

CS502 IDEA SOLUTION ASSIGNMENT 1 2023

Solution Question # 01:

Pseudo code for adding the digits of an integer number:

Algorithm: SumDigits

Input: integer number

Output: sum of the digits

1. Initialize a variable "sum" to 0.
2. Convert the integer number to a string.
3. Iterate over each character, "digit", in the string:
 - Convert the "digit" back to an integer.
 - Add the integer digit to the "sum".
4. Return the "sum" as the output.

Solution Question # 02:

Calculation of worst-case time complexity $T(n)$ of the algorithm:

Let's analyze the steps of the algorithm to determine their execution time and calculate the worst-case time complexity.

1. Initializing the variable "sum" takes constant time: $O(1)$.
2. Converting the integer number to a string takes $O(\log n)$, where n is the magnitude of the integer.
3. Iterating over each character in the string takes $O(\log n)$ time, as there are $\log n$ digits in the integer.
4. Converting each digit back to an integer takes constant time: $O(1)$.
5. Adding the integer digit to the "sum" takes constant time: $O(1)$.
6. Returning the "sum" as the output takes constant time: $O(1)$.

Therefore, the total worst-case running time $T(n)$ can be expressed as:

$$T(n) = O(1) + O(\log n) + O(\log n) + O(1) + O(1) + O(1) = O(\log n)$$

Hence, the worst-case time complexity of the algorithm is $O(\log n)$, where n is the magnitude of the integer.

Please rephrase and provide your own simplified explanations.



+923137375444



/asksolutionservices/



ASK Solution Services



SUBSCRIBE



asksolutionservices@gmail.com