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489. Robot Room Cleaner

Hard   👍 1658   👎 102   ♡ Add to List   ⬆ Share

Given a robot cleaner in a room modeled as a grid.

Each cell in the grid can be empty or blocked.

The robot cleaner with 4 given APIs can move forward, turn left or turn right. Each turn it made is 90 degrees.

When it tries to move into a blocked cell, its bumper sensor detects the obstacle and it stays on the current cell.

Design an algorithm to clean the entire room using only the 4 given APIs shown below.

```
interface Robot {
  // returns true if next cell is open and robot moves into the cell.
  // returns false if next cell is obstacle and robot stays on the current cell.
  boolean move();

  // Robot will stay on the same cell after calling turnLeft/turnRight.
  // Each turn will be 90 degrees.
  void turnLeft();
  void turnRight();

  // Clean the current cell.
  void clean();
}
```

Example:

```
Input:
room = [
  [1,1,1,1,1,0,1,1],
  [1,1,1,1,1,0,1,1],
  [1,0,1,1,1,1,1,1],
  [0,0,0,1,0,0,0,0],
  [1,1,1,1,1,1,1,1]
],
row = 1,
col = 3

Explanation:
All grids in the room are marked by either 0 or 1.
0 means the cell is blocked, while 1 means the cell is accessible.
The robot initially starts at the position of row=1, col=3.
From the top left corner, its position is one row below and three columns right.
```

Notes:

1. The input is only given to initialize the room and the robot's position internally. You must solve this problem "blindfolded". In other words, you must control the robot using only the mentioned 4 APIs, without knowing the room layout and the initial robot's position.
2. The robot's initial position will always be in an accessible cell.
3. The initial direction of the robot will be facing up.
4. All accessible cells are connected, which means the all cells marked as 1 will be accessible by the robot.
5. Assume all four edges of the grid are all surrounded by wall.

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```
1    # """
2    # This is the
     robot's control
     interface.
3    # You should not
     implement it, or
     speculate about its
     implementation
4    # """
5    #class Robot:
6    #    def
     move(self):
7    #        """
8    #        Returns
     true if the cell in
     front is open and
     robot moves into
     the cell.
9    #        Returns
     false if the cell
     in front is blocked
     and robot stays in
     the current cell.
10   #        :rtype
     bool
11   #        """
12   #
13   #    def
     turnLeft(self):
14   #        """
15   #        Robot will
     stay in the same
     cell after calling
     turnLeft/turnRight.
16   #        Each turn
     will be 90 degrees.
17   #        :rtype
     void
18   #        """
19   #
20   #    def
     turnRight(self):
21   #        """
22   #        Robot will
     stay in the same
     cell after calling
     turnLeft/turnRight.
23   #        Each turn
     will be 90 degrees.
24   #        :rtype
     void
25   #        """
26   #
27   #    def
     clean(self):
28   #        """
29   #        Clean the
     current cell.
30   #        :rtype
```

Your previous code was restored from y

Test…   Run Code R…   Debu… 🔒

Accepted   Runtime: 20   ⓘ
                  ms

Your input   [[1,1,1,1,1,0
              [1,1,1,1,1,0

Output |

              | Diff

Expected   Robot
              cleaned

▶ Run Code ^   Submit