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| **Name** |  |
| **CMS ID** |  |
| **Date** |  |

**Objectives:**

After completing this Lab students will able to

1. Understand the concept and usage of graphs.
2. Implement graphs.

For revision of the concepts of graphs, please refer to the lectures uploaded to google classroom. Call me anytime if you need any help. Here are the tasks that you need to perform

**Note:**

**In case of tasks of adjacency lists, you are supposed to implement your own List class with all the required methods needed.**

1. Implement the following methods for graphs using adjacency lists
   1. **Create the graph.** That is, store the graph in computer memory using a particular graph representation.
   2. **Clear the graph.** This operation makes the graph empty.
   3. Determine whether the graph is **empty**.
   4. **InsertAdjacency** that takes the vertex number/name and Adjacent Node number/name as input and create adjacency for that vertex.
   5. **Traverse** the graph.
   6. **Print** the graph.
2. **Implement the above function using adjacency matrix as well.**

You should get values from a file named graphData.txt that have data in the following format

1000

10

0 2 5 66 -999

1 4 15 8 -999

2 -999

3 7 44 2 -999

4 12 3 11 5 66 5 -999

5 -999

6 1 -999

7 0 1 5 17 99 -999

8 1 4 5 6 11 222 -999

9 -999

Where first entry in the file represent maximum graph size and second one represent current graph size. Some of the vertices have adjacencies to no one.

1. Implement a weighted graph where each node in the list not only represent the vertex number, but also the city that it represent. Also, each edge should be represented by its length as well. Think about implementing the following graph

