

## A. Split the Multiset

time limit per test: 1 second  
memory limit per test: 512 megabytes

A *multiset* is a set of numbers in which there can be equal elements, and the order of the numbers does not matter. For example,  $\{2, 2, 4\}$  is a multiset.

You have a multiset  $S$ . Initially, the multiset contains only one positive integer  $n$ . That is,  $S = \{n\}$ . Additionally, there is a given positive integer  $k$ .

In one operation, you can select any positive integer  $u$  in  $S$  and remove one copy of  $u$  from  $S$ . Then, insert no more than  $k$  positive integers into  $S$  so that the sum of all inserted integers is equal to  $u$ .

Find the minimum number of operations to make  $S$  contain  $n$  ones.

### Input

Each test contains multiple test cases. The first line contains the number of test cases  $t$  ( $1 \leq t \leq 1000$ ). Description of the test cases follows.

The only line of each testcase contains two integers  $n, k$  ( $1 \leq n \leq 1000, 2 \leq k \leq 1000$ ).

### Output

For each testcase, print one integer, which is the required answer.

### Example

input	Copy
4	
1 5	
5 2	
6 3	
16 4	
output	Copy
0	
4	
3	
5	

### Note

For the first test case, initially  $S = \{1\}$ , already satisfying the requirement. Therefore, we need zero operations.

For the second test case, initially  $S = \{5\}$ . We can apply the following operations:

- Select  $u = 5$ , remove  $u$  from  $S$ , and insert  $2, 3$  into  $S$ . Now,  $S = \{2, 3\}$ .
- Select  $u = 2$ , remove  $u$  from  $S$ , and insert  $1, 1$  into  $S$ . Now,  $S = \{1, 1, 3\}$ .
- Select  $u = 3$ , remove  $u$  from  $S$ , and insert  $1, 2$  into  $S$ . Now,  $S = \{1, 1, 1, 2\}$ .
- Select  $u = 2$ , remove  $u$  from  $S$ , and insert  $1, 1$  into  $S$ . Now,  $S = \{1, 1, 1, 1, 1\}$ .

Using 4 operations in total, we achieve the goal.

For the third test case, initially  $S = \{6\}$ . We can apply the following operations:

- Select  $u = 6$ , remove  $u$  from  $S$ , and insert  $1, 2, 3$  into  $S$ . Now,  $S = \{1, 2, 3\}$ .
- Select  $u = 2$ , remove  $u$  from  $S$ , and insert  $1, 1$  into  $S$ . Now,  $S = \{1, 1, 1, 3\}$ .
- Select  $u = 3$ , remove  $u$  from  $S$ , and insert  $1, 1, 1$  into  $S$ . Now,  $S = \{1, 1, 1, 1, 1, 1\}$ .

Using 3 operations in total, we achieve the goal.

For the fourth test case, initially  $S = \{16\}$ . We can apply the following operations:

- Select  $u = 16$ , remove  $u$  from  $S$ , and insert  $4, 4, 4, 4$  into  $S$ . Now,  $S = \{4, 4, 4, 4\}$ .
- Repeat for 4 times: select  $u = 4$ , remove  $u$  from  $S$ , and insert  $1, 1, 1$  into  $S$ .

Using 5 operations in total, we achieve the goal.

Codeforces Round 958 (Div. 2)

Finished

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→ Problem tags

brute force greedy implementation  
math \*900

No tag edit access

→ Contest materials

- Announcement (en) ×
- Video Tutorial (en) ×
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