CS347 FS2005 Exam 1

This is a closed-book closed-notes exam. The only items you are permitted to bring are writing implements. Mark every sheet of paper you use with your name and the string “cs347fs2005 exam1”. If you are caught cheating, you will receive a zero grade for this exam. The max number of points per question is indicated in square brackets after each question. The sum of the max points is 76 (80 including the 4 bonus points). You have 90 minutes to complete this exam. Good luck!

1. List two advantages of the Turing test for deciding whether an artificial entity is intelligent. [4]

2. Briefly explain the consequences for AI research if Descartes was right with his theory of dualism. [4]

3. Give a formal description of FreeCell by defining the initial state, successor function, goal test, and path cost function. [8]

All the following questions are about the following state space graph, with A being the start state and C & G being goal states. The order in which successors are generated is counterclockwise, ending at exactly 9 o’clock. Example: C generates first H, then G, then D, and finally B; while E generates first D, then F, and finally A. When sorting by path-cost, nodes with equal path-cost are ordered such that the earlier a node is generated, the higher its priority. Nodes already on the open list have higher priority than newly added nodes with equal path-cost.

![State Space Graph](image-url)
4. Give the execution trace of BFTS. [7]

5. Give the execution trace of bi-directional DFTS. [10]

6. Give the execution trace of ID-DFGS. [10]

7. Give the execution trace of UCGS. [15]

8. Is UCGS complete for this problem? Explain your answer! [1]


10. Is BFTS optimal for this problem? Explain your answer! [2]

11. Is bi-directional DFTS optimal for this problem? Explain your answer! [2]

12. Is ID-DFGS optimal for this problem? Explain your answer! [2]

13. Are there depths $l$ for which DLTS would be incomplete for this problem? If yes, give those depths; otherwise explain why not. [2]

14. Is there a step cost associated with a single action that can be changed in the state space graph which would make ID-DFGS not complete? (Note: bidirectional edges represent two separate actions, each with their own step cost). If yes, then give the action and new step cost; otherwise, explain why not. [2]

15. Is there a step cost associated with a single action that can be changed in the state space graph which would make UCGS not complete? (Note: bidirectional edges represent two separate actions, each with their own step cost). If yes, then give the action and new step cost; otherwise, explain why not. [2]

BONUS Are there state spaces for which DLTS with $l < \text{diameter}$ is optimal? Explain your answer! [4]