# Exercise 7: Financial Forecasting

## Problem Statement

Build a recursive forecasting algorithm that predicts future value based on compound growth.

## Recursion

A function that calls itself with a smaller problem.

Base case: stops recursion. Recursive case: continues until base case is hit.

## Forecasting Formula

Future Value (FV) = Present Value (PV) × (1 + Rate)^Years

Java Code:  
  
double forecast(double value, double rate, int years) {  
 if (years == 0) return value;  
 return forecast(value \* (1 + rate), rate, years - 1);  
}

## Time Complexity

Time Complexity: O(n) – Each recursive call reduces 'years' by 1.

## Optimization Ideas

Convert to iteration for better memory usage.

Use memoization if needed.

In production, use Math.pow() or financial libraries.

## Conclusion

Recursion works well for simple forecasting logic.

For large datasets or real-time systems, iteration is preferred to prevent stack overflow.