**Analysis**

**Time Complexity:**

* The **time complexity** of the recursive algorithm is O(n)O(n)O(n), where nnn is the number of periods. This is because each call to calculateFutureValue results in exactly one additional recursive call until the base case is reached.

**Optimization:**

* **Memoization:** To avoid recalculating the future value for the same parameters, you can use memoization. This involves storing results of previous calculations and reusing them, which transforms the time complexity to O(n)O(n)O(n) with added space complexity for storing results.
* **Iterative Approach:** For large numbers of periods, an iterative approach using a loop might be more efficient in terms of both time and space. This avoids the overhead of recursive calls and the risk of stack overflow.