Down to Zero II



You are given $m{Q}$ queries. Each query consists of a single number $m{N}$. You can perform any of the $m{2}$ operations on $m{N}$ in each move:

- 1: If we take 2 integers a and b where $N=a\times b(a\neq 1,b\neq 1)$, then we can change N=max(a,b)
- 2: Decrease the value of N by 1.

Determine the minimum number of moves required to reduce the value of $oldsymbol{N}$ to $oldsymbol{0}$.

Input Format

The first line contains the integer $oldsymbol{Q}$. The next $oldsymbol{Q}$ lines each contain an integer, $oldsymbol{N}$.

Constraints

$$1 \le Q \le 10^3$$
$$0 \le N \le 10^6$$

Output Format

Output $m{Q}$ lines. Each line containing the minimum number of moves required to reduce the value of $m{N}$ to $m{0}$.

Sample Input

```
2
3
4
```

Sample Output

```
3
3
```

Explanation

For test case 1, We only have one option that gives the minimum number of moves. Follow 3 -> 2 -> 1 -> 0. Hence, 3 moves.

For the case 2, we can either go 4 -> 3 -> 2 -> 1 -> 0 or 4 -> 2 -> 1 -> 0. The 2nd option is more optimal. Hence, 3 moves.