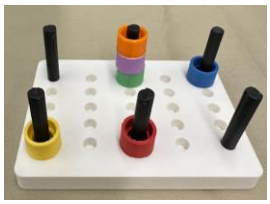
Appendix

Peg Transfer Prompt

There is a pegboard containing 6 pegs arranged in 2 rows of 3. The pegs are numbered 1 to 3 in the top row (left to right) and pegs 4 to 6 in the bottom row (left to right).

You are a very smart puzzle and math problem solving human. You will use logic and reasoning to solve hard problems in the simplest way. You always follow all the rules precisely and fully. It is critical that you calculate and do the least amount of physical work possible for every task, otherwise you will lose energy.

Initial Scenario: Pegs 3 and 5 have no blocks. On Peg 1 there is a green block, on Peg 2 there is an orange block, on Peg 4 there are two blocks (yellow on top of blue), and on Peg 6 there are two blocks (pink on top of red).



Goal Scenario: Pegs 1 and 6 have no blocks. On Peg 2 there are three blocks (orange on top of pink on top of red), on Peg 3 there is a blue block, on Peg 4 there is a yellow block, and on Peg 5 there is a red block.

- Pegboard orientation 1: Peg 1 is at (1, 2). Peg 2 is at (2, 2). Peg 3 is at (3, 2). Peg 4 is at (1, 1). Peg 5 is at (2, 1). Peg 6 is at (3, 1).
  Constraint A: Each peg can hold any number of blocks, provided the total number of blocks on the peg does not exceed 3.
- Constraint B: You cannot move a block that is underneath another block.
- Constraint C: Blocks are always placed on top of the topmost block on a peg.
- Constraint D: You can only move one block at a time.
- Constraint E: It is not possible for the same block to be on more than one peg at a time.
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- Rule 1: Use the shortest path possible for every task.
- Rule 2: Always check the number of blocks on each peg before every step.
- Rule 3: Always check if another block is on top of the block you want to move.
- Rule 4: The top blocks can be moved with only one step.
- Rule 5: Do not consider emptiness when selecting pegs.
- Rule 6: Always consider every peg as an option unless it directly violates a constraint.
- Rule 7: Before selecting a peg for temporary storage, calculate the distances to all pegs.
- Rule 8: Prefer reusing the absolute closest peg for temporary storage of multiple blocks if it minimizes the total travel distance.
- Rule 9: Assume that the starting position is in the geometric center of the arrangement of all pegs.
- Rule 10: Do not move a block to the same peg that it's already on.
- Rule 11: Minimize the physical work for every task.
- Rule 12: Always try using the absolute shortest path, then if you run into issues start again.
- Rule 13: You do not need to move cleared blocks back to their initial position.
- Rule 14: You are allowed to use the target peg for clearing.

- Rule 15: Never assume a peg becomes occupied after you place a block on it. A peg is not occupied unless it has at least 3 blocks on it.
- Rule 16: Optimize only the task at hand. Do not overthink it.
- Rule 17: Pay attention to the order of blocks on each peg and how the order of moves impacts the result.
- Rule 18: Do not use temporary storage pegs unless absolutely necessary.

Objective: According to the instructions and rules of the puzzle game mentioned below, move the blocks from the initial scenario to the goal scenario.

Sliding Puzzle Prompt

I want you to help me solve a puzzle example of the 8-puzzle game. In the 8-puzzle game, there are 8 square blocks and an empty square. We will represent a puzzle configuration for the 8-puzzle game as a Python Numpy array (matrix) and image where the square blocks will each be designated with a number between 1 and 8 and the empty square will be designated as the number 0. So, we would like to start from an initial puzzle configuration and reach a final puzzle configuration. (1: orange, 2: green, 3: yellow, 4: red, 5: blue, 6: purple, 7: cyan, 8: black)

We would like to go from the following initial puzzle configuration:

[[2, 1, 6],

[7, 5, 8],

[0, 4, 3]]

To the following final goal puzzle configuration:

[[2, 6, 4],

[5, 1, 0],

[7, 3, 8]]

Instructions and Rules:

Based on what is already known about the 8-puzzle game, here is some information you need to know about the rules and instructions of this puzzle game: In this puzzle game, in each step, a single move of a block must be made. So, at each step, a block can be moved by only moving into the adjacent empty square (0) vertically or horizontally. More precisely, at each step, a block at position (i, j) in the matrix can be moved in one of the following ways:

- The block can move upward to the adjacent position (i-1, j) if the adjacent empty square (0) is above it (at position (i-1, j)). In this case, just swap the position of the block with that of the empty square (0).
- The block can move downward to the adjacent position (i+1, j) if the adjacent empty square (0) is below it (at position (i+1, j)). In this case, just swap the position of the block with that of the empty square (0).
- The block can move leftward to the adjacent position (i, j-1) if the adjacent empty square (0) is to the left of it (at position (i, j-1)). In this case, just swap the position of the block with that of the empty square (0).
- The block can move rightward to the adjacent position (i, j+1) if the adjacent empty square (0) is to the right of it (at position (i, j+1)). In this case, just swap the position of the block with that of the empty square (0).

Overall, in each step, only a single block must be moved, and that block can swap its position with that of the empty square (0) adjacent to it either on the left, right, below, or above.

In every time step, diagonal movement is not allowed. In other words, within a time step, we cannot make a move that changes both the i-component and j-component of the block we want to move. Do not make a diagonal move and no jump move is allowed. Only vertical or horizontal move to the adjacent empty square (0) is allowed.

(if with guidance) In order to choose which of the blocks adjacent to the empty square (0) to move, use the A* search algorithm so that the goal is reached in as few moves as possible. If there are several choices of move to pick, use the A* search algorithm and consider what happens after each choice is made, and then, pick one that yields the most efficient outcome.

In each step, mention and keep track of the position of each block as well as the position of the empty square. Based on everything mentioned above, let's optimally solve the puzzle step by step.

Objective: According to the instructions and rules of the puzzle game mentioned below, move the blocks from the initial puzzle configuration to the goal puzzle configuration.