**Hong Kong Institute of Vocational Education**

**IT114105 HD in Software Engineering**

**IT124106 HD in Computer Systems Administration**

**ITP3914 Programming**

**Topic: 4.1 to 4.4 Part (a) Objects and Classes**

# **Lab 11 – Objects and Classes**

Exercise 1

(a) Create a class **Employee** that has

Variables:

|  |  |
| --- | --- |
| Variable name | Data type |
| name | String |
| salary | int |

Methods:

getName(), setName(), getSalary() and setSalary()

(b) Complete the following test program that creates two **Employee** object instances named emp1 and emp2. Then perform the followings:

1. Set the name and salary of emp1 to "*Chan Tai Man*" and 12000, respectively.
2. Set the name and salary of emp2to "*Tam Ping Shing*" and 13500, respectively.
3. Print the current details of emp1 and emp2.
4. Increase the salary of "*Chan Tai Man*" by 10% and the salary of "*Tam Ping Shing*" by 5%.
5. Print the new details of emp1 and emp2.

public class TestEmployee {

public static void main(String [] args) {

Employee emp1 = new Employee();

Employee emp2 = new Employee();

int oldSalary;

// Part 1-2 here

// Part 3 below

System.out.println("Before-");

System.out.println("Employee 1: name="+emp1.getName() +

" salary=" + emp1.getSalary());

System.out.println("Employee 2: name="+emp2.getName() +

" salary=" + emp2.getSalary());

// Part 4-5 here

}

}

The output of the program is shown below.

Before-

Employee 1: name=Chan Tai Man salary=12000

Employee 2: name=Tam Ping Shing salary=13500

After-

Employee 1: name=Chan Tai Man salary=13200

Employee 2: name=Tam Ping Shing salary=14175

Exercise 2

(a) Create a class **Student** that has

Variables:

|  |  |
| --- | --- |
| Attribute name | Data type |
| name | String |
| id | int |
| score | double |

Methods:

*the getter and setter methods for each of the above attributes.*

(b) Write a test program that creates three **Student** object instances named stud1, stud2 and stud3. Then perform the followings:

1. Set the name, id and score of stud1 to "*Cheung Siu Ming*", 310567 and 87.1.
2. Set the name, id and score of stud2 to "*Ng Wai Man*", 451267 and 77.5.
3. Set the name, id and score of stud3 to "*Wong Sui Kai*", 789014 and 83.4.
4. Print the details of stud1, stud2 and stud3.
5. Find and print the average score among the three students.

The output of the program is shown below.

Student 1: name=Cheung Siu Ming id=310567 score=87.1

Student 2: name=Ng Wai Man id=451267 score=77.5

Student 3: name=Wong Sui Kai id=789014 score=83.4

Average Score = 82.66666666666667

Exercise 3

Consider the following classes.

class AStudent {

private String name;

public int age;

public void setName(String inName) {

name = inName;

}

public String getName() {

return name;

}

}

public class TestStudent2 {

public static void main(String s[]) {

AStudent stud1 = new AStudent();

AStudent stud2 = new AStudent();

stud1.setName("Chan Tai Man");

stud1.age = 19;

stud2.setName("Ng Hing");

stud2.age = -23;

System.out.println("Student: name="+stud1.getName() +

", age=" + stud1.age);

System.out.println("Student: name="+stud2.getName() +

", age=" + stud2.age);

}

}

1. What is the output of the above program?

Student: name=Chan Tai Man , age=19

Student: name= Ng Hing, age=-23

(b) Identify the problem regarding the data stored in the object stud2.

The age of stud2 can’t be negative

(c) Enhance the class AStudent by enforcing data encapsulation on the attribute age. If the inputted age is invalid, print an error message and set the age to 18.

class AStudent {  
 private String name;  
 private int age;  
  
 public int getAge() {  
 return age;  
 }  
  
 public void setAge(int inAge) {  
 if (inAge < 0) {  
 System.*out*.println("Invalid Age! \nThe age will set to 18");  
 inAge = 18;  
 }  
 age = inAge;  
 }  
  
 public void setName(String inName) {  
 name = inName;  
 }  
  
 public String getName() {  
 return name;  
 }  
}

public class TestStudent2 {  
 public static void main(String s[]) {  
 AStudent stud1 = new AStudent();  
 AStudent stud2 = new AStudent();  
 stud1.setName("Chan Tai Man");  
 stud1.setAge(18);  
 stud2.setName("Ng Hing");  
 stud2.setAge(-23);  
 System.*out*.println("Student: name=" + stud1.getName() + ", age=" + stud1.getAge());  
 System.*out*.println("Student: name=" + stud2.getName() + ", age=" + stud1.getAge());  
 }  
}

**END.**