CSCI-201: Principles of Software Development

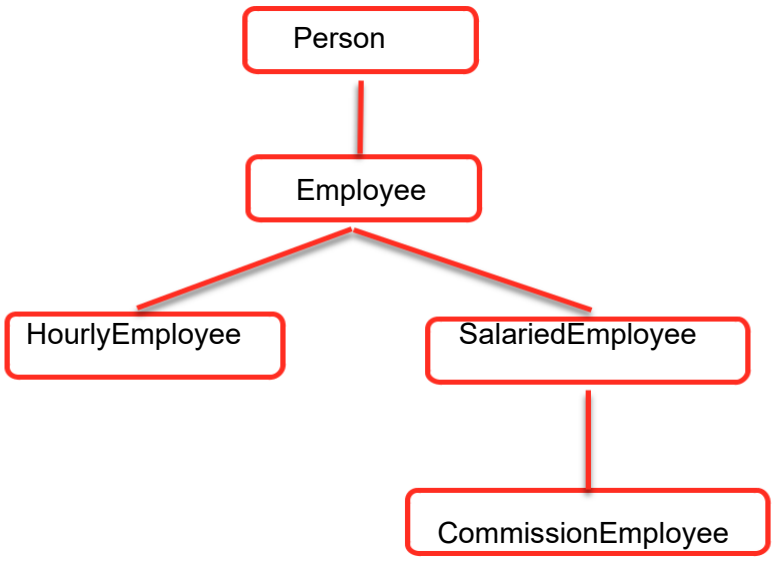
Spring 2022

Lab01: Inheritance

Introduction:

Inheritance is an important part of Object-Oriented languages. It is the mechanism in Java by which one class is allowed to inherit the fields and methods of another class. The idea behind inheritance in Java is that you can create new classes that are built upon existing classes. When you inherit from an existing class, you can reuse methods and fields of the parent class. Moreover, you can also add new methods and fields in your current class.

For this lab, you will have to implement the inheritance hierarchy below.



To start, you will need to create the Person class, which serves as the parent for all other classes. This class needs to have the following data: firstName, lastName, birthdate.

The Employee class inherits from the Person class and is the parent for all the classes below it. This class needs to have the following data: employeeID, jobTitle, company.

To make use of polymorphism, add the following method into the Employee class.

```
public abstract double getAnnualSalary();
```

Please note that the abstract method needs to be implemented in all children classes. Both HourlyEmployee and SalariedEmployee inherit from Employee, and CommissionEmployee inherits from SalariedEmployee.
Below is the data that needs to be in each class. Other data can be included, but at least the following data should be included.

HourlyEmployee	SalariedEmployee	CommissionEmployee
hourlyRate	annualSalary	salesTotal
numberHoursPerWeek		commissionPercentage

You will also need to create other methods (such as getters and constructors) in the above classes as needed to make the Lab1.java file works with your code. Note that you are ***not*** allowed to make ***any c***hanges to the Lab1.java file.

Use 52 weeks in a year to compute salary where needed.

Testing:

Here is the output of your program when run with the Lab1.java file. There is no user input in this program. Your output should not be hard-coded, but instead utilize inheritance and polymorphism.

```
Employee Information
--------------------
Name: Bill Gates
Birthdate: October 28, 1955
Title and Company: Co-founder at Microsoft
ID: 1
Annual Salary: $1.15E10

Employee Information
--------------------
Name: Paul Allen
Birthdate: January 21, 1953
Title and Company: Co-founder at Microsoft
ID: 2
Annual Salary: $1.0E9
Employee Information
--------------------
```

Name: Sammy Salesman
Birthdate: January 1, 1970
Title and Company: Salesman at Sales Company
ID: 3
Annual Salary: $400000.0

Employee Information

Name: Harley Hourly
Birthdate: December 31, 1971
Title and Company: Hourly Employee at Hours R Us
ID: 4
Annual Salary: $41600.0

Grading Criteria:

1) Complete the lab following the instructions above

2) Show your understanding of the lab material by answering questions upon the following check-offs.

Check-off Questions:

Instructors, please randomly select two questions:

1. What happens if we don't implement the abstract method in child classes?
2. Why do we need to implement the abstract method in all 3 child classes?
3. What happens if the CommissionEmployee class doesn't implement the abstract method?
4. What is the return type of a constructor?
5. What is the main purpose of a constructor?
6. Why do we need to specify the abstract method in the Employee class?
7. What happens if we don't declare the abstract method in the Employee class?
8. Why don't we declare the abstract method in the Person class?
9. What is the relationship between HourlyEmployee and SalariedEmployee?
10. What is the relationship between HourlyEmployee and CommissionEmployee?