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File - Bi-directional Dijkstra
C:\Users\Hrishikesh\PycharmProjects\Py\venv\Scripts\python.exe "C:/Users/Hrishikesh/Python/Bi-directional Dijkstra.py"

CE 5290 Group Project_Team 1 : Bidirectional Dijkstra Algorithm


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Enter the number of Nodes: 9

The Cost matrix is:
Nodes  1  2  3  4  5  6  7  8  9
0      1  0  5  2  0  0  0  0  0
1      2  0  0  0  3  7  0  0  0
2      3  0  2  0  0  0  0  9  0
3      4  0  0  3  0  2  0  6  0
4      5  0  0  0  0  0  8  5  7
5      6  0  0  0  0  0  0  0  4
6      7  0  0  0  0  0  0  0  2
7      8  0  0  0  0  0  3  0  0
8      9  0  0  0  0  0  0  0  0

The Graph Node set is:  [1, 2, 3, 4, 5, 6, 7, 8, 9]
The Edges with associated Costs is:  [(1, 2, 5), (1, 3, 2), (2, 4, 3), (2, 5, 7), (3, 2, 2), (3, 7, 9), (4, 3, 3), (4, 5, 2), (4, 7, 6), (5, 6, 8), (5, 7, 5), (5, 8, 7), (6, 9, 4), (7, 8, 2), (8, 6, 3)]

Please choose the Source node 's': 1
Please choose the Sink node 't': 9

The Distance labels in Forward are:  {1: 0, 2: inf, 3: inf, 4: inf, 5: inf, 6: inf, 7: inf, 8: inf, 9: inf}
The Distance labels in Reverse are:  {1: inf, 2: inf, 3: inf, 4: inf, 5: inf, 6: inf, 7: inf, 8: inf, 9: 0}
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Iteration Number: 1

Forward Dijkstra -
The smallest labelled unexplored Node is:  1
The set S is:  [1]
The set S1 is:  [2, 3, 4, 5, 6, 7, 8, 9]
The updated Distance labels are:  {1: 0, 2: 5, 3: 2, 4: inf, 5: inf, 6: inf, 7: inf, 8: inf, 9: inf}
The list of Predecessors is:  {2: 1, 3: 1}

Reverse Dijkstra -
The smallest labelled unexplored Node is:  9
The set T is:  [9]
The set T1 is:  [1, 2, 3, 4, 5, 6, 7, 8]
The updated Distance labels in Reverse are:  {1: inf, 2: inf, 3: inf, 4: inf, 5: inf, 6: 4, 7: inf, 8: inf, 9: 0}
The list of Successors is:  {6: 9}
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Iteration Number:  2

Forward Dijkstra -
The smallest labelled unexplored Node is:  3
The set S is:  [1, 3]
The set S1 is:  [2, 4, 5, 6, 7, 8, 9]
The updated Distance labels are:  {1: 0, 2: 4, 3: 2, 4: inf, 5: inf, 6: inf, 7: 11, 8: inf, 9: inf}
The list of Predecessors is:  {2: 3, 3: 1, 7: 3}

Reverse Dijkstra -
The smallest labelled unexplored Node is:  6
The set T is:  [9, 6]
The set T1 is:  [1, 2, 3, 4, 5, 7, 8]
The updated Distance labels in Reverse are:  {1: inf, 2: inf, 3: inf, 4: inf, 5: 12, 6: 4, 7: inf, 8: 7, 9: 0}
The list of Successors is:  {6: 9, 5: 6, 8: 6}
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Iteration Number:  3

Forward Dijkstra -
The smallest labelled unexplored Node is:  2
The set S is:  [1, 3, 2]
The set S1 is:  [4, 5, 6, 7, 8, 9]
The updated Distance labels are:  {1: 0, 2: 4, 3: 2, 4: 7, 5: 11, 6: inf, 7: 11, 8: inf, 9: inf}
The list of Predecessors is:  {2: 3, 3: 1, 7: 3, 4: 2, 5: 2}

Reverse Dijkstra -
The smallest labelled unexplored Node is:  8
The set T is:  [9, 6, 8]
The set T1 is:  [1, 2, 3, 4, 5, 7]
The updated Distance labels in Reverse are:  {1: inf, 2: inf, 3: inf, 4: inf, 5: 12, 6: 4, 7: 9, 8: 7, 9: 0}
The list of Successors is:  {6: 9, 5: 6, 8: 6, 7: 8}
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Iteration Number:  4

Forward Dijkstra -
The smallest labelled unexplored Node is:  4
The set S is:  [1, 3, 2, 4]
The set S1 is:  [5, 6, 7, 8, 9]
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The updated Distance labels are: {1: 0, 2: 4, 3: 2, 4: 7, 5: 9, 6: inf, 7: 11, 8: inf, 9: inf}
The list of Predecessors is: {2: 3, 3: 1, 7: 3, 4: 2, 5: 4}

Reverse Dijkstra -
The smallest labelled unexplored Node is: 7
The set T is: [9, 6, 8, 7]
The set T1 is: [1, 2, 3, 4, 5]
The updated Distance labels in Reverse are: {1: inf, 2: inf, 3: 18, 4: 15, 5: 12, 6: 4, 7: 9, 8: 7, 9: 0}
The list of Successors is: {6: 9, 5: 6, 8: 6, 7: 8, 3: 7, 4: 7}

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Iteration Number: 5

Forward Dijkstra -
The smallest labelled unexplored Node is: 5
The set S is: [1, 3, 2, 4, 5]
The set S1 is: [6, 7, 8, 9]
The updated Distance labels are: {1: 0, 2: 4, 3: 2, 4: 7, 5: 9, 6: 17, 7: 11, 8: 16, 9: inf}
The list of Predecessors is: {2: 3, 3: 1, 7: 3, 4: 2, 5: 4, 6: 5, 8: 5}

Reverse Dijkstra -
The smallest labelled unexplored Node is: 5
The set T is: [9, 6, 8, 7, 5]
The set T1 is: [1, 2, 3, 4]
The updated Distance labels in Reverse are: {1: inf, 2: 19, 3: 18, 4: 14, 5: 12, 6: 4, 7: 9, 8: 7, 9: 0}
The list of Successors is: {6: 9, 5: 6, 8: 6, 7: 8, 3: 7, 4: 5, 2: 5}

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The Shortest Path distance labels in Forward are as follows:
{1: 0, 2: 4, 3: 2, 4: 7, 5: 9, 6: 17, 7: 11, 8: 16, 9: inf}
The Shortest Path distance labels in Reverse are as follows:
{1: inf, 2: 19, 3: 18, 4: 14, 5: 12, 6: 4, 7: 9, 8: 7, 9: 0}

The Common Node found is: 5

The current optimal path is d1(5) + d2(5) = 21

The Shortest path passes through nodes 3 and 7
The bridging arc between set S and set T is (3,7)

The Shortest Path distance is: 20

The predecessor list: {2: 3, 3: 1, 7: 3, 4: 2, 5: 4, 6: 5, 8: 5}

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The Shortest path from Source 1 to Sink 9 is: [1, 3, 7, 8, 6, 9]
The Shortest Path with the Arc & Costs is: {(1, 3): 2, (3, 7): 9, (6, 9): 4, (7, 8): 2, (8, 6): 3}

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Process finished with exit code 0
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