Assignment 4 : Sandeep sir

1. Loan Amortization Calculator

```
package com.example;

import java.util.Scanner;

class Util {
    private double principalAmt;
    private double annualInterestRate;
    private int loanTerm;
    private double monthlyPayment;

    // Constructor
    Util() {
        this.principalAmt = 0.0;
        this.annualInterestRate = 0.0;
        this.loanTerm = 0;
        this.monthlyPayment = 0.0;

    }

    // Getter
    public double getPrincipalAmt() {
        return principalAmt;

    }

    public double getAnnualInterestRate() {
        return annualInterestRate;
    }

    public double getLoanTerm() {
        return loanTerm;
    }

    // Setters
    public void setPrincipalAmt(double amt) {
        this.principalAmt = amt;
    }

    public void setAnnualInterestRate(double amt) {
        this.annualInterestRate = amt;
    }

    public void setLoanTerm(int years) {
        this.loanTerm = years;
    }

    // Methods
    public double calculateMonthlyPayment() {
        double monthlyInterestRate = (getAnnualInterestRate() / 12) / 100;
        int numberOfMonths = loanTerm * 12;
        return getPrincipalAmt() * (monthlyInterestRate * Math.pow(1 + monthlyInterestRate, numberOfMonths)
                / (Math.pow(1 + monthlyInterestRate, numberOfMonths) - 1);

    }
```

```
    public double calculateTotalPayment() {
        return calculateMonthlyPayment() * getLoanTerm() * 12;
    }
}

public class LoanAmortizationCalculator {
    public static void main(String[] args) {
        Util util = new Util();

        Scanner sc = new Scanner(System.in);
        System.out.print("Enter loan amount :  ");
        util.setPrincipalAmt(sc.nextDouble());

        System.out.print("Enter annual interest rate (in %): ");
        util.setAnnualInterestRate(sc.nextDouble());

        System.out.print("Enter loan term (in years): ");
        util.setLoanTerm(sc.nextInt());

        double monthlyPayment = util.calculateMonthlyPayment();
        double totalPayment = util.calculateTotalPayment();

        System.out.printf("Monthly Payment: %.2f\n" , monthlyPayment);

        System.out.println("Total Payment over the life of loan:  " + totalPayment);
    }

}
```

2. Compound Interest Calculator for Investment

```
package com.example;

import java.util.Scanner;

class Util {
    private double initialInvestmentAmt;
    private int annualInterestRate;
    private int NumOfTime;
    private int investmentDuration;

    public double getInitialInvestmentAmt() {
        return this.initialInvestmentAmt;
    }

    public void setInitialInvestmentAmt(double initialInvestmentAmt) {
        this.initialInvestmentAmt = initialInvestmentAmt;
    }

    public int getAnnualInterestRate() {
        return this.annualInterestRate;
    }

    public void setAnnualInterestRate(int annualInterestRate) {
        this.annualInterestRate = annualInterestRate;
    }

    public int getNumOfTime() {
```

```
        return this.NumOfTime;
    }

    public void setNumOfTime(int numOfTime) {
        NumOfTime = numOfTime;
    }

    public int getInvestmentDuration() {
        return this.investmentDuration;
    }

    public void setInvestmentDuration(int investmentDuration) {
        this.investmentDuration = investmentDuration;
    }

    public double calculateFutureValue() {
        return getInitialInvestmentAmt()
                * Math.pow(1 + getAnnualInterestRate() / getNumOfTime(), (getNumOfTime() * getInvestmentDur

    }

}

public class CompoundInterestCalculator {
    public static void main(String[] args) {
        Util util = new Util();
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the initial investment amount (₹): ");
        util.setInitialInvestmentAmt(scanner.nextDouble());

        System.out.print("Enter the annual interest rate (in %): ");
        util.setAnnualInterestRate(scanner.nextInt());

        System.out.print("Enter the number of times the interest is compounded per year: ");
        util.setNumOfTime(scanner.nextInt());

        System.out.print("Enter the investment duration (in years): ");
        util.setInvestmentDuration(scanner.nextInt());

        // Calculate future value
        double futureValue = util.calculateFutureValue();

        // Display the result
        System.out.printf("Future Value: ₹ %.2f\n", futureValue);

    }

}
```

3. BMI (Body Mass Index) Tracker

```
package com.example;

import java.util.Scanner;

class BMITracker {
    private double weight;
    private double height;

    // Getter and Setter methods
```

```
    public double getWeight() {
        return this.weight;
    }

    public void setWeight(double weight) {
        this.weight = weight;
    }

    public double getHeight() {
        return this.height;
    }

    public void setHeight(double height) {
        this.height = height;
    }

    public double calculateBMI() {
        return getWeight() / (getHeight() * getHeight());
    }

    public String classifyBMI(double bmi) {
        if (bmi < 18.5) {
            return "Underweight";
        } else if (bmi < 24.9) {
            return "Normal weight";
        } else if (bmi < 29.9) {
            return "Overweight";
        } else {
            return "Obese";
        }
    }

    public void printRecord() {
        double bmi = calculateBMI();
        String classification = classifyBMI(bmi);
        System.out.printf("BMI: %.2f\n", bmi);
        System.out.println("Classification: " + classification);
    }
}

public class BMICalculatorTest {
    public static void main(String[] args) {
        BMITracker bmiTracker = new BMITracker();
        Scanner scanner = new Scanner(System.in);

        // Accept user input
        System.out.print("Enter weight (in kilograms): ");
        bmiTracker.setWeight(scanner.nextDouble());

        System.out.print("Enter height (in meters): ");
        bmiTracker.setHeight(scanner.nextDouble());

        bmiTracker.printRecord();

    }
}
```

4. Discount Calculation for Retail Sales

```
import java.util.Scanner;

class DiscountCalculator {
    private double originalPrice;
    private double discountRate;

    // Getter and Setter methods
    public double getOriginalPrice() {
        return this.originalPrice;
    }

    public void setOriginalPrice(double originalPrice) {
        this.originalPrice = originalPrice;
    }

    public double getDiscountRate() {
        return this.discountRate;
    }

    public void setDiscountRate(double discountRate) {
        this.discountRate = discountRate;
    }

    public double calculateDiscount() {
        return getOriginalPrice() * (getDiscountRate() / 100);
    }

    public double calculateFinalPrice() {
        return getOriginalPrice() - calculateDiscount();
    }

    public void printRecord() {
        double discountAmount = calculateDiscount();
        double finalPrice = calculateFinalPrice();
        System.out.printf("Discount Amount: ₹ %.2f\n", discountAmount);
        System.out.printf("Final Price: ₹ %.2f\n", finalPrice);
    }
}

public class DiscountCalculatorTest {
    public static void main(String[] args) {
        DiscountCalculator discountCalculator = new DiscountCalculator();
        Scanner scanner = new Scanner(System.in);

        // Accept user input
        System.out.print("Enter the original price of the item (₹): ");
        discountCalculator.setOriginalPrice(scanner.nextDouble());

        System.out.print("Enter the discount percentage: ");
        discountCalculator.setDiscountRate(scanner.nextDouble());

        discountCalculator.printRecord();


    }
}
```

5. Toll Booth Revenue Management

```
import java.util.Scanner;

class TollBoothRevenueManager {
    private double carRate = 50.00;
    private double truckRate = 100.00;
    private double motorcycleRate = 30.00;

    private int numCars;
    private int numTrucks;
    private int numMotorcycles;

    // Getter and Setter methods
    public int getNumCars() {
        return this.numCars;
    }

    public void setNumCars(int numCars) {
        this.numCars = numCars;
    }

    public int getNumTrucks() {
        return this.numTrucks;
    }

    public void setNumTrucks(int numTrucks) {
        this.numTrucks = numTrucks;
    }

    public int getNumMotorcycles() {
        return this.numMotorcycles;
    }

    public void setNumMotorcycles(int numMotorcycles) {
        this.numMotorcycles = numMotorcycles;
    }

    public double calculateTotalRevenue() {
        return (getNumCars() * carRate) + (getNumTrucks() * truckRate) + (getNumMotorcycles() * motorcycleR
    }

    public void printRecord() {
        int totalVehicles = getNumCars() + getNumTrucks() + getNumMotorcycles();
        double totalRevenue = calculateTotalRevenue();
        System.out.println("Total Number of Vehicles: " + totalVehicles);
        System.out.printf("Total Revenue: ₹ %.2f\n", totalRevenue);
    }
}

public class TollBoothRevenueManagerTest {
    public static void main(String[] args) {
        TollBoothRevenueManager tollBooth = new TollBoothRevenueManager();
        Scanner scanner = new Scanner(System.in);

        // Accept user input
        System.out.print("Enter the number of cars: ");
        tollBooth.setNumCars(scanner.nextInt());

        System.out.print("Enter the number of trucks: ");
        tollBooth.setNumTrucks(scanner.nextInt());
```

```
        System.out.print("Enter the number of motorcycles: ");
        tollBooth.setNumMotorcycles(scanner.nextInt());


        tollBooth.printRecord();

    }
}
```