E. Transforming Sequence

time limit per test: 7 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Let's define the transformation P of a sequence of integers $a_1, a_2, ..., a_n$ as $b_1, b_2, ..., b_n$, where $b_i = a_1 \mid a_2 \mid ... \mid a_i$ for all $i = 1, 2, ..., n$, where $\mid$ is the bitwise OR operation.

Vasya consequently applies the transformation P to all sequences of length n consisting of integers from 1 to 2^k - 1 inclusive. He wants to know how many of these sequences have such property that their transformation is a **strictly increasing** sequence. Help him to calculate this number modulo $10^9 + 7$.

Input

The only line of the input contains two integers n and k ($1 \le n \le 10^{18}$, $1 \le k \le 30\,000$).

Output

Print a single integer — the answer to the problem modulo $10^9 + 7$.

Examples

input
1 2
output
3

input
2 3
output
30

input
3 3
output
48