1. Explain briefly how the local search technique Simulated Annealing works.

2. What is the advantage of adding alpha-beta pruning to a minimax algorithm?

3. What is the advantage of adding a move-ordering heuristic to a minimax algorithm with alpha-beta pruning?

4. Give two advantages of Iterative Deepening minimax algorithms over Depth Limited minimax algorithms.

5. Explain what a transposition table is and what its use is in adversarial search.

All the questions on this page 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., B3 indicates that the heuristic value of state B is 3). The order in which successors are generated is from left to right. Example: A generates first B and then C. The non-quiescent states are circled in bold.

6. Give the execution trace of Depth Limited Minimax employing Alpha-Beta pruning with depth-limit=2 and root-node=A and Quiescence Search with QSdepth-limit=1 (QSABDLM(A,2,1,−∞,∞)).

7. What is the Principal Variant (PV) found by QSABDLM(A,2,1,−∞,∞)?

8. Give the execution trace of Iterative Deepening Minimax employing Alpha-Beta pruning with depth-limit=2 and root-node=A and History Table Move Ordering Heuristic and Quiescence Search with QSdepth-limit=1 (QSHTABIDM(A,2,1,−∞,∞)).

9. What is the PV found by QSHTABIDM(A,2,1,−∞,∞)? [5]

10. From ALL the information available to you in the adversarial search tree, did having the Quiescence Search in the above traces you executed improve the search results?
All the questions on this page 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., $A_3$ indicates that the heuristic value of state $A$ is 3). The order in which successors are generated is from left to right. Example: $A$ generates first $B$, then $C$, and finally $D$. The non-quiescent states are circled in bold.

11. Give the execution trace of Depth Limited Minimax employing Alpha-Beta pruning with depth-limit=2 and root-node=$A$ and Quiescence Search with QSdepth-limit=1 (QSABDLM($A, 2, 1, -\infty, \infty$)).

12. What is the Principal Variant (PV) found by QSABDLM($A, 2, 1, -\infty, \infty$)?

13. Give the execution trace of Iterative Deepening Minimax employing Alpha-Beta pruning with depth-limit=2 and root-node=$A$ and History Table Move Ordering Heuristic and Quiescence Search with QSdepth-limit=1 (QSHTABIDM($A, 2, 1, -\infty, \infty$)).

14. What is the PV found by QSHTABIDM($A, 2, 1, -\infty, \infty$)?

15. From ALL the information available to you in the adversarial search tree, did having the Quiescence Search in the above traces you executed improve the search results?