

IOI Training Camp 2018 Practice Test 1

Bracket Pairs

Baba loves brackets. So much so, that rather than just use plain brackets like $()$, $\{\}$, or $[]$, he has invented his own notation that allows him to use many more types of brackets.

Each type of bracket is designated by an integer. A negative integer $-x$ represents an opening bracket of type x ; while a positive integer x represents a closing bracket of type x . Any sequence of such integers is then called a bracket-pair sequence.

A balanced bracket-pair sequence can be defined recursively as follows:

- The empty sequence is a balanced bracket-pair sequence.
- If S is a balanced bracket-pair sequence, then $-x S x$ is a balanced bracket-pair sequence for any positive integer x .
- If S and T are balanced bracket-pair sequences, then $S T$ is a balanced bracket-pair sequence.

For example, "-1 -2 2 -3 -4 4 3 1" is a balanced bracket-pair sequence, but "-1 -2 1 2" is not.

Baba has a bracket-pair sequence (which may or may not be balanced) consisting of N integers. There are 2^N ways to form a subsequence of his sequence. He wants to know how many of these subsequences are balanced.

Help him to calculate this number, modulo $10^9 + 7$.

Input

The first line contains a single integer N denoting the number of brackets in his sequence.

The second line contains N space-separated integers A_1, A_2, \dots, A_N denoting the types of brackets. A negative number means an opening bracket; a positive number means a closing bracket.

Output

In a single line print the required answer.

General Constraints

Unless otherwise mentioned, the following constraints are met throughout all subtasks:

- $1 \leq N \leq 100$
- $-10^9 \leq A_i \leq 10^9$
- $A_i \neq 0$
- It is *not* guaranteed that each opening bracket has a closing bracket of same type and vice-versa.

Subtasks

Subtask 1 (25 Points):

- $N \leq 20$

Subtask 2 (75 Points):

- $N \leq 100$

Sample Input 1

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11
-1 -2 9 2 -3 -4 3 4 8 8 1
```

Sample Output 1

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12
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Limits

Time: 2 seconds

Memory: 512 MB