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AIML Experiment 2

Aim :- Implement the uninformed search using BFS and DFS in 15 puzzle problem.

What is uninformed search :- An uninformed search is a group of general-purpose search algorithm which operates in brute force way. It doesn't have additional information about state or search space other than how to traverse the tree; it is blind search

→ 15 puzzle problem :-
In this problem, we have a 4x4 puzzle containing 0-15 numbers where starting piece consist of 01 till 15 counts and ending with zero, this is the final state of the puzzle. The puzzle can have initial state as random and we have to find possible move with "0" to reach final state.

→ Using BFS :- [Time complexity = $O(b^d)$ b = branching factor, d = depth.
In breath first search, we first initialize a queue which takes the start point, visited states list which keeps track of the already visited nodes for optimization. We then loop it till the queue is empty and add all possible valid moves in current game puzzle (left, right, up, down)
If the goal state is found, it traces back the previous states to find the solution path.

→ Using DFS :- Time complexity = $O(n^m)$ m = max depth
It is the same approach as BFS except stack is used.

In conclusion, BFS find the shallowest goal and hence takes less time than DFS as it finds the deepest solution in state space which might not be the optimal solution.