Assignment 4
N Puzzle Problem using Depth Limited Search

What does the code do?
The code solves the n-Puzzle problem (like 8-puzzle or 15-puzzle) using Depth-Limited Search. It reads the puzzle size, start state, and goal state from an input file. The user provides a depth limit. The code tries to find a solution within that limit and writes all the steps (or a failure message) to a separate output file. The input file is never changed.

Key variables and their roles:

size: The dimension of the puzzle (e.g., 3 for 3x3).
start: The starting state as a flat list (e.g., [1,2,3,4,5,6,0,7,8]).
goal: The goal state as a flat list.
limit: The maximum depth the search will go.
path: The sequence of states from start to the current state during the search.
seen: A set to keep track of visited states and avoid cycles.
steps: The list of all states in the solution path (if found).
found: Boolean, True if a solution is found, otherwise False.

How does it work?

1. The code reads the puzzle from the input file.
2. It asks the user for a depth limit.
3. It tries to solve the puzzle using depth-limited search, exploring possible moves up to the given depth.
4. If a solution is found, it writes each step (as a matrix) and the final output state to the output file.
5. If no solution is found within the depth limit, it writes a message to the output file.

The files that I have submitted:

1. When running the n puzzle problem where the file includes 3X3 matrix, the input and output files
2. When running the n puzzle problem where the file includes 3X3 matrix, the input and output files
3. If the matrix can't be solved in the given depth limit, the message is displayed within the file itself