# 1057. Campus Bikes Premium

Medium Topics Companies Hint

On a campus represented on the X-Y plane, there are `n` workers and `m` bikes, with `n <= m`.

You are given an array `workers` of length `n` where workers[i] = [$x_i$, $y_i$] is the position of the $i^{th}$ worker. You are also given an array `bikes` of length `m` where bikes[j] = [$x_j$, $y_j$] is the position of the $j^{th}$ bike. All the given positions are **unique**.

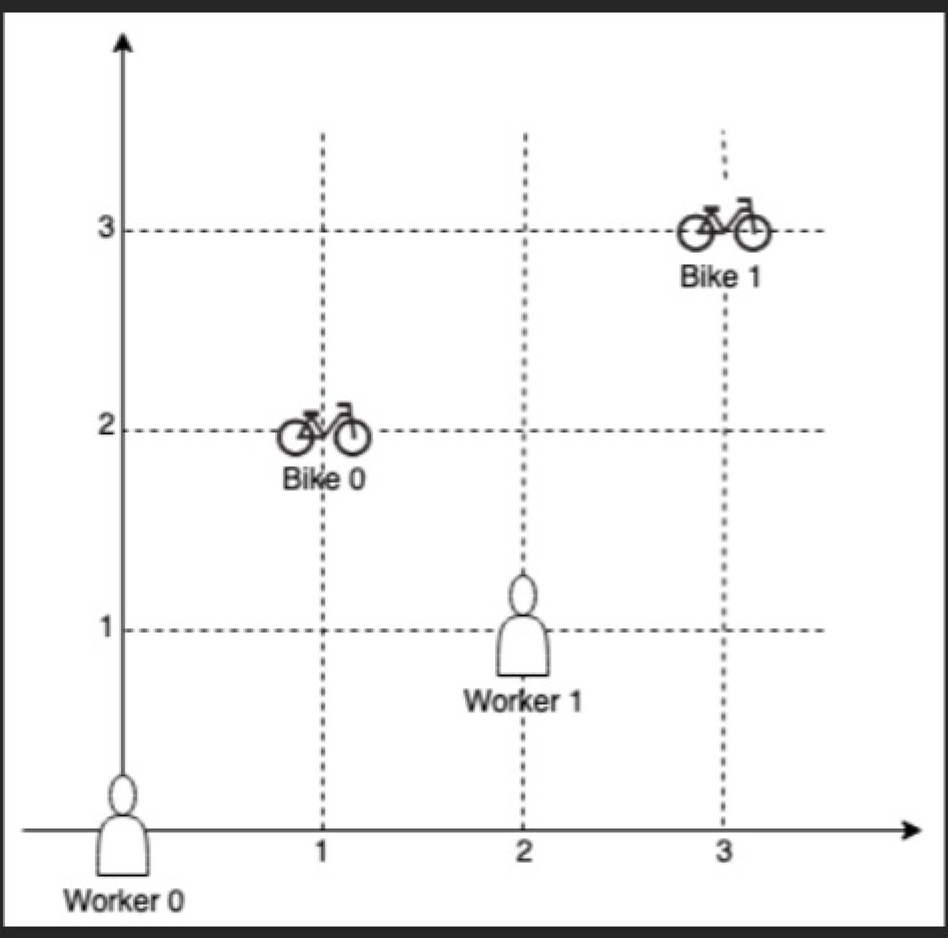
Assign a bike to each worker. Among the available bikes and workers, we choose the (worker$_i$, bike$_j$) pair with the shortest **Manhattan distance** between each other and assign the bike to that worker.

If there are multiple (worker$_i$, bike$_j$) pairs with the same shortest **Manhattan distance**, we choose the pair with **the smallest worker index**. If there are multiple ways to do that, we choose the pair with **the smallest bike index**. Repeat this process until there are no available workers.

Return *an array* `answer` *of length* `n`*, where* `answer[i]` *is the index (**0-indexed**) of the bike that the* $i^{th}$ *worker is assigned to.*

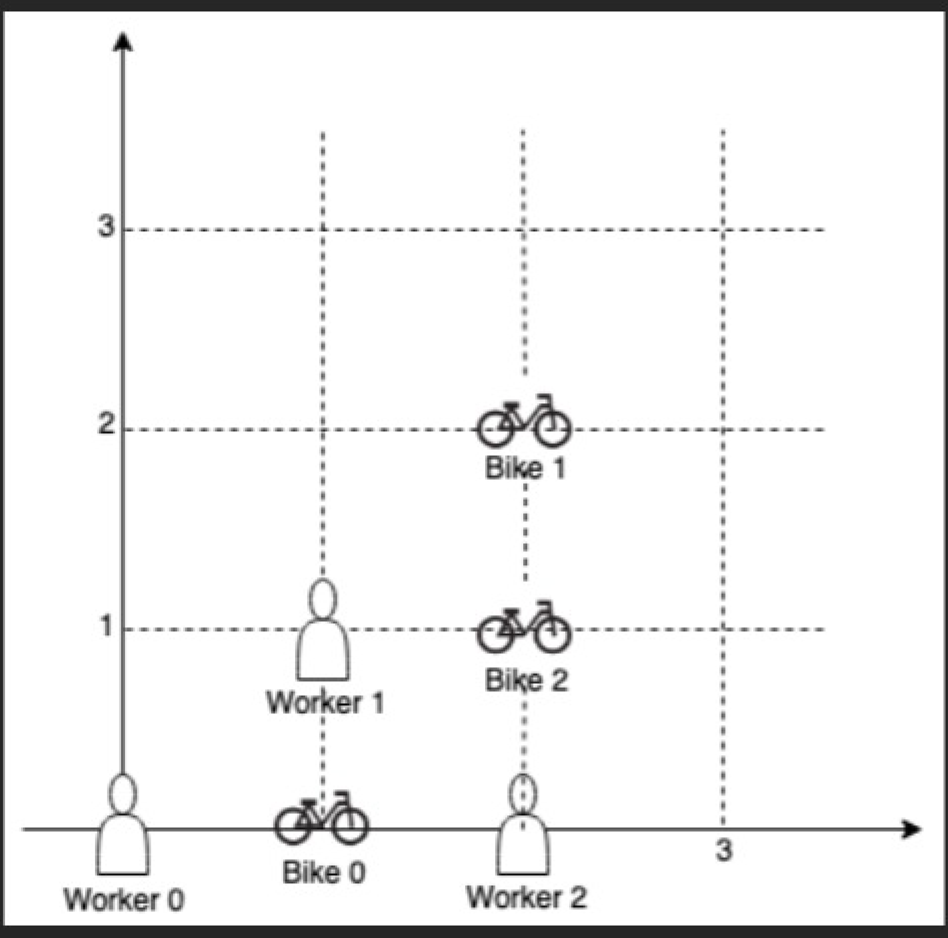
The **Manhattan distance** between two points `p1` and `p2` is `Manhattan(p1, p2) = |p1.x - p2.x| + |p1.y - p2.y|`.

**Example 1:**



```
Input: workers = [[0,0],[2,1]], bikes = [[1,2],[3,3]]
Output: [1,0]
Explanation: Worker 1 grabs Bike 0 as they are closest (without ties), and Worker 0
is assigned Bike 1. So the output is [1, 0].
```

**Example 2:**



```
Input: workers = [[0,0],[1,1],[2,0]], bikes = [[1,0],[2,2],[2,1]]
Output: [0,2,1]
Explanation: Worker 0 grabs Bike 0 at first. Worker 1 and Worker 2 share the same
distance to Bike 2, thus Worker 1 is assigned to Bike 2, and Worker 2 will take Bike
1. So the output is [0,2,1].
```

**Constraints:**

- `n == workers.length`
- `m == bikes.length`
- `1 <= n <= m <= 1000`
- `workers[i].length == bikes[j].length == 2`
- $0 <= x_i, y_i < 1000$
- $0 <= x_j, y_j < 1000$
- All worker and bike locations are **unique**.

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

Yes No

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Hint 1

Sort the elements by distance. In case of a tie, sort them by the index of the worker. After that, if there are still ties, sort them by the index of the bike.

Can you do this in less than O(nlogn) time, where n is the total number of pairs between workers and bikes?

Hint 2

Loop the sorted elements and match each pair of worker and bike if the given worker and bike where not used.

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