Problem Statement

Solve Sliding Block Puzzle using three graph traversal algorithms:

- BFS (Breadth First Search)
- DFS (Depth First Search)
- IDFS (Iterative Deepening Depth First Search)

Sliding Block Puzzle

A sliding block puzzle is played on a rectangular board. Each cell in the board can be either free, have a wall, or be the goal.
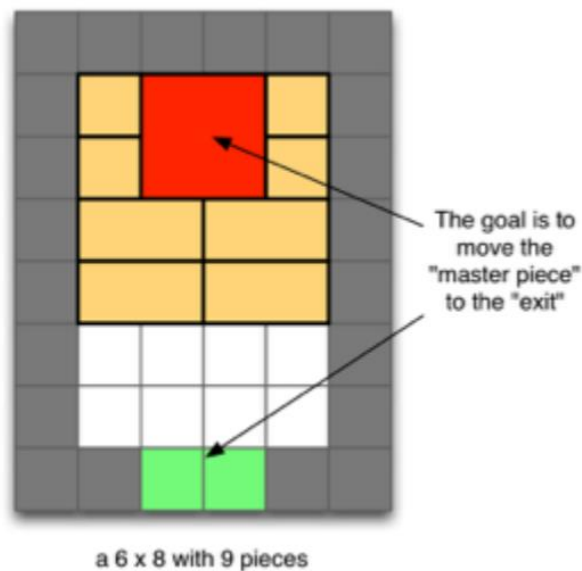
On the board there is a set of solid pieces (or blocks) that can be moved around the board. One of the blocks is special (the master block).

A move consists of sliding one of the blocks one cell up, down, left or right. Notice that blocks collide with either walls or other blocks, so we cannot move a block on top of another. Blocks can only slide, they cannot rotate nor be flipped.
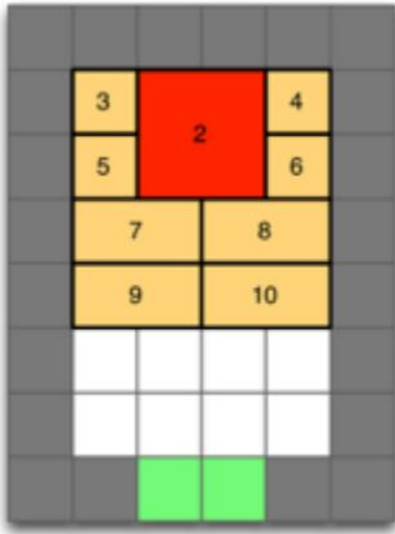
To solve the puzzle, we have to find a sequence of moves that allows you to move the master block on top of the goal cell(s). No other blocks are allowed to be placed on top of the goal cell(s)

To play the game online, please visit https://www.proprofs.com/games/sliding-block-puzzle/

Sample Game Board:

The goal is to move the "master piece" to the "exit"

a 6 x 8 with 9 pieces

State Representation:

$$\begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 3 & 2 & 2 & 4 & 1 \\ 1 & 5 & 2 & 2 & 6 & 1 \\ 1 & 7 & 7 & 8 & 8 & 1 \\ 1 & 9 & 9 & 10 & 10 & 1 \\ 1 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & 1 \\ 1 & 1 & -1 & -1 & 1 & 1 \end{pmatrix}$$

Cell types:

- -1 – goal cell
- 0 – empty cell
- 1 – wall
- 2 – master block
- 3 or more – regular block

Output

Puzzle will be solved using all three algorithms and the output will be displayed.

The output for each contains:

- Time taken to solve
- Final State of the board (solution)
- List of all the moves taken to reach the final state