Assignment 5: Inheritance

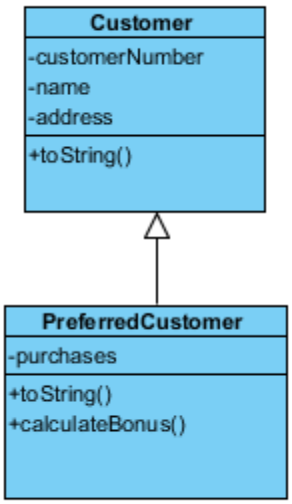
Exercise 5.1

Use the class Prism of Exercises 2 as a base class and derive a new class, which represents a solid prism, which is made of a specific material. It has a variable for the density of the material. It has also a method to calculate the mass of the solid prism (volume*density).

Write a short main method that instantiates a solid prism object, assigns values to its variables and prints out its volume and mass.

Exercise 5.2

Write a class that describes the characteristics of a customer: customer has a customer number, name, and address. You can declare the variables using private access modifier. Use inheritance to implement a class for a preferred customer, which gets some bonus depending on how much he/she has bought and declare a variable for the value of purchases.



Write constructors, getters, setters, and toString method. In the preferred customer class, write also a method to calculate the bonus: if the purchases are between 500 and 1000, the bonus is 2 % of the value of the purchases, and if the purchases are over 1000, the bonus is 5 %.

Write a main method that has one ArrayList for all customers. Create some customer objects and preferred customer objects, and add those into the ArrayList collection. Loop through the ArrayList collection and print the data of all the customers. Also loop again through the ArrayList collection and print out the data and bonus of the preferred customers.

Exercise 5.3

Write a class that describes the common characteristics of a room in a school building. A room has a number (e.g. A2056) and a description (e.g. storage room). Write a method that asks the values of the room number and description from the user. Write also the toString method, which returns the room's data as a string (e.g. A2056: storage room). Write a getter for the room number.

Use inheritance and derive a new class, which describes the characteristics of a room that is used as an office. It has a String variable (or array or ArrayList) to store the names of the staff members working in that room. Write a method that asks the data from the user (first it calls the method with the same name from the super class and after that asks the names of the staff members). Write also the toString method (e.g. A2050: room for teachers, staff members Smith, Jones, Brown).

Use the room class as a base class and inherit another class from it. This class describes the characteristics of a classroom. It has variables for the number of seats, number of computers, and if there is a data

projector. Write a method that asks the data from the user and toString method (e.g. C1146: auditorium, seats 140, computers 1, data projector).

Write a program that stores all the different room objects in **one** ArrayList collection (or HashMap collection). The program has a menu:

1. Insert an office

2. Insert a classroom

3. Insert another room (not office, not classroom)

4. Print out all rooms

5. Print out offices

6. Print out classrooms

7. Print out other rooms (not office, not classroom)

8. Search a room

9. Search a staff member

In the choice 8, program asks the room number from the user and prints out that room.

For the choice 9, write a method in the office room class which gets the name of a staff member as a parameter and it returns a boolean value if the staff member works in this office. The program asks the name of the staff member from the user and prints out the data of the office.