**ANSWER**

**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**:

* **Description**:
  + Recursion is a programming technique where a function calls itself to solve smaller instances of the same problem. It involves breaking down a problem into smaller sub-problems until a base case is reached.
* **Advantages**:
  + Simplifies complex problems by dividing them into smaller, manageable tasks.
  + Useful for problems that have a natural recursive structure, such as tree traversals, factorial calculations, and the Fibonacci sequence.
* **Disadvantages**:
  + Can lead to excessive memory usage and stack overflow if not implemented correctly.
  + May result in redundant calculations if overlapping subproblems are not optimized.

1. **Analysis:**
   * Discuss the time complexity of your recursive algorithm.

* The time complexity of the recursive algorithm is O(n), where n is the number of periods.
  + Explain how to optimize the recursive solution to avoid excessive computation.

**Memoization**:

* Store the results of expensive function calls and reuse them when the same inputs occur again.
* This reduces the number of redundant calculations, improving efficiency.

**Iterative Approach**:

* Convert the recursive solution to an iterative one to avoid the overhead of recursive function calls and reduce memory usage.