Dancing

Description

Every summer, HH will hold a summer camp called Happy Summer Camp. The happiest part of Happy Summer Camp is that every one will dance around the campfire on the last night of this camp.

When dancing around the campfire, each boy will dance with a girl and no one will dance alone. For convenience, boys are numbered from 1 to N while girls are also numbered from 1 to N.

At the beginning, boy numbered 1 will dance with girl numbered 1, boy numbered 2 will dance with girl numbered 2 and so on. Formally, we can define the matching between boys and girls as a sequence which composed of the number of girl dancing with boy numbered 1, the number of girl dancing with boy numbered 2, and so on.

Once a minute passes, some girl may swap with other girls. Actually, on the i-th minute (starting from 1), the sequence defined above will be i-th lexicographical sequence among all possible ones. Once the sequence is the largest lexicographical sequence, all girls stop swapping. That is, the sequence won't be changed anymore.

However, HH likes uniform. He hopes that each boy will dance with the girl who has the same number. Therefore, HH is wondering how many boys will dance with the girl with the same number on the K-th minutes.

Input

The first line contains an integer T indicating the total number of test cases. Each test case contains one line with two positive integer N and K.

- $1 \leq T \leq 100$
- $1 \leq N \leq 10^5$
- $1 \leq K \leq 10^{18}$

Output

For each test case, please output one line indicating the number of boys who dances with the girl with the same number.

Sample Input

```
3
5 2
1 1
4 3
```

Sample Output

```
3
1
2
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