**WEEK 1- Exercise 7: Financial Forecasting**

**Explain the concept of recursion and how it can simplify certain problems.**  
  
Recursion is a technique where a function calls itself to solve smaller sub-problems. It is useful for problems like compound interest where the future value depends on the previous value.

In financial forecasting:

FV(n)=FV(n−1)×(1+rate)

FV(n) = Future Value after n years

rate = annual growth rate

FV(0) = initial investment  
  
  
**Discuss the time complexity of your recursive algorithm.**

Recursive method has O(n) time complexity, where n is the number of years.

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

For large n, avoid deep recursion (stack overflow risk). Use iteration instead:

static double CalculateFutureValueIterative(double principal, double rate, int years)

{

for (int i = 0; i < years; i++)

{

principal \*= (1 + rate);

}

return principal;

}

Iteration is preferred when n is large and Memory and performance are critical.