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import numpy as np
import matplotlib.pyplot as plt
class Student:
    def init (self, name, roll number, grades):
        self.name = name
       self.roll_number = roll_number
       self.grades = grades
    def average_grade(self):
       return np.mean(self.grades)
    def grade summary(self):
        return f"Name: {self.name}, Roll No: {self.roll_number}, Grades: {self.grades}, Average: {self.average_grade():.2f}"
class GradeSystem:
   def __init__(self):
        self.students = []
    def add_student(self, name, roll_number, grades):
        student = Student(name, roll_number, np.array(grades))
        self.students.append(student)
       print(f"Student {name} added successfully.")
    def view_students(self):
       if not self.students:
           print("No student data available.")
            return
       print("\nStudent Data:")
        for student in self.students:
            print(student.grade_summary())
    def highest_scorer(self):
        if not self.students:
           print("No student data available.")
            return
        top student = max(self.students, key=lambda s: s.average grade())
        print(f"\\nTop\ Scorer:\ \{top\_student.name\}\ with\ Average\ Grade:\ \{top\_student.average\_grade():.2f\}")
    def visualize_grades(self):
        if not self.students:
           print("No student data available.")
       names = [student.name for student in self.students]
       averages = [student.average_grade() for student in self.students]
       plt.figure(figsize=(10, 6))
       plt.bar(names, averages, color='skyblue')
       plt.title("Student Average Grades", fontsize=16)
       plt.xlabel("Student Name", fontsize=12)
       plt.ylabel("Average Grade", fontsize=12)
       plt.xticks(rotation=45)
       plt.tight_layout()
       plt.show()
    def save_data(self, filename):
       data = []
        for student in self.students:
            data.append([student.name, student.roll_number] + student.grades.tolist())
        np.savetxt(filename, data, fmt='%s', delimiter=',')
       print(f"Data saved to {filename}")
    def load_data(self, filename):
            data = np.loadtxt(filename, dtype=str, delimiter=',')
            self.students = []
            for row in data:
                name = row[0]
                roll_number = row[1]
                grades = list(map(float, row[2:]))
                self.add_student(name, roll_number, grades)
            print(f"Data loaded from {filename}")
        except OSError:
            print("No saved data found.")
def main():
    svstem = GradeSvstem()
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while True:
       print("\nMenu:")
       print("1. Add Student")
       print("2. View Students")
       print("3. Display Highest Scorer")
       print("4. Visualize Grades")
       print("5. Save Data")
       print("6. Load Data")
       print("7. Exit")
       choice = input("Enter your choice: ")
        if choice == "1":
           name = input("Enter student name: ")
           roll_number = input("Enter roll number: ")
           grades = list(map(float, input("Enter grades separated by space: ").split()))
           system.add_student(name, roll_number, grades)
        elif choice == "2":
           system.view_students()
        elif choice == "3":
           system.highest_scorer()
        elif choice == "4":
           system.visualize_grades()
        elif choice == "5":
           filename = input("Enter filename to save data (e.g., grades.csv): ")
           system.save_data(filename)
        elif choice == "6":
           filename = input("Enter filename to load data (e.g., grades.csv): ")
           system.load_data(filename)
        elif choice == "7":
           print("Exiting the program. Goodbye!")
        else:
           print("Invalid choice! Please try again.")
if __name__ == "__main__":
   main()
```