Homework 4 Test Cases: Pt 3

In this document, the test cases for verifying the implementation of Dijkstra Algorithm are discussed. In order to carry out these test cases, you will need to complete the implementation of member functions developed from Part I and II before attempting Part III.

Part 3 Test Cases for Dijkstra algorithm for undirected/directed graphs given in `csv` format:

In these group of test cases, the experiments start with a given graph data stored in `csv` format. Since we have to handle both directed graphs and undirected graphs, we will denote directed graphs by D and the undirected graphs by U.

The test cases can be summarized as follows:

Tasks	Undirected Graphs	Directed Graphs
Compute shortest distance via Dijkstra alg.	Test Case 5	Test Case 6
Compute shortest paths via Dijkstra alg.	Test Case 7	Test Case 8
Visual Display of shortest paths	Test Case 9	Test Case 10

Test Cases 5 and 6 Use pseudorandom function to select a vertex s in the vertex set. Use Dijkstra algorithm to compute shortest distances. Your answer must be displayed as a table in the following form:

Vertex Name	Distance from source vertex s
1	...
2	...
...	...
n	...

Use pseudorandom function to select a vertex $t \neq s$. Remove all edges that use the vertex t. Use Dijkstra algorithm to compute the shortest distances. Your answer must be displayed as a table in the following form:

Vertex Name	Distance from source vertex s
1	...
2	...
...	...
n	...

Note that t should not appear in the vertex name column.

Test Cases 7 and 8 In these two test cases, you may assume that the graphs have more than 5 vertices.

Use pseudorandom function to select a vertex s and five other vertices v_1, ..., v_5 from the vertex set. Use Dijkstra algorithm to compute the shortest paths between s to each of these vertices. Your answer must be displayed as a table in the following form:

Vertex Name	The Path from source vertex s to this vertex
v_1	...
v_2	...
...	...
v_5	...

Remove $\lfloor 1/4 \rfloor |E|$ edges from the edge set. Use Dijkstra algorithm to compute the shortest paths between s to each of these vertices. Your answer must be displayed as a table in the following form:

Vertex Name	The Path from source vertex s to this vertex
v_1	...
v_2	...
...	...
v_5	...

Test Case 9 and 10

Select 5 pair vertices from the graph, say s_i, t_i, $i = 1, \ldots, 5$. Use Dijkstra algorithm to compute the shortest paths between them. Display the shortest path from vertex s_i to vertex t_i as a colored path in the graph (by returning a dot file).