

Swap (Easy - Level 2)

Let's play with sequence of non negative integer. Given two sequence of n non negative integers (a_1, a_2, \dots, a_n) and (b_1, b_2, \dots, b_n) . Both sequence has maximum element less than k , $\max(a_1, a_2, \dots, a_n) < k$ and $\max(b_1, b_2, \dots, b_n) < k$. The game rule is you can edit both sequence with this operator: swap a_i and b_j with $1 \leq i \leq n$, and the goal is to make sequence \mathbf{a} and \mathbf{b} become increasing sequence: $a_i \leq a_j$ if and only if $i \leq j$ and $b_i \leq b_j$ if and only if $i \leq j$. But not all initial sequence \mathbf{a} and \mathbf{b} can be solved.

For example $(2,0)$ and $(0,1)$ is a pair of sequence that can't be solved:

- If you don't swap any element, you have $(2,0)$ and $(0,1)$, but sequence $(2,0)$ is not increasing.
- If you swap first element only, then the pair become like this $(0,0)$ and $(2,1)$, sequence $(2,1)$ is not increasing.
- If you swap second element only, then the pair become like this $(2,1)$ and $(0,0)$, again $(2,1)$ is not increasing.
- If you swap both element, then the pair become like this $(0,1)$ and $(2,0)$, again $(2,0)$ is not increasing

So it's impossible to solve if initial sequence is $(2,0)$ and $(0,1)$, because all possible move can't make both sequence become increasing.

Now given n and k , your task is to compute number of different pair of initial sequence (\mathbf{a}, \mathbf{b}) that can be solved with game described above.

Input

First line there is an integer T denoting number of test case, then T test cases follow.

For each case, there are two integers n and k written in one line, separated by a space.

Output

For each case, output number of different pair of initial sequence (\mathbf{a}, \mathbf{b}) , since the answer can be large, output the answer modulo 10^9+7 .

Constraints

$$0 < T \leq 10^5$$

$$0 < \min(n, k) \leq 2$$

$$0 < \max(n, k) < 10^9$$

Example

Input:

2 1
1 2
1 3
2 2
3 2
2 3

Output:

1
4
9
11
26
46

Explanation

Here is list of all possible pair of initial sequence (**a,b**) on each case:

Case 1: $\{[(0,0),(0,0)]\}$

Case 2: $\{[(0),(0)],[(0),(1)],[(1),(0)],[(1),(1)]\}$

Case 3: $\{[(0),(0)],[(0),(1)],[(0),(2)],[(1),(0)],[(1),(1)],[(1),(2)],[(2),(0)],[(2),(1)],[(2),(2)]\}$

Case 4: $\{[(0,0),(0,0)],[(0,0),(0,1)],[(0,0),(1,1)],[(0,1),(0,0)],[(0,1),(0,1)],[(0,1),(1,0)],[(0,1),(1,1)],[(1,0),(0,1)],[(1,1),(0,0)],[(1,1),(0,1)],[(1,1),(1,1)]\}$

Case 5: $\{[(0,0,0),(0,0,0)],[(0,0,0),(0,0,1)],[(0,0,0),(0,1,1)],[(0,0,0),(1,1,1)],[(0,0,1),(0,0,0)],[(0,0,1),(0,0,1)],[(0,0,1),(0,1,0)],[(0,0,1),(0,1,1)],[(0,0,1),(1,1,0)],[(0,0,1),(1,1,1)],[(0,1,0),(0,0,1)],[(0,1,0),(1,0,1)],[(0,1,1),(0,0,0)],[(0,1,1),(0,0,1)],[(0,1,1),(0,1,1)],[(0,1,1),(1,0,0)],[(0,1,1),(1,0,1)],[(0,1,1),(1,1,1)],[(1,0,0),(0,1,1)],[(1,0,1),(0,1,0)],[(1,0,1),(0,1,1)],[(1,1,0),(0,0,1)],[(1,1,1),(0,0,0)],[(1,1,1),(0,0,1)],[(1,1,1),(0,1,1)],[(1,1,1),(1,1,1)]\}$

Case 6: $\{[(0,0),(0,0)],[(0,0),(0,1)],[(0,0),(0,2)],[(0,0),(1,1)],[(0,0),(1,2)],[(0,0),(2,2)],[(0,1),(0,0)],[(0,1),(0,1)],[(0,1),(0,2)],[(0,1),(1,0)],[(0,1),(1,1)],[(0,1),(1,2)],[(0,1),(2,2)],[(0,2),(0,0)],[(0,2),(0,1)],[(0,2),(0,2)],[(0,2),(1,0)],[(0,2),(1,1)],[(0,2),(1,2)],[(0,2),(2,0)],[(0,2),(2,1)],[(0,2),(2,2)],[(1,0),(0,1)],[(1,0),(0,2)],[(1,1),(0,0)],[(1,1),(0,1)],[(1,1),(0,2)],[(1,1),(1,1)],[(1,1),(1,2)],[(1,1),(2,2)],[(1,2),(0,0)],[(1,2),(0,1)],[(1,2),(0,2)],[(1,2),(1,1)],[(1,2),(1,2)],[(1,2),(2,1)],[(1,2),(2,2)],[(2,0),(0,2)],[(2,1),(0,2)],[(2,1),(1,2)],[(2,2),(0,0)],[(2,2),(0,1)],[(2,2),(0,2)],[(2,2),(1,1)],[(2,2),(1,2)],[(2,2),(2,2)]\}$

Other Info

Test case (**n** and **k**) is generated randomly using this rule:

- Probability that $n > k$ or $n \leq k$ is ~50% each.

- Maximum **n** and **k** is random log-uniform.
- Minimum **n** and **k** is random uniform.

[Click here if you want to know my program speed and other detail.](#)

Time limit > 100× my program top speed.

See also: [Another problem added by Tjandra Satria Gunawan](#)