Getting Started with Competitive Programming

Problem Solving session – Week 2

Problem Statement 1

You have a set of N slips of different colors. The i-th slip has the number Li written on it.

Suppose we have a set S of three slips with the numbers a, b, and c written on it. This collection of slips S is called a *nice triplet* if the numbers satisfy all the following conditions:

- $a<b+c$
- $b<c+a$
- $c<a+b$

How many different nice triplets can be formed? Two collections of slips are considered different when there is a color that occurs in only one of them.

Constraints

- All values in input are integers.
- $3 \leq N \leq 2 \times 10^3$
- $1 \leq Li \leq 10^3$

Input

Input is given from Standard Input in the following format:

```
N

L1, L2, ... LN
```

Constraints

Print the number of different triangles that can be formed.

Sample Input 1

```
4

3 4 2 1
```

Sample Output 1

```
1
```

Only one nice triplet can be formed using the first, second, and third slips.

Sample test cases:

	Input	Output
Test Case 1	16 1 13 987 144 34 21 610 233 55 2 89 3 377 1 8 5	0
Test Case 2	3 4 2 3	1
Test Case 4	6 637 493 886 16 289 242	5
Test Case 5	4 3 4 2 1	1
Test Case 6	3 1 1000 1	0
Test Case 7	7 218 786 704 233 645 728 389	23

Problem Statement 2

You have decided to join a local study group for this NPTEL course. You are going to be visiting $N-1$ fellow learners who happen to be there. These N learners, including you, are numbered 1 through N, and the **amicability** of learner i is A_i.

The N learners will arrive at the place one by one in some order. To make sure nobody gets lost, you have set the following rule: learners who have already arrived there should form a circle, and a learner who has just arrived there should cut into the circle somewhere.

When each learner, except the first one to arrive, arrives at the place, the learner gets **good vibes** equal to the smaller of the **amicability** of the clockwise adjacent learner and that of the counter-clockwise adjacent learner. The first learner to arrive gets 0 good vibes.

What is the maximum total good vibes that the N learners can get by optimally choosing the order of arrivals and the positions in the circle to cut into?

Constraints

- All values in input are integers.
- $2 \leq N \leq 2 \times 10^5$
- $1 \leq A_i \leq 10^9$

Input

Input is given from Standard Input in the following format:

N A_1, A_2,...A_N

Output

Print the maximum total good vibes the N learners can get.

Sample test cases:

	Input	Output
Test Case 1	4 2 2 1 3	7
Test Case 2	7 1 1 1 1 1 1 1	6
Test Case 3	6 3 6 4 5 4 7	29
Test Case 4	10 8 6 10 3 8 5 2 5 1 1	64