Problem 1620: Coordinate With Maximum Network Quality

Problem Information

Difficulty: Medium
Acceptance Rate: 38.87%
Paid Only: No
Tags: Array, Enumeration

Problem Description

You are given an array of network towers `towers`, where `towers[i] = [xi, yi, qi]` denotes the `ith` network tower with location `(xi, yi)` and quality factor `qi`. All the coordinates are **integral coordinates** on the X-Y plane, and the distance between the two coordinates is the **Euclidean distance**.

You are also given an integer `radius` where a tower is **reachable** if the distance is **less than or equal to** `radius`. Outside that distance, the signal becomes garbled, and the tower is **not reachable**.

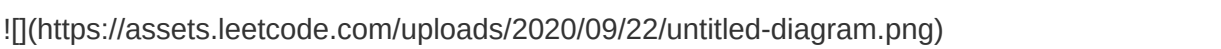
The signal quality of the `ith` tower at a coordinate `(x, y)` is calculated with the formula `■qi / (1 + d)■`, where `d` is the distance between the tower and the coordinate. The **network quality** at a coordinate is the sum of the signal qualities from all the **reachable** towers.

Return _the array_`[cx, cy]`_representing the**integral** coordinate _`(cx, cy)`_where the**network quality** is maximum. If there are multiple coordinates with the same **network quality** , return the lexicographically minimum **non-negative** coordinate._

Note:

* A coordinate `(x1, y1)` is lexicographically smaller than `(x2, y2)` if either: * `x1 < x2`, or * `x1 == x2` and `y1 < y2`. * `■val■` is the greatest integer less than or equal to `val` (the floor function).

Example 1:



Input: towers = [[1,2,5],[2,1,7],[3,1,9]], radius = 2 **Output:** [2,1] **Explanation:** At coordinate (2, 1) the total quality is 13. - Quality of 7 from (2, 1) results in ■7 / (1 + sqrt(0)■ = ■7■ = 7 - Quality of 5 from (1, 2) results in ■5 / (1 + sqrt(2)■ = ■2.07■ = 2 - Quality of 9 from (3, 1) results in ■9 / (1 + sqrt(1)■ = ■4.5■ = 4 No other coordinate has a higher network quality.

Example 2:

Input: towers = [[23,11,21]], radius = 9 **Output:** [23,11] **Explanation:** Since there is only one tower, the network quality is highest right at the tower's location.

Example 3:

Input: towers = [[1,2,13],[2,1,7],[0,1,9]], radius = 2 **Output:** [1,2] **Explanation:** Coordinate (1, 2) has the highest network quality.

Constraints:

* `1 <= towers.length <= 50` * `towers[i].length == 3` * `0 <= xi, yi, qi <= 50` * `1 <= radius <= 50`

Code Snippets

C++:

```
class Solution {
public:
vector<int> bestCoordinate(vector<vector<int>>& towers, int radius) {

}
};
```

Java:

```
class Solution {
public int[] bestCoordinate(int[][] towers, int radius) {

}
```

```
}
```

Python3:

```
class Solution:
def bestCoordinate(self, towers: List[List[int]], radius: int) -> List[int]:
```