Comprehensive Python course for AI

Final Project

Deadline: 2024 10 March

Score: 2000 + 800

2024 22 February

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- **Develop an OOP-based backend system for managing school operations, focusing on entities such as students, teachers, classes, and courses. Your system will handle data operations like adding, removing, editing, and searching records, alongside generating insightful reports.**

  - ✓ **Part 1: Object-Oriented Database Design**
  - ✓ **Part 2: CRUD Operations with OOP**
  - ✓ **Part 3: Visualization and Reporting**
  - ✓ **Part 4: System Logging**

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❖ Part1: Object-Oriented Database Design

- ✓ **Entities:** **Define classes in Python that represent your database schema, including Student, Teacher, Class, and Course. (Mysql)**
- ✓ **Relationships:** **Use OOP principles to model relationships between entities. For example, a Course object might contain references to Teacher and Student objects.**
- ✓ **Attributes:** **Each class should have attributes that reflect the database columns (e.g., Student might have student_id, name, email, class_id).**

❖ Tip

- ✓ **Database Connection:** **Utilize a single class for managing database connections, ensuring that your system maintains a solid connection throughout its operations.**

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❖ Part 2: CRUD Operations with OOP

- ✓ **Adding Records**
  Objective: Implement methods in each class for adding new records to the database, encapsulating the SQL insert commands within these methods.(The user can enter data through input or upload a csv file.)
- ✓ **Removing Records**
  Objective: Provide functionality for safely removing records, ensuring that related data is not adversely affected.
- ✓ **Editing Records**
  Objective: Allow users to edit existing records through object methods, which update the corresponding database entries.
- ✓ **Searching and Displaying Records**
  Objective: Facilitate search operations across entities with methods that execute SQL queries and return results in a user-friendly format.
- ✓ **Advanced Search Capabilities**
  Objective: Develop advanced search functionalities that allow users to query the database based on multiple criteria.

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❖ Part 3: Visualization and Reporting

- ✓ **Objective: Craft essential reports and visualizations that offer insights into the school's performance, using pandas for data manipulation and matplotlib for visualization.**

- ✓ **Visualization Highlights**
- ✓ **Grade Distribution Report: Implement a method generate_grade_distribution_report() that uses pandas to aggregate grades and matplotlib to create histograms or pie charts displaying grade frequencies for each course.**
- ✓ **Enrollment Trends: In display_enrollment_trends(), use pandas to analyze enrollment data over time and matplotlib to plot line graphs, illustrating how course enrollments evolve across different academic periods.**
- ✓ **Teacher Workload Analysis: With analyze_teacher_workload(), utilize pandas to calculate the number of courses and total students per teacher. Employ matplotlib bar charts to visualize and compare the workload among teachers.**
- ✓ **Student Performance Overview: Through summarize_student_performance(), leverage pandas for compiling a student's grades across courses and matplotlib for line graphs or scatter plots, offering a visual summary of individual academic progress.**

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❖ Part 4: System Logging

- ✓ **Logging System Activities**

  Design a Logger class dedicated to logging system activities, which can be instantiated and used across your system.

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800

❖ Additional Points for Higher Scores:

- ✓ **Team Collaboration:** **Form teams of up to 3 members. Collaborate to divide tasks, integrate parts, and peer review code for quality and functionality.**
- ✓ **Version Control with GitHub:** **Use GitHub for version control. Each team should maintain a repository for their project, demonstrating regular commits, proper documentation, and usage of branches for feature development.**
- ✓ **Report:** **Creating a reporting part where the user can get a report in the form of a csv file.**
- ✓ **Innovative Feature Addition:** **Add a useful new feature to the project that improves the system and makes it more enjoyable or efficient for users.**
- ✓ **MongoDb:** **After writing the project with mysql, change it and use mongodb.**

Thanks

Good Luck!

Don't give up on your dreams ☺