Optimal Stick Cutting

Time: 1 sec / Memory: 2 GB

Problem Statement

You are given a stick of length x and your task is to divide it into n sticks, with specified lengths such that their total length is x.
In each step, you can select any stick and cut it into two smaller sticks. The cost of a cut is equal to the length of the original stick.
What is the minimum total cost required to achieve the desired division?

Input

The first line has two integers x and n, representing the length of the stick and the number of sticks to be obtained after the division.
The second line has n integers $d_1, d_2, \ldots, d_n$, representing the lengths of the sticks after the division.

Output

Output a single integer: the minimum cost required to complete the division.

Constraints

- $1 \leq x \leq 10^9$
- $1 \leq n \leq 2000$
- $\sum d_i = x$

Example

Input:

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8 3
2 3 3
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Output: