Artificial Intelligence Homework 1

Due date: 2/8 by 11:59pm

Fill in the following table with the total number of nodes expanded and the number of moves in the returned solution. The first puzzle has been filled in for you.

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| --- | --- | --- | --- | --- |
| **Puzzle Name** | **BFS** | **DFS** | **A\* - Number of misplaced tiles** | **A\* - Manhattan distance** |
| puzzle1.puzz | 175,313 nodes | 99, 523 nodes | 52, 193 nodes | 1, 619 nodes |
| 27 moves | 93,079 moves | 27 moves | 27 moves |
| puzzle2.puzz | 139641 nodes | 50610 nodes | 16533 nodes | 1740 nodes |
| 24 moves | 48990 moves | 24 moves | 24 moves |
| puzzle3.puzz | 165233 nodes | 99725 nodes | 40337 nodes | 1906 nodes |
| 26 moves | 93240 moves | 26 moves | 26 moves |
| puzzle4.puzz | 158853 nodes | 28034 nodes | 29929 nodes | 2477 nodes |
| 26 moves | 27336 moves | 26 moves | 26 moves |
| puzzle5.puzz | 51562 | 22387 nodes | 3241 nodes | 518 nodes |
| 20 moves | 21842 moves | 20 moves | 20 moves |

Given the information in the above table, what can you conclude about the performance of the different search algorithms?

BFS, A\* manhattan, and A\* misplaced all gave optimal path costs. It is clear that BFS is much more costly in terms of nodes traversed than A\*. Also A\* manhattan clearly dominates A\* misplaced, since A\* manhattan never took more nodes to find the result.

DFS was less costly to reach a solution than BFS, but way more costly than either form of A\*. It also returned a hugely sub optimal path.