European Girls'
Olympiad in Informatics
EGOI - 2022
Antalya / Türkiye

legowall
Day1 Tasks
English (ISC)

Lego Wall

| Problem Name	Lego Wall
Input file	standard input
Output file	standard output
Time limit	3 seconds
Memory limit	256 megabytes

There are two kinds of lego bricks, characterized by their dimensions: 1 × 1 × 1 and 2 × 1 × 1 (width, height and depth, respectively, as shown below). You have an infinite supply of each of them, and within each kind, they are indistinguishable.
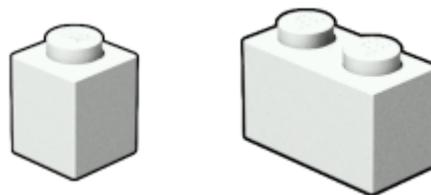

A lego brick is always used in upright position. The faces on the sides are made from identical material and are indistinguishable, except their dimensions.

We consider two lego bricks to be **locked** if one is directly above the other. Two bricks b_0 and b_k are said to be **connected** if there is a sequence of bricks $b_0, b_1, ..., b_k$ such that bricks b_{i-1} and b_i are locked for all i such that $1 \leq i \leq k$. We consider an arrangement of bricks **connected** if each pair of bricks within this arrangement is connected.

You would like to build a thin rectangular wall with width w and height h (and depth 1) such that the wall contains **no holes** and its brick arrangement is **connected**. As an example, below is a such a lego wall of width 4 and height 3:
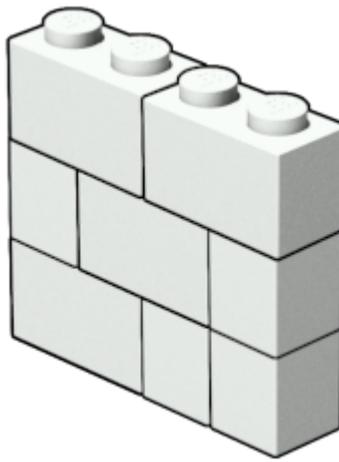
On the other hand, the following 4 × 3 lego wall is **not** connected, and therefore is not desired:
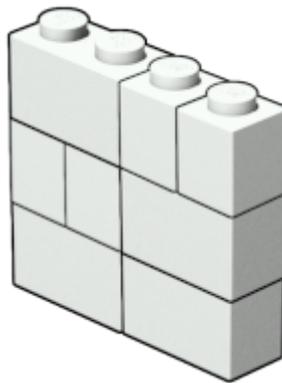
How many ways of building a **connected** wall **with no holes** are there? Since this number may be large, output it modulo 1 000 000 007.

Note that the mirrored (180-degree rotated) version of a lego wall is considered to be a different wall, unless the mirrored wall looks identical to the original wall.

Input

The input consists of a single line containing two space separated integers w and h ($1 \le w \le 250\,000$, $2 \le h \le 250\,000$, $w \times h \le 500\,000$) – the width and the height of the wall, respectively.

Output

Output a single integer – the number of hole-free connected lego walls of dimensions $w \times h$, modulo 1 000 000 007.

Scoring

Subtask 1 (14 points): $w = 2$.

Subtask 2 (12 points): $h = 2$.

Subtask 3 (18 points): $w, h \leq 100$.

Subtask 4 (30 points): $w \leq 700$.

Subtask 5 (20 points): $h \leq 700$.

Subtask 6 (6 points): no additional constraints.

Examples

Input	Output
2 2	3
3 3	12
5 7	1436232

Explanation for the first input

The three connected 2 × 2 walls one can build are: