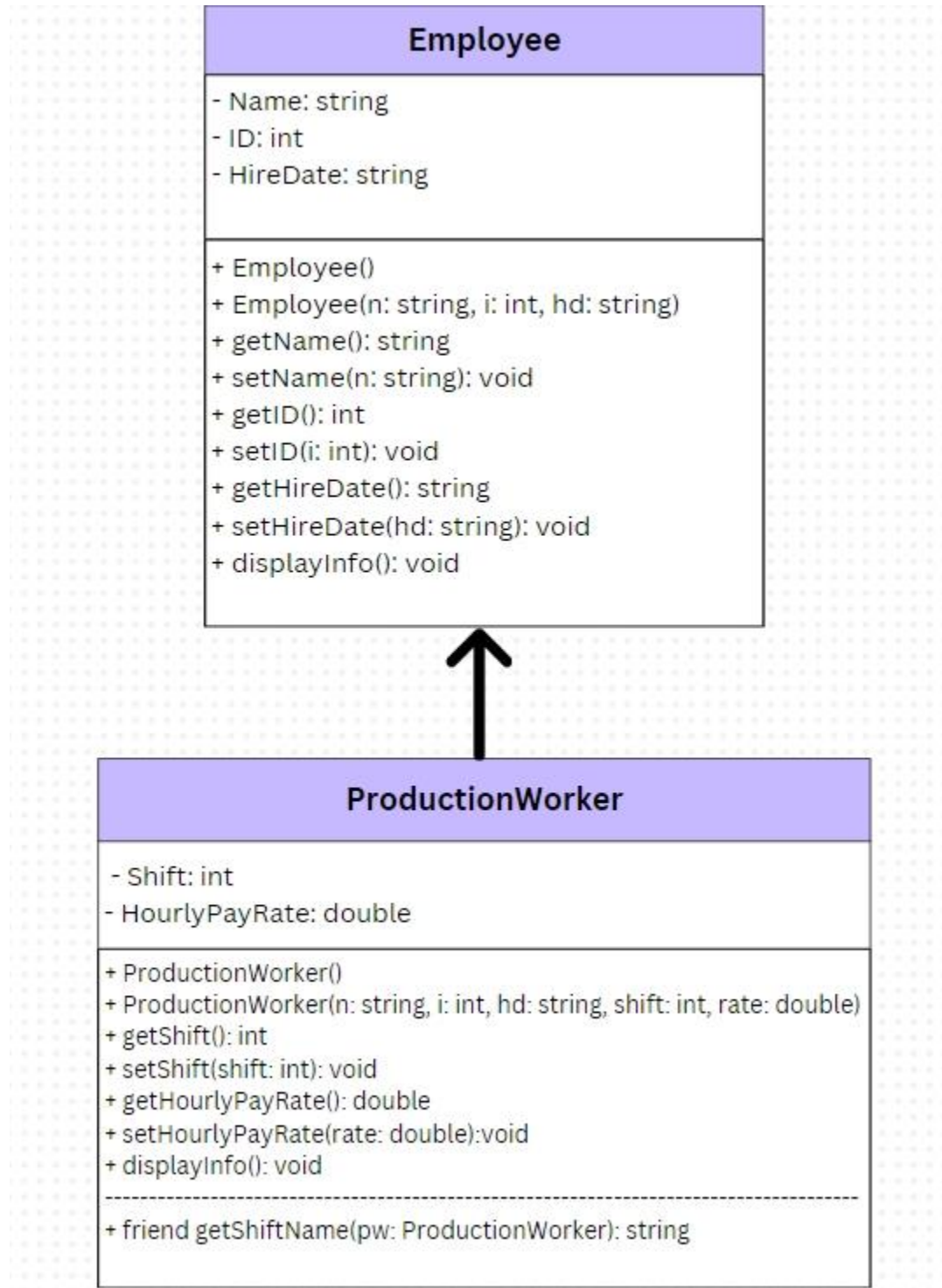# Object Oriented Programming Lab#7

Topics covered in this lab:

1. Public, protected, private access specifiers
2. Inheritance
3. Functions overriding/ re-definition

Section A

1. Explain the difference between overloading a function and re-defining a function.
2. What is the difference between private members and protected members?
3. What is the difference between member access specification and class access specification?
4. What is a base class? What is a derived class?
5. What are friend functions and where are they implemented?
6. Which is called first, the base class constructor or the derived class constructor?
7. Which is called first, the base class destructor or the derived class destructor?
8. When the inheritance is private, the private methods in base class are _____ in the derived class (in C++).

    a. Inaccessible
    b. Accessible
    c. Protected
    d. Public

9. Can we pass parameters to base class constructor though derived class or derived class constructor? (YES or NO)
10. C++ Inheritance relationship is?

    a. Association
    b. Has a
    c. Is a
    d. None of the above

Section B - Problem 1:

```
                        Employee

         - Name: string
         - ID: int
         - HireDate: string

         + Employee()
         + Employee(n: string, i: int, hd: string)
         + getName(): string
         + setName(n: string): void
         + getID(): int
         + setID(i: int): void
         + getHireDate(): string
         + setHireDate(hd: string): void
         + displayInfo(): void
```

```
                     ProductionWorker

          - Shift: int
          - HourlyPayRate: double

          + ProductionWorker()
          + ProductionWorker(n: string, i: int, hd: string, shift: int, rate: double)
          + getShift(): int
          + setShift(shift: int): void
          + getHourlyPayRate(): double
          + setHourlyPayRate(rate: double):void
          + displayInfo(): void
          ------------------------------------------------------------------------
          + friend getShiftName(pw: ProductionWorker): string
```
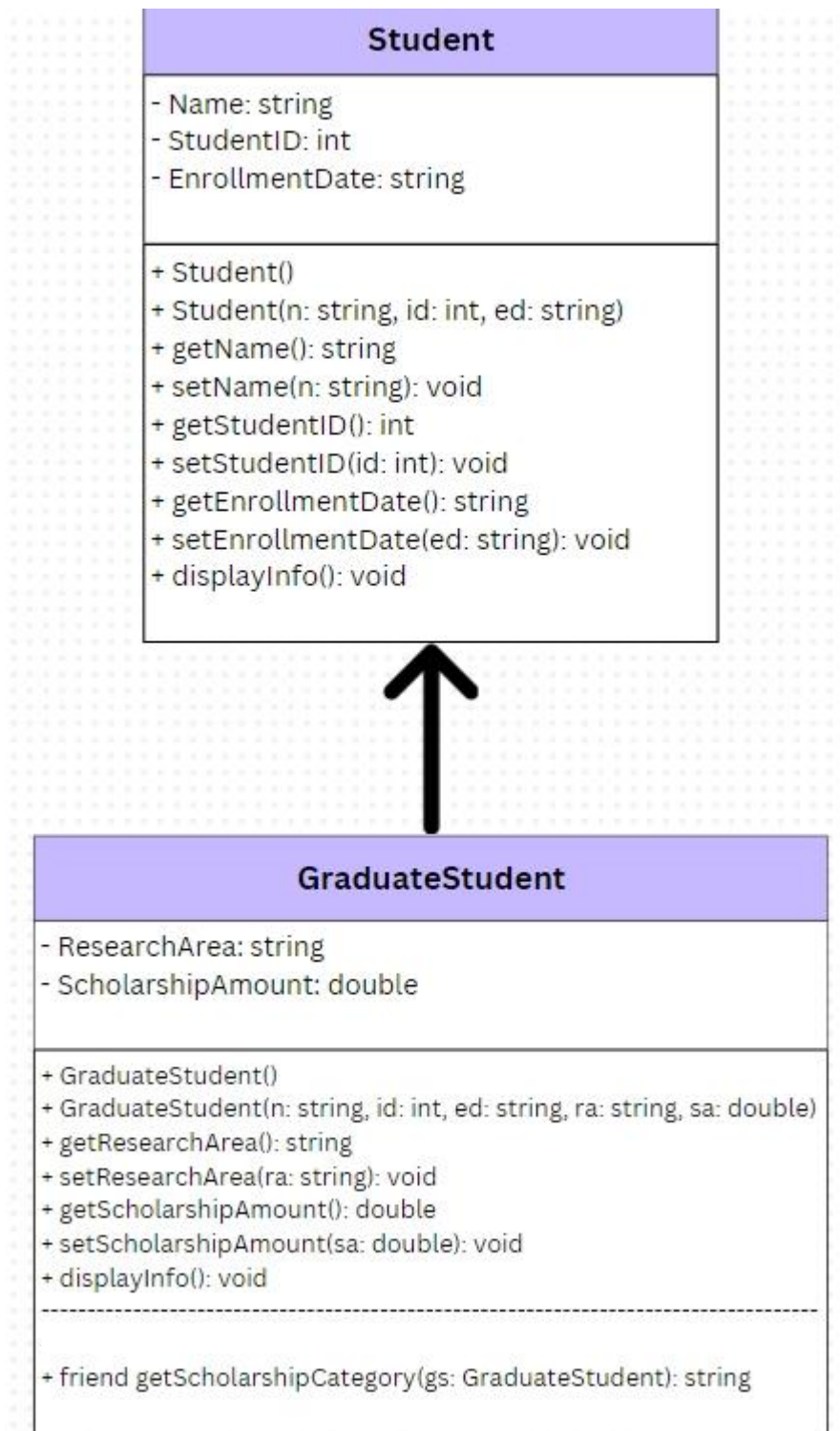
Demonstrate the classes as follows:

1. Create a ProductionWorker object named pw that has the following information, (name = "Youssef", id = 89657, hire date = "5/6/2020", shift = 2, hourly pay rate = 18.5).

2. Call the function displayInfo() for the object (pw) created in step 1.

3. Create an Employee object named emp1 that has the following information, (name = "Yassin", id = 97568, hire date = "8/9/2021").

```
Microsoft Visual Studio Debug Console
Shift number: 2
Pay rate: 18.5

The shift name is: Night

Name: Yassin
Employee number: 97568
Hire date: 8/9/2021
```

Expected Sample Run

Section B - Problem 2:

Student

- Name: string
- StudentID: int
- EnrollmentDate: string

+ Student()
+ Student(n: string, id: int, ed: string)
+ getName(): string
+ setName(n: string): void
+ getStudentID(): int
+ setStudentID(id: int): void
+ getEnrollmentDate(): string
+ setEnrollmentDate(ed: string): void
+ displayInfo(): void

GraduateStudent

- ResearchArea: string
- ScholarshipAmount: double

+ GraduateStudent()
+ GraduateStudent(n: string, id: int, ed: string, ra: string, sa: double)
+ getResearchArea(): string
+ setResearchArea(ra: string): void
+ getScholarshipAmount(): double
+ setScholarshipAmount(sa: double): void
+ displayInfo(): void

+ friend getScholarshipCategory(gs: GraduateStudent): string

Demonstrate the Classes as Follows:

1. **Create a GraduateStudent Object:**
   o Name: "Alice"
   o StudentID: 12345
   o EnrollmentDate: "09/01/2022"
   o ResearchArea: "Artificial Intelligence"
   o ScholarshipAmount: $25,000
2. **Call the `displayInfo()` Function for the `GraduateStudent` Object (`gs`) Created in Step 1**
3. **Create a `student` Object Named `st1` with the Following Information:**

Name: "`Bob`", StudentID: `67890`, EnrollmentDate: "`09/01/2023`"