Problem KENNEDY: Kennedy

Well, everyone knows about the assassination of John F. Kennedy in Dallas on November 22. There are several conspiracy theories concerning his assassination and much remains unclear. You, however, have been offered a unique opportunity. A secret agent of the CIA, who – of course – would not like to disclose his identity, is willing to tell you the full story under the condition that you are able to solve the following problem. (Since he is not very good at math, he considers this problem to be impossible to solve.)

Given an integer n, find a set of integer numbers $a = \{s_1, \ldots, s_k\}$ such that

- $s_i > 0$,

- $n = \sum_{i=1}^{k} s_i$,

- every number m, $0 < m \leq n$, equals the sum of the numbers of a subset of a,

- and k is minimal.

Numbers may be inserted several times and not just once into the set.

Input

The first line of input will contain the number of test cases (at most $10,000$). Each following line will contain exactly one number n, the number that has to be partitioned into summands ($0 < n < 2^{31}$).

Output

Print the number k of elements of a partition that satisfies all of the above conditions on a separate line for each test case.

Sample Input 1

```
5
1
2
3
4
5
```

Sample Output 1

```
1
2
2
3
3
```