

Base Exploration

Problem Statement is easy, for a given number N , you have to print the *base* B such that if we write N in base B then it would contain most 0's at the end.

If more then one such *base* exist, which satisfy the given condition then print the smallest such base.

Input

The first line of the input consist of a single integer number t which determines the number of tests.

In each of next t lines there is a single integer number N .

Constraints

- $0 < t \leq 10^5$
- $2 \leq N \leq 10^{12}$

Output

Output contains one line with one integer B such that N written in base B has the most zeros at the end and is the smallest B with this property.

Example

Input:

2

72

18

Output:

2

3

Explanation

The answer for $N=72$ is $B=2$, because $72=1001000_2$ (72 written in base 2) has 3 zeros at the end.

Using base 3, we only get 2 zeroes at the end (because $72=2200_3$),

using base 6 would also give us 2 zeros, and no other base would give us more than 1 zero

For 18, $18=10010_2$ and $18=200_3$ so answer will be 3.

Note: Testcase are regenerated on 23 June 2020.

As rejudge is disabled by SPOJ please submit your code again.