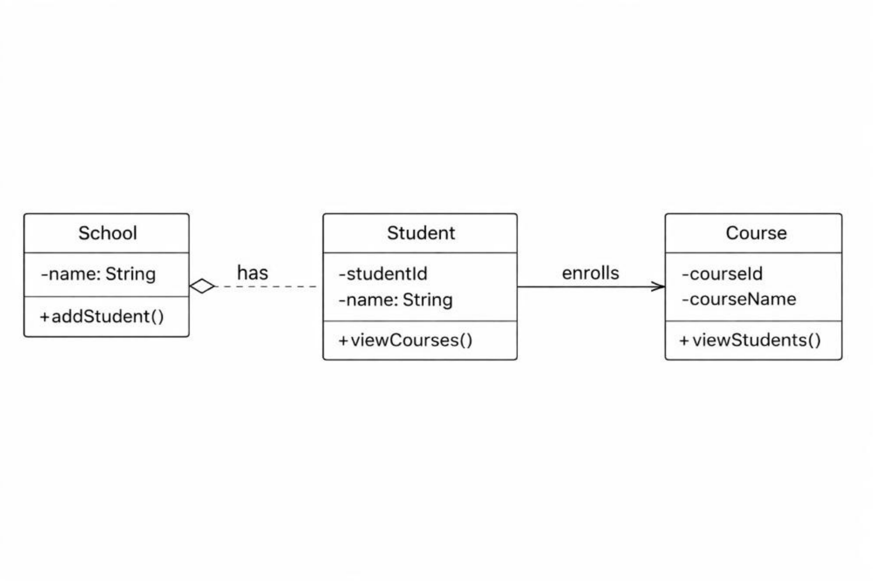
Problem 1: School and Students with Courses (Association and Aggregation)

- **Description**: Model a School with multiple Student objects, where each student can enroll in multiple courses, and each course can have multiple students.
- **Tasks**:
  - Define School, Student, and Course classes.
  - Model an association between Student and Course to show that students can enroll in multiple courses.
  - Model an aggregation relationship between School and Student.
  - Demonstrate how a student can view the courses they are enrolled in and how a course can show its enrolled students.
- **Goal**: Practice association by modeling many-to-many relationships between students and courses.

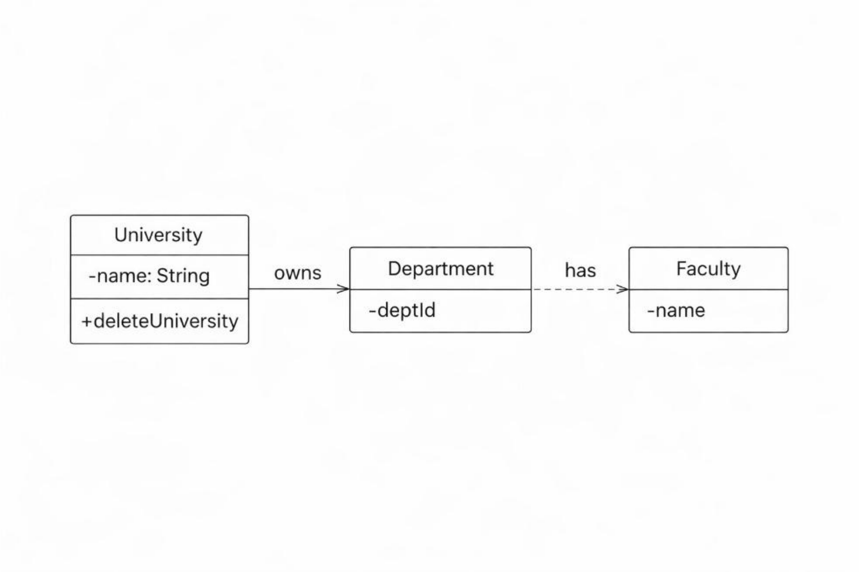
Class Diagram:



Problem 2: University with Faculties and Departments (Composition and Aggregation)

- **Description**: Create a University with multiple Faculty members and Department objects. Model it so that the University and its Departments are in a composition relationship (deleting a university deletes all departments), and the Faculty members are in an aggregation relationship (faculty can exist outside of any specific department).
- **Tasks**:
    - Define a University class with Department and Faculty classes.
    - Demonstrate how deleting a University also deletes its Departments.
    - Show that Faculty members can exist independently of a Department.
- **Goal**: Understand the differences between composition and aggregation in modeling complex hierarchical relationships.

Class Diagram:

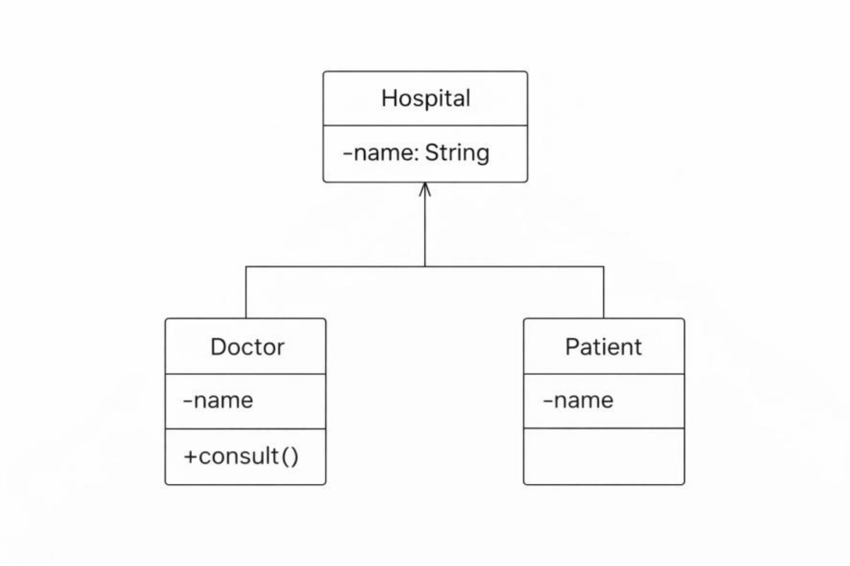


Problem 3: Hospital, Doctors, and Patients (Association and Communication)

- **Description**: Model a Hospital where Doctor and Patient objects interact through consultations. A doctor can see multiple patients, and each patient can consult multiple doctors.
- **Tasks**:
    - Define a Hospital class containing Doctor and Patient classes.
    - Create a method consult() in the Doctor class to show communication, which would display the consultation between a doctor and a patient.
    - Model an association between doctors and patients to show that doctors and patients can have multiple relationships.

- **Goal**: Practice creating an association with communication between objects by modeling doctor-patient consultations.

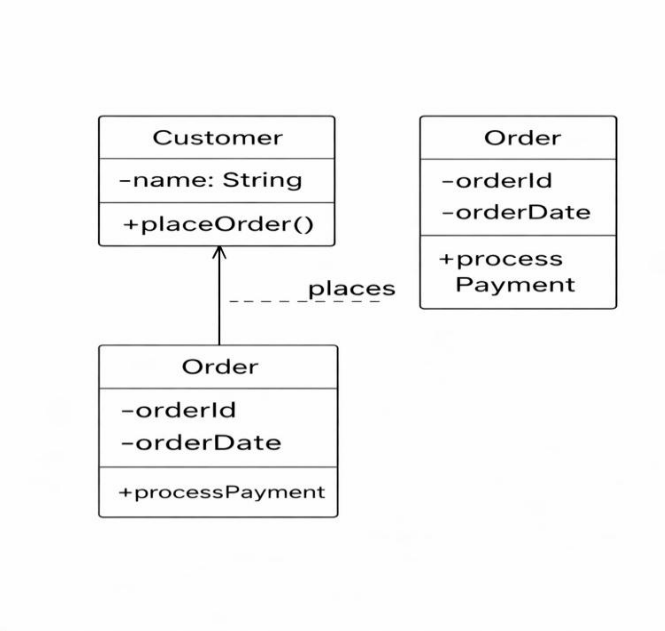
  Class diagram:



Problem 4: E-commerce Platform with Orders, Customers, and Products

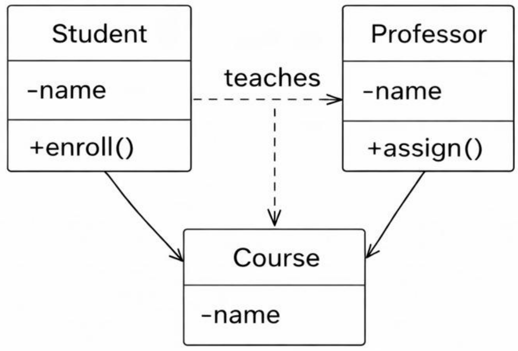
- **Description**: Design an e-commerce platform with Order, Customer, and Product classes. Model relationships where a Customer places an Order, and each Order contains multiple Product objects.
- **Goal**: Show communication and object relationships by designing a system where customers communicate through orders, and orders aggregate products.

  Class Diagram:



Problem 5: University Management System

- **Description**: Model a university system with Student, Professor, and Course classes. Students enroll in courses, and professors teach courses. Ensure students and professors can communicate through methods like enrollCourse() and assignProfessor().
- **Goal**: Use association and aggregation to create a university system that emphasizes relationships and interactions among students, professors, and courses.


Student
-name
+enroll()
teaches
Professor
-name
+assign()
Course
-name