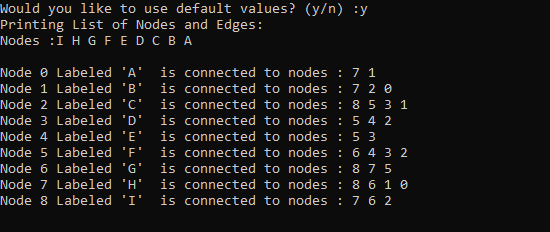
The graph that I will be using to test each of the questions



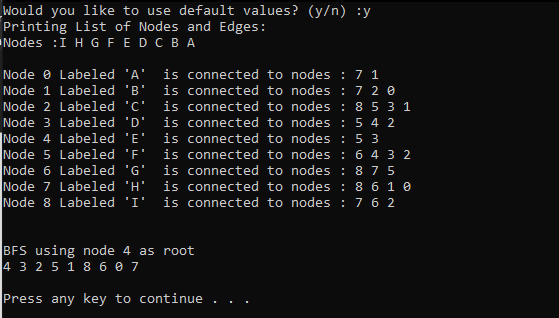
1.



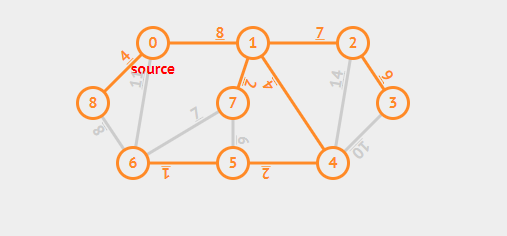
Source code will be the same for all questions and will be located at the bottom of this electronic packet. My representation of this class only allows for undirected graphs. To change to a directed graph, inside of the addEdge() function of the Graph class you can take out the second insert to only create a record from node1 to node2 with weight of the weight passed into the function.

2.

The two methods we talked about in class are the Breadth First Traversal and the Depth First Traversal. The Breadth First Traversal goes through the tree each “Row” at a time and checks each neighbor before traversing to the next level inside of the tree. Depth first does the opposite where it goes as far down the tree as it can until it reaches a leaf, then it will start back at the top and go down the next neighbor’s subtree.



Source code will be located at the bottom of this packet.

3. Min Weight = 37  


Source Code is at the bottom of this packet

I could not get prims algorithm working.

Psudocode for prims algorithm

T = ∅;

U = { 1 };

while (U ≠ V)

let (u, v) be the lowest cost edge such that u ∈ U and v ∈ V - U;

T = T ∪ {(u, v)}

U = U ∪ {v}

The output of this function should show the minimal spanning tree is

Min Weight 37

0 – 8 4

0 – 1 8

1 – 7 2

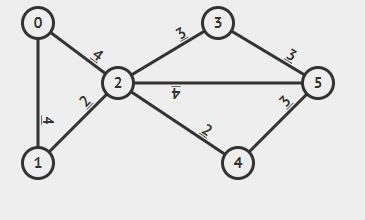
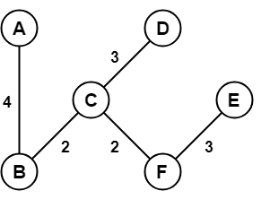
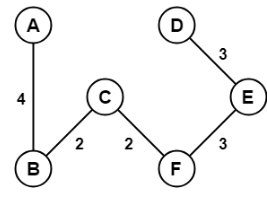
1 – 4 4

1 – 2 7

2 – 3 9

4 – 5 2

5 – 6 1

1. 1. 1. The cut property states “For any cut C of the graph, if the weight of an edge e in the cut-set of C is strictly smaller than the weights of all other edges of the cut-set of C, then this edge belongs to all MSTs of the graph.” (This was provided by Wikipedia)
      2. Because you are always pulling the smallest edge that connects a node to the graph being created, you will always pull the smallest weighted edge in the graph. The MST is the smallest sum of weights to connect the graph without a cycle. Since you are always pulling the smallest edge this will prove to be the MST.
   2. Prim’s and Kruskal’s may produce different MST of G if the MST is not unique
      1. Using this as the source graph  
         
      2. Prims
         1. Cost = 14
         2. 
      3. Kruskals
         1. Cost = 14
         2. 
   3. When Sorting the list of edges, sort them in decreasing order by weight and use the max weight when choosing which edge to add into the graph instead of the min.