

scientific-computing-hw3-work2

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1 Work2

For $fib(n) = n \leq 2 : fib(n-1) + fib(n-2)$

is exponential due to redundant recursive calls forming a binary recursion tree. Each call branches into two, leading to approximately $O(\phi^n)$ growth, where $\phi = \frac{1+\sqrt{5}}{2} \approx 1.618$ is the golden ratio. In Big-O notation, this is commonly simplified and bounded above by:

$$O(2^n)$$

For the second one, it is linear, as it performs a single loop from 3 to n , executing constant-time operations in each iteration. Thus, the time complexity is:

$$O(n)$$