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Min-Max Algorithm:

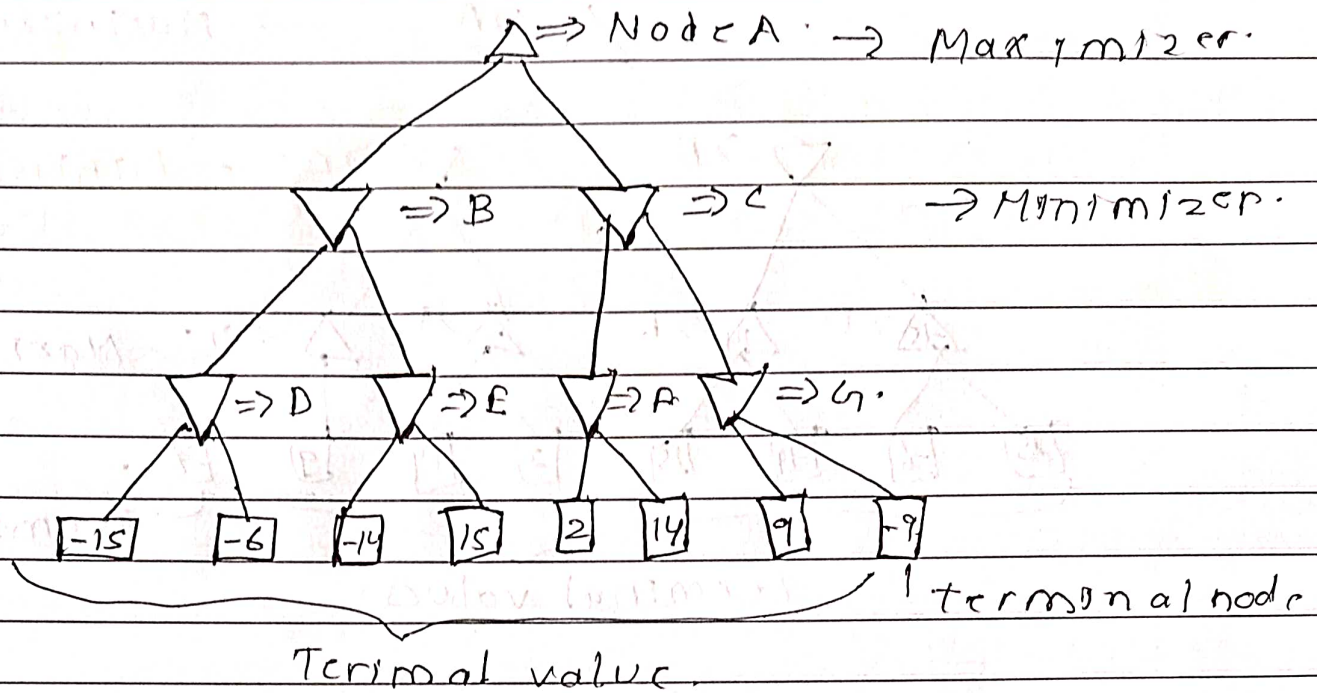
→ Min Max Algorithm:

Min-max algorithm is a recursive a back tracking 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.

- Min Max 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 played in AI.

Step 1:

Let take A is a initial state of the tree. Suppose maximizes take first turn (when a) which has worst-case initial value = $-\infty$, and minimizes will take next turn which has worst case initial values $+\infty$.



Step 2:

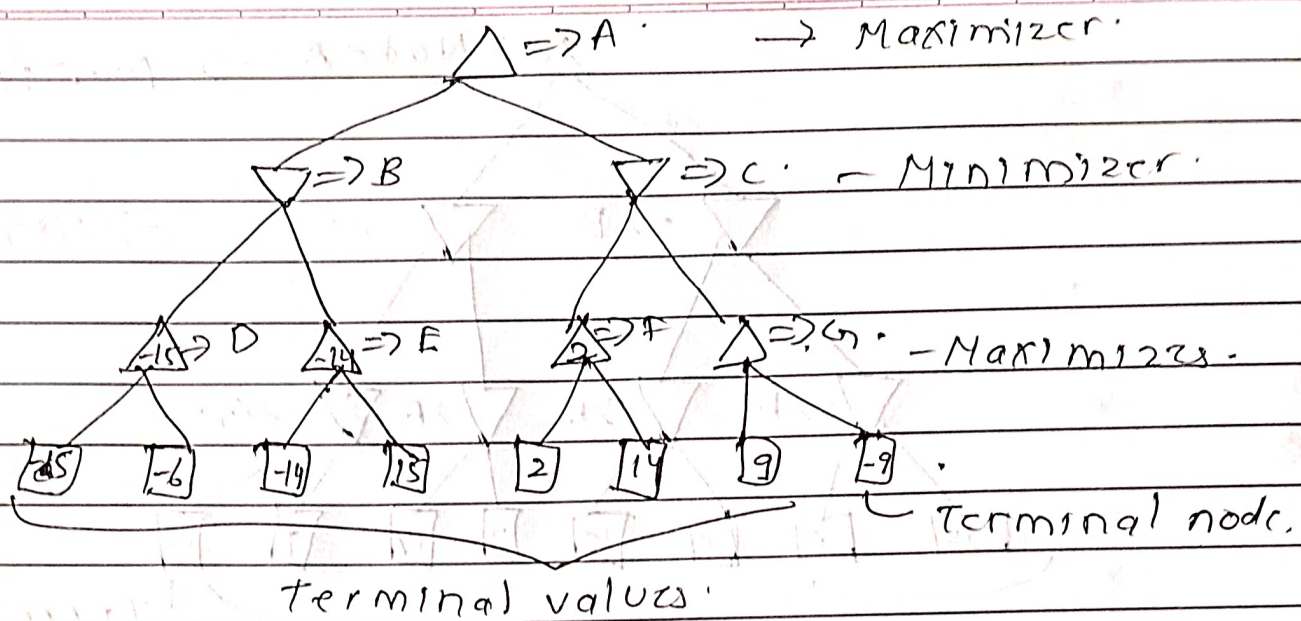
First we find the utility value for the maximizer, its initial value is $-\infty$. So we will compare each value in terminal state with initial value of maximizers and determine the higher nodes values. It will find the maximum among all.

For node D: $\max(\alpha = -\infty, \beta = -15) \Rightarrow \max(-15, 6) = 6$

For node E: $\max(\alpha = -15, \beta = -14) \Rightarrow \max(-14, 15) = 15$

For node F: $\max(\alpha = -\infty, \beta = -14) \Rightarrow \max(2, 14) = 14$

For node G: $\max(9, -9) \Rightarrow 9$

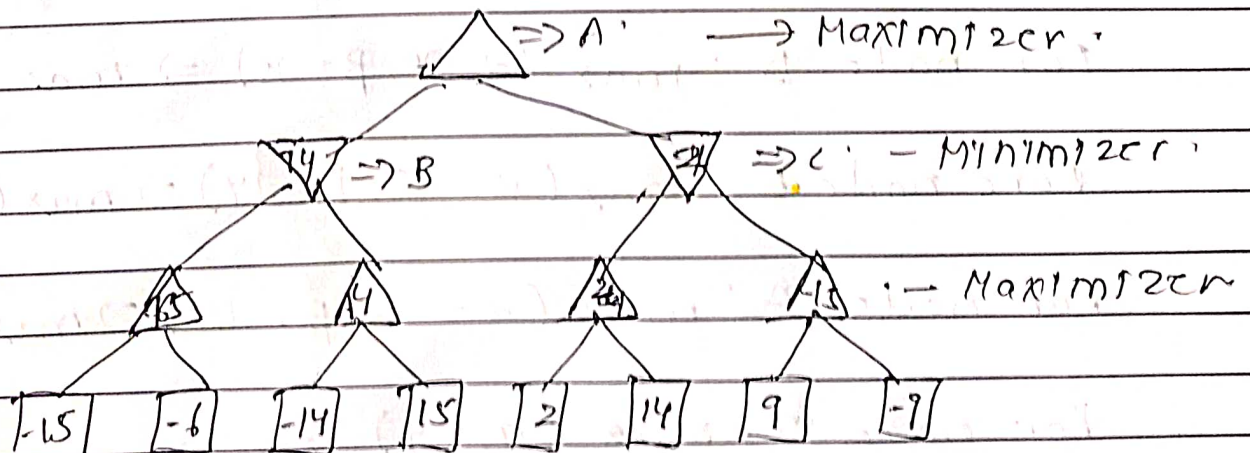


→ Step 3:

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

For node B $\Rightarrow \min(-15, -14) \Rightarrow -14$.

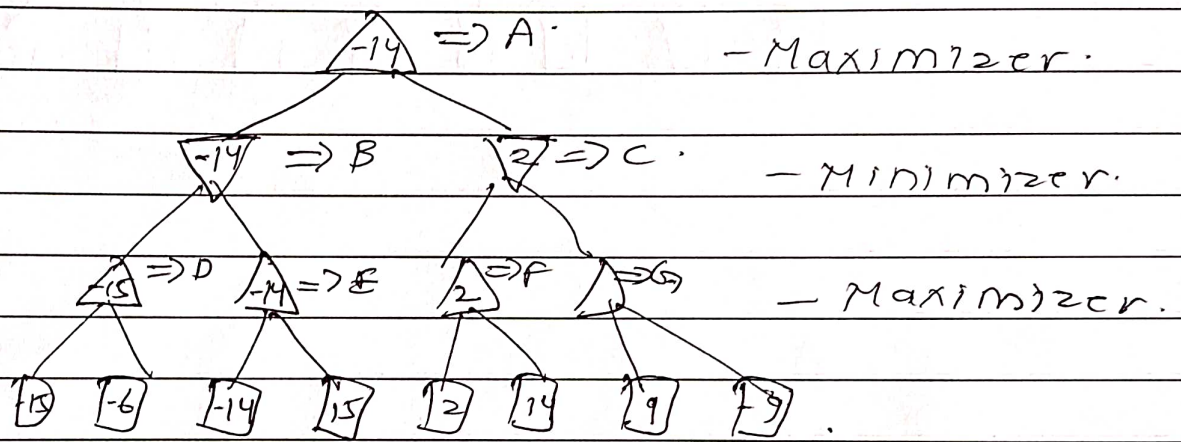
For node C $\Rightarrow \min(2,) \Rightarrow$



Step 4:

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

For node A: $\max(-14, 2) = 2$.



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