

12339 Help Hermione

Arithmancy is one of the most favorite subjects of Hermione Granger, the most intelligent witch of her generation. She was thinking about the last homework given by Professor Vector:

A peculiar magical creature can live in a rectangle drawn into a $n \times n$ square grid if and only if *the rectangle is not a square and its sides are parallel to the major axes*. Same conditions hold for higher dimensions (yes, the peculiar creature can even be 2500-dimensional!!!), i.e. if the sides parallel to the major axes are **all equal**, it cannot live inside the hyper box. For example, in a 3-dimensional grid, it can live inside a $2 \times 2 \times 3$ or a $3 \times 4 \times 5$ box, but it cannot live inside a $5 \times 5 \times 5$ *cube*!! In how many ways one can draw a k -dimensional hyper box inside a $n \times n \times \dots \times n$ (k times n) grid so that the peculiar creature can live inside the hyper box? A way is different from another way if at least one co-ordinate of one corner is different. For example, in a 4×4 grid, $\{(0,0), (0,3), (2,3), (2,0)\}$, $\{(1,0), (1,3), (3,3), (3,0)\}$ and $\{(0,0), (0,3), (4,3), (4,0)\}$ are 3 different ways but $\{(0,0), (0,3), (2,3), (2,0)\}$, $\{(0,3), (2,3), (2,0), (0,0)\}$ and $\{(2,3), (2,0), (0,0), (0,3)\}$ are not different.

Hermione is quite confident of solving it, but she has to go now to the Room of Requirement with Harry and Ron for a secret meeting. Your task is to write a program that solves the problem for Hermione.

Input

The first line contains a single integer T ($T \leq 5,000$) which denotes the number of test cases. Each of the following T lines contains two integers, n ($1 \leq n \leq 10^9$) and k ($2 \leq k \leq 2500$).

Output

For each test case, output a single integer in each line which is the number of ways to draw k -dimensional axis-parallel hyper boxes in an $n \times n \times \dots \times n$ grid. As this number can be quite large, output the *answer mod* $1,000,000,007$ ($10^9 + 7$).

Sample Input

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2
3 2
2 2
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Sample Output

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22
4
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