Problem B. Tim and the Secret Code

Time limit 1000 ms
Memory limit 256MB

Problem Description

Tim, a legendary figure in the world of competitive programming, had always been known for his brilliance — and his silence. Despite winning contests across the globe, he remained an introverted genius who rarely spoke unless the topic was algorithms.

He first met her in their university's Graph Theory course.

As Tim took his usual seat in the back row, a girl walked in — a beautiful computer science major with a warm, bright smile. She paused beside him and said:

"Hi, how are you?"

Caught off guard by the sudden interaction, Tim froze for half a second. Then, without quite making eye contact, he managed to reply:

"Hi."

She pointed to the chair next to him.

"Is this seat taken?"

"For sure," he said, trying not to sound nervous.

Throughout the lecture, they discussed shortest paths, strongly connected components, and elegant proofs. She asked questions; Tim answered with precise clarity. Each time he explained something, she looked at him with genuine admiration.

By the end of the class, she laughed softly and said:

"How are you so smart? Maybe we can study together."

For the first time in a long while, Tim felt his heart skip a beat.

After weeks of small conversations, shared problem sets, and secretly synchronized library study sessions, Tim finally gathered the courage to send her a handwritten love letter.

A few days later, a reply arrived — but instead of sentences, the page contained n mysterious strings. At the bottom, she left only a cryptic hint:

"If you truly understand me, then you can decode my answer.

Find the shortest suffix length that makes all my messages distinguishable."

Tim immediately realized: this was a puzzle only someone who appreciated algorithms would design.

Input format

An integer N ($1 \leq N \leq 10^5$) in the first line, followed by N lines of strings containing lower case alphabet. ($1 \leq \sum |s_i| \leq 10^6$, where $|s_i|$ denotes the length of i-th string)

Output format

A single integer denoting the smallest length that makes all suffix distinquishable.

Subtask score

Subtask	Score	Additional Constraints
0	0	Sample testcases
1	100	No additional constraints

Sample

Sample Input 1

```
2
aab
ab
```

Sample Output 1

```
3
```

Sample Input 2

```
5
bacd
aadd
cd
qq
bace
```

Sample Output 2

```
3
```

Sample Input 3

```
3
aaa
aaa
zzzzz
```

Sample Output 3

```
4
```

Notes

When considering a suffix length k, any string whose length is strictly less than k is excluded from the consideration for that k, note that there might be duplicated strings.