Answer

The following are the observations from the output of the assignment.

SAMPLE OUTPUT:

Greedy Search
Traversal sequence:
m1,m3,m6,m9,m12
Dissimilarity:37
Propagating path:
m1,m3,m6,m9,m12

A* Search
Traversal sequence:
m1,m3,m4,m7,m9,m2,m8,m12
Dissimilarity:25
Propagating path:
m1,m3,m7,m9,m12

Greedy Search

Advantages:

1. It has a faster time to converge to the goal than the A* search.
   By looking at the output we find that m1,m3,m6,m9,m12 only 5 nodes are traversed of the 12 nodes present in the graph. This shows that the greedy search can converge faster to the goal than A* Search (It may go into a loop but this is fixed using traversed feature) .

2. It traverses lesser number of nodes and it uses lesser memory than Astar search as each node does not need to store the earlier path cost to getting to the node. By the output we find that the Greedy search only traverses 5 of the possible 12 nodes, lesser number of nodes are expanded compared to the A* Search. We also find that m1,m3,m6,m9,m12 only 5 nodes are traversed hence the amount of nodes in memory are lesser than the A* search to store the parent node and the matrix required to store the reverse path, also the higher costing nodes compared to the current node can be discarded. It also need not keep the parent traversal cost into consideration.

Disadvantages:

1. It does not produce the optimal path to the goal. The output shows the dissimilarity value of the graph traversed is 37 which is not the optimal solution from start to goal.

2. The search is based solely on heuristics. The heuristics may not be accurate to find the lowest cost path to the goal, in a cyclic graph this may be a problem.

A* Search

Advantages:

1. It produces an optimal solution path to the goal if the heuristics are admissible. The number of nodes iterated by the algorithm is higher, but the at the this cost we are able to find the optimal solution. From the output of the program we find that the dissimilarity is 25 which is the optimal solution of the given graph.

2. The search is not only based on heuristics but also the cost of the path traversed so far from the start node. The search takes into account the cost of the path so far which is a better heuristic to converge to optimal solution.

Disadvantages:

1. It has a slower convergence time than Greedy Search, and takes more space as the number of traversed nodes are m1,m3,m4,m7,m9,m2,m8,m12 which are more than the number of nodes traversed by the greedy search algorithm.

2. It requires larger amount of computation as fn needs to be evaluated for every node that is being added to the queue. It requires more computation as the fn value needs to computed at every iteration of reaching the child node.
