web综合案例

学习目标

目标1：完成使用POI读写Excel的测试案例

目标2：完成题目模板的制作，包括表头，标题及数据

目标3：完成题目报表数据导出的业务功能

目标4：完成角色与模块功能的快速开发

目标5：能够自己独立分析树形控件的页面制作

目标6：完成授权时动态加载授权数据

目标7：完成角色与模块的绑定关系

1. 报表

报表：简单的说，报表就是用表格、图表等格式来动态显示数据，可以用公式表示为："报表 = 多样的格式 + 动态的数据"。

报表的种类有很多：Excel报表，PDF报表，网页报表等，他们各有优缺点

可编辑	不可编辑	不可编辑
动态数据	死数据	动态数据
格式多样化	格式固定	格式多样化

在本课程中，我们主要来将Excel报表。

对于Excel报表的技术实现上也有很多种选择：

- JXL：支持xls文件操作
- POI：支持xls和xlsx文件操作

我们只要来讲POI技术，要使用POI就要导入其坐标，如下

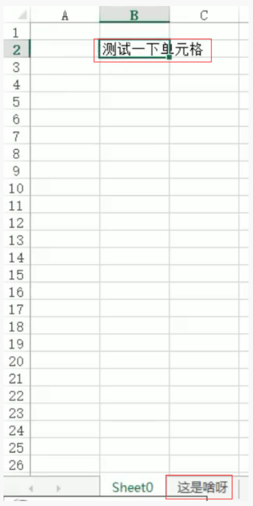
```
<!--POI-->
<dependency>
    <groupId>org.apache.poi</groupId>
    <artifactId>poi</artifactId>
    <version>4.0.1</version>
</dependency>
<dependency>
    <groupId>org.apache.poi</groupId>
```

```
        <artifactId>poi-ooxml</artifactId>
        <version>4.0.1</version>
    </dependency>
    <dependency>
        <groupId>org.apache.poi</groupId>
        <artifactId>poi-ooxml-schemas</artifactId>
        <version>4.0.1</version>
    </dependency>
```

1.1 POI写Excel文件

在测试包下创建POI测试类：com.itheima.service.store.PoiTest

```
public class PoiTest {

    @Test
    public void testWriteByPoi() throws IOException {
        //1.获取到对应的Excel文件，工作簿文件
        Workbook wb = new XSSFWorkbook();
        //2.创建工作表
        Sheet sheet = wb.createSheet();
        wb.createSheet("这是啥呀");

        //3.创建工作表中的行对象
        Row row = sheet.createRow(1);
        //4.创建工作表中行中的列对象
        Cell cell = row.createCell(1);
        //5.在列中写数据
        cell.setCellValue("测试一下单元格");

        //创建一个文件对象，作为excel文件内容的输出文件
        File f = new File("test.xlsx");
        //输出时通过流的形式对外输出，包装对应的目标文件
        OutputStream os = new FileOutputStream(f);
        //将内存中的workbook数据写入到流中
        wb.write(os);
        wb.close();
        os.close();
    }
}
```



使用单元测试进行测试！

1.2 POI读Excel文件

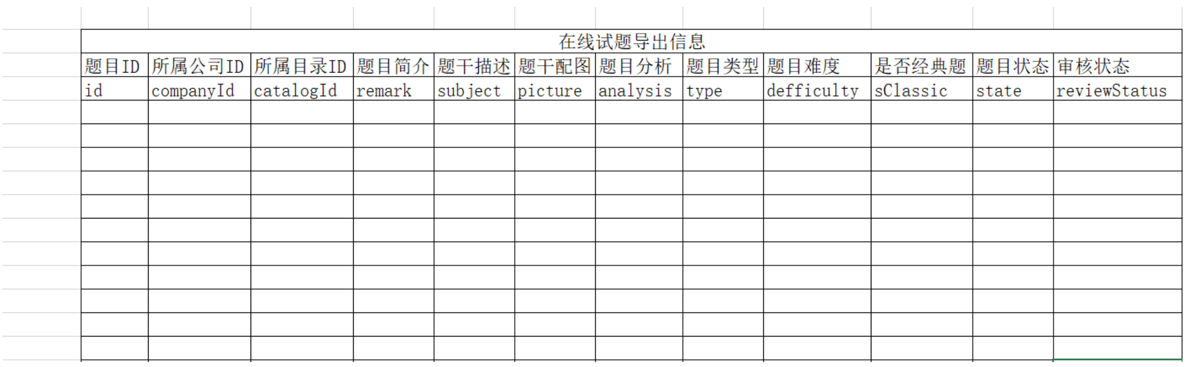
创建读Excel的测试方法：`testReadByPoi`

```
@Test
public void testReadByPoi() throws IOException {
    //1.获取要读取的文件工作簿对象
    Workbook wb = new XSSFWorkbook("test.xlsx");
    //2.获取工作表
    Sheet s = wb.getSheetAt(0);
    //3.获取行
    Row row = s.getRow(3);
    //4.获取列
    Cell cell = row.getCell(1);
    //5.根据数据的类型获取数据
    //        String data = cell.getStringCellValue();
    //        double data = cell.getNumericCellValue();
    boolean data = cell.getBooleanCellValue();

    System.out.println(data);

    wb.close();
}
```

直接读取第一节创建好的Excel文件

1.3 题目模板表头制作

前两节我们讲了如何去读取及写入Excel数据，操作相对简单，但是实际业务中我们要操作的Excel报表还是比较繁琐的，我们可以从今日课程资料中找到我们最终要导出报表的模板：`资料\Excel解析\模板.xlsx`



在线试题导出信息											
题目ID	所属公司ID	所属目录ID	题目简介	题干描述	题干配图	题目分析	题目类型	题目难度	是否经典题	题目状态	审核状态
id	companyId	catalogId	remark	subject	picture	analysis	type	defficulty	sClassic	state	reviewStatus

这种形式的我们如何去操作呢？

在测试类中再编写一个测试方法：`testProjectPoi`

```
@Test
public void testProjectPoi() throws IOException {
    //1.获取到对应的Excel文件，工作簿文件
    Workbook wb = new XSSFWorkbook();
    //2.创建工作表
    Sheet s = wb.createSheet("题目数据文件");
    //制作标题
    s.addMergedRegion(new CellRangeAddress(1,1,1,12));
    Row row_1 = s.createRow(1);
    Cell cell_1_1 = row_1.createCell(1);
    cell_1_1.setCellValue("在线试题导出信息");
    //创建一个样式
    CellStyle cs_title = wb.createCellStyle();
    cs_title.setAlignment(HorizontalAlignment.CENTER); 居中
    cs_title.setVerticalAlignment(VerticalAlignment.CENTER); 垂直居中
    cell_1_1.setCellStyle(cs_title);
    //制作表头

    //制作数据区

    //创建一个文件对象，作为excel文件内容的输出文件
    File f = new File("test.xlsx");
    //输出时通过流的形式对外输出，包装对应的目标文件
    OutputStream os = new FileOutputStream(f);
    //将内存中的workbook数据写入到流中
    wb.write(os);
    wb.close();
    os.close();
}
```

1.4 题目模板标题制作

下面我们接着来做Excel的表头

在测试方法`testProjectPoi`中继续编写代码

```
@Test
public void testProjectPoi() throws IOException {
    //1.获取到对应的Excel文件，工作簿文件
    Workbook wb = new XSSFWorkbook();
    //2.创建工作表
    Sheet s = wb.createSheet("题目数据文件");
    //设置通用配置
    //        s.setColumnWidth(4,100);
    //制作标题
    s.addMergedRegion(new CellRangeAddress(1,1,1,12));
    Row row_1 = s.createRow(1);
    Cell cell_1_1 = row_1.createCell(1);
    cell_1_1.setCellValue("在线试题导出信息");
    //创建一个样式
    CellStyle cs_title = wb.createCellStyle();
    cs_title.setAlignment(HorizontalAlignment.CENTER);
    cs_title.setVerticalAlignment(VerticalAlignment.CENTER);
    cell_1_1.setCellStyle(cs_title);
    //制作表头
   String[] fields = {"题目ID","所属公司ID","所属目录ID","题目简介","题干描述",
                "题干配图","题目分析","题目类型","题目难度","是否经典题","题目状态","审核
状态"};
    Row row_2 = s.createRow(2);
    for (int i = 0; i < fields.length; i++) {
        Cell cell_2_temp = row_2.createCell(1 + i); //++
        cell_2_temp.setCellValue(fields[i]);    //++

        CellStyle cs_field = wb.createCellStyle();
        cs_field.setAlignment(HorizontalAlignment.CENTER);
        cell_2_temp.setCellStyle(cs_field);
    }

    //制作数据区

    //创建一个文件对象，作为excel文件内容的输出文件
    File f = new File("test.xlsx");
    //输出时通过流的形式对外输出，包装对应的目标文件
    OutputStream os = new FileOutputStream(f);
    //将内存中的workbook数据写入到流中
    wb.write(os);
    wb.close();
    os.close();
}
```

1.5 题目模板数据制作

我们继续来做数据区

```java
@Test
public void testProjectPoi() throws IOException {
    //1.获取到对应的Excel文件，工作簿文件
    Workbook wb = new XSSFWorkbook();
    //2.创建工作表
    Sheet s = wb.createSheet("题目数据文件");
    //设置通用配置
    //          s.setColumnWidth(4,100);
    CellStyle cs_field = wb.createCellStyle();
    cs_field.setAlignment(HorizontalAlignment.CENTER);
    cs_field.setBorderTop(BorderStyle.THIN);
    cs_field.setBorderBottom(BorderStyle.THIN);
    cs_field.setBorderLeft(BorderStyle.THIN);
    cs_field.setBorderRight(BorderStyle.THIN);


    //制作标题
    s.addMergedRegion(new CellRangeAddress(1,1,1,12));
    Row row_1 = s.createRow(1);
    Cell cell_1_1 = row_1.createCell(1);
    cell_1_1.setCellValue("在线试题导出信息");
    //创建一个样式
    CellStyle cs_title = wb.createCellStyle();
    cs_title.setAlignment(HorizontalAlignment.CENTER);
    cs_title.setVerticalAlignment(VerticalAlignment.CENTER);
    cell_1_1.setCellStyle(cs_title);
    //制作表头
    String[] fields = {"题目ID","所属公司ID","所属目录ID","题目简介","题干描述",
                       "题干配图","题目分析","题目类型","题目难度","是否经典题","题目状
态","审核状态"};
    Row row_2 = s.createRow(2);

    for (int i = 0; i < fields.length; i++) {
        Cell cell_2_temp = row_2.createCell(1 + i); //++
        cell_2_temp.setCellValue(fields[i]);    //++
        cell_2_temp.setCellStyle(cs_field);
    }


    //制作数据区
    List<Question> questionList = new ArrayList<>();
    Question qq = new Question();
    qq.setId("1");
    qq.setPicture("12");
    qq.setReviewStatus("13");
    qq.setAnalysis("14");
    qq.setCatalogId("15");
    qq.setCompanyId("16");
    qq.setDifficulty("17");
    qq.setIsClassic("18");
    qq.setRemark("19");
    qq.setState("21");
    qq.setSubject("31");
    qq.setType("41");
    questionList.add(qq);
    Question qqq = new Question();
    qqq.setId("1");
    qqq.setPicture("12");
    qqq.setReviewStatus("13");
    qqq.setAnalysis("14");
    qqq.setCatalogId("15");
    qqq.setCompanyId("16");
    qqq.setDifficulty("17");
    qqq.setIsClassic("18");
    qqq.setRemark("19");
    qqq.setState("21");
    qqq.setSubject("31");
    qqq.setType("41");
    questionList.add(qqq);


    int row_index = 0;
    for (Question q : questionList) {
        int cell_index = 0;
        Row row_temp = s.createRow(3 + row_index++);

        Cell cell_data_1 = row_temp.createCell(1 + cell_index++);
        cell_data_1.setCellValue(q.getId());    //++
        cell_data_1.setCellStyle(cs_field);

        Cell cell_data_2 = row_temp.createCell(1 + cell_index++);
        cell_data_2.setCellValue(q.getCompanyId());    //++
        cell_data_2.setCellStyle(cs_field);

        Cell cell_data_3 = row_temp.createCell(1 + cell_index++);
        cell_data_3.setCellValue(q.getCatalogId());    //++
        cell_data_3.setCellStyle(cs_field);

        Cell cell_data_4 = row_temp.createCell(1 + cell_index++);
        cell_data_4.setCellValue(q.getRemark());    //++
        cell_data_4.setCellStyle(cs_field);

        Cell cell_data_5 = row_temp.createCell(1 + cell_index++);
        cell_data_5.setCellValue(q.getSubject());    //++
        cell_data_5.setCellStyle(cs_field);

        Cell cell_data_6 = row_temp.createCell(1 + cell_index++);
        cell_data_6.setCellValue(q.getPicture());    //++
        cell_data_6.setCellStyle(cs_field);

        Cell cell_data_7 = row_temp.createCell(1 + cell_index++);
        cell_data_7.setCellValue(q.getAnalysis());    //++
        cell_data_7.setCellStyle(cs_field);

        Cell cell_data_8 = row_temp.createCell(1 + cell_index++);
        cell_data_8.setCellValue(q.getType());    //++
        cell_data_8.setCellStyle(cs_field);

        Cell cell_data_9 = row_temp.createCell(1 + cell_index++);
```

```
            cell_data_9.setCellValue(q.getDifficulty());    //++
            cell_data_9.setCellStyle(cs_field);

            Cell cell_data_10 = row_temp.createCell(1 + cell_index++);
            cell_data_10.setCellValue(q.getIsClassic());    //++
            cell_data_10.setCellStyle(cs_field);

            Cell cell_data_11 = row_temp.createCell(1 + cell_index++);
            cell_data_11.setCellValue(q.getState());    //++
            cell_data_11.setCellStyle(cs_field);

            Cell cell_data_12 = row_temp.createCell(1 + cell_index++);
            cell_data_12.setCellValue(q.getReviewStatus());    //++
            cell_data_12.setCellStyle(cs_field);
        }

        //创建一个文件对象，作为excel文件内容的输出文件
        File f = new File("test.xlsx");
        //输出时通过流的形式对外输出，包装对应的目标文件
        OutputStream os = new FileOutputStream(f);
        //将内存中的workbook数据写入到流中
        wb.write(os);
        wb.close();
        os.close();
    }
```

测试即可！

1.6 题目报表数据准备

（1）找到 `/WEB-INF/pages/store/question/list.jsp` 页面，修改导出题目的链接

```
<button type="button" class="btn btn-default" title="导出题目"
onclick=location.href="${ctx}/store/question?operation=downloadReport"> <i
class="fa fa-download"></i>导出题目</button>
```

（2）在后台servlet中添加对应的方法

```
// uri:/store/question?operation=list
@WebServlet("/store/question")
public class QuestionServlet extends BaseServlet {

    @Override
    protected void doGet(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
        String operation = request.getParameter("operation");
        if("list".equals(operation)){
            this.list(request,response);
        }
        //其他的else if判断省略
        else if("downloadReport".equals(operation)){
            this.downloadReport(request,response);
        }
    }
    private void downloadReport(HttpServletRequest request, HttpServletResponse
response) throws IOException {
        //生成报告的文件，然后传递到前端页面
        questionService.getReport();
    }
}
```

（3）在业务层`QuestionService`添加一个方法`getReport`

```
public void getReport() throws IOException;
```

（4）在对应的实现类中去实现该方法，把之前在测试类中的测试方法`testProjectPoi`里面的所有代码拷贝过来，其中数据我们应该是从数据库中查询出来，因此调用dao完成数据的查询

```
@Override
public void getReport() throws IOException{
     //获取对应要展示的数据
        SqlSession sqlSession = null;
        List<Question> questionList = null;
        try{
            //1.获取SqlSession
            sqlSession = MapperFactory.getSqlSession();
            //2.获取Dao
            QuestionDao questionDao =
MapperFactory.getMapper(sqlSession,QuestionDao.class);
            //3.调用Dao层操作
            questionList = questionDao.findAll();
        }catch (Exception e){
            throw new RuntimeException(e);
            //记录日志
        }finally {
            try {
                TransactionUtil.close(sqlSession);
            }catch (Exception e){
                e.printStackTrace();
            }
        }


        //1.获取到对应的Excel文件，工作簿文件
        Workbook wb = new XSSFWorkbook();
        //2.创建工作表
        Sheet s = wb.createSheet("题目数据文件");
        //设置通用配置
//        s.setColumnWidth(4,100);
        CellStyle cs_field = wb.createCellStyle();
        cs_field.setAlignment(HorizontalAlignment.CENTER);
        cs_field.setBorderTop(BorderStyle.THIN);
        cs_field.setBorderBottom(BorderStyle.THIN);
        cs_field.setBorderLeft(BorderStyle.THIN);
        cs_field.setBorderRight(BorderStyle.THIN);
        //制作标题
        s.addMergedRegion(new CellRangeAddress(1,1,1,12));
        Row row_1 = s.createRow(1);
        Cell cell_1_1 = row_1.createCell(1);
        cell_1_1.setCellValue("在线试题导出信息");
        //创建一个样式
        CellStyle cs_title = wb.createCellStyle();
        cs_title.setAlignment(HorizontalAlignment.CENTER);
        cs_title.setVerticalAlignment(VerticalAlignment.CENTER);
        cell_1_1.setCellStyle(cs_title);


        //制作表头
        String[] fields = {"题目ID","所属公司ID","所属目录ID","题目简介","题干描述",
                "题干配图","题目分析","题目类型","题目难度","是否经典题","题目状态","审核
状态"};
        Row row_2 = s.createRow(2);
        for (int i = 0; i < fields.length; i++) {
            Cell cell_2_temp = row_2.createCell(1 + i); //++
            cell_2_temp.setCellValue(fields[i]);    //++
            cell_2_temp.setCellStyle(cs_field);
        }
        //制作数据区
        int row_index = 0;
        for (Question q : questionList) {
            int cell_index = 0;
            Row row_temp = s.createRow(3 + row_index++);

            Cell cell_data_1 = row_temp.createCell(1 + cell_index++);
            cell_data_1.setCellValue(q.getId());    //++
            cell_data_1.setCellStyle(cs_field);

            Cell cell_data_2 = row_temp.createCell(1 + cell_index++);
            cell_data_2.setCellValue(q.getCompanyId());    //++
            cell_data_2.setCellStyle(cs_field);

            Cell cell_data_3 = row_temp.createCell(1 + cell_index++);
            cell_data_3.setCellValue(q.getCatalogId());    //++
            cell_data_3.setCellStyle(cs_field);

            Cell cell_data_4 = row_temp.createCell(1 + cell_index++);
            cell_data_4.setCellValue(q.getRemark());    //++
            cell_data_4.setCellStyle(cs_field);

            Cell cell_data_5 = row_temp.createCell(1 + cell_index++);
            cell_data_5.setCellValue(q.getSubject());    //++
            cell_data_5.setCellStyle(cs_field);

            Cell cell_data_6 = row_temp.createCell(1 + cell_index++);
            cell_data_6.setCellValue(q.getPicture());    //++
            cell_data_6.setCellStyle(cs_field);

            Cell cell_data_7 = row_temp.createCell(1 + cell_index++);
            cell_data_7.setCellValue(q.getAnalysis());    //++
            cell_data_7.setCellStyle(cs_field);

            Cell cell_data_8 = row_temp.createCell(1 + cell_index++);
            cell_data_8.setCellValue(q.getType());    //++
            cell_data_8.setCellStyle(cs_field);

            Cell cell_data_9 = row_temp.createCell(1 + cell_index++);
            cell_data_9.setCellValue(q.getDifficulty());    //++
            cell_data_9.setCellStyle(cs_field);
            Cell cell_data_10 = row_temp.createCell(1 + cell_index++);
            cell_data_10.setCellValue(q.getIsClassic());    //++
            cell_data_10.setCellStyle(cs_field);

            Cell cell_data_11 = row_temp.createCell(1 + cell_index++);
            cell_data_11.setCellValue(q.getState());    //++
            cell_data_11.setCellStyle(cs_field);

            Cell cell_data_12 = row_temp.createCell(1 + cell_index++);
            cell_data_12.setCellValue(q.getReviewStatus());    //++
            cell_data_12.setCellStyle(cs_field);
        }

        //创建一个文件对象，作为excel文件内容的输出文件
        File f = new File("test.xlsx");
        //输出时通过流的形式对外输出，包装对应的目标文件
        OutputStream os = new FileOutputStream(f);
        //将内存中的workbook数据写入到流中
        wb.write(os);
        wb.close();
        os.close();
}
```

1.7 题目报表业务实现

现在后台已经能够生成Excel文件并且填充了数据，但是真实的业务中我们是需要将这个文件下载到客户端

（1）修改接口方法`getReport`，添加返回值

```
/**
     * 获取包含了数据的流对象
     * @return 包含了报表数据的流对象
     * @throws IOException
     */
ByteArrayOutputStream getReport() throws IOException;
```

（2）在实现类中实现该方法时，将内存中的Excel相关数据写入到`ByteArrayOutputStream`流中

```
@Override
public ByteArrayOutputStream getReport() throws IOException {
    //前面的代码无变动 故省略


    /**
    //创建一个文件对象，作为excel文件内容的输出文件
        File f = new File("test.xlsx");
        //输出时通过流的形式对外输出，包装对应的目标文件
        OutputStream os = new FileOutputStream(f);
        //将内存中的workbook数据写入到流中
        wb.write(os);
        wb.close();
        os.close();
    */
    //将内存中的workbook数据写入到流中
    ByteArrayOutputStream os = new ByteArrayOutputStream();
    wb.write(os);
    wb.close();
    return os;
}
```

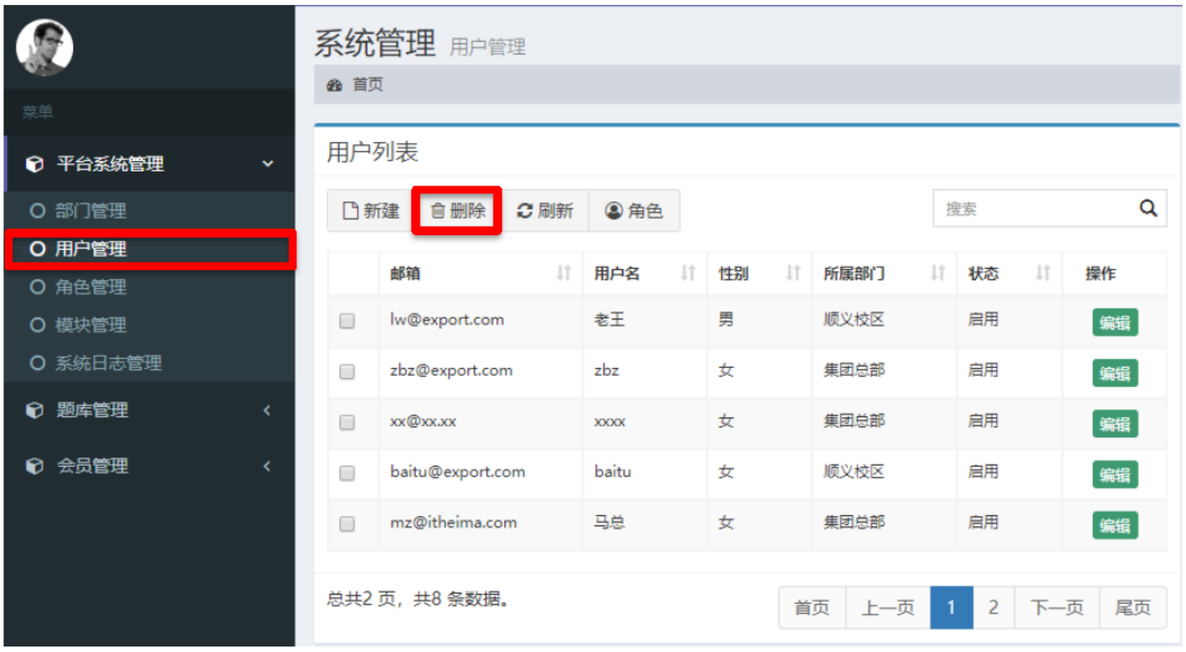
（3）修改后台servlet的`downloadReport`方法

```
private void downloadReport(HttpServletRequest request, HttpServletResponse
response) throws IOException {
    //返回的数据类型为文件xlsx类型
    response.setContentType("application/vnd.openxmlformats-
officedocument.spreadsheetml.sheet;charset=utf-8");
    String fileName = new String("测试文件名.xlsx".getBytes(),"iso8859-1");
    response.addHeader("Content-Disposition","attachment;fileName="+fileName);

    //生成报告的文件，然后传递到前端页面
    ByteArrayOutputStream os = questionService.getReport();
    //获取产生响应的流对象
    ServletOutputStream sos = response.getOutputStream();
    //将数据从原始的字节流对象中提取出来写入到servlet对应的输出流中
    os.writeTo(sos);
    //将输出流刷新
    sos.flush();
    os.close();
}
```

（4）启动项目，进行测试

2.权限系统设计与开发

2.1 权限系统简介与结构设计



	邮箱	用户名	性别	所属部门	状态	操作
☐	lw@export.com	老王	男	顺义校区	启用	编辑
☐	zbz@export.com	zbz	女	集团总部	启用	编辑
☐	xx@xx.xx	xxxx	女	集团总部	启用	编辑
☐	baitu@export.com	baitu	女	顺义校区	启用	编辑
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总共2 页，共8 条数据。

什么是权限系统？

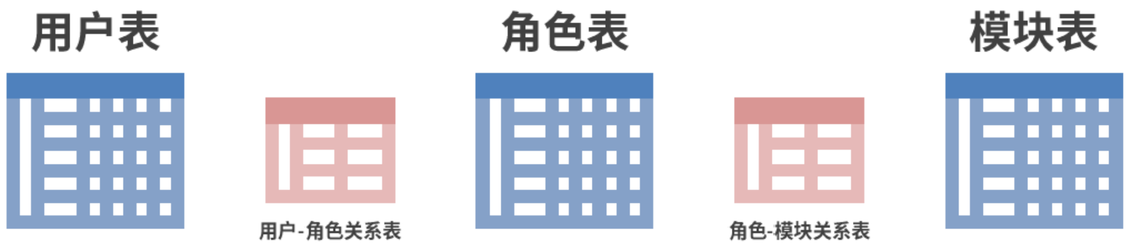
权限系统是一种设定用户与可操作模块之间关系的系统。

通过设定用户与可操作的模块之间的关系,控制用户在可指定范围内进行业务执行

基于用户的权限控制(UBAC:User-BasedAccessControl)

基于角色的权限控制(RBAC:role-BasedAccessControl)

在本课程中我们采用基于角色的权限控制RBAC



2.2 角色与模块功能快速开发

首先来看角色与模块各自的结构

```
public class Role {
    private String id;
    private String name;               名称
    private String remark;             描述
    private Date createTime;           创建时间
}
```

```
public class Module {
    private String id;
    private String parentId;           所属模块id
    private String name;               名称
    private Long ctype;                类型（1-系统菜单，2-二级菜单，3-……，4-……）
    private Long state;                状态（1-可用，2-不可用）
    private String curl;               请求url（用于权限校验）
    private String remark;             描述

    private Module module;             自连接关系
}
```

（1）创建角色实体：com.itheima.domain.system.Role

```java
public class Role {
    private String id;
    private String name;
    private String remark;
    private Date createTime;
    // getter/setter略
}
```

（2）创建角色Dao：com.itheima.dao.system.RoleDao

```java
public interface RoleDao {
    int save(Role role);

    int delete(Role role);

    int update(Role role);

    Role findById(String id);

    List<Role> findAll();
}
```

（3）添加接口的映射配置文件，从今日课程资料中找到`资料\dao层资源文件`将里面所有的xml映射配置文件拷贝到项目`src/main/resources/com/itheima/dao/system`目录下

（4）创建业务层接口：com.itheima.service.system.RoleService

```java
public interface RoleService {
    /**
     * 添加
     * @param role
     * @return
     */
    void save(Role role);

    /**
     * 删除
     * @param role
     * @return
     */
    void delete(Role role);

    /**
     * 修改
     * @param role
     * @return
     */
    void update(Role role);

    /**
     * 查询单个
     * @param id 查询的条件（id）
     * @return 查询的结果，单个对象
     */
    Role findById(String id);

    /**
     * 查询全部的数据
     * @return 全部数据的列表对象
     */
    List<Role> findAll();

    /**
     * 分页查询数据
     * @param page 页码
     * @param size 每页显示的数据总量
     * @return
     */
    PageInfo findAll(int page, int size);
}
```

（5）创建接口的实现：com.itheima.service.system.impl

```
public class RoleServiceImpl implements RoleService {
    @Override
    public void save(Role role) {
        SqlSession sqlSession = null;
        try{
            //1.获取SqlSession
            sqlSession = MapperFactory.getSqlSession();
            //2.获取Dao
            RoleDao roleDao = MapperFactory.getMapper(sqlSession,RoleDao.class);
            //id使用UUID的生成策略来获取
            String id = UUID.randomUUID().toString();
            role.setId(id);
            //3.调用Dao层操作
            roleDao.save(role);
            //4.提交事务
            TransactionUtil.commit(sqlSession);
        }catch (Exception e){
            TransactionUtil.rollback(sqlSession);
            throw new RuntimeException(e);
            //记录日志
        }finally {
            try {
                TransactionUtil.close(sqlSession);
            }catch (Exception e){
                e.printStackTrace();
            }
        }
    }

    @Override
    public void delete(Role role) {
        SqlSession sqlSession = null;
        try{
            //1.获取SqlSession
            sqlSession = MapperFactory.getSqlSession();
            //2.获取Dao
            RoleDao roleDao = MapperFactory.getMapper(sqlSession,RoleDao.class);
            //3.调用Dao层操作
            roleDao.delete(role);
            //4.提交事务
            TransactionUtil.commit(sqlSession);
        }catch (Exception e){
            TransactionUtil.rollback(sqlSession);
            throw new RuntimeException(e);
            //记录日志
        }finally {
            try {
                TransactionUtil.close(sqlSession);
            }catch (Exception e){
                e.printStackTrace();
            }
```

```java
        }
    }

    @Override
    public void update(Role role) {
        SqlSession sqlSession = null;
        try{
            //1.获取SqlSession
            sqlSession = MapperFactory.getSqlSession();
            //2.获取Dao
            RoleDao roleDao = MapperFactory.getMapper(sqlSession,RoleDao.class);
            //3.调用Dao层操作
            roleDao.update(role);
            //4.提交事务
            TransactionUtil.commit(sqlSession);
        }catch (Exception e){
            TransactionUtil.rollback(sqlSession);
            throw new RuntimeException(e);
            //记录日志
        }finally {
            try {
                TransactionUtil.close(sqlSession);
            }catch (Exception e){
                e.printStackTrace();
            }
        }
    }

    @Override
    public Role findById(String id) {
        SqlSession sqlSession = null;
        try{
            //1.获取SqlSession
            sqlSession = MapperFactory.getSqlSession();
            //2.获取Dao
            RoleDao roleDao = MapperFactory.getMapper(sqlSession,RoleDao.class);
            //3.调用Dao层操作
            return roleDao.findById(id);
        }catch (Exception e){
            throw new RuntimeException(e);
            //记录日志
        }finally {
            try {
                TransactionUtil.close(sqlSession);
            }catch (Exception e){
                e.printStackTrace();
            }
        }
    }

    @Override
    public List<Role> findAll() {
        SqlSession sqlSession = null;
        try{
            //1.获取SqlSession
            sqlSession = MapperFactory.getSqlSession();
            //2.获取Dao
            RoleDao roleDao = MapperFactory.getMapper(sqlSession,RoleDao.class);
            //3.调用Dao层操作
            return roleDao.findAll();
        }catch (Exception e){
            throw new RuntimeException(e);
            //记录日志
        }finally {
            try {
                TransactionUtil.close(sqlSession);
            }catch (Exception e){
                e.printStackTrace();
            }
        }
    }

    @Override
    public PageInfo findAll(int page, int size) {
        SqlSession sqlSession = null;
        try{
            //1.获取SqlSession
            sqlSession = MapperFactory.getSqlSession();
            //2.获取Dao
            RoleDao roleDao = MapperFactory.getMapper(sqlSession,RoleDao.class);
            //3.调用Dao层操作
            PageHelper.startPage(page,size);
            List<Role> all = roleDao.findAll();
            PageInfo pageInfo = new PageInfo(all);
            return pageInfo;
        }catch (Exception e){
            throw new RuntimeException(e);
            //记录日志
        }finally {
            try {
                TransactionUtil.close(sqlSession);
            }catch (Exception e){
                e.printStackTrace();
            }
        }
    }
}
```

(6) 创建sevlet：com.itheima.web.controller.system.RoleServlet

```java
// uri:/system/role?operation=list
@WebServlet("/system/role")
public class RoleServlet extends BaseServlet {

    @Override
    protected void doGet(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
        String operation = request.getParameter("operation");
        if("list".equals(operation)){
            this.list(request,response);
        }else if("toAdd".equals(operation)){
            this.toAdd(request,response);
        }else if("save".equals(operation)){
            this.save(request, response);
        }else if("toEdit".equals(operation)){
            this.toEdit(request,response);
        }else if("edit".equals(operation)){
            this.edit(request,response);
        }else if("delete".equals(operation)){
            this.delete(request,response);
        }else if("author".equals(operation)){
            this.author(request,response);
        }
    }

    private void list(HttpServletRequest request,HttpServletResponse response)
throws ServletException, IOException {
        //进入列表页
        //获取数据
        int page = 1;
        int size = 5;
        if(StringUtils.isNotBlank(request.getParameter("page"))){
            page = Integer.parseInt(request.getParameter("page"));
        }
        if(StringUtils.isNotBlank(request.getParameter("size"))){
            size = Integer.parseInt(request.getParameter("size"));
        }
        PageInfo all = roleService.findAll(page, size);
        //将数据保存到指定的位置
        request.setAttribute("page",all);
        //跳转页面
        request.getRequestDispatcher("/WEB-
INF/pages/system/role/list.jsp").forward(request,response);
    }

    private void toAdd(HttpServletRequest request,HttpServletResponse response)
throws ServletException, IOException {
        //加载所有的部门信息放入到roleList
        List<Role> all = roleService.findAll();
        request.setAttribute("roleList",all);
        //跳转页面
        request.getRequestDispatcher("/WEB-
INF/pages/system/role/add.jsp").forward(request,response);
    }

    private void save(HttpServletRequest request,HttpServletResponse response)
throws ServletException, IOException {
        //将数据获取到，封装成一个对象
        Role role = BeanUtil.fillBean(request,Role.class,"yyyy-MM-dd");
        //调用业务层接口save
        roleService.save(role);
        //跳转回到页面list
        response.sendRedirect(request.getContextPath()+"/system/role?
operation=list");
    }

    private void toEdit(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
        //查询要修改的数据findById
        String id = request.getParameter("id");
        Role role = roleService.findById(id);
        //将数据加载到指定区域，供页面获取
        request.setAttribute("role",role);
        //跳转页面
        request.getRequestDispatcher("/WEB-INF/pages/system/role/update.jsp").forward(request,response);
    }

    private void edit(HttpServletRequest request, HttpServletResponse response) throws IOException {
        //将数据获取到，封装成一个对象
        Role role = BeanUtil.fillBean(request,Role.class,"yyyy-MM-dd");
        //调用业务层接口save
        roleService.update(role);
        //跳转回到页面list
        response.sendRedirect(request.getContextPath()+"/system/role?operation=list");
    }

    private void delete(HttpServletRequest request, HttpServletResponse response) throws IOException {
        //将数据获取到，封装成一个对象
        Role role = BeanUtil.fillBean(request,Role.class);
        //调用业务层接口save
        roleService.delete(role);
        //跳转回到页面list
        response.sendRedirect(request.getContextPath()+"/system/role?operation=list");
    }

    private void author(HttpServletRequest request, HttpServletResponse response) throws IOException, ServletException {
        //获取要授权的角色id
        String roleId = request.getParameter("id");
        //使用id查询对应的数据（角色id对应的模块信息）
        Role role = roleService.findById(roleId);
        request.setAttribute("role",role);
        //根据当前的角色id获取所有的模块数据，并加载关系数据
        List<Map> map = moduleService.findAuthorDataByRoleId(roleId);
        //map转成json数据
        ObjectMapper om = new ObjectMapper();
        String json = om.writeValueAsString(map);
        request.setAttribute("roleModuleJson",json);
        // TODO 数据未查询
        //跳转到树页面中
        request.getRequestDispatcher("/WEB-INF/pages/system/role/author.jsp").forward(request,response);
    }

    @Override
    protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
        this.doGet(request,response);
    }
}
```

同时需要在BaseServlet中添加`RoleService`

```
public class BaseServlet extends HttpServlet {
    protected CompanyService companyService;
    protected DeptService deptService;
    protected UserService userService;
    protected CourseService courseService;
    protected CatalogService catalogService;
    protected QuestionService questionService;
    protected QuestionItemService questionItemService;
    protected RoleService roleService;

    @Override
    public void init() throws ServletException {
        companyService = new CompanyServiceImpl();
        deptService = new DeptServiceImpl();
        userService = new UserServiceImpl();
        courseService = new CourseServiceImpl();
        catalogService = new CatalogServiceImpl();
        questionService = new QuestionServiceImpl();
        questionItemService = new QuestionItemServiceImpl();
        roleService = new RoleServiceImpl();
    }
}
```

（7）拷贝页面到项目中，从今日课程资料中找到：`资料\模块页面`将下面所有模块全部拷贝到项目`/WEB-INF/pages/system`目录下

（8）启动项目，进行测试

然后我们按照相同的方式将模块的相关功能快速开发完成

（1）创建模块实体：com.itheima.domain.system.Module

```
public class Module {
    private String id;
    private String parentId;
    private String name;
    private Long ctype;
    private Long state;
    private String curl;
    private String remark;

    private Module module;
    // getter/setter略
}
```

（2）创建模块dao：com.itheima.dao.system.ModuleDao

```
public interface ModuleDao {
    int save(Module module);

    int delete(Module module);

    int update(Module module);

    Module findById(String id);

    List<Module> findAll();
}
```

(3) 映射配置文件，之前已拷贝，查看一下即可

(4) 创建业务层接口：com.itheima.service.system.ModuleService

```
public interface ModuleService {
    /**
     * 添加
     * @param module
     * @return
     */
    void save(Module module);

    /**
     * 删除
     * @param module
     * @return
     */
    void delete(Module module);

    /**
     * 修改
     * @param module
     * @return
     */
    void update(Module module);

    /**
     * 查询单个
     * @param id 查询的条件（id）
     * @return 查询的结果，单个对象
     */
    Module findById(String id);

    /**
     * 查询全部的数据
     * @return 全部数据的列表对象
     */
    List<Module> findAll();

    /**
     * 分页查询数据
     * @param page 页码
     * @param size 每页显示的数据总量
     * @return
     */
    PageInfo findAll(int page, int size);

}
```

（5）创建业务层实现类：com.itheima.service.system.impl.ModuleServiceImpl

```java
public class ModuleServiceImpl implements ModuleService {
    @Override
    public void save(Module module) {
        SqlSession sqlSession = null;
        try{
            //1.获取SqlSession
            sqlSession = MapperFactory.getSqlSession();
            //2.获取Dao
            ModuleDao moduleDao =
MapperFactory.getMapper(sqlSession,ModuleDao.class);
            //id使用UUID的生成策略来获取
            String id = UUID.randomUUID().toString();
            module.setId(id);
            //3.调用Dao层操作
            moduleDao.save(module);
            //4.提交事务
            TransactionUtil.commit(sqlSession);
        }catch (Exception e){
            TransactionUtil.rollback(sqlSession);
            throw new RuntimeException(e);
            //记录日志
        }finally {
            try {
                TransactionUtil.close(sqlSession);
            }catch (Exception e){
                e.printStackTrace();
            }
        }
    }

    @Override
    public void delete(Module module) {
        SqlSession sqlSession = null;
        try{
            //1.获取SqlSession
            sqlSession = MapperFactory.getSqlSession();
            //2.获取Dao
            ModuleDao moduleDao =
MapperFactory.getMapper(sqlSession,ModuleDao.class);
            //3.调用Dao层操作
            moduleDao.delete(module);
            //4.提交事务
            TransactionUtil.commit(sqlSession);
        }catch (Exception e){
            TransactionUtil.rollback(sqlSession);
            throw new RuntimeException(e);
            //记录日志
        }finally {
            try {
                TransactionUtil.close(sqlSession);
            }catch (Exception e){
                e.printStackTrace();
            }
        }
    }

    @Override
    public void update(Module module) {
        SqlSession sqlSession = null;
        try{
            //1.获取SqlSession
            sqlSession = MapperFactory.getSqlSession();
            //2.获取Dao
            ModuleDao moduleDao =
MapperFactory.getMapper(sqlSession,ModuleDao.class);
            //3.调用Dao层操作
            moduleDao.update(module);
            //4.提交事务
            TransactionUtil.commit(sqlSession);
        }catch (Exception e){
            TransactionUtil.rollback(sqlSession);
            throw new RuntimeException(e);
            //记录日志
        }finally {
            try {
                TransactionUtil.close(sqlSession);
            }catch (Exception e){
                e.printStackTrace();
            }
        }
    }

    @Override
    public Module findById(String id) {
        SqlSession sqlSession = null;
        try{
            //1.获取SqlSession
            sqlSession = MapperFactory.getSqlSession();
            //2.获取Dao
            ModuleDao moduleDao =
MapperFactory.getMapper(sqlSession,ModuleDao.class);
            //3.调用Dao层操作
            return moduleDao.findById(id);
        }catch (Exception e){
            throw new RuntimeException(e);
            //记录日志
        }finally {
            try {
                TransactionUtil.close(sqlSession);
            }catch (Exception e){
                e.printStackTrace();
            }
        }
    }

    @Override
    public List<Module> findAll() {
        SqlSession sqlSession = null;
        try{
            //1.获取SqlSession
            sqlSession = MapperFactory.getSqlSession();
            //2.获取Dao
            ModuleDao moduleDao =
MapperFactory.getMapper(sqlSession,ModuleDao.class);
            //3.调用Dao层操作
            return moduleDao.findAll();
        }catch (Exception e){
            throw new RuntimeException(e);
            //记录日志
        }finally {
            try {
                TransactionUtil.close(sqlSession);
            }catch (Exception e){
                e.printStackTrace();
            }
        }
    }

    @Override
    public PageInfo findAll(int page, int size) {
        SqlSession sqlSession = null;
        try{
            //1.获取SqlSession
            sqlSession = MapperFactory.getSqlSession();
            //2.获取Dao
            ModuleDao moduleDao =
MapperFactory.getMapper(sqlSession,ModuleDao.class);
            //3.调用Dao层操作
            PageHelper.startPage(page,size);
            List<Module> all = moduleDao.findAll();
            PageInfo pageInfo = new PageInfo(all);
            return pageInfo;
        }catch (Exception e){
            throw new RuntimeException(e);
            //记录日志
        }finally {
            try {
                TransactionUtil.close(sqlSession);
            }catch (Exception e){
                e.printStackTrace();
            }
        }
    }
}
```

（6）创建servlet：com.itheima.web.controller.system.ModuleServlet

```
// uri:/system/module?operation=list
@WebServlet("/system/module")
public class ModuleServlet extends BaseServlet {

    @Override
    protected void doGet(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
        String operation = request.getParameter("operation");
        if("list".equals(operation)){
```

```java
            this.list(request,response);
        }else if("toAdd".equals(operation)){
            this.toAdd(request,response);
        }else if("save".equals(operation)){
            this.save(request, response);
        }else if("toEdit".equals(operation)){
            this.toEdit(request,response);
        }else if("edit".equals(operation)){
            this.edit(request,response);
        }else if("delete".equals(operation)){
            this.delete(request,response);
        }
    }

    private void list(HttpServletRequest request,HttpServletResponse response)
throws ServletException, IOException {
        //进入列表页
        //获取数据
        int page = 1;
        int size = 10;
        if(StringUtils.isNotBlank(request.getParameter("page"))){
            page = Integer.parseInt(request.getParameter("page"));
        }
        if(StringUtils.isNotBlank(request.getParameter("size"))){
            size = Integer.parseInt(request.getParameter("size"));
        }
        PageInfo all = moduleService.findAll(page, size);
        //将数据保存到指定的位置
        request.setAttribute("page",all);
        //跳转页面
        request.getRequestDispatcher("/WEB-
INF/pages/system/module/list.jsp").forward(request,response);
    }

    private void toAdd(HttpServletRequest request,HttpServletResponse response)
throws ServletException, IOException {
        //加载所有的信息放入到moduleList
        List<Module> all = moduleService.findAll();
        request.setAttribute("moduleList",all);
        //跳转页面
        request.getRequestDispatcher("/WEB-
INF/pages/system/module/add.jsp").forward(request,response);
    }

    private void save(HttpServletRequest request,HttpServletResponse response)
throws ServletException, IOException {
        //将数据获取到，封装成一个对象
        Module module = BeanUtil.fillBean(request,Module.class,"yyyy-MM-dd");
        //调用业务层接口save
        moduleService.save(module);
        //跳转回到页面list
        response.sendRedirect(request.getContextPath()+"/system/module?
operation=list");
    }

    private void toEdit(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
        //查询要修改的数据findById
        String id = request.getParameter("id");
        Module module = moduleService.findById(id);
        //将数据加载到指定区域，供页面获取
        request.setAttribute("module",module);
        //跳转页面
        request.getRequestDispatcher("/WEB-
INF/pages/system/module/update.jsp").forward(request,response);
    }

    private void edit(HttpServletRequest request, HttpServletResponse response)
throws IOException {
        //将数据获取到，封装成一个对象
        Module module = BeanUtil.fillBean(request,Module.class,"yyyy-MM-dd");
        //调用业务层接口save
        moduleService.update(module);
        //跳转回到页面list
        response.sendRedirect(request.getContextPath()+"/system/module?
operation=list");
    }

    private void delete(HttpServletRequest request, HttpServletResponse
response) throws IOException {
        //将数据获取到，封装成一个对象
        Module module = BeanUtil.fillBean(request,Module.class);
        //调用业务层接口save
        moduleService.delete(module);
        //跳转回到页面list
        response.sendRedirect(request.getContextPath()+"/system/module?
operation=list");
    }

    @Override
    protected void doPost(HttpServletRequest request, HttpServletResponse
response) throws ServletException, IOException {
        this.doGet(request,response);
    }
}
```

同时需要在BserServlet中添加`ModuleService`

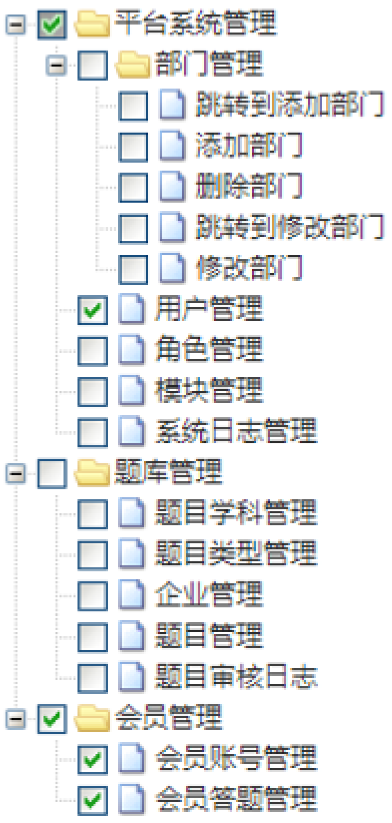
```
public class BaseServlet extends HttpServlet {
    protected CompanyService companyService;
    protected DeptService deptService;
    protected UserService userService;
    protected CourseService courseService;
    protected CatalogService catalogService;
    protected QuestionService questionService;
    protected QuestionItemService questionItemService;
    protected RoleService roleService;
    protected ModuleService moduleService;

    @Override
    public void init() throws ServletException {
        companyService = new CompanyServiceImpl();
        deptService = new DeptServiceImpl();
        userService = new UserServiceImpl();
        courseService = new CourseServiceImpl();
        catalogService = new CatalogServiceImpl();
        questionService = new QuestionServiceImpl();
        questionItemService = new QuestionItemServiceImpl();
        roleService = new RoleServiceImpl();
        moduleService = new ModuleServiceImpl();
    }
}
```

（7）拷贝页面：之前已经拷贝过了，我们可以直接启动项目进行测试！

2.3 树形控件结构分析（1）

树形结构如下图所示：



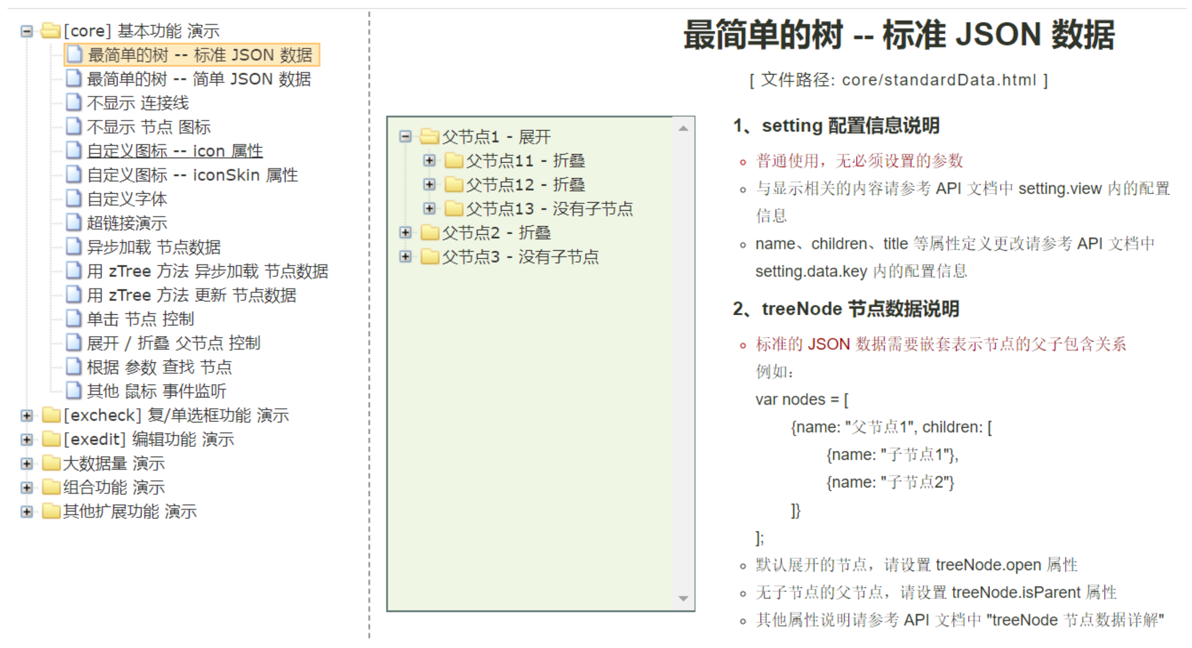
对应的实现技术有：

dTree

tdTree

zTree

我们主要来看关于**zTree**的相关操作，从今日课程资料中找到：`资料\树\zTree-zTree_v3-master\zTree_v3\demo\cn\index.html`，打开就可查阅



[core] 基本功能 演示
- 最简单的树 -- 标准 JSON 数据
- 最简单的树 -- 简单 JSON 数据
- 不显示 连接线
- 不显示 节点 图标
- 自定义图标 -- icon 属性
- 自定义图标 -- iconSkin 属性
- 自定义字体
- 超链接演示
- 异步加载 节点数据
- 用 zTree 方法 异步加载 节点数据
- 用 zTree 方法 更新 节点数据
- 单击 节点 控制
- 展开 / 折叠 父节点 控制
- 根据 参数 查找 节点
- 其他 鼠标 事件监听

[excheck] 复/单选框功能 演示
[exedit] 编辑功能 演示
大数据量 演示
组合功能 演示
其他扩展功能 演示

父节点1 - 展开
- 父节点11 - 折叠
- 父节点12 - 折叠
- 父节点13 - 没有子节点

父节点2 - 折叠
父节点3 - 没有子节点

最简单的树 -- 标准 JSON 数据

[文件路径: core/standardData.html]

1、setting 配置信息说明
- 普通使用，无必须设置的参数
- 与显示相关的内容请参考 API 文档中 setting.view 内的配置信息
- name、children、title 等属性定义更改请参考 API 文档中 setting.data.key 内的配置信息

2、treeNode 节点数据说明
- 标准的 JSON 数据需要嵌套表示节点的父子包含关系
  例如：
  var nodes = [
  {name: "父节点1", children: [
  {name: "子节点1"},
  {name: "子节点2"}
  ]}
  ];
- 默认展开的节点，请设置 treeNode.open 属性
- 无子节点的父节点，请设置 treeNode.isParent 属性
- 其他属性说明请参考 API 文档中 "treeNode 节点数据详解"

我们主要是针对里面的Checkbox 勾选操作进行学习，我们自己来编写一个测试页面 `test.html` 来完成一个树形结构，操作步骤：

- 1.观察整体的页面结构
- 2.去除无效的基础信息
- 3.去除页面无效的基础信息
- 4.分析页面js内容
- 5.分页结构所使用的数据
- 6.简化页面内容书写

```
- 1.观察整体的页面结构
- 2.去除无效的基础信息
- 3.去除页面无效的基础信息
- 4.分析页面js内容
- 5.分页结构所使用的数据
- 6.简化页面内容书写

<meta http-equiv="content-type" content="text/html; charset=UTF-8">
<link rel="stylesheet" href="../../../css/demo.css" type="text/css">
<link rel="stylesheet" href="../../../css/zTreeStyle/zTreeStyle.css"
type="text/css">
<script type="text/javascript" src="../../../js/jquery-1.4.4.min.js"></script>
<script type="text/javascript" src="../../../js/jquery.ztree.core-3.5.js">
</script>
<script type="text/javascript" src="../../../js/jquery.ztree.excheck-3.5.js">
</script>
<SCRIPT type="text/javascript">
    var setting = {
        check: {
            enable: true
        },
        data: {
            simpleData: {
                enable: true
            }
        }
    };
    /**/var zNodes =[
        { id:11, pId:1, name:"随意勾选 1-1", open:true},
        { id:111, pId:11, name:"随意勾选 1-1-1"},
        { id:112, pId:11, name:"随意勾选 1-1-2"},
        { id:12, pId:1, name:"随意勾选 1-2", open:true},
        { id:121, pId:12, name:"随意勾选 1-2-1"},
        { id:122, pId:12, name:"随意勾选 1-2-2"},
        { id:2, pId:0, name:"随意勾选 2", checked:true, open:true},
        { id:21, pId:2, name:"随意勾选 2-1"},
        { id:22, pId:2, name:"随意勾选 2-2", open:true},
        { id:221, pId:22, name:"随意勾选 2-2-1", checked:true},
        { id:222, pId:22, name:"随意勾选 2-2-2"},
        { id:23, pId:2, name:"随意勾选 2-3"},
        { id:1, pId:0, name:"随意勾选 1", open:true}
    ];
    var code;
    function setCheck() {
        var zTree = $.fn.zTree.getZTreeObj("treeDemo"),
            py = $("#py").attr("checked")? "p":"",
            sy = $("#sy").attr("checked")? "s":"",
            pn = $("#pn").attr("checked")? "p":"",
            sn = $("#sn").attr("checked")? "s":"",
            type = { "Y":py + sy, "N":pn + sn};
        zTree.setting.check.chkboxType = type;
        showCode('setting.check.chkboxType = { "Y" : "' + type.Y + '", "N" : "'
+ type.N + '" };');
    }
    function showCode(str) {
        if (!code) code = $("#code");
        code.empty();
        code.append("<li>"+str+"</li>");
    }
    $(document).ready(function(){
        $.fn.zTree.init($("#treeDemo"), setting, zNodes);
        setCheck();
        $("#py").bind("change", setCheck);
        $("#sy").bind("change", setCheck);
        $("#pn").bind("change", setCheck);
        $("#sn").bind("change", setCheck);
    });
</SCRIPT>
<div class="content_wrap">
    <div class="zTreeDemoBackground left">
        <ul id="treeDemo" class="ztree"></ul>
    </div>
    <div class="right">
        <ul class="info">
            <li class="title">
                <ul class="list">
                    <li>
                        <input type="checkbox" id="py" class="checkbox first"
checked /><span>关联父</span>
                        <input type="checkbox" id="sy" class="checkbox first"
checked /><span>关联子</span><br/>
                        <input type="checkbox" id="pn" class="checkbox first"
checked /><span>关联父</span>
                        <input type="checkbox" id="sn" class="checkbox first"
checked /><span>关联子</span><br/>
```

```
                        <ul id="code" class="log" style="height:20px;"></ul></p>
            </li>
        </ul>
        </li>
    </ul>
</div>
</div>
```

2.4 树形控件结构分析（2）

分析页面js

```
- 1.观察整体的页面结构
- 2.去除无效的基础信息
- 3.去除页面无效的基础信息
- 4.分析页面js内容
- 5.分页结构所使用的数据
- 6.简化页面内容书写
<meta http-equiv="content-type" content="text/html; charset=UTF-8">
<link rel="stylesheet" href="../../../css/demo.css" type="text/css">
<link rel="stylesheet" href="../../../css/zTreeStyle/zTreeStyle.css"
type="text/css">
<script type="text/javascript" src="../../../js/jquery-1.4.4.min.js"></script>
<script type="text/javascript" src="../../../js/jquery.ztree.core-3.5.js">
</script>
<script type="text/javascript" src="../../../js/jquery.ztree.excheck-3.5.js">
</script>
<SCRIPT type="text/javascript">
    var setting = {check: {enable: true},data: {    simpleData: {enable:
true}}};
    var zNodes =[
        { id:11, pId:1, name:"随意勾选 1-1", open:true},
        { id:111, pId:11, name:"随意勾选 1-1-1"},
        { id:112, pId:11, name:"随意勾选 1-1-2"},
        { id:12, pId:1, name:"随意勾选 1-2", open:true},
        { id:121, pId:12, name:"随意勾选 1-2-1"},
        { id:122, pId:12, name:"随意勾选 1-2-2"},
        { id:2, pId:0, name:"随意勾选 2", checked:true, open:true},
        { id:21, pId:2, name:"随意勾选 2-1"},
        { id:22, pId:2, name:"随意勾选 2-2", open:true},
        { id:221, pId:22, name:"随意勾选 2-2-1", checked:true},
        { id:222, pId:22, name:"随意勾选 2-2-2"},
        { id:23, pId:2, name:"随意勾选 2-3"},
        { id:1, pId:0, name:"随意勾选 1", open:true}
    ];

    $(document).ready(function(){
        $.fn.zTree.init($("#treeDemo"), setting, zNodes);
        var zTree = $.fn.zTree.getZTreeObj("treeDemo")
        zTree.setting.check.chkboxType = { "Y" : "ps", "N" : "ps" }
    });
</SCRIPT>
<ul id="treeDemo" class="ztree"></ul>
```

2.5 树形控件结构分析（3）

继续进行数据结构的分析

```
<meta http-equiv="content-type" content="text/html; charset=UTF-8">
<link rel="stylesheet" href="../../../css/demo.css" type="text/css">
<link rel="stylesheet" href="../../../css/zTreeStyle/zTreeStyle.css"
type="text/css">
<script type="text/javascript" src="../../../js/jquery-1.4.4.min.js"></script>
<script type="text/javascript" src="../../../js/jquery.ztree.core-3.5.js">
</script>
<script type="text/javascript" src="../../../js/jquery.ztree.excheck-3.5.js">
</script>
<SCRIPT type="text/javascript">
    var setting = {check: {enable: true},data: {    simpleData: {enable:
true}}};
    var zNodes =[
        { id:2, pId:0, name:"test", checked:true, open:true},
        { id:21, pId:2, name:"test22222"},
        { id:22, pId:1, name:"test22222"}
    ];

    $(document).ready(function(){
        $.fn.zTree.init($("#treeDemo"), setting, zNodes);
        var zTree = $.fn.zTree.getZTreeObj("treeDemo")
        zTree.setting.check.chkboxType = { "Y" : "ps", "N" : "ps" }
    });
</SCRIPT>
<ul id="treeDemo" class="ztree"></ul>
```

2.6 动态加载授权数据

（1）查看页面：`/WEB-INF/pages/system/role/list.jsp`，授权按钮点击时要传递id

（2）进入后台servlet：`RoleServlet`添加`author`方法

```
@Override
protected void doGet(HttpServletRequest request, HttpServletResponse response)
throws ServletException, IOException {
    String operation = request.getParameter("operation");
    if("list".equals(operation)){
        this.list(request,response);
    }else if("toAdd".equals(operation)){
        this.toAdd(request,response);
    }else if("save".equals(operation)){
        this.save(request, response);
    }else if("toEdit".equals(operation)){
        this.toEdit(request,response);
    }else if("edit".equals(operation)){
        this.edit(request,response);
    }else if("delete".equals(operation)){
        this.delete(request,response);
    }else if("author".equals(operation)){
        this.author(request,response);
    }
}
```

```
private void author(HttpServletRequest request, HttpServletResponse response)
throws IOException, ServletException {
    //获取要授权的角色id
    String roleId = request.getParameter("id");

    // TODO 数据未查询
    //跳转到树页面中
    request.getRequestDispatcher("/WEB-
INF/pages/system/role/author.jsp").forward(request,response);
}
```

（3）在`/WEB-INF/pages/system/role`下创建一个jsp页面：`test.jsp`，内容粘贴我们之前编辑的`test.html`页面，我们在后台跳转的时候跳转的是该目录下的`author.jsp`，我们可以拿这俩页面做一个对比

（4）完善servlet中的`author`方法

```
private void author(HttpServletRequest request, HttpServletResponse response)
throws IOException, ServletException {
    //获取要授权的角色id
    String roleId = request.getParameter("id");
    //使用id查询对应的数据（角色id对应的模块信息）
    Role role = roleService.findById(roleId);
    request.setAttribute("role",role);
    //根据当前的角色id获取所有的模块数据，并加载关系数据
    List<Map> map = moduleService.findAuthorDataByRoleId(roleId);
    //map转成json数据
    ObjectMapper om = new ObjectMapper();
    String json = om.writeValueAsString(map);
    request.setAttribute("roleModuleJson",json);
    // TODO 数据未查询
    //跳转到树页面中
    request.getRequestDispatcher("/WEB-
INF/pages/system/role/author.jsp").forward(request,response);
}
```

在`WEB-INF\pages\system\role\author.jsp`页面中修改js代码：用后台查询的数据直接赋值给zNodes

```
var zNodes =${roleModuleJson}
```

（5）在`ModuleService`中添加`findAuthorDataByRoleId`方法

```
/**
     * 根据角色id获取对应的所有模块关联数据
     * @param roleId 角色id
     */
List<Map> findAuthorDataByRoleId(String roleId);
```

（6）在实现类中实现该方法

```
@Override
public List<Map> findAuthorDataByRoleId(String roleId) {
    SqlSession sqlSession = null;
    try{
        //1.获取SqlSession
        sqlSession = MapperFactory.getSqlSession();
        //2.获取Dao
        ModuleDao moduleDao =
MapperFactory.getMapper(sqlSession,ModuleDao.class);
        //3.调用Dao层操作
        return moduleDao.findAuthorDataByRoleId(roleId);
    }catch (Exception e){
        throw new RuntimeException(e);
        //记录日志
    }finally {
        try {
            TransactionUtil.close(sqlSession);
        }catch (Exception e){
            e.printStackTrace();
        }
    }
}
```

（7）添加dao接口方法：`findAuthorDataByRoleId`

```
List<Map> findAuthorDataByRoleId(String roleId);
```

（8）在ModuleDao对应的映射配置文件中添加对应的查询语句

```
<select id="findAuthorDataByRoleId" parameterType="string"
resultType="java.util.Map">
    select
        module_id as id,
        parent_id as pId,
        name as name,
        case
            when module_id in (select module_id from ss_role_module where
role_id = #{roleId})
                then 'true'
                else 'false'
            end
        as checked
    from
        ss_module
</select>
```

（9）启动测试

2.7 绑定角色与模块关系

（1）查看`WEB-INF\pages\system\role\author.jsp`页面中提交保存的js代码

```
<SCRIPT type="text/javascript">
    //实现权限分配
    function submitCheckedNodes() {
        //1.获取所有的勾选权限节点
        var nodes = zTreeObj.getCheckedNodes(true);//true:被勾选，false：未被勾选
        //2.循环nodes，获取每个节点的id，并将数据加入数组
        //1,2,3,4,5     1+","+2+","+3.....
        //数据的临时存储数组，为了方便内容连接成为一个由逗号分隔的字符串
        var moduleArrays = [];
        for(var i=0;i<nodes.length;i++) {
            moduleArrays.push(nodes[i].id);
        }
        //3.将数组中的数据使用,连接后，赋值给表单，传入后台
        $("#moduleIds").val(moduleArrays.join(','));    //1,2,3,4,5
        $("#icform").submit();
    }
</SCRIPT>
<form id="icform" method="post" action="${ctx}/system/role?
operation=updateRoleModule">
    <input type="hidden" name="roleId" value="${role.id}"/>
        <input type="hidden" id="moduleIds" name="moduleIds" value=""/>
            <ul id="treeDemo" class="ztree"></ul>
</form>
<!--工具栏-->
</form>
```

(2) 在后台servlet中添加方法`updateRoleModule`

```
@Override
protected void doGet(HttpServletRequest request, HttpServletResponse response)
throws ServletException, IOException {
    String operation = request.getParameter("operation");
    if("list".equals(operation)){
        this.list(request,response);
    }
    //中间的else if无变动 省略
    else if("updateRoleModule".equals(operation)){
        this.updateRoleModule(request,response);
    }
}
private void updateRoleModule(HttpServletRequest request, HttpServletResponse
response) throws IOException, ServletException {
    String roleId = request.getParameter("roleId");
    String moduleIds = request.getParameter("moduleIds");
    roleService.updateRoleModule(roleId,moduleIds);
    //跳转回到页面list
    response.sendRedirect(request.getContextPath()+"/system/role?
operation=list");
}
```

(3) 在`RoleService`中添加方法`updateRoleModule`

```
/**
     * 建立角色与模块之间的关联
     * @param roleId 角色id
     * @param moduleIds 模块id（多个）
     */
void updateRoleModule(String roleId, String moduleIds);
```

(4) 在对应的实现类中实现该方法

```
@Override
public void updateRoleModule(String roleId, String moduleIds) {
    SqlSession sqlSession = null;
    try{
        //1.获取SqlSession
        sqlSession = MapperFactory.getSqlSession();
        //2.获取Dao
        RoleDao roleDao = MapperFactory.getMapper(sqlSession,RoleDao.class);
        //3.调用Dao层操作
        //修改role_module
        //3.1现有的关系全部取消掉
        roleDao.deleteRoleModule(roleId);
        //3.2建立新的关系（多个）
        String[] moduleArray = moduleIds.split(",");
        for(String moduleId:moduleArray){
            roleDao.saveRoleModule(roleId,moduleId);
        }
        //4.提交事务
        TransactionUtil.commit(sqlSession);
    }catch (Exception e){
        TransactionUtil.rollback(sqlSession);
        throw new RuntimeException(e);
        //记录日志
    }finally {
        try {
            TransactionUtil.close(sqlSession);
        }catch (Exception e){
            e.printStackTrace();
        }
    }
}
```

(5) 在`RoleDao`中添加方法`deleteRoleModule`，`saveRoleModule`

```
    void deleteRoleModule(String roleId);

    void saveRoleModule(@Param("roleId") String roleId, @Param("moduleId")
String moduleId);
```

(6) 在对应的映射配置文件中添加对应的操作

```
<!--配置根据roleId删除关系表数据-->
<delete id="deleteRoleModule" parameterType="java.lang.String">
    delete from ss_role_module
    where role_id = #{roleId,jdbcType=VARCHAR}
</delete>

<!--配置全字段插入，当某个字段没有值时，插入null-->
<insert id="saveRoleModule" parameterType="map">
    insert into ss_role_module (role_id, module_id)
    values (#{roleId,jdbcType=VARCHAR}, #{moduleId,jdbcType=VARCHAR})
</insert>
```

(7) 启动项目进行测试