Problem E
Where Am I Now?
Time limit: 5 seconds

Relax: No knowledge of geometry primitives is needed to solve this problem.

Your country's space agency has just landed a rover on a new planet. The planet's surface can be thought of as a grid of squares containing 10^9 columns (numbered starting from 1 from west to east) and 10^9 rows (numbered starting from 1 from north to south). Let (w, h) denote the square in the w-th column and the h-th row. The rover begins on the square $(1, 1)$.

NASA's Curiosity rover, selfie, 2015
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The rover can be maneuvered around on the surface of the planet by sending it a program, which contains a string of characters representing movements in the four cardinal directions. The robot executes each character of the string in order. The rover moves according to the following rules:

- `N` is move one unit to north.
- `S` is move one unit to south.
- `E` is move one unit to east.
- `W` is move one unit to west.

There is also a special instruction `X(Y)`, where X is a number between 2 and 9 (inclusive) and Y is a non-empty subprogram. This denote that the robot should repeat the subprogram Y a total of X times. For example:

- `2(NWE)` is equivalent to `NWENWE`.
- `3(S2(E))` is equivalent to `SEESEESEE`.
- `EE3(N)2(WW)` is equivalent to `EENNNWWWW`.

Since the planet is a spheroid, the first and last columns are adjacent, so moving column or row from 10^9 will move the rover to column 1, vice versa.

Given a program that the robot will execute, determine the final positiion of the robot after it has finished all its movements.

Input

Single line containing a single string S – the program send to rover.

Output

Please output current position of the rover.

Constraints

$1 \leq |S| \leq 100\,000$

Sample Input 1	Sample Output 1
SSSEEE	4 4

Sample Input 2	Sample Output 2
N	1 1000000000

Sample Input 3	Sample Output 3
N3(S)N2(E)N	3 1

Sample Input 4	Sample Output 4
2(3(NW)2(W2(EE)W))	3 999999995