

Problem A. Edges Counting

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 256 megabytes

We call a simple graph good if each component of the graph has at most one cycle.
Your task is to count the number of edges belonging to one cycle for all the good graphs with n labeled vertices.
In order to avoid calculations of huge integers, please report the total number of these edges modulo p .

Input

There are multiple test cases. The first line of the input contains two integers T and p ($1 \leq T \leq 3000$, $1 \leq p \leq 2^{30}$), indicating the number of test cases and the modulus. For each test case:
The first line contains the only integer n ($1 \leq n \leq 3000$).

Output

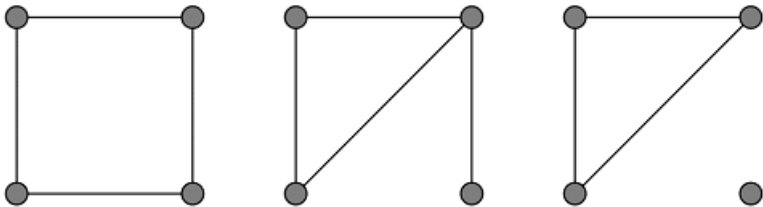
For each test case, output the total numbers of edges, each of which belongs to one cycle of a good graph with n labeled vertices, modulo p in a single line.

Example

standard input	standard output
7 998244353	0
1	0
2	3
3	60
4	1050
5	19380
6	393750
7	

Note

There are three types of good graphs having four labeled vertices in which at least one cycle exists.



The numbers of these types of graphs are 3, 12 and 4 respectively. Consequently, the total number of required edges is $3 \times 4 + 12 \times 3 + 4 \times 3 = 60$.