**LAB NO :02**

**Name: Noor Fatima**

**Roll No: 21sw062**

**Section: II**

**TASK NO:1**

Create a class Rectangle with attributes length and width, each of which defaults to 1. Provide member functions thatcalculate the perimeter and the area of the rectangle. Also, provide set and get functions for the length and widthattributes. The set functions should verify that length and width are each floating-point numbers larger than 0.0 and lessthan20.0.

class Rectangle {  
 float length=1,width=1;  
  
 public void setLength(float length) {  
 if (length>=0.0 && length<=20.0)  
 this.length = length;  
 }  
 public void setWidth(float width) {  
 if (width>=0.0 && width<=20.0)  
 { this.width = width;}  
 }  
 public float getLength(){  
 return this.length;  
 }  
  
 public float getWidth() {  
 return this.width;  
 }  
  
 public float area(float length, float width){  
 return length\*width;  
 }  
  
 public float perimeter(float length,float width){  
 return 2\*length\*width;  
 }  
}

class Main{  
 public static void main(String[] args) {  
  
 // Task 1  
  
 Rectangle r=new Rectangle();  
 r.setLength(5.0f);  
 r.setWidth(3.0f);  
 System.*out*.println("Length: "+r.getLength());  
 System.*out*.println("Width: "+r.getWidth());  
 float len=r.getLength();  
 float width=r.getWidth();  
 System.*out*.println("Area: "+r.area(len,width));  
 System.*out*.println("Perimeter: "+r.perimeter(len,width));  
  
 System.*out*.println();  
  
 Rectangle r1=new Rectangle();  
 r1.setLength(36.0f);  
 r1.setWidth(50.0f);  
 System.*out*.println("Length: "+r1.getLength());  
 System.*out*.println("Width: "+r1.getWidth());  
 float len1=r1.getLength();  
 float width1=r1.getWidth();  
 System.*out*.println("Area: "+r1.area(len1,width1));  
 System.*out*.println("Perimeter: "+r1.perimeter(len1,width1));}}

**OUTPUT:**

"C:\Program Files\Java\jdk-17.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.1\lib\idea\_rt.jar=49649:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.1\bin" -Dfile.encoding=UTF-8 -classpath C:\Users\hp\IdeaProjects\DSA\_ALL\_LABS\out\production\DSA\_ALL\_LABS Main  
Length: 5.0  
Width: 3.0  
Area: 15.0  
Perimeter: 30.0  
  
Length: 1.0  
Width: 1.0  
Area: 1.0  
Perimeter: 2.0

**TASK NO:2**

Create a class called Employee that includes three pieces of information as data members—a first name (type char\*), alast name (type string) and a monthly salary (type int). Your class should have a setter function that initializes the threedata members. Provide a getter function for each data member. If the monthly salary is not positive, set it to 0.Write atest program that demonstrates class Employee’s capabilities. Create two Employee objects and display each object’syearly salary. Then give each Employee a 10 percent raise and display each Employee’s yearly salary again. Identify andaddany other relatedfunctions toachievethesaidgoal.

class Employee{  
 String firstName,lastName;  
 int monthlySalary=0;  
  
 public void setDetails(String firstName,String lastName,int monthlySalary) {  
 this.firstName = firstName;  
 this.lastName=lastName;  
 if (monthlySalary>=0)  
 this.monthlySalary=monthlySalary;  
 }  
 public String getFirstName(){  
 return firstName;  
 }  
  
 public String getLastName() {  
 return lastName;  
 }  
  
 public int getMonthlySalary() {  
 return monthlySalary;  
 }  
 public int yearly(int monthlySalary){  
 return 12\*monthlySalary;  
 }  
 public int raiseAmount(){  
 int salary=yearly(monthlySalary);  
 return (10\*salary)/100;}  
  
}

class Main{  
 public static void main(String[] args) {

// TASK 2  
Employee e=new Employee();  
e.setDetails("Noor","Fatima",10000);  
 System.*out*.println("First Name: "+e.getFirstName());  
 System.*out*.println("Last Name: "+e.getLastName());  
 System.*out*.println("Monthly salary: "+e.getMonthlySalary());  
  
 System.*out*.println("Yearly salary: "+e.yearly(e.getMonthlySalary()));  
 System.*out*.println("10% raise salary: "+e.raiseAmount());  
  
 System.*out*.println();  
  
 Employee e2=new Employee();  
 e2.setDetails("Ali","Ahmed",-1200);  
 System.*out*.println("First Name: "+e2.getFirstName());  
 System.*out*.println("Last Name: "+e2.getLastName());  
 System.*out*.println("Monthly salary: "+e2.getMonthlySalary());  
  
 System.*out*.println("Yearly salary: "+e2.yearly(e2.getMonthlySalary()));  
 System.*out*.println("10% raise salary: "+e2.raiseAmount());}}

**OUTPUT:**

"C:\Program Files\Java\jdk-17.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.1\lib\idea\_rt.jar=49649:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.1\bin" -Dfile.encoding=UTF-8 -classpath C:\Users\hp\IdeaProjects\DSA\_ALL\_LABS\out\production\DSA\_ALL\_LABS Main

First Name: Noor  
 Last Name: Fatima  
 Monthly salary: 10000  
 Yearly salary: 120000  
 10% raise salary: 12000  
  
 First Name: Ali  
 Last Name: Ahmed  
 Monthly salary: 0  
 Yearly salary: 0  
 10% raise salary: 0

**TASK NO:3**

Create a class called Invoice that a hardware store might use to represent an invoice for an item sold at the store. AnInvoice should include four data members—a part number (type string), a part description (type string), a quantity of theitembeingpurchased(typeint)andapriceperitem(typefloat).Yourclassshouldhaveafunctionsthatinitializesthefourdatamembers.Provideagetfunctionforeachdatamember.Inaddition,provideamemberfunctionnamedgetInvoiceAmountthatcalculatestheinvoiceamount(i.e.,multipliesthequantitybythepriceperitem),thenreturnstheamount as a float value. If the quantity is not positive, it should be set to 0. If the price per item is not positive, it shouldbe setto0.Writeatestprogramthat demonstratesclass Invoice’scapabilities.

class Invoice{  
 String number,description;  
 int quantity=0;  
 float price=0;  
  
 public void setDetails(String number,String description,int quantity,float price){  
 this.number=number;  
 this.description=description;  
 if (quantity>0){  
 this.quantity=quantity;}  
 if (price>0){  
 this.price=price;}  
 }  
  
 public String getNumber(){  
 return number;  
 }  
 public String getDescription() {  
 return description;  
 }  
 public int getQuantity() {  
 return quantity;  
 }  
 public float getPrice() {  
 return price;  
 }  
  
 public float invoiceAmount(){  
 return quantity\*price ;  
 }  
  
}

class Main{  
 public static void main(String[] args) {  
Invoice i=new Invoice();  
i.setDetails("12-2-3","sw12jdt",4,20.5f);  
 System.*out*.println("Number: "+i.getNumber());  
 System.*out*.println("Description: "+i.getDescription());  
 System.*out*.println("Quantity: "+i.getQuantity());  
 System.*out*.println("price: "+i.getPrice());  
 System.*out*.println("Invoice Amount: "+ i.invoiceAmount());  
  
 System.*out*.println();  
  
 Invoice i2=new Invoice();  
 i2.setDetails("12-2-3","sw12jdt",-23,20.5f);  
 System.*out*.println("Number: "+i2.getNumber());  
 System.*out*.println("Description: "+i2.getDescription());  
 System.*out*.println("Quantity: "+i2.getQuantity());  
 System.*out*.println("price: "+i2.getPrice());  
 System.*out*.println("Invoice Amount: "+ i2.invoiceAmount());}}

**OUTPUT:**

"C:\Program Files\Java\jdk-17.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.1\lib\idea\_rt.jar=49649:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.1\bin" -Dfile.encoding=UTF-8 –classpath

Number: 12-2-3

Description: sw12jdt

Quantity: 4

price: 20.5

Invoice Amount: 82.0

Number: 12-2-3

Description: sw12jdt

Quantity: 0

price: 20.5

Invoice Amount: 0.0

**TASK NO:4**

Write JAVA code to represent a hitting game.The details are as follows:

This game is being played between two teams (i.e.yourteamandtheenemyteam). The total number of players in your team is randomly generated and stored accordingly.The function generates a pair of numbers and matches each pair. If the numbers get matched, the following message is displayed:“Enemy got hit by your team!”Otherwise,the following message is displayed:“You go thit by the enemy team!”The number of hits should be equal to the number of players in your team.The program should tell the final result of your team by counting the hits of both the teams.

class Players {  
 Random num=new Random();  
 int players= num.nextInt(5);  
 public void game(){  
 int turns=0;  
 int count = 0, count1 = 0;  
 while (turns!=players) {  
 int player1 = num.nextInt(5);  
 System.*out*.println("player1: "+ player1);  
 int player2 = num.nextInt(5);  
 System.*out*.println("player2: "+player2);  
 if (player1 == player2) {  
 System.*out*.println("Enemy got hit by you");  
 count++;  
 } else {  
 System.*out*.println("you got hit by enemy team");  
 count1++;  
 }  
 turns++;  
 }  
 if (count>count1) System.*out*.println("your team is winner!: ");  
 else if (count==count1) {  
 System.*out*.println("Game Tie");  
 } else System.*out*.println("enemy team is winner: ");  
 }}

class Main{  
 public static void main(String[] args) {

Players p=new Players();  
 System.*out*.println("your team players: "+p.players);  
 p.game();

}}

**OUTPUT:**

"C:\Program Files\Java\jdk-17.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.1\lib\idea\_rt.jar=49649:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.1\bin" -Dfile.encoding=UTF-8 -classpath C:\Users\hp\IdeaProjects\DSA\_ALL\_LABS\out\production\DSA\_ALL\_LABS Main

your team players: 2

player1: 0

player2: 0

Enemy got hit by you

player1: 0

player2: 2

you got hit by enemy team

Game Tie

**TASK NO:05**

MyJavaCoffee Outlet runs a catalog business. It sells only one type of coffee beans. The company sells the coffee in 2-lbbags only and the price of a single 2-lb bag is $5.50 when a customer places an order, the company ships the order inboxes.The boxes comein3sizes with3differentcosts:CapacityLarge Box20BagsMediumBox10BagsSmallBox5 BagsCost$1.80$1.00$0.60The order is shipped using the least number of boxes. For example, the order of 52 bags will be shipped in 2 boxes: 2large boxes,1mediumand1 small.Developan applicationthat computesthe total costof anorder.Number of Bags Ordered: 52The Cost of Order: $ 286.00BoxesUsed:2Large -$3.601 Medium -$1.001Small-$0.60Yourtotalcost is:$291.20

class Cost\_Calculation{  
 float bags\_price=5.50f;  
 int bags20,bags5,bags10;  
 int bags;  
 public void setBags(int bags){  
 this.bags=bags;}  
  
 public void calculate(){  
 int total\_bags=bags;  
 bags20=bags/20;  
 bags=bags%20;  
 System.*out*.println("20 bags: "+bags20+" price = 1.80$");  
 bags10=bags/10;  
 bags=bags%10;  
 System.*out*.println("10 bags: "+bags10+" price = 1.00$");  
 bags5=bags/5;  
 bags=bags%5;  
 System.*out*.println("5 bags: "+bags5+" price = 0.60$");  
  
 int remaining=total\_bags-((20\*bags20)+(5\*bags5)+(10\*bags10));  
 System.*out*.println("Remaing bags: "+remaining+" Price = 5.50$");  
  
 float total=((bags20\*1.80f)+(bags10\*1)+(bags5\*0.60f)+(remaining\*5.50f));  
 System.*out*.println("total price of bags are: "+ total);  
 }}

class Main{  
 public static void main(String[] args) {

Cost\_Calculation c=new Cost\_Calculation();  
c.setBags(56);  
c.calculate();

}}

**OUTPUT:**

"C:\Program Files\Java\jdk-17.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.1\lib\idea\_rt.jar=49649:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.1\bin" -Dfile.encoding=UTF-8 -classpath C:\Users\hp\IdeaProjects\DSA\_ALL\_LABS\out\production\DSA\_ALL\_LABS Main

20 bags: 2 price = 1.80$

10 bags: 1 price = 1.00$

5 bags: 1 price = 0.60$

Remaing bags: 1 Price = 5.50$

total price of bags are: 10.7

**TASK NO:06**

Write a class named Vehicle that can represent both the Rickshaw and Bike on the basis of number of wheels it has. Eachvehiclehas thefollowingdetails•year.Anint thatholdsthevehicle’smodelyear.•manufacturer. A stringthat holdsthemanufacturer nameofthatvehicle.•speed. Anint that holds thevehicle’scurrentspeed.Inaddition,theclassshouldhavethefollowingmemberfunctions.•accelerate.The acceleratefunction shouldadd5 tothespeedmembervariableeach timeitis called.•brake.The brakefunctionshouldsubtract5 fromthespeedmembervariableeachtimeit iscalled.Demonstrate the class in a program that creates a Vehicle object for a Rickshaw and for a Bike both, and then calls theaccelerate function five times. After each call to the accelerate function, get the current speed of the car and display it.Then,callthebrakefunctiontwotimes.Aftereachcalltothebrakefunction,getthecurrentspeedofthecaranddisplayit.

class Vehicles{  
 int model;  
 String manufacture;  
 int speed;  
  
 public void setManu(int model,String manufacture,int speed) {  
 this.model=model;  
 this.manufacture = manufacture;  
 this.speed=speed;  
 }  
  
 public int accelerate(){  
 int i = this.speed + 5;  
 speed=i;  
 return i;  
 }  
 public int deAccelerate(){  
 int i = this.speed - 5;  
 speed=i;  
 return i;  
 }  
}  
class Main{  
 public static void main(String[] args) {

Vehicles bike=new Vehicles();  
 bike.setManu(12,"honda",300);  
 bike.accelerate();  
 bike.accelerate();  
 bike.accelerate();  
 bike.accelerate();  
 System.*out*.println("Bike Speed after 5 time accelerate: "+bike.accelerate());  
 bike.deAccelerate();  
 System.*out*.println("Bike Speed after 2 times deAccelerate: "+bike.deAccelerate());  
 System.*out*.println();  
  
 Vehicles rickshaw=new Vehicles();  
 rickshaw.setManu(2222,"Alto",150);  
 rickshaw.accelerate();  
 rickshaw.accelerate();  
 rickshaw.accelerate();  
 rickshaw.accelerate();  
 System.*out*.println("Rickshaw Speed after 5 time accelerate: "+rickshaw.accelerate());  
 rickshaw.deAccelerate();  
 System.*out*.println("Rickshaw Speed after 2 times deAccelerate: "+rickshaw.deAccelerate());  
 System.*out*.println();  
  
}  
  
 }

"C:\Program Files\Java\jdk-17.0.2\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.1\lib\idea\_rt.jar=49649:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2022.1\bin" -Dfile.encoding=UTF-8 -classpath C:\Users\hp\IdeaProjects\DSA\_ALL\_LABS\out\production\DSA\_ALL\_LABS Main

Bike Speed after 5 time accelerate: 325

Bike Speed after 2 times deAccelerate: 315

Rickshaw Speed after 5 time accelerate: 175

Rickshaw Speed after 2 times deAccelerate: 165

Process finished with exit code 0