COMS 4701 - Homework 3 - Written

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Question 1

a.) $A \geq 5$. The min at depth 2 will have the max value returned by the left "Max" of 5, and it is going to look at the value of A. The "Max" will return the max value between A and B. if A is greater than 5, the minimum value that this "Max" will return will be equal or greater than 5. There is no need to check B, so B is pruned.

b.) If A and B is 5, the left "MIN" will return 5, if C and D are not greater than 5(i.e. **C & D < 5**), The max value collected by the right "MIN" will be smaller than 5, and the top "MAX" knows there is no need to check the remaining E and F because the left "MIN" (return 5) will always be greater than the right "MIN".

Question 2

1. The two-player games usually have time limitation for the search, and for a search agent, the accuracy of the static evaluation increases with the depth of search. To maximize the accuracy in limited time means minimize the time complexity, which depth-first iterative-deepening minimize the time and space needed for a given search depth.
2. DFID can improve the efficiency of alpha-beta efficiency, according to Korf: “best move at a given iteration has been shown experimentally to terminate the next iteration in about 70% of cases”.

Question 3

The question does not specify the ground truth of the negative predictions so I assume all negative predictions are correct.

1. TP = 10, FP = 20, TN = 70, FN = 0
2. Accuracy = 80/100 = 80%

   Precision = 10/30 = 33%

   Recall = 10/10 = 100%

   Specificity = 70/90 = 77%

   Here, the precision best reports the poor prediction ability since it shows that only 33% of the positive predictions are correct.