

## Algorithm Class Mini-Contest 5

# Problem: ANCESTRY

Time Limit: 1.0 seconds

Memory Limit: 64 MB

**Problem Description** You are a historian studying an ancient alien society, wishing to find out the line of ancestry for an ancient family line. In this alien society, each organism reproduces asexually, and produces at most one offspring.

Each organism is given a name, made up of at most 10 lowercase alphabets. It is guaranteed that the last letter of the name of a parent is the first letter of the name of the child.

You found a record of  $N$  organisms in a society, listed in their birth order. A family line within the society is therefore a subsequence of organisms such that every adjacent pair of organisms form a parent-child relationship.

The length of a family line is defined as the sum of the number of characters of the names of all organisms in the family line. You want to find the longest family line such that the last letter of the last organism in the family line is the same as the first letter of the first organism in the family line.

**Input Format** The first line of input will contain one integer,  $N$ . The next  $N$  lines of input will contain one string each, representing the names found in the record.

**Output Format** The output should contain exactly one line with one integer, the maximum length of a family line satisfying the condition.

**Limits** These are the bounds on the input.

| Subtask | Score | Additional Bounds         |
|---------|-------|---------------------------|
| 1       | 14    | $1 \leq N \leq 16$        |
| 2       | 21    | $1 \leq N \leq 3,000$     |
| 3       | 28    | $1 \leq N \leq 50,000$    |
| 4       | 37    | $1 \leq N \leq 1,000,000$ |

### Sample Input

```
3
abc
```

ceff  
cba

### Sample Output

6