

Problem 1776: Car Fleet II

Problem Information

Difficulty: Hard

Acceptance Rate: 57.11%

Paid Only: No

Tags: Array, Math, Stack, Heap (Priority Queue), Monotonic Stack

Problem Description

There are n cars traveling at different speeds in the same direction along a one-lane road. You are given an array `cars` of length n , where `cars[i] = [positioni, speedi]` represents:

* `positioni` is the distance between the i th car and the beginning of the road in meters. It is guaranteed that `positioni < positioni+1`. * `speedi` is the initial speed of the i th car in meters per second.

For simplicity, cars can be considered as points moving along the number line. Two cars collide when they occupy the same position. Once a car collides with another car, they unite and form a single car fleet. The cars in the formed fleet will have the same position and the same speed, which is the initial speed of the **slowest** car in the fleet.

Return an array `answer`, where `answer[i]` is the time, in seconds, at which the i th car collides with the next car, or `-1` if the car does not collide with the next car. Answers within 10^{-5} of the actual answers are accepted.

Example 1:

Input: `cars = [[1,2],[2,1],[4,3],[7,2]]` **Output:** `[1.00000,-1.00000,3.00000,-1.00000]`

Explanation: After exactly one second, the first car will collide with the second car, and form a car fleet with speed 1 m/s. After exactly 3 seconds, the third car will collide with the fourth car, and form a car fleet with speed 2 m/s.

Example 2:

Input: `cars = [[3,4],[5,4],[6,3],[9,1]]` **Output:** `[2.00000,1.00000,1.50000,-1.00000]`

****Constraints:****

*`1 <= cars.length <= 105` *`1 <= positioni, speedi <= 106` *`positioni < positioni+1`

Code Snippets

C++:

```
class Solution {  
public:  
    vector<double> getCollisionTimes(vector<vector<int>>& cars) {  
  
    }  
};
```

Java:

```
class Solution {  
    public double[] getCollisionTimes(int[][] cars) {  
  
    }  
}
```

Python3:

```
class Solution:  
    def getCollisionTimes(self, cars: List[List[int]]) -> List[float]:
```