Permutations and cycles (1) P64069_en

Write a program to count the number of permutations of $\{1, \ldots, n\}$ with exactly k cycles, where $1 \leq k \leq n$.

For instance, of the six permutations of $\{1, 2, 3\}$, we have:

- two with one cycle, which are: $(2, 3, 1)$ and $(3, 1, 2)$.
- three with two cycles, which are: $(2, 1, 3)$, $(1, 3, 2)$ and $(3, 2, 1)$.
- one with three cycles, which is: $(1, 2, 3)$.

Input

Input consists of several cases, each with n and k, such that $1 \leq k \leq n \leq 1000$.

Output

For every case, count the number of permutations of $\{1, \ldots, n\}$ with k cycles. As the result can be very large, make the computations modulo $10^8 + 7$.

Observation

Let c be the number of cases. The expected solution has total cost $O(1000^2 + c)$. You can get up to 80 points with test cases where $n \leq 100$, with a solution with cost $O(100^3 + c)$.

Problem information

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