

B. Strongly Connected City

time limit per test: 2 seconds

memory limit per test: 256 megabytes

input: standard input

output: standard output

Imagine a city with n horizontal streets crossing m vertical streets, forming an $(n - 1) \times (m - 1)$ grid. In order to increase the traffic flow, mayor of the city has decided to make each street one way. This means in each horizontal street, the traffic moves only from west to east or only from east to west. Also, traffic moves only from north to south or only from south to north in each vertical street. It is possible to enter a horizontal street from a vertical street, or vice versa, at their intersection.

The mayor has received some street direction patterns. Your task is to check whether it is possible to reach any junction from any other junction in the proposed street direction pattern.

Input

The first line of input contains two integers n and m , ($2 \leq n, m \leq 20$), denoting the number of horizontal streets and the number of vertical streets.

The second line contains a string of length n , made of characters '<' and '>', denoting direction of each horizontal street. If the i -th character is equal to '<', the street is directed from east to west otherwise, the street is directed from west to east. Streets are listed in order from north to south.

The third line contains a string of length m , made of characters '^' and 'v', denoting direction of each vertical street. If the i -th character is equal to '^', the street is directed from south to north, otherwise the street is directed from north to south. Streets are listed in order from west to east.

Output

If the given pattern meets the mayor's criteria, print a single line containing "YES", otherwise print a single line containing "NO".

Examples

| input |
|----------------------|
| 3 3 ><> v v |
| output |
| NO |
| input |
| 4 6 <><> v v v |
| output |
| YES |

Note

The figure above shows street directions in the second sample test case.

Bayan 2015 Contest Warm Up

Finished

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ACM-ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.


Start virtual contest

→ Problem tags

brute force dfs and similar graphs
implementation

No tag edit access

→ Contest materials

- Announcement 
- Tutorial 