MarsRoverAPI

Develop an API that moves a rover around a planet. The planet is represented as grid with *x* and *y* coordinates. The rover has also a direction that it is facing. The direction can be north (*N*), south (*S*), west (*W*) or east (*E*). The input received by the rover is a string representing the commands it needs to execute.

1. The planet

The planet where the rover moves is represented as a squared grid, with size (x, y).

Requirement: Define a planet of size (x, y).

Example: (100,100) creates a planet of size 100x100.

2. Landing

When the rover lands on the planet, it starts its journey at the start of the grid and faces north.

Requirement: When the rover lands on the planet its position shall be (0,0) facing north.

Example: An empty command (i.e.: "") to the rover results in returning its landing status (0,0,N).

3. Turning

The rover turns right or left. It remains on the same grid's cell. Its orientation change accordingly.

Requirement: Compute the position of the rover after turning left (command "l") or right (command "r").

Example: A rover in position (0,0,N) is in position (0,0,E) after executing command "r". A rover in position (0,0,N) is in position (0,0,W) after executing command "l".

4. Moving

The rover moves forward or backward one grid's cell with reference to its facing. The rover direction does not change.

Requirement: Compute the position of the rover after moving forward (command "f") or backward (command "b") one cell on the grid.

Example: A rover in position (7,6,N) arrives at (7,7,N) after executing a "f "command. A rover in position (5,8,E) arrives at (4,8,E) after executing a "b" command.

5. Moving and turning combined

The rover shall be able to execute arbitrary sequences of "f", "b", "l" and "r" commands.

Requirement: Compute the position of the rover after executing commands in series.

Example: A rover in position (0,0,N) arrives at position (2,2,E) after executing "ffrff".

6. Wrapping

Since the planet is a sphere the rover wraps at the opposite edge once it moves over it.

Requirement: Compute the position of the rover moving over the edges. The rover shall spawn on the opposite side.

Example: A rover on a planet of size 100x100, which moves backward (command "b") after landing (remember that landing takes place always in position (0,0,N)), arrives at position (0,99,N).

7. Placing obstacles

Obstacles can be placed on specific cells of the grid.

Requirement: Define the obstacles as a string (x1,y1)(x2,y2)… Place the obstacles on the grid.

Example: "(1,1)(4,5)" defines two obstacles, one in position (1,1) and another in position (4,5). Notice that the planet grid should be greater or equal than 6x6.

8. Locating a single obstacle

The rover might encounter (i.e.: tries to move onto) an obstacle. When it does it should report the obstacle and continue executing the remaining commands.

Requirement: Compute the position of a rover encountering an obstacle, and report the obstacle. The same obstacle should be reported only once.

Example: A rover just landed (position (0,0,N)). There is one obstacle on coordinates (2,2) of the planet. The rover executes "ffrfff" and reports (1,2,E)(2,2). Notice that the same obstacle is encountered twice but reported only once.

9. Locating multiple obstacles

The rover might encounter multiple obstacles. When it does, it should report all of them once, and in the order they have been encountered.

Requirement: Compute the position of the rover encountering obstacles, and report the obstacles encountered in the order they are encountered. The same obstacle shall be reported only once.

Example: A rover just landed (position (0,0,N)). There are two obstacles at coordinates (2,2) and (2,1) on the planet. The rover executes "ffrfffrflf" and reports (1,1,E)(2,2)(2,1). Notice that the first obstacle is encountered twice but reported only once.

10. A tour around the planet

The rover goes on a tour around the planet encountering several obstacles, and wrapping in both axes.

Requirement: Compute the position of a rover that executes a series of commands that result in moving along both axes in both directions, encountering several obstacles and wrapping from both edges of the planet.

Example: The rover lands on a 6x6 planet with obstacles at (2,2), (0,5) and (5,0). It executes the command "ffrfffrbbblllfrfrbbl" and returns (0,0,N)(2,2)(0,5)(5,0)

Congratulations, you are done!