Grading exams P40362_en

Professor Oak has graded n exams, and now he has to transfer the grades to some webpage. He has not sorted the exams at all, so he has a pile of n randomly permuted exams, which he will take one by one. In the screen, there is only space for ℓ lines at a time (with $2\ell \geq n$), each one corresponding to one student. Initially, the webpage shows the alphabetically first ℓ students. When the name of the next student is not among the ℓ visible lines, Prof. Oak will have to press the End key or the Home key before being able to introduce the grade.

For instance, suppose $n = 6$, $\ell = 4$, and that the names of the students correspond to the permutation 4 2 6 3 5 1. Initially, the screen will show the lines 1, 2, 3 and 4. Prof. Oak will directly introduce the grades of 4 and 2, press the End key (therefore, he will see the lines 3, 4, 5 and 6), introduce the grades of 6, 3 and 5, press the Home key, and introduce the grade of 1. In this example, the cost is 2. For the permutation 1 2 3 4 5 6 the cost is just 1, and for the permutation 6 1 5 2 4 3 it is 4.

Given n and ℓ, can you compute $c(n, \ell)$, the expected number of times that Prof. Oak will have to press the End and the Home keys while transferring all the grades? For instance, $c(2, 1) = 1.5$, because the permutation 1 2 has cost 1 and the permutation 2 1 has cost 2.

Input

Input consists of several cases, with n and ℓ. Assume $2 \leq n \leq 10^5$, $2\ell \geq n$ and $\ell \leq n$.

Output

For every case, print $(n!\,c(n, \ell))$ modulo $P = 10^9 + 7$. Note that we multiply by $n!$ to get rid of decimals, and we make the computations modulo P to avoid overflows.

Sample input 1

```
2 1
6 4
100000 60000
```

Sample output 1

```
3
1800
947828254
```

Problem information

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