

Arrow Field Traversal Problem

You must traverse a field of arrows (red or blue). You must find a route from the arrow in the top left corner to the bullseye in the bottom right corner. You must follow the direction that the arrows point, and you can only stop on the other colored arrow or the bullseye. For example, start on red, then chose a blue arrow (in the direction that the red arrow is pointing), then from the blue arrow chose a red arrow in the direction the blue arrow is pointing. Continue in this fashion until you find the bullseye in the bottom right corner. It does not have to be the first opposite color that you find. You may find your-self in a loop and continuously visiting the same arrows; you need to account for this. You must find the correct path. You also need to handle what happens if you get to a node that you already visited within a path and you need to continue in that direction.

2.1 Input file format

Your program should read its input from a file with the following format. The input begins with two positive characters on a line indicating the number of rows and columns of the maze, respectively. The next lines contain the color and directional information for each arrow in the maze. Each line has c values, where each value represents the color of the arrow by the direction of the arrow (N, E, S, W, NE, SE, SW, or NW). The color codes R and B represent red and blue, respectively, while the direction codes represent north, east, south, west, northeast, southeast, southwest, or northwest, respectively. The bullseye is represented by the letter O. You may assume that the bullseye will always be in the bottom-right corner of the maze.

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8      8
R-E    R-SE  B-S  B-SW  R-S  R-SW  R-S  R-S
B-E    R-S  B-SE  R-E  B-SE  B-S  B-W  R-SW
R-N    B-W  B-SW  R-SE  R-NE  B-SW  B-W  R-W
R-SE   R-SE  B-SW  R-SE  R-S  B-NW  R-E  B-NW
B-NE   R-W  R-S  B-S  B-E  B-NE  B-NW  R-NW
R-S    B-SE  R-SE  R-SE  R-NW  R-NE  B-E  R-W
R-NE   B-W  B-SE  R-E  R-E  B-E  B-NW  R-SW
B-NE   R-E  B-N  R-NE  B-NE  B-N  B-NW  O
```

2.2 Output file format

You must write the output file in the following format. The output will consist of a path from the top left square to the bottom right square (bullseye). Write a single line consisting of a sequence of moves, separated by spaces. Each move should be represented by the number of spaces to move and the direction, with no spaces in between. The direction should be represented using N, E, S, W, NE, SE, SW, and NW, as in the input. The sequence of moves must solve the maze from the input.

For example, if your first 3 moves take you 3 spaces east, 3 spaces southwest, and 4 spaces southeast, your output should begin as follows(note, the 3 moves below correspond to the first three possible moves to the graph given above):

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3E 3SW 4SE
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