Problem I. Interval-Free Permutations

Time limit: 2 seconds

Consider a permutation $p_1, p_2, \dots p_n$ of integers from 1 to n. We call a sub-segment $p_l, p_{l+1}, \dots, p_{r-1}, p_r$ of the permutation an *interval* if it is a reordering of some set of consecutive integers. For example, the permutation $(6, 7, 1, 8, 5, 3, 2, 4)$ has the intervals $(6, 7)$, $(5, 3, 2, 4)$, $(3, 2)$, and others.

Each permutation has some trivial intervals — the full permutation itself and every single element. We call a permutation *interval-free* if it does not have non-trivial intervals. In other words, interval-free permutation does not have intervals of length between 2 and $n - 1$ inclusive.

Your task is to count the number of interval-free permutations of length n modulo prime number p.

Input

In the first line of the input there are two integers t ($1 \le t \le 400$) and p ($10^8 \le p \le 10^9$) — the number of test cases to solve and the prime modulo. In each of the next t lines there is one integer n ($1 \le n \le 400$) — the length of the permutation.

Output

For each of t test cases print a single integer — the number of interval-free permutations modulo p.

Examples

standard input	standard output
4 998244353 1 4 5 9	1 2 6 28146
1 437122297 20	67777575

Note

For $n = 1$ the only permutation is interval-free. For $n = 4$ two interval-free permutations are $(2, 4, 1, 3)$ and $(3, 1, 4, 2)$. For $n = 5$ — $(2, 4, 1, 5, 3)$, $(2, 5, 3, 1, 4)$, $(3, 1, 5, 2, 4)$, $(3, 5, 1, 4, 2)$, $(4, 1, 3, 5, 2)$, and $(4, 2, 5, 1, 3)$. We will not list all 28146 for $n = 9$, but for example $(4, 7, 9, 5, 1, 8, 2, 6, 3)$, $(2, 4, 6, 1, 9, 7, 3, 8, 5)$, $(3, 6, 9, 4, 1, 5, 8, 2, 7)$, and $(8, 4, 9, 1, 3, 6, 2, 7, 5)$ are interval-free.

The exact value for $n = 20$ is 264111424634864638.