**Exercise 7 : Financial Forecasting**

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

Recursion is a programming technique where a function calls itself in order to solve smaller instances of a problem. It simplifies complex problems by breaking them down into more manageable sub-problems. A base case is defined to stop the recursive calls, preventing infinite loops.

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

The time complexity of the recursive algorithm is O(n), where n is the number of years. Each recursive call reduces the problem size by one year, requiring a linear number of calls to reach the base case.

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

To avoid excessive computation, especially when the growth rate is consistent across multiple calculations, we can use memoization or iteration:

* Memoization: Store previously computed results to avoid redundant calculations in future recursive calls.
* Iterative Approach: Convert the recursive solution into an iterative one, where the future value is calculated using a loop. This approach avoids the overhead of recursive function calls and can be more efficient in terms of both time and space complexity.