**南京理工大学计算机科学与工程学院**

**软件工程专业毕业实习报告**

**班 级 9151065501**

**学生姓名 陈旖旎**

**学 号 915106840546**

**实习时间 2018.09**

**指导教师 严悍、余立功、赵学龙**

**南京理工大学计算机科学与工程学院制**

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| 一 毕业实习简况  **1.1实习时间和地点**  实习时间：2018.9.3-2018.9.21  地点：江苏润和软件有限公司、华为软件技术有限公司、南京理工大学  **1.2实习目的**  具体实习目的：   1. 了解当前软件企业的现状。 2. 实践软件工程基本过程。 3. 在实践中扩展知识面、增强技能。 4. 在实践中增强观察、分析和解决实际问题的能力。 5. 培养合作意识和团队精神。 6. 为毕业设计和就业打好基础。   **1.3任务及要求**   1. 企业参观和讲座 2. 企业培训 3. 5-7人一组软件项目实践 4. 演示、验收 5. 完成实习报告   二 项目实习技术总结  1概述  在信息多元化的时代背景下，要适应信息化发展带来的机遇和挑战，积极通过新媒体手段来推动时代的发展。在上大学期间，我们往往回去寻找一些课程相关的资料，往往要几经周转才能得到我们所需要的资料。现在我们将利用互联网络的手段开发一个高校内的共享平台。该共享平台主要是针对大学生的实际生活和学习需求，提供高校内的资料共享，让大学生能更加便利地获取想要的资料，大大方便了学生的学习和生活，同时，我们还将增加一个二手交易信息发布功能，便利同校同学间的二手交易活动。    图 1.1 系统功能模块图  2需求分析  2.1 功能需求分析   * 学生端：给学生提供的功能主要为学习资料（包括课程ppt，讲义，试卷；各大竞赛的资料，心得；书籍的影印版等等）的上传和下载，旧物品的拍卖信息发放，失物招领信息的发放。 * 管理员端：给管理员提供的权限主要为学习资料（包括课程ppt，讲义，试卷；各大竞赛的资料，心得；书籍的影印版等等）的审核和公开，旧物品的拍卖信息和失物招领信息的审核。 * 本软件主要在供南京理工大学在校学生使用，旨在为南理工学子提供学习生活的辅助性服务，填补官方服务的空白和短板。使用者包括学生，管理员等。   2.2 对性能的需求分析   * 网络环境下的多用户系统：信息主要存储在服务器端的数据库中，由各使用者在规定的权限下在各自的客户端上录入，修改，删除相关的内容，进行各自的相关操作，不可跨权限经常操作。各用户还可进行查询，调用，达到信息共享。 * 数据的完整性与准确性保护：录入数据采用表格方式，对录入的数据进行相关的限制，限制录入数据类型及取值范围以保证数据的完整性及准确性。 * 服务器响应：服务器一般响应时间（除报表统计、数据导入）不超过2秒。   表2.1 数据库不同时段查询时间需求   |  |  |  | | --- | --- | --- | | 时间段 | 种类 | 响应时间(秒) | | 平时 | 新增资料等数据 | 2 | | 查询高峰 | 4 | | 平时 | 简单查询 | 2 | | 复杂查询 | 10 | | 查询高峰 | 简单查询 | 8 | | 复杂查询 | 20 |   2.3 输入输出要求  输入部分:  输入选框：服务器需要提前从数据库中获得响应数据作为输入选框中的选项作为用户输入的选择。  文件：上传的文件大小小于2G。  字符串：字符串不能为空，同时字符串大小小于20个字符。  输出部分：  多项数据：以页表的方式表现出来，每页最多20项。  文件：跳出下载文件，并保证下载文件内容的正确性。  2.4 模块要求分析  2.4.1 容错性  调用相关数据操作要简单，从数据中调出来的数据要方便打印，录入，修改，删除等相关的操作。软件允许用户使用屏幕触摸使用，也可以对手机接入的鼠标、键盘做出反应。软件的设计和实现需要考虑到运行环境的变化，并能够在运行环境变化的情况下正常使用。同时，软件需要兼容其他软件接口的变化，以保证在不同运行环境，不同软件接口的情况下的正常使用。  2.4.2 封闭性  每个模块间封闭，对模块进行扩展的时候不影响已有的程序模块。  2.4.3 安全性  保证教务管理系统中的数据进行相应的安全限制，管理员与用户的操作必须经过的严格安全体系校验，不能随便进行更改，保密性要高，以防发生随意泄露事件发生。  3面向复杂工程问题的系统设计  3.1 概要设计  F:\GitHub\graduation-internship\逻辑设计图\《基于数据挖掘的实践任务教学平台》架构图.jpg  图3.1 系统结构图  3.2系统模块设计  3.2.1 用户端   1. 教辅资料共享模块   用例图：    图3.2 教辅资料共享用例图  功能说明：为了更好地实现资料的共享，该模块提供资料上传和下载功能；   * 上传资料：用户上传已有的资料，方便其他用户下载； * 下载资料：用户可以下载自己需要的资料。 * 标签分类：此外，模块允许资料码上标签进行分类。用户在上传资料时给资料勾选不同的分类标签，用作分类的依据。这里的标签包括：专业分类：软件工程、计算机科学与技术、网络工程、智能科学与技术等；课程名称：高等数学、大学英语、大学物理、计算机组成原理、操作系统、软件体系结构、软件设计模式等；资料类型：课件、试卷、文档等等。 * 分类筛选：用户可以输入标签类型，筛选数据库内的资料。比如当用户在下拉框中选择数据结构这个科目的标签，列表会呈现出当前所有给科目的资料。 * 资料检索：用户可以输入关键字检索含有该关键字的资料。  1. 旧物拍卖模块   用例图：    图3.3 旧物拍卖用例图  功能说明：   * 拍卖信息维护：用户可通过该网页发布物品拍卖信息，例如：旧书、旧运动器材等物品。当然也可以随时编辑、删除自己的拍卖信息 * 物品资料展示：拍卖消息不提供买卖途径，仅提供商品信息（商品图片等） * 买家联系：拍卖意愿已经卖家联系方式。买家若有需要可以以给予的联系方式联系卖家。 * 状态监视：假若当前物品已经被拍卖成功，当前的拍卖消息被标记为诸如拍卖成功的状态；  1. 失物招领模块：   用例图：    图3.4 失物招领模块用例图  功能说明：   * 失物招领：此功能可以发布失物招领公告；发布者可以查看到自己发布过的所有公告；可以随时编辑、删除已发布的公告；已经被认领的启事可以被发布者置为失效或被删除。 * 寻物启示：丢失者可以及时得到失物招领的资讯，或发布寻物启事，以便找回失物。已经找到失物的用户可以删除寻物启示。 * 失主联系：失主可以通过该系统查看其他用户发布的失物招领信息列表，若找到自己的失物可以根据信息联系公告发布者，找回失物。捡到别人物品的人也可以在这里查看寻物启事，以便归还物品。   3.2.2 管理员端   1. 教辅资料管理模块   用例图：    图3.5 教辅资料管理用例图  功能说明：   * 内容审查：为了保证用户上传的资料内容符合规定，即不包含无关内容，系统为管理员提供了审查权限，管理员可以查看用户上传的文件内容，也可以删除不符合规定的文件； * 内容维护：同时，对于用户创建标签的请求，管理员具有审核和批准权限，管理员也可以自行更改资料的标签参数。  1. 旧物拍卖管理模块   用例图：    图3.6 旧物拍卖用例图  功能说明：   * 信息审核：管理员可通过该网页审核拍卖信息。重点在现实核对身份信息以及物品信息，防止出现买家秀与卖家秀区别大或者网络被骗等情况。若审核不通过，则通知卖家重新进行发布以及审核。 * 信息管理：管理员可以通过编辑让信息合法发布，也可以直接删除不合法的拍卖信息。  1. 失物招领模块   用例图：    图3.7 失物招领用例图  功能说明：   * 信息审核：失物招领公告发布需要管理员审核通过才能显示在公告列表中； * 信息维护：管理员有权限查看、编辑和删除失物招领公告。   3.3流程逻辑设计  F:\GitHub\graduation-internship\逻辑设计图\png\Activity1__二手交易活动图_3.png  图 拍卖消息发布活动图  文件上传活动图  图 资源上传活动图  F:\GitHub\graduation-internship\逻辑设计图\png\Activity1__文件下载活动图_1.png  图 资源下载活动图  F:\GitHub\graduation-internship\逻辑设计图\资源上传时序图.png  图 资源下载时序图  3.4数据结构设计 （包括所采用的数据库，文件等）  3.4.1 数据库逻辑结构  图3.8 实体关系图  3.4.2 数据库目录  表3.1 little\_mat后台数据库目录   |  |  |  |  | | --- | --- | --- | --- | | 序号 | 数据库名 | 标识符 | 页号 | | 1 | course | CT |  | | 2 | department\_course | DCT |  | | 3 | department | DT |  | | 4 | competition | COMT |  | | 5 | resource | RT |  | | 6 | download\_res | DRT |  | | 7 | user | UT |  | | 8 | auction\_msg | AMT |  | | 9 | photo | PT |  | | 10 | account | ACT |  | | 11 | admin | ADT |  | |  | 设计者 王远 | 审核者 | 刘祥德 | |  | 设计日期 2018-9-4 | 审核日期 | 2018-9-6 |   3.4.3 字典数据  表3.2课程信息表设计   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **项目名称** | little\_mat | **项目标识** | lm | **数据库表标识符** | CT | | **子系统名称** | 用户端 | **建档日期** | 2018-9-5 | **数据库表名称** | course | | **主　键** | courseId | | | **数据库表类别** | InnoDB | | **索　引** |  | | | **数据来源** | 备份 | | **外　键** |  | | | **备分周期** |  | | **简要说明** |  | | | **预计记录数** |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **项次** | **字段名称** | **属性名** | **数据类型** | **长度** | **Null** | **缺省** | | 01 | 课程号 | courseId | int | 11 | NO |  | | 02 | 课程名 | courseName | VACHAR | 11 | YES |  | | 03 | 学分 | credit | float | 0 | YES |  | |  |  |  |  |  |  |  | |  | 设计者 | 王远 | 审核者 | | 刘祥德 | | |  | 设计日期 | 2018-9 | 审核日期 | | 2018-9-6 | |   表3.3学院-课程信息表设计   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **项目名称** | little\_mat | **项目标识** | lm | **数据库表标识符** | DCT | | **子系统名称** | 用户端 | **建档日期** | 2018-9-5 | **数据库表名称** | department\_course | | **主　键** | courseId，depId | | | **数据库表类别** | InnoDB | | **索　引** |  | | | **数据来源** | 备份 | | **外　键** | courseId，depId | | | **备分周期** |  | | **简要说明** |  | | | **预计记录数** |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **项次** | **字段名称** | **属性名** | **数据类型** | **长度** | **Null** | **缺省** | | 01 | 课程号 | courseId | int | 11 | NO |  | | 02 | 学院号 | depId | int | 11 | NO |  | |  |  |  |  |  |  |  | |  | 设计者 | 王远 | 审核者 | | 刘祥德 | | |  | 设计日期 | 2018-9 | 审核日期 | | 2018-9-6 | |   表3.4 学院信息表设计   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **项目名称** | little\_mat | **项目标识** | lm | **数据库表标识符** | DT | | **子系统名称** | 用户端 | **建档日期** | 2018-9-5 | **数据库表名称** | department | | **主　键** | depId | | | **数据库表类别** | InnoDB | | **索　引** |  | | | **数据来源** | 备份 | | **外　键** |  | | | **备分周期** |  | | **简要说明** |  | | | **预计记录数** |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **项次** | **字段名称** | **属性名** | **数据类型** | **长度** | **Null** | **缺省** | | 01 | 学院号 | depId | int | 11 | NO |  | | 02 | 学院名 | depName | VACHAR | 255 | YES |  | |  |  |  |  |  |  |  | |  | 设计者 | 王远 | 审核者 | | 刘祥德 | | |  | 设计日期 | 2018-9 | 审核日期 | | 2018-9-6 | |   表3.5资源信息表设计   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **项目名称** | little\_mat | **项目标识** | lm | **数据库表标识符** | RT | | **子系统名称** | 用户端 | **建档日期** | 2018-9-5 | **数据库表名称** | resource | | **主　键** | resId | | | **数据库表类别** | InnoDB | | **索　引** |  | | | **数据来源** | 备份 | | **外　键** | uploaderId，courseId，comId，checkerId | | | **备分周期** |  | | **简要说明** |  | | | **预计记录数** |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **项次** | **字段名称** | **属性名** | **数据类型** | **长度** | **Null** | **缺省** | | 01 | 资源号 | resId | int | 11 | NO |  | | 02 | 格式 | format | VACHAR | 255 | YES |  | | 03 | 资源名 | name | VACHAR | 255 | YES |  | | 04 | 路径 | path | VACHAR | 255 | YES |  | | 05 | 大小 | size | bigint | 20 | YES |  | | 06 | 审核状态 | status | int | 11 | YES |  | | 07 | 类别 | type | int | 11 | YES |  | | 08 | 审核者号 | checkerId | int | 11 | YES |  | | 09 | 竞赛号 | comId | int | 11 | YES |  | | 10 | 课程号 | courseId | int | 11 | YES |  | | 11 | 上传者号 | uploaderId | int | 11 | YES |  | |  |  |  |  |  |  |  | |  | 设计者 | 王远 | 审核者 | | 刘祥德 | | |  | 设计日期 | 2018-9-4 | 审核日期 | | 2018-9-6 | |   表3.6资源下载信息表设计   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **项目名称** | little\_mat | **项目标识** | lm | **数据库表标识符** | DRT | | **子系统名称** | 用户端 | **建档日期** | 2018-9-5 | **数据库表名称** | download\_res | | **主　键** | resId，downloaderId | | | **数据库表类别** | InnoDB | | **索　引** |  | | | **数据来源** | 备份 | | **外　键** | resId，downloaderId | | | **备分周期** |  | | **简要说明** |  | | | **预计记录数** |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **项次** | **字段名称** | **属性名** | **数据类型** | **长度** | **Null** | **缺省** | | 01 | 资源号 | resId | int | 11 | NO |  | | 02 | 下载者号 | downloaderId | int | 11 | NO |  | |  |  |  |  |  |  |  | |  | 设计者 | 王远 | 审核者 | | 刘祥德 | | |  | 设计日期 | 2018-9-4 | 审核日期 | | 2018-9-6 | |   表3.7 用户信息表设计   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **项目名称** | little\_mat | **项目标识** | lm | **数据库表标识符** | UT | | **子系统名称** | 用户端 | **建档日期** | 2018-9-5 | **数据库表名称** | user | | **主　键** | userId | | | **数据库表类别** | InnoDB | | **索　引** |  | | | **数据来源** | 备份 | | **外　键** | accountId，depId | | | **备分周期** |  | | **简要说明** |  | | | **预计记录数** |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **项次** | **字段名称** | **属性名** | **数据类型** | **长度** | **Null** | **缺省** | | 01 | 用户号 | userId | int | 11 | NO |  | | 02 | 邮箱 | email | VACHAR | 255 | YES |  | | 03 | 性别 | gender | VACHAR | 255 | YES |  | | 04 | 年级 | grade | VACHAR | 255 | YES |  | | 05 | 专业 | major | VACHAR | 255 | YES |  | | 06 | 姓名 | name | VACHAR | 255 | YES |  | | 07 | 电话 | phone | VACHAR | 255 | YES |  | | 08 | 账户号 | accountId | int | 11 | YES |  | | 09 | 学院号 | depId | int | 11 | YES |  | |  |  |  |  |  |  |  | |  | 设计者 | 王远 | 审核者 | | 刘祥德 | | |  | 设计日期 | 2018-9-4 | 审核日期 | | 2018-9-6 | |   表3.8 拍卖信息表设计   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **项目名称** | little\_mat | **项目标识** | lm | **数据库表标识符** | AMT | | **子系统名称** | 用户端 | **建档日期** | 2018-9-5 | **数据库表名称** | auction\_msg | | **主　键** | amsgId | | | **数据库表类别** | InnoDB | | **索　引** |  | | | **数据来源** | 备份 | | **外　键** | publisherId | | | **备分周期** |  | | **简要说明** |  | | | **预计记录数** |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **项次** | **字段名称** | **属性名** | **数据类型** | **长度** | **Null** | **缺省** | | 01 | 拍卖号 | amsgId | int | 11 | NO |  | | 02 | 内容 | content | VACHAR | 255 | YES |  | | 03 | 价格 | price | float | 0 | YES |  | | 04 | 发布时间 | publicDate | datetime | 0 | YES |  | | 05 | 状态 | status | int | 11 | YES |  | | 06 | 标题 | title | VACHAR | 255 | YES |  | | 07 | 发布者 | publisherId | int | 11 | YES |  | |  |  |  |  |  |  |  | |  | 设计者 | 王远 | 审核者 | | 刘祥德 | | |  | 设计日期 | 2018-9-4 | 审核日期 | | 2018-9-6 | |   表3.9 照片信息表设计   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **项目名称** | little\_mat | **项目标识** | lm | **数据库表标识符** | PT | | **子系统名称** | 用户端 | **建档日期** | 2018-9-5 | **数据库表名称** | photo | | **主　键** | photoId | | | **数据库表类别** | InnoDB | | **索　引** |  | | | **数据来源** | 备份 | | **外　键** | amsgId | | | **备分周期** |  | | **简要说明** |  | | | **预计记录数** |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **项次** | **字段名称** | **属性名** | **数据类型** | **长度** | **Null** | **缺省** | | 01 | 照片号 | photoId | int | 11 | NO |  | | 02 | 路径 | photoPath | VACHAR | 255 | YES |  | | 03 | 拍卖号 | amsgId | int | 11 | YES |  | |  |  |  |  |  |  |  | |  | 设计者 | 王远 | 审核者 | | 刘祥德 | | |  | 设计日期 | 2018-9-4 | 审核日期 | | 2018-9-6 | |   表3.10 账户信息表设计   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **项目名称** | little\_mat | **项目标识** | lm | **数据库表标识符** | ACT | | **子系统名称** | 用户端 | **建档日期** | 2018-9-5 | **数据库表名称** | account | | **主　键** | accountId | | | **数据库表类别** | InnoDB | | **索　引** |  | | | **数据来源** | 备份 | | **外　键** |  | | | **备分周期** |  | | **简要说明** |  | | | **预计记录数** |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **项次** | **字段名称** | **属性名** | **数据类型** | **长度** | **Null** | **缺省** | | 01 | 账户号 | accountId | int | 11 | NO |  | | 02 | 密码 | password | VACHAR | 255 | YES |  | | 03 | 用户名 | username | VACHAR | 255 | YES |  | |  |  |  |  |  |  |  | |  | 设计者 | 王远 | 审核者 | | 刘祥德 | | |  | 设计日期 | 2018-9-4 | 审核日期 | | 2018-9-6 | |   表3.11 管理员信息表设计   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **项目名称** | little\_mat | **项目标识** | lm | **数据库表标识符** | ADT | | **子系统名称** | 管理员端 | **建档日期** | 2018-9-5 | **数据库表名称** | admin | | **主　键** | adminId | | | **数据库表类别** | InnoDB | | **索　引** |  | | | **数据来源** | 备份 | | **外　键** | accountId | | | **备分周期** |  | | **简要说明** |  | | | **预计记录数** |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **项次** | **字段名称** | **属性名** | **数据类型** | **长度** | **Null** | **缺省** | | 01 | 管理员号 | adminId | int | 11 | NO |  | | 02 | 账户号 | accountId | int | 11 | YES |  | |  |  |  |  |  |  |  | |  | 设计者 | 王远 | 审核者 | | 刘祥德 | | |  | 设计日期 | 2018-9-4 | 审核日期 | | 2018-9-6 | |   3.5系统性能力毕业要求达成度分析  基本达到要求。  4 系统实现  4.1 系统关键模块实现  4.1.1 前端界面   1. 登录界面     图4.1 登录界面   1. 资料分享界面     图4.2 资料分享界面   1. 二手资料界面     图4.3 二手资料界面   1. 个人信息界面     图4.4 个人信息界面   1. 上传资料界面     图4.5 上传资料界面  4.1.2 后端服务器   1. 资料上传     图4.6 上传源代码截图   1. 资料下载     图4.7 下载源代码截图   1. 用户服务     图4.8 删除用户源代码截图    图4.9 用户更新注册源代码截图   1. 拍卖业务     图4.10 拍卖业务源代码截图  4.2系统接口实现  4.2.1资源管理业务接口   1. 获取资料  |  |  |  |  |  | | --- | --- | --- | --- | --- | | 接口编号 | RESOURCE-HQZL | NO | 23 | | | 接口名 | 获取资料 | 语言 | Java | | | 调用关系 | 发送http get请求 | | | | | URL描述 | /resource | | | | | 接口功能 | 获取所有资料列表 | | | | | 输入说明 | 资源的审核者Id，资源当前的审核状态status，资源所属院系Id，  资源的课程Id，资源所属的类型type | | | | | 输出说明 | 资料列表的json字符串序列 | | | | | 详细描述 |  | | | | | 设计者 | 温光照 | 审核者 | | 刘祥德 | | 设计日期 | 2018-9-7 | 审核日期 | | 2018-9-14 |  1. 修改资源信息  |  |  |  |  |  | | --- | --- | --- | --- | --- | | 接口编号 | RESOURCE-XGZYXX | NO | 24 | | | 接口名 | 修改资源信息 | 语言 | Java | | | 调用关系 | 发送http patch请求 | | | | | URL描述 | /resource | | | | | 接口功能 | 修改资源信息 | | | | | 输入说明 | 资源的json字符串序列 | | | | | 输出说明 | 资源的json字符串序列 | | | | | 详细描述 |  | | | | | 设计者 | 温光照 | 审核者 | | 刘祥德 | | 设计日期 | 2018-9-7 | 审核日期 | | 2018-9-14 |  1. 创建资料  |  |  |  |  |  | | --- | --- | --- | --- | --- | | 接口编号 | RESOURCE-CJZL | NO | 25 | | | 接口名 | 创建资料 | 语言 | Java | | | 调用关系 | 发送http post请求 | | | | | URL描述 | /resource | | | | | 接口功能 | 创建资料 | | | | | 输入说明 | 用户实体主键userId，课程实体主键courseId，资源类型type | | | | | 输出说明 | 资源的json字符串序列 | | | | | 详细描述 |  | | | | | 设计者 | 温光照 | 审核者 | | 刘祥德 | | 设计日期 | 2018-9-7 | 审核日期 | | 2018-9-14 |  1. 模糊查询资料  |  |  |  |  |  | | --- | --- | --- | --- | --- | | 接口编号 | RESOURCE-MHCXZL | NO | 26 | | | 接口名 | 模糊查询资料 | 语言 | Java | | | 调用关系 | 发送http get请求 | | | | | URL描述 | /resource/fuzzy | | | | | 接口功能 | 模糊查询资料 | | | | | 输入说明 | 名字子串name，资源当前的审核状态status | | | | | 输出说明 | 资源列表的json字符串序列 | | | | | 详细描述 |  | | | | | 设计者 | 温光照 | 审核者 | | 刘祥德 | | 设计日期 | 2018-9-7 | 审核日期 | | 2018-9-14 |  1. 删除上传资料  |  |  |  |  |  | | --- | --- | --- | --- | --- | | 接口编号 | RESOURCE-SCSCZL | NO | 27 | | | 接口名 | 删除上传资料 | 语言 | Java | | | 调用关系 | 发送http delete请求 | | | | | URL描述 | /resource/{resId} | | | | | 接口功能 | 删除上传的资料 | | | | | 输入说明 | 资料实体主键resId | | | | | 输出说明 | 资源列表的json字符串序列 | | | | | 详细描述 |  | | | | | 设计者 | 温光照 | 审核者 | | 刘祥德 | | 设计日期 | 2018-9-7 | 审核日期 | | 2018-9-14 |  1. 获取资源信息  |  |  |  |  |  | | --- | --- | --- | --- | --- | | 接口编号 | RESOURCE-HQZYXX | NO | 28 | | | 接口名 | 获取资源信息 | 语言 | Java | | | 调用关系 | 发送http get请求 | | | | | URL描述 | /resource/{resId} | | | | | 接口功能 | 获取资源信息 | | | | | 输入说明 | 资料实体主键resId | | | | | 输出说明 | 资源的json字符串序列 | | | | | 详细描述 |  | | | | | 设计者 | 温光照 | 审核者 | | 刘祥德 | | 设计日期 | 2018-9-7 | 审核日期 | | 2018-9-14 |  1. 资源审核通过  |  |  |  |  |  | | --- | --- | --- | --- | --- | | 接口编号 | RESOURCE-ZYSHTG | NO | 29 | | | 接口名 | 资源审核通过 | 语言 | Java | | | 调用关系 | 发送http patch请求 | | | | | URL描述 | /resource/{resId}/admin/{adminId} | | | | | 接口功能 | 管理员审核资源通过 | | | | | 输入说明 | 资料实体主键resId，管理员实体主键asminId | | | | | 输出说明 | 资源的json字符串序列 | | | | | 详细描述 |  | | | | | 设计者 | 温光照 | 审核者 | | 刘祥德 | | 设计日期 | 2018-9-7 | 审核日期 | | 2018-9-14 |  1. 上传资料  |  |  |  |  |  | | --- | --- | --- | --- | --- | | 接口编号 | RESOURCE-SCZL | NO | 30 | | | 接口名 | 上传资料 | 语言 | Java | | | 调用关系 | 发送http post请求 | | | | | URL描述 | /resource/{resId}/file | | | | | 接口功能 | 上传资料 | | | | | 输入说明 | 资料实体主键resId，文件地址 | | | | | 输出说明 | 资源的json字符串序列 | | | | | 详细描述 |  | | | | | 设计者 | 温光照 | 审核者 | | 刘祥德 | | 设计日期 | 2018-9-7 | 审核日期 | | 2018-9-14 |  1. 下载资料  |  |  |  |  |  | | --- | --- | --- | --- | --- | | 接口编号 | RESOURCE-XZZL | NO | 31 | | | 接口名 | 下载资料 | 语言 | Java | | | 调用关系 | 发送http post请求 | | | | | URL描述 | /resource/{resId}/user/{userId} | | | | | 接口功能 | 下载资料 | | | | | 输入说明 | 资料实体主键resId，上传者userId | | | | | 输出说明 | 资源的json字符串序列 | | | | | 详细描述 |  | | | | | 设计者 | 温光照 | 审核者 | | 刘祥德 | | 设计日期 | 2018-9-7 | 审核日期 | | 2018-9-14 |   4.3复杂工程问题能力毕业要求达成度分析  能够在计算机领域复杂工程问题的预测、建模、模拟或仿真、测试、验证和文档编撰过程中，开发、选择与使用恰当的技术、软硬件及系统资源、现代工程研发工具，提高解决复杂工程问题的能力和效率，并能够理解其局限性。  5 系统测试  5.1测试方法  5.1.1 合法性检查  检查开发者在开发网站时，使用的开发工具是否合法。对在编程中使用的一些非本单 位自己开发的，也不是由开发工具提供的控件、组件、函数库等，检查其是否有合法的发布许可。  5.1.2 软件代码测试  5.1.2.1 源代码一般性检查   1. 命名规范检查 2. 注释检查 3. 限制性检查   5.1.2.2 软件一致性检查   * 编译检查   后台数据经过在IDEA编译运行，能正常运行，相应的UI能正常的在服务器上运行，且功能接口符合预期结果，可认定编译检查合格无误。确定代码是符合要求的源代码。   * 安装／卸载检查   在新系统上用交付的软件Docker镜像重新安装各个模块，并且通过运行这些软件模块，能否完成相应的功能，从而确定移交的确实是正确的软件Docker镜像。 在安装后立即卸载所安装的模块，并且检查是否能够做到彻底卸载。   * 运行模块检查   将新安装的软件模块与现场运行模块用软件工具抽样比较，确认交付的软件安装盘与现场运行软件一致。  5.2 测试项目及测试报告   1. 用户业务模块测试  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **测试用例编号** | | 01 | **测试需求项** | | 用户业务 | | **设计者** | | 温光照 | | **测试需求标识** | |  | **设计日期** | | 2018-9-15 | | **测试目标状态和测试数据状态** | | 符合预期 | | | | | | | | | **序号** | **测试项** | **输入说明（操作）** | | **预期结果** | | **测试结果** | | **分析结论** | | | **1** | 获得全部的用户信息 |  | | 获得所有用户信息 | | 获得所有用户信息 | | 符合要求 | | | **2** | [用户注册](http://localhost:8080/swagger-ui.html" \l "!/teacher45arrangement45controller/findArrangementUsingGET_1) | 正确输入用户注册用的账号密码。 | | 成功生成一个用户账户 | | 成功生成一个用户账户 | | 符合要求 | | | **3** | [修改用户信息](http://localhost:8080/swagger-ui.html" \l "!/class45schedule45controller/findTestsIsDoneUsingGET) | 可以为用户分配学院和个人资料的完善 | | 成功修改用户信息 | | 成功修改了用户信息 | | 符合要求 | | | **4** | [用户登录模块](http://localhost:8080/swagger-ui.html" \l "!/class45schedule45controller/findTestsIsExpectedDoneUsingGET) | 正确输入用户的账户和密码 | | 成功在数据库中查找获得一个用户信息 | | 成功在数据库中查找获得一个用户信息 | | 符合要求 | | | 输入错误的账号密码 | | 返回空 | | 返回空 | | 符合要求 | | | **5** | [用户修改密码](http://localhost:8080/swagger-ui.html" \l "!/teacher45arrangement45controller/findCourseUsingGET_1) | 正确输入用户的Id和新的密码password | | 更新用户的密码为新的password | | 成功更新用户的密码为password | | 符合要求 | | | **6** | [获取学生课表对应的签到记录](http://localhost:8080/swagger-ui.html" \l "!/teacher45arrangement45controller/findAllNoticeUsingGET) | 正确输入学生课表编号scheduleId | | 正确  [获取学生课表对应的签到记录](http://localhost:8080/swagger-ui.html" \l "!/teacher45arrangement45controller/findAllNoticeUsingGET) | | 正确  [获取学生课表对应的签到记录](http://localhost:8080/swagger-ui.html" \l "!/teacher45arrangement45controller/findAllNoticeUsingGET) | | 符合要求 | | | **7** | [删除用户](http://localhost:8080/swagger-ui.html" \l "!/teacher45arrangement45controller/findAllNoticeUsingGET) | 正确输入要删除的用户的Id | | 正确  [删除用户和与其关联的拍卖信息，并将其上传资料的上传者置为空，但是保留其上传资料](http://localhost:8080/swagger-ui.html" \l "!/teacher45arrangement45controller/findAllNoticeUsingGET) | | 正确  [删除用户和与其关联的拍卖信息，并将其上传资料的上传者置为空，但是保留其上传资料](http://localhost:8080/swagger-ui.html" \l "!/teacher45arrangement45controller/findAllNoticeUsingGET) | | 符合要求 | |  1. 资料管理业务测试  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **测试用例编号** | | 02 | **测试需求项** | | 资料管理业务 | | **设计者** | 温光照 | | | **测试需求标识** | |  | **设计日期** | 2018-09-14 | | | **测试目标状态和测试数据状态** | | 符合预期 | | | | | | | | | **序号** | **测试项** | **Case** | | **预期结果** | | **测试结果** | | | **分析结论** | | **1** | 获取资料 | 正确输入课程Id | | 获得对应Id的课程相关的所有资料信息 | | 正确获得所有的该课程下的资料信息，返回200 | | | 符合要求 | | 正确输入比赛Id | | 获得对应的比赛下的所有资料信息 | | 正确获得对应比赛下的所有资料信息 | | | 符合要求 | | 正确输入审核者的Id | | 获得经过响应Id管理员审核的所有资料 | | 正确获得对应Id管理员审核过的所有资料 | | | 符合要求 | | 正确输入资料的审核状态status | | 当status为0找到所有审核过的资料，status为1时找到所有审核过的资料 | | 成功找到对应状态的资料的信息，并返回200 | | | 符合要求 | | 正确输入课程的Id和所需资料的type | | 返回对应课程的中对应类型的资料信息 | | 正确找到所需要的信息，服务器返回200 | | | 符合要求 | | 正确输入课程的Id和所需资料的状态 | | 获得对应Id的课程相关的所有转台为status的资料信息 | | 正确返回对应的资料信息，并返回200 | | | 符合要求 | | 输入不存在的课程Id进行资料的查找 | | 返回空的资料信息页 | | 找不到对应的资料，返回一个空页面信息，服务器返回404 | | | 符合要求 | | **2** | 更新资料信息 | 输入资料的Id和资料对应的信息，类型type和名字 | | 正确更新一个资料信息 | | 正确更新一个资料信息 | | | 符合要求 | | **3** | 删除资料业务 | 正确输入需要删除的资料的Id | | 正确删除服务器磁盘上的资料和数据库上的资料信息 | | 收到下载记录的影响无法正常删除 | | | 级联删除的问题 | | **4** | 上传资料 | 正确输入资料对应的信息和文件 | | 正确上传相应的资料到服务器的磁盘上，并生成资料记录 | | 成功上传了资料并在数据库上生成了资料信息，返回200 | | | 符号要求 | | **5** | 下载资料 | 正确输入下载者的Id和资料的Id | | 正确下载了对应资料，并生成了下载记录 | | 正确下载了对应资料，并生成了下载记录，返回200 | | | 符合要求 | | **6** | 资料审核 | 正确输入管理员的Id和资料Id | | 对应资料添加审核者的联系，并将status置1 | | 正确修改了资料的状态，并添加了审核者的联系 | | | 符合要求 | | **7** | 模糊查询资料信息 | 正确传入资料name的子串和状态信息status | | 获得所有名字中含有name子串的状态信息为status的资料信息 | | 正确获得了对应的资料信息，并返回200 | | | 符合要求 |  1. 二手交易业务模块测试  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **测试用例编号** | | 03 | **测试需求项** | | 二手交易业务 | | **设计者** | 温光照 | | |  | |  |  |  | | | **测试需求标识** | |  | **设计日期** | 2018-09-15 | | | **测试目标状态和测试数据状态** | | 符合预期 | | | | | | | | | **序号** | **测试项** | **Case** | | **预期结果** | | **测试结果** | | | **分析结论** | | **1** | [获得拍卖信息](http://localhost:8080/swagger-ui.html" \l "!/teacher45arrangement45controller/findAllArrangementsUsingGET) | null | | 获得所有的拍卖信息 | | 获得所有的拍卖信息，并返回200 | | | 符合要求 | | 发布者的Id | | 获得对应用户发布的全部的拍卖信息 | | 获得了对应用户发布的全部的拍卖信息，并返回200 | | | 符合要求 | | 拍卖信息的状态status | | 获得状态为status的全部拍卖信息 | | 获得了状态为status的全部拍卖信息，并返回200 | | | 符合要求 | | 发布者的Id和拍卖信息的状态status | | 获得对应用户发布的全部状态为status的拍卖信息 | | 获得了对应用户发布的全部状态为status的拍卖信息，并返回200 | | | 符合要求 | | **2** | [获得特定的拍卖信息](http://localhost:8080/swagger-ui.html" \l "!/teacher45arrangement45controller/findArrangementUsingGET_1) | 拍卖的Id | | 获得具体的拍卖信息 | | 正确获得了具体的拍卖信息并返回200 | | | 符合要求 | | **3** | [发布拍卖](http://localhost:8080/swagger-ui.html" \l "!/teacher45arrangement45controller/createAttendanceUsingPOST_1) | 拍卖信息以及拍卖相关的照片 | | 数据库生成了拍卖的记录和对应照片的记录，并将照片的文件信息传到服务器上 | | 正确发布了拍卖，生成了对应的数据库记录，并返回200 | | | 符合要求 | | **4** | 标记已售出的记录 | 正确输入对应拍卖的Id | | 将拍卖的状态的status变成1，表示已售出 | | 成功标记对应的拍卖记录，并返回200 | | | 符合要求 | | **5** | 更新拍卖信息 | 正确输入更新的拍卖信息的Id和对应的新的信息 | | 重新上传对应的图片信息，同时删除原本服务器中保存的该拍卖信息的图片，并更新拍卖信息中的其他字段 | | 成功更新拍卖信息的照片信息，并返回200 | | | 符合要求 | | **6** | [删除拍卖信息](http://localhost:8080/swagger-ui.html" \l "!/teacher45arrangement45controller/findAllNoticeUsingGET) | 要删除的拍卖的Id | | 删除该拍卖信息，并删除服务器磁盘上及数据库上与拍卖相关的照片信息 | | 成功删除对应信息和照片资料，返回204 | | | 符合要求 |   5.3 测试结果  5.3.1 缺陷情况   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **标识** | **操作** | **现象** | **原因** | **回测** | | 1 | 用户新建的时候只输入用户名和密码 | 提示空指针访问错误 | 后端默认同时在用户注册的时候默认要添加用户的学院信息，而前段设计的时候，默认认为最初主需要账户密码 | 合格 | | 2 | 正确输入userId，去获取用户信息 | 利用json传递参数的时候，出现参数的无限递归问题 | 实体之间存在联系环路 | 合格 | | 3 | 正确配置序列化日期格式，输入正确的测试建立时间 | 返回Timestramp类型的时间值 | 日期格式化没有起作用，@EnableSpringMvc使上述配置失效 | 合格 | | 4 | 正确开启Maven自动化打包步骤 | Repository模块打包失败，提示依赖的domain模块缺失 | 打包插件spring boot plugin在父工程被子工程继承 | 合格 | | 5 | 正确发送amsgId请求交易信息 | Json中无法获得对应的图片信息 | 为了解决之前的json串的无限递归问题，却把没有递归问题的photo和auctionMsg的联系给jsonIgnore了，导致后来获得json串的图片路径的缺失 | 合格 | | 6 | 正确发送发送获取测试问题的Requset | 懒加载，无法将实体序列化 | 测试问题的查询加载出错 | 合格 |   5.3.2 建议  该“有点料”南京理工大学服务平台基本满足功能需求，但在性能方面还存在不足，有系统继续优化的空间。当项目确定后，在项目内部对一些事项进行约定，将会在一定程度上提高开发和测试的效率。  三 企业实习总结和分析  1实习单位及岗位简介；   1. 江苏润和软件股份有限公司   江苏润和软件股份有限公司是中国软件产业中的大型企业，公司成立于2006年，2012年在深圳证券交易所创业板上市，是中国领先的软件整体解决方案与服务供应商。  润和软件自成立至今始终坚持“国际化”、“专业化”、“高端化”的发展战略，公司的主营业务为向国际、国内客户提供基于业务解决方案的软件和信息技术服务，业务聚焦在“金融信息化”、“智慧能源信息化”、“智能终端信息化”等专业领域，业务覆盖东亚、东南亚、北美等区域。公司总部位于南京，在北京、上海、深圳、广州、重庆、成都、西安、福州、无锡、香港特区等国内主要城市设有分子公司，并在日本、新加坡、美国等地设立有海外子公司。拥有全球软件服务能力，能够为客户提供全面、即时、高效的软件和信息技术服务。   1. 华为技术有限公司   华为是全球领先的信息与通信技术（ICT）解决方案供应商，专注于ICT领域，坚持稳健经营、持续创新、开放合作，在电信运营商、企业、终端和云计算等领域构筑了端到端的解决方案优势，为运营商客户、企业客户和消费者提供有竞争力的ICT解决方案、产品和服务，并致力于使能未来信息社会、构建更美好的全联接世界。2013年，华为首超全球第一大电信设备商爱立信，排名《财富》世界500强第315位。  截至2016年底，华为有17万多名员工，华为的产品和解决方案已经应用于全球170多个国家，服务全球运营商50强中的45家及全球1/3的人口。  2参观企业对本专业人才的具体要求；   1. 重在参与，敢于向自己挑战 2. 重视向别人学习，取长补短 3. 要善于归纳总结 4. 实事求是地做职业生涯设计 5. 培养专家，不要“万能将军” 6. 员工要热爱工作 7. 员工应从小事开始关心他人 8. 提倡“干一行爱一行” 9. 由“抬石头”变成“修教堂” 10. 员工要长期坚持自我批判 11. 不要有“打工仔”心态 12. 加强自我培训，超越自我   3本次实习的个人收获  通过本次实习，我对计算机专业相关职业有了一定的了解，对我们今后想要做的工作也有了一定的了解。在听完企业工程师及HR的课程后，我对今后将要面对的就业，也有了一定的方向，而且也了解了很多关于这方面的前沿技术、需求等等。虽然我们参观的润和软件和华为两家公司的企业文化各不相同，但我能够近距离的了解今后我的工作是什么样子的，非常有意义。  在企业实习的过程中，我们成立了一个项目小组，一起开发项目，在团队中不仅提高了本身的技术，同时也从队友身上学到了很多，在团队能力上有了很大的提升。  四 毕业要求达成度分析   |  |  |  |  | | --- | --- | --- | --- | | **达成指标** | **具体的针对性方案** | **自评等级（1~5）** | **综合评定等级**  **（1~5）** | | （1.1）能够在设计环节中体现创新意识； | 项目组针对当前周围环境需求选题南理工资料共享平台，并在此基础上增加二手资料，具有创新意识。 | 4 |  | | （1.2）在设计/开发解决方案过程中，考虑社会、健康、安全、法律、文化以及环境等因素； | 项目在选题时充分考虑当代大学生的需求，以方便用户、传播知识为目的。 | 4 |  | | （1.3）能够在计算机领域复杂工程问题的预测、建模、模拟或仿真、测试、验证和文档编撰过程中，开发、选择与使用恰当的技术、软硬件及系统资源、现代工程研发工具，提高解决复杂工程问题的能力和效率，并能够理解其局限性。 | 项目在开发过程中，采用前后端分离开发的方式。前端使用vue、ajax技术，提升开发效率，同时规范好后端接口，方便使用。 | 3 |  | | （2.1）针对计算机领域复杂工程问题，能够基于计算机领域科学原理对其进行分析和设计，并能够通过理论证明、软件建模、实验仿真等多种科学方法说明其有效性、合理性； | 项目采用科学原理进行分析和设计，并在设计过程中引入了软件建模的知识，从而大大提升了整体的有效性和合理性。 | 3 |  | | （2.2）能够在计算机领域复杂工程问题的预测、建模、模拟或仿真、测试、验证和文档编撰过程中，开发、选择与使用恰当的技术、软硬件及系统资源、现代工程研发工具，提高解决复杂工程问题的能力和效率，并能够理解其局限性； | 要使文档具有准确性与合理性，文档的撰写工作由负责该模块的组员进行编写，最后再统一整合。 | 4 |  | | （2.3）能够在计算机领域工程实践中理解并遵守工程职业道德和规范，履行责任。 | 在项目的完成过程中，听从项目组组长的分工弄安排，并有效完成自己的任务。 | 4 |  | | （2.4）具备多学科背景知识，能够在多学科背景下的团队中与团队成员沟通，了解团队成员想法，并能够协调和组织。 | 项目组的同学有熟悉后端开发的，有熟悉前端开发的，也有能够有效管理的，所以我们分工明确，各取所长，在碰到大家都不会的技术难点时，也共同学习互相帮助 | 4 |  | | （2.5）能够就计算机领域复杂工程问题与业界同行及社会公众进行有效沟通和交流，包括撰写报告和设计文稿、陈述发言、清晰表达或回应指令。 | 在项目的需求设计初期，项目组成员积极与项目交互主体大学生进行沟通，来确定需求，同时，在完成初步设计后同实习公司的工程师们积极交流，以确保项目的有用性。 | 4 |  | | （2.6）能够在多学科环境中应用工程管理原理与经济决策方法 | 项目的整个开发过程运用了工程管理原理以及经济决策方法。 | 3 |  | | （3.1）掌握基本的社会、身体和心理健康、安全、法律等方面知识和技能，了解计算机领域活动与之相关性，理解计算机相关领域工程实践中应承担的社会责任； | 项目在选题时充分考虑当代大学生的需求，以方便用户、传播知识为目的。 | 4 |  | | （3.2）在计算机相关领域开展工程实践和复杂工程问题解决过程中，能够基于计算机工程领域相关背景知识进行合理分析，思考和评价工程对社会、健康、安全、法律以及文化的影响； | 工程实践过程中，有基于计算机工程领域相关背景知识进行合理分析，在工程对社会、健康、安全、法律以及文化的影响方面均有所考虑。 | 3 |  | | （3.3）了解信息化与环境保护的关系，能够理解和评价复杂问题的计算机工程实践对环境、社会可持续发展的影响； | 整个毕业实习过程中，我了解到信息化与环境保护的关系，在计算机工程实践对环境、社会可持续发展的影响方面有了深刻的认识。 | 3 |  | | （3.4）对计算机领域及其行业的国际发展趋势跟踪了解，具备一定的国际视野，具有良好的外语听、说、读、写能力，能够在跨文化背景下进行沟通和交流； | 在企业实习的过程中，为了深入了解学习项目所需的技术，阅读了部分英语文献，具有良好的外语听、说、读、写能力。 | 3 |  | | （3.5）了解计算机技术发展中取得重大突破的历史背景，以及当前发展的热点问题，了解信息技术发展的前沿和趋势。 | 通过阅读相关技术博客、论文，关注国家乃至国际论坛，积极参与到相关行业的发展中来。 | 3 |  | | （3.6）具有自主学习和终身学习的意识，不断学习并适应新的热点或者运用现代化教育手段学习新技术、新知识，具有不断学习和适应计算机技术快速发展的能力。 | 在项目开发过程中，大多数技术都是之前没有学习过的，我能够积极自学相关技术，并且运用到项目中来。 | 4 |  |  五 实习心得体会 在项目初期，我主要完成了项目界面UI设计，在项目进行过程中，我负责前端bootstrap框架的搭建，页面HTML、css、JavaScript的编写工作，在项目后期，负责答辩ppt的制作、接口设计文档的编写。  在工作中，我遇到了很多的困难，首先是新的工具的使用，项目组组长在分配给我前端开发的任务后，让我们使用了webstorm来作为前端工具，新工具的使用算是开头的小困难；其次是新语言的学习，在开发这个项目之前，我基本上都是使用java语言，对于前端在这之前学习了微信小程序的前端开发，所以这次使用的HTML、css、JavaScript对我来说都是新的语言；最大的困难是前端与后端连接整合的部分，我们决定使用vue、ajax技术来实现，在这之前项目组的成员都没有接触过这个技术，所以，从零开始学习这门技术，不仅要从原理理解，还要实践到我们的项目上，对我们来说是一个困难。  通过上述工作，我学习到了：   1. 使用webstorm作为前端编写工具，方便快捷； 2. 学会了使用bootstrap框架，熟练掌握了HTML和css； 3. 学习了JavaScript语法知识，并使用vue，ajax技术进行http请求； 4. 团队合作，项目组成员各自有自己所擅长的技术，合理分工是好的团队合作的前提； 5. 良好沟通，在项目组中，能准确表达自己的看法，虚心听从他人意见。   认识到的不足：   1. 自学能力还不足够，虽然项目的完成时间比较短，但学习一门新的技术并运用到项目上来的自学能力还不够，而且高估了自己的学习能力； 2. 在专业方面，相关技术虽然了解但还没有达到熟练的程度； 3. 在团队合作方面，还没有完全能够区别好自己的分工，分工界限模糊。   在今后的学习中，我还会提高自己的业务水平，提高自己的技术水平，要在计算机相关领域开展工程实践和复杂工程问题解决过程中，能够基于计算机工程领域相关背景知识进行合理分析。不管是前端还是后端编程，都要学习最新的技术框架，提升自己的实践能力，多写代码，多看书。 |
| **指导教师评语：**    **成绩评定：　　　　　　　　　指导教师签字：**  **年 月 日** |