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Section: 7

The following programing assignment measuresthe ability to analyze and implement Kruskal's algorithm to find MST of a network. You are required to work with your colleagues in a teamwork (Maximum Two– Three members).

a. *Write all required algorithms needed to find MST using Kruskal's Algorithm.*

```
Kruskal(g):
   mst = ()
   edges = g.edges
   sort(edges)
 disjoinset(g.vertices)
   for edge in edges:
      u, v, weight = edge
      if find(u) != find(v):
         add edge to mst
         union(u, v)
 if len(mst) == g.vertices - 1:
         break
   return mst
find(v):
```

```
    if parent[v] != v:
        parent[v] = find(parent[v])
    return parent[v]

Union(vertex u, vertex v):
root_u = Find(u)
 root_v = Find(v)
IF rank(root_u) < rank(root_v):
Set parent of root_u to root_v
Else if  rank(root_u) > rank(root_v):
 Set parent of root_v to root_u
else:
Set parent of root_v to root_u
 Increment rank of root_u
```

b. <u>Analyze in detail your written algorithms in Part (a).</u>

Each of union is O(log E)

The loop is O(E)

Sorting all edges O(Elog E)

Find and union operation is total

O(Elog E)

Time complexity is O(Elog E)

E is the number of edge.