**Exercise 7: Financial Forecasting**

**Scenario:**

You are developing a financial forecasting tool that predicts future values based on past data.

**Steps:**

1. **Understand Recursive Algorithms:**
   * Explain the concept of recursion and how it can simplify certain problems.
2. **Setup:**
   * Create a method to calculate the future value using a recursive approach.
3. **Implementation:**
   * Implement a recursive algorithm to predict future values based on past growth rates.
4. **Analysis:**
   * Discuss the time complexity of your recursive algorithm.
   * Explain how to optimize the recursive solution to avoid excessive computation.

code :

public class FinancialForecast {

    public static double calculateFutureValueRecursive(double presentValue, double growthRate, int years) {

        if (years == 0) {

            return presentValue;

        }

        return calculateFutureValueRecursive(presentValue, growthRate, years - 1) \* (1 + growthRate);

    }

    public static double calculateFutureValueIterative(double presentValue, double growthRate, int years) {

        double result = presentValue;

        for (int i = 0; i < years; i++) {

            result \*= (1 + growthRate);

        }

        return result;

    }

    public static void main(String[] args) {

        double presentValue = 10000;

        double growthRate = 0.08;

        int years = 5;

        double futureRecursive = calculateFutureValueRecursive(presentValue, growthRate, years);

        double futureIterative = calculateFutureValueIterative(presentValue, growthRate, years);

        System.out.printf("Future Value after %d years (Recursive): ₹%.2f\n", years, futureRecursive);

        System.out.printf("Future Value after %d years (Iterative): ₹%.2f\n", years, futureIterative);

    }

}

Output :

