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CLASS : BE-IT

Roll no. : 34
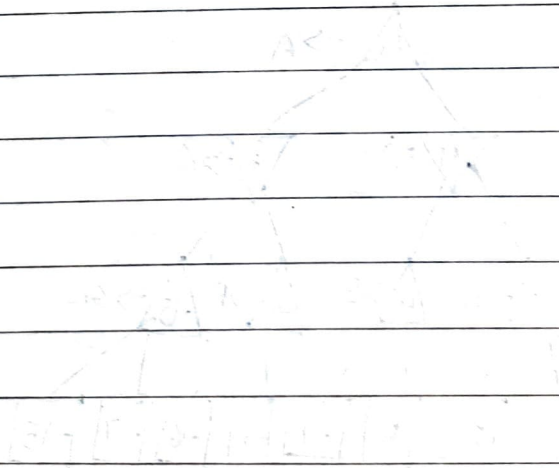
Sub : IS Lab

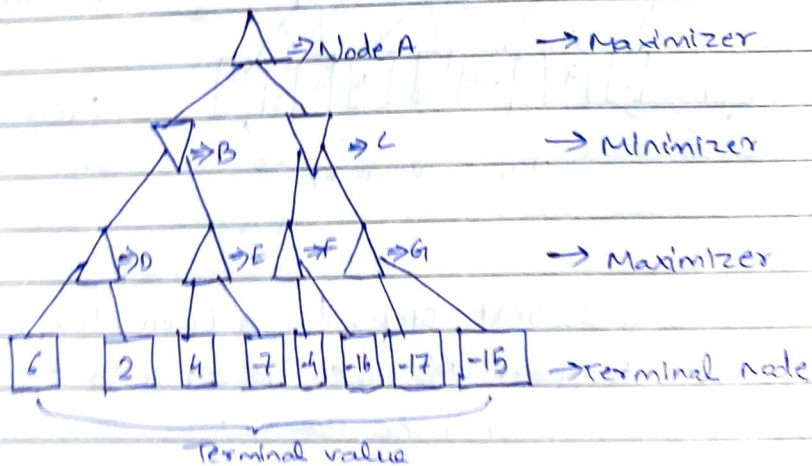| DOP	DOA	MARK	SIGN.

Min - Max Algorithm :

Min-max algorithm is a recursive or back tracking algo which is used in decision-making and game theory. It provides an optimal move for the player assuming for that opponent is also playing optimally.

- Min Max algo uses recussion to search through the game-tree.

- In this algo two players plays the game, one is called MAX and other is called MIN.

- Min-Max algo is mostly used for game playing in AI.

- Step 1:
Lets take A is the initial state of the tree. Suppose maximize takes first turn (when or) which has worst case initial value = -infinity, and minimize will take next turn which has worst-case initial value = +infinity.

Terminal value

Step 2 :
First we find the utilities value for the maxi-mizer, It's initial value is -∞, so we will compute
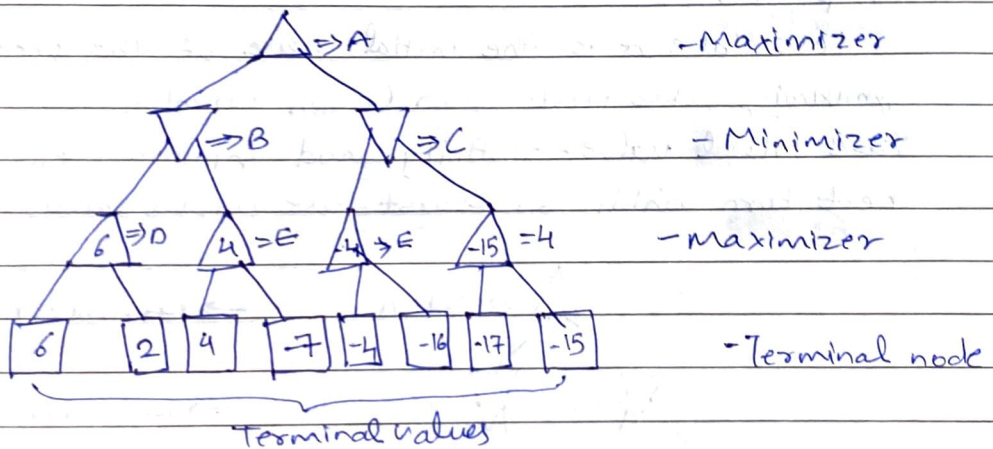
each value in terminal state with initial value of maxi-
mizer and determines the higher nodes values. It will
find the maximum among all.

For node D: $\max(6, -\infty) \Rightarrow \max(6, 2) = 6$

For node E: $\max(4, -\infty) \Rightarrow \max(4, -7) = 4$

For node F: $\max(-4, -\infty) \Rightarrow \max(-4, -16) = -4$

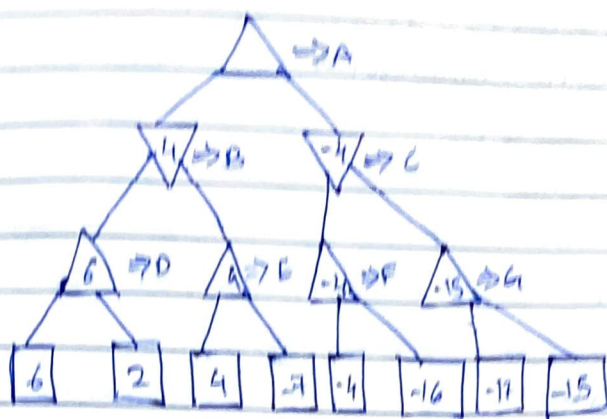For node G: $\max(-17, -\infty) \Rightarrow \max(-17, -15) = -15$

Step 3:
    In the next step, it's a turn for minimize,
so it will compare all nodes values with two and will
find the 3rd layer node value.

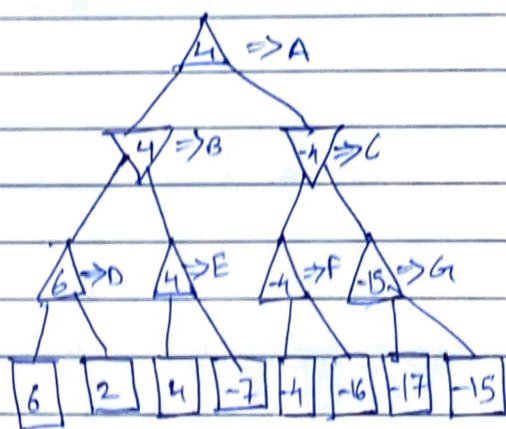For node B - $\min(6, 4) = 4$
For node C - $\min(-4, -15) = -4$.

=> A   : Maximizer

4 => B   -4 => C   - Minimizer

6 => D   4 => E   -4 => F   -15 => G   - Maximizer

6   2   4   -7   -4   -16   -17   -15

Step 4 :

Now it's a turn for maximizer, and it will again choose the maximum of all node values and find the maximum value for the root node.

For node A : max $(4, -4) = 4$

4 => A   - Maximizer

4 => B   -4 => C   - Minimizer

6 => D   4 => E   -4 => F   -15 => G   - Maximizer

6   2   4   -7   -4   -16   -17   -15

Hence, it was the complete workflow of the minmax algorithm with two player game.