Assignment 2: Lost in the Enchanted Forest

Most of us are familiar with the classic tale of two siblings, Hansel and Gretel. For those who need a quick recap, Hansel and Gretel were led into the woods by their stepmother and left to fend for themselves. To find their way back home, they initially marked their path with breadcrumbs, but these were eaten by forest animals, leaving them lost.

In this assignment, we reimagine this fairy tale scenario. Instead of using breadcrumbs that are easily consumed, the siblings now utilize magical crystals that cannot be removed by anyone. These crystals serve as a reliable trail for Hansel and Gretel to follow back to their house, especially in times of danger, such as encountering an evil witch.

Task

Given the sequence of movements taken by Hansel and Gretel until they found the house of the witch, your task is to compute the minimum number of movements it will take for them to get back to the starting point. They can only follow the path marked by the magical crystals.

Hansel and Gretel began their journey by marking their path with magical crystals, their route might not have been straightforward. It's possible that they wandered off in various directions, possibly crossing their own path multiple times, before reaching the witch's house. Each movement made by Hansel and Gretel is identified by one of the characters N, E, S, or W, corresponding to the geographical North, East, South, and West. They can only backtrack by following the trail of magical crystals they left behind. They rely on the crystals to get them through the magical forest and back home in one piece.

Your task is to help Hansel and Gretel navigate through the twists and turns of the forest, ensuring they follow the shortest path marked by the remaining crystals and reach their starting point with the minimum number of movements.

Input

The input of the program consists of a line with a positive integer L, followed by L lines showing the movements Hansel and Gretel took from the starting point until they found the witch's house. Each movement is identified by one of the characters N, E, S, or W, corresponding to the initial of the direction in which the movement was taken. All lines of

input with Hansel and Gretel's movements have a length of C, except, possibly, the last line, which may have between 1 and C characters.

Constraints

$1 \leq M \leq 250\,000$ Number of movements
$C = 80$ Maximum number of steps on a line

Output

The output consists of a single line with the minimum number of movements it takes to go back from the witch house to the location from where Hansel and Gretel started.

Sample Input 1

1
NNEEEENWNENNSEEEWWWSWSESWWWNNNNWWWSSNNNNEE

Sample Output 1

14

Sample Input 2

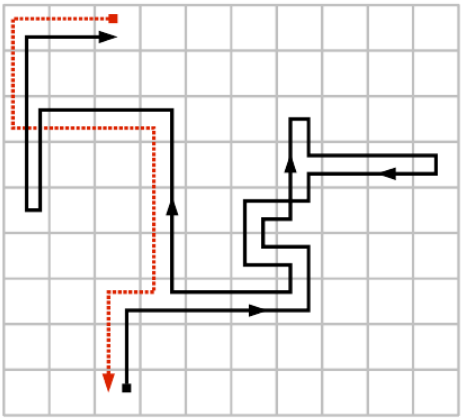
1
NEEENNWWWSSWNNEN

Sample Output 2

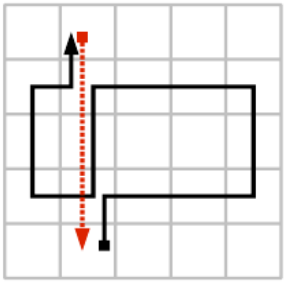
4

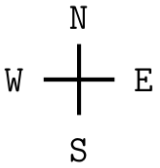
Explanation

Sample 1



Sample 2





Hansel and Gretel Path
Shortest path to starting location.