CS347 SP2004 Quiz 3

This is a closed-book test. The *only* item not supplied that you are allowed (and required) to use, is a pen or pencil. Mark every sheet of paper you use with your name, the date, and the string “cs347sp2004 quiz3” (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 100. You have exactly 25 minutes to complete this test. Good luck!

The local search question is about the following state space graph, with G being the goal state. The edge labels indicate step-cost, the vertex labels contain the node identifier (letter) followed by the value of heuristic $h$ (number). The order in which successors are generated is counterclockwise, ending at exactly 9 o’clock. Example: A generates first D, then B, and finally F. When sorting by f-value, nodes with equal f-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 with equal f-value.

1. Give the execution trace of steepest-ascent hill climbing with starting node A. [15]

2. Give the execution trace of (deterministic) local beam search with $k = 2$ and the starting nodes being A and C. [20]
All the remaining questions are about the following adversarial search tree which describes part of the full search tree (which might belong to some imaginary game). State evaluation heuristic values for the max player are provided in the form of numbers following the letter labels of the states (e.g., B3 indicates that the heuristic value of state B for the max player is 3). The order in which successors are generated is from left to right. Example: A generates first B, then C, and finally D.

3. Give the execution trace of Depth-Limited Minimax with \textit{depth-limit}=2 and \textit{root-node}=A (DLM(A,2)). [25]

4. What is the Principal Variant (PV) found by DLM(A,2)? [5]

5. Give the execution trace of DLM(I,2)). [25]

6. What is the PV found by DLM(I,2)? [5]

7. Would you recommend that the max player when at move in node A make the best move found by DLM(A,2)? Explain your answer! [5]