

SWE2004: Principles in Programming(Spring 2014)

Programming Lab #12

Due-date: June 5, 14:45PM

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Description

You have to cut a wood stick into several pieces. The most affordable company, Analog Cutting Machinery (ACM), charges money according to the length of the stick being cut. Their cutting saw allows them to make only one cut at a time.

It is easy to see that different cutting orders can lead to different prices. For example, consider a stick of length 10 m that has to be cut at 2, 4, and 7 m from one end. There are several choices. One can cut first at 2, then at 4, then at 7. This leads to a price of $10 + 8 + 6 = 24$ because the first stick was of 10 m, the resulting stick of 8 m, and the last one of 6 m. Another choice could cut at 4, then at 2, then at 7. This would lead to a price of $10 + 4 + 6 = 20$, which is better for us.

Your boss demands that you write a program to find the minimum possible cutting cost for any given stick.

Input

The input will consist of several input cases. The first line of each test case will contain a positive number l that represents the length of the stick to be cut. You can assume $l < 1,000$. The next line will contain the number n ($n < 50$) of cuts to be made.

The next line consists of n positive numbers c_i ($0 < c_i < l$) representing the place where the cuts must be made, given in strictly increasing order.

An input case with $l = 0$ represents the end of input.

Output

Print the cost of the minimum cost solution to cut each stick in the format shown below.

Sample Input

100
3
25 50 75
10
4
4 5 7 8
0

Sample Output

The minimum cutting is 200.
The minimum cutting is 22.