

图书管理系统 设计报告

数据库系统原理课程 指导老师: 孙建伶 申亚鹏

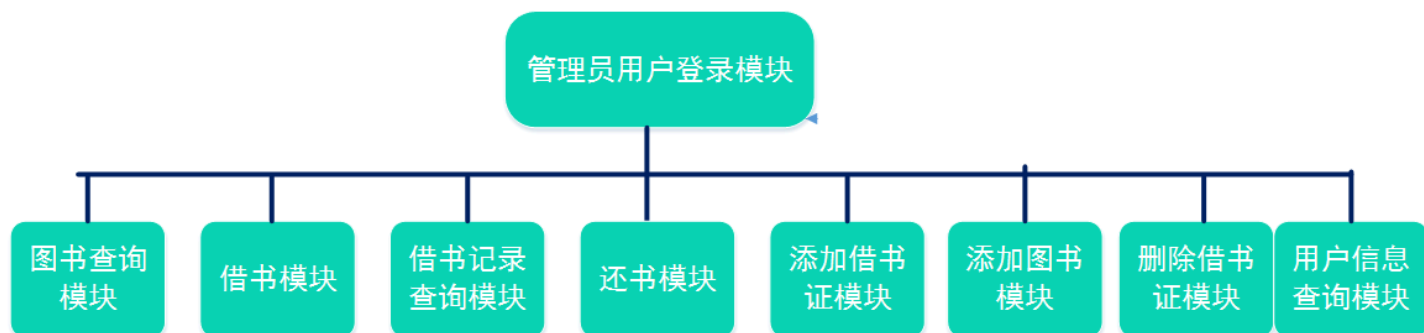
学生: 钱 昕 3130000054 June, 14, 2014

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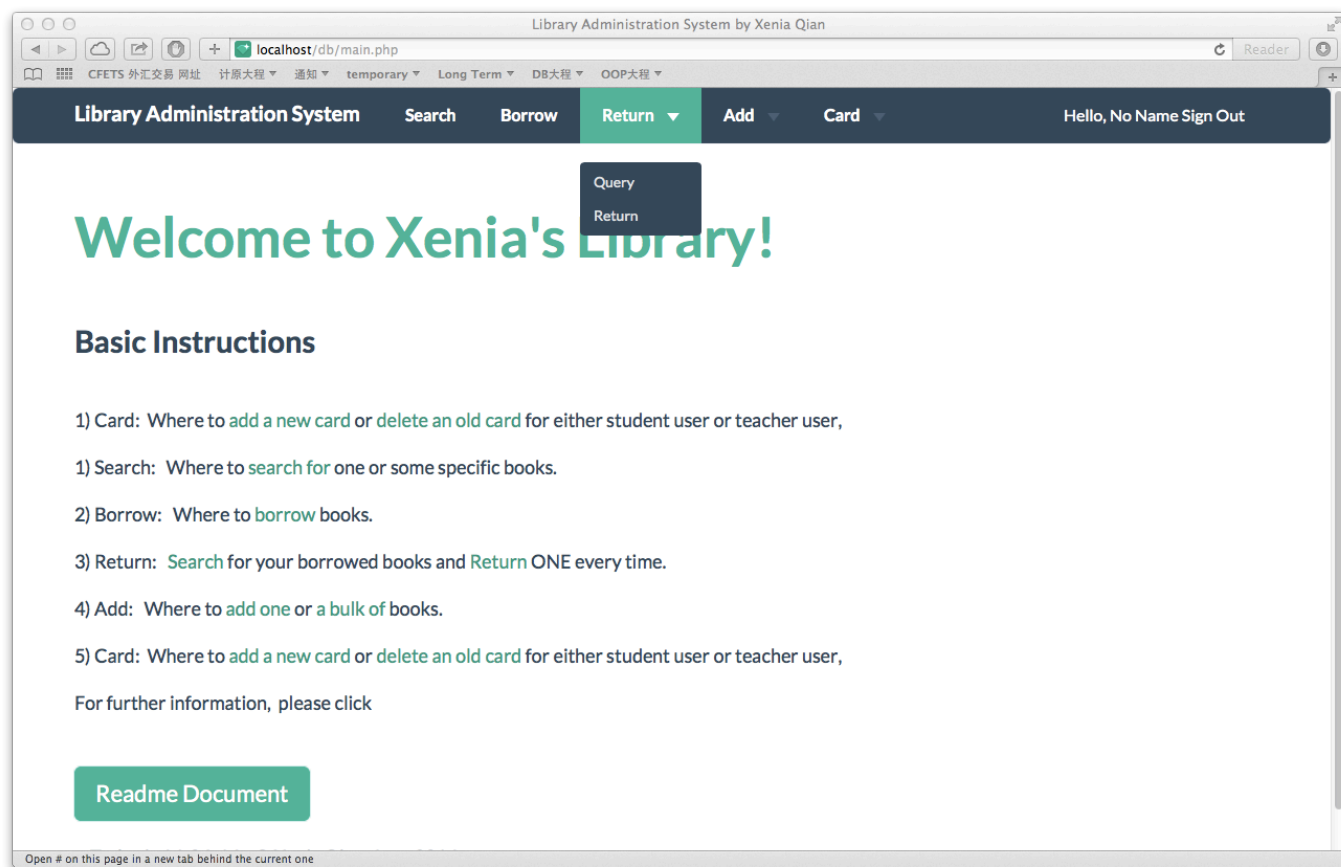
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系统整体架构

本图书管理系统共有 8 个模块，分别为管理员用户登录模块，图书查询模块，图书入库模块，借书模块，借书记录查询模块（附带一键归还功能），还书模块，添加借书证模块，删除借书证模块以及用户信息查询模块。模块间的整体架构如下图所示。



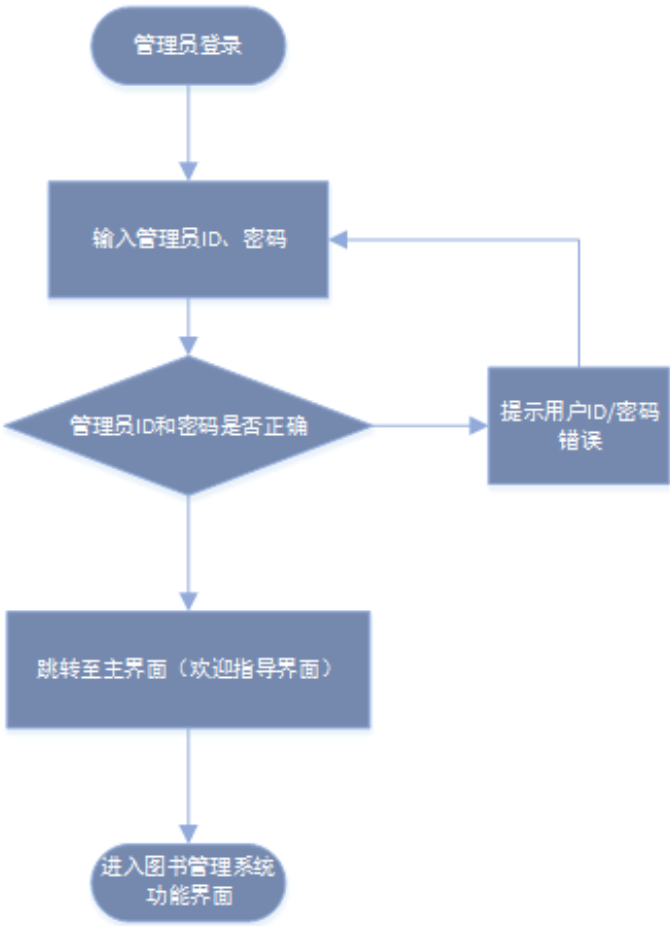
欢迎界面出现于管理员用户登录界面以后，页面上方显示同能导航条，以及登录状态。



模块流程图

本部分以流程图的形式详细介绍各模块流程，并配以 PHP 后台处理语句。

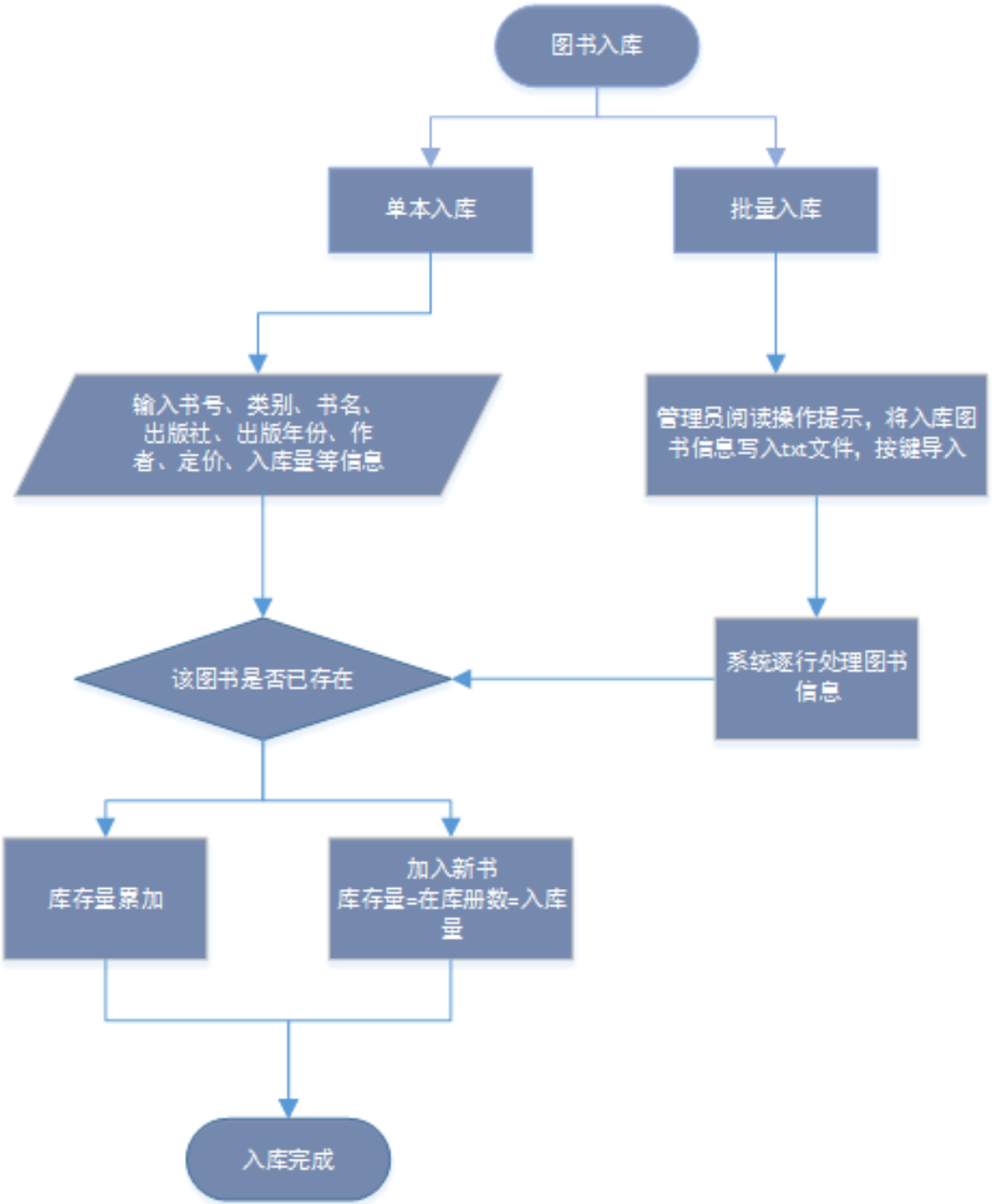
管理员用户登陆模块



注：用户登录后，管理员 ID 被设置为\$_SESSION 类型变量，在后续功能模块起效。

```
<?php
if(isset($_POST['submit'])){
    $con=mysqli_connect("127.0.0.1","root","1324","library2");
    $aid=$_POST['aid'];
    $password=$_POST['password'];
    $result = mysqli_query($con,"SELECT * FROM admin WHERE aid='$aid' AND password='$password'");
    if($row = mysqli_fetch_array($result))
    {
        session_start();
        $_SESSION['aid'] = $aid;
        $_SESSION['admin_name'] = $row['aname'];
        echo "<script language=javascript>alert('Login Succeed !');window.location='main.php'</script>";
    }
    else
    {
        echo "<script language=javascript>alert('Wrong User ID / Password !');window.location='login.php'</script>";
    }
    mysqli_close($con);
}
?>
```

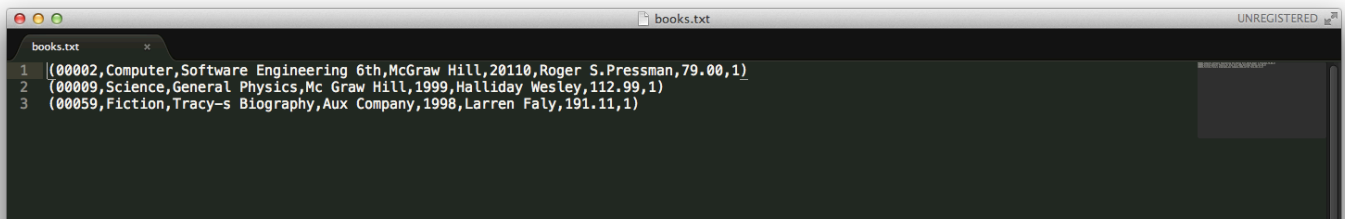
图书入库



```
// 判断这种书图书馆之前是否已经有了
$sql0="SELECT * FROM book WHERE bid='$bid'";
$arr0=mysqli_query($con,$sql0);
// echo mysqli_errno($con)." ".mysqli_error($con);
if (mysqli_affected_rows($con)>0)
{
    $sql1="UPDATE book SET stock=stock+$total WHERE bid LIKE '%$bid%'";
    $arr1=mysqli_query($con,$sql1);
    $sql1="UPDATE book SET total=total+$total WHERE bid LIKE '%$bid%'";
    $arr1=mysqli_query($con,$sql1);
    // echo "Book"."$bid." already exists. Stock changed!";
    echo "<script>alert('Book ".$bid." already existed. Stock changed');window.location='add_one.php'</script>";
}
else if (mysqli_affected_rows($con)==0)
```

注：批量入库读取管理员用户编辑的.txt 文件。图书信息存放在该文件中，每条图书信息为一行。一行中的内容如（书号，类别，书名，出版社，年份，作者，价格，数量）逗号分隔。

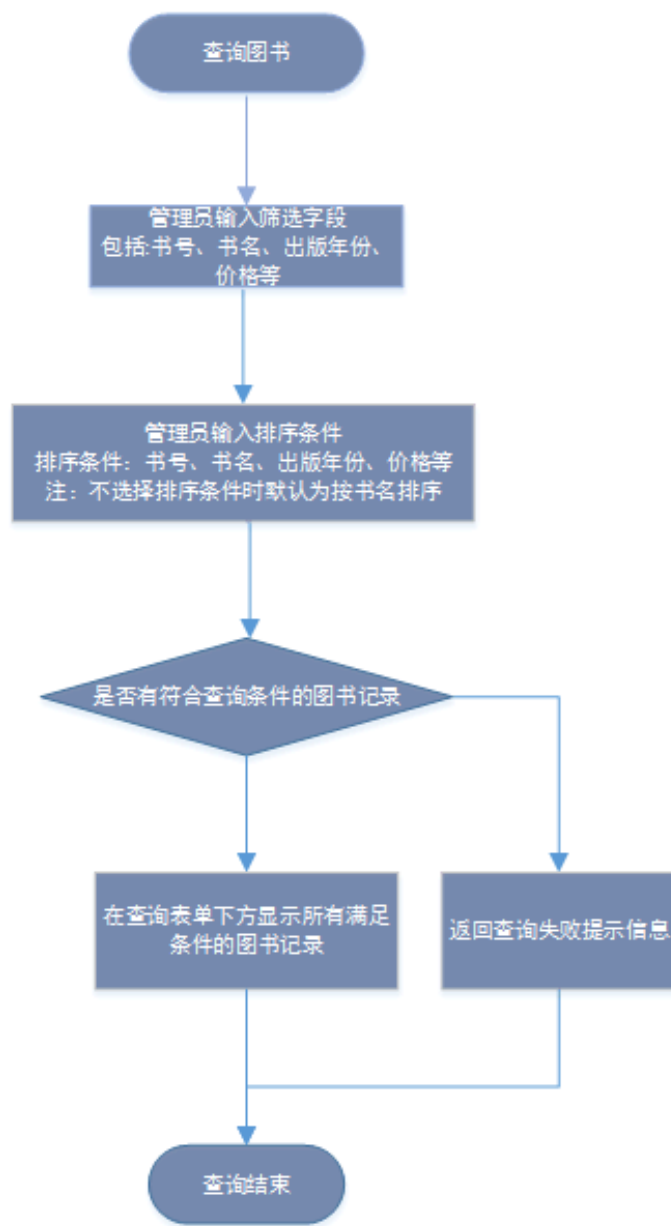
Sample: (00059,Fiction,Tracy-s Biography,Aux Company,1998,Larren Faly,191.11,1)



使用 PHP 内置的 explode 函数，对文件中的每行记录进行切割，分割为属性字段，与数据库进行交互。

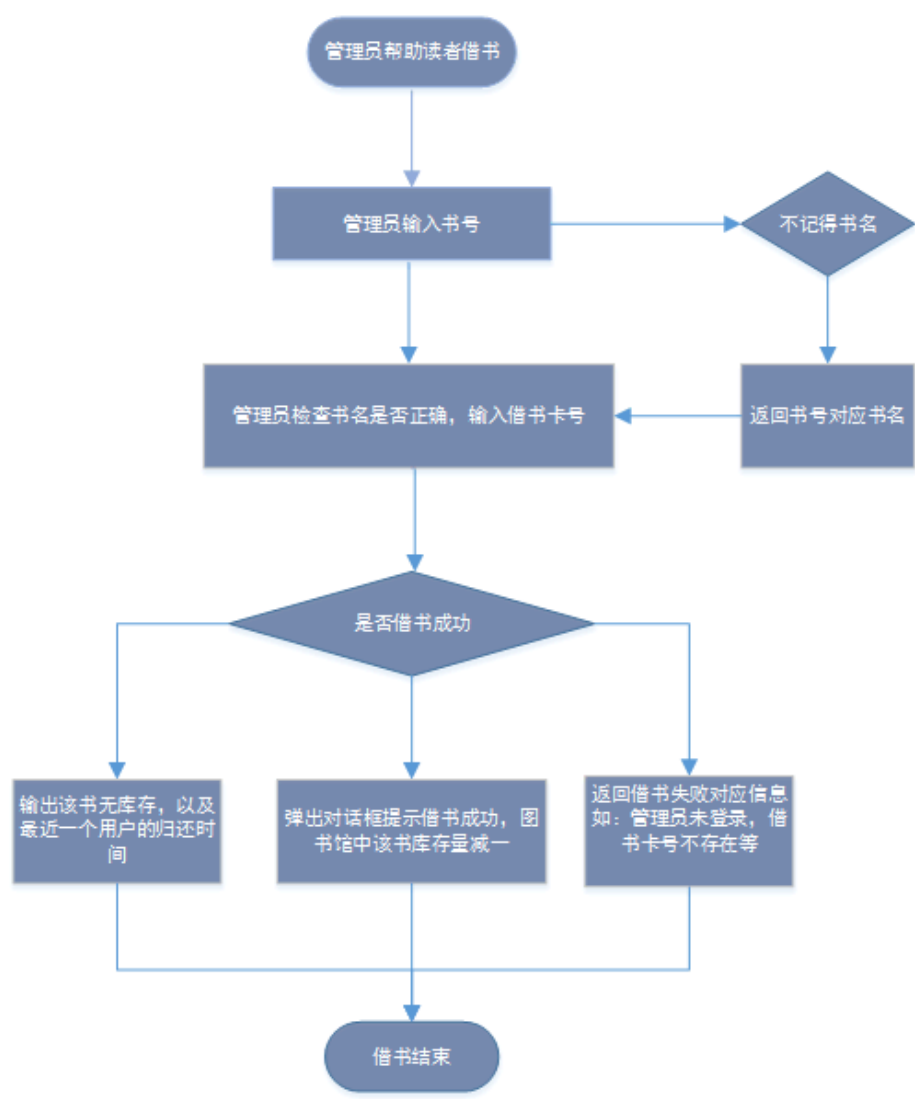
```
<?php
// error_reporting( E_ALL&~E_NOTICE );
if (isset($_POST['import']))
{
    $con=mysqli_connect("127.0.0.1","root","1324");
    $con2=mysqli_connect("127.0.0.1","root","1324","library2");
    $db_selected = mysqli_select_db("library2",$con);
    $file = fopen("books.txt", "r") or exit("Unable to open file!");
    while(!feof($file))
    {
        $sql=fgets($file);
        $array0=explode(",",$sql);
        $array1=explode("(", $array0[0]);
        $array=explode(",",$array1[1]);
        $bid=$array[0];
        $category=$array[1];
        $bname=$array[2];
        $publisher=$array[3];
        $year=intval($array[4]);
        $author=$array[5];
        $price=floatval($array[6]);
        $total=intval($array[7]);
        $sql0="SELECT * FROM book WHERE bid=$bid";
        $arr0=mysqli_query($con,$sql0);
        if (mysqli_num_rows($arr0)==1) //已经有这么一本书
        {
            $sql1="UPDATE book SET stock=stock+$total WHERE bid=$bid";
            $arr1=mysqli_query($con2,$sql1);
            $sql1="UPDATE book SET total=total+$total WHERE bid=$bid";
            $arr1=mysqli_query($con2,$sql1);
            // echo mysqli_errno($con2)." ".mysqli_error($con2);
            // echo "Book existed.";
            // echo "<script>alert('Book already exists. Stock changed!');window.location='add_more.php'</script>";
        }
        else if (mysqli_num_rows($arr0)==0)
        {
            $sql = "INSERT INTO book VALUES('$bid','$category','$bname','$publisher',$year,$author,$price,$total,$total,now()-now())";
            $arr=mysqli_query($con2,$sql);
            echo mysqli_errno($con2)." ".mysqli_error($con2);
        }
    }
}
```

图书查询模块



```
if (!($lower|$upper))
{
    if (!($keyword)) $sql="SELECT * FROM book ORDER BY $order_by;"; //米有keyword
    else
    {
        $sql="SELECT * FROM book WHERE $select_by LIKE '%$keyword%' ORDER BY $order_by;"; //有keyword
    }
}
else
{
    if ($select_by=="all") $sql="SELECT * FROM book WHERE bname<=$upper AND bname>=$lower ORDER BY $order_by;";
    else
    {
        $sql="SELECT * FROM book WHERE $select_by<=$upper AND $select_by>=$lower ORDER BY $order_by;";
    }
}
$arr=mysqli_query($con,$sql);
```

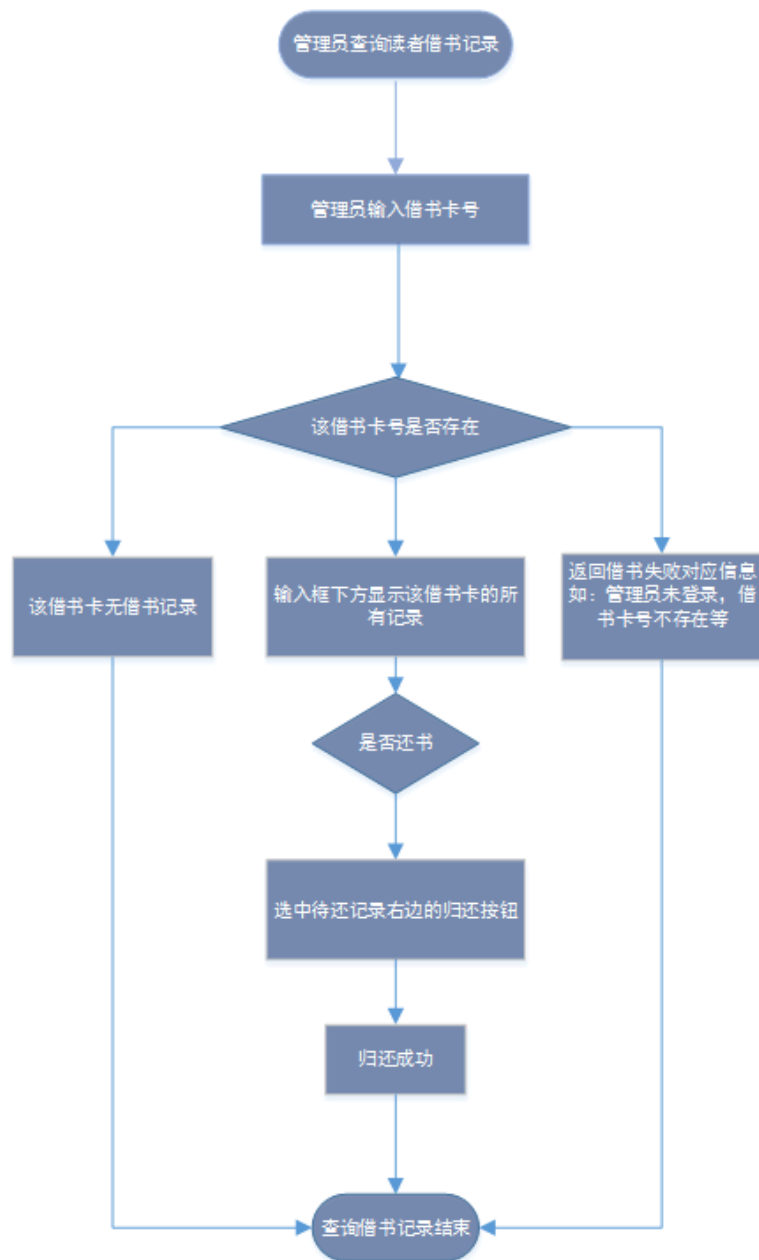
借书模块



```
<?php
if(isset($_GET['check']))
{
    $thiscon=mysqli_connect("127.0.0.1","root","1324","library2");
    $thisbid=$_GET["bid"];
    // $thissql="SELECT * FROM book WHERE bid LIKE '%$bid%'";
    $thissql="SELECT * FROM book WHERE bid LIKE '%$thisbid%'";
    $thisarr=mysqli_query($thiscon,$thissql);
    if ($thisarr)
    {
        $thisval=mysqli_fetch_row($thisarr);
    }
}
if (isset($_GET['submit']))
{
    $con=mysqli_connect("127.0.0.1","root","1324","library2");
    $bid=$_GET['bid'];
    $cid=$_GET['cid'];
    $aid=$_SESSION['aid'];
    $sql="SELECT * FROM book WHERE bid LIKE '%$bid%'";
    $arr=mysqli_query($con,$sql);
    if ($arr)
    {
        $val=mysqli_fetch_row($arr);

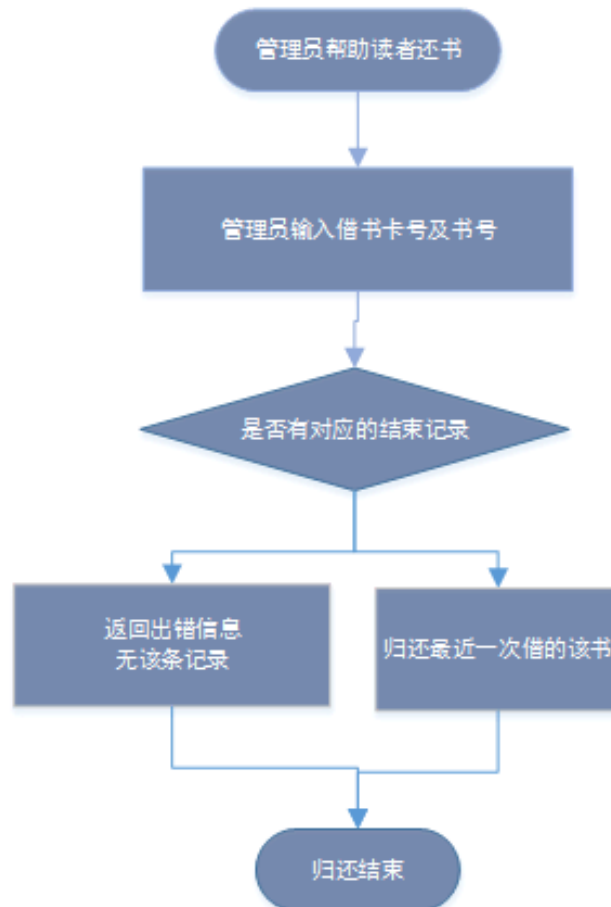
        if ($val[8]>0)
        {
            $sql2="INSERT INTO record VALUES('$bid','$cid','$aid',now(),now()+INTERVAL 40 DAY)";
            echo $sql2;
            $arr2=mysqli_query($con,$sql2);
            $sql3="UPDATE book SET stock=stock-1 WHERE bid LIKE '%$bid%'";
            echo $sql3;
```


借书记录查询模块



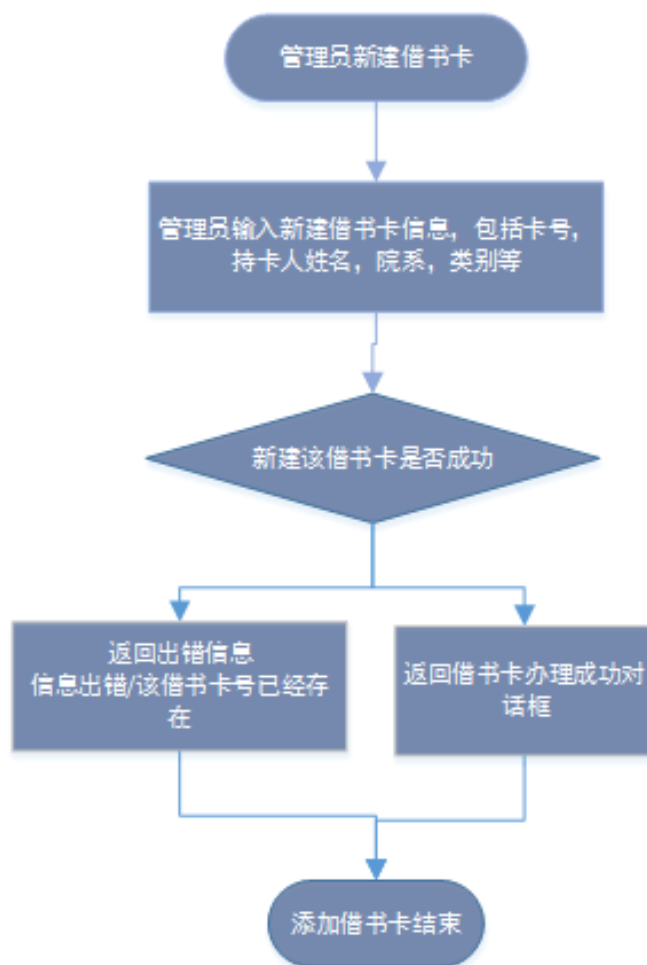
```
<?php
if (isset($_GET["submit"]))
{
    $con=mysqli_connect("127.0.0.1","root","1324","library2");
    $cid=$_GET["cid"];
    $sql="SELECT bid,bname,aid,bdate,due from record NATURAL JOIN book WHERE cid=$cid;";
    $arr=mysqli_query($con,$sql);
    if($arr)
```

还书模块



```
else if (isset($_GET['bid']))
{
    $bid=$_GET['bid'];
    $cid=$_GET['cid'];
    $con=mysqli_connect("127.0.0.1","root","1324","library2");
    $aid=$_SESSION['aid'];
    if (mysqli_num_rows(mysqli_query($con,"SELECT * FROM record WHERE bid=$bid AND cid=$cid;"))
    {
        $sql="DELETE FROM record WHERE bid=$bid AND cid=$cid LIMIT 1;";
        $arr=mysqli_query($con,$sql);
        $sql2="UPDATE book SET lastreturn = now() WHERE bid=$bid;";
        mysqli_query($con,$sql2);
        $sql2="UPDATE book SET stock=stock+1 WHERE bid=$bid;";
        mysqli_query($con,$sql2);
        echo "<script>alert('You have successfully returned one book!');window.location='return.php?cid=".$cid."</script>";
    }
    else
    {
        echo "<script>alert('Return Error! Please check.');
```

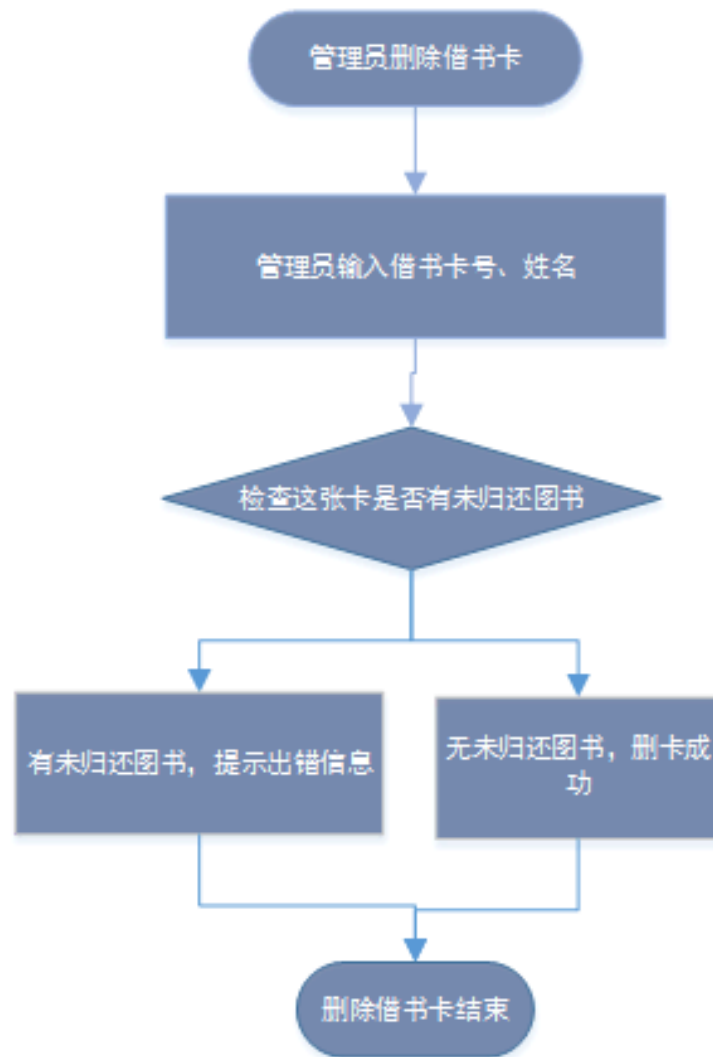
添加借书证模块



```
<?php
if(isset($_POST['submit']))
{
    $con=mysqli_connect("127.0.0.1","root","1324","library2");
    $cid = $_POST['cid'];
    $cname = $_POST['cname'];
    $department = $_POST['department'];
    if ($_POST['type']) $type='Teacher';
    else $type='Student';
    $sql = "INSERT INTO card VALUES ('$cid','$cname','$department','$type')";

    $arr=mysqli_query($con,$sql);
    if (mysqli_affected_rows($con)==1) echo "<script>alert('Add card succeed!');window.location='add_card.php'</script>";
    else echo "<script>alert('Add card failed! Please check your input.');
```

删除借书证模块



```
<?php
if(isset($_POST['submit']))
{
    $con=mysqli_connect("127.0.0.1","root","1324","library2");
    $cid = $_POST['cid'];
    $cname = $_POST['cname'];
    $sql = "DELETE FROM card WHERE cid='$cid' AND cname='$cname'";
    $arr=mysqli_query($con,$sql);
    $ra=mysqli_affected_rows($con);
    if (mysqli_affected_rows($con)==1) echo "<script>alert('Delete card succeed!');window.location='delete_card.php'";
    else if (mysqli_errno($con)==1451) echo "<script>alert('Delete card failed! Return your book first.');
```

数据库表结构

表结构定义

本项目的数据库 library 共包含 4 个 table: admin, book, card, record。

基本遵循实验要求，额外添加了 lastreturn 属性。

admin (aid, password, aname, phone)

card (cid, name, department, type)

book (bid, category, bname, publisher, year, author, price, total, stock, lastreturn)

record (bid, cid, aid, bdate, due)

各自的属性与数据类型定义如下。

Table: admin

Columns:

<u>aid</u>	char(10) PK
password	char(45)
aname	char(45)
phone	char(11)

Table: card

Columns:

<u>cid</u>	char(10) PK
cname	char(45)
departmen t	char(45)
type	char(10)

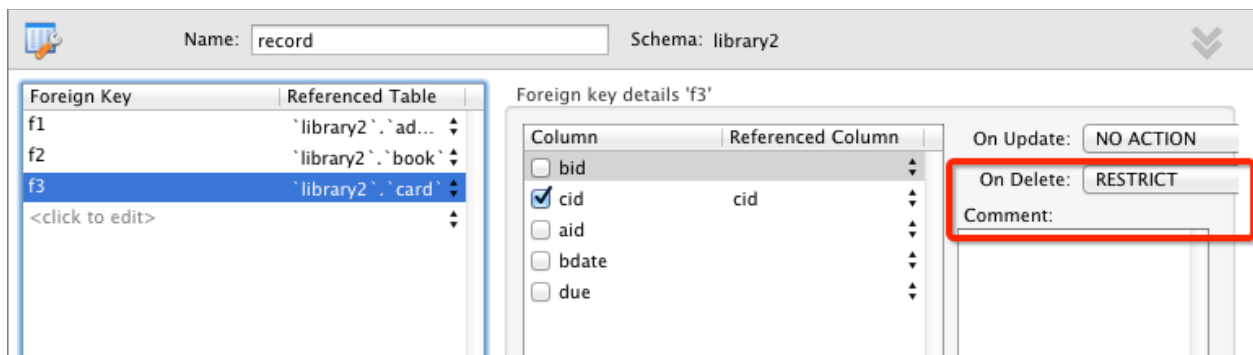
Table: book**Columns:**

<u>bid</u>	char(10) PK
category	char(15)
bname	char(45)
publisher	char(45)
year	int(4)
author	char(45)
price	decimal(10,2)
total	int(11)
stock	int(11)
lastreturn	timestamp

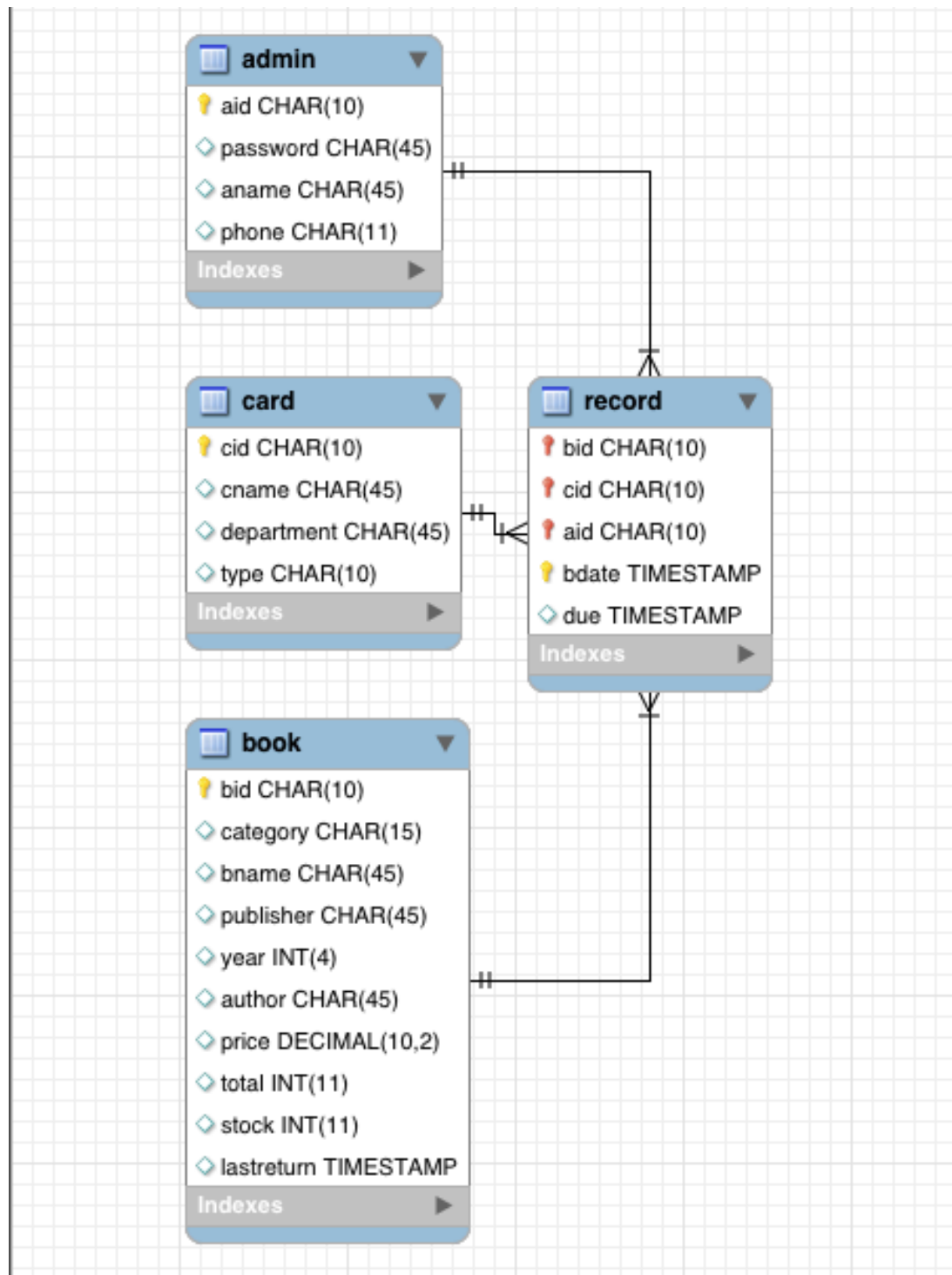
Table: record**Columns:**

<u>bid</u>	char(10) PK
<u>cid</u>	char(10) PK
<u>aid</u>	char(10) PK
<u>bdate</u>	timestamp PK
due	timestamp

其中, record 表的三个主键 aid, bid, cid 分别为引用自 admin, book, card 三张表的外键, 且由于业务逻辑, 定义 on delete restrict, 指当 record 中有某 cid 的记录时, 该 cid 在 card 中的记录不能被删除。



EER Diagram



程序所采用技术

PHP

PHP 超文本预处理器（译者注：PHP: Hypertext Preprocessor，递归命名）是一种创建动态交互性站点的强有力的服务器端脚本语言。支持很多数据库（MySQL、Informix、Oracle、Sybase、Solid、PostgreSQL、Generic ODBC 等等）可包含文本、HTML 标签以及脚本。PHP 文件可以向浏览器返回纯粹的 HTML。PHP 与 MySQL 的组合是跨平台的（可以在 Windows 环境进行开发，而在 Unix 平台上提供服务）。PHP 与目前几乎所有的正在被使用的服务器相兼容（Apache、IIS 等）

语言	名称	代码
php	判断是否定义	isset()
	输出	echo
	条件判断	if...else...
	循环语句	while/for
	session	session_start(),session_destroy()

Javascript

JavaScript 是属于网络的脚本语言, 被数百万计的网页用来改进设计、验证表单、检测浏览器、创建 cookies, 以及更多的应用,是因特网上最流行的脚本语言。

语言	名称	代码
javascript	表单验证函数	Function check()
	多种弹窗	Alert、confirm
	跳转	Windows.location
	更改样式	SelectPicker()

HTML

HTML 是用来描述网页的一种语言。指的是超文本标记语言 (Hyper Text Markup Language)。标记语言是一套标记标签 (markup tag)。HTML 标记标签通常被称为 HTML 标签 (HTML tag)，是由尖括号包围的关键词，比如 <html>。它们通常是成对出现的，比如 和

语言	名称	代码
html	表单	<form></form>
	文本框	<input type="text" name="name">
	密码框	<input type="password" name="password">
	提交按钮	<input type="submit" value="submit">
	下拉菜单	<select name="order_by"> <option value="year">year </select>
	插入图像	

Bootstrap

Bootstrap 是 Twitter 推出的一个开源的用于前端开发的工具包,是一个 CSS/HTML 框架。Bootstrap 提供了优雅的 HTML 和 CSS 规范,它即是由动态 CSS 语言 Less 写成。

Bootstrap 在 jQuery 框架的基础上进行了更为个性化和人性化的完善,形成一套自己独有的网站风格。Bootstrap 中包含了丰富的 Web 组件,根据这些组件,可以快速的搭建一个漂亮、功能完备的网站。其中包括以下组件: 下拉菜单、按钮组、按钮下拉菜单、导航、导航条、面包屑、分页、排版、缩略图、警告对话框、进度条、媒体对象等。



Flat UI

Flat UI Free 是一套精美的扁平风格 UI 工具包，基于 Twitter Bootstrap 实现。这套界面工具包包含许多基本的和复杂的 UI 部件，例如按钮，输入框，组合按钮，复选框，单选按钮，标签，菜单，进度条和滑块，导航元素等等。



Basic elements

Buttons

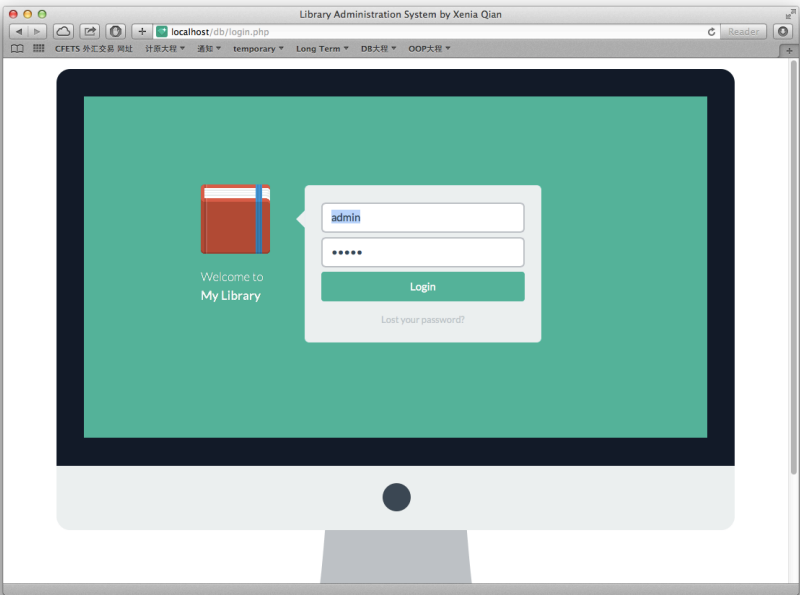


Apache

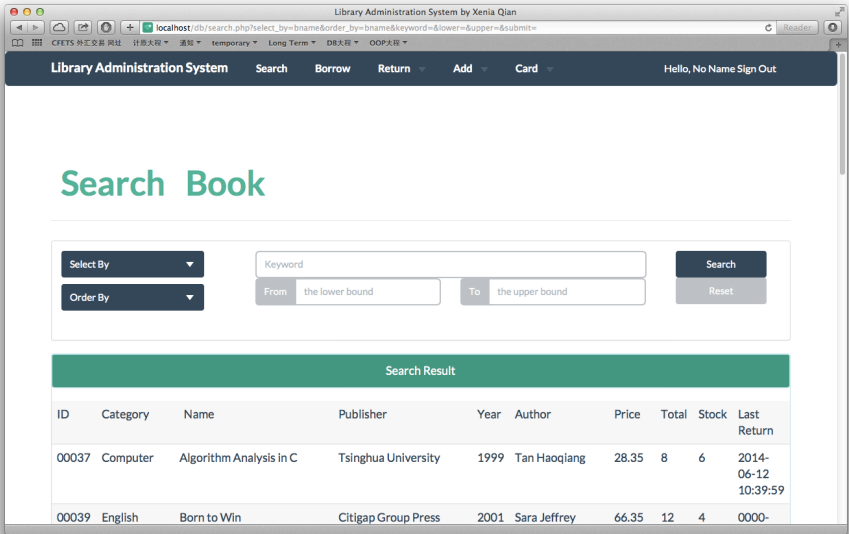
Apache 是世界使用排名第一的 Web 服务器软件，可以运行在几乎所有广泛使用的计算机平台上，由于其跨平台 and 安全性被广泛使用，是最流行的 Web 服务器端软件。

功能详述（用户界面示意）

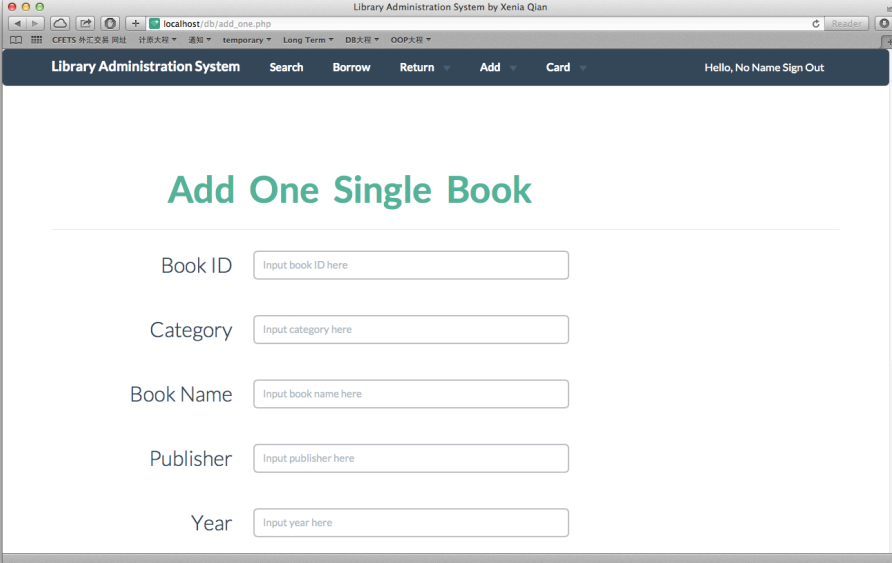
管理员用户登录模块



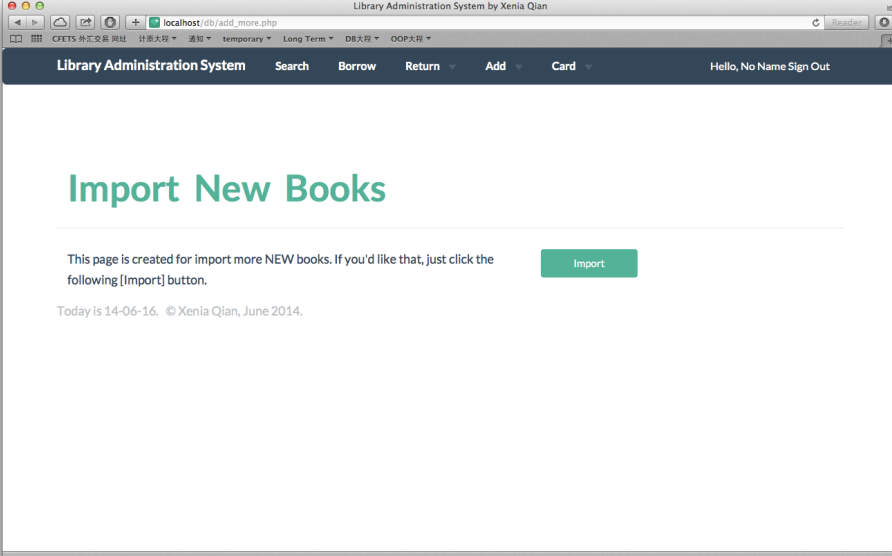
图书查询模块



图书入库模块

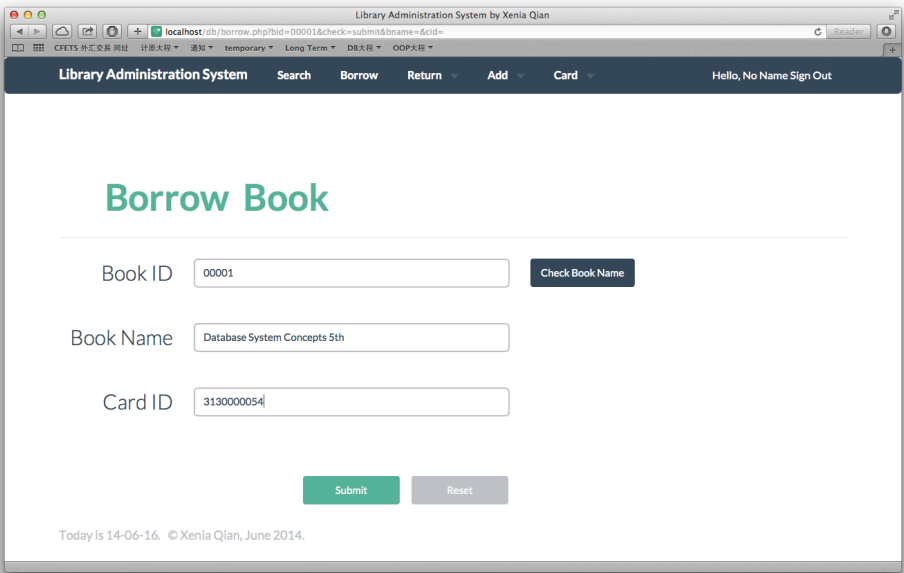


The screenshot shows a web browser window titled "Library Administration System by Xenia Qian". The address bar shows "localhost:db/add_one.php". The browser's menu bar includes "CFETS 外汇交易系统", "网址", "计划大纲", "通知", "temporary", "Long Term", "题库大纲", and "OOP大纲". The page has a dark blue header with the text "Library Administration System" and navigation links: "Search", "Borrow", "Return", "Add", and "Card". On the right side of the header, it says "Hello, No Name Sign Out". The main content area has a green heading "Add One Single Book". Below the heading is a form with five input fields, each with a label and a placeholder text: "Book ID" (placeholder: "Input book ID here"), "Category" (placeholder: "Input category here"), "Book Name" (placeholder: "Input book name here"), "Publisher" (placeholder: "Input publisher here"), and "Year" (placeholder: "Input year here").

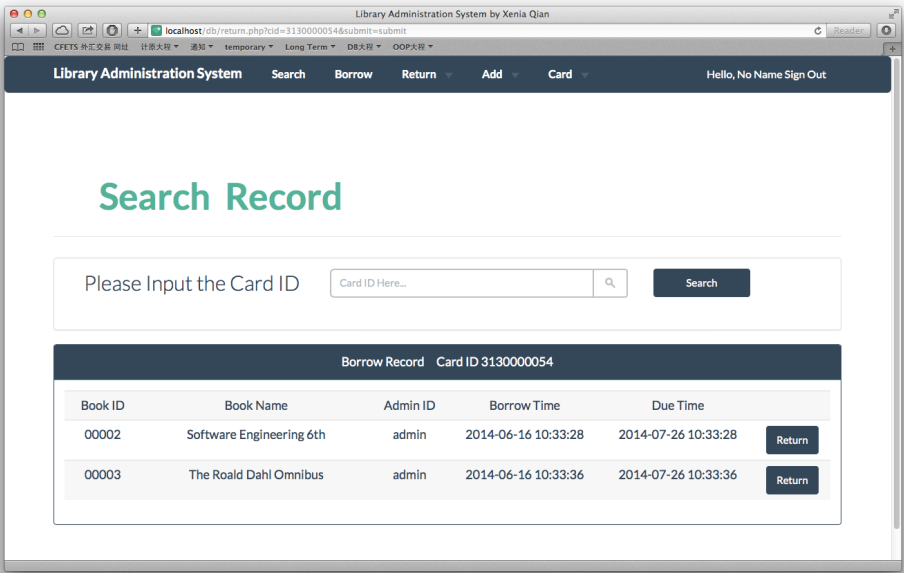


The screenshot shows a web browser window titled "Library Administration System by Xenia Qian". The address bar shows "localhost:db/add_more.php". The browser's menu bar is the same as the previous screenshot. The page has the same dark blue header with "Library Administration System" and navigation links: "Search", "Borrow", "Return", "Add", and "Card". On the right side of the header, it says "Hello, No Name Sign Out". The main content area has a green heading "Import New Books". Below the heading is a paragraph of text: "This page is created for import more NEW books. If you'd like that, just click the following [Import] button." To the right of this text is a green button labeled "Import". At the bottom of the page, there is a footer that says "Today is 14-06-16. © Xenia Qian, June 2014."

借书模块



借书记录查询模块（附带一键归还功能）



还书模块

Library Administration System by Xenia Qian

localhost:db/return_book.php

CFETS 外汇交易系统 计息大额 通知 temporary Long Term 大额 大额 大额

Library Administration SystemSearchBorrowReturnAddCardHello, No Name Sign Out

Return Book

Please note that it returns ONE book at a time!

Book ID

Check Book Name

Book Name

Card ID

Submit

Reset

添加借书证模块

Library Administration System by Xenia Qian

localhost:db/add_card.php

CFETS 外汇交易系统 计息大额 通知 temporary Long Term 大额 大额 大额

Library Administration SystemSearchBorrowReturnAddCardHello, No Name Sign Out

Add Card

Card ID

Holder Name

Department

Type

☐ Teacher

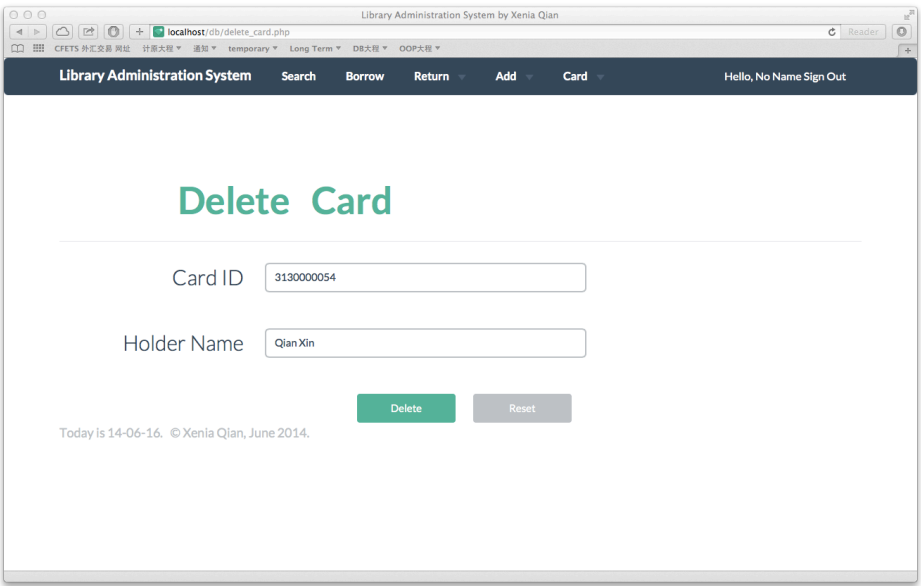
☒ Student

Submit

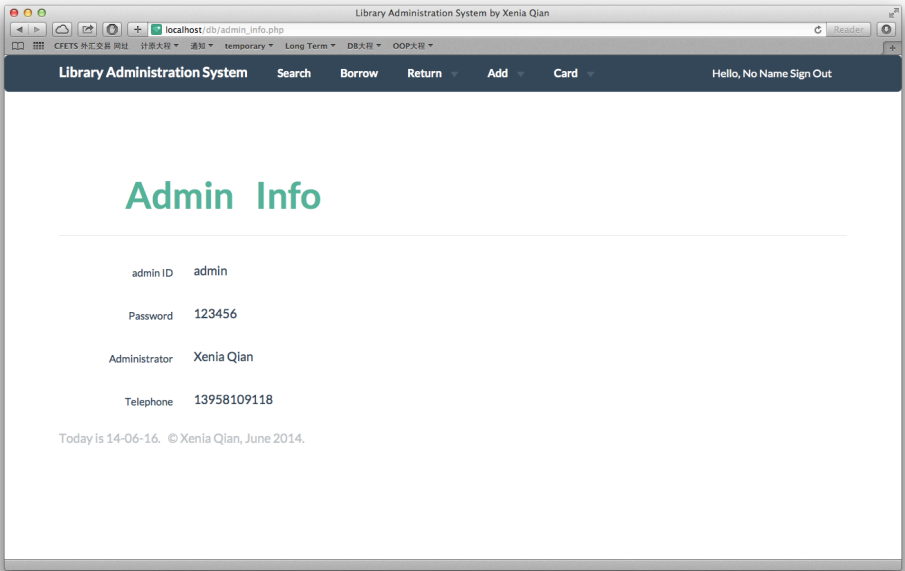
Reset

Today is 14-06-16. © Xenia Qian, June 2014.

删除借书证模块



用户信息查询模块



实验心得

本次大程的任务帮助我更深入得理解了数据库系统知识在实际的运用，同时，编码过程让我通过 W3School 平台自学了 PHP 及 HTML 方面的知识，锻炼了编码能力及自学能力。测试与报告撰写阶段则锻炼了测试与文档能力。测试环节会主动查询手册，使用 PHP 的 `mysqli` 函数，输出结果进行调试。

验收环节也发现了细小的问题，例如，当读者希望借阅的书无库存时，系统应该告知读者最近归还时间，这里对“最近归还时间”这个概念的理解应当是所有借这本书的人中还书日期最早的一人的 DDL，而不是已经最近一次归还本书的人的归还时间。

另外的一点点小遗憾有两点：一，没能用上一些动态的网页元素，如果再深入学习一些 Javascript 和 AJAX。用户体验还可以进一步改善。二，数据库设计的时候，几张表的 ID 可以设置为 INT 类型，而使用了 CHAR，降低了 SQL 语句的速度。下次可以注意。

总体说来，完成这次大程的过程是一次对 Web App 开发的初步认识，这样做一个小项目还是蛮有启发的。

