Name: ID:

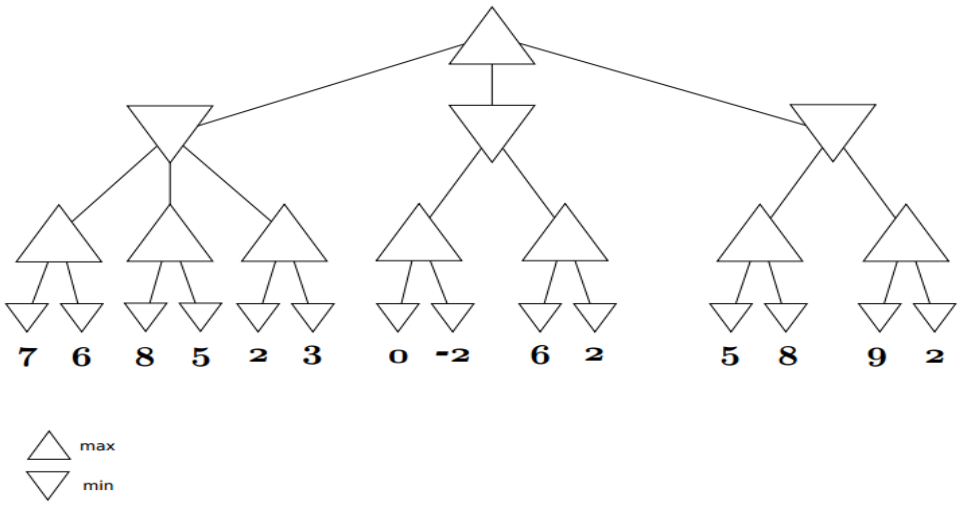
1. (8 points) The Alpha-Beta pruning technique is used to improve the runtime of the minimax algorithm. With a constant branching factor of b, and a search depth of d, answer the following questions about it's performance:

    a. (2 point) What is the worst case runtime of minimax using Alpha-Beta pruning?

    b. (2 point) What is the best case runtime of minimax using Alpha-Beta pruning?

    c. (2 point) Under what conditions can we achieve the best case runtime?

    d. (2 point) Under what conditions will Alpha-Beta pruning not prune any branches at all?



2. (7 points)

a. (5 points) Execute alpha-beta pruning on the example, write the minimax value at each node (including the nodes got pruned), and cross out the branches that get pruned by the algorithm. If a branch does get pruned, circle the nodes under that branch that you had to explore in order to decide to prune the branch.

b. (2 points) How would you reorder the first moves that max makes in order to improve alpha-beta pruning?