DMOPC '22 Contest 2 P6 - Yogyakarta Elevators

Time limit: 2.0s **Memory limit:** 256M

At IOI 2022, Team Canada encountered a mystery with the hotel elevators. Puzzled, they have asked you (their tour guide) to solve it for them.

The elevator system of the hotel can be viewed as a 2-D grid E with N floors and M elevators. The floors are numbered 1 to N from bottom to top and the elevators are numbered 1 to M from left to right. For each floor i, $E_{i,j}$ is 1 if elevator j stops at that floor and 0 if it doesn't. Each elevator can be used to travel between the floors it stops at.

A contiguous subsequence of floors $[l, r]$ is defined as explorable if, starting from any floor in the subsequence, it is possible to reach all other floors in the subsequence while only entering floors numbered from l to r.

Your task is to determine the length of the largest explorable contiguous subsequence of floors.

Constraints

$1 \leq N \leq 5 \times 10^4$

$1 \leq M \leq 500$

Subtask 1 [10%]

$1 \leq N, M \leq 300$

Subtask 2 [20%]

$1 \leq M \leq 10$

Subtask 3 [30%]

$1 \leq M \leq 50$

Subtask 4 [40%]

No additional constraints.

Input Specification

The first line contains 2 integers N and M.

The next N lines each contain M characters (0 or 1), the j-th character of the i-th line representing $E_{N-i+1,j}$.

Output Specification

Output the length of the largest explorable contiguous subsequence of floors.

Sample Input

```
5 3
001
010
011
100
001
```

Sample Output

```
3
```

Explanation for Sample

The largest contiguous subsequence of floors that is explorable is $[3, 5]$.