Number of paths P19587_en

You are located on the point $(0, 0)$ of an infinite integer grid, and you need to go to (x, y). You have two follow two conditions when moving:

- At every step, you can only go to any of the eight points horizontally, vertically or diagonally adjacent to the point where you currently are.
- Every movement must strictly reduce the geometric distance to (x, y).

In how many ways can you reach (x, y)?

Input

Input consists of several cases with two integers x and y, each between -2000 and 2000. A case with $x = y = 0$ ends the input.

Output

For every case, print the number of ways to go from $(0, 0)$ to (x, y). Since this number can be huge, compute it modulo $10^8 + 9$.

Sample input 1

```
0 1
-1 -1
0 -2
-5 3
2000 2000
0 0
```

Sample output 1

```
1
3
7
9132
6647843
```

Problem information

Author: Salvador Roura

Generation: 2026-01-25T10:24:42.261Z