This is a closed-book closed-notes exam. The only items you are permitted to bring are writing implements, food and drink. Mark every sheet of paper you use with your name and the string “cs347fs2007 exam2”. 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 52 (that includes 2 bonus points). You have 75 minutes to complete this exam. Good luck!

Questions 1-5 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., A19 indicates that the heuristic value of state A for the max player is 19). The order in which successors are generated is from left to right. Example: A generates first B, then C, and finally D.

2. Indicate for each depth iteration of ABIDM(A,3,−∞,∞) which nodes, if any, get pruned. [5]
3. What is the Principal Variant (PV) found by ABIDM(A,3,−∞,∞)? [3]
4. Would IDM(A,3) have found the same PV? Explain your answer! [1]
5. Would adding a move ordering heuristic to ABIDM possibly have changed the PV found? Explain your answer! [1]
6. Given two admissible heuristics \( h_1 \) and \( h_2 \).
   (a) What does it mean for \( h_1 \) to dominate \( h_2 \)? [2]
   (b) If \( h_1 \) dominates \( h_2 \), what is the implication for \( A^*TS \) using \( h_1 \) versus \( A^*TS \) using \( h_2 \)? [2]
   (c) Are there any circumstances under which it would be beneficial to include in the max composite heuristic, two heuristics of which one is dominated by the other? Explain your answer! [3]
7. What is the optimal move for player A in the top state? Illustrate your computation by copying the game tree onto your answer paper and writing the backed-up utility vectors by each state. [8]

8. What is the PV? [2]