Object-Oriented Programming: Homework #5

Time

- Assigned on 5/8/2023 (Monday); Due at 09:00 on 5/22/2023 (Monday)

Submission

- Source Code Submit on iLearning.
- Your program code for this homework should be submitted as a single .java file named HW5_{Student ID}.java (**DO NOT** submit the entire Eclipse project, only the source files).
- In addition, please delete the package before uploading the file.

Objectives

- Familiarity with inheritance and polymorphism in Java.
- Practice to create and use abstract classes and methods.

Program Descriptions

- Please create a program that manages a list of employees in a company. Each employee has a name, an ID number, a salary, and a job title. There are three types of employees: Managers, Engineers, and Salespeople. Managers have a bonus percentage that is added to their salary, Engineers have a number of projects they are responsible for, and Salespeople have a sales amount.

Program Specifications

- Create an abstract class called `Employee` that contains the following instance variables and methods:
  - Attributes
    - `String name`
    - `int id`
    - `double salary`
    - `String jobTitle`

  - Methods
    - `String getName()`
      - ✓ Return the value of `name`.
    - `int getId()`
      - ✓ Return the value of `id`.
    - `double getSalary()`
      - ✓ Return the value of `salary`.

- void setSalary(int number)
  - ✓ Set the salary as number.
- String getJobTitle()
  - ✓ Return the value of jobTitle.
- abstract void display()
  - ✓ Display the employee's information according to their jobtitle.
- Create three concrete classes that extend the Employee class: Manager, Engineer, and Salesperson. Each class should have unique instance variables and methods as follows:
  - o Manager:
    - double bonusPercentage
      - ✓ bonusPercentage represents the additional bonus as bonusPercentage times the salary.
    - void setBonusPercentage(double bonusPercentage)
      - ✓ Set bonusPercentage. Note that the salary should be increased based on the additional bonus.
    - double getBonusPercentage()
      - ✓ Return the value of BonusPercentage.
  - o Engineer:
    - int numProjects
      - ✓ When in charge of a project, the salary increases by 1000.
    - void setNumProjects(int numProjects)
      - ✓ Set numProjects. Note that the salary should be increased based on the number of projects.
    - int getNumProjects()
      - ✓ Return the value of NumProjects.
  - o Salesperson:
    - double salesAmount
      - ✓ Increase the salary by 1% of the total sales amount.
    - void setSalesAmount (double salesAmount)
      - ✓ Set salesAmount. Note that the salary should be increased based on the sales amount.
    - double getSalesAmount ()
      - ✓ Return the value of salesAmount.
- Create a void method called display(). Each class should display the employee's information.

- Note that when creating the constructor, the salary should be increased based on each employee's job.

- Create a main class called **HW5_{Student ID}** that creates an Array of Employee objects. Add at least one Manager, Engineer, and Salesperson object to the list.

Example Program Run

- Use polymorphism to display the information for each employee in the list using the `display()` method.
- Please limit the decimal place to the **first digit** when printing the `salary`.

output example
Employee List: **Name: John Smith** **ID: 1234** **Salary: $55000.0** **Job Title: Manager** **Bonus Percentage: 0.1** **Name: Jane Doe** **ID: 5678** **Salary: $63000.0** **Job Title: Engineer** **Number of Projects: 3** **Name: Bob Johnson** **ID: 9012** **Salary: $41000.0** **Job Title: Salesperson** **Sales Amount: $100000.0**