DEPTH-FIRST SEARCH (DFS) FOR MAZE SOLVING

INTRODUCTION

This report presents the implementation and results of solving single-prize mazes using Depth-First Search (DFS). The algorithm explores paths in a depthward manner until it finds the prize, marking the solution path with '#' symbols.

IMPLEMENTATION DETAILS

The function 'single_dfs' takes a maze file as input and performs a DFS search to locate the prize. The algorithm tracks visited nodes and constructs the solution path.

EXECUTION PROCESS

To run the DFS solver, execute the following command:

python main.py

This script will solve three maze files and print the results.

RESULTS

Below are the results of solving three different mazes using DFS. Each result includes:

- The solved maze with '#' marking the path.

- The path cost (number of steps from start to prize).

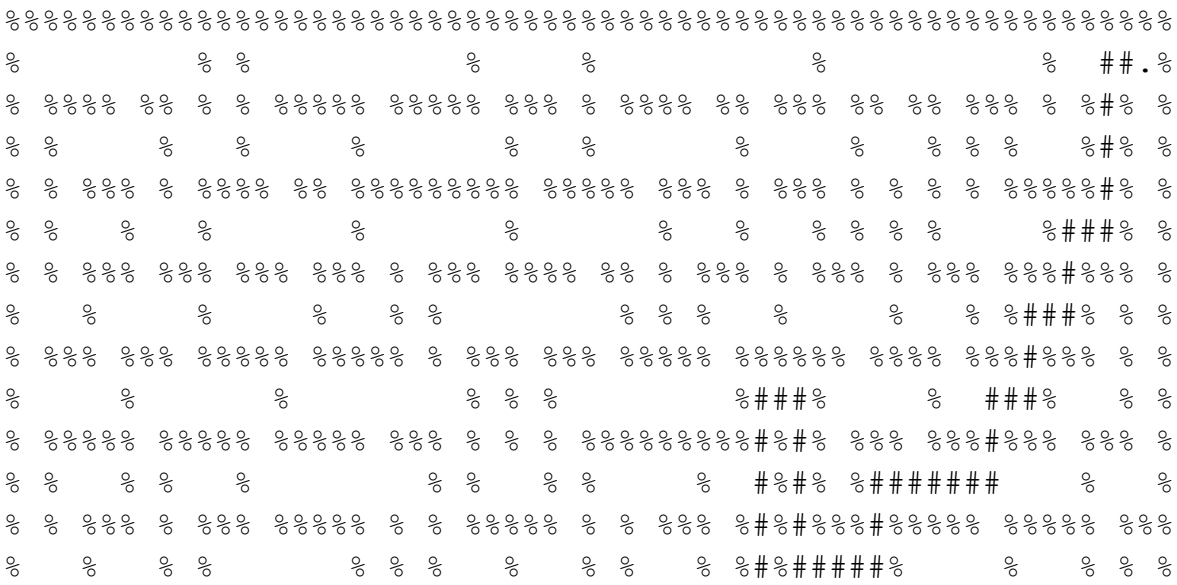
- The number of nodes expanded during the search.

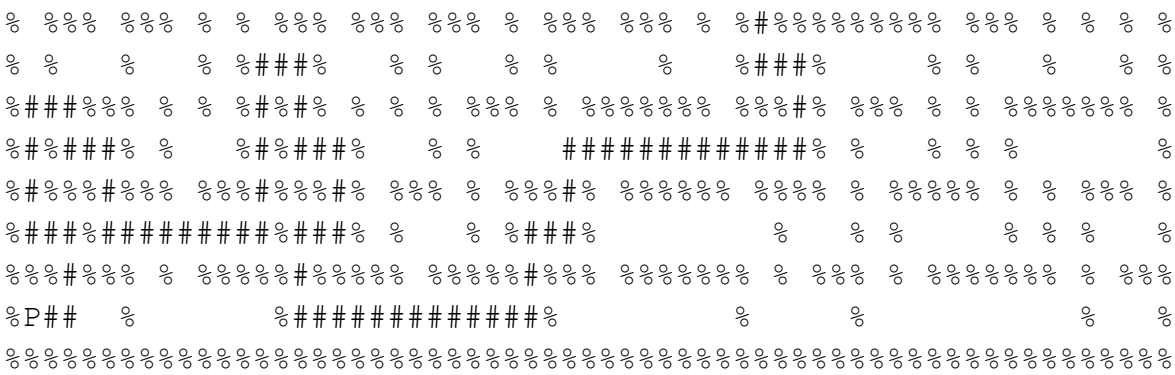
EXAMPLE OUTPUT

Solution1:

Path Cost: 217
Nodes Expanded: 385

Solution2:





Path Cost: 116
Nodes Expanded: 167

Solution3:

Path Cost: 240
Nodes Expanded: 319

CONCLUSION

Depth-First Search successfully finds the prize in the maze. It is a complete but not always optimal solution. The results show the path cost and number of nodes expanded, which are important performance metrics for search algorithms.