

Exercise 7: Financial Forecasting

a. Understand Recursive Algorithms:

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

The process in which a function calls itself directly or indirectly is called recursion and the corresponding function is called a recursive function.

Recursion can simplify certain problems as it is a wonderful technique by which we can reduce the length of our code and make it easier to read and write. We can perform the same operations multiple times with different inputs. Recursion solves such recursive problems by using functions that call themselves from within their own code.

b. Analysis:

1. Discuss the time complexity of your recursive algorithm.

The time complexity of this recursive algorithm is $O(n)$, where n is the number of years. This is because the function makes a single recursive call for each year, decrementing the years by 1 each time until it reaches 0.

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

To optimize the recursive solution and avoid excessive computation, we can use a technique called memoization. Memoization involves storing the results of expensive function calls and reusing them when the same inputs occur again.