

IOITC 2020 TST 1

Paint It Black

You have a matrix A with N rows and M columns. The rows are numbered $1, 2, \dots, N$ and the columns are numbered $1, 2, \dots, M$. For each $1 \leq i \leq N$ and $1 \leq j \leq M$, let (i, j) denote the cell with row number i and column number j . Initially, all of its $N \times M$ cells are colored white.

You have to do the following operation **exactly** K times:

- Choose any rectangular submatrix (i.e., choose some $1 \leq L_1 \leq R_1 \leq N$ and $1 \leq L_2 \leq R_2 \leq M$) and paint all the cells inside this submatrix black. A cell (i, j) is inside this submatrix if and only if $L_1 \leq i \leq R_1$ and $L_2 \leq j \leq R_2$.

You are given a $N \times M$ matrix C consisting of zeroes and ones. For each cell (i, j) of the matrix A , if $C_{ij} = 0$, you want the cell (i, j) to remain white after the K operations, else you want it to be painted black.

Find if there exist K operations which convert the matrix A into the required state.

Note that you can pick the same submatrix in different operations.

Input

- The first line contains N, M and K , the number of rows, the number of columns and the number of operations to be applied respectively.
- The i -th of the next N lines contains a string of length M . The j -th character of this string is equal to C_{ij}

Output

Print Yes if it is possible to convert the matrix into the required state after K operations and No otherwise.

Test Data

In all inputs, $1 \leq N, M \leq 1000$.

Subtask 1 (10 Points): $K = 1$

Subtask 2 (30 Points): $K = 2$

Subtask 3 (25 Points): $K = 3$

Subtask 3 (35 Points): $K = 4$

Sample Input 1

```
5 6 2
000000
001100
001111
000111
000000
```

Sample Output 1

Yes

Sample Input 2

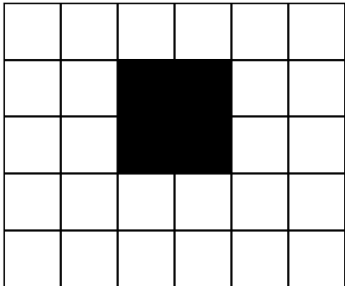
5 6 1
000000
001100
001111
000111
000000

Sample Output 2

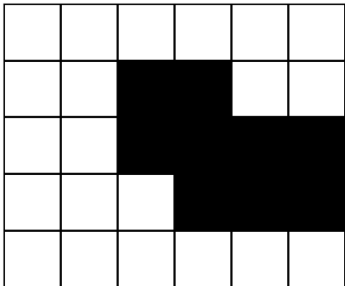
No

Explanation

In the first example:
In the first operation, choose the submatrix $[2, 3] \times [3, 4]$



In the second operation, choose the submatrix $[3, 4] \times [4, 6]$



In the second example, one can not obtain the required coloring in 1 operation.

Limits

Time: 2 seconds
Memory: 256 MB