LeetCode – Number of Connected Components in an Undirected Graph (Java)

Given n nodes labeled from 0 to n - 1 and a list of undirected edges (each edge is a pair of nodes), write a function to find the number of connected components in an undirected graph.

Example 1:
0 3
| |
1 --- 2 4
Given n = 5 and edges = [[0, 1], [1, 2], [3, 4]], return 2.

Java Solution - Union-find

This problem can be solved by using union-find beautifully. Initially, there are n nodes. The nodes that are involved in each edge is merged.

There are k loops and each loop processing the root array costs log(n). Therefore, time complexity is O(k*log(n)).

```
public int countComponents(int n, int[][] edges) {
    int count = n;

    int[] root = new int[n];
    // initialize each node is an island
    for(int i=0; i<n; i++){
        root[i]=i;
    }

    for(int i=0; i<edges.length; i++){
        int x = edges[i][0];
        int y = edges[i][1];

        int xRoot = getRoot(root, x);
        int yRoot = getRoot(root, y);

        if(xRoot!=yRoot){
            count--;
            root[xRoot]=yRoot;
        }

    }

    return count;
}

public int getRoot(int[] arr, int i){
    while(arr[i]!=i){
        arr[i]= arr[arr[i]];
        i=arr[i];
    }
    return i;
}
```

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Category >> Algorithms

If you want someone to read your code, please put the code inside <pre><code> and </code></pre> tags. For example:

```
<pre><code>
String foo = "bar";
</code></pre>
```

Brenda Martis on 2017-2-7

Can someone explain the logic of getRoot(int[] arr, int i)?

Chintan Thakkar on 2017-2-7

Refer http://vancexu.github.io/2015/07/13/intro-to-union-find-data-structure.html

Kuanysh on 2017-5-2

Thank you very much! Helped to finish my C++ code 🙂

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