Lab4 - Solving Problems by Searching - Part I

AI701: Artificial Intelligence

September 14, 2021

This experiment uses the uninformed search methods to solve the eight-digit problem.

General Instructions

All written answers must be in order and clearly written.
You should modify the code in the code cells of the jupyter platform between
 # BEGIN_YOUR_CODE
and
 # END_YOUR_CODE
but you can add other helper functions outside this block if you want.

Eight - digit problem

Problem background: There are eight numbers 1, 2, 3, 4, 5, 6, 7, and 8 placed on a 3×3 checkerboard. Each number occupies a grid and there is a space.

Moving rules: These numbers can be moved on the board. The moving rule is: the numbers adjacent to the space can be moved into the space.

Solution goal: The problem is: the specified initial game and target game are given in Fig.1. You need to use the search algorithm to make the initial game state transition to the target game state, and give the sequence of movement of the numbers.

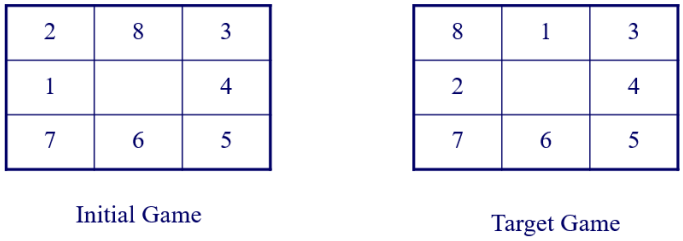

Figure 1: The initial state and target state of the eight-digit problem

1 Part A: Uninformed search

In part A, you need to use some uniformed search strategies (specifically, DFS and BFS) to solve the eight-digit problem.

1. Understand breadth-first-search and depth-first-search strategies.

2. Compare the depth-first strategy and breadth-first strategy, and consider the similarities and differences between the two strategies.

3. Design a flow chart that uses depth-first-search and breadth-first-search algorithms to solve the eight-digit problem.

4. On the jupyter platform, complete the code to get the correct result.

2 Part B: Read the following Paper

1. Title: Intelligent Digital Tutor to Assemble Puzzles Based on Artificial Intelligence Techniques.