

#### Problem 4 – Active Directory

Structurally we are facing a tree in this problem. Therefore Depth First Search was my choice to traverse and find the matches.

In terms of time complexity we need to traverse each vertex (nodes), and then add to an array – this takes  $O(v)$  where  $v$  is the number of vertexes. But further, we need to iterate through the children (list of users) of that node and call DFS function. Therefore, this problem is  $O(v + e)$  time complexity. For space complexity we need basically need to store an array of  $v$  different nodes, hence space complexity is  $O(v)$ .