

## Search Algorithms Summary

Algorithm	Path Length	Time Taken (seconds)
DFS	2, 3, 4, 5, 6, 6, 8, 10, 16, 4	0.006, 0.014, 0.017, 0.03, 0.004, 0.049, 0.015, 0.015, 0.01, 0.004
BFS	3, 5, 6, 7, 9, 13, 14, 16, 20, 3	0.005, 0.013, 0.011, 0.014, 0.023, 0.028, 0.04, 0.039, 0.105, 0.005
A*	2, 2, 3, 3, 3, 5, 5, 5, 6, 6	0.041, 0.031, 0.045, 0.143, 0.122, 0.648, 0.916, 0.649, 3.487, 0.13
Bidirectional Search	2, 2, 3, 3, 3, 4, 5, 5, 6, 6	0.006, 0.044, 0.007, 0.008, 0.008, 0.011, 0.013, 0.022, 0.016, 0.005
UCS	1, 2, 2, 2, 4, 4, 5, 5, 4, 5	0.009, 0.037, 0.029, 0.026, 0.067, 0.055, 0.06, 0.051, 0.064, 0.019

## Centrality Summary

The result of measuring the centralities for the nodes indicates that the higher ranks are populated by roughly the same cities, although there are some differences in ranks too. Cities like Bucharest, Sibiu, and Craiova hold the top three ranks in the degree centrality metric mainly due to the higher number of edges or immediate neighbors they have.

Pitesti, Rimnicu Vilcea, and Bucharest respectively score the highest in closeness centrality, because they are generally "closer" to the other cities (there is low overall cost incurred when connecting to all other nodes).

Cities like Bucharest and Pitesti have higher eigenvector centralities, as they are connected to other important cities. They are connected not only to more cities directly but also to more cities that are important.

Bucharest, Pitesti, Fagaras, and Sibiu have the highest katz centralities as so many paths from one part of the graph to the other have to go through them.

Bucharest, Sibiu, Craiova, and Pitesti are top four PageRank centrality scorers because of the higher numbers of important cities that link towards them.

Bucharest, Urziceni, Pitesti ,and Rimnicu Vilcea are then highest betweenness centrality scorers. When one tries to pick a pair of cities and tries to connect them using the shortest possible route, these four cities are likely to appear.

Centrality Type	Top 5 Centrality Scorers
Degree Centrality	1. Bucharest 2. Sibiu 3. Craiova 4. Pitesti 5. Arad
Closeness Centrality	1. Pitesti 2. Rimnicu Vilcea 3. Bucharest 4. Sibiu 5. Craiova
Eigenvector Centrality	1. Bucharest 2. Pitesti 3. Fagaras

	<ul style="list-style-type: none"> <li>4. Craiova</li> <li>5. Sibiu</li> </ul>
Katz Centrality	<ul style="list-style-type: none"> <li>1. Bucharest</li> <li>2. Pitesti</li> <li>3. Fagaras</li> <li>4. Sibiu</li> <li>5. Craiova</li> </ul>
PageRank Centrality	<ul style="list-style-type: none"> <li>1. Bucharest</li> <li>2. Sibiu</li> <li>3. Craiova</li> <li>4. Pitesti</li> <li>5. Arad</li> </ul>
Betweenness Centrality	<ul style="list-style-type: none"> <li>1. Bucharest</li> <li>2. Urziceni</li> <li>3. Pitesti</li> <li>4. Rimnicu Vilcea</li> <li>5. Sibiu</li> </ul>