Problem 3383: Minimum Runes to Add to Cast Spell

Problem Information

Difficulty: Hard
Acceptance Rate: 43.33%
Paid Only: Yes
Tags: Array, Depth-First Search, Breadth-First Search, Union Find, Graph, Topological Sort

Problem Description

Alice has just graduated from wizard school, and wishes to cast a magic spell to celebrate. The magic spell contains certain **focus points** where magic needs to be concentrated, and some of these focus points contain **magic crystals** which serve as the spell's energy source. Focus points can be linked through **directed runes** , which channel magic flow from one focus point to another.

You are given a integer `n` denoting the _number_ of focus points and an array of integers `crystals` where `crystals[i]` indicates a focus point which holds a magic crystal. You are also given two integer arrays `flowFrom` and `flowTo`, which represent the existing **directed runes**. The `ith` rune allows magic to freely flow from focus point `flowFrom[i]` to focus point `flowTo[i]`.

You need to find the number of directed runes Alice must add to her spell, such that _each_ focus point either:

* **Contains** a magic crystal. * **Receives** magic flow _from_ another focus point.

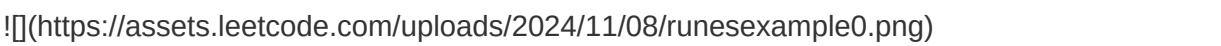
Return the **minimum** number of directed runes that she should add.

Example 1:

Input: n = 6, crystals = [0], flowFrom = [0,1,2,3], flowTo = [1,2,3,0]

Output: 2

Explanation:



Add two directed runes:

* From focus point 0 to focus point 4. * From focus point 0 to focus point 5.

Example 2:

Input: n = 7, crystals = [3,5], flowFrom = [0,1,2,3,5], flowTo = [1,2,0,4,6]

Output: 1

Explanation:

Add a directed rune from focus point 4 to focus point 2.

Constraints:

* `2 <= n <= 105` * `1 <= crystals.length <= n` * `0 <= crystals[i] <= n - 1` * `1 <= flowFrom.length == flowTo.length <= min(2 * 105, (n * (n - 1)) / 2)` * `0 <= flowFrom[i], flowTo[i] <= n - 1` * `flowFrom[i] != flowTo[i]` * All pre-existing directed runes are **distinct**.

Code Snippets

C++:

```
class Solution {
public:
int minRunesToAdd(int n, vector<int>& crystals, vector<int>& flowFrom,
vector<int>& flowTo) {

}
};
```

Java:

```
class Solution {
public int minRunesToAdd(int n, int[] crystals, int[] flowFrom, int[] flowTo)
{

}
}
```

Python3:

```
class Solution:
def minRunesToAdd(self, n: int, crystals: List[int], flowFrom: List[int],
flowTo: List[int]) -> int:
```