3568. Minimum Moves to Clean the Classroom

Solved ●

Medium   🏷 Topics   💡 Hint

You are given an `m x n` grid `classroom` where a student volunteer is tasked with cleaning up litter scattered around the room. Each cell in the grid is one of the following:

- `'S'` : Starting position of the student

- `'L'` : Litter that must be collected (once collected, the cell becomes empty)

- `'R'` : Reset area that restores the student's energy to full capacity, regardless of their current energy level (can be used multiple times)

- `'X'` : Obstacle the student cannot pass through

- `'.'` : Empty space

You are also given an integer `energy`, representing the student's maximum energy capacity. The student starts with this energy from the starting position `'S'`.

Each move to an adjacent cell (up, down, left, or right) costs 1 unit of energy. If the energy reaches 0, the student can only continue if they are on a reset area `'R'`, which resets the energy to its **maximum** capacity `energy`.

Return the **minimum** number of moves required to collect all litter items, or `-1` if it's impossible.

Example 1:

Input: classroom = ["S.", "XL"], energy = 2

Output: 2

Explanation:

- The student starts at cell `(0, 0)` with 2 units of energy.

- Since cell `(1, 0)` contains an obstacle 'X', the student cannot move directly downward.

- A valid sequence of moves to collect all litter is as follows:
  - Move 1: From `(0, 0)` → `(0, 1)` with 1 unit of energy and 1 unit remaining.

  - Move 2: From `(0, 1)` → `(1, 1)` to collect the litter `'L'`.

- The student collects all the litter using 2 moves. Thus, the output is 2.

Example 2:

Input: classroom = ["LS", "RL"], energy = 4

Output: 3

Explanation:

- The student starts at cell `(0, 1)` with 4 units of energy.

- A valid sequence of moves to collect all litter is as follows:
  - Move 1: From `(0, 1)` → `(0, 0)` to collect the first litter `'L'` with 1 unit of energy used and 3 units remaining.

  - Move 2: From `(0, 0)` → `(1, 0)` to `'R'` to reset and restore energy back to 4.

  - Move 3: From `(1, 0)` → `(1, 1)` to collect the second litter `'L'`.

- The student collects all the litter using 3 moves. Thus, the output is 3.

Example 3:

> **Input:** classroom = ["L.S", "RXL"], energy = 3
>
> **Output:** -1
>
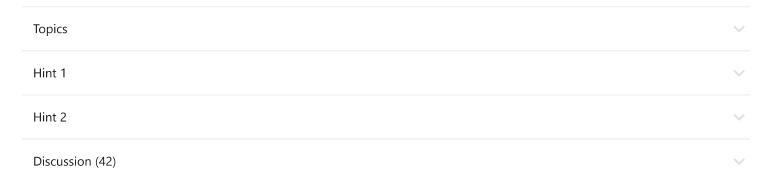> **Explanation:**
>
> No valid path collects all `L`.

Constraints:

- `1 <= m == classroom.length <= 20`

- `1 <= n == classroom[i].length <= 20`

- `classroom[i][j]` is one of `'S'`, `'L'`, `'R'`, `'X'`, or `'.'`

- `1 <= energy <= 50`

- There is exactly **one** `'S'` in the grid.

- There are **at most** 10 `'L'` cells in the grid.

Seen this question in a real interview before?   1/5

Yes   No

Accepted **7.616** /29.9K | **Acceptance Rate** **25.5** %

Topics	⌄

Hint 1	⌄

Hint 2	⌄

Discussion (42)	⌄