**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.