CSC 241

Lab 9

Complete the implementation of the **WeightedGraph** class by providing the bodies for the following methods:

isEmpty, **isFull**, **hasVertex**, **clearMarks**, **markVertex**, **isMarked**, and **getUnmarked**.

Test the completed implementation using the **UseGraph.java** file.

If you try to run the **UseGraph** driver without completing the implementation of the **WeightedGraph** class, the output will not be correct.

When implementing **hasVertex**, use the **equals** method to compare vertices.

Add the following lines of code to test the **hasVertex** method:

```
System.out.println("The graph has Atlanta: " + graph.hasVertex(s0));

System.out.println("The graph has L.A.: " + graph.hasVertex("L.A."));
```

The correct output of the **UseGraph** driver should be the following:

```
Creating graph in figure 10.3
The graph has Atlanta: true
The graph has L.A.: false
Determining path using depth first ...

Austin     to Chicago
Austin
Houston
Atlanta
Washington
Dallas
Denver
Chicago
true

Austin     to Washington
Austin
Houston
Atlanta
Washington
true

Dallas     to Austin
Dallas
Denver
Atlanta
Washington
Houston
Chicago
Austin
true
```

```
Atlanta    to Denver
Atlanta
Washington
Dallas
Denver
true

Washington to Dallas
Washington
Dallas
true

Washington to Austin
Washington
Dallas
Denver
Chicago
Austin
true


Determining path using breadth first ...

Austin     to Chicago
Austin
Dallas
Houston
Chicago
true

Austin     to Washington
Austin
Dallas
Houston
Chicago
Denver
Atlanta
Washington
true

Dallas     to Austin
Dallas
Austin
true

Atlanta    to Denver
Atlanta
Houston
Washington
Dallas
Austin
Chicago
Denver
true
```

```
Washington to Dallas
Washington
Atlanta
Dallas
true

Washington to Austin
Washington
Atlanta
Dallas
Houston
Austin
true


Shortest paths starting at Washington
Last Vertex   Destination   Distance
-----------------------------------
Washington    Washington    0
Washington    Atlanta       600
Washington    Dallas        1300
Atlanta       Houston       1400
Dallas        Austin        1500
Dallas        Denver        2080
Dallas        Chicago       2200

The unreachable vertices are:



Shortest paths starting at Denver
Last Vertex   Destination   Distance
-----------------------------------
Denver        Denver        0
Denver        Chicago       1000
Denver        Atlanta       1400
Atlanta       Washington    2000
Atlanta       Houston       2200
Washington    Dallas        3300
Dallas        Austin        3500

The unreachable vertices are:



Creating graph in figure 10.x
Determining path using depth first ...

Austin     to Chicago
Austin
Houston
Atlanta
Washington
Dallas
```

```
Denver
Chicago
true

Austin     to Washington
Austin
Houston
Atlanta
Washington
true

Washington to Houston
Washington
Atlanta
Houston
true

Washington to Dallas
Washington
Atlanta
Houston
false

Washington to Austin
Washington
Atlanta
Houston
false


Determining path using breadth first ...

Austin     to Chicago
Austin
Dallas
Houston
Chicago
true

Austin     to Washington
Austin
Dallas
Houston
Chicago
Denver
Atlanta
Washington
true

Washington to Houston
Washington
Atlanta
Houston
true
```

```
Washington to Dallas
Washington
Atlanta
Houston
false

Washington to Austin
Washington
Atlanta
Houston
false


Shortest paths starting at Washington
Last Vertex   Destination   Distance
-----------------------------------
Washington    Washington    0
Washington    Atlanta       600
Atlanta       Houston       1400

The unreachable vertices are:
Austin
Chicago
Dallas
Denver



Shortest paths starting at Denver
Last Vertex   Destination   Distance
-----------------------------------
Denver        Denver        0
Denver        Chicago       1000
Denver        Atlanta       1400
Atlanta       Washington    2000
Atlanta       Houston       2200

The unreachable vertices are:
Austin
Dallas
```