**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.

**ANSWER:**

**Explain the concept of recursion and how it can simplify certain problems.**

* Recursion is a technique where a function calls itself to solve smaller instances of the same problem.
* It can simplify problems by breaking them down into smaller sub-problems that have the same structure as the original problem.
* A recursive solution typically involves a base case (to stop the recursion) and a recursive case (where the function calls itself).

**Discuss the time complexity of your recursive algorithm.**

The time complexity of a simple recursive algorithm to calculate future values is O(n), where n is the number of time periods.

**Explain how to optimize the recursive solution to avoid excessive computation.**

To avoid excessive computation, we can use memoization, which stores the results of previous calculations and reuses them when needed, thus reducing the number of recursive calls.