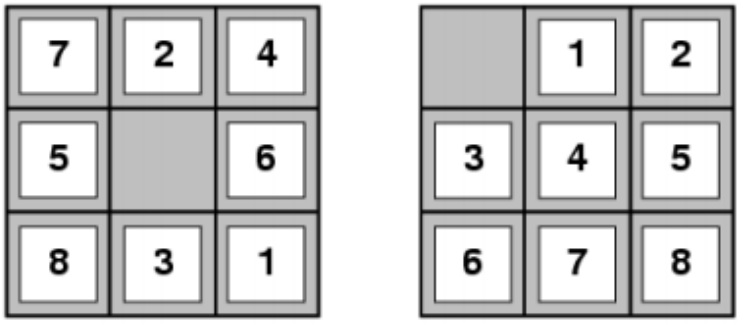
Problem:



- Consists of a 3x3 board with 8 numbered tiles and a blank space.
- A tile adjacent to the blank space can slide into the space.
- The object is to reach a specified goal state, such as the one shown on the right.

Below are the measurements I have made for the above initial and target situations:

1) BFS (Breadth-first)

```
Cost of path: 26
Nodes expanded: 171711
Fringe size: 6097
Max fringe size: 24983
Search depth: 26
Max search depth: 27
```

2) DFS (Depth-first)

```
Cost of path: 62140
Nodes expanded: 114207
Fringe size: 41215
Max fringe size: 42912
Search depth: 62140
Max search depth: 66122
```

3) Depth Limited

```
Cost of path: 62140
Nodes expanded: 114207
Fringe size: 41215
Max fringe size: 42912
Search depth: 62140
Max search depth: 66122
```

Breadth-first search(BFS) is an algorithm for traversing or searching tree or graph data structures. It starts at the tree root (or some arbitrary node of a graph, sometimes referred to as a 'search key'), and explores all of the neighbor nodes at the present depth prior to moving on to the nodes at the next depth level.

Depth-first search (**DFS**) is an algorithm for traversing or searching tree or graph data structures. The algorithm starts at the root node (selecting some arbitrary node as the root node in the case of a graph) and explores as far as possible along each branch before backtracking.

The depth-limited search (DLS) method is almost equal to depth-first search (DFS), but DLS can work on the infinite state space problem because it bounds the depth of the search tree with a predetermined limit L. Nodes at this depth limit are treated as if they had no successors.

IDDFS combines depth-first search's space-efficiency and breadth-first search's fast search (for nodes closer to root).
How does IDDFS work?
IDDFS calls DFS for different depths starting from an initial value. In every call, DFS is restricted from going beyond given depth. So basically we do DFS in a BFS fashion.

Instruction

You can find breadth-first search (bfs), depth-first search (dfs) and depth-limited search (dls) algorithms in 'Ai_SearchAlgorithm file' .

Run Codes

You can run this project use to Python Compiler.