**Programming: Inheritance, Polymorphism and Payroll Extensibility Assignment Instructions**

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**Exercise 9.5 JHTP:**

Student

Graduate Student

Undergraduate Student

Senior

Freshman

Masters

Junior

Sophomore

Doctoral

Research

Professional

* **Student** is the parent class for both **Undergraduate Student** and **Graduate Student**.
* **Undergraduate Student** has subclasses: **Freshman**, **Sophomore**, **Junior**, and **Senior**.
* **Graduate Student** has subclasses: **Masters Student** and **Doctoral Student**, which further divides into **Research Doctorate** and **Professional Doctorate**.

**Exercise 10.6:** How does polymorphism promote extensibility?

* Polymorphism is a fundamental concept in object-oriented programming (OOP) that significantly enhances the flexibility and extensibility of software. It allows objects from different classes to be treated as instances of a common superclass, meaning that functions can work with various objects without needing to know their specific types. This makes it much easier to add new subclasses without having to change existing code. Additionally, polymorphism encourages code reuse by enabling developers to create general algorithms that can handle different types of objects, reducing the need to duplicate code. It also helps keep different parts of a system independent, so if changes are made in one area—like introducing a new subclass—it won’t disrupt other areas of the code. Ultimately, polymorphism leads to a more adaptable and maintainable system, allowing new features to be added seamlessly while minimizing errors and simplifying testing.

**Exercise 10.12:** Payroll Modification Modify the payroll system of Figs 10.4 –10.9 to include private instance variable birthdate in class Employee. Use class Date of Fig 8.7 to represent an employee’s birthday. Add get methods to class Date. Assume that payroll is processed once per month. Create an array of Employee variables to store references to the various employee objects. In a loop, calculate the payroll for each Employee (polymorphic ally), and add a $100.00 bonus to the persons payroll amount if the current month is the one in which the Employee’s birthdate occurs.

A screenshot of a computer

Description automatically generated

1. I have not shared the source code in my program with anyone other than my instructor’s approved human sources.
2. I have not used source code obtained from another student, or any other unauthorized source, either modified or unmodified.
3. If any source code or documentation used in my program was obtained from another source, such as a textbook or course notes, that has been clearly noted with a proper citation in the comments of my program.
4. I have not knowingly designed this program in such a way as to defeat or interfere with the normal operation of any machine it is graded on or to produce apparently correct results when in fact it does not.