

## Java Lab Assignment-5

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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

```
1 package Assn_5;
2
// ... (code omitted) ...

// Output:
// SIT, Pune
// Lavale
// Pay Slip for April, 2023
// Name: yashasvi
// Employee ID: -69
// Designation: CFO
// Department: cleanliness
// DOB: 15-02-2004
// Gross Wage: 21000.0
// Total Working Days: 30
// LOP Days: 1
// Paid Days: 29
// Earnings Deductions
// Basic Wage: 9135.0 EPF: 1370.25
// HRA: 3654.0 ESI: 152.25
// Conveyance Allowance: 1537.0 Professional Tax: 0.0
// Medical Allowance: 1189.0 Loan Recovery: 0.0
// Other Allowances: 4785.0 Total Earnings: 20300.0 Total Deductions: 1522.5
// Net Salary: 18777.5
// SIT, Pune
// Lavale
// Pay Slip for April, 2023
// Name: on
// Employee ID: 21
// Designation: CEO
// Department: AI ML
// DOB: 03-05-2003
// Gross Wage: 21000.0
// Total Working Days: 30
// LOP Days: 1
// Paid Days: 29
// Earnings Deductions
// Basic Wage: 9135.0 EPF: 1800.0
// HRA: 3654.0 ESI: 0.0
// Conveyance Allowance: 1537.0 Professional Tax: 0.0
// Medical Allowance: 1189.0 Loan Recovery: 0.0
// Other Allowances: 72384.0 Total Earnings: 20300.0 Total Deductions: 1800.0
// Net Salary: 264231.5
PS C:\Users\hp\OneDrive\SIT Pune Global Folder\Fourth Semester\Java Lab>
```

```
1 package Assn_5;
2
// ... (code omitted) ...

// Output:
// Windows PowerShell
// Copyright (C) Microsoft Corporation. All rights reserved.
//
// Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows
//
// PS C:\Users\hp\OneDrive\SIT Pune Global Folder\Fourth Semester\Java Lab> & 'D:\java\jdk-19\bin\java.exe' '-enable-preview' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\hp\AppData\Roaming\Code\User\workspaceStorage\5d8c5252d376f8755e2c7cdf495b3dc\redhat.java\jdk_ws\Java_Lab_9a713b43\bin' 'Assn_5.ShapeTestDrive'
// Circle:
// Area: 314.1592653589793 Perimeter: 62.83185307179586
// Square:
// Area: 100.0 Perimeter: 40.0
// Triangle:
// Area: 76.54 Perimeter: 62.0
// PS C:\Users\hp\OneDrive\SIT Pune Global Folder\Fourth Semester\Java Lab>
```