

Problem H. Humongous String

Input file: *standard input*
Output file: *standard output*
Time limit: 1 second
Memory limit: 512 mebibytes

Consider the alphabet $\Sigma = \{s_0, \dots, s_{k-1}\}$ of size k . Define the sequence of strings $\{T_i\}$ as follows:

- $T_0 = s_0$;
- $T_i = T_{i-1}s_{i \bmod k}$ for all integers $i \geq 1$.

Let $S = T_0T_1T_2\dots$ be an infinite string which is a concatenation of all strings $\{T_i\}$ in ascending order of their indices. For example, if $k = 3$, $s_0 = \text{"a"}$, $s_1 = \text{"b"}$, and $s_2 = \text{"c"}$, then $T_0 = \text{"a"}$, $T_1 = \text{"ab"}$, $T_2 = \text{"abc"}$, $T_3 = \text{"abca"}$, $T_7 = \text{"abcabcaab"}$ (and so on), and $S = \text{"aababcaabcaabcaab..."}.$

Denote the prefix of string S of length n by S_n . Given numbers n and k , count the number of distinct non-empty substrings of string S_n provided that $|\Sigma| = k$.

Input

The first line contains a single integer T ($1 \leq T \leq 10^5$), the number of test cases.

Then T lines follow. The i -th of these lines contains two integers n_i and k_i ($1 \leq n_i \leq 10^9$, $1 \leq k_i \leq 10^9$) separated by a single space: the length of string S_{n_i} and the size of alphabet Σ in the i -th test case.

Output

Print T lines. The i -th of them should contain a single integer: the answer for the i -th test case.

Example

standard input	standard output
7	1
1 3	2
2 3	5
3 3	8
4 3	11
5 3	17
6 3	23
7 3	