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Subject :- IS LAB

Class :- BE-II

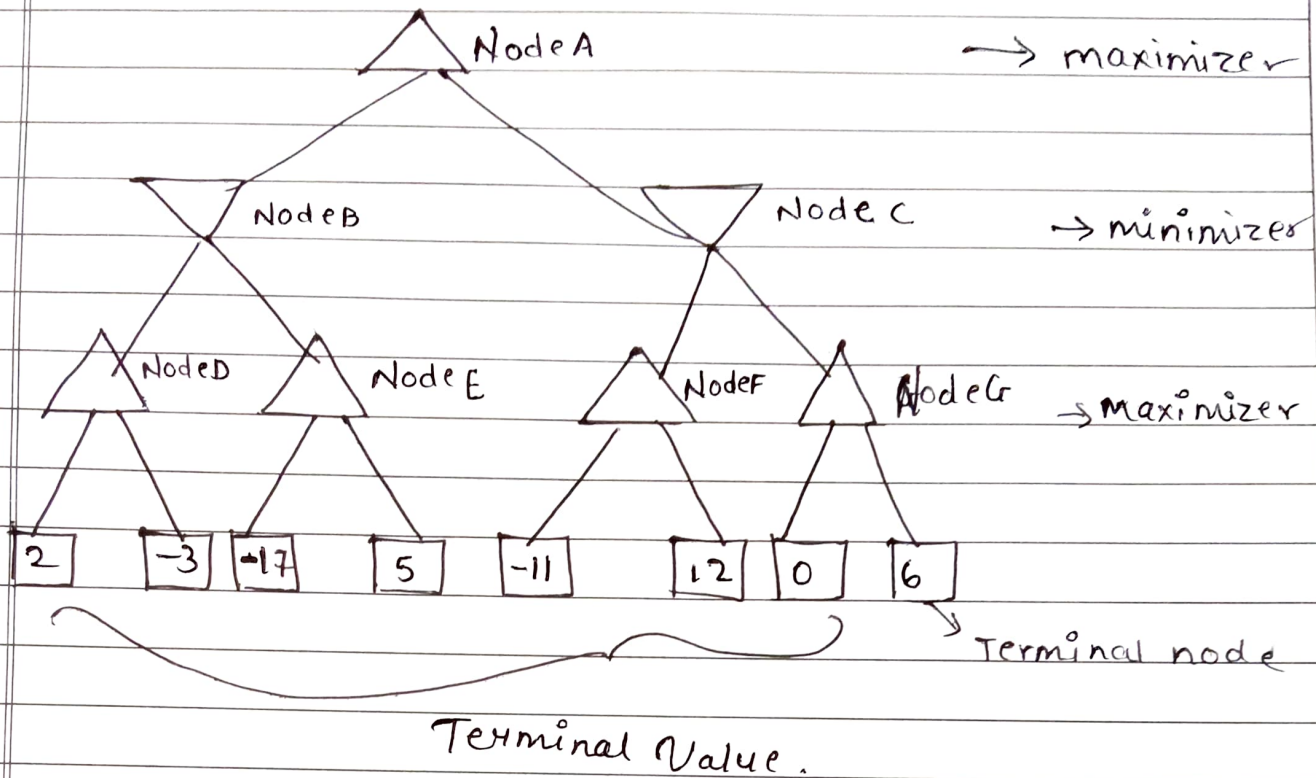
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Min - Max Algorithm :-

Min - max algorithm is a recursive or backtracking algorithm that is used a decision making and game theory to find the optimal move for a player, assuming that your opponent also play optimally.

- Min - max algorithm uses recursion to search through game tree.
- In minimax two player are called maximizer and minimizer.
- The maximizer tries to get the highest score possible.
- The minimizer tries to do opposite and get the lowest possible score.
- If the minimizer has the upper value in the board state then it will tend to be some negative value.

Step 1 :- Lets take A is the initial state of the tree. Suppose maximizing takes first which has worst-case initial value = $-\infty$ and minimize will next turn which has worst-case initial value = $+\infty$



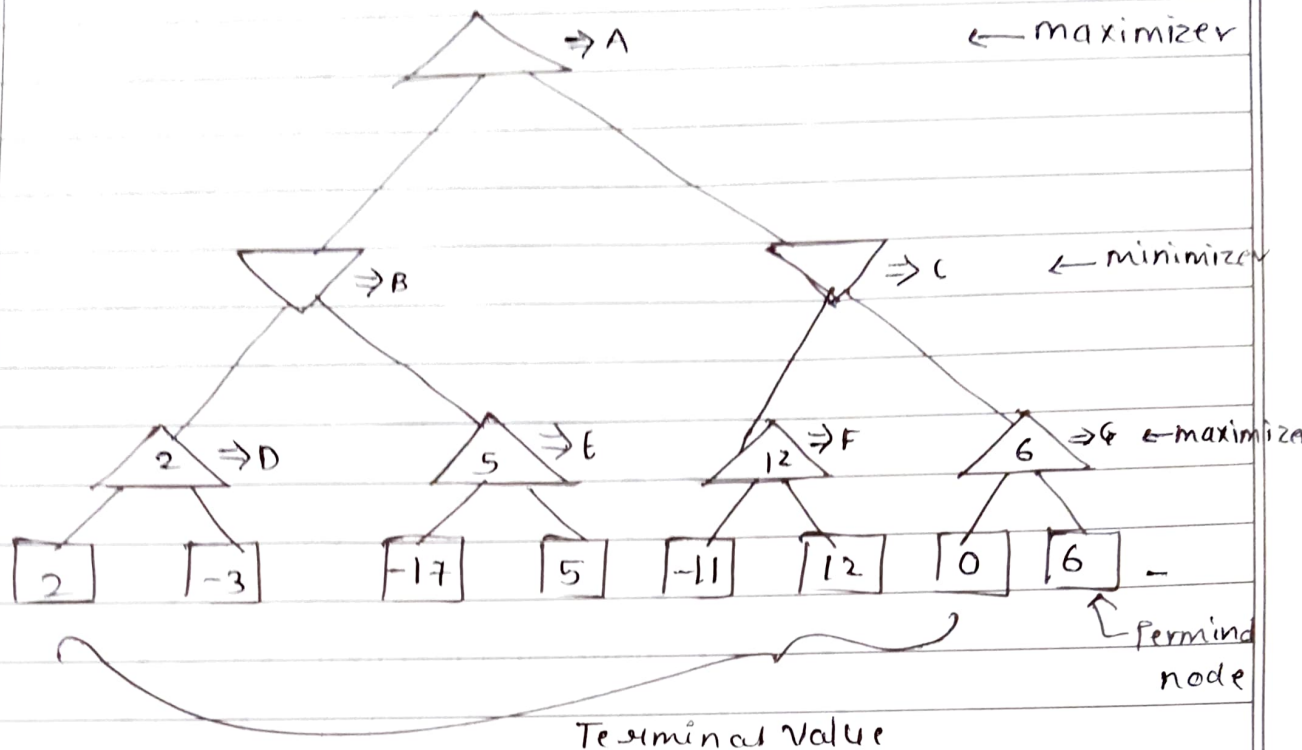
Step 2:- First max find utilities value For the maximizer. Its initial value is $-\infty$. So will compare each value in terminal state with initial value of maximizes and determines the highest node value. It will find the maximum among all.

For node D : $\max(2, -\infty) \Rightarrow \max(2, -3) = 2$

For node E : $\max(-17, \infty) \Rightarrow \max(-17, 5) = 5$

For node F : $\max(-11, \infty) \Rightarrow \max(-11, 12) = 12$

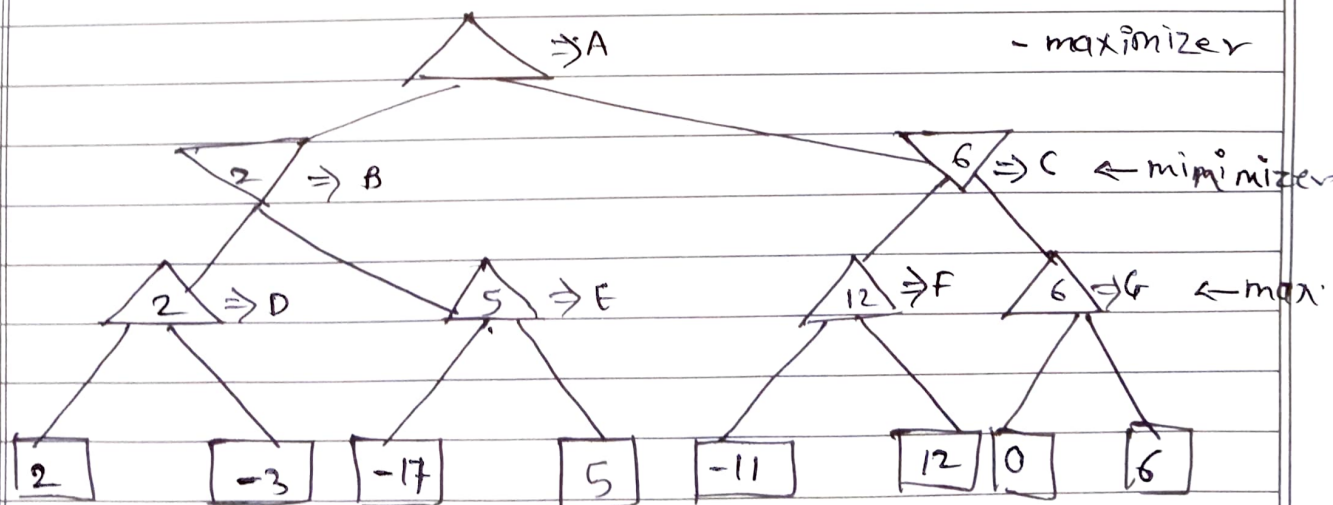
For node G : $\max(0, 6) \Rightarrow \max(0, 6) = 6$



Step 3 :- In the next step it is a turn for minimizing, so it will compare all nodes value with two, and will find the 3rd layer node value.

For node B $\min(2, 5) = 2$

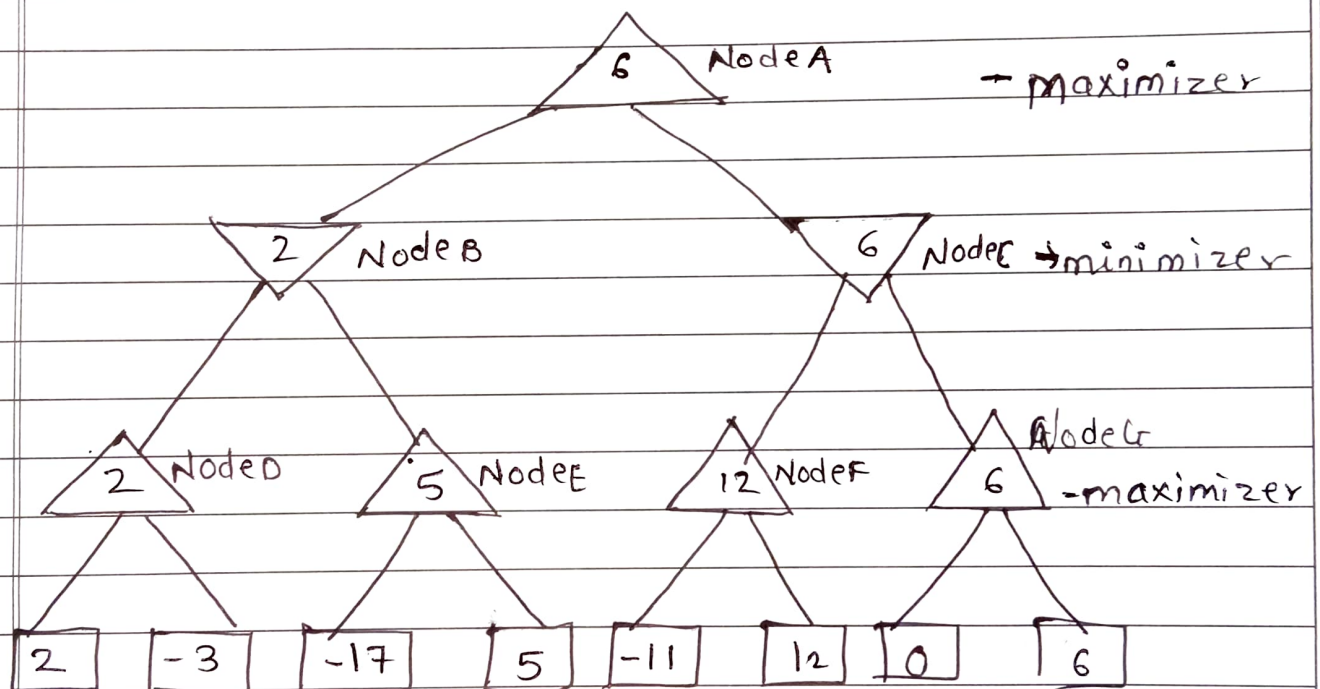
For node C $\min(12, 6) = 6$



Step 4:-

Now it is a turn For maximize and it will again choose the maximum of all nodes values and Find the maximum value for the node.

$$\text{For node A} = \max(2, 6) = 6$$



Here, it is the complete work flow of the minmax algorithm with two player game.