**Exercise 7: Financial Forecasting**

**Step-1:**

**Recursive Algorithms:**

Recursive Algorithms basically use recursion which is a technique where a function/method calls itself repeatedly to solve a problem by breaking it into similar subproblems.

* Recursion is used in some type of problems where we need to calculate or do same things repeatedly.
* It makes code more readable with repetitive structure. And **reduces the need for explicit loops and states**.

**Setup and Implementations:**

Here we are asked to recursive algorithm to predict future **values based on past growth rates**.

So we take some growth rates as a example and do recursive algorithm on the initial amount.

So its normal mathematical formula new\_value=curr\_value\*(1+rate)

Refer repository for code and Outputs.

**Analysis:**

Here, Time Complexity is O(n),.

Space Complexity is O(n) where n is number of past growth’s

So, When it comes to optimization, we may face Stack Over Flow for the very large number of past growth’s.

So, it is better to use Iterative version to avoid stack issues.

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| **Approach** | **Time**  **Complexity** | **Space**  **Complexity** | **Notes** |
| Recursive | O(n) | O(n) | Elegant, but stack risk |
| Iterative | O(n) | O(1) | Safer for large n |