CS347 SP2012 Exam 3

This is a two-page closed-book, closed-notes exam. The only items you are permitted to use are writing implements. Mark each sheet of paper you use with your name and the string “cs347sp2012 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 42, but the max exam score will be capped at 40 (i.e., there are 2 bonus points but you can’t score more than 100%). You have 75 minutes to complete this exam. Good luck!

Multiple Choice Questions - write the letter of your choice on your answer paper

1. Alice is trying to identify the global optimum in a state-space landscape, given that it contains many local optima which are not globally optimal. Which of the following local search algorithms should she use? [2]
   (a) Steepest-ascent hill climbing
   (b) Stochastic hill climbing
   (c) First-choice hill climbing
   (d) Random-restart hill climbing
   (e) any of the above
   (f) none of the above

2. Which of the following are stochastic algorithms (i.e., algorithms which for the same input can produce different output)? [2]
   (a) Simulated Annealing
   (b) Genetic Algorithms
   (c) Particle Swarm Optimization
   (d) Ant Colony Optimization
   (e) Answers b and c
   (f) Answers a, b, and c
   (g) Answers a, b, c, and d
   (h) none of the above

Regular Questions

3. The following question is about the following graph:

   Assuming a bound of [-6,6] 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]
4. Give the LRTA* trace terminating either when the goal is found or after the 15th call to LRTA*-COST. [27]

5. What is the competitive ratio based on the final state of your LRTA* trace? Explain your answer and make sure to list the final state you are using. [4]