Sliding Puzzle Solver

The 8-puzzle is a classic problem where a 3x3 grid is filled with tiles numbered from 1 to 8, and one tile is left empty. The goal is to rearrange the tiles to reach a specific configuration. This repository contains C++ programs that solve the 8-puzzle problem using different heuristics.

**Programs Overview**

* **Program 1: A\* Algorithm with Manhattan Distance Heuristic (H1)**
* **File**: **program1.cpp**
* **Description**: Uses the A\* algorithm with the Manhattan Distance heuristic (H1) to solve the 8-puzzle problem. Priority queue is employed for state exploration.
* **Program 2: A\* Algorithm with Misplaced Tiles Heuristic (H2)**
* **File**: **program2.cpp**
* **Description**: Uses the A\* algorithm with the Misplaced Tiles heuristic (H2) to solve the 8-puzzle problem. Priority queue is employed for state exploration.
* **Program 3: A\* Algorithm with Manhattan Distance Heuristic (H1) Extended**
* **File**: **program3.cpp**
* **Description**: An extended version of Program 1, with increased step limits and additional comments. Uses the A\* algorithm with the Manhattan Distance heuristic (H1) to solve the 8-puzzle problem.
* **Program 4: A\* Algorithm with Misplaced Tiles Heuristic (H2) Extended**
* **File**: **program4.cpp**
* **Description**: An extended version of Program 2, with increased step limits and additional comments. Uses the A\* algorithm with the Misplaced Tiles heuristic (H2) to solve the 8-puzzle problem.
* **Functionality**
* **findGoalPosition**: Finds the position of a value in the goal matrix.
* **calculateManhattanDistance**: Calculates the Manhattan distance heuristic (H1).
* **misplacedTilesHeuristic**: Calculates the Misplaced Tiles heuristic (H2).
* **isGoalState**: Checks if the current state is the goal state.
* **printMatrix**: Prints the given matrix.
* **solvePuzzle**: Implements the A\* algorithm with specified heuristics.
* **getMatrixFromUser**: Takes input matrix from the user.

**Note**

Feel free to explore and modify the programs as needed. Adjust step limits, heuristics, or any other parameters to experiment with different configurations.