1041. Robot Bounded In Circle

Description

On an infinite plane, a robot initially stands at `(0, 0)` and faces north. Note that:

- The **north direction** is the positive direction of the y-axis.
- The **south direction** is the negative direction of the y-axis.
- The **east direction** is the positive direction of the x-axis.
- The **west direction** is the negative direction of the x-axis.

The robot can receive one of three instructions:

- `"G"`: go straight 1 unit.
- `"L"`: turn 90 degrees to the left (i.e., anti-clockwise direction).
- `"R"`: turn 90 degrees to the right (i.e., clockwise direction).

The robot performs the `instructions` given in order, and repeats them forever.

Return `true` if and only if there exists a circle in the plane such that the robot never leaves the circle.

Example 1:

```
Input: instructions = "GGLLGG"
Output: true
Explanation: The robot is initially at (0, 0) facing the north direction.
"G": move one step. Position: (0, 1). Direction: North.
"G": move one step. Position: (0, 2). Direction: North.
"L": turn 90 degrees anti-clockwise. Position: (0, 2). Direction: West.
"L": turn 90 degrees anti-clockwise. Position: (0, 2). Direction: South.
"G": move one step. Position: (0, 1). Direction: South.
"G": move one step. Position: (0, 0). Direction: South.
Repeating the instructions, the robot goes into the cycle: (0, 0) --> (0, 1) --> (0, 2) --> (0, 1) --> (0, 0).
Based on that, we return true.
```

Example 2:

```
Input: instructions = "GG"
Output: false
Explanation: The robot is initially at (0, 0) facing the north direction.
"G": move one step. Position: (0, 1). Direction: North.
"G": move one step. Position: (0, 2). Direction: North.
Repeating the instructions, keeps advancing in the north direction and does not go into cycles.
Based on that, we return false.
```

Example 3:

```
Input: instructions = "GL"
Output: true
Explanation: The robot is initially at (0, 0) facing the north direction.
"G": move one step. Position: (0, 1). Direction: North.
"L": turn 90 degrees anti-clockwise. Position: (0, 1). Direction: West.
"G": move one step. Position: (-1, 1). Direction: West.
"L": turn 90 degrees anti-clockwise. Position: (-1, 1). Direction: South.
"G": move one step. Position: (-1, 0). Direction: South.
"L": turn 90 degrees anti-clockwise. Position: (-1, 0). Direction: East.
"G": move one step. Position: (0, 0). Direction: East.
"L": turn 90 degrees anti-clockwise. Position: (0, 0). Direction: North.
Repeating the instructions, the robot goes into the cycle: (0, 0) --> (0, 1) --> (-1, 1) --> (-1, 0) --> (0, 0).
Based on that, we return true.
```

Constraints:

- `1 <= instructions.length <= 100`
- `instructions[i]` is `'G'`, `'L'` or, `'R'`.