Problem J. Xingqiu's Joke

Once again, Xingqiu hides Chongyun's ice cream into a box with a strange lock. Liyue's summer has been always very hot and Chongyun suffers more because of his excessive yang (positive) energy, so he needs that ice cream desperately.



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There are two integers a and b on the lock. Chongyun can perform the following three types of operations any number of times:

- Minus 1 from both a and b;
- Plus 1 to both a and b;
- Divide both a and b by one of their common **prime** factor (that is to say, divide them by a **prime** g where a and b are both divisible by g).

The box will be unlocked if either a or b or both become 1. To help Chongyun gets the ice cream back as quickly as possible, please tell him the minimum number of operations needed to unlock the box.

Input

There are multiple test cases. The first line of the input contains an integer T ($1 \leq T \leq 300$) indicating the number of test cases. For each test case:

The first and only line contains two integers a and b ($1 \leq a, b \leq 10^9$, $a \neq b$).

Output

For each test case output one line containing one integer indicating the minimum number of operations to make a or b or both equal 1.

Example

standard input	standard output
5 4 7 9 8 32 84 11 35 2 1	2 7 5 4 0

Note

For the first sample test case, the optimal way is $(4, 7) \to (3, 6) \to (1, 2)$.

For the second sample test case, the optimal way is to apply the first type of operation 7 times.

For the third sample test case, the optimal way is $(32, 84) \to (16, 42) \to (15, 41) \to (14, 40) \to (13, 39) \to (1, 3)$.

For the fourth sample test case, the optimal way is $(11, 35) \to (12, 36) \to (6, 18) \to (2, 6) \to (1, 3)$.