

Rainforest Robot

The Problem

Rainforest LTD is an online distribution company that specialises in selling bags of sugar-free gummy bears. They have a large warehouse in Milton Keynes where crates of the bags are stored.

A new remote-controlled robot is being tested at the warehouse. The robot can move around the warehouse floor, reach into crates to pick up bags of gummy bears, and drop the bags off at a conveyor-belt feeder. The robot is only able to pick up one bag at a time, but can carry multiple bags at once. However when dropping off the bags the robot drops all the bags in its possession at once.

The robot is controlled with the following instructions:

N, S, E, W - the robot moves one unit of distance in the direction specified (**N** increases the y coordinate value, **E** increases the x coordinate value).

P - pick up one bag of sugar-free gummy bears from a crate.

D - drop the bags of sugar-free gummy bears that the robot currently has in its possession onto the conveyor-belt feeder.

A couple of issues with the robot have been found:

- If the robot tries to retrieve a bag from a position where a crate doesn't reside, it falls over and short-circuits. From this point onwards it no longer responds to instructions.
- If the robot tries to drop bags off at a position that is any place other than the conveyor-belt feeder, the bags get caught in its wheels and it short-circuits. In this instance it also no longer responds to instructions.

Your task is to develop an application that takes in the following lines of input:

- i) The x, y coordinates of the position of the conveyor-belt feeder
- ii) The x, y coordinates of the start position of the robot
- iii) comma separated descriptions of the crates. Each crate has an x coord, y coord and quantity.
- iv) A set of instructions for the robot to perform.

The application should respond with the total number of bags dropped on the conveyor-belt feeder, and the final position and health of the robot (either *OK* or *BROKEN*)

For example:

INPUT

```
0 2          // Conveyor-belt feeder is at coord 0,2
0 0          // Robot is at coord 0,0
0 1 10, -1 -2 5 // A crate at 0,1 with 10 bags and at -1,-2 with 5 bags
```

```
NPPPNND           // Move North, pick up a bag (x3), move north, drop bags
```

OUTPUT

```
3                 // 3 bags have been dropped on the conveyor-belt feeder
0 2 OK           // The robot is at 0,2 and still functioning
```

Your Submission

You are free to choose the interface through which your application receives input and provides output. Please include documentation explaining how to build and run your code, and how to run any tests. Also please include tests to demonstrate that your application produces the correct outputs for the inputs specified in the test cases listed below.

If you make additional assumptions about the problem when developing your solution, please document these.

The intent of this problem is to provide an opportunity to demonstrate the ability to write readable, maintainable, well-tested code.

Sample Test Cases

INPUT

```
1 1
0 1
0 0 10
PNNEE
```

OUTPUT

```
0
0 1 BROKEN
```

INPUT

```
0 5
0 1
0 1 3, 1 3 3
PPPPENNPPWNNNDSS
```

OUTPUT

```
5
0 3 OK
```

INPUT

-2 -2
0 0
-1 -1 2
SWPSWDNDN

OUTPUT

1
-2 -1 BROKEN
