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BSCS 3A - Artificial Intelligence
Class Participation 2

Answers for Search Algorithms using Google Colab:

1.

Start State:

[[5, 4, 0],
[6, 1, 8],
[7, 3, 2]]

Goal State:

[[1, 2, 3],
[7, 8, 0],
[4, 5, 6]]

1. How many total steps for BFS? DFS? IDS?

- BFS: 23 total steps
- DFS: 29 total steps (though it changes as you change the max-depth. Lowest I got was 29 total steps at 31 max-depth)
- IDS: 29 total steps

2. For UCS where the cost per move is equal to 1, what is the total cost?

- 23 total cost

3. For DLS where the depth limit is set to 30, what is the total steps?

- 30 total steps

4. For GBFS, what are the expanding node values for the 20th to 25th move ($h(n)=?$)

- 20th move: $h(n) = 10$
- 21st move: $h(n) = 10$
- 22nd move: $h(n) = 9$
- 23rd move: $h(n) = 8$
- 24th move: $h(n) = 7$
- 25th move: $h(n) = 6$

5. For A*, what are the expanding node values for the 10th move $g=?$, $h=?$, $f=?$

- 10th expansion: $g=3$, $h=15$, $f=18$
- State:
 - [5, 1, 4]
 - [6, 3, 8]
 - [7, 0, 2]
- 22 total moves

2.

Start State:

[4, 5, 8],
[3, 1, 0],
[7, 6, 2]]

Goal State:

[1, 2, 3],
[7, 8, 0],
[4, 5, 6]]

6. How many total steps for BFS? DFS? IDS?

- BFS: 22 total steps
- DFS: 28 total steps (though it changes as you change the max-depth. Lowest I got was 28 total steps at 32 max-depth)
- IDS: 28 total steps

7. For UCS where the cost per move is equal to 1, what is the total cost?

- 22 total cost

8. For DLS where the depth limit is set to 30, what is the total steps?

- No solution found within depth limit of 30

9. For GBFS, what are the expanding node values for the 20th to 25th move ($h(n)=?$)

- 20th move: $h(n) = 10$
- 21st move: $h(n) = 11$
- 22nd move: $h(n) = 11$
- 23rd move: $h(n) = 10$
- 24th move: $h(n) = 9$
- 25th move: $h(n) = 8$

10. For A*, what are the expanding node values for the 10th move $g=?$, $h=?$, $f=?$

- 10th expansion: $g=2$, $h=15$, $f=17$
- State:
[4, 5, 8]
[3, 1, 0]
[7, 6, 2]
- 22 total moves