# Parallel Arrays

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|---|---|
| Input file: | **standard input** |
| Output file: | **standard output** |
| Time limit: | 1 second |
| Memory limit: | 256 megabytes |

Given the array $[1, 2, \ldots, 2 \cdot n]$, partition it into 2 subsequences $a$ and $b$ of length $n$ such that each element of the original array is present in one of $a$ or $b$. A subsequence is a sequence that can be derived from the given array by deleting zero or more elements without changing the order of the remaining elements.

For each index $i$ ($1 \le i \le n$), you are given one of the three following constraints: $a_i + b_i = v_i$, $|a_i - b_i| = v_i$, or $\max(a_i, b_i) = v_i$. Find the number of possible subsequences $a$ and $b$, modulo $10^9 + 7$. It is guaranteed there exists at least one partition that satisfies the constraints.

## Input

The first line of input contains a single integer $n$ ($1 \le n \le 10^5$).

The next $n$ lines each contain two integers $t_i$ and $v_i$ ($1 \le t_i \le 3, 1 \le v_i < 4 \cdot n$) — the constraints on $a_i$ and $b_i$.

If $t_i = 1$, $v_i = a_i + b_i$.

If $t_i = 2$, $v_i = |a_i - b_i|$.

If $t_i = 3$, $v_i = \max(a_i, b_i)$.

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There are 10 tests, not including samples. Each test is worth $\frac{100}{10} = 10$ points.

## Output

Output a single integer — the number of possible ways to partition the array $[1, 2, \ldots 2 \cdot n]$ into $a$ and $b$ that satisfy the constraints. Output your answer modulo $10^9 + 7$.

## Example

| standard input | standard output |
|---|---|
| 5<br>1 5<br>3 5<br>3 6<br>2 2<br>1 18 | 4 |

## Note

In the sample test, the 4 ways to partition the array are:

- $a = [1, 2, 3, 7, 8]$ and $b = [4, 5, 6, 9, 10]$

- $a = [1, 2, 3, 9, 10]$ and $b = [4, 5, 6, 7, 8]$

- $a = [4, 5, 6, 7, 8]$ and $b = [1, 2, 3, 9, 10]$

- $a = [4, 5, 6, 9, 10]$ and $b = [1, 2, 3, 7, 8]$

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Problem Idea: superhelen

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Problem Preparation: xug

Occurrences: Novice D