Name:_____ Roll Number:_____

Quiz-2

Max points: 16 **Max Time: 20 mins**

Q.1. [6 points]

Mark True (T) or False (F), fill in the blanks, or choose the correct choice for the statements below.

1. Heuristic search, in general, guarantees optimal solution.

(A) True (B) False

2. Fractional knapsack problem using Hill Climbing algorithm always returns the optimal solution.

(A) True (B) False (C) Depends on the problem data

3. In α-β search, the value of α is always monotonically non-decreasing.

(A) True (B) False

4. For pruning redundant branches in game trees, $\alpha \leq \beta$.

(A) True (B) False

5. While evaluating the best move in board games, we impose a depth bound, which results in _____.

(A) Efficient search (B) Horizon effect (C) Quiescent effect (D) None of the given options

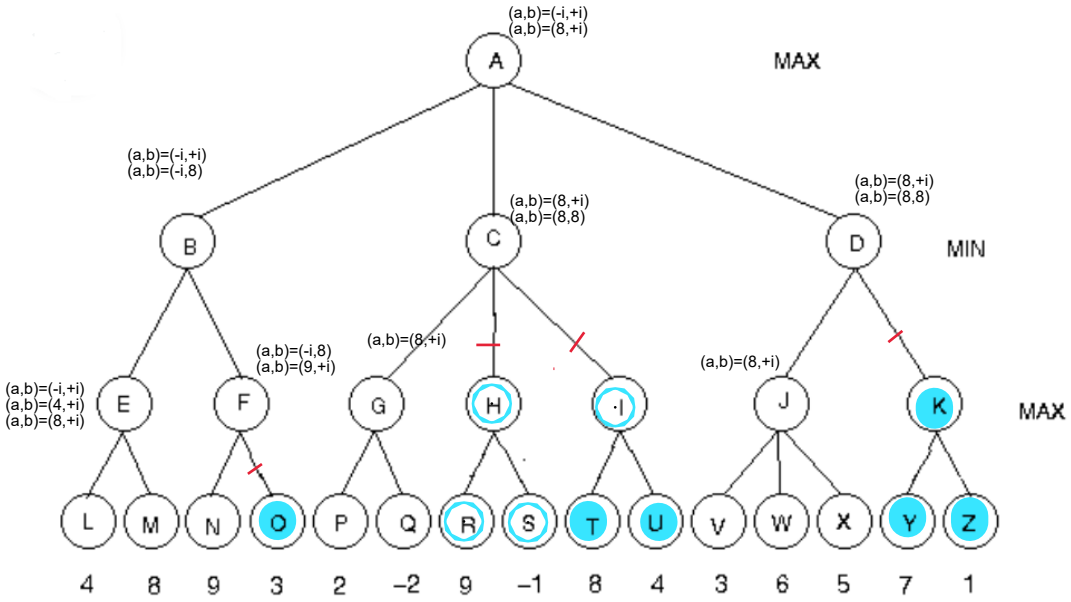
6. In the best case, using alpha-beta method, the search can take:

(A) the same amount of time as Minimax (B) twice the time as that for Minimax (C) the same time depending upon the ply depth being ODD or EVEN (D) None of the given choices

Q.2. [5+5 points]

a) For the following game tree, find out how many nodes would be pruned off using alpha-beta search.

Name:_____ Roll Number:_____



Ten nodes (highlighted above) would be pruned off. Node 'O' is discarded after beta cut-off condition at 'F'. alpha cut-off below nodes 'C' and 'D' gets rid of the remainder of the nodes.
Note: In the above fig., alpha beta pair values are shown stacked (near a node) in the order of updation (top: oldest, bottom:recent). A single value of alpha-beta pair shows that no updation was possible.

b) Write **expressions** for the total number of nodes explored using alpha-beta search in the following scenarios:

i) Best case

S=2(b)^d/2 -1 [Even ply depth]
S= (b)^(d+1)/2 + (b)^(d-1)/2 -1 [Odd ply depth]

ii) Worst case

S=(1-(b)^d+1)/(1-b)