Searching Algorithms

In this experiment we've tested 4 Graph processing Algorithms.

A Star, Best First Search, BFS and DFS.

We're mostly looking for the shortest path and the one with the least cost (since we're dealing with weighted graphs.)

Overall from our result tables:

A* and Best First Search are very close in terms of *minimal path cost* but processed the most nodes.

BFS had the *least nodes in path* but average processing and cost.
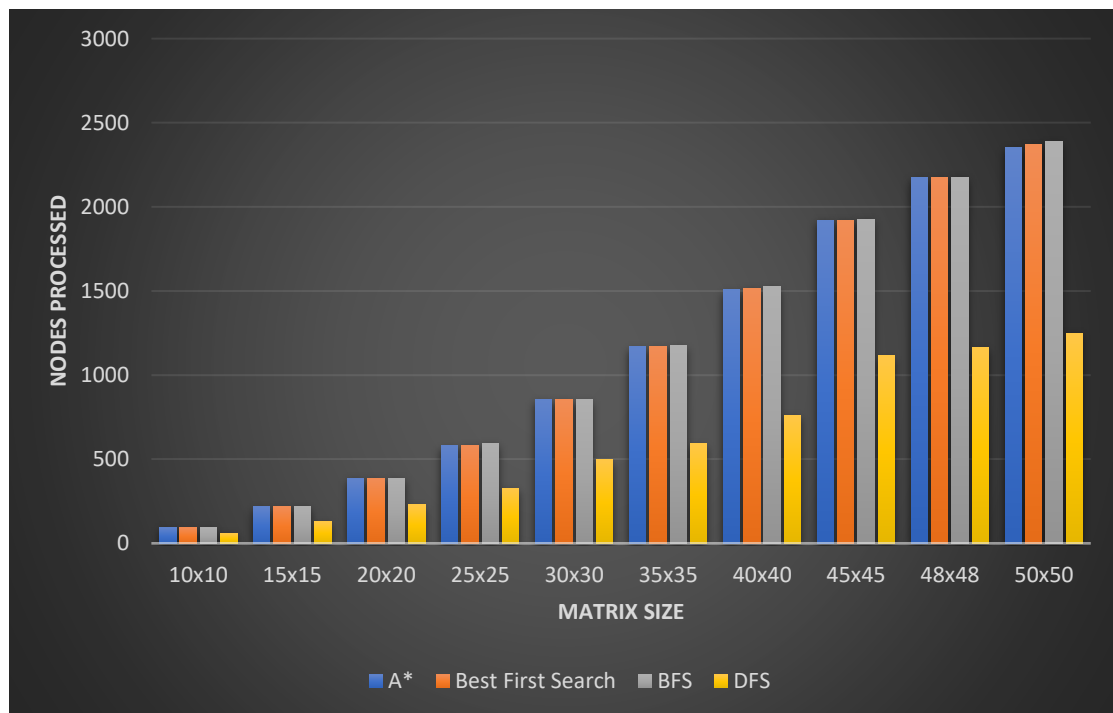
DFS had *least nodes processed* but had a much higher cost and path length.

As such, our choice of algorithm for implementation would be A* which allows us to get good performance and results on weighted graphs.

Since DFS and BFS do not take into consideration the weights of the graph, we'll compare our results with the number of **nodes processed** with each algorithm until we've gotten to the end.

We've ran the algorithms on 10 matrices of increasing sizes, from 10x10 to 50x50 and the results are as follows:

- The complete tables are at the end of the document

Complete Results

10x10

Algorithm	# of Nodes in Path	# of Nodes Processed	Path Cost
A*	18	94	123
Best First Search	18	93	123
BFS	18	94	171
DFS	38	61	388

15x15

Algorithm	# of Nodes in Path	# of Nodes Processed	Path Cost
A*	28	216	185
Best First Search	28	218	175
BFS	28	220	302
DFS	120	129	1204

20x20

Algorithm	# of Nodes in Path	# of Nodes Processed	Path Cost
A*	38	386	244
Best First Search	38	385	244
BFS	38	386	397
DFS	168	228	1656

25x25

Algorithm	# of Nodes in Path	# of Nodes Processed	Path Cost
A*	48	579	255
Best First Search	48	582	255
BFS	48	596	540
DFS	300	326	3123

30x30

Algorithm	# of Nodes in Path	# of Nodes Processed	Path Cost
A*	60	852	294
Best First Search	60	852	294
BFS	58	854	558
DFS	400	497	3942

35x35

Algorithm	# of Nodes in Path	# of Nodes Processed	Path Cost
A*	68	1167	377
Best First Search	68	1170	377
BFS	68	1174	652
DFS	564	594	5675

Complete Results cont.

40x40

Algorithm	# of Nodes in Path	# of Nodes Processed	Path Cost
A*	80	1506	431
Best First Search	80	1516	431
BFS	78	1526	757
DFS	710	762	7057

45x45

Algorithm	# of Nodes in Path	# of Nodes Processed	Path Cost
A*	92	1920	511
Best First Search	92	1920	511
BFS	88	1926	898
DFS	816	1114	8193

48x48

Algorithm	# of Nodes in Path	# of Nodes Processed	Path Cost
A*	94	2175	499
Best First Search	94	2175	499
BFS	94	2177	976
DFS	922	1163	9341

50x50

Algorithm	# of Nodes in Path	# of Nodes Processed	Path Cost
A*	102	2355	515
Best First Search	102	2369	515
BFS	98	2386	979
DFS	1084	1250	10551