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## min-max algorithm

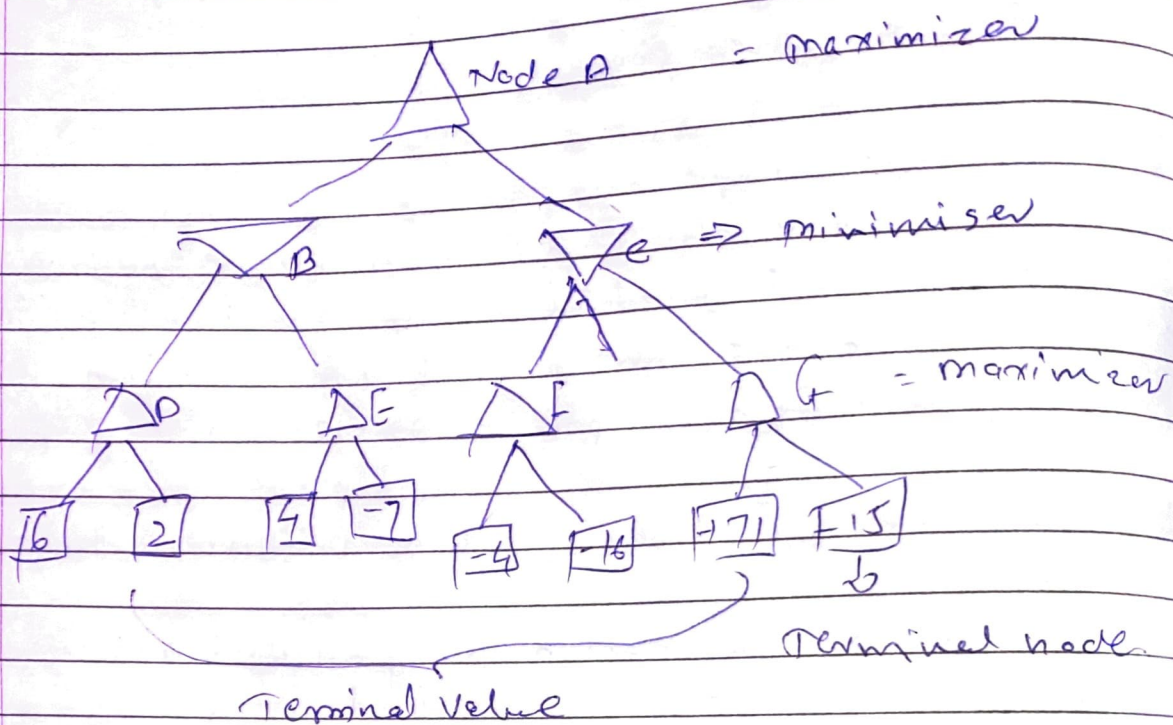
### min-max algorithm:

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

- min max algo uses recursion to search through the game-tree.
- In this algo two players play the game, one is called max & other is called min.
- MIN-MAX algo is mostly used for game playing in AI.

### - Step 1:-

Let's take a tree's initial state at a tree. Suppose maximizes takes first time which has worst-case initial value: infinity and minimize will take next turn which has worst-case initial value: infinity.



Step 2.

First we find the values for maximizer, its initial value is  $-\infty$ , so we will compare each value in terminal state with initial value of maximizer & determines the highest nodes value. It will find the maximum among all

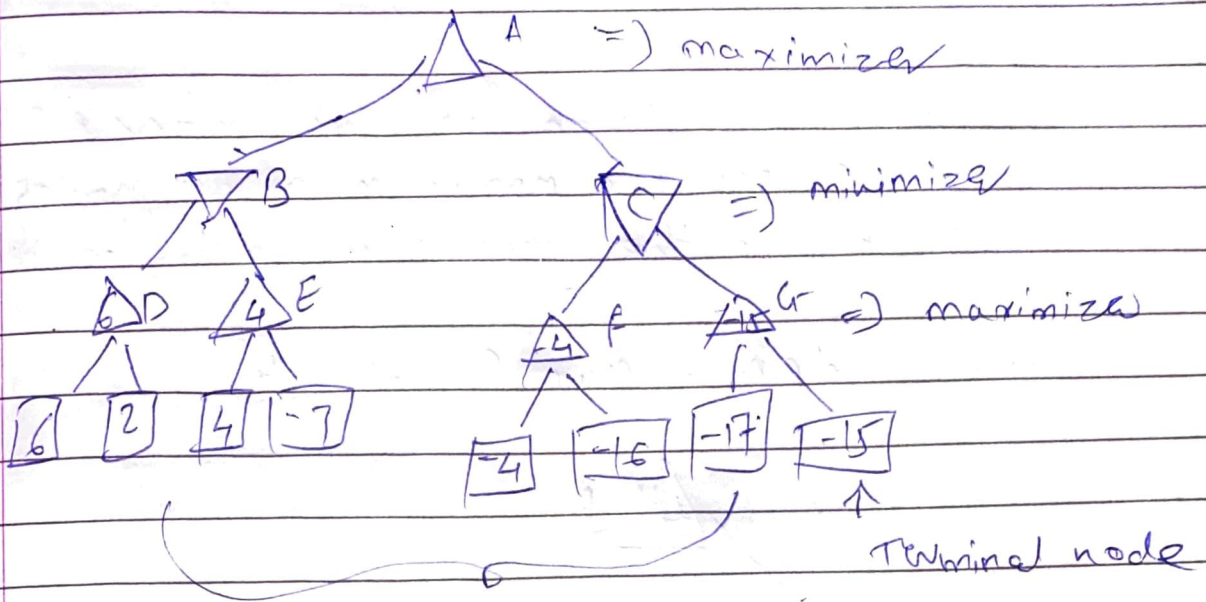
For node D:  $\max(6, -\infty) \Rightarrow \max(6, 2) = 6$

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

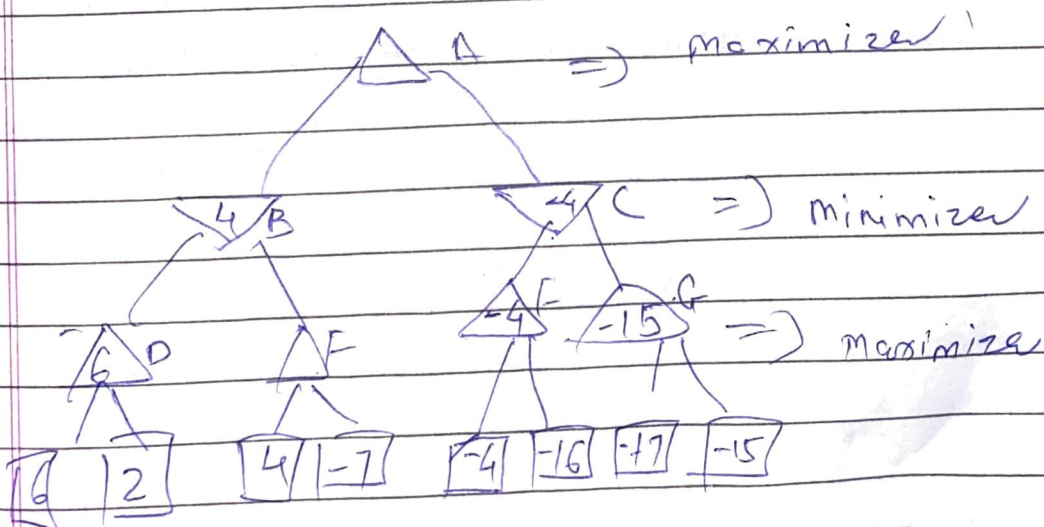




Step 3:

In the next step, it's a turn for minimizer. So it will compare all nodes values with two. It will find the 3<sup>rd</sup> layer node value.

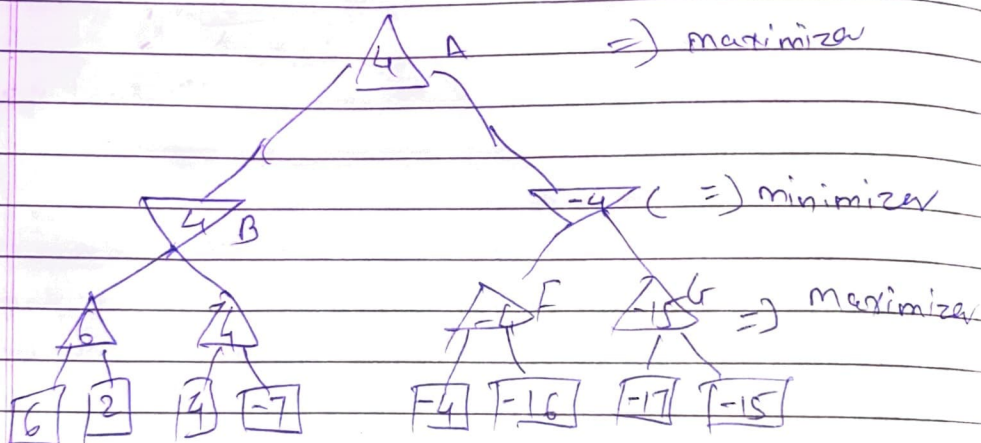
For node B  $-\min(6, 4) = 4$   
 For node C  $-\min(-4, -15) = -4$



Step 4 :-

Now it's a turn for maximizer & it will again choose the maximum of all nodes value & find the maximum value for root.

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



Hence it is the complete workflow of the minimax algorithm with two player game.