Final Project: Student Information Management System

Target

Develop a simple student information management system using Python as the main programming language and operating the database through SQL. The project will include CRUD functionality, data analysis and a basic user interface.

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Deadline: June 27, 2024.

technology stack

Python: Primary programming language
SQL: database query language
SQLite: lightweight database, suitable for teaching and small projects

Project requirements

Overall, if you are a IT manager in the Sichuan University, you are building a system to support these functions
(f1) student to choose course,
(f2) student accommodation related information management,
(f3) students buy books for the related course,
(f4) students to register/update his or her information

1. Database setup (30%)
    a. Create and initialize database using SQLite.
    b. Create tables containing student information, course information, course schedules, student advisor, etc. Fields include student number, name, year of enrollment, major, gender, etc. Note: You can design the data table according to your needs.
2. Data operations (50%)
    a. Implement basic CRUD operations: add new students, update student information, delete student records, query student information.
    b. Generate sample column data, then insert it into the basic data table for database testing and generate a test report.
    c. Use SQL statements for data manipulation for f1 to f4.
3. Data analysis and reporting (20%)
    a. Use Pandas or SQL to analyze data,
        i. Calculate the number of students and gender ratio for each major.
        ii. Analyze the comparison of results in different majors
        iii. Analyze the relationship between student age and test scores
        iv. Analyze the relationship between students' regional distribution and test scores
        v. Other analysis (you can use it yourself)

b. Generate and display analysis reports, either as text output or using charts (e.g. using matplotlib or seaborn)

Work requirements

1. **Submit complete project code**
2. **Submit a complete project report**
3. **Plagiarism is not allowed. Once discovered, it will be reported to the school and will be dealt with seriously.**

Bonus

1. **Build the GUI to visualize the results (5)**
2. **Build the DB test code (5)**
3. **Run the concurrent query tests (5)**

Reference Code for you to start:

Project structure:

```
student-info-system/
│
├── db/
│   └── database.sqlite # SQLite database file
│
├── modules/
│   ├── database.py # Database operation related code
│   ├── analysis.py # Data analysis related code
└── main.py # Main program entry
```

Initialize the database system

```
import sqlite3

# Connect to SQLite database
# If the database does not exist, it will be created automatically
conn = sqlite3.connect('student_info_system.db')

#Create a cursor object
cursor = conn.cursor()

# Create Students table
cursor.execute('''
CREATE TABLE IF NOT EXISTS Students (
    StudentID INT PRIMARY KEY,
    Name TEXT,
    EnrollmentYear INT,
    Major TEXT,
```

```
    Gender TEXT
)
''')

# Create Grades table

# others tables based on your requirements

# Submit transaction
conn.commit()

# Close the connection
conn.close()

print("Database created and tables initialized.")
```

To run this script, you can save the above code into a .py file, say called init_db.py. Then run this file from the command line:

Execute script

```
python init_db.py
```

Start other development and show off their talents

Setting up the Python environment: you can refer to

1. https://sspai.com/post/68097
2. Various tutorials on the Internet can also be developed in the Google colab environment, eliminating the painful process of setting up an environment. Google colab: https://colab.research.google.com/