

# “银行业务管理系统”

## 系统设计与实现报告

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# 1 概述

## 1.1 系统目标

构建一个 B/S 结构的银行业务管理系统，基本实现系统的前端页面、后台服务器和数据库的设计构建，满足银行业务管理系统的基本需求。

## 1.2 需求说明

银行有多个支行。各个支行位于某个城市，每个支行有唯一的名字。银行要监控每个支行的资产。银行的客户通过其身份证号来标识。银行存储每个客户的姓名、联系电话以及家庭住址。为了安全起见，银行还要求客户提供一位联系人的信息，包括联系人姓名、手机号、Email 以及与客户的关系。客户可以有帐户，并且可以贷款。客户可能和某个银行员工发生联系，该员工是此客户的贷款负责人或银行帐户负责人。银行员工也通过身份证号来标识。员工分为部门经理和普通员工，每个部门经理都负责领导其所在部门的员工，并且每个员工只允许在一个部门内工作。每个支行的管理机构存储每个员工的姓名、电话号码、家庭地址及部门经理的身份证号。银行还需知道每个员工开始工作的日期，由此日期可以推知员工的雇佣期。银行提供两类帐户——储蓄帐户和支票帐户。帐户可以由多个客户所共有，一个客户也可开设多个账户，但在一个支行内最多只能开设一个储蓄账户和一个支票账户。每个帐户被赋以唯一的帐户号。银行记录每个帐户的余额、开户日期、开户的支行名以及每个帐户所有者访问该帐户的最近日期。另外，每个储蓄帐户有利率和货币类型，且每个支票帐户有透支额。每笔贷款由某个分支机构发放，能被一个或多个客户所共有。每笔贷款用唯一的贷款号标识。银行需要知道每笔贷款所贷金额以及逐次支付的情况（银行将贷款分几次付给客户）。虽然贷款号不能唯一标识银行所有为贷款所付的款项，但可以唯一标识为某贷款所付的款项。对每次的付款需要记录日期和金额。

## 1.3 本报告的主要贡献

解释了银行业务管理系统各项功能需求的实现方案；解释了数据库的设计方案；给出了前后端功能结构设计和模块关系；说明了前后端各个功能模块的具体设计；给出了系统最终的测试结果展示；为系统的使用提供基本参考。

## 2 总体设计

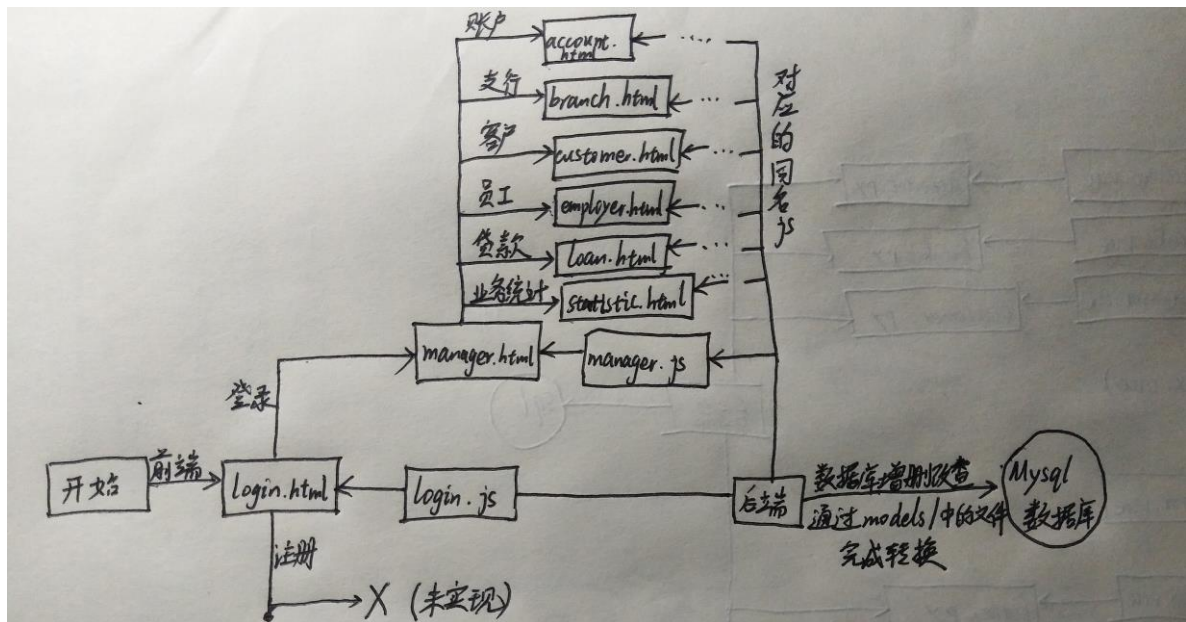
### 2.1 系统模块结构

```
bankview\  
  controllers\      #后端  
    account.js      #账户  
    branch.js       #支行  
    customer.js     #客户  
    employer.js     #员工  
    loan.js         #贷款  
    login.js        #登录  
    manager.js      #主页  
    statistic.js    #业务统计  
  models\          #后端连接数据库  
    account.js  
    branch.js  
    customer.js  
    employer.js  
    loan.js  
  static\          #前端外观  
    css\            #页面样式  
      bootstrap.css  
      bootstrap.min.css  
      bootstrap-grid.min.css  
      login.css      #登录页面  
      utils.css      #业务页面  
    images\  
      background.jpg #业务页面背景图  
    js\             #bootstrap 自动生成
```

---

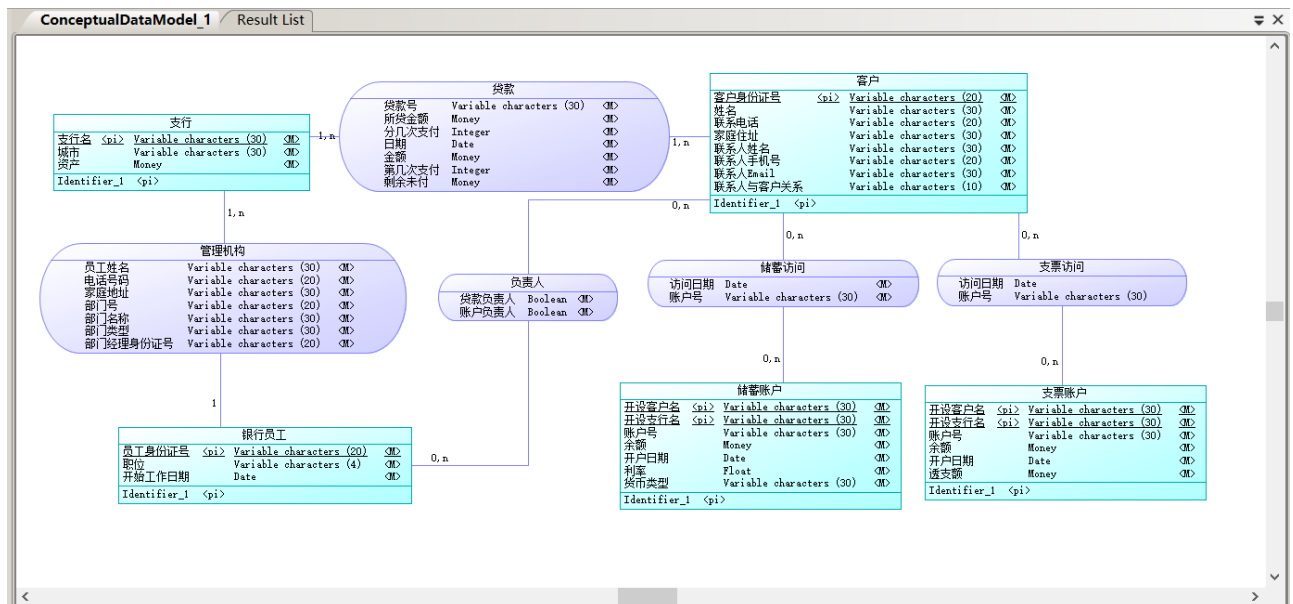
- bootstrap.js
- bootstrap.min.js
- highcharts.js
- highcharts-3d.js
- jquery-3.3.1.js
- login.js
- utils.js
- views\ #前端代码
  - account.html
  - branch.html
  - customer.html
  - employer.html
  - loan.html
  - login.html
  - manager.html
  - statistic.html
- app.js #顶层模块
- config.js #数据库连接设置
- controller.js #前后端连接控制
- db.js #数据库连接
- init.sql #数据库生成脚本
- package.json
- README.md
- static-files.js #模板文件
- templating.js #模板文件
- testdata.sql #数据库测试数据导入脚本

## 2.2 系统工作流程



## 2.3 数据库设计

ER 图:



数据库逻辑结构（用加粗代表主键，下划线代表唯一键）：

- 支行（**支行名**，所在城市）
- 部门（部门名，部门类型，部门经理身份证，**部门号**，支行名）
- 员工（**身份证**，部门号，姓名，家庭地址，电话号码，开始工作日期）

- 客户（身份证，员工\_身份证，姓名，家庭地址，电话号码，联系人姓名， 联系人手机，联系人邮箱，联系人关系）
- 账户（账户号，余额，开户日期，最近访问日期）
- 开户（身份证，账户号，开户行，账户类型）
- 储蓄账户（账户号，开户日期，最近访问日期，利率，货币类型）
- 支票账户（账户号，开户日期，最近访问日期，透支额）
- 贷款（贷款号，支行名，贷款金额，总共支付次数）
- 支付（支付序号，贷款号，身份证，支付金额）
- 外键联系（前者 references 后者）：

储蓄账户 账户号-账户 账户号

员工 部门号-部门 部门号

客户 员工\_身份证-员工 身份证

开户 账户号-账户 账户号

支付 贷款号-贷款 贷款号

支付 身份证-客户 身份证

支票账户 账户号-账户 账户号

贷款 支行名-支行 支行名

部门 支行名-支行 支行名

前端向后端发送信息，后端生成对应的数据库指令使数据库执行；后端读取数据库内容返回给前端。

## 3 详细设计

因为这些模块都是只有前端操作或者可以概括成前端向后端发送一批数据（输入），然后后端向前端反馈数据（输出）的模式，所以就不画流程图了，直接指明前后端互相发送的数据是什么就好了。

### 3.1 登录模块

实际上只是在前端做个样子，因为注册部分没有写好。当且仅当账户密码均正确时跳转到主页（manager.html），否则跳转到只有 Try Again 内容的提示页面。可以点击 create an account 切换到注册框，但是注册其实没写好，所以点击注册会进入 Not found 页面。

## 3.2 增删改查模块

在输入列中要填写的内容按文本框上方提示为准（文本框预先显示的内容请无视，为了省时间复用搞乱了）。

### 1. 增加：

网页下拉选项选择"Create"，在右侧 Update Form 列中填写全部或部分（例如储蓄账户不需要填透支额）内容；

前端将用户在网页文本框内填写的所有内容整理按格式发送到后端；

后端组织 SQL 语句，对数据库进行增加，向前端反馈增加是否成功，若出现主键冲突等问题会提示。

### 2. 删除：

网页下拉选项选择"Delete"，在左侧 Exist Form 列中填写全部或部分内容；

前端将用户在网页文本框内填写的所有内容整理按格式发送到后端；

后端组织 SQL 语句，对数据库进行删除，向前端反馈删除是否成功，若删除内容不存在或者外键冲突会提示。

### 3. 修改：

网页下拉选项选择"Update"，在两列中均填写全部或部分内容；

前端会将修改记录的主键和所有字段的值都发送给后端；

后端组织 SQL 语句，对数据库进行修改，向前端反馈修改是否成功，若出现主键不存在等问题会提示。

### 4. 查询：

网页下拉选项选择"Search"，在左侧 Exist Form 列中填写部分内容；

前端将用户在网页文本框内填写的所有内容（未填写部分则不作为查询条件）整理按格式发送到后端；

后端将这些输入组织成 SQL 语句，从数据库中查询得到结果，向前端反馈，前端在网页显示所有符合的条目。

## 3.3 业务统计模块

前端动态设置 highcharts 数据列 series，后端访问数据库后进行统计，将参数传给前端后，

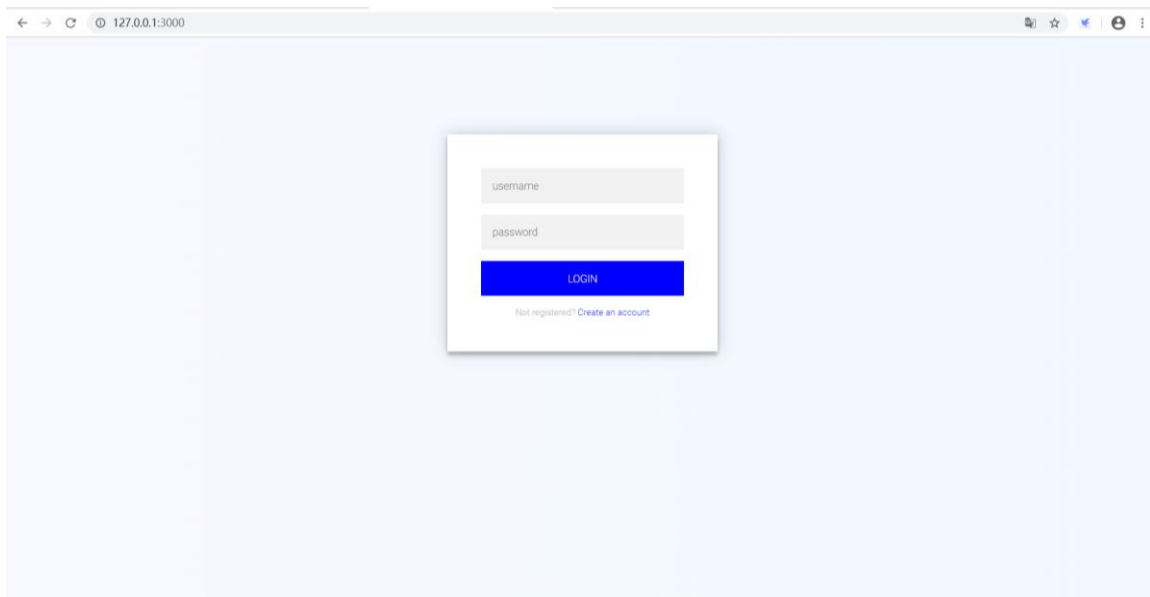


在前端的js 代码里通过 highcharts 绘制图表。（这部分拿别人代码改的，个人也不是很懂。）

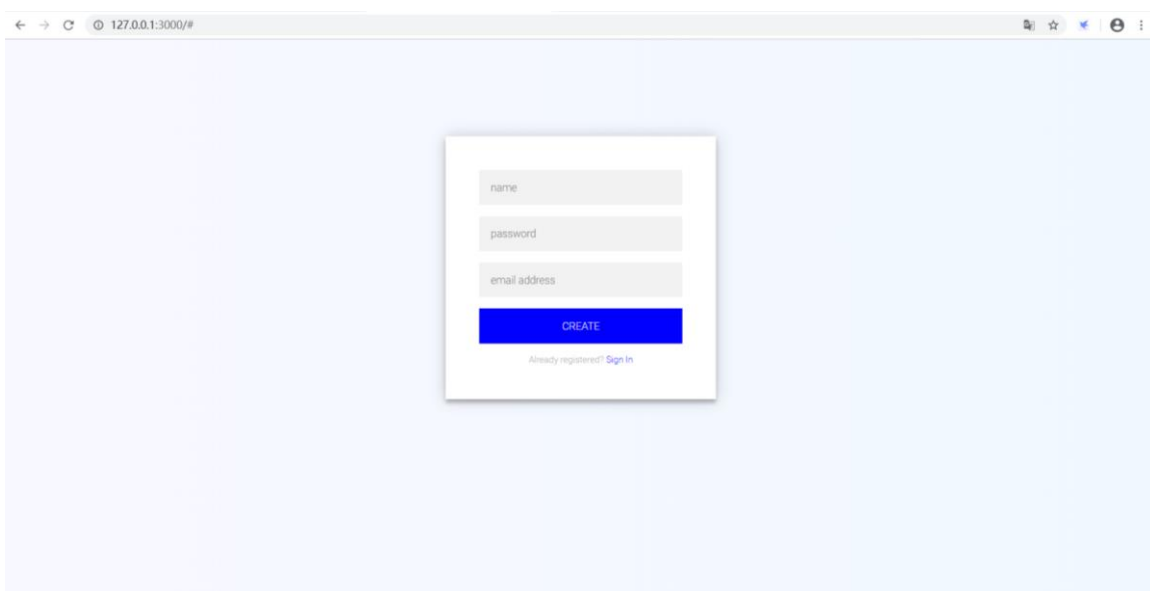
## 4 实现与测试

### 4.1 实现结果

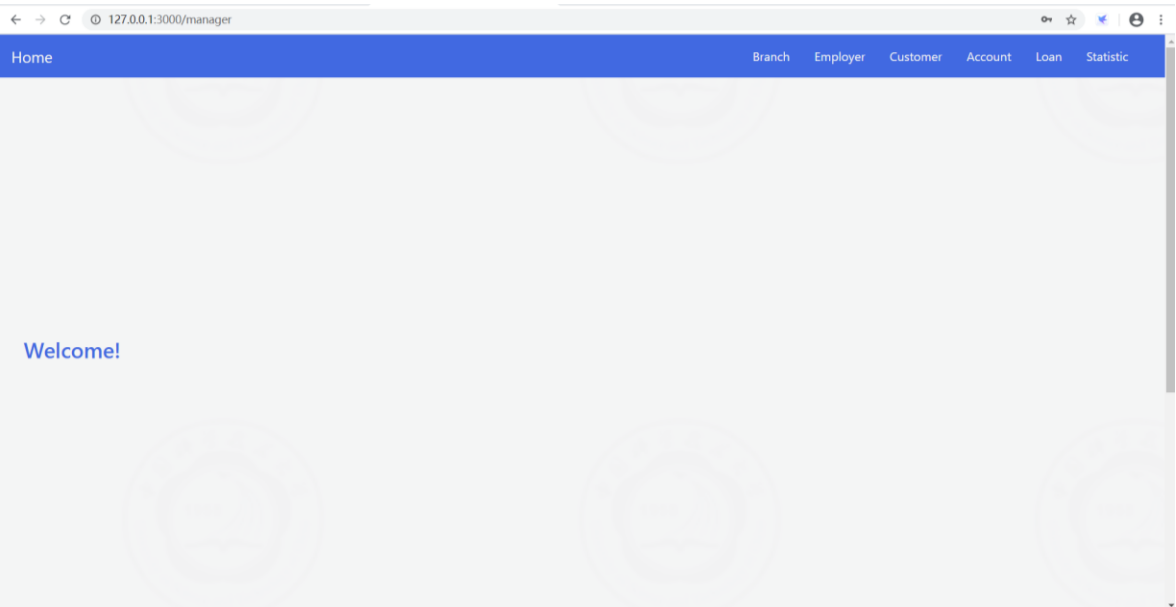
- 登录界面



- 注册界面（并没有用）



- 主页



• 支行

A screenshot of the 'branch' application at 127.0.0.1:3000. It features a blue header with 'Home' and navigation links. The main content area is divided into three sections: a table on the left, and two form panels on the right titled 'Exist Form' and 'Update Form'.

支行	地点	部门	部门号	部门类型	部门经理ID
京1	北京	财务	7777	财务	1111
浙1	浙江	宣传部	1111	宣传	1111
浙1	浙江	科技部	2222	科技	2222
浙2	浙江	宣传部	5555	宣传	5555
浙2	浙江	财务部	6666	科技	6666
皖1	安徽	财务部	3333	财务	3333
皖2	安徽	科技部	4444	科技	4444

**Exist Form**

Exist Branch Name  
  
Only for search, update, delete

Exist Branch Location  
  
Only for search, update, delete

Exist Department Name  
  
Only for search, update, delete

Exist Department Num  
  
Only for search, update, delete

Exist Department Type  
  
Only for search, update, delete

Exist Department Manager ID

**Update Form**

New Branch Name  
  
Only for create, update

New Branch Location  
  
Only for create, update

New Department Name  
  
Only for create, update

New Department Num  
  
Only for create, update

New Department Type  
  
Only for create, update

New Department Manager ID

• 员工

Home

BranchEmployerCustomerAccountLoanStatistic

ID	部门号	姓名	地址	电话	入职
1111	1111	test	USTC	8888888	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)
2222	1111	ustc	USTC	8888881	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)
3333	2222	a1	USTC	8888882	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)
4444	2222	a2	USTC	8888883	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)
5555	4444	a3	USTC	8888884	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)
6666	3333	a4	USTC	8888885	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)
7777	7777	a5	USTC	8888887	Mon Jun 29 2020 08:00:00 GMT+0800 (GMT+08:00)
7890	5555	a4	USTC	8888886	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)

Exist Form

Exist Employer ID  
Enter employer ID  
Only for search, update, delete

Exist Employer Name  
Enter employer name  
Only for search, update, delete

Exist Employer Address  
Enter employer address  
Only for search, update, delete

Exist Employer Phone  
Enter employer phone  
Only for search, update, delete

Exist Employer Department Num.  
Enter department number  
Only for search, update, delete

Exist Employer Start Working  
Enter job taking time

Update Form

New Employer ID  
Enter employer ID  
Only for create, update

New Employer Name  
Enter employer name  
Only for create, update

New Employer Address  
Enter employer address  
Only for create, update

New Employer Phone  
Enter employer phone  
Only for create, update

New Employer Department Num.  
Enter department number  
Only for create, update

New Employer Start Working  
Enter job taking time

• 客户

Home

BranchEmpolyerCustomerAccountLoanStatistic

ID	姓名	地址	电话	受理员工ID	联系人姓名	联系人手机	联系人邮箱
1111	test	USTC	8888888	2222	ustc	8888881	ustc@163.
2222	ustc	USTC	7777771	1111	test	8888888	test@163.
5555	a3	USTC	7777771	1111	test	8888888	test@163.
6666	a4	USTC	7777771	3333	a3	8888888	a3@163.cc

Exist Form

Exist Customer ID  
Enter Customer ID  
Only for search, update, delete

Exist Customer Name  
Enter Customer name  
Only for search, update, delete

Exist Customer Address  
Enter Customer address  
Only for search, update, delete

Exist Customer Phone  
Enter Customer phone  
Only for search, update, delete

Exist Assignee ID  
Enter department name  
Only for search, update, delete

Exist Contacts Name  
Enter department name

Update Form

New Customer ID  
Enter Customer ID  
Only for create, update

New Customer Name  
Enter Customer name  
Only for create, update

New Customer Address  
Enter Customer address  
Only for create, update

New Customer Phone  
Enter Customer phone  
Only for create, update

New Assignee ID  
Enter department name  
Only for create, update

New Contacts Name  
Enter department number

• 账户

127.0.0.1:3000/account

Home Branch Employer Customer Account Loan Statistic

账户号	余额	开户日期	最近访问日期	利率	货币类型	透支额
222222	300000	Sat May 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)			300
555555	350000	Thu Apr 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)			100
111111	200000	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	0.03	RMB	
333333	250000	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	0.04	Dollar	

### Exist Form

Exist Customer ID

Only for search, update, delete

Exist Branch Name

Only for search, update, delete

Exist Account

Only for search, update, delete

Exist Balance

Only for search, update, delete

Exist Account Open Date

Only for search, update, delete

Exist Last Visit Date

### Update Form

New Customer ID

Only for create, update

New Branch Name

Only for create, update

New Account

Only for create, update

New Balance

Only for create, update

New Account Open Date

Only for create, update

New Last Visit Date

## • 贷款

Manager Bank System 127.0.0.1:3000/loan

Home Branch Employer Customer Account Loan Statistic

完成情况	贷款号	支行名	贷款金额	总共需支付次数
进行中	1111	浙1	300000	6
进行中	2222	浙2	400000	8
未开始	5555	皖1	900000	10
已完成	6666	皖2	400000	2

### Exist Form

Exist Loan Number

Only for search, update, delete

Exist Branch Name

Only for search, update, delete

Exist Total Money

Only for search, update, delete

Exist Payment Times

Only for search, update, delete

Manage Option

### Update Form

New Loan Number

Only for create, update

New Branch Name

Only for create, update

New Total Money

Only for create, update

New Payment Times

Only for create, update

Submit

## • 业务统计



## 4.2 测试结果

因为五种数据库的增删改查操作都是类似的，接下来就以储蓄账户为例子。账户当前状态：

账户号	余额	开户日期	最近访问日期	利率
222222	300000	Sat May 30 2020 08:00:00 GMT+08:00	Tue Jun 30 2020 08:00:00 GMT+08:00	
555555	350000	Thu Apr 30 2020 08:00:00 GMT+08:00	Tue Jun 30 2020 08:00:00 GMT+08:00	
111111	200000	Tue Jun 30 2020 08:00:00 GMT+08:00	Tue Jun 30 2020 08:00:00 GMT+08:00	0.03
333333	250000	Tue Jun 30 2020 08:00:00 GMT+08:00	Tue Jun 30 2020 08:00:00 GMT+08:00	0.04
444444	150000	Tue Jun 30 2020 08:00:00 GMT+08:00	Tue Jun 30 2020 08:00:00 GMT+08:00	0.05

### Exist Form

Exist Customer ID

Only for search, update, delete

Exist Branch Name

Only for search, update, delete

Exist Account

Only for search, update, delete

Exist Balance

Only for search, update, delete

Exist Account Open Date

Only for search, update, delete

Exist Last Visit Date

Only for search, update, delete

Exist Overdraft

Only for search, update, delete

Exist Interest Rate

### Update Form

New Customer ID

Only for create, update

New Branch Name

Only for create, update

New Account

Only for create, update

New Balance

Only for create, update

New Account Open Date

Only for create, update

New Last Visit Date

Only for create, update

New Overdraft

Only for create, update

New Interest Rate



- 增加一个储蓄账户:  
输入:

Home

BranchEmpolyerCustomerAccountLoanStatistic

账户号	余额	开户日期	最近访问日期	利率
222222	300000	Sat May 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	
555555	350000	Thu Apr 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	
111111	200000	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	0.03
333333	250000	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	0.04
444444	150000	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	0.05

Exist Form

Exist Customer ID

Enter employer ID

Only for search, update, delete

Exist Branch Name

Enter Branch Name

Only for search, update, delete

Exist Account

Enter employer ID

Only for search, update, delete

Exist Balance

Enter employer name

Only for search, update, delete

Exist Account Open Date

Enter employer address

Only for search, update, delete

Exist Last Visit Date

Enter employer phone

Only for search, update, delete

Exist Overdraft

Enter department name

Only for search, update, delete

Exist Interest Rate

Enter department number

Only for search, update, delete

Exist Currency Type

Enter job taking time

Only for search, update, delete

Card Type

All

Manage Option

Create

Update Form

New Customer ID

1111

Only for create, update

New Branch Name

京1

Only for create, update

New Account

666666

Only for create, update

New Balance

1

Only for create, update

New Account Open Date

06/30/2020

Only for create, update

New Last Visit Date

06/30/2020

Only for create, update

New Overdraft

Enter department name

Only for create, update

New Interest Rate

0.03

Only for create, update

New Currency Type

RMB

Only for create, update

New Card Type

Saving

Submit

前端返回：

Home

BranchEmpolyerCustomerAccountLoanStatistic

账户号	余额	开户日期	最近访问日期	利率	货币类型
666666	1	06/30/2020	06/30/2020	0.03	RMB

Exist Form

Exist Customer ID

Enter employer ID

Only for search, update, delete

Exist Branch Name

Enter Branch Name

Only for search, update, delete

Update Form

New Customer ID

Enter employer ID

Only for create, update

New Branch Name

Enter Branch Name

Only for create, update

业务统计变化（存款总数值为 125 万）：



查询该账户，仅输入账户 ID:



Home

BranchEmpolyerCustomerAccountLoanStatistic

账户号	余额	开户日期	最近访问日期	利率	货币类型	透支额
--	--	--	--	--	--	--

Exist Form

Exist Customer ID

Enter employer ID

Only for search, update, delete

Exist Branch Name

Enter Branch Name

Only for search, update, delete

Exist Account

666666

Only for search, update, delete

Exist Balance

Enter employer name

Only for search, update, delete

Exist Account Open Date

Enter employer address

Only for search, update, delete

Exist Last Visit Date

Enter employer phone

Only for search, update, delete

Exist Overdraft

Enter department name

Only for search, update, delete

Exist Interest Rate

Enter department number

Only for search, update, delete

Exist Currency Type

Enter job taking time

Only for search, update, delete

Card Type

Saving

Manage Option

Search

Update Form

New Customer ID

Enter employer ID

Only for create, update

New Branch Name

Enter Branch Name

Only for create, update

New Account

Enter employer ID

Only for create, update

New Balance

Enter employer name

Only for create, update

New Account Open Date

Enter employer address

Only for create, update

New Last Visit Date

Enter employer phone

Only for create, update

New Overdraft

Enter department name

Only for create, update

New Interest Rate

Enter department number

Only for create, update

New Currency Type

Enter job taking time

Only for create, update

New Card Type

Credit

Submit

查询结果:

Home

BranchEmpolyerCustomerAccountLoanStatistic

账户号	余额	开户日期	最近访问日期	利率	货币类型	透支额
666666	1	Mon Jun 29 2020 08:00:00 GMT+0800 (GMT+08:00)	Mon Jun 29 2020 08:00:00 GMT+0800 (GMT+08:00)	0.03	RMB	

Exist Form

Exist Customer ID

Enter employer ID

Only for search, update, delete

Exist Branch Name

Enter Branch Name

Only for search, update, delete

Exist Account

Enter employer ID

Only for search, update, delete

Update Form

New Customer ID

Enter employer ID

Only for create, update

New Branch Name

Enter Branch Name

Only for create, update

New Account

Enter employer ID

Only for create, update

修改:  
输入 (将余额加到 25 万):

Home
Branch
Empolyer
Customer
Account
Loan
Statistic

账户号	余额	开户日期	最近访问日期	利率	货币类型	透支额
--	--	--	--	--	--	--

### Exist Form

Exist Customer ID

Only for search, update, delete

Exist Branch Name

Only for search, update, delete

Exist Account

Only for search, update, delete

Exist Balance

Only for search, update, delete

Exist Account Open Date

Only for search, update, delete

Exist Last Visit Date

Only for search, update, delete

Exist Overdraft

Only for search, update, delete

Exist Interest Rate

Only for search, update, delete

Exist Currency Type

Only for search, update, delete

Card Type

Manage Option

### Update Form

New Customer ID

Only for create, update

New Branch Name

Only for create, update

New Account

Only for create, update

New Balance

Only for create, update

New Account Open Date

Only for create, update

New Last Visit Date

Only for create, update

New Overdraft

Only for create, update

New Interest Rate

Only for create, update

New Currency Type

Only for create, update

New Card Type

Submit

执行结果:

Home
Branch
Empolyer
Customer
Account
Loan
Statistic

账户号	余额	开户日期	最近访问日期	利率	货币类型	透支额
666666	250000	Mon Jun 29 2020 08:00:00 GMT+08:00	Mon Jun 29 2020 08:00:00 GMT+08:00	0.03	RMB	

### Exist Form

Exist Customer ID

Only for search, update, delete

Exist Branch Name

Only for search, update, delete

Exist Account

Only for search, update, delete

Exist Balance

Only for search, update, delete

Exist Account Open Date

Only for search, update, delete

Exist Last Visit Date

Only for search, update, delete

Exist Overdraft

Only for search, update, delete

Exist Interest Rate

Only for search, update, delete

Exist Currency Type

Only for search, update, delete

Card Type

Manage Option

### Update Form

New Customer ID

Only for create, update

New Branch Name

Only for create, update

New Account

Only for create, update

New Balance

Only for create, update

New Account Open Date

Only for create, update

New Last Visit Date

Only for create, update

New Overdraft

Only for create, update

New Interest Rate

Only for create, update

New Currency Type

Only for create, update

New Card Type

Submit

业务统计（可以看到存款从 125 万增加到了 150 万）:



删除：  
删除生成的这个账户：

Home

BranchEmployerCustomerAccountLoanStatistic

账户号	余额	开户日期	最近访问日期	利率
222222	300000	Sat May 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	
555555	350000	Thu Apr 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	
111111	200000	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	0.03
333333	250000	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	0.04
444444	150000	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	0.05
666666	250000	Mon Jun 29 2020 08:00:00 GMT+0800 (GMT+08:00)	Mon Jun 29 2020 08:00:00 GMT+0800 (GMT+08:00)	0.03

Exist Form

Exist Customer ID

Enter employer ID

Only for search, update, delete

Exist Branch Name

Enter Branch Name

Only for search, update, delete

Exist Account

666666

Only for search, update, delete

Exist Balance

Enter employer name

Only for search, update, delete

Exist Account Open Date

Enter employer address

Only for search, update, delete

Exist Last Visit Date

Enter employer phone

Only for search, update, delete

Exist Overdraft

Enter department name

Only for search, update, delete

Exist Interest Rate

Enter department number

Only for search, update, delete

Exist Currency Type

Enter job taking time

Only for search, update, delete

Card Type

Saving

Manage Option

Delete

Update Form

New Customer ID

Enter employer ID

Only for create, update

New Branch Name

Enter Branch Name

Only for create, update

New Account

Enter employer ID

Only for create, update

New Balance

Enter employer name

Only for create, update

New Account Open Date

Enter employer address

Only for create, update

New Last Visit Date

Enter employer phone

Only for create, update

New Overdraft

Enter department name

Only for create, update

New Interest Rate

Enter department number

Only for create, update

New Currency Type

Enter job taking time

Only for create, update

New Card Type

Credit

Submit

删除结果:

Home

BranchEmployerCustomerAccountLoanStatistic

账号号	余额	开户日期	最近访问日期	利率
222222	300000	Sat May 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	
555555	350000	Thu Apr 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	
111111	200000	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	0.03
333333	250000	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	0.04
444444	150000	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	Tue Jun 30 2020 08:00:00 GMT+0800 (GMT+08:00)	0.05

Exist Form

Exist Customer ID

Enter employer ID

Only for search, update, delete

Exist Branch Name

Enter Branch Name

Only for search, update, delete

Exist Account

Enter employer ID

Only for search, update, delete

Exist Balance

Enter employer name

Only for search, update, delete

Exist Account Open Date

Enter employer address

Only for search, update, delete

Exist Last Visit Date

Enter employer phone

Only for search, update, delete

Exist Overdraft

Enter department name

Only for search, update, delete

Exist Interest Rate

Enter department number

Only for search, update, delete

Exist Currency Type

Enter job taking time

Only for search, update, delete

Card Type

All

Manage Option

Search

Update Form

New Customer ID

Enter employer ID

Only for create, update

New Branch Name

Enter Branch Name

Only for create, update

New Account

Enter employer ID

Only for create, update

New Balance

Enter employer name

Only for create, update

New Account Open Date

Enter employer address

Only for create, update

New Last Visit Date

Enter employer phone

Only for create, update

New Overdraft

Enter department name

Only for create, update

New Interest Rate

Enter department number

Only for create, update

New Currency Type

Enter job taking time

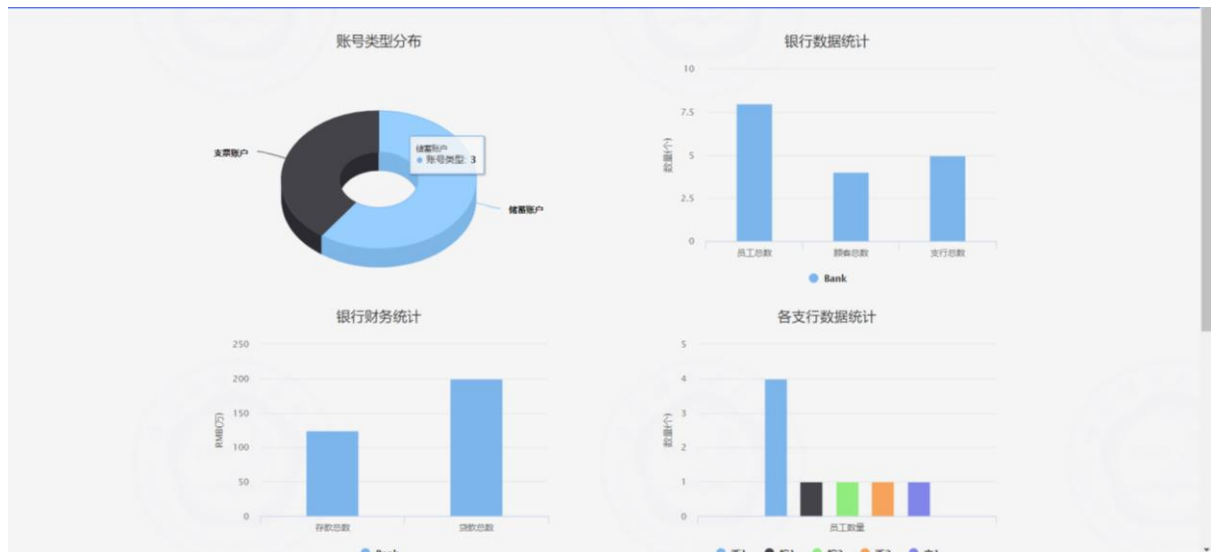
Only for create, update

New Card Type

Credit

Submit

业务统计变成和原来一样：



## 5 总结与讨论

通过这次系统开发，我学习了 html 前端框架和 javascript(nodejs)+mysql 后端框架的基本开发技术和架构思想（其实感觉也没法把 javascript 按前后端分得很清楚）；练习使用了现代数据库应用技术；提高了编程能力和软件工程开发素质；学会了使用一些 html 和 Nodejs 工具（bootstrap,highcharts 等）；强化了对他人代码的阅读理解能力。

教训：做 lab2 ER 图的时候对实际如何实现有欠考虑；自身在课外能力积累不足；还有几个 bug（比如业务统计同步更新有问题，日期可能和输入的差一天等）和瑕疵（复用的输入文本框的内容很多没改掉）没来得及修，对工作量没有评估，而且做事情规划性较差。