INFS 7901 Database Principle

Project Report

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Aim and Background

For this project, I propose to build an online bookstore for people, which acts as a central database that contains various courses books in stock along with their titles, creators and selling prices. The system should manage information about books in the bookstore, registered users and books in their shopping basket. The database stores various book related details and customer information.

The background to this topic was chosen because many students find textbooks too expensive to buy at school bookstores and many courses only use the required textbooks a few days in a semester. This becomes very wasteful and frustrating for students & others people. This online bookstore system provides a solution to this. It will provide a service in which students can buy books online without any trouble.

The system has the following main components:
1. Implement of new user registration and old user login.
2. Allow users to change their own passwords and system administrators to modify book information, such as prices.
3. Implement the user to add books to the shopping basket.
4. Implement to search the author and publisher of the book by the ISBN of the book.
5. Implement to get publisher information by publisher name.

Query Demonstration

1. Join Operation

- **Query and Explanation**

```
SELECT * FROM PUBLISHER NATURAL JOIN PUB_PHONE;
```

PUBLISHER table and PUB_PHONE table are connected by pairs of identically named columns (PName) in them.

- **Result**

Before the join:

PUBLISHER table

PUB_PHONE table

After the join:

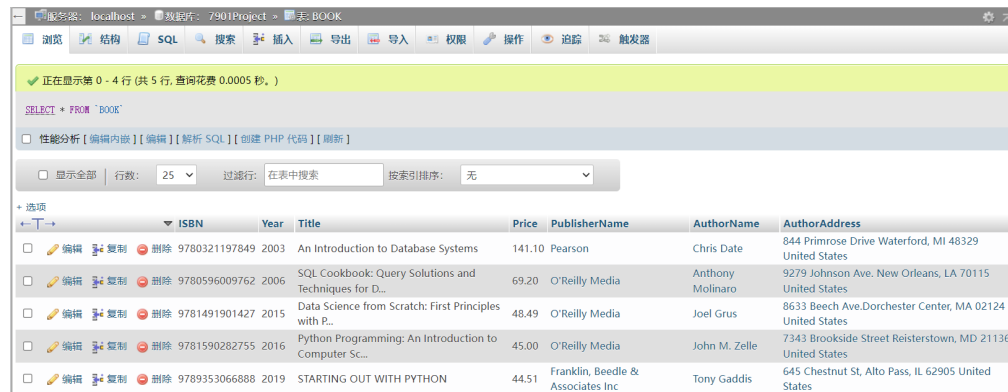*The Phone in PUB_PHONE has been connected to PUBLISHER table*

2. Aggregation Query

- **Query and Explanation**

```sql
SELECT COUNT(*) FROM BOOK WHERE Year > 2012;
```

Counts the number of books which published after 2012

- **Result**

BOOK table

There are 3 books published later than 2012

3. Aggregation with Group-By

- **Query and Explanation**

```sql
SELECT PublisherName, SUM(Price) FROM BOOK GROUP BY PublisherName;
```

Calculate the total price of books published by each publisher recorded in the system (If there are no books in BOOK table published by this publisher, his name will not be displayed)

- **Result**

BOOK table

The books in the BOOK Table are published by only three publishers

4. Delete Operation with Cascade

- **Query and Explanation**

```
DELETE FROM PUBLISHER WHERE PName='Relx'
```

Delete the "Relx" publisher with cascade, which means the record in PUB_PHONE would be delete as well.

- **Result**

Before the deletion:

PUBLISHER table

PUB_PHONE table

After the deletion:

The "Relx" publisher has been delete from both table

5. Update Operation

- **Query and Explanation**

```
UPDATE BOOK SET Price = Price + 4.99 WHERE Price < 46.00
```

Increase the book price of all books by 4.99 (should not be more than 46.00).
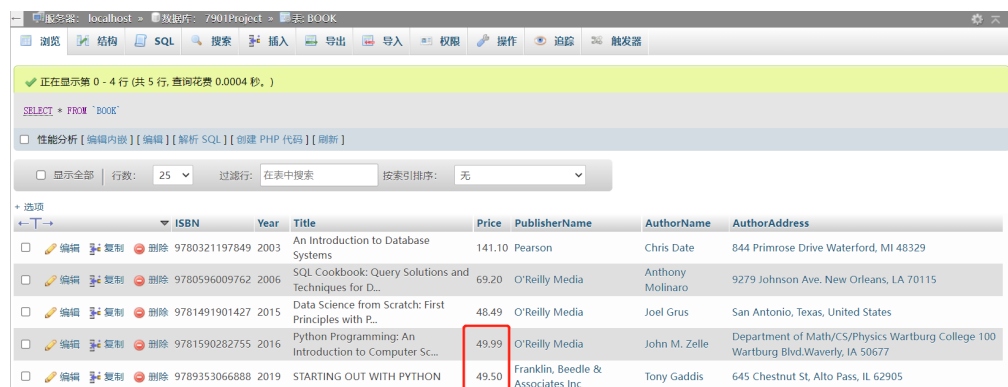
- **Result**

Before the update:

BOOK table

After the update:

Books cost less than 46.00 have been markup

Conclusion

I spent about 40 hours on this project, most of the time was spent on designing E/R diagram and completing SQL Dump, other parts like schema, functional dependencies, normalized schema spent no more than 3 hours each, and the remaining sporadic time was spent on completing the report.

My favorite part was designing the E/R diagram, I think it was a very meaningful process to do to get my ideas off the ground step by step, although the process of using "draw.io" to draw the diagram was a bit torturous, but these hours also helped me to get familiar with it, and I believe this will help me in the future. My least favorite part is SQL Dump, because it's relatively a repetitive process that can be tedious but can't be wrong, and it's a necessary step for us to do meaningful query, good thing is that Phpmyadmin is quite convenient and powerful, which saves a lot of trouble overall.

I think the process of completing this project helped me the most is the professor's course wares, which are very detailed and most of the time I can find the knowledge points I need in them, I basically did not use the search engine like google when doing this project; in addition, the tutor also helped me a lot, when I felt confused about what to do, he opened a separate chat room to answer my questions patiently, which relieved my anxiety and also gave me a direction.

My advice to beginners is to strictly follow the steps of database design, do not create the whole database at once. It is important to solve problems as they are encountered and not to take them to the next step or they will lead to a chain reaction. I recommend the following database design steps.

- Determining the purpose of your database
- Finding and organizing the required information
- Dividing the information into tables
- Turning information items into columns
- Specifying primary keys
- Creating the table relationship
- Refining the design
- Applying the normalization rules