SEWERS

Miles Moore-ales is looking for his nemisis Doc Ong in the underground sewers of New York City. The sewers consist of an $R \times C$ grid of *rooms* with R rows (numbered 1 to R from north to south) and C columns (numbered 1 to C from west to east).

Miles enters the sewers in the top-left room. He then makes N *moves*, described by a sequence of N characters:

- `N`: Move into the room north of the current one.
- `E`: Move into the room east of the current one.
- `S`: Move into the room south of the current one.
- `W`: Move into the room west of the current one.

Miles did not move north from the northernmost row, nor move south from the southernmost row. He also did not move west from the westernmost column, nor move east from the easternmost column. Miles may have visited the same room multiple times.

After the sequence of N moves, Miles realised Doc is probably not hiding in the smelly sewers. What is the fewest additional moves Miles must make to return to the top-left room **only using rooms that he has already visited**? Output such a sequence of moves.
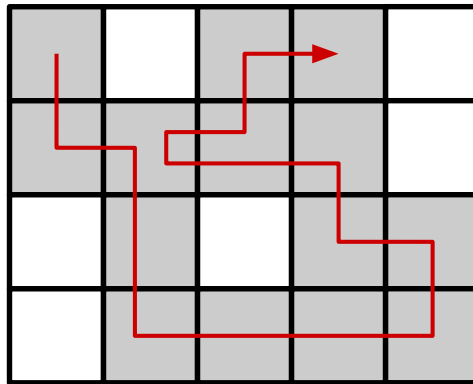

Figure 1: In sample input 1, $R = 4$ and $C = 5$. Miles' sequence of moves is `SESSEEENWNWWENE`. The visited cells are shaded.

Subtasks and Constraints

For all subtasks:

- $2 \leq R, C \leq 100\,000$
- $1 \leq N \leq 100\,000$.

Additional constraints for each subtask are given below.

Subtask	Points	Additional constraints
1	50	$R, C \leq 100$, $N \leq 1000$.
2	30	$R, C \leq 1000$.
3	20	No additional constraints.

Input

- The first line of input contains the three integers R, C and N.
- The second line contains a string of N characters, the sequence of moves.

Output

- On the first line, output a single integer: the fewest additional moves Miles must make to return to the top-left room only using rooms that he has already visited.
- On the second line, output a string of characters representing such a sequence of moves. If there is more than one such sequence, output any of them.

Scoring

You will receive partial credit for determining just the fewest additional moves Miles must make. In particular:

- If the first line of your output is incorrect, you will receive 0% for that test case, otherwise
- If the second line of your output is incorrect (or you did not print a second line) you will receive 80% for that test case, otherwise
- You will receive 100% for that test case.

Recall that your score for each subtask is the **minimum** score of all test cases in that subtask.

Sample Input 1

```
4 5 15
SESSEEENWNWWENE
```

Sample Output 1

```
5
WSWWN
```

Sample Input 2

```
6 5 20
EEEESSWWWSENESSSWWNW
```

Sample Output 2
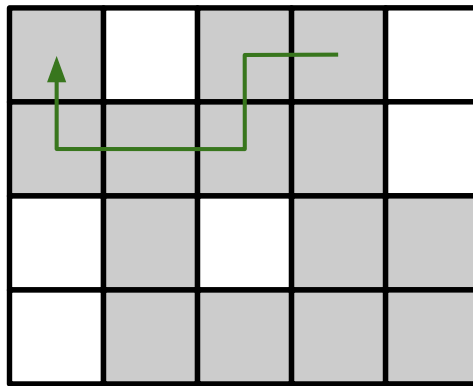
```
12
ENNEEENNWWWW
```

Explanation

Figure 2: Sample input 1: one of the possible shortest sequences is depicted (WSWWN)
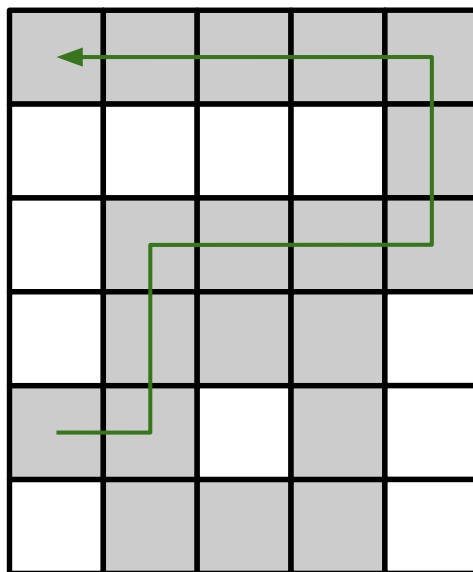

Figure 3: Sample input 2: one of the possible shortest sequences is depicted (ENNEEENNWWWW)