

1a. The worst case complexity of union is  $n$  because it finds the representative nodes of each set thus if we have somehow have to unionize two elements which are the last children in their sets and have not yet been path compressed then it would be  $n$ .

1b. find's worst complexity is also  $O(n)$  in the case of sets that have not been path compressed.

2. The function grows but it doesn't grow as fast as linear this is because of the path compression which would reduce the complexity slightly.