

Date : \_\_\_\_\_

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## Min - Max algorithm

Min - Max algorithm :-

It 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.

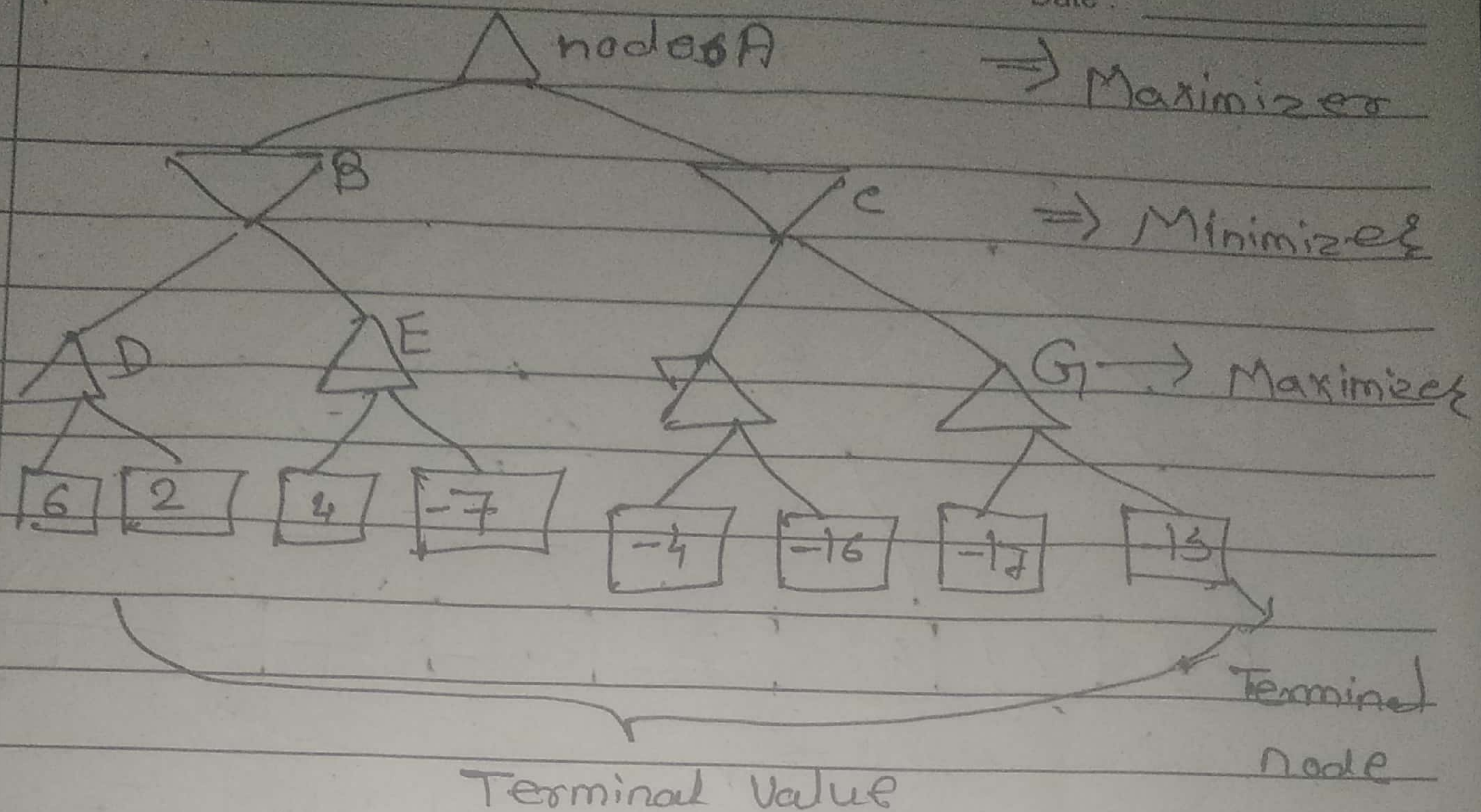
- Min max algo uses recursion to search through the game-tree
- In this algo two player play the game, one is called max & other is called Min.
- MIN-MAX algo is mostly used for game playing in AI

5-step:-

Let's take A is initial state of a tree. Suppose maximizer takes first turn which has worst case initial value  $-\infty$ , & minimize will next turn which has worst case initial value  $+\infty$ .



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Step 2:-

First we find the value for maximizer, its initial value is  $-\infty$ , So we will compare each value in terminal state with initial.

for node D :  $\text{Max}(6, -\infty) \Rightarrow \text{Max}(6, 2) = 6$

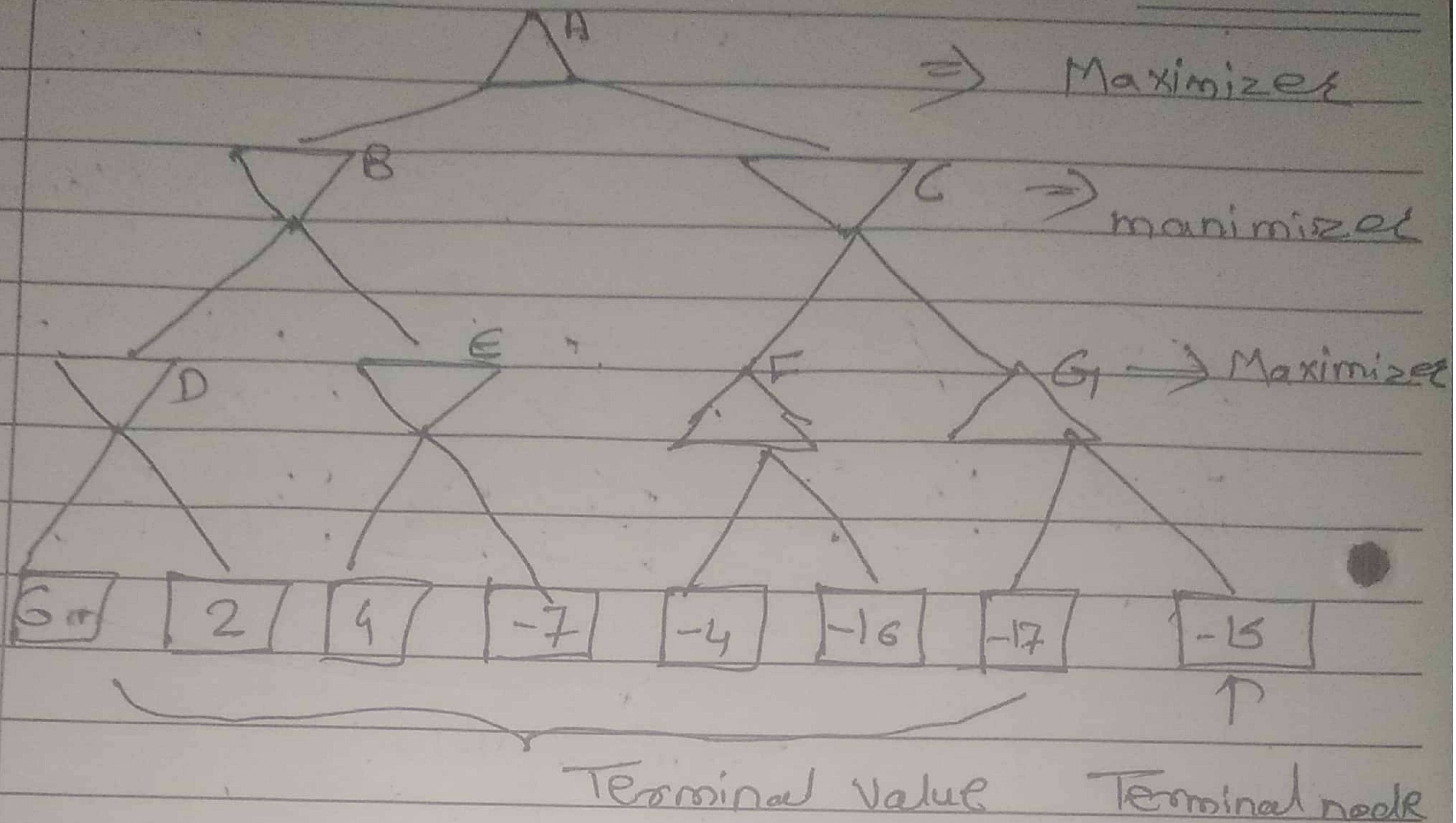
for node E :  $\text{Max}(4, \infty) \Rightarrow \text{Max}(4, -7) = 4$

for node F :  $\text{Max}(-4, -\infty) \Rightarrow \text{Max}(-4, -16) = -4$

for node G :  $\text{Max}(-17, -\infty) \Rightarrow \text{Max}(-17, 13) = 13$



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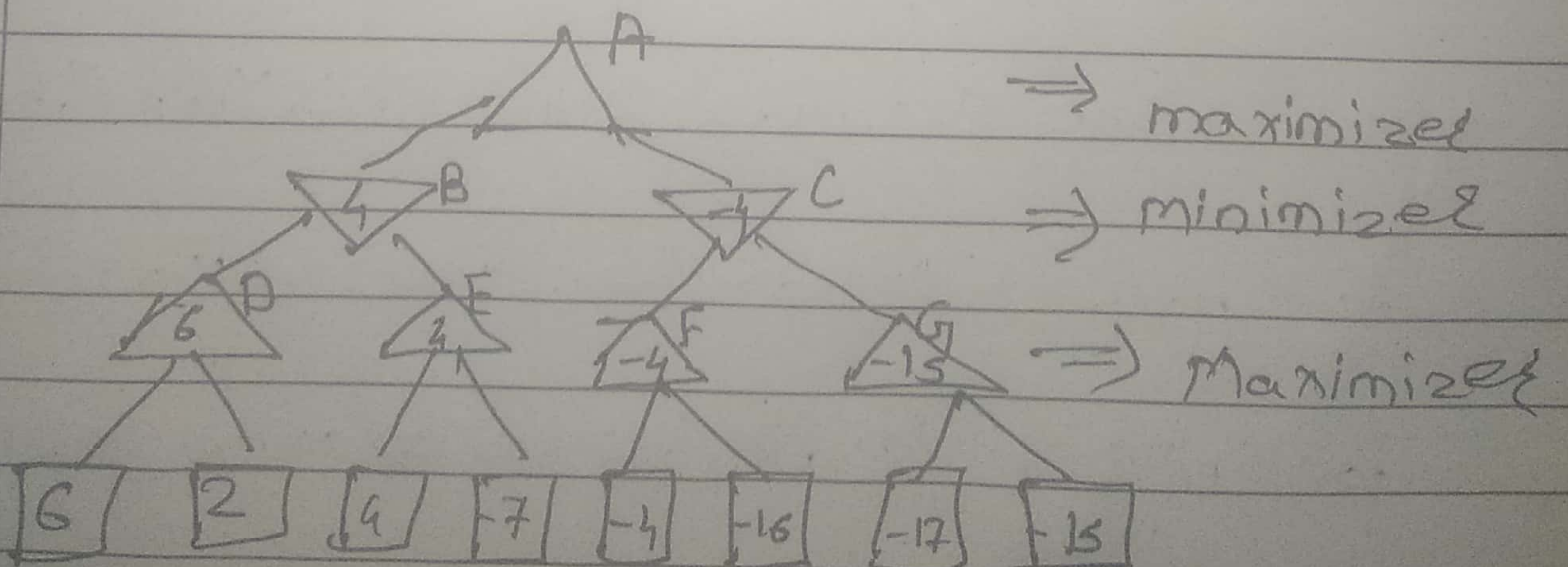


Step 3:-

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

for node B -  $\text{Min}(6, 4) = 4$

for node C -  $\text{Min}(-4, -15) = -4$

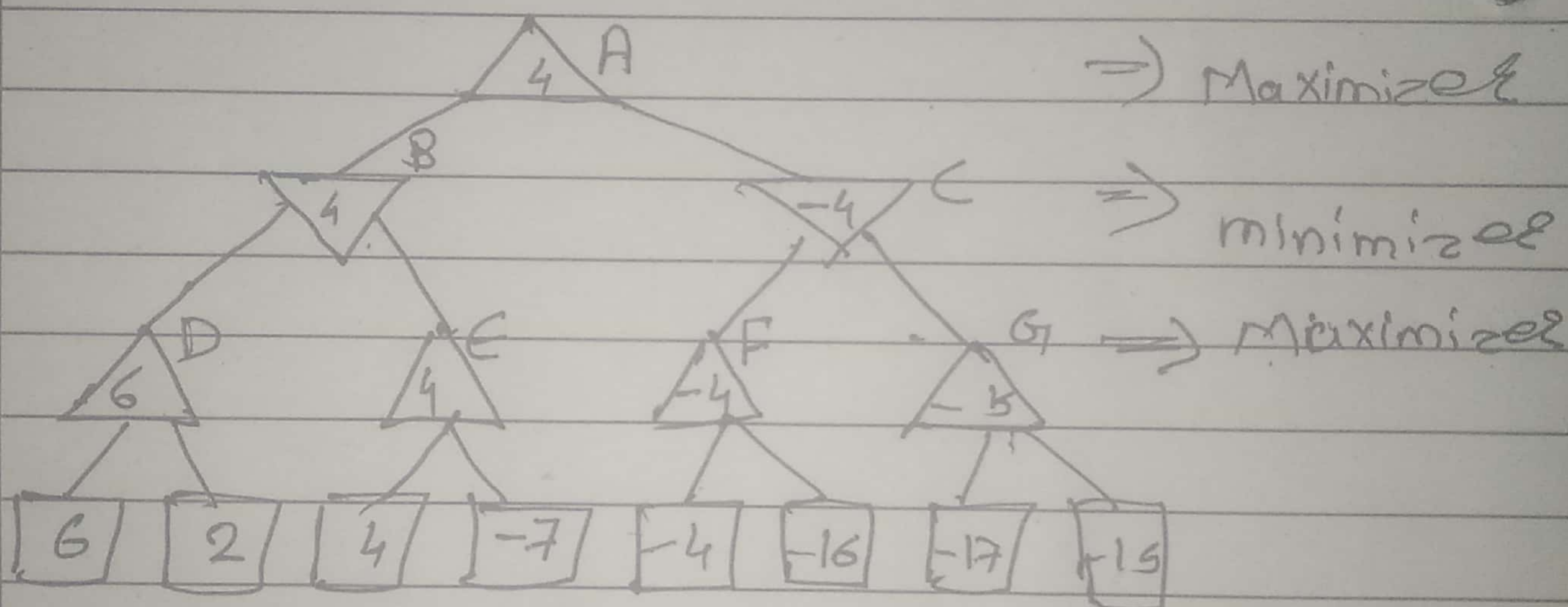




Step 4 :-

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

for node A:  $\text{Max}(4, -4) = 4$



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