

Merging Companies

Time Limit: 2 seconds

Problem Description

There are n companies c_1, \dots, c_n in the ALGO group. Recently, Mr. Rhythm, the chairman of the ALGO group, determined to merge all these n companies into one. However, according to companies laws, he can only merge two companies into a new one at a time. In addition, the new company must issue new ID cards to its employees. If it has x employees, then it has to issue x new ID cards. I.e., if Mr. Rhythm merges companies A and B into C where A has x_A employees and B has x_B employees, then C has to issue $x_A + x_B$ new ID cards. Assume there are 3 companies c_1, c_2, c_3 having $x_1 = 4, x_2 = 6, x_3 = 20$ employees. There are three ways to merge them into one:

- Merge c_1 and c_2 into c_4 , then merge c_3 and c_4 . The total number of ID cards issued is $(4 + 6) + (20 + 10) = 40$.
- Merge c_1 and c_3 into c_4 , then merge c_2 and c_4 . The total number of ID cards issued is $(4 + 20) + (6 + 24) = 54$.
- Merge c_2 and c_3 into c_4 , then merge c_1 and c_4 . The total number of ID cards issued is $(6 + 20) + (4 + 26) = 56$.

Mr. Rhythm has to merge the n companies in a clever order to ensure that the number of the issued ID cards during the $n - 1$ merge processes is minimized. Suppose every employee will stay in the new company during the merge processes, and company c_i has exactly x_i employees. Write a program to compute the minimum number of the ID cards issued during the merging process.

Technical Specifications

1. The number of test cases is no more than 20.
2. Basic: $2 \leq n \leq 2000$.
3. Hard: $2 \leq n \leq 20000$.
4. $1 \leq x_i \leq 200$ for every $i \in \{1, \dots, n\}$.

Input Format

The first line of the input file contains an integer indicating the number of test cases. The first line of each test case contains an integer n indicating the number of companies in the ALGO group. In the following line, there are n integers x_1, \dots, x_n separated by blanks. x_i indicates the number of employees in the i -th company c_i .

Output Format

For each test case, output the minimum number of the ID cards issued in the merging process.

Sample Input

```
2
3
4 6 20
5
1 2 9 8 8
```

Sample Output

```
40
59
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