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Task 14

2024

1. What is the time complexity:
   1. **1.1** and **1.2** have a time complexity of **O (log n)**.
   2. **1.3** has a time complexity **of O(n).**
2. Recursion

A screenshot of a computer code

Description automatically generated

Conclusion: I was able to create a function that can calculate the sum of the digits of any natural number using a recursive approach. It's pretty cool how it works: it keeps breaking down the number into smaller pieces until there's nothing left. Then it adds up all those pieces to get the final sum. I tested it with a really big number, 1983718947864287, and it worked perfectly, giving me a result of 92. It's a simple yet effective solution to a common problem.



A screenshot of a computer code

Description automatically generated

Conclusion: The code effectively calculates the sum of numbers from 0 to a given number using a recursive approach. It breaks down the problem into smaller subproblems, each calculating the sum of numbers from 0 to a smaller number. By repeatedly calling itself with decreasing values of n, the function eventually reaches the base case of n = 0, where the sum is 0. The results of these recursive calls are then combined to obtain the final sum. This recursive solution provides a concise and elegant way to solve the problem, demonstrating the power of recursion in problem-solving.

A screenshot of a computer program

Description automatically generated

Conclusion: I used fib\_function to calculate the nth Fibonacci number. It works by following the Fibonacci sequence rule: the next number is the sum of the previous two. The function keeps calling itself with smaller and smaller numbers until it reaches the base cases of 0 and 1. While this recursive approach is simple to understand, it's not very efficient because it recalculates the same numbers many times.

General conclusion: It was really interesting to work on these recursive functions. I was able to create solutions for a variety of problems, from simple digit summation to complex Fibonacci calculations. I found the recursive approach to be a powerful tool, allowing me to break down complex problems into simpler subproblems.