

# Shuffle

Input file:            **standard input**  
Output file:           **standard output**  
Time limit:            0.5 seconds  
Memory limit:         256 megabytes

*Shooting for the stars when you couldn't make a killing.*

Shadowice is playing with a deck which has  $mn$  **distinct** cards  $1, 2, 3, \dots, mn$ . At the very beginning, the cards in deck from bottom to top forms an ascending sequence  $1, 2, 3, \dots, mn$ . Now he decide to use a special method to shuffle his deck.

To describe the method more precisely, in each **shuffle**, Shadowice will execute the procedures below in order.

1. Split the deck into  $n$  plies  $p_1, p_2, p_3, \dots, p_n$ . Each pile has  $m$  cards. The lowest  $m$  cards belongs to pile  $p_1$ , and so on. Note that the cards in pile  $p_i$  keep the original order in the deck.
2. Create  $m$  new piles  $q_1, q_2, q_3, \dots, q_m$  with pile  $p_1, p_2, p_3, \dots, p_n$ .
  - 2-1. Draw the bottom card in  $p_1$ , which is the lowest card in  $q_1$ ;
  - 2-2. Draw the bottom card in  $p_2$ , put it on the top of  $q_1$ ;
  - 2-i. Draw the bottom card in  $p_i$ , put it on the top of  $q_1$ ;
  - ...
  - 2-n. Draw the bottom card in  $p_n$ , put it on the top of  $q_1$ .

Repeat the steps 2-1 ~ 2-n to create pile  $q_2, q_3, \dots, q_m$ .

3. Stack plie  $q_2$  onto  $q_1$ , stack plie  $q_3$  onto  $q_2$ , ..., stack pile  $q_m$  onto  $q_{m-1}$ , and generate a new deck.

If he shuffle the deck enough times, the order of the cards will be exactly the same as the very beginning. Now he wonder how many times he has to shuffle to see the initial state again. He must shuffle at least one time.

## Input

The input contains several test cases, and the first line is a positive integer  $T$  indicating the number of test cases which is up to 100.

For each test case, a line contains two positive integers  $n, m$  ( $2 \leq n \times m \leq 10^{18}$ ).

## Output

For each test case, output one line contains an integer: the smallest times Shadowice has to shuffle the deck to reach the initial state.

## Example

standard input	standard output
2	4
2 3	8
2 26	