

Invisible point

Daniel marked a point on a plane with sympathetic ink and he has also drawn a regular n -gon with normal ink. Max can see the n -gon, but can't see the point. Max can draw a line and ask Daniel which side of the line the point is. What is the minimum number of questions Max have to ask to define if the point is inside the n -gon in the worst case?

Input

First line of the input contains number t - the amount of test cases. Each test consists of the single integer n - the amount of sides of the n -gon.

Constraints

$1 \leq t \leq 100$

$3 \leq n \leq 1000000$

Output

For each test case print a single number - the answer to the question in the statement.

Example

Input:

1

4

Output:

3