

Problem 1722: Minimize Hamming Distance After Swap Operations

Problem Information

Difficulty: Medium

Acceptance Rate: 48.93%

Paid Only: No

Tags: Array, Depth-First Search, Union Find

Problem Description

You are given two integer arrays, `source` and `target`, both of length `n`. You are also given an array `allowedSwaps` where each `allowedSwaps[i] = [ai, bi]` indicates that you are allowed to swap the elements at index `ai` and index `bi` *(0-indexed)* of array `source`. Note that you can swap elements at a specific pair of indices **multiple** times and in **any** order.

The **Hamming distance** of two arrays of the same length, `source` and `target`, is the number of positions where the elements are different. Formally, it is the number of indices `i` for `0 <= i <= n-1` where `source[i] != target[i]` *(0-indexed)*.

Return _the**minimum Hamming distance** of _`source`_ and_`target` _after performing**any** amount of swap operations on array _`source`_._

Example 1:

Input: source = [1,2,3,4], target = [2,1,4,5], allowedSwaps = [[0,1],[2,3]] **Output:** 1
Explanation: source can be transformed the following way: - Swap indices 0 and 1: source = [2, 1, 3, 4] - Swap indices 2 and 3: source = [2, 1, 4, 3] The Hamming distance of source and target is 1 as they differ in 1 position: index 3.

Example 2:

Input: source = [1,2,3,4], target = [1,3,2,4], allowedSwaps = [] **Output:** 2
Explanation: There are no allowed swaps. The Hamming distance of source and target is 2 as they differ in 2 positions: index 1 and index 2.

****Example 3:****

****Input:**** source = [5,1,2,4,3], target = [1,5,4,2,3], allowedSwaps = [[0,4],[4,2],[1,3],[1,4]]

****Output:**** 0

****Constraints:****

* `n == source.length == target.length` * `1 <= n <= 105` * `1 <= source[i], target[i] <= 105` * `0 <= allowedSwaps.length <= 105` * `allowedSwaps[i].length == 2` * `0 <= ai, bi <= n - 1` * `ai != bi`

Code Snippets

C++:

```
class Solution {  
public:  
    int minimumHammingDistance(vector<int>& source, vector<int>& target,  
        vector<vector<int>>& allowedSwaps) {  
  
    }  
};
```

Java:

```
class Solution {  
public int minimumHammingDistance(int[] source, int[] target, int[][]  
    allowedSwaps) {  
  
    }  
}
```

Python3:

```
class Solution:  
    def minimumHammingDistance(self, source: List[int], target: List[int],  
        allowedSwaps: List[List[int]]) -> int:
```