

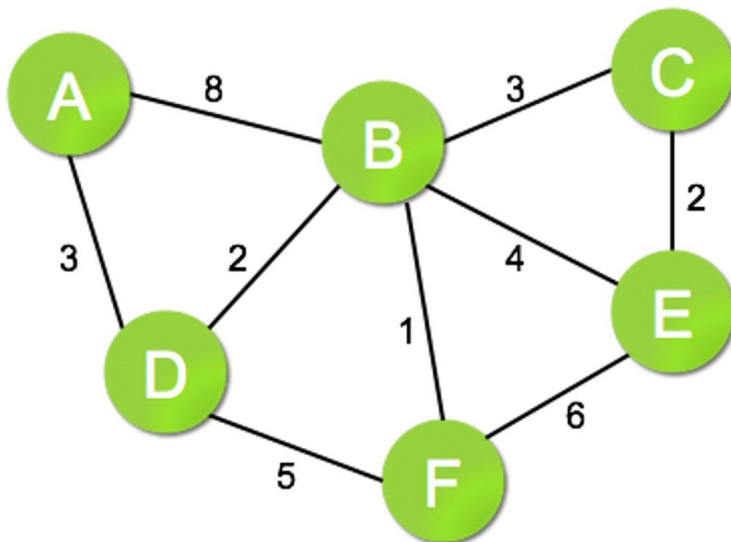
Names: _____

CS Logins: _____

Worksheet #16

MSTs: Prim's and Kruskal's

As always, sit with a partner and work through these together.



Activity 3: Kruskal Simulation

for each edge in shortest order
add edge to MST if it doesn't make a cycle

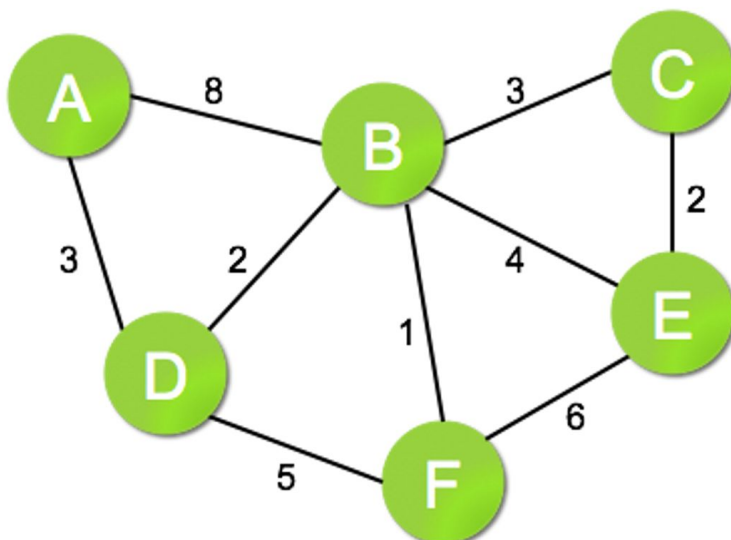
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Activity 4: Runtime of Naïve Kruskal's

Fill in the left-hand run times below for Kruskal's Algorithm based on the naïve union-find implementation of merging clouds.

function kruskal(G):

//Input: undirected, weighted graph G

//Output: list of edges in MST

for vertices v in G: -----
 makeCloud(v)

MST = []

Sort edges by weight -----

for all edges (u,v): -----

 if u and v are not in same cloud:-----

 add (u,v) to MST

 merge clouds containing u and v----

return MST

Activity 5: Runtime of Path-Compression Kruskal's

Fill in the right-hand run times below of Kruskal's Algorithm based on the path-compression union-find implementation of merging clouds.

1. O(_____) 1. O(_____) 1. O(_____) 1. O(_____)

2. O(_____) 2. O(_____) 2. O(_____) 2. O(_____)

3. O(_____) 3. O(_____) 3. O(_____) 3. O(_____)

4. O(_____) 4. O(_____) 4. O(_____) 4. O(_____)

5. O(_____) 5. O(_____) 5. O(_____) 5. O(_____)

Runtime of Naïve Kruskal's: _____ of Path-Compression Kruskal's: _____

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Runtime of Naïve Kruskal's: _____ of Path-Compression Kruskal's: _____