C. Prairie Partition

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

It can be shown that any positive integer x can be uniquely represented as $x = 1 + 2 + 4 + ... + 2^{k-1} + r$, where k and r are integers, $k \geq 0$, $0 < r \leq 2^k$. Let's call that representation prairie partition of x.

For example, the prairie partitions of 12, 17, 7 and 1 are:

$$12 = 1 + 2 + 4 + 5,$$
$$17 = 1 + 2 + 4 + 8 + 2,$$

$$7 = 1 + 2 + 4,$$

$$1 = 1.$$

Alice took a sequence of positive integers (possibly with repeating elements), replaced every element with the sequence of summands in its prairie partition, arranged the resulting numbers in non-decreasing order and gave them to Borys. Now Borys wonders how many elements Alice's original sequence could contain. Find all possible options!

Input

The first line contains a single integer n ($1 \leq n \leq 10^5$) — the number of numbers given from Alice to Borys.

The second line contains n integers $a_1, a_2, ..., a_n$ ($1 \leq a_i \leq 10^{12}$; $a_1 \leq a_2 \leq ... \leq a_n$) — the numbers given from Alice to Borys.

Output

Output, **in increasing order**, all possible values of m such that there exists a sequence of positive integers of length m such that if you replace every element with the summands in its prairie partition and arrange the resulting numbers in non-decreasing order, you will get the sequence given in the input.

If there are no such values of m, output a single integer `-1`.

Examples

input

```
8
1 1 2 2 3 4 5 8
```

output

```
2
```

input

```
6
1 1 1 2 2 2
```

output

```
2 3
```

input

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

output

```
-1
```

Note

In the first example, Alice could get the input sequence from $[6, 20]$ as the original sequence.

In the second example, Alice's original sequence could be either $[4, 5]$ or $[3, 3, 3]$.