Pair Pressure

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	1024 megabytes

An array b of length $2k$ is called *good* if $b_{2i-1} = b_{2i}$ is satisfied over all $1 \le i \le k$. In other words, b consists of k consecutive pairs of equal elements.

For an array a, define its *score* as the maximum integer k such that there exists a *good* subsequence* of a of length $2k$.

You are given two integers n and M, where M is a prime number. Find the sum, modulo M, of the scores over all arrays of length $2n$ where each integer from 1 to n appears exactly twice.

* A subsequence of an array is a sequence that can be derived by deleting zero or more elements without changing the order of the remaining elements.

Input

The first line contains a single integer t ($1 \le t \le 20$) — the number of test cases.

Each of the next t lines contains two space-separated integers n ($1 \le n \le 400$) and M ($10^8 \le M \le 10^9$). It is guaranteed that M is a prime number.

It is guaranteed that the sum of n over all test cases does not exceed 400.

Output

For each test case, print the answer modulo M.

Example

standard input	standard output
3 2 998244353 3 973733479 4 998244353	8 150 4944

Note

In the first test case, for $n = 2$, there are 6 possible arrays where each integer from 1 to 2 appears exactly twice. The arrays and their respective scores are:

- $[1, 1, 2, 2]$: score 2 (using the subsequence $[1, 1, 2, 2]$).
- $[1, 2, 1, 2]$: score 1 (using the subsequence $[1, 1]$ or $[2, 2]$).
- $[1, 2, 2, 1]$: score 1 (using the subsequence $[1, 1]$ or $[2, 2]$).
- $[2, 1, 1, 2]$: score 1 (using the subsequence $[1, 1]$ or $[2, 2]$).
- $[2, 1, 2, 1]$: score 1 (using the subsequence $[1, 1]$ or $[2, 2]$).
- $[2, 2, 1, 1]$: score 2 (using the subsequence $[2, 2, 1, 1]$).

The sum of all scores is $2 + 1 + 1 + 1 + 1 + 2 = 8$.