

You are playing a number-guessing game with a friend. He is thinking of an integer between 1 and  $N$  inclusive. You have unlimited guesses to figure it out, but of course you want to do it in as few guesses as possible. He won't actually tell you if you guess correctly; the only information he will give you is that, on every guess except the first, he will say "warmer" or "colder" depending on whether this guess is nearer or farther than the previous guess. (If the distance is exactly the same, either may be said) When you are certain that your last guess was correct, you tell your friend, winning the game.

Note that your guesses must all be genuine guesses, consistent with all the information you have. You can't guess a number that has no chance of being correct, even though you might want to!

At worst, how many guesses will it take you?

## Input

Every case consists of a line containing  $N$ ,  $1 \leq N \leq 300$ . Input will end on a case where  $N = 0$ . This case should not be processed.

## Output

For each case, output a line containing the maximum number of guesses it should take to guess the number.

## Sample Input

```
75
75
0
```

## Sample Output

```
10 guess(es) required.
10 guess(es) required.
```