**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.

**Source code:**

package week1.algorithmsanddatastructures;  
  
public class InvestmentProjection  
{  
 public static void main(String[] args)  
 {  
 double principal = 10000;  
 double interestRate = 0.08;  
 int duration = 5;  
  
 double projectedAmount = Calculator.compoundGrowth(principal, interestRate, duration);  
 System.out.println("Projected Amount (Recursive): " + projectedAmount);  
 }  
}  
  
class Calculator  
{  
 public static double compoundGrowth(double principal, double rate, int periods)  
 {  
 if (periods == 0) return principal;  
 return compoundGrowth(principal, rate, periods - 1) \* (1 + rate);  
 }  
}

Output :

Future Value (Recursive): 14693.28064