

Assignment3 实验报告

18307130123 戴华昇 2020/05/07

代码链接: <https://github.com/daihuasheng/repository/tree/master>

一、 建表

我建了三个表格, student 用于存储学生账户, 包括学号和 available (用于存储是否被暂停的信息), 为简单起见此处省略了学生的其他非必要信息; book 存储书籍信息, 包括书号、书名、作者、出版社、可用记号 (被借走或者移除都标记为 1, 否则标记为 0, 且移除时需添加原因, 原因缺省则为借出); record 存储借阅信息, 包括书号, 学号, 借出日期, 归还日期, 延迟次数以及是否归还 (我使用书号、学号、借出日期作为主键, 这样使得学生无法在同一天借阅同一本书, 即使它已经被归还; 但是只要把借出日期的 date 类型改为 datetime 类型即可, 因为同一学生无法在同一时间借同一本书, 故这个纰漏是无伤大雅的)。

二、 函数实现

简单功能此处不表, 谈谈一些尚有优化空间的函数和设计独特的函数。

- (1) 在查询时我本想用 QueryRow 函数, 但是这会使得当查询结果为空时返回错误, 但这是一个很正常的现象。本来希望通过判断 err 为 sql.ErrNoRows 来鉴别, 但实际操作中编译器提醒我该方法未被定义在 string 里, 即便我用 errors.New 新建了一个同一信息的错误全局变量也无法匹配, 这里我尚不知道原因, 故只好全部用 Query 函数来查询, 并且在用 rows.Next()来判断查询返回是否为空, 但这样的效率无疑是比较低下的。

- (2) 在查询借阅日期和归还日期时我把 MySQL 返回的 date 类型存储在

string 格式里直接输出，但是这样使得在 go 函数里无法对日期进行操作。我本想将其转化为 go 中的 time 类型，但是没有找到只保留日期的类型，故只好作罢。但是如果如建表中所言将 date 类型改为 datetime 类型，这个问题就迎刃而解了。

- (3) 在借书函数 BorrowBook 中我设计在添加借书记录和修改书本可用标志时先检查一下书本是否在 book 表里且可用，学生账户是否在 student 表里（这是不必要的，因为只有在表里的账户才能登陆，但是学号作为主键在检查可用标志时必然会用到，故这个检查算作无额外开销的保险）且为可用。虽然这些功能可以在添加借阅记录时通过嵌套查询一并实现，但是这样可以得到书不可借（查无此书、已被移除、已被借走）的信息和学生账户不可用（超过三次延期记录）的信息，所以是值得的。
- (4) 在还书时同样也进行了记录是否存在的查询，也是将该查询和修改记录和书本信息分开，理由同（3）。

三、 测试截图

如下所示。

```
daihuasheng@daihuasheng-virtual-machine:~/Documents$ go run ass3.go
Welcome to the Library Management System!
Please sign in
user name:(Please use '10000' if you are administrator)
10000
password:
root
Please type a code to choose an operation
0 for exiting
1 for adding a student account
2 for adding a book into library
3 for removing a book from library
4 for querying a book
5 for querying the borrowing history of a student account
6 for querying the books a student has borrowed and not returned yet
7 for checking the deadline of returning a borrowed book
8 for extending the deadline of returning a book, at most 3 times
9 for checking if a student has any overdue books that needs to be returned
1
Please type 0 for return
Please type the student id (only numbers allowed)
student id: 110
Please type a code to choose an operation
0 for exiting
1 for adding a student account
2 for adding a book into library
3 for removing a book from library
4 for querying a book
5 for querying the borrowing history of a student account
6 for querying the books a student has borrowed and not returned yet
7 for checking the deadline of returning a borrowed book
8 for extending the deadline of returning a book, at most 3 times
9 for checking if a student has any overdue books that needs to be returned
4
Please type a code to choose a operation
1 for querying id
2 for querying name
3 for querying author
4 for querying publisher
1
Please type the id
book id: 1
{1 book1 me me 0 }

Please type a code to choose an operation
0 for exiting
1 for adding a student account
2 for adding a book into library
3 for removing a book from library
```

如上，图一是管理员视角，通过特殊的账号“10000”和密码“root”访问，该图实现了添加学生账户和按学号查询书本的功能。

```
Please type a code to choose an operation
0 for exiting
1 for adding a student account
2 for adding a book into library
3 for removing a book from library
4 for querying a book
5 for querying the borrowing history of a student account
6 for querying the books a student has borrowed and not returned yet
7 for checking the deadline of returning a borrowed book
8 for extending the deadline of returning a book, at most 3 times
9 for checking if a student has any overdue books that needs to be returned
2
Please type the information of this book
id: 4
name: book4
author: whoCares
publisher: notMe
Please type a code to choose an operation
0 for exiting
1 for adding a student account
2 for adding a book into library
3 for removing a book from library
4 for querying a book
5 for querying the borrowing history of a student account
6 for querying the books a student has borrowed and not returned yet
7 for checking the deadline of returning a borrowed book
8 for extending the deadline of returning a book, at most 3 times
9 for checking if a student has any overdue books that needs to be returned
4
Please type a code to choose a operation
1 for querying id
2 for querying name
3 for querying author
4 for querying publisher
3
Please type the author
author: whoCares
{4 book4 whoCares notMe 0 }

Please type a code to choose an operation
0 for exiting
```

如上，图二实现添加书本的功能并对刚添加的书本进行了一次查询。

```

Please type a code to choose an operation
0 for exiting
1 for adding a student account
2 for adding a book into library
3 for removing a book from library
4 for querying a book
5 for querying the borrowing history of a student account
6 for querying the books a student has borrowed and not returned yet
7 for checking the deadline of returning a borrowed book
8 for extending the deadline of returning a book, at most 3 times
9 for checking if a student has any overdue books that needs to be returned
3
Please type id of the book you want to remove
book id: 4
reason: forTest
Please type a code to choose an operation
0 for exiting
1 for adding a student account
2 for adding a book into library
3 for removing a book from library
4 for querying a book
5 for querying the borrowing history of a student account
6 for querying the books a student has borrowed and not returned yet
7 for checking the deadline of returning a borrowed book
8 for extending the deadline of returning a book, at most 3 times
9 for checking if a student has any overdue books that needs to be returned
4
Please type a code to choose a operation
1 for querying id
2 for querying name
3 for querying author
4 for querying publisher
1
Please type the id
book id: 4
{4 book4 whoCares notMe 1 forTest}

Please type a code to choose an operation
0 for exiting

```

如上，图三实现了移除书本的功能，移除后查询该书可用标志已经变为 1，且理由一栏不再缺省，为刚刚键入的理由。

```

Please type a code to choose an operation
0 for exiting
1 for adding a student account
2 for adding a book into library
3 for removing a book from library
4 for querying a book
5 for querying the borrowing history of a student account
6 for querying the books a student has borrowed and not returned yet
7 for checking the deadline of returning a borrowed book
8 for extending the deadline of returning a book, at most 3 times
9 for checking if a student has any overdue books that needs to be returned
5
Please type the student id
id: 123
{1 123 2020-05-06 2020-09-06 3 1}
{3 123 2020-05-06 2020-08-06 2 0}

Please type a code to choose an operation
0 for exiting
1 for adding a student account
2 for adding a book into library
3 for removing a book from library
4 for querying a book
5 for querying the borrowing history of a student account
6 for querying the books a student has borrowed and not returned yet
7 for checking the deadline of returning a borrowed book
8 for extending the deadline of returning a book, at most 3 times
9 for checking if a student has any overdue books that needs to be returned
6
Please type the student id
id: 123
book id:
3

```

如上, 图四实现了查询学生借阅记录的功能, 其中两个例子是我昨天借阅留下的, 其中一本已经归还 (第一本)。并查询了 123 账号尚未归还的书。

```
Please type a code to choose an operation
0 for exiting
1 for adding a student account
2 for adding a book into library
3 for removing a book from library
4 for querying a book
5 for querying the borrowing history of a student account
6 for querying the books a student has borrowed and not returned yet
7 for checking the deadline of returning a borrowed book
8 for extending the deadline of returning a book, at most 3 times
9 for checking if a student has any overdue books that needs to be returned
5
Please type the student id
id: 120
No such record!
```

如上, 图五实现了查询记录时输入一个不存在的账号, 系统返回无此记录。

```
Please type a code to choose an operation
0 for exiting
1 for adding a student account
2 for adding a book into library
3 for removing a book from library
4 for querying a book
5 for querying the borrowing history of a student account
6 for querying the books a student has borrowed and not returned yet
7 for checking the deadline of returning a borrowed book
8 for extending the deadline of returning a book, at most 3 times
9 for checking if a student has any overdue books that needs to be returned
7
Please type the book id
id: 3
2020-08-06
Days to due: 91
```

如上, 图六实现了查询 book3 的归还时间, 系统输出了归还截止日期和距离今天的时间。

```
Please type a code to choose an operation
0 for exiting
1 for adding a student account
2 for adding a book into library
3 for removing a book from library
4 for querying a book
5 for querying the borrowing history of a student account
6 for querying the books a student has borrowed and not returned yet
7 for checking the deadline of returning a borrowed book
8 for extending the deadline of returning a book, at most 3 times
9 for checking if a student has any overdue books that needs to be returned
8
Please type the book id and the student id
book id: 3
student id: 123
Success!
```

如上, 图七实现了 book3 归还日期的延期, 此时 book3 的归还截止日期应为 2020-09-06, 因为我设置了每次借阅和延期都是一个月为期。

```

Please type a code to choose an operation
0 for exiting
1 for adding a student account
2 for adding a book into library
3 for removing a book from library
4 for querying a book
5 for querying the borrowing history of a student account
6 for querying the books a student has borrowed and not returned yet
7 for checking the deadline of returning a borrowed book
8 for extending the deadline of returning a book, at most 3 times
9 for checking if a student has any overdue books that needs to be returned
9
Please type the student id
id: 123
No overdue record

```

如上，图八实现了查询学生是否有违期记录，123 账号并没有。

接下来是学生用户视角，我以 123 账号登录。

```

daihuasheng@daihuasheng-virtual-machine:~/Documents$ go run ass3.go
Welcome to the Library Management System!
Please sign in
user name:(Please use '10000' if you are administrator)
123
Please type a code to choose an operation
0 for exiting
1 for borrowing book
2 for returning book
3 for querying the borrowing history of your account
4 for querying a book
5 for querying the books you have borrowed and not returned yet
6 for checking the deadline of returning a borrowed book
7 for extending the deadline of returning a book, at most 3 times
8 for checking if you have any overdue books that needs to be returned
1
Please type the book id
id: 5
book found
student found
Success!

```

如上，图九实现了借书，借阅了书号为 5 的书。

```

Please type a code to choose an operation
0 for exiting
1 for borrowing book
2 for returning book
3 for querying the borrowing history of your account
4 for querying a book
5 for querying the books you have borrowed and not returned yet
6 for checking the deadline of returning a borrowed book
7 for extending the deadline of returning a book, at most 3 times
8 for checking if you have any overdue books that needs to be returned
7
Please type the book id
book id: 5
Success!

Please type a code to choose an operation
0 for exiting
1 for borrowing book
2 for returning book
3 for querying the borrowing history of your account
4 for querying a book
5 for querying the books you have borrowed and not returned yet
6 for checking the deadline of returning a borrowed book
7 for extending the deadline of returning a book, at most 3 times
8 for checking if you have any overdue books that needs to be returned
7
Please type the book id
book id: 5
Times limited, cannot delay

```

如上，图十实现了对刚借的 book5 的延期申请（前两次未截图），第四次申请遭到了拒绝，因为已经延期了三次了。

```
Please type a code to choose an operation
0 for exiting
1 for borrowing book
2 for returning book
3 for querying the borrowing history of your account
4 for querying a book
5 for querying the books you have borrowed and not returned yet
6 for checking the deadline of returning a borrowed book
7 for extending the deadline of returning a book, at most 3 times
8 for checking if you have any overdue books that needs to be returned
2
Please type the book id
id: 5
Success!
```

如上，图十一实现了归还刚借的 book5，系统显示成功。

```
daihuasheng@daihuasheng-virtual-machine:~/Documents$ go run ass3.go
Welcome to the Library Management System!
Please sign in
user name:(Please use '10000' if you are administrator)
110
Please type a code to choose an operation
0 for exiting
1 for borrowing book
2 for returning book
3 for querying the borrowing history of your account
4 for querying a book
5 for querying the books you have borrowed and not returned yet
6 for checking the deadline of returning a borrowed book
7 for extending the deadline of returning a book, at most 3 times
8 for checking if you have any overdue books that needs to be returned
1
Please type the book id
id: 5

book found
student found
Success!
```

如上，图十二，为了验证 123 账号刚归还的 book5 是否成功，我切换到刚添加的 110 账户，并申请借 book5，系统显示成功，说明归还操作和借书操作都是没有问题的。

用户视角的其他功能和管理员视角是一致的，只是不用再输入学生账号（登录账号作为参数传递，学生也无权操作其他人的账号），故此处不再赘述，截图略。

四、 运行系统

我写了一个简单的交互界面，故只要运行程序就可以操作，此处不表。另：创建表的程序 create_ass3.go 运行一次即可，若要日常访问和切换账号只需退出并重新运行 ass3.go。