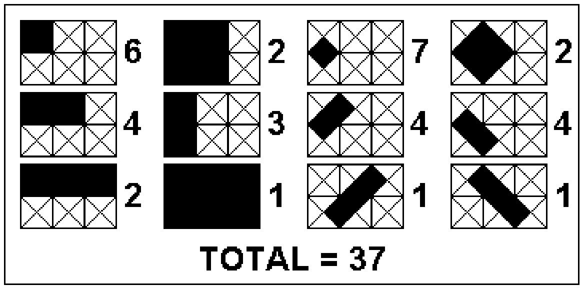
Project Euler #147: Rectangles in cross-hatched grids

This problem is a programming version of Problem 147 from projecteuler.net

In a 3x2 cross-hatched grid, a total of 37 different rectangles could be situated within that grid as indicated in the sketch.



There are 5 grids smaller than 3x2, vertical and horizontal dimensions being important, i.e. 1x1, 2x1, 3x1, 1x2 and 2x2. If each of them is cross-hatched, the following number of different rectangles could be situated within those smaller grids:

1x1: 1
2x1: 4
3x1: 8
1x2: 4
2x2: 18

Adding those to the 37 of the 3x2 grid, a total of 72 different rectangles could be situated within 3x2 and smaller grids.

How many different rectangles could be situated within $M \times N$ and smaller grids? To make the task more challenging, you need to output the number of upright and diagonal rectangles separately.

Since the numbers can be large, output them modulo $10^9 + 7$.

Input Format

The first line of input contains T, the number of test cases.

Each test case consists of one line containing two integers, M and N, separated by a space.

Constraints

$1 \leq T \leq 10000$

In test file #1: $1 \leq M, N \leq 30$
In test file #2: $1 \leq M, N \leq 50$
In test file #3: $1 \leq M, N \leq 1000$
In test file #4: $1 \leq M, N \leq 10^9$

Output Format

For each test case, output a single line containing two integers separated by single spaces:

- The number of upright rectangles.
- The number of diagonal rectangles.

Sample Input

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1
3 2
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Sample Output

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40 32
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Explanation

Of the 72 rectangles that could be situated within 3×2 and smaller grids, 40 of those are upright and 32 are diagonal.