Problem 2751: Robot Collisions

Problem Information

Difficulty: Hard
Acceptance Rate: 56.07%
Paid Only: No
Tags: Array, Stack, Sorting, Simulation

Problem Description

There are `n` **1-indexed** robots, each having a position on a line, health, and movement direction.

You are given **0-indexed** integer arrays `positions`, `healths`, and a string `directions` (`directions[i]` is either **' L'** for **left** or **' R'** for **right**). All integers in `positions` are **unique**.

All robots start moving on the line**simultaneously** at the **same speed** in their given directions. If two robots ever share the same position while moving, they will **collide**.

If two robots collide, the robot with **lower health** is **removed** from the line, and the health of the other robot **decreases** **by one**. The surviving robot continues in the **same** direction it was going. If both robots have the **same** health, they are both**** removed from the line.

Your task is to determine the **health** of the robots that survive the collisions, in the same **order** that the robots were given,**** i.e. final health of robot 1 (if survived), final health of robot 2 (if survived), and so on. If there are no survivors, return an empty array.

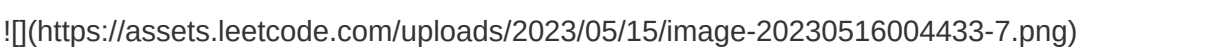
Return _an array containing the health of the remaining robots (in the order they were given in the input), after no further collisions can occur._

Note: The positions may be unsorted.

Example 1:

Input: positions = [5,4,3,2,1], healths = [2,17,9,15,10], directions = "RRRRR" **Output:** [2,17,9,15,10] **Explanation:** No collision occurs in this example, since all robots are moving in the same direction. So, the health of the robots in order from the first robot is returned, [2, 17, 9, 15, 10].

Example 2:



Input: positions = [3,5,2,6], healths = [10,10,15,12], directions = "RLRL" **Output:** [14] **Explanation:** There are 2 collisions in this example. Firstly, robot 1 and robot 2 will collide, and since both have the same health, they will be removed from the line. Next, robot 3 and robot 4 will collide and since robot 4's health is smaller, it gets removed, and robot 3's health becomes 15 - 1 = 14. Only robot 3 remains, so we return [14].

Example 3:

Input: positions = [1,2,5,6], healths = [10,10,11,11], directions = "RLRL" **Output:** [] **Explanation:** Robot 1 and robot 2 will collide and since both have the same health, they are both removed. Robot 3 and 4 will collide and since both have the same health, they are both removed. So, we return an empty array, [].

Constraints:

* `1 <= positions.length == healths.length == directions.length == n <= 105` * `1 <= positions[i], healths[i] <= 109` * `directions[i] == 'L'` or `directions[i] == 'R'` * All values in `positions` are distinct

Code Snippets

C++:

```
class Solution {
public:
vector<int> survivedRobotsHealths(vector<int>& positions, vector<int>&
```

```
healths, string directions) {

}
};
```

Java:

```
class Solution {
public List<Integer> survivedRobotsHealths(int[] positions, int[] healths,
String directions) {

}
}
```

Python3:

```
class Solution:
def survivedRobotsHealths(self, positions: List[int], healths: List[int],
directions: str) -> List[int]:
```