

Jetton

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

Yuki and Ena are playing a turn-based poker game.

Initially, Yuki has x jetton, and Ena has y jetton. The winner of each round is determined as follows:

- If Yuki has a different number of jetton from Ena, the player with fewer jetton is the winner;
- If Yuki has the same number of jetton as Ena, Yuki is the winner.

The other player must pay the winner an amount of jetton equal to the number of jetton the winner had.

When either player's number of jetton becomes 0, the game ends immediately. You are asked to determine whether the game will end in a finite number of rounds. Specifically, if it does, you also need to compute the number of rounds from start to finish.

Input

Each test contains multiple test cases. The first line of input contains a single integer t ($1 \leq t \leq 10^5$) — the number of test cases. The description of the test cases follows.

The first and only line of input of each test case contains two integers x and y ($1 \leq x, y \leq 10^9$), denoting the initial jetton that Yuki and Ena initially possess, respectively.

Output

For each test case, output a single line containing an integer: if the game ends in a finite number of rounds, output an integer representing the number of rounds; otherwise, output -1 .

Example

standard input	standard output
5	1
100 100	2
30 90	-1
15 55	-1
11 4514	6
2 126	

Note

In the first test case, in the first round, both Yuki and Ena have 100 jetton, so Yuki is the winner. Yuki's jetton count becomes $100 + 100 = 200$, and Ena's jetton count becomes $100 - 100 = 0$. At this point, the game ends immediately, and the number of rounds is 1.

In the second test case, in the first round, Yuki has 30 jetton and Ena has 90 jetton; Yuki has fewer jetton, so she is the winner. Her jetton count becomes $30 + 30 = 60$, while Ena's jetton count becomes $90 - 30 = 60$. In the second round, both Yuki's and Ena's jetton counts are 60, and similarly, the number of rounds is 2.

For the third test case, it can be proven that the game cannot end in a finite number of rounds.