This is a closed-book closed-notes exam. The only items you are permitted to bring are writing implements, food and drink; no calculators! Mark every sheet of paper you use with your name and the string “cs347fs2006 exam3”. 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 80 (that includes 5 bonus points). You have 90 minutes to complete this exam. Good luck!

1. Describe two advantages of Iterative Deepening Minimax algorithms over Depth Limited Minimax algorithms. [6]
2. Explain briefly how the local search technique Stochastic Hill Climbing works. [3]
3. Explain briefly how the local search technique Local Beam Search works. [3]
4. Explain briefly how the local search technique Simulated Annealing works. [5]
5. One problem in adversarial search is the “horizon effect” and a possible solution is the use of “singular extensions”.
   (a) Explain briefly what the “horizon effect” is. [3]
   (b) Explain briefly what “singular extensions” are. [3]
6. Assuming a bound of [-10,10] on the state eval values, calculate first the bound on node C before evaluating node D1, then after evaluating node D1, and finally after evaluating both node D1 and D2. Show all your calculations for full points! [7]

The final questions are about the following adversarial search tree. State evaluation heuristic values for the max player are provided in the form of numbers following the letter labels of the states (e.g., A9 indicates that the heuristic value of state A for the max player is 9). The order in which successors are generated is from left to right. Example: A generates first B, then C, and finally D. Non-quiescent states are indicated by bold circled states.

7. Give the execution trace for HTQSABIDM(A,3,2,−∞,∞). [40]
8. Indicate for each depth iteration of HTQSABIDM(A,3,2,−∞,∞) which nodes, if any, get pruned. [6]
9. What is the Principal Variant (PV) found by HTQSABIDM(A,3,2,−∞,∞)? [4]