**Assignment-3**

1. Loan Amortization Calculator
2. import java.util.Scanner;
3. public class LoanAmortizationCalculator {
4. private double principal;
5. private double annualInterestRate;
6. private int loanTerm;
7. public void acceptRecord() {
8. Scanner scanner = new Scanner(System.in);
9. System.out.print("Enter the principal amount (loan amount) in ₹: ");
10. principal = scanner.nextDouble();
11. System.out.print("Enter the annual interest rate (in %): ");
12. annualInterestRate = scanner.nextDouble();
13. System.out.print("Enter the loan term (in years): ");
14. loanTerm = scanner.nextInt();
15. }
16. public double calculateMonthlyPayment() {
17. double monthlyInterestRate = (annualInterestRate / 12) / 100;
18. int numberOfMonths = loanTerm \* 12;
19. double monthlyPayment = principal \* (monthlyInterestRate \* Math.pow((1 + monthlyInterestRate), numberOfMonths)) /
20. (Math.pow((1 + monthlyInterestRate), numberOfMonths) - 1);
21. return monthlyPayment;
22. }
23. public void printRecord() {
24. double monthlyPayment = calculateMonthlyPayment();
25. double totalAmountPaid = monthlyPayment \* loanTerm \* 12;
26. System.out.println("\nLoan Details:");
27. System.out.println("Principal Amount: ₹" + principal);
28. System.out.println("Annual Interest Rate: " + annualInterestRate + "%");
29. System.out.println("Loan Term: " + loanTerm + " years");
30. System.out.println("Monthly Payment: ₹" + String.format("%.2f", monthlyPayment));
31. System.out.println("Total Amount Paid: ₹" + String.format("%.2f", totalAmountPaid));
32. }
33. public static void main(String[] args) {
34. LoanAmortizationCalculator calculator = new LoanAmortizationCalculator();
35. calculator.acceptRecord();
36. calculator.printRecord();
37. }
38. }

OUTPUT :-

Enter the principal amount (loan amount) in ?: 100000

Enter the annual interest rate (in %): 20

Enter the loan term (in years): 10

Loan Details:

Principal Amount: ?100000.0

Annual Interest Rate: 20.0%

Loan Term: 10 years

Monthly Payment: ?1932.56

Total Amount Paid: ?231906.81

**2. Compound Interest Calculator for Investment**

import java.util.Scanner;

public class CompoundInterestCalculator {

    private double principal;

    private double annualInterestRate;

    private int numberOfCompounds;

    private int years;

    public void acceptRecord() {

        try (Scanner scanner = new Scanner(System.in)) {

            System.out.print("Enter the initial investment amount in ₹: ");

            principal = scanner.nextDouble();

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

            annualInterestRate = scanner.nextDouble();

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

            numberOfCompounds = scanner.nextInt();

            System.out.print("Enter the investment duration (in years): ");

            years = scanner.nextInt();

        }

    }

    public double calculateFutureValue() {

        double futureValue = principal \* Math.pow((1 + (annualInterestRate / 100) / numberOfCompounds), numberOfCompounds \* years);

        return futureValue;

    }

    public void printRecord() {

        double futureValue = calculateFutureValue();

        double totalInterest = futureValue - principal;

        System.out.println("\nInvestment Details:");

        System.out.println("Initial Investment Amount: ₹" + principal);

        System.out.println("Annual Interest Rate: " + annualInterestRate + "%");

        System.out.println("Number of Compounds per Year: " + numberOfCompounds);

        System.out.println("Investment Duration: " + years + " years");

        System.out.println("Future Value: ₹" + String.format("%.2f", futureValue));

        System.out.println("Total Interest Earned: ₹" + String.format("%.2f", totalInterest));

    }

    public static void main(String[] args) {

        CompoundInterestCalculator calculator = new CompoundInterestCalculator();

        calculator.acceptRecord();

        calculator.printRecord();

    }

}

OUTPUT :-

Enter the initial investment amount in ?: 2346

Enter the annual interest rate (in %): 7

Enter the number of times the interest is compounded per year: 10

Enter the investment duration (in years): 4

Investment Details:

Initial Investment Amount: ?2346.0

Annual Interest Rate: 7.0%

Number of Compounds per Year: 10

Investment Duration: 4 years

Future Value: ?3101.04

Total Interest Earned: ?755.04

**3. BMI (Body Mass Index) Tracker**

import java.util.Scanner;

public class BMIcalculater {

     public static void main(String[] agrs) {

        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter your weight in kg: ");

        double weight = scanner.nextDouble();

        System.out.print("Enter your height in m: ");

        double height = scanner.nextDouble();

        double bmi = weight / (height \* height);

         System.out.printf("Your BMI is: %.2f\n", bmi);

         if (bmi < 18.5)  {

            System.out.println("You are underweight. ");

         }

         else if (bmi >= 18.5 && bmi < 24.9) {

            System.out.println("You have a normal weight: ");

         }

         else if (bmi >= 25 && bmi < 29.9) {

            System.out.println("You are  overweight: ");

         }

         else {

            System.out.println("You are obese. ");

         }

         scanner.close();

     }

}

OUTPUT:-

Enter your weight in kg: 55

Enter your height in m: 1.53

Your BMI is: 23.50

You have a normal weight:

**4. Discount Calculation for Retail Sales**

import java.util.Scanner;

public class DiscountCalculator {

private double originalPrice;

private double discountRate;

public void acceptRecord() {

try (Scanner scanner = new Scanner(System.in)) {

System.out.print("Enter the original price of the item in ₹: ");

originalPrice = scanner.nextDouble();

System.out.print("Enter the discount percentage: ");

discountRate = scanner.nextDouble();

}

}

public double calculateDiscount() {

double discountAmount = originalPrice \* (discountRate / 100);

return discountAmount;

}

public double calculateFinalPrice() {

double discountAmount = calculateDiscount();

double finalPrice = originalPrice - discountAmount;

return finalPrice;

}

public void printRecord() {

double discountAmount = calculateDiscount();

double finalPrice = calculateFinalPrice();

System.out.println("\nDiscount Details:");

System.out.println("Original Price: ₹" + String.format("%.2f", originalPrice));

System.out.println("Discount Rate: " + String.format("%.2f", discountRate) + "%");

System.out.println("Discount Amount: ₹" + String.format("%.2f", discountAmount));

System.out.println("Final Price: ₹" + String.format("%.2f", finalPrice));

}

public static void main(String[] args) {

DiscountCalculator calculator = new DiscountCalculator();

calculator.acceptRecord();

calculator.printRecord();

}

}

OUTPUT:-

Enter the original price of the item in ?: 500

Enter the discount percentage: 40

Discount Details:

Original Price: ?500.00

Discount Rate: 40.00%

Discount Amount: ?200.00

Final Price: ?300.00

**5. Toll Booth Revenue Management**

import java.util.Scanner;

public class TollBoothRevenueManager {

private double carTollRate;

private double truckTollRate;

private double motorcycleTollRate;

private int numCars;

private int numTrucks;

private int numMotorcycles;

private Scanner scanner;

public TollBoothRevenueManager() {

scanner = new Scanner(System.in);

}

public void setTollRates() {

System.out.print("Enter the toll rate for Cars in ₹: ");

carTollRate = scanner.nextDouble();

System.out.print("Enter the toll rate for Trucks in ₹: ");

truckTollRate = scanner.nextDouble();

System.out.print("Enter the toll rate for Motorcycles in ₹: ");

motorcycleTollRate = scanner.nextDouble();

}

public void acceptRecord() {

System.out.print("Enter the number of Cars: ");

numCars = scanner.nextInt();

System.out.print("Enter the number of Trucks: ");

numTrucks = scanner.nextInt();

System.out.print("Enter the number of Motorcycles: ");

numMotorcycles = scanner.nextInt();

}

public double calculateRevenue() {

double totalRevenue = (numCars \* carTollRate) + (numTrucks \* truckTollRate) + (numMotorcycles \* motorcycleTollRate);

return totalRevenue;

}

public void printRecord() {

double totalRevenue = calculateRevenue();

int totalVehicles = numCars + numTrucks + numMotorcycles;

System.out.println("\nToll Booth Revenue Report:");

System.out.println("Total Number of Vehicles: " + totalVehicles);

System.out.println("Total Revenue: ₹" + String.format("%.2f", totalRevenue));

}

public static void main(String[] args) {

TollBoothRevenueManager manager = new TollBoothRevenueManager();

System.out.println("Set the toll rates for different vehicle types:");

manager.setTollRates();

System.out.println("Enter the number of vehicles of each type:");

manager.acceptRecord();

manager.printRecord();

manager.scanner.close(); // Close the Scanner object after use

}

}

OUTPUT:-

Set the toll rates for different vehicle types:

Enter the toll rate for Cars in ?: 50

Enter the toll rate for Trucks in ?: 100

Enter the toll rate for Motorcycles in ?: 30

Enter the number of vehicles of each type:

Enter the number of Cars: 10

Enter the number of Trucks: 20

Enter the number of Motorcycles: 5

Toll Booth Revenue Report:

Total Number of Vehicles: 35

Total Revenue: ?2650.00