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.

  Recursion is a programming technique where a method calls itself to solve smaller instances of the same problem. It's especially useful for problems that can be broken down into simpler, repetitive subproblems.

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.
  The time complexity of the recursive algorithm is O(n) because it makes one recursive call for each year until the base case is reached.

- Explain how to optimize the recursive solution to avoid excessive computation.
  To avoid excessive computation, we can use an iterative approach instead of recursion, which saves memory by not using the call stack. Alternatively, memoization can be used to store and reuse previously calculated values.