Home assignment - 1

1. Provide a step-by-step procedure to solve 8 puzzle problem using A* Algorithm?

Ans The 8-puzzle problem is a sliding puzzle contains of 3×3 grid with 8 numbered tiles & one empty space.

The possible moves that a slide a tile into the empty space ('up', 'down', 'left', 'right')

Each has a uniform cost of 1

Initialise open & closed list, A priority queue containing nodes that are yet to be explored, sorted by $f(n) = g(n) + h(n)$

Go to the loop untill the Goal state is Reached & open list is empty.

Repeat the Until Goal is found or no more nodes are left to explore.

Reconstruct the path.

2. Provide a step-by-step procedure for solving map-colouring problem using constraint satisfaction?

Ans The map colouring problem is an example of a constraint satisfaction Problem (CSP) is the goal to colour a map.

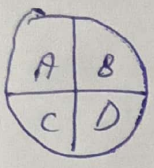
The most common strategies include Backtracking, Forward checking & constraint propogation.

Forward checking : After assigning a colour to a region, eliminate that colour from the domain of all neighbouring regions.

Back tracking : If you reach a point where no valid colour assignments can be made (i.e all domains are empty), back track to the previous variable & try a different color.

Variables : A, B, C, D

Domains = {Red, Green, Blue}



Constraints :

$A \neq B$ $B \neq C$ $C \neq D$

$D \neq A$ $A \neq C$ (if they are also neighbours)

Assign color to A then apply forward checking to reduce the domains of B & D. Continue the process, checking constraints & backtracking.