Take any four positive integers: a, b, c, d. Form four more, like this:

$$|a-b|, |b-c|, |c-d|, |d-a|$$

That is, take the absolute value of the differences of a with b, b with c, c with d, and d with a. (Note that a zero could crop up, but they'll all still be non-negative.) Then, do it again with these four new numbers. And then again. And again. Eventually, all four integers will be the same. For example, start with `1,3,5,9`:

```
1 3 5 9
2 2 4 8 (1)
0 2 4 6 (2)
2 2 2 6 (3)
0 0 4 4 (4)
0 4 0 4 (5)
4 4 4 4 (6)
```

In this case, the sequence converged in 6 steps. It turns out that in all cases, the sequence converges very quickly. In fact, it can be shown that if all four integers are less than 2^n, then it will take no more than $3 * n$ steps to converge!

Given a, b, c and d, figure out just how quickly the sequence converges.

Input

There will be several test cases in the input. Each test case consists of four positive integers on a single line ($1 \leq a, b, c, d \leq 2,000,000,000$), with single spaces for separation. The input will end with a line with four `0`'s.

Output

For each test case, output a single integer on its own line, indicating the number of steps until convergence. Output no extra spaces, and do not separate answers with blank lines.

Sample Input

```
1 3 5 9
4 3 2 1
1 1 1 1
0 0 0 0
```

Sample Output

```
6
4
0
```