DMOPC '20 Contest 3 P4 - Bob and Typography

Bob is taking a course on typography, the art of arranging words! In this course, he is given a phrase with N words consisting only of English letters. He must split the phrase over one or more lines, and he cannot split the phrase in the middle of a word.

For example, he can split `the quick brown fox jumps over the lazy dog` over four lines like this:

```
the quick brown
fox jumps
over
the lazy dog
```

As any good typographer knows, a split is **pretty** if the number of letters in each line (not including spaces) form:

- a non-increasing sequence,
- a non-decreasing sequence,
- or a non-increasing then non-decreasing sequence.

More rigorously, let K be the total number of lines and t_i be the number of letters in line i. Then a split is pretty if there exists $k \in \{0, \ldots, K\}$ such that $t_1 \geq \cdots \geq t_k$ and $t_{k+1} \leq \cdots \leq t_K$.

For example, the following splits are pretty:

```
the
quick brown
fox jumps over the lazy dog
```

```
the quick brown
fox jumps
over
the lazy dog
```

```
the quick brown fox jumps over the lazy dog
```

And the following split is not:

```
the quick
brown fox jumps
over the lazy
dog
```

Over all pretty splits, please help Bob find the one with the maximum number of lines!

Constraints

Each word contains at least 1 and no more than 3000 letters.

Subtask 1 [2/15]

$1 \leq N \leq 20$

Subtask 2 [3/15]

$1 \leq N \leq 100$

Subtask 3 [3/15]

$1 \leq N \leq 700$

Subtask 4 [6/15]

$1 \leq N \leq 5000$

Subtask 5 [1/15]

$1 \leq N \leq 30\,000$

Input Specification

The first line contains N, the number of words in the phrase.
The second line contains N space-separated integers, the number of letters in each word.

Output Specification

The number of lines in the longest possible pretty split.

Sample Input

```
9
3 5 5 3 5 4 3 4 3
```

Sample Output

```
6
```

Explanation for Sample Output

This input corresponds to the phrase given in the problem description. One longest pretty split for that phrase is:

```
the quick
brown
fox
jumps
over the
lazy dog
```

with 6 lines.