PROGRAMMING IN JAVA LAB-5

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BATCH-AIML A1

Part 1 - Implement the generic Shapes class as an interface s so that we can implement concrete classes like circle, triangle, rectangle class from it.

Part 2 - Refer the excel sheet for salary calculation. In this exercise, take an abstract class which is defined below and develop two classes. The abstract class represents the basic building block for employees in a personnel database. The code is shown below:

abstract class Employee private String name, address; protected int basicSalary;

The class contains three instance variables which hold the name, address and basic yearly salary of an employee.

Aim of this exercise
Generate concrete classes from an abstract class:

- • Copy the code above
- • into the file Employee.java in a folder. Make this class public.
- • Write the code for a class NormalEmployee which extends the class above. This class

  should have a single method which calculates themonthly () salary for an employee.

  Compile the class.

- • Write the code for a class BonusEmployee which extends the class Employee.java. This

  class describes an employee who

  has a monthly bonus added to their monthly salary. Compile the class

- • Create a fourth file which tests the implementation

  of NormalEmployee and BonusEmployee files by creating suitable objects.

//

PART-1

```
public interface Shapes { double getArea(); double getPerimeter();

}
public class Circle implements Shapes {
```

```
private double radius;
public Circle(double radius) {

    this.radius = radius;
}

public double getArea() {
return Math.PI * Math.pow(radius, 2); }

public double getPerimeter() { return 2 * Math.PI * radius;
} }

public class Triangle implements Shapes { private double base;
private double height;
private double side1;

private double side2; private double side3;

public Triangle(double base, double height, double side1, double side2,
double side3) {

        this.base = base;
        this.height = height;
        this.side1 = side1;
        this.side2 = side2;
        this.side3 = side3;
    }

public double getArea() { return 0.5 * base * height;

}

public double getPerimeter() { return side1 + side2 + side3;

} }

public class Rectangle implements Shapes{ private double width;
private double height;

public Rectangle(double width, double height) { this.width = width;
this.height = height;

}

public double getArea() { return width * height;
}

public double getPerimeter() { return 2 * (width + height);

} }
```

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

// Create a circle with radius 5
```

```
Circle circle = new Circle(5); System.out.println("Circle area: " +
circle.getArea());
System.out.println("Circle perimeter: " + circle.getPerimeter());

// Create a triangle with base 6, height 4, and sides 3, 4, and 5

Triangle triangle = new Triangle(6, 4, 3, 4, 5);
System.out.println("Triangle area: " + triangle.getArea());
System.out.println("Triangle perimeter: " + triangle.getPerimeter());

// Create a rectangle with width 7 and height 3
Rectangle rectangle = new Rectangle(7, 3); System.out.println("Rectangle
area: " + rectangle.getArea()); System.out.println("Rectangle perimeter: "
+

rectangle.getPerimeter()); }

}
```

OUTPUT:

```
Circle area: 78.53981633974483
Circle perimeter: 31.41592653589793
Triangle area: 12.0
Triangle perimeter: 12.0
Rectangle area: 21.0
Rectangle perimeter: 20.0
```

PART-2

```
package Employee_ASS_5_pt2;
abstract class employee{
   private String name, address, designation, department, DOJ, BankName,
         BankAccNo, UAN, ESI;
   protected int paidDays;
   protected float basicSalary, basicWage;
   // getter and setter methods
   public String getName(){ return name;
   }
   public void setName(String name){ this.name = name;
   }
   public String getAddress(){ return address;
   }
```

```
public void setAddress(String address){ this.address = address;
}
public String getDesignation(){ return designation;
}
public void setDesignation(String designation){ this.designation = designation;
}
public String getDepartment(){ return department;
}
public void setDepartment(String department){ this.department = department;
}
public String getDOJ(){ return DOJ;
}
public void setDOJ(String DOJ){ this.DOJ = DOJ;
}
public String getBankName(){ return BankName;
}
public void setBankName(String BankName){ this.BankName = BankName;
}
public String getBankAccNo(){ return BankAccNo;
}
public void setBankAccNo(String BankAccNo){ this.BankAccNo = BankAccNo;
}
public String getUAN(){ return UAN;
}
public void setUAN(String UAN){ this.UAN = UAN;
}
public String getESI(){ return ESI;
}
public void setESI(String ESI){ this.ESI = ESI;
}
public float getBasicSalary(){ return basicSalary;
}
public void setBasicSalary(float basicSalary){ this.basicSalary = basicSalary;
}
public int getPaidDays(){ return paidDays;
}

public void setPaidDays(int paidDays){ this.paidDays = paidDays;
}
public float getBasicWage(){ return basicWage;
}
public void setBasicWage(float basicWage){ this.basicWage = basicWage;
}
// abstract method
public abstract float getMonthlySalary(); }
```

/*Write the code for a class BonusEmployee which extends the class Employee.java. This class describes an employee who has a monthly bonus

```
 added to their monthly salary */
package Employee_5_pt2;
public class BonusEmployee extends employee{
   private int bonus; public BonusEmployee(){
      super(); }
   public int getBonus(){ return bonus;
   }
   public void setBonus(int b){ this.bonus = b;
   }
   // add the bonus to the monthly salary of the employee from the monthly salary of the
employee from the NormalEmployee class
   public float getMonthlySalary(){
   } }
   NormalEmployee ne = new NormalEmployee();
   // add bonus to the monthlySalary from NormalEmployee class
ne.setBasicSalary(super.getBasicSalary());
   float monthlySalary = (float) (ne.getMonthlySalary() + bonus); return monthlySalary;
      package Employee_5_pt2;
      import java.util.Scanner;
public class Main{
   public static void main(String[] args){
      Scanner sc = new Scanner(System.in);
// input all the details of the employee into the object
      NormalEmployee ne = new NormalEmployee(); System.out.println("Enter the name of
the employee: ");

      ne.setName(sc.nextLine());
      System.out.println("Enter the address of the employee: "); ne.setAddress(sc.nextLine());
      System.out.println("Enter the designation of the employee: ");
      ");
      ne.setDesignation(sc.nextLine());
      System.out.println("Enter the department of the employee: ");
ne.setDepartment(sc.nextLine());
      System.out.println("Enter the date of joining of the employee: ");
ne.setDOJ(sc.nextLine());
      System.out.println("Enter the bank name of the employee: ");
ne.setBankName(sc.nextLine());
      System.out.println("Enter the bank account number of the employee:
            ne.setBankAccNo(sc.nextLine());
      System.out.println("Enter ne.setUAN(sc.nextLine()); System.out.println("Enter
ne.setESI(sc.nextLine()); System.out.println("Enter
            the UAN of the employee: ");
      the ESI of the employee: ");
      the paid days of the employee: ");
      ");
      ne.setPaidDays(sc.nextInt());
      System.out.println("Enter the basic monthly salary of the employee:
```

```
            ne.setBasicSalary(sc.nextFloat());
// calculate the monthly salary of the employee
      System.out.println("The monthly salary of the employee is: " + ne.getMonthlySalary());
// ask the user if they want to add a bonus to the employee
      System.out.println("Do you want to add a bonus to the employee? (y/n)");
      char choice = sc.next().charAt(0);
// if yes, then add the bonus to the monthly salary of the employee used previously from
NormalEmployee class normal employee
      if(choice == 'y'){
         BonusEmployee be = new BonusEmployee(); be.setName(ne.getName());
be.setAddress(ne.getAddress()); be.setDesignation(ne.getDesignation());
be.setDepartment(ne.getDepartment());
         be.setDOJ(ne.getDOJ());
         be.setBankName(ne.getBankName()); be.setBankAccNo(ne.getBankAccNo());
         be.setUAN(ne.getUAN());
         be.setESI(ne.getESI());
         be.setPaidDays(ne.getPaidDays()); be.setBasicSalary(ne.getBasicSalary());
System.out.println("Enter the bonus amount: "); be.setBonus(sc.nextInt());
         System.out.println("The monthly salary of the employee is: " +
               be.getMonthlySalary()); }
      sc.close();
   }
}
```

OUTPUT:

```
Enter the name of the employee:
Gautam Shah
Enter the address of the employee:
Pune
Enter the designation of the employee:
Head
Enter the department of the employee:
Technical
Enter the date of joining of the employee:
20/08/2019
Enter the bank name of the employee:
Gautam S
Enter the bank account number of the employee:
287372392
Enter the UAN of the employee:

Enter the ESI of the employee:
200
Enter the paid days of the employee:
29
Enter the basic monthly salary of the employee:
50000

Travel allowance: 9666.666
House rent allowance: 19333.332
Conveyance allowance: 4833.333
Medical allowance: 7250.0
Total allowance: 41083.332
```

```
Employee provident fund: 5800.0
Professional tax: 4833.333
Employee state insurance: 845.8333
Total deduction: 11479.166

Monthly salary: 77937.5
The monthly salary of the employee is: 77937.5
Do you want to add a bonus to the employee? (y/n)
y
Enter the bonus amount:
10000

Travel allowance: 0.0
House rent allowance: 0.0
Conveyance allowance: 0.0
Medical allowance: 0.0
Total allowance: 0.0

Employee provident fund: 0.0
Professional tax: 0.0
Employee state insurance: 0.0
Total deduction: 0.0

Monthly salary: 0.0
The monthly salary of the employee is: 10000.0
```