**Exercise 7: Financial Forecasting**

**CODE:**

**FinancialForecast.java:**

public class FinancialForecast {

    // Recursive method to calculate future value

    public static double calculateFutureValue(double presentValue, double rate, int years) {

        if (years == 0) {

            return presentValue;

        }

        return (1 + rate) \* calculateFutureValue(presentValue, rate, years - 1);

    }

     // Optimized using memoization

    public static double calculateFutureValueMemo(double presentValue, double rate, int years, double[] memo) {

        if (years == 0) return presentValue;

        if (memo[years] != 0) return memo[years];

        memo[years] = (1 + rate) \* calculateFutureValueMemo(presentValue, rate, years - 1, memo);

        return memo[years];

    }

}

**Main.java:**

public class Main {

    public static void main(String[] args) {

        double presentValue = 10000;

        double annualRate = 0.08;

        int years = 5;

        //  Recursive approach

        double futureValue = FinancialForecast.calculateFutureValue(presentValue, annualRate, years);

        System.out.printf("Future Value (Recursive): ₹%.2f\n", futureValue);

        //  Optimized with memoization

        double[] memo = new double[years + 1];

        double futureValueMemo = FinancialForecast.calculateFutureValueMemo(presentValue, annualRate, years, memo);

        System.out.printf("Future Value (Memoized): ₹%.2f\n", futureValueMemo);

    }

}

**OUTPUT:**

