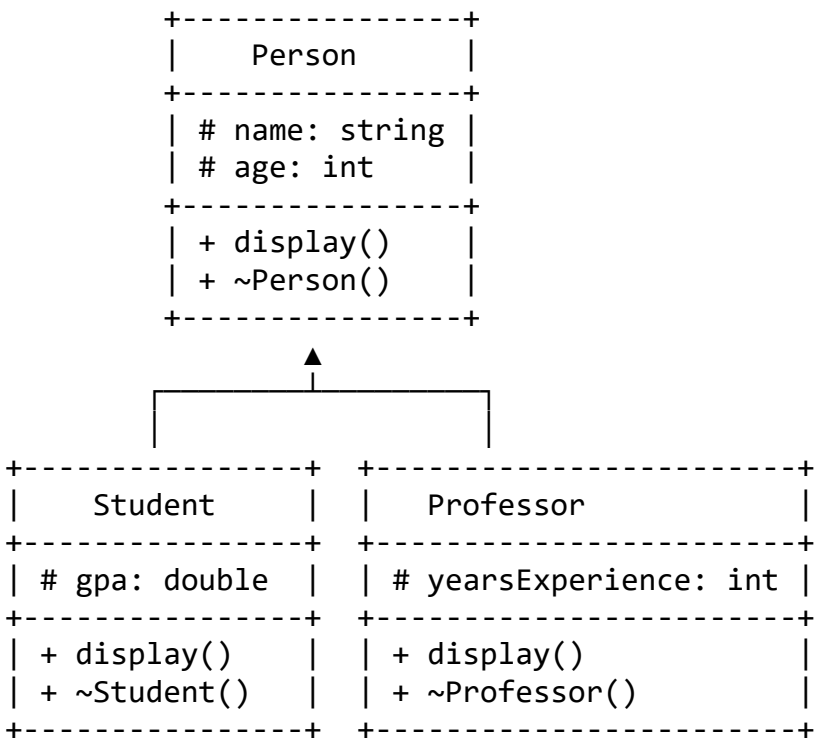
C15-LAB Title: Exploring Inheritance in C++

Implement the following hierarchy. We are interested in quick prototyping. Apply the Lazy-Classes approach (instead of P.O.C.O. design)



Part 1: Create a Base Class (Person)

The attributes name and age must be declared **protected.**

Part 2: Create Derived Classes (Student and Professor)

Students will create two classes that inherit from Person:

1. **Student Class:**
    - Additional attribute: gpa (double)
    - Overrides display() to show gpa
2. **Professor Class:**
    - Additional attribute: yearExperience (int)
    - Overrides display() to show salary

Part 3: Use Polymorphism

- Make display() a **virtual function** in Person to enable **runtime polymorphism**

This is your main function

```
//------------------------------------------------------------
int main() {
    Person* p1 = new Student("Bart Simpson", 10, 2.13);
    Person* p2 = new Professor("Edna Krabappel", 45, 28);

    p1->display(); // Calls Student's display()
    p2->display(); // Calls Professor's display()

    delete p1;
    delete p2;

    return 0;
}
```

Part 4: Experimenting with the Code

Additional Tasks for Students:

1. **Add a destructor** to Student and Professor to observe how destructors work in an inheritance hierarchy.
2. **Make a vector of Person*** and store both Student and Professor objects. Iterate through and call display() on each.
3. **Introduce an Employee class** (inherits Person) with an employeeID and experiment with **dynamic_cast**.

Part 5: Experiment with Composition

- Create a Department class holding a name and office number. It should also include a display method.
- Each department has zero or many professors.
- Create an instance named "General Studies", add the professors to the department.
- Display the department.

Areas of Interest.

- Observe how **constructors and destructors** behave in an inheritance chain.
- Use **virtual functions** for polymorphism.

Elizabeth Hoover, B.Ed.
(Lisa's Teacher)

Edna Krabapple

Principal Skinner

Coach Krup

Lunchlady Doris

Bus driver – Otto Mann

Groundskeeper Willie