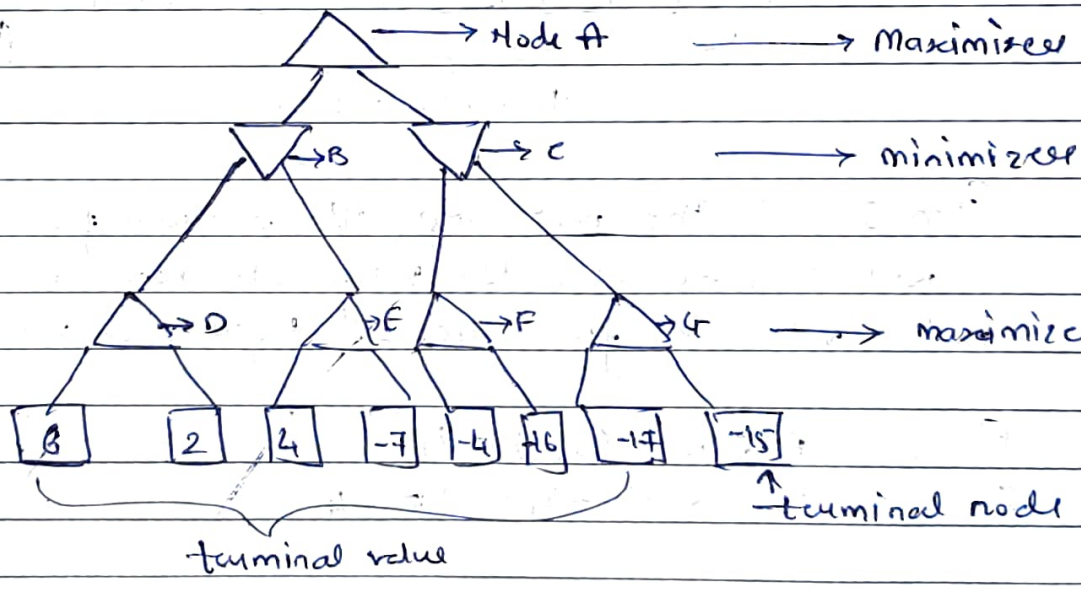
Min - Max Algorithm

Min-max Algorithm ?

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

- Minmax algo. uses recursion to search through the game-tree
- In this algo, two players play 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 initial state of tree. Suppose maximizer takes first turn (when root) which has worst-case initial value = -infinity, and minimizer will take next turn which has worst-case initial value = +infinity.



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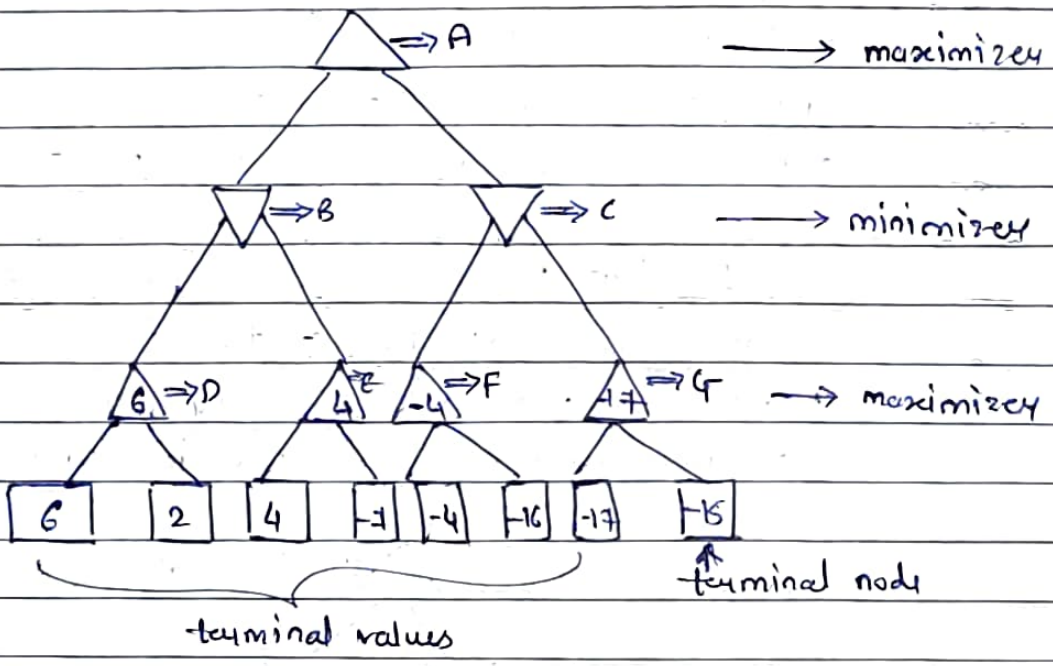
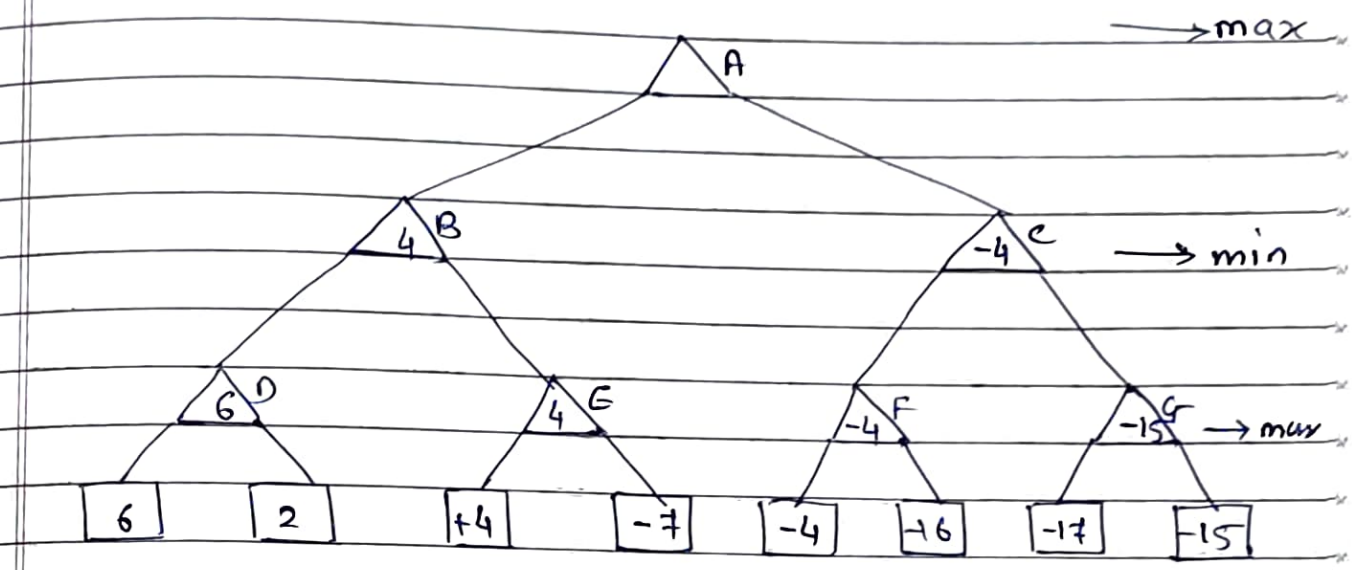
Step 2 : first we find the utilities value for the maximizer, its initial value is $-\infty$, so we will compare each value in terminal state with ~~initial~~ each value in terminal state with initial value of maximizer & determines the higher nodes values. It will find the maximum among all.

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



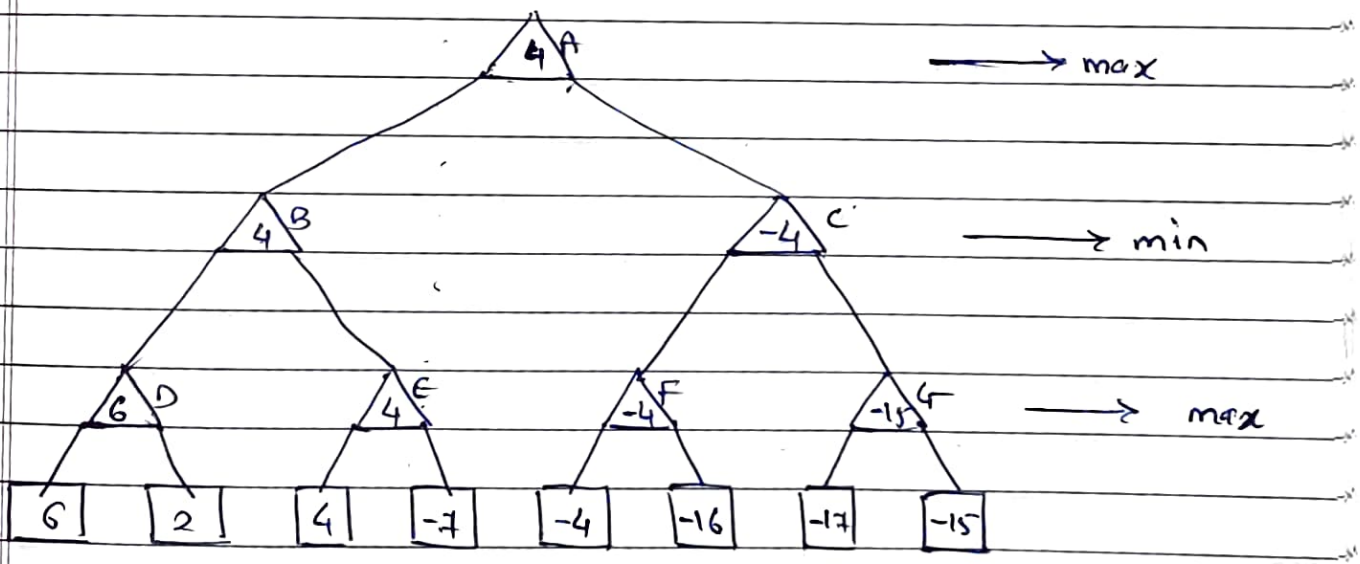
Step 3 : In the next step, it's a turn for minimize, so it will compare all nodes value with ~~to~~ and will ~~compare all nodes value with~~ find the 3rd layer node value.

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



Step 4 : Now its a turn for maximizer, and it will again choose the maximum no. of all nodes values and find the maximum value for the root node.

for node A : max (4, -4) = 4



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