# Java Lab Assignment -5

Om Varshney. AI ML B2. 21070126117

## Part 1:

### Circle.java

package Assn\_5;

public class Circle implements Shape {

    float radius;

    double area;

    double perimeter;

    Circle(int radius) {

        this.radius = radius;

    }

    public void calculateArea() {

        this.area = Math.PI \* Math.pow(radius, 2);

    }

    public void calculatePerimeter() {

        this.perimeter = 2 \* Math.PI \* this.radius;

    }

    public String toString() {

        return "Area: " + this.area + " Perimeter: " + this.perimeter;

    }

}

### Square.java

package Assn\_5;

public class Square {

    float side;

    double area;

    double perimeter;

    Square(float side) {

        this.side = side;

    }

    public void calculateArea() {

        this.area = Math.pow(this.side, 2);

    }

    public void calculatePerimeter() {

        this.perimeter = this.side \* 4;

    }

    public String toString() {

        return "Area: " + this.area + " Perimeter: " + this.perimeter;

    }

}

### Triangle.java

package Assn\_5;

public class Triangle {

    double firstSide;

    double secondSide;

    double thirdSide;

    double perimeter;

    double area;

    Triangle(double firstSide, double secondSide, double thirdSide) {

        this.firstSide = firstSide;

        this.secondSide = secondSide;

        this.thirdSide = thirdSide;

    }

    public void calculateArea() {

        double semi = (this.firstSide + this.secondSide + this.thirdSide) / 2;

        this.area = Math.pow(

            semi \* (semi - this.firstSide) \* (semi - this.secondSide) \* (semi - this.thirdSide),

            0.5

        );

    }

    public void calculatePerimeter() {

        this.perimeter = this.firstSide + this.secondSide + this.thirdSide;

    }

    public String toString() {

        return "Area: " + this.area + " Perimeter: " + this.perimeter;

    }

}

### Shape.java

package Assn\_5;

public interface Shape {

    void calculateArea();

    void calculatePerimeter();

}

### ShapeTestDrive.java

package Assn\_5;

public class ShapeTestDrive {

    public static void main(String[] args) {

        System.out.println("Circle: ");

        Circle c = new Circle(10);

        c.calculateArea();

        c.calculatePerimeter();

        System.out.println(c);

        System.out.println("Square: ");

        Square s = new Square(10);

        s.calculateArea();

        s.calculatePerimeter();

        System.out.println(s);

        System.out.println("Triangle: ");

        Triangle t = new Triangle(10, 20, 30);

        t.calculateArea();

        t.calculatePerimeter();

        System.out.println(t);

    }

}

## Part 2

### EmployeeBase.java

package Assn\_5;

/\*

This is the abstract class which represents all the properties of the employee. It acts as the parent

class to NormalEmployee and BonusEmployee.

\*/

public abstract class EmployeeBase {

    public String name;

    public int EID;

    public String designation;

    public String department;

    public String DOJ;

    public double grossWage;

    public int TWD = 30;

    public int LOP = 1;

    public int leavesTaken;

    public EmployeeBase(

        String name,

        int EID,

        String designation,

        String department,

        String DOJ,

        double grossWage,

        int leavesTaken

    ) {

        this.name = name;

        this.EID = EID;

        this.designation = designation;

        this.department = department;

        this.DOJ = DOJ;

        this.grossWage = grossWage;

        this.leavesTaken = leavesTaken;

    }

    public abstract double basicWage();

    public abstract double EPF();

    public abstract double HRA();

    public abstract double ESI();

    public abstract double coveyanceAllowance();

    public abstract double medicalAllowance();

    public abstract double otherAllowance();

    public abstract double totalEarnings();

    public abstract double totalDeductions();

    public double professionalTax() {

        return 0.0;

    }

    public double loanRecovery() {

        return 0.0;

    }

    public double bonus() {

        return 0;

    }

}

### NormalEmployee.java

package Assn\_5;

/\*

This is the normal employee class which implements all abstract methods from the EmployeeBase.

It acts as parent to BonusEmployee.

\*/

public class NormalEmployee extends EmployeeBase{

    public NormalEmployee(

        String name,

        int EID,

        String designation,

        String department,

        String DOJ,

        double grossWage,

        int leavesTaken

    ) {

        super(

                name,

                EID,

                designation,

                department,

                DOJ,

                grossWage,

                leavesTaken);

    }

    public double basicWage() {

        return (this.grossWage / this.TWD) \* (this.TWD - this.LOP) \* 0.45;

    }

    public double HRA() {

        return this.basicWage() \* 0.4;

    }

    public double coveyanceAllowance() {

        return (1600 / this.TWD) \* (this.TWD - this.LOP);

    }

    public double medicalAllowance() {

        return (1250 / this.TWD) \* (this.TWD - this.LOP);

    }

    public double otherAllowance() {

        return ((this.grossWage / this.TWD) \* (this.TWD - this.LOP)) - (this.basicWage() + this.HRA()

                + this.coveyanceAllowance() + this.medicalAllowance());

    }

    public double EPF() {

        if (this.basicWage() > 15000) {

            return 15000 \* 0.12;

        } else {

            return this.basicWage() \* 0.15;

        }

    }

    public double totalEarnings() {

        return this.basicWage() + this.HRA() + this.coveyanceAllowance() + this.medicalAllowance()

                + this.otherAllowance();

    }

    public double ESI() {

        if (this.basicWage() < 21000) {

            return this.totalEarnings() \* 0.0075;

        } else {

            return 0.0;

        }

    }

    public double totalDeductions() {

        return this.EPF() + this.ESI() + this.professionalTax() + this.loanRecovery();

    }

    public double netSalary() {

        return this.totalEarnings() - this.totalDeductions() + this.bonus();

    }

    public String salaryReport() {

        return (

            "\t\tSIT, Pune\n" +

            "\t\tLavale\n" +

            "\t\tPay Slip for April, 2023\n" +

            "Name:                \t" + this.name + "\n" +

            "Employee ID:         \t" + this.EID + "\n" +

            "Designation:         \t" + this.designation + "\n" +

            "Department:          \t" + this.department + "\n" +

            "DOJ:                 \t" + this.DOJ + "\n" +

            "Gross Wage:          \t" + this.grossWage + "\n" +

            "Total Working Days:  \t" + this.TWD + "\n" +

            "LOP Days:            \t" + this.LOP + "\n" +

            "Paid Days:           \t" + (this.TWD - this.LOP) + "\n" +

            "\tEarnings\t\t\tDeductions\n" +

            "Basic Wage:          \t" + this.basicWage() + "\t" + "EPF:             \t" + this.EPF() + "\n" +

            "HRA:                 \t" + this.HRA() + "\t" + "ESI:             \t" + this.ESI() + "\n" +

            "Conveyance Allowance:\t" + this.coveyanceAllowance() + "\t" + "Professional Tax:\t" + this.professionalTax() + "\n" +

            "Medical Allowance:   \t" + this.medicalAllowance() + "\t" + "Loan Recovery:   \t" + this.loanRecovery() + "\n" +

            "Other Allowances:    \t" + this.otherAllowance() + "\t" +

            "Total Earnings:      \t" + this.totalEarnings() + "\t" + "Total Deductions:\t" + this.totalDeductions() + "\n" +

            "Net Salary:          \t" + this.netSalary() + "\n"

        );

    }

}

### BonusEmployee.java

package Assn\_5;

/\*

This is the bonus employee who gets a 69% bonus on the basic Wage.

\*/

public class BonusEmployee extends NormalEmployee {

    public BonusEmployee(

        String name,

        int EID,

        String designation,

        String department,

        String DOJ,

        double grossWage,

        int leavesTaken

    ) {

        super(

                name,

                EID,

                designation,

                department,

                DOJ,

                grossWage,

                leavesTaken);

    }

    public double bonus() {

        return this.basicWage() \* 0.69;

    }

}

### EmployeeTestDrive.java

package Assn\_5;

/\*

Testing code for the Employee Class

\*/

public class EmployeeTestDrive {

    public static void main(String[] args) {

        NormalEmployee ne = new NormalEmployee("yashasvi", -69, "janitor", "cleanliness", "15-02-2004", 21000, 0);

        System.out.print(ne.salaryReport());

        BonusEmployee be = new BonusEmployee("om", 21, "CEO", "AI ML", "03-05-2003", 210000, 20);

        System.out.print(be.salaryReport());

    }

}

## Outputs



