B. Fibonaccharsis

time limit per test: 2 seconds
memory limit per test: 256 megabytes

Ntarsis has received two integers n and k for his birthday. He wonders how many fibonacci-like sequences of length k can be formed with n **as the k-th element** of the sequence.

A sequence of **non-decreasing non-negative** integers is considered fibonacci-like if $f_i = f_{i-1} + f_{i-2}$ for all $i > 2$, where f_i denotes the i-th element in the sequence. Note that f_1 and f_2 can be arbitrary.

For example, sequences such as $[4, 5, 9, 14]$ and $[0, 1, 1]$ are considered fibonacci-like sequences, while $[0, 0, 0, 1, 1]$, $[1, 2, 1, 3]$, and $[-1, -1, -2]$ are not: the first two do not always satisfy $f_i = f_{i-1} + f_{i-2}$, the latter does not satisfy that the elements are non-negative.

Impress Ntarsis by helping him with this task.

Input

The first line contains an integer t ($1 \le t \le 2 \cdot 10^5$), the number of test cases. The description of each test case is as follows.

Each test case contains two integers, n and k ($1 \le n \le 2 \cdot 10^5$, $3 \le k \le 10^9$).

It is guaranteed the sum of n over all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case output an integer, the number of fibonacci-like sequences of length k such that the k-th element in the sequence is n. That is, output the number of sequences f of length k so f is a fibonacci-like sequence and $f_k = n$. It can be shown this number is finite.

Example

input Copy

```
8
22 4
3 9
55 11
42069 6
69420 4
69 1434
1 3
1 4
```

output Copy

```
4
0
1
1052
11571
0
1
0
```

Note

There are 4 valid fibonacci-like sequences for $n = 22$, $k = 4$:

- $[6, 8, 14, 22]$,
- $[4, 9, 13, 22]$,
- $[2, 10, 12, 22]$,
- $[0, 11, 11, 22]$.

For $n = 3$, $k = 9$, it can be shown that there are no fibonacci-like sequences satisfying the given conditions.

For $n = 55$, $k = 11$, $[0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55]$ is the only fibonacci-like sequence.

Codeforces Round 887 (Div. 2)
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Practice

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You can clone this contest to a mashup.

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Language: GNU G++20 13.2 (64 bit, win

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
269819397	Jul/11/2024 07:23	Accepted
269819218	Jul/11/2024 07:21	Accepted
269819162	Jul/11/2024 07:20	Accepted
269818843	Jul/11/2024 07:16	Accepted
269818675	Jul/11/2024 07:14	Accepted
269783574	Jul/10/2024 22:28	Accepted
269755577	Jul/10/2024 18:39	Accepted
269755131	Jul/10/2024 18:36	Accepted
269754946	Jul/10/2024 18:35	Accepted
269752665	Jul/10/2024 18:18	Accepted

→ Problem tags

binary search brute force math *1200

No tag edit access

→ Contest materials

- Announcement (en)
- Tutorial (en)