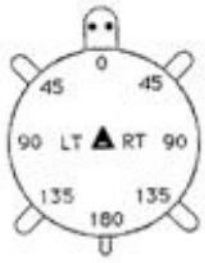
Turtle



A turtle robot can be control its moving direction on a plain by giving it a command. There are four commands: FD, RT, LT, and BW, which are to order the turtle to go forward, go to the right, go to the left, and go backward, respectively. Each command must have a parameter to indicate how far the movement can be. If the turtle initially locates at (0,0) and the direction is to the East (E) and it is received a sequence of commands LT 2, RT 4, FD 3, when each command finishes the result of each is shown on the table below.

Com mand	Meaning	Current Position	Current Direction	New Position	New Direction
LT 2	Turtle turns left to the North and then walk for 2 steps	(0,0)	E	(0,2)	N
RT 4	Turtle turns right to the East and then walk 4 steps	(0,2)	N	(4,2)	E
FD 3	Turtle does not change direction and go straight to the East and walk for 3 steps	(4,2)	N	(7,2)	E

However, the turtle can live only on the integer coordinates (x,y) where $-50000 \leq x \leq 50000$ and $-50000 \leq y \leq 50000$. If giving a command to order the turtle to touch or walk over the edges, the turtle will die immediately before it executes that commands and it also will not execute any other following commands.

Task

You have to write a program to receive a sequence of commands and identify where the turtle locates and what its last direction is after the last command is executed. Initially, the turtle locates at (0,0) and head to the East.

Input

First Line an Integer *n* indicates a total number of commands

Lines 2 to *n*+1 each line is a command. Each command is in the form of <operator> <blank > <operand>. The possible operators are FD, RT, LT, and BW. The operand is an integer *k* indicating the distance of movement, $0 \leq k \leq 50000$.

Output

First Line If the turtle is dead, print 'DEAD' without quotes. Otherwise, print the coordinate (x,y) of turtle's position after the last command is executed. (x and y is separated by a blank)

Second Line If turtle is dead, do nothing, Otherwise, print the last direction of turtle by 'N', 'S', 'E', 'W', where these letters represents North, South, East, and West, respectively.

Example

Input

```
3
LT 2
RT 4
FD 3
```

Output

```
7 2
E
```

Input

```
2
BW 50000
FD 4
```

Output

```
DEAD
```