



STONES DISTRIBUTION

COURSE WORK #09

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PROBLEM STATEMENT

You have N stones ($1 \leq N \leq 20$) with weights $w_1, w_2, \dots, w_N$ ($1 \leq w_i \leq 100000$). You need to distribute stones between two stacks in the way to get the smallest weight difference.

Input. The first string contains the number N . The second string contains N numbers — the stone weights w_i , divided by spaces.

Output. The single number — the smallest weight difference of the two stacks.

PROBLEM STATEMENT

Example

Input:

5

5 8 13 27 14

Output: 3

$$(27+8) - (13+14+5) = 35 - 32 = 3$$

THE PROBLEM SOLVING

We can use a simple recursive approach to solve this problem, or dynamic programming approaches with memoization or tabulation.

The recursive approach has a time complexity of $O(2^N)$ and both dynamic programming approaches have a time complexity of $O(N * \text{Sum})$.

The possible maximum sum of all stones is $N * 100\,000 = 2\,000\,000$.

Thus, for the recursive approach, the time complexity will be $O(2^{20}) = O(1\,048\,576)$, and for the dynamic programming approaches — $O(20 * 2\,000\,000) = O(40\,000\,000)$. The choice is obvious.

The image features a dark gray background with a subtle pattern of concentric circles. In the four corners, there are white, stylized circuit board traces with small circles at the end of the lines, resembling electronic components or data paths.

**THANK
YOU!**