

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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