New Year Patterns

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

On the eve of the first qualifying round of the Innopolis Open, Tatyana and Renata, the olympiad managers, started thinking about New Year decorations for the university. Tatyana suggested hanging garlands, but there was almost no time left to decorate the venue before the contest. Then Renata decided to at least prepare a computer sketch of the future festive installation.

— Let's do something mathematical! — Renata suggested. — For example, let's draw a pattern made of glowing lines. Their intersections will resemble the facets of New Year decorations.

For help, the managers turned to the teachers Amir and Ilnur. Amir quickly prepared a program for creating the sketch. Now, every time someone entered two numbers k and b, a line

$$y = kx + b.$$

appeared on the laptop screen.

Ilnur looked more closely at the resulting image and noticed that some quadruples of lines bound parallelograms. Tatyana liked the idea of counting such figures: their number could be shown on the screen next to the pattern.

However, Amir's program allowed adding only one line at a time. Moreover, sometimes someone entered values of k and b that had already been used, and the new line completely coincided with one of the existing ones. In that case, the pattern itself did not change.

Help the organizers: after each line is added, determine how many different non-degenerate parallelograms can be formed using all the lines drawn by that moment.

A parallelogram is considered formed if each of its four sides lies on one of the drawn lines, and these four lines are pairwise distinct. Lines that coincide on the plane are considered to be one line, no matter how many times they are added. Parallelograms are considered different if they occupy different regions of the plane. The presence of other drawn lines inside the parallelogram or intersecting its sides does not affect the count.

Since the answer may be very large, output it modulo $10^9 + 7$.

Input

The first line contains one integer q ($1 \le q \le 2 \cdot 10^5$) — the number of line additions.

The next q lines contain two integers k_i and b_i ($-10^9 \le k_i, b_i \le 10^9$). The operation with number i adds the line $y = k_i x + b_i$ to the plane.

There is no guarantee that the added lines are distinct.

Output

Print q lines. In the i-th line, output the number of different non-degenerate parallelograms after the first i line additions modulo $10^9 + 7$.

Scoring

The tests are divided into subtasks listed in the table below. Points for a subtask are awarded only if the solution successfully passes all tests of this subtask and all subtasks listed in the column «Required subtasks».

In each subtask, it is necessary to correctly output the answers after all line additions. The constraints from the statement remain in effect unless otherwise specified.

Subtask	Points	Additional constraints	Required subtasks
0	0	Sample from the statement	—
1	10	$q \leq 30$	—
2	15	$q \leq 2000$	1
3	20	All added lines are pairwise distinct	—
4	15	$k_i \in \{0, 1\}$ for all i	—
5	40	No additional constraints	1–4

Example

standard input	standard output
10 0 0 0 2 1 0 1 3 0 0 1 5 -1 0 -1 2 0 4 1 0	0 0 0 1 1 3 3 7 15 15