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AIML Experiment 3

Aim :- Solve a problem (15puzzle) using informed searching A*Star and analyze the algorithm wrt completeness, time/space complexity and optimality.

Informed Search:-

It refers to search algorithms which help in navigating large databases with certain available information about the end goal in search and most widely used in large databases. It uses the idea of heuristic, hence it is called heuristic search

Admissiblity of heuristic function.

$h(n) <= h^*(n)$ Where $h(n)$ is heuristic cost
$h^*(n)$ is estimated cost

A* Search Algorithm:-

A* search uses best-first search, heuristic function $h(n)$ to and cost to reach the node n from start state $g(n)$ A* search finds the shortest path through search state using heuristic function.

In code, priority queue is used to find the nodes with minimum cost. We combine both the heuristic cost and cost to reach the node to determine the total cost $[f(n) = g(n) + h(n)]$ where $f(n)$ = estimated cost, $g(n)$ = cost to reach node 'n' and $h(n)$ = cost to reach n to goal Major disadvantage of A* is memory, it keeps all nods in memory. A* search is optimal if its admissible & consitency. It is complete as long as branhing factor is finite and cost at node is fixed. Time complexity of A* depends on heuristic function and given by $O(b^d)$ (d=depth)(b=branching factor). Space complexity = $O(b^d)$