Exercise 7: Financial Forecasting - Analysis

1. Concept of Recursion:

Recursion solves a problem by breaking it into smaller instances of the same problem. It simplifies logic in certain scenarios such as mathematical modeling.

2. Forecasting Formula:

Future Value = Present Value × (1 + rate)^years. This can be implemented using recursion to simulate compound growth.

3. Time Complexity of Recursive Algorithm:

• Time Complexity: O(n)  
• Space Complexity: O(n) due to function call stack

4. Optimization using Memoization:

Memoization caches previous results to avoid repeated calculations, improving performance especially for larger inputs.

5. Recursive vs Iterative:

Recursive implementation is simpler and more readable. Iterative is faster and memory efficient. Use memoization if recursion is necessary.

Conclusion:

Recursive financial forecasting is practical and intuitive for limited inputs. Memoization improves performance. For large inputs, iterative solutions or mathematical libraries are preferred.