Pandit Deendayal Petroleum University

School of Technology

ICT Department

Artificial Intelligence, BTech ICT Sem VI

Name of the student : Dirgh Kotharia

Student ID : 16BIT025

1. Suggest appropriate heuristic functions?

Ans. Manhattan Distance and Hamming Distance

2. Prove that they are admissible?

Ans. Hamming distance directly calculates the misplaced blocks and it will be the least number of steps needed to reach the goal state. So it will never overestimates the number of steps. So hamming is admissible heuristic

Manhattan Distance is the minimum number of steps needed to reach the goal state with the relaxed condition of sliding puzzle so it will also never overestimate the number of steps so it is also admissible.

3. Compare the heuristic function in terms of number of nodes which are expanded from initial to goal state.

Ans. Hamming Heuristic Function expands the maximum number of nodes.

4. Compute the total cost computed by various heuristics function during graph traversal from Initial to final state.

Ans. Maximum Number of Steps taken by algorithm in case of Hamming=9

Maximum Number of Steps taken by algorithm in case of Manhattan=9

5. Compare the results of A* search with BFS and DFS on following points

a. Number of nodes expanded.

b. Memory requirements
c. Optimality of the search
d. Completeness
Ans. a. DFS=9
b. Memory requirements are lower than BFS and greater than DFS
c. A* provides more optimum search than BFS and DFS
d. A* is a complete problem
6. Is A* able to find goal state starting from any initial state?
Ans. Yes, A* search is able to find goal state from any initial state