



MIKROSKIL IDEAFUSE COMPETITION 2025

War Simulation: Pairing

Once upon a time, there was a legendary tactician who understood the art of psychological warfare.

Before every battle, he would arrange his armies with perfect balance:

- His **weakest soldiers** fought the **strongest enemy soldiers**, to make the enemy overconfident.
- His **strongest soldiers** fought the **weakest enemies**, to crush them decisively.

Over several rounds, he repeated this pairing strategy to maintain balance until only **two grand armies** remained.

Your task is to simulate this **pairing and merging process**.

You are given:

- A number of armies, $M = 2^N$ (so always a power of two).
- Each army's power level.

Process:

1. Sort all armies from weakest to strongest.
2. Pair the **weakest** with the **strongest**, the **second weakest** with the **second strongest**, and so on.
3. The **power of each new group** is the **sum** of the two armies' powers.
4. After one full round of pairing, the number of groups is halved.
5. Repeat the process until exactly **two groups remain**.
6. Output the total powers of the final two groups in **ascending order**.

Input Format

- The input starts with an integer N — number of pairing rounds ($1 \leq N \leq 15$)
- The next line contains 2^N integers, p_i — power of the i -th army ($1 \leq p_i \leq 10^6$)

Output Format

- Output the answer into one line $A \ B$, where $A \leq B$ are the total powers of the final two groups.

Sample Input 1

```
2
1 2 3 4
```

Sample Output 1

```
5 5
```

Explanation

Total armies = $2^2 = 4$ Sorted powers: [1, 2, 3, 4]

Round 1:

- Pair (1,4) $\rightarrow$ 5
- Pair (2,3) $\rightarrow$ 5 New groups: [5, 5]

Only 2 groups remain $\rightarrow$ stop.

Final output: 5 5

Sample Input 2

```
3
1 2 2 4 4 4 4 8
```

Sample Output 2

```
14 15
```

Explanation

Initial sorted: [1 2 2 4 4 4 4 8]

Round 1: (1+8)=9, (2+4)=6, (2+4)=6, (4+4)=8 $\rightarrow$ [9, 6, 6, 8]

Round 2: Sorted: [6, 6, 8, 9] (6+9)=15, (6+8)=14 $\rightarrow$ [15, 14]

Final output: 14 15