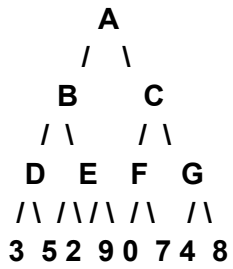
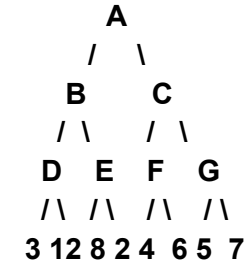
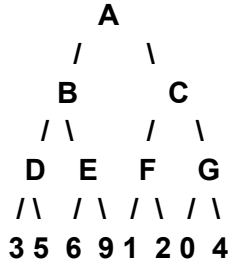
PSET Adversarial Search
CSE422
Ipshita Bonhi Upoma

1. For the following search trees, simulate the minimax algorithm and the alpha-beta pruning algorithm. Identify which subtrees are pruned using the alpha-beta pruning algorithm. At each node, show the alpha and beta values.







2. Now consider that the root node is controlled by the minimizing player for the graphs in question 1. Simulate the results using the minimax and alpha-beta pruning algorithms. Identify the subtrees that are pruned by the alpha-beta algorithm. Display the alpha and beta values at each node.
3. Draw a graph for explaining a case for which alpha-beta pruning will explore the same nodes as the minimax algorithm. Demonstrate the simulation over this graph.
4. Explain the worst case scenario for alpha-beta pruning.
5. What is alpha-beta pruning, and how does it relate to the minimax algorithm?

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6. Explain how alpha-beta pruning reduces the number of nodes evaluated in the minimax algorithm.
7. What are alpha and beta values in the context of alpha-beta pruning, and how are they used during the search process?
8. Discuss the best-case and worst-case scenarios for alpha-beta pruning in terms of computational efficiency.
9. What is the primary purpose of the minimax algorithm in game theory?
10. Describe the role of maximizing and minimizing players in the minimax algorithm.
11. Explain how the minimax algorithm handles decision-making in games with perfect information.
12. What are the limitations of the minimax algorithm when applied to real-world problems with large search spaces?
13. How does the minimax algorithm determine the best move in a two-player game?
14. Discuss the concept of "utility values" in the context of the minimax algorithm. How are they calculated and used?