

## Greedy Best First Search

### Advantages

- The search cost of Greedy Best First Search is minimal because for this particular problem, the search algorithm finds a solution without ever expanding a node that is not on the solution path. i.e. Both the traversal sequence and the propagating path are the same in this case. It attributes to the fact that the heuristic dissimilarity used here is on the same lines of a straight line distance heuristic.

### Disadvantages

- The obtained dissimilarity value (search cost) is not optimal. i.e. Greedy Best First Solution, guarantees a solution if one exists but it may not be the optimal solution. In the given search space, greedy search considers the path [m1, m3, m6, m9, m12] by only looking at the heuristic values and thus a path cost of 37 which is suboptimal.
- Greedy search is incomplete in infinite search spaces and even in some cases of finite search spaces.

## A\* Search

### Advantages

- The A\* search algorithm is both complete and optimal. i.e. It guarantees a solution if one exists and the solution returned by A\* search will be optimal. In the given search space, A\* search considers the path [m1, m3, m7, m9, m12] by considering the shortest path to a node as well as the heuristic path towards the goal. The path cost is 25 which is the optimal solution.
- The search is also optimally efficient meaning that the number of nodes expanded by A\* search is minimal to find the goal, given a consistent heuristic.

### Disadvantages

- One main drawback is that A\* search holds all nodes in memory and hence it requires a large storage space for the nodes. It isn't practical to use A\* search to find optimal solutions for large search spaces. For example, had there been 1000 movie nodes instead of 12, it would have been practically impossible to find the optimal solution without running out of memory.
- The time complexity of A\* search is also exponential in terms of the length of the solution and the relative error in the estimation of the heuristic.