Data Structures and Algorithms

Exercise 7:

Financial Forecasting

This project implements a financial forecasting tool using Java. It uses a recursive algorithm to predict future values based on historical growth and includes an optimized iterative version for efficiency. Here's a detailed explanation:

Step 1: Understand Recursive Algorithms

- Recursion is a method where a function calls itself to solve smaller instances of the same problem.
- It simplifies problems like computing compounded growth.

Step 2: Setup

- Define a class *FinancialForecasting*.
- Inside it, create methods to calculate the future value recursively and iteratively.
- Used input values like:
    - *initialValue* - base amount.
    - *growthRate* - annual percentage increase.
    - *years* - time period for forecasting.

Step 3: Implementation

- *forecastRecursive()* - recursively computes future value.
- *forecastIterative()* - optimized iterative approach to avoid recursion stack overhead.
- *main()* - sets up initial values and runs both methods.

Step 4: Time Complexity Analysis

Method	Time Complexity	Space Complexity
Recursive	O(n)	O(n)

Method	Time Complexity	Space Complexity
Iterative (Optimized)	O(n)	O(1)

- Use **Recursive** approach for simplicity and learning.
- Use **Iterative** approach for performance and large datasets.

Output