Colonization

Input file: `standard input`
Output file: `standard output`
Time limit: 5 seconds
Memory limit: 512 megabytes

Recently, Bytecja has begun the colonization of a newly discovered continent and its countless surrounding islands. Unfortunately, the indigenous people are not pleased with the arrival of the colonizers.

The colonization process on an island is as follows. There are n villages on the island, connected by $n-1$ bidirectional roads in such a way that you can get from any village to any other. In other words, the layout of villages and roads on each island forms a tree. Initially, in a village chosen by the colonizers, k colonizers appear, making this village colonized. Then, the colonizers can freely move along the roads or wait for the movements of other colonizers. A village is colonized the moment a colonizer arrives.

Taking over the whole island would be simple even with one colonizer, but there's a catch – if a colonized village is left without a waiting colonizer and it neighbors an uncolonized village, the locals might raid it, leading to a tragic outcome. So, this situation must be avoided. A colonizer has to guard such a village or be on the road between these villages, as the locals will definitely not bypass him.

The question for a given setup is the minimum number of k for which there's a choice of the initial village and a strategy for the colonizers' movements that allows for the whole island to be colonized.

Your task is to determine, given the number n, for each k, the possible road layouts on the island which require exactly k colonizers to be conquered. Two road layouts are considered different if the trees they represent are not isomorphic (meaning you need to count **unlabeled trees**). In other words, two road layouts are different if there is no bijection between villages in one layout and the villages in the other layout such that two villages in the first layout are connected by a road if and only if their corresponding villages in the second layout are connected by a road.

Since these numbers can be very large, you can provide the modulus of these numbers by a given prime.

Input

The first and only line of the standard input contains two integers n and p ($2 \le n \le 500$; $10^8 + 7 \le p \le 10^9 + 7$; p is a prime number), representing the considered number of villages on the island and the mentioned prime number, respectively.

Output

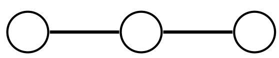
The first and only line of the standard output should contain n integers. The k-th number should represent the number of different road layouts among the n villages that require exactly k colonizers to be conquered, provided modulo p.

Examples

standard input	standard output
3 100000007	1 0 0
6 300000007	1 5 0 0 0 0
10 1000000007	1 104 1 0 0 0 0 0 0 0

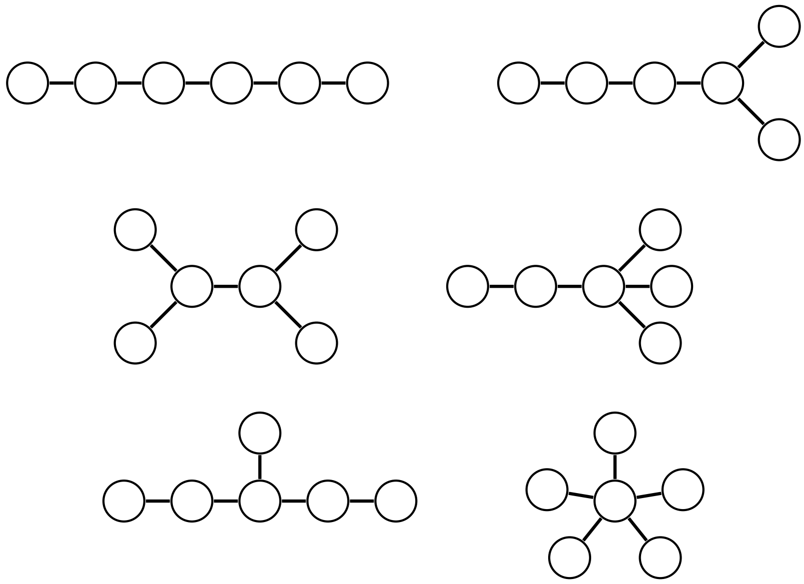
Note

In the first sample test, there is only one possible road layout and it looks as follows:



To colonize such an island, only one colonizer is needed, provided he doesn't start in the central village.

In the second sample test, there are 6 possible road layouts and they look as follows:



Only the top-left of these layouts can be colonized with the help of just one colonizer. For all the others, exactly two of them are required. For example, in the middle-right layout, they can start in the far-left village, move together two villages to the right, and then one of them will wait for the other, who will then consecutively colonize the remaining three villages.

In the third sample test, there is only one layout that requires three colonizers and it looks as follows: