role,u.sy_ui_pwd,u.sy_si_id,s.sy_si_name
10         from sy_userinfo u left join sy_schoolinfo s on u.sy_si_id = s.sy_si_id where sy_ui_id = #{sy_ui_id}
11     </select>
12
13     <!-- findByThing -->
14     <select id="findByThing" resultType="com.fantai.entity.UserInfo">
15         select u.sy_ui_id,u.sy_ui_name,u.sy_ui_phone,u.sy_ui_email,u.sy_ui_role,s.sy_si_name from sy_userinfo u left join sy_schoolinfo s
16         on sy_si_id = s.sy_si_id
17     </select>
18
19 </mapper>

```

DeviceInfoMapper.xml

```

<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE mapper PUBLIC "-//ibatis.apache.org/DTD Mapper 3.0//EN"
"http://ibatis.apache.org/dtd/ibatis-3-mapper.dtd">

<mapper namespace="com.fantai.dao.DeviceInfoMapper">

    <!-- findByThing -->
    <select id="findByThing" resultType="com.fantai.entity.DeviceInfo">
        select d.sy_di_id,d.sy_di_code,d.sy_di_identify,d.sy_di_type,d.sy_di_status,d.sy_di_reg_time,d.sy_di_nfc,d.sy_ui_id,u.sy_ui_name,
        s.sy_si_name from sy_deviceinfo d left join sy_userinfo u on d.sy_ui_id = u.sy_ui_id left join sy_schoolinfo s
        on u.sy_si_id = s.sy_si_id
    </select>

    <!-- findByCode -->
    <select id="findByCode" parameterType="string" resultType="com.fantai.entity.DeviceInfo">
        select sy_di_code,sy_di_gps_value from sy_deviceinfo where sy_di_code = #{sy_di_code}
    </select>

</mapper>

```

LockInfoMapper.xml

```

1 <?xml version="1.0" encoding="UTF-8" ?>
2 <!DOCTYPE mapper PUBLIC "-//ibatis.apache.org/DTD Mapper 3.0//EN"
3 "http://ibatis.apache.org/dtd/ibatis-3-mapper.dtd">
4
5 <mapper namespace="com.fantai.dao.LockInfoMapper">
6
7     <!-- findByUser -->
8     <select id="findByUser" parameterType="string" resultType="com.fantai.entity.LockInfo">
9         select l.sl_li_id,l.sy_di_code,l.sl_liimei,l.sl_li_sim,l.sl_li_electric,l.sl_li_status,l.sl_li_online,l.sl_li_time,
10         d.sy_ui_id,u.sy_ui_name,u.sy_si_id,s.sy_si_name from sl_lockinfo l left join sy_deviceinfo d on l.sy_di_code =
11         d.sy_di_code left join sy_userinfo u on d.sy_ui_id = u.sy_ui_id left join sy_schoolinfo s on u.sy_si_id =
12         s.sy_si_id where d.sy_ui_id = #{sy_ui_id}
13     </select>
14
15     <!-- findByCode -->
16     <select id="findByCode" parameterType="string" resultType="com.fantai.entity.LockInfo">
17         select l.sl_li_id,l.sy_di_code,l.sl_liimei,l.sl_li_sim,l.sl_li_electric,l.sl_li_status,l.sl_li_online,l.sl_li_time,
18         d.sy_ui_id,u.sy_ui_name,d.sy_di_reg_time,d.sy_di_con_time,d.sy_di_con_type,d.sy_di_ip,d.sy_di_port,d.sy_di_gps_num,d.sy_di_heartbeat_num,
19         u.sy_si_id,s.sy_si_name from sl_lockinfo l left join sy_deviceinfo d on l.sy_di_code =
20         d.sy_di_code left join sy_userinfo u on d.sy_ui_id = u.sy_ui_id left join sy_schoolinfo s on u.sy_si_id =
21         s.sy_si_id where l.sy_di_code = #{sy_di_code}
22     </select>
23
24 </mapper>

```

SensorInfoMapper.xml

```

<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE mapper PUBLIC "-//ibatis.apache.org/DTD Mapper 3.0//EN"
"http://ibatis.apache.org/dtd/ibatis-3-mapper.dtd">

<mapper namespace="com.fantai.dao.SensorInfoMapper">

    <!-- findByUser -->
    <select id="findByUser" parameterType="string" resultType="com.fantai.entity.SensorInfo">
        select se.se_si_id,se.sy_di_code,se.se_si_tem,se.se_si_hum,se.se_si_pressure,se.se_si_imei,se.se_si_sim,se.se_si_online,
        se.se_si_electric,se.se_si_time,se.se_si_up_time,d.sy_ui_id,u.sy_ui_name,u.sy_si_id,s.sy_si_name from se_sensorinfo se left join
        sy_deviceinfo d on se.sy_di_code = d.sy_di_code left join sy_userinfo u on d.sy_ui_id = u.sy_ui_id left join
        sy_schoolinfo s on u.sy_si_id = s.sy_si_id where d.sy_ui_id = #{sy_ui_id}
    </select>

    <!-- findByCode -->
    <select id="findByCode" parameterType="string" resultType="com.fantai.entity.SensorInfo">
        select se.se_si_id,se.sy_di_code,se.se_si_tem,se.se_si_hum,se.se_si_pressure,se.se_si_imei,se.se_si_sim,se.se_si_online,
        se.se_si_electric,se.se_si_time,se.se_si_up_time,d.sy_di_reg_time,d.sy_di_con_time,d.sy_di_con_type,d.sy_di_ip,d.sy_di_port,d.sy_di_gps_num,
        d.sy_di_heartbeat_num,d.sy_ui_id,u.sy_ui_name,u.sy_si_id,s.sy_si_name from se_sensorinfo se left join
        sy_deviceinfo d on se.sy_di_code = d.sy_di_code left join sy_userinfo u on d.sy_ui_id = u.sy_ui_id left join
        sy_schoolinfo s on u.sy_si_id = s.sy_si_id where se.sy_di_code = #{sy_di_code}
    </select>

</mapper>

```

```
CarInfoMapper.xml
<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE mapper PUBLIC "-//ibatis.apache.org/DTD Mapper 3.0//EN"
"http://ibatis.apache.org/dtd/ibatis-3-mapper.dtd">

<mapper namespace="com.fantai.dao.CarInfoMapper">

    <!-- findByUser -->
    <select id="findByUser" parameterType="string" resultType="com.fantai.entity.CarInfo">
        select c.st_ci_id,c.sy_di_code,c.st_ci_nfc,c.st_ci_carmnum,c.st_ci_imei,c.st_ci_sim,c.st_ci_status,c.st_ci_money,
        c.st_ci_online,c.st_ci_electric,d.sy_ui_id,u.sy_ui_name,u.sy_si_id,s.sy_si_name from st_carinfo c left join
        sy_deviceinfo d on c.sy_di_code = d.sy_di_code left join sy_userinfo u on d.sy_ui_id = u.sy_ui_id left join
        sy_schoolinfo s on u.sy_si_id = s.sy_si_id where d.sy_ui_id = #{sy_ui_id}
    </select>

    <!-- findByCode -->
    <select id="findByCode" parameterType="string" resultType="com.fantai.entity.CarInfo">
        select c.st_ci_id,c.sy_di_code,c.st_ci_nfc,c.st_ci_carmnum,c.st_ci_imei,c.st_ci_sim,c.st_ci_status,c.st_ci_money,
        c.st_ci_online,c.st_ci_electric,d.sy_di_reg_time,d.sy_di_con_time,d.sy_di_con_type,d.sy_di_ip,d.sy_di_port,d.sy_di_gps_num,d.sy_di_heartbeat_num,
        d.sy_ui_id,u.sy_ui_name,u.sy_si_id,s.sy_si_name from st_carinfo c left join
        sy_deviceinfo d on c.sy_di_code = d.sy_di_code left join sy_userinfo u on d.sy_ui_id = u.sy_ui_id left join
        sy_schoolinfo s on u.sy_si_id = s.sy_si_id where c.sy_di_code = #{sy_di_code}
    </select>

</mapper>
```

5) 创建相应的工具类，如图所示。（详情见源码）

```
C3P0Util.java
1 package com.fantai.util;
2
3 import ...
4
5
6
7 /**
8  * Created by fantai-xyz on 2017/10/17.
9  */
10 public class C3P0Util {
11     private static ComboPooledDataSource cpds;
12     static {
13         initDataSource();
14     }
15
16     // 配置数据源
17     public static void initDataSource() {
18         cpds = new ComboPooledDataSource();
19         cpds.setDataSourceName("acms01");
20     }
21 }
```

```
CRC8.java
1 package com.fantai.util;
2
3 // CRC8相关计算
4
5 public class CRC8 {
6     static byte[] crc8_tab = {(byte) 0, (byte) 94, (byte) 188, (byte) 226, (byte) 97, (byte) 63, (byte) 221,
7     (byte) 156, (byte) 126, (byte) 32, (byte) 163, (byte) 252, (byte) 21, (byte) 65,
8     (byte) 23, (byte) 127, (byte) 252, (byte) 162, (byte) 64, (byte) 30, (byte) 95,
9     (byte) 1, (byte) 227, (byte) 189, (byte) 62, (byte) 96, (byte) 130, (byte) 220, (byte) 35, (byte) 125,
10    (byte) 159, (byte) 193, (byte) 66, (byte) 28, (byte) 254, (byte) 160, (byte) 225, (byte) 191, (byte) 93,
11    (byte) 3, (byte) 128, (byte) 222, (byte) 60, (byte) 98, (byte) 190, (byte) 224, (byte) 2, (byte) 92, (byte) 223,
12    (byte) 129, (byte) 99, (byte) 61, (byte) 124, (byte) 34, (byte) 192, (byte) 158, (byte) 29, (byte) 67, (byte) 161,
13    (byte) 255, (byte) 70, (byte) 24,
14    (byte) 250, (byte) 164, (byte) 39, (byte) 121, (byte) 155, (byte) 197, (byte) 132, (byte) 218, (byte) 56,
15    (byte) 102, (byte) 229, (byte) 187, (byte) 89, (byte) 7, (byte) 219, (byte) 133, (byte) 103, (byte) 57,
16    (byte) 186, (byte) 228, (byte) 6, (byte) 88, (byte) 25, (byte) 71, (byte) 165, (byte) 251, (byte) 120, (byte) 38,
17    (byte) 196, (byte) 154, (byte) 101, (byte) 59, (byte) 217, (byte) 135, (byte) 4, (byte) 90, (byte) 184, (byte) 230,
18    (byte) 167, (byte) 249, (byte) 27, (byte) 69, (byte) 198, (byte) 152, (byte) 122, (byte) 36, (byte) 248, (byte) 216,
19    (byte) 68, (byte) 26, (byte) 153, (byte) 199, (byte) 37, (byte) 123, (byte) 58, (byte) 100, (byte) 124, (byte) 216,
20    (byte) 91, (byte) 5, (byte) 231, (byte) 185, (byte) 140, (byte) 210, (byte) 48, (byte) 110, (byte) 237,
21    (byte) 179, (byte) 81, (byte) 15, (byte) 78, (byte) 16, (byte) 242, (byte) 172, (byte) 47, (byte) 113,
```

```

CRC16.java ×
1 package com.fantai.util;
2
3 import java.util.Arrays;
4
5 public class CRC16 {
6
7     public static byte[] crc16(byte[] buf, int start, int len) {
8         int checkCode = 0;
9         checkCode = crc_16_CCITT_False(buf, start, len);
10        byte[] crcByte = new byte[2];
11        crcByte[0] = (byte) ((checkCode >> 8) & 0xff);
12        crcByte[1] = (byte) (checkCode & 0xff);
13        // 将新生成的byte数组添加到原数据结尾并返回
14        return crcByte;
15    }
16
17 }

```

```

DatabaseUtil.java ×
1 package com.fantai.util;
2
3 import java.sql.*;
4
5 public class DatabaseUtil {
6
7     private static String dbDriver = "com.mysql.jdbc.Driver";
8     private static String dbUrl = "jdbc:mysql://localhost:3306/fantainb?autoReconnect=true&autoReconnectForPools=true"; // 数据库地址
9     private static String dbUser = "root"; // 用户名
10    private static String dbPass = "test123"; // 用户密码
11    static Connection connection = null;
12
13    public static void closeConnection() {
14        if (connection != null) {
15            try {
16                connection.close();
17            } catch (SQLException e) {
18                e.printStackTrace();
19            }
20        }
21    }
22
23 }

```

```

DataFormat.java ×
1 package com.fantai.util;
2
3 public class DataFormat {
4
5     /**
6     * 十六进制数组转十六进制字符串
7     */
8     @ public static String bytes2HexString(byte[] src) {
9         StringBuilder stringBuilder = new StringBuilder("");
10        if (src == null || src.length <= 0) {
11            return null;
12        }
13        for (int i = 0; i < src.length; i++) {
14            int v = src[i] & 0xFF;
15            String hv = Integer.toHexString(v);
16            if (hv.length() < 2) {
17                stringBuilder.append(0);
18            }
19            stringBuilder.append(hv);
20        }
21        return stringBuilder.toString().toUpperCase();
22    }
23
24 }

```

```

1 package com.fantai.util;
2
3 import ...
4
5 public class DataMsg {
6
7     private final static int FuncData = 3; //子功能数据长度大小
8     private final static int RandomRange = 1000; //随机数范围获取
9     private static Map<String, HeartCheck> m_CodeIdMap = new HashMap<>();
10
11     private void HandleHeart(byte codeId, String code, int time) {
12         if (m_CodeIdMap.containsKey(code)) { //判断是否含有该codeId
13             m_CodeIdMap.get(code).setRunning(false);
14             m_CodeIdMap.get(code).interrupt();
15             HeartCheck heartCheck = new HeartCheck(codeId, code, time);
16             heartCheck.start();
17             m_CodeIdMap.put(code, heartCheck);
18         } else {
19             HeartCheck heartCheck = new HeartCheck(codeId, code, time);
20             heartCheck.start();
21             m_CodeIdMap.put(code, heartCheck);
22         }
23     }
24 }

```

```

1 package com.fantai.util;
2
3 import ...
4
5 /**
6  * 心跳检测类
7  */
8 public class HeartCheck extends Thread {
9
10     public void setRunning(boolean running) { isRunning = running; }
11
12     private boolean isRunning = true;
13     private String code;
14     private int time;
15     private byte codeId;
16
17     public HeartCheck(byte codeId, String code, int time) {
18         this.code = code;
19         this.time = time;
20         this.codeId = codeId;
21         this.isRunning = true;
22     }
23 }

```

```

1 package com.fantai.util;
2
3 import ...
4
5 public class TcpThreadServer {
6     private static final int PORT = 28888;
7
8     public void start() throws Exception {
9         ServerSocket ss = new ServerSocket(PORT);
10         while (true) {
11             Socket s = ss.accept();
12             Thread t = new Thread(new TCPThreadServerSocket(s));
13             t.start();
14         }
15     }
16 }

```

```

1 package com.fantai.util;
2
3 import ...
4
5
6
7
8 public class TCPThreadServerSocket implements Runnable {
9     private Socket socket;
10    private InputStream in;
11    private OutputStream out;
12    public TCPThreadServerSocket(Socket s) {
13        this.socket = s;
14    }
15
16    DataMsg dataMsg = new DataMsg();
17
18    @Override
19    public void run() {
20        byte[] recData = null;
21        try {
22            //获取服务端输入的消息
23            in = socket.getInputStream();
24            //服务端返回的消息
25            out = socket.getOutputStream();
26            //用一个字节数来存放消息，提高效率
27            while(true) {

```

```

1 package com.fantai.util;
2
3 public class TransFunc {
4     public final static byte LOGIN = 0x01; //平台登录
5     public final static byte GIVETIME = 0x05; //平台授时
6
7     public final static byte GPSUPDATE = 0x02; //gps信息更新，手动刷新
8     public final static byte GPSTIME = 0x03; //gps时间间隔信息
9     public final static byte SENSORTIME = 0x06; //传感器间隔时间信息设置
10    public final static byte GPSINTERVAL = 0x05; //GPS定时上传信息
11    public final static byte SENSORINTERVAL = 0x07; //传感器定时上传信息
12    public final static byte ALARMEXCEPTION = 0x04; //终端异常报警信息上传
13    public final static byte LOCK = (byte)0x2D; //电磁锁操作
14    public final static byte ICUP = 0x08; //卡号上传信息
15
16    public final static byte ICACCREDIT = 0x09; //卡 accredit授权信息
17    public final static byte NOWARSEND = (byte)0x21; //正常发送到终端
18    public final static byte NOTORSEND = (byte)0x81; //机动发送终端
19
20
21    public final static byte LockSealing = 0x41; //施封
22    public final static byte LockDeSealing = 0x43; //解封
23    public final static byte LockCheck = (byte)0x45; //验封
24    public final static byte AlarmRelease = (byte)0x47; //解除报警
25    public final static byte Buzzer = 0x49; //铃铛
26    public final static byte SensorCollectSet = (byte)0x6D; //传感器模式设置
27    public final static byte PdaSensor = (byte)0x10;

```

6) 创建 Controller 类，如图所示。（详情见源码）

```

1 package com.fantai.controller;
2
3 import ...
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18 @Controller
19 @RequestMapping("/login")
20 public class LoginController {
21
22     public final static int ID_ERROR = 1;
23     public final static int PWD_ERROR = 2;
24     public final static int ROOT_ERROR = 3;
25
26     public final static int SUCCESS = 0;
27
28     @Resource
29     private UserInfomapper userMapper;
30
31     @RequestMapping("/toLogin1.do")
32     public String toLogin1() {
33         try {
34             ServerSocket ss = new ServerSocket(port: 28888);
35             System.out.println("服务器已经启动。。。");
36             while (true) {
37                 Socket s = ss.accept();
38                 Thread t = new Thread(new TCPThreadServerSocket(s));
39                 t.start();
40             }

```

```

1 package com.fantai.controller;
2
3 import ...
4
5
6
7
8
9
10 @Controller
11 @RequestMapping("/public")
12 public class PublicController {
13
14     @Resource
15     private CarInfoMapper carInfoMapper;
16
17     @Resource
18     private LockInfoMapper lockInfoMapper;
19
20     @Resource
21     private SensorInfoMapper sensorInfoMapper;
22
23     @RequestMapping("/freshCar.do")
24     @ResponseBody
25     public List<CarInfo> freshCar(HttpServletRequest request) {
26         UserInfo userInfo = (UserInfo)request.getSession().getAttribute("user");
27         String ui_id = userInfo.getUserId();
28         List<CarInfo> list = carInfoMapper.findByUser(ui_id);
29         return list;
30     }
31 }

```

```

1 package com.fantai.controller;
2
3 import ...
4
5
6
7
8
9 @Controller
10 @RequestMapping("/lock")
11 public class LockController {
12
13     public static final int UPDATE_SUCCESS = 0;
14
15     @Resource
16     private LockInfoMapper lockInfoMapper;
17
18     @Resource
19     private DeviceInfoMapper deviceInfoMapper;
20
21     @RequestMapping("/findByThing.do")
22     public String findByThing(Model model, HttpServletRequest request) {
23         UserInfo u = (UserInfo)request.getSession().getAttribute("user");
24         if (u.getUserId() == 2) {
25             List<LockInfo> list = lockInfoMapper.findByUser(u.getUserId());
26             model.addAttribute("module", "lock_list");
27             model.addAttribute("lockinfos", list);
28             return "lock/findByUser";
29         }
30         return null;
31     }
32 }

```

```

1 package com.fantai.controller;
2
3 import ...
4
5
6
7
8
9 @Controller
10 @RequestMapping("/sensor")
11 public class SensorController {
12
13     @Resource
14     private SensorInfoMapper sensorInfoMapper;
15
16     @Resource
17     private DeviceInfoMapper deviceInfoMapper;
18
19     @RequestMapping("/findByThing.do")
20     public String findByThing(Model model, HttpServletRequest request) {
21         UserInfo u = (UserInfo)request.getSession().getAttribute("user");
22         if (u.getUserId() == 2) {
23             List<SensorInfo> list = sensorInfoMapper.findByUser(u.getUserId());
24             model.addAttribute("module", "sensor_list");
25             model.addAttribute("sensorinfos", list);
26             return "sensor/findByUser";
27         }
28         return null;
29     }
30 }

```

```

CarController.java
package com.fantai.controller;

import ...

@Controller
@RequestMapping("/car")
public class CarController {

    public static final int NFC_ERROR = 1;
    public static final int NFC_SUCCESS = 0;

    @Resource
    private CarInfoMapper carInfoMapper;

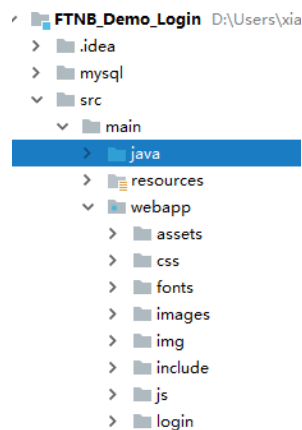
    @Resource
    private DeviceInfoMapper deviceInfoMapper;

    @RequestMapping("/findByThing.do")
    public String findByThing(Model model, HttpServletRequest request) {
        UserInfo u = (UserInfo) request.getSession().getAttribute("user");
        if (u.getSys_ui_role() == 2) {
            List<CarInfo> list = carInfoMapper.findByUser(u.getSys_ui_id());
            model.addAttribute("module", "car_list");
            model.addAttribute("carinfos", list);
            return "car/findByUser";
        }
        return null;
    }
}

```

1.4.5 页面编写

1) 将准备好的样式文件及 js 文件导入到 webapp 目录下，如图所示。（详情见源码）



2) 编写 index 页面，如图所示。（详情见源码）

```

index.jsp
<%@ page language="java" import="java.util.*" pageEncoding="UTF-8"%>
<%
    String path = request.getContextPath();
    String basePath = request.getScheme() + "://" + request.getServerName() + ":" + request.getServerPort() + path + "/";
%>
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
<html>
<head>
<script type="text/javascript">
    function show() {
        window.location="login/toLogin1.do";
    }
</script>
</head>
<body onload="return show();">
</body>
</html>

```

3) 在 WEB-INF 目录下，创建一个名为 include 的目录，并在此目录下新建菜单页面，如图所示。（详情见源码）


```
info.jsp x
1 <%@ page contentType="text/html; charset=UTF-8" language="java" %>
2 <html>
3 <head>
4 <title></title>
5 </head>
6 <body>
7 <div id="head-nav" class="navbar navbar-default navbar-fixed-top">
8 <div class="container-fluid">
9 <div class="navbar-header">
10 <button type="button" class="navbar-toggle" data-toggle="collapse" data-target=".navbar-collapse">
11 <span class="fa fa-gear"></span>
12 </button>
13 <a class="navbar-brand" href="#"><span>NB-IOT 平台登录</span></a>
14 </div>
15 <div class="navbar-collapse collapse">
16
17 <ul class="nav navbar-nav navbar-right user-nav">
18 <li class="dropdown profile_menu">
19 <a href="#" class="dropdown-toggle" data-toggle="dropdown">
20 <%
21 String u=session.getAttribute("name").toString();
22 %>
23 <out.print(u); %>
24 <b class="caret"></b></a>
25 <ul class="dropdown-menu">
26 <li><a href="${pageContext.request.contextPath}/login/toLogin.do">Sign Out</a></li>
27 </ul>
28 </li>
29 </ul>
30
31 </div><!--.nav-collapse -->
32 </div>
33 </body>
34 </html>

menu.jsp x
1 <%@ page contentType="text/html; charset=UTF-8" language="java" %>
2 <%taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c" %>
3 <html>
4 <head>
5 <meta http-equiv="content-type" content="text/html; charset=UTF-8">
6 <meta charset="utf-8">
7 <script type="text/javascript" src="../../js/jquery.js"></script>
8 </head>
9 <body>
10 <ul class="cl-vnavigation">
11 <li <c:if test='${module == index}'>class="active"</c:if><a href="${pageContext.request.contextPath}/login/toIndex.do"><i class="fa fa-home">
12 </li>
13 <li><a href="#"><i class="fa fa-list-alt"></i><span>智能锁管理</span></a>
14 <ul class="sub-menu">
15 <li <c:if test='${module == lock_list}'>class="active"</c:if><a href="${pageContext.request.contextPath}/lock/findByThing.do">智能锁列表
16 </li>
17 </ul>
18 </li>
19 <li><a href="#"><i class="fa fa-table"></i><span>智能环境管理</span></a>
20 <ul class="sub-menu">
21 <li <c:if test='${module == sensor_list}'>class="active"</c:if><a href="${pageContext.request.contextPath}/sensor/findByThing.do">环境
22 </li>
23 <li><a href="#"><i class="fa fa-map-marker"></i><span>智慧交通管理</span></a>
24 <ul class="sub-menu">
25 <li <c:if test='${module == car_list}'>class="active"</c:if><a href="${pageContext.request.contextPath}/car/findByThing.do">车辆列表
26 </li>
27 </ul>
28 </li>
29 </ul>
30 </body>
31 </html>
```

4) 在 WEB-INF 目录下, 创建一个名为 main 的目录, 并在此目录下新建主页页面以及登录页面, 如图所示。(详情见源码)

```

login.jsp
1  }
2  </script>
3  </head>
4  <body>
5
6  <div class="login-form">
7  <form action="#">
8  <div class="top">
9  
10 <h1> 登录 </h1>
11 <h4>WEB-INF实验箱平台</h4>
12 </div>
13 <div class="form-area">
14 <div class="group">
15 <input id="sy_ui_id" name="sy_ui_id" type="text" class="form-control" placeholder="用户名" onfocus="clear_msg('id_msg');">
16 <i class="fa fa-user"></i>
17 <label for="sy_ui_id" id="id_msg" style="display:none"></label>
18 </div>
19 <div class="group">
20 <input id="sy_ui_pwd" name="sy_ui_pwd" type="password" class="form-control" placeholder="密码" onfocus="clear_msg('pwd_msg');">
21 <i class="fa fa-key"></i>
22 <label for="sy_ui_pwd" id="pwd_msg" style="display:none"></label>
23 </div>
24 <div>
25 <button type="button" class="btn btn-default btn-block" onclick="check_login();">登录</button>
26 <br>
27 <div class="text-center out-links">版权所有: <a href="http://www.fantaitech.com/" target="_blank">无锡泛太科技有限公司</a></div>
28 </div>
29 </form>
30 </div>
31
index.jsp
44 <jsp:include page="/WEB-INF/include/info.jsp" flush="true" />
45
46 <div id="cl-wrapper">
47 <div class="cl-sidebar">
48 <div class="cl-toggle"><i class="fa fa-bars"></i></div>
49 <div class="cl-mainblock">
50 <div class="menu-space">
51 <div class="content">
52 <div class="side-user">
53 <div class="avatar"></div>
54 <div class="info">
55 <a href="#">
56 <%
57 String u=session.getAttribute("name").toString();
58 %>
59 <out.print(u); %>
60 </a>
61  <span>Online</span>
62 </div>
63 </div>
64 </div>
65 <jsp:include page="/WEB-INF/include/menu.jsp" flush="true" />
66 </div>
67 </div>
68 <div class="text-right collapse-button" style="display:none">
69 <button id="sidebar-collapse" class="btn btn-default" style="display:none"><i style="display:none" class="fa fa-angle-left"></i></button>
70 </div>
71 </div>
72
73 <div class="container-fluid" id="pcont">
74 <div class="page-head">
75 <h2>主页</h2>
76 <ol class="breadcrumb">
77 <li><a href="#">主页</a></li>
78 <li class="active">主页</li></ol>
79 </div>
80

```

5) 在 WEB-INF 目录下，创建一个名为 lock 的目录，并在此目录下新建智能锁相关页面，如图所示。（详情见源码）

```

12      <li class="active">智能锁列表信息</li>
13    </ol>
14  </div>
15  <div class="cl-mcont">
16
17    <div class="row">
18      <div class="col-md-12">
19        <div class="block-flat">
20          <div class="header">
21            <h3>智能锁列表信息</h3>
22          </div>
23          <div class="content">
24            <div class="table-responsive">
25              <table class="table table-bordered" id="datatable-icons">
26                <thead>
27                  <tr>
28                    <th>ID</th>
29                    <th>设备序列号</th>
30                    <th>锁状态</th>
31                    <th>在线状态</th>
32                    <th>操作</th>
33                  </tr>
34                </thead>
35                <tbody>
36                  <c:forEach items="${lockinfos}" var="l">
37                    <tr>
38                      <td>${l.sl_li_id}</td>
39                      <td>${l.sy_di_code}</td>
40                      <td id="${l.sl_sy_di_code}">
41                        <c:choose>
42                          <c:when test="${l.sl_li_status==0}">施封</c:when>
43                          <c:when test="${l.sl_li_status==1}">解封</c:when>
44                          <c:when test="${l.sl_li_status==2}">验封</c:when>
45                          <c:when test="${l.sl_li_status==3}">解除报警</c:when>
46                        </c:choose>
47                      </td>
48                      <td id="2${l.sl_sy_di_code}">

```

6) 在 WEB-INF 目录下，创建一个名为 sensor 的目录，并在此目录下新建智能环境相关页面，如图所示。（详情见源码）

```

12      <div class="row">
13        <div class="col-md-12">
14          <div class="block-flat">
15            <div class="header">
16              <h3>智能环境列表信息</h3>
17            </div>
18            <div class="content">
19              <div class="table-responsive">
20                <table class="table table-bordered" id="datatable-icons">
21                  <thead>
22                    <tr>
23                      <th>ID</th>
24                      <th>设备序列号</th>
25                      <th>温度</th>
26                      <th>湿度</th>
27                      <th>气压</th>
28                      <th>在线状态</th>
29                      <th>操作</th>
30                    </tr>
31                  </thead>
32                  <tbody>
33                    <c:forEach items="${sensorinfos}" var="s">
34                      <tr>
35                        <td>${s.se_si_id}</td>
36                        <td>${s.sy_di_code}</td>
37                        <td id="${s.sy_di_code}1">${s.se_si_tem}</td>
38                        <td id="${s.sy_di_code}2">${s.se_si_hum}</td>
39                        <td id="${s.sy_di_code}3">${s.se_si_pressure}</td>
40                        <td id="${s.sy_di_code}4">
41                          <c:choose>
42                            <c:when test="${s.se_si_online==0}">离线</c:when>
43                            <c:when test="${s.se_si_online==1}">在线</c:when>
44                          </c:choose>
45                        </td>
46                      <td>

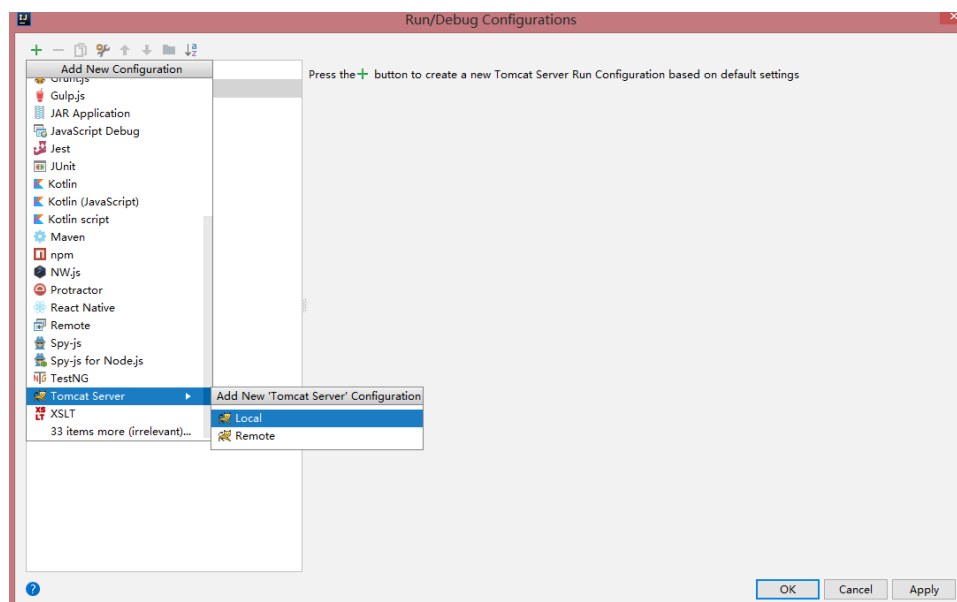
```

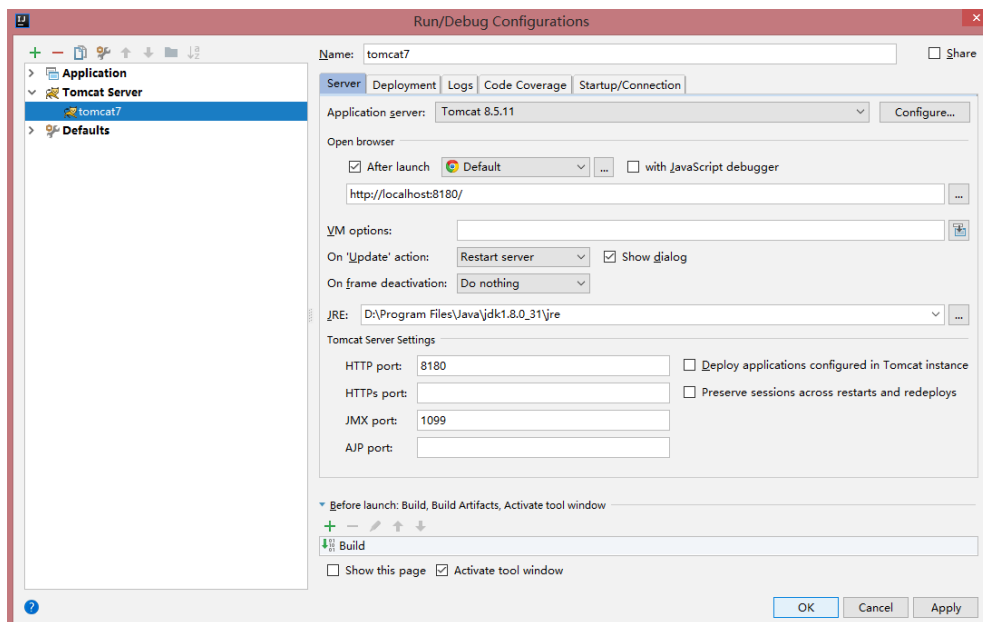
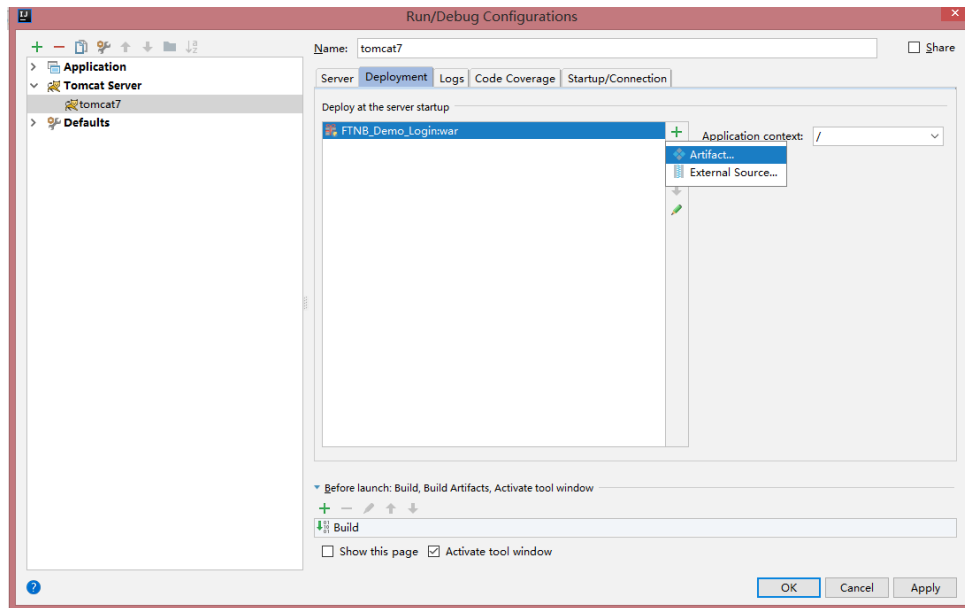
7) 在 WEB-INF 目录下，创建一个名为 car 的目录，并在此目录下新建智能交通相关页面，如图所示。（详情见源码）

```
findByUser.jsp
113 <div class="row">
114 <div class="col-md-12">
115 <div class="block-flat">
116 <div class="header">
117 <h3>设备列表信息</h3>
118 </div>
119 <div class="content">
120 <div class="table-responsive">
121 <table class="table table-bordered" id="datatable-icons">
122 <thead>
123 <tr>
124 <th>ID</th>
125 <th>设备序列号</th>
126 <th>MFC</th>
127 <th>车牌号</th>
128 <th>车辆状态</th>
129 <th>在线状态</th>
130 <th>操作</th>
131 </tr>
132 </thead>
133 <tbody>
134 <c:forEach items="${carinfos}" var="c">
135 <tr>
136 <td>${c.st_ci_id}</td>
137 <td>${c.sy_di_code}</td>
138 <td>${c.st_ci_mfc}</td>
139 <td>${c.st_ci_carnum}</td>
140 <td id="${c.sy_di_code}1">
141 <c:choose>
142 <c:when test="${c.st_ci_status==1}">入库</c:when>
143 <c:when test="${c.st_ci_status==2}">出库</c:when>
144 </c:choose>
145 </td>
146 <td id="${c.sy_di_code}2">
147 <c:choose>
148 <c:when test="${c.st_ci_online==0}">离线</c:when>
149 <c:when test="${c.st_ci_online==1}">在线</c:when>
```

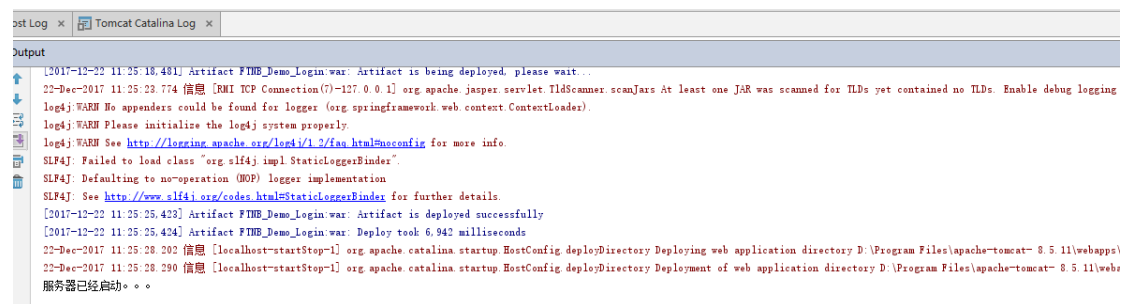
1.5 实验结果

1) 配置 tomcat，并启动，如图所示。





2) 登录平台，先开启 TCP 服务器（http://域名:端口/项目名），开启之后关闭页面，再输入 http://域名:端口/项目名/login/toLogin.do，打开系统，登录账号，进入。并且将 NBIOT 设备通电，连接。等设备连接上服务器之后，设备的状态会从离线更改为在线。如图所示。





登 录

NB-IOT实验箱平台

👤

🔑

登 录

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NB-IOT 平台登录
👤 用户



用户
Online

- 🏠 主页
- 📁 智能管理
- 📁 智能环境管理
- 📁 智慧交通管理
- 🚗 车辆列表

设备列表信息

[主页](#) / [智慧交通管理](#) / 设备列表信息

设备列表信息

Show 10 Rows

ID	设备序列号	NFC	车牌号	车辆状态	在线状态	操作
1	12000001	88D1C7B7	苏B 2345	入库	离线	
18	12000008	C0F8E044	苏B530A8	出库	离线	

Showing 1 to 2 of 2 entries

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NB-IOT 平台登录
👤 用户



用户
Online

- 🏠 主页
- 📁 智能管理
- 📁 智能环境管理
- 📁 智慧交通管理
- 🚗 车辆列表

设备列表信息

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设备列表信息

Show 10 Rows

ID	设备序列号	NFC	车牌号	车辆状态	在线状态	操作
1	12000001	88D1C7B7	苏B 2345	入库	离线	
18	12000008	C0F8E044	苏B530A8	出库	在线	

Showing 1 to 2 of 2 entries

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1
Next >

我们可以看到 12000008 编号的设备从离线状态更改为在线状态。至此，平台登录实验就完成了。