CS347 FS2004 Exam 2

This is a closed-book test. The only items not supplied that you are allowed (and required) to use, are writing implements. Mark every sheet of paper you use with your name and the string “cs347fs2004 exam2” (omittance, even if it is partial, will be penalized at 1 point per sheet). If you are caught cheating, you will receive a zero grade for this test. The max number of points per question is indicated in square brackets after each question. The sum of the max points is 90. You have exactly 50 minutes to complete this test. Good luck!

The following questions on this page are about the following state space graph, with A being the start state and H the goal state. The heuristic values are denoted by numerals after the letter labels in the graph. The order in which successors are generated is counterclockwise, ending at exactly 9 o’clock. The order in which successors are generated is counterclockwise, starting downwards. Example: E generates first G, then H, then F and finally D. When sorting nodes, whether for path-cost, heuristic value, etc., nodes with equal “sorting value” 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 for equal “sorting value”. For this exam assume that graph search discards generated nodes if they are already on the closed list, EVEN IF THE ONES ON THE CLOSED LIST HAVE A HIGHER COST! When performing execution traces, let the leftmost column indicate the open list, the next column the closed list (if you are using a closed list), and the rightmost column the node to be evaluated.

A

1. Give the execution trace of Uniform Cost Graph Search (UCGS). [15]
2. Give the execution trace of Greedy Best First Graph Search (GBeFGS). [15]
4. Is for this problem the heuristic admissible? Explain your answer. [5]
5. Is for this problem the heuristic consistent? Explain your answer. [5]
6. Is UCGS optimal for this problem? Explain your answer. [5]
7. Is GBeFGS with this heuristic optimal for this problem? Explain your answer. [5]
8. Is A*GS with this heuristic optimal for this problem? Explain your answer. [5]
9. Give the execution trace of Depth-Limited Minimax with \( depth - limit = 2 \) and \( root - node = A \) (DLM(A,2)). [17]

10. What is the Principal Variant (PV) found by DLM(A,2)? [3]