Project: Student Performance Analyzer System

Objective

Build a structured student performance analysis system that demonstrates:

- Object-Oriented Programming
- Modular project structure
- File handling (CSV or JSON)
- Clean architecture and separation of concerns

Required Project Structure

```
student_system/
├── main.py
├── models.py
├── analytics.py
├── utils.py
└── data.csv
```

Implementation Requirements

models.py (OOP Layer)

Create a Student class:

- Name
- Student_id
- grades (list)
- Method to calculate average
- Method to determine grade category
- Proper encapsulation (private attributes where appropriate)

Create a Classroom class:

- List of students
- Add student (method)

- Remove student (method)
- Search student (method)
- Calculate classroom average (method)

analytics.py (Analysis Layer)

Functions for:

- Top-performing student
- Lowest-performing student
- Ranking students
- Grade distribution

utils.py (Utility Layer)

- Load students from CSV
- Save students to file
- Input validation
- Helper functions

main.py (Application Layer)

- Interactive CLI menu
- Uses all modules
- Proper error handling
- Clean user interaction

Mandatory Technical Requirements

- Use @classmethod
- Use @staticmethod
- Apply encapsulation
- Use try/except
- Validate user input
- Organize code professionally