

IQ test

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 256 megabytes

Find $\sum_{i=0}^p a^i$ modulo p where p is a prime number.

Input

The first line of input contains a single integer T ($1 \leq T \leq 2000000$) — the number of testcases.

The first and only line of each testcase contains two integers a and p ($1 \leq a < p \leq 10^9$). p is guaranteed to be a prime number.

Output

Output $\sum_{i=0}^p a^i$ modulo p .

Example

standard input	standard output
2	3
2 5	0
998244352 998244353	