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Class : B.E, I.T

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Subject : IS LAB

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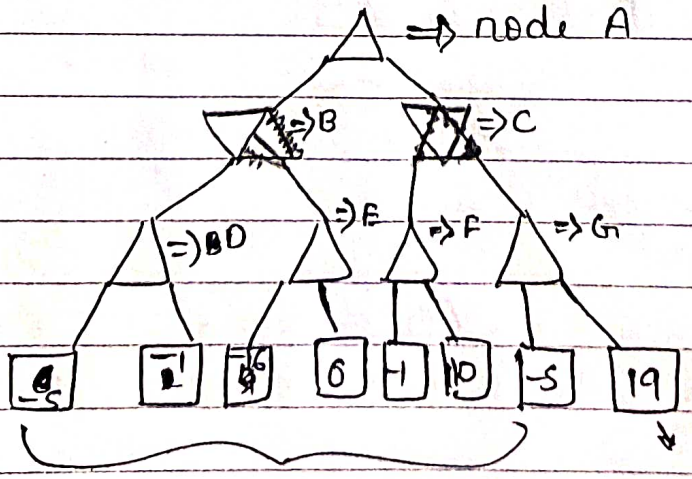
* min-max Algorithm:

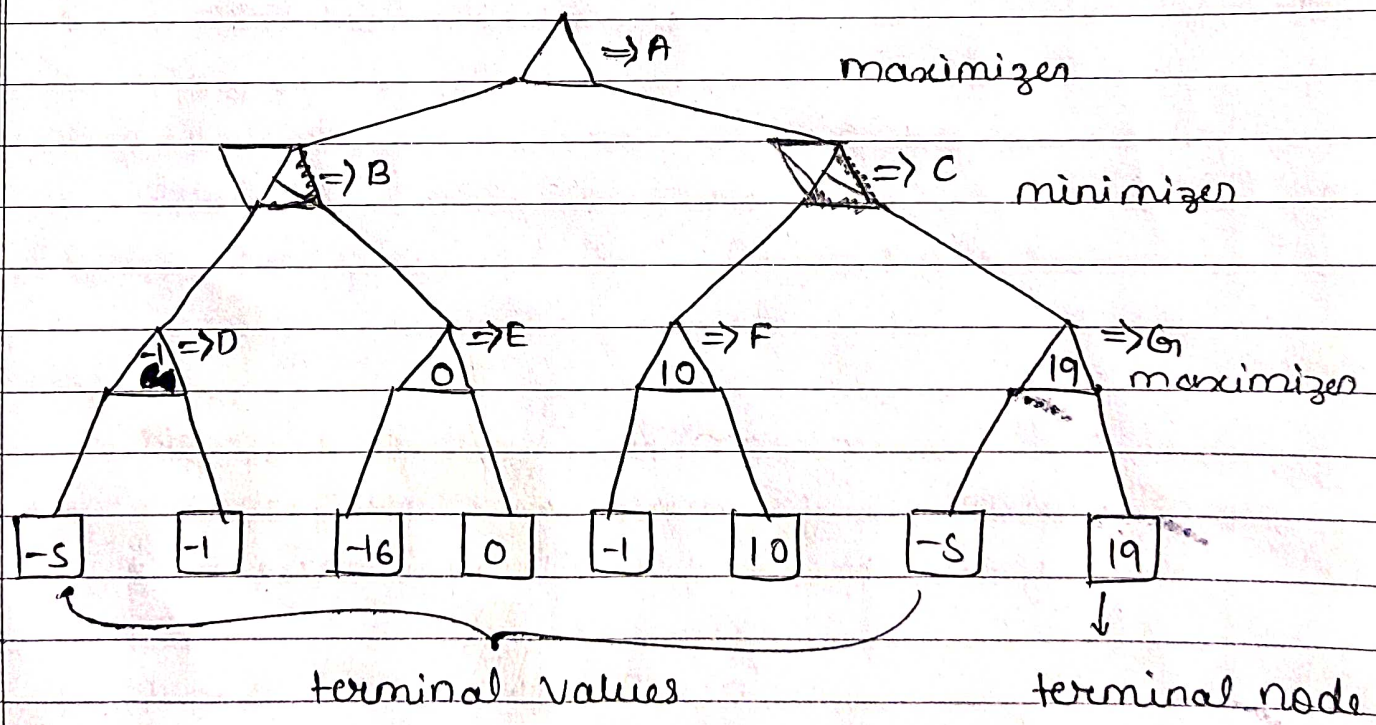
- min-max algorithm is a recursive or backtracking algo which is used in decision making & game theory, It provides an optimal move for the player assuming that opponent is also playing optimally.
- min max algo uses recursion to search through the game-tree.
- In this algo two players play the game, one is called max & other one is called min.
- min-max algo is mostly used for game playing in AI.
- Step 1:
  Lets take A is the initial state of the tree. Suppose maximizes takes first turn (when or) which has worst-case initial value = -infinity & minimize will take next turn which has worst case initial value = +infinity.



- Step 2:

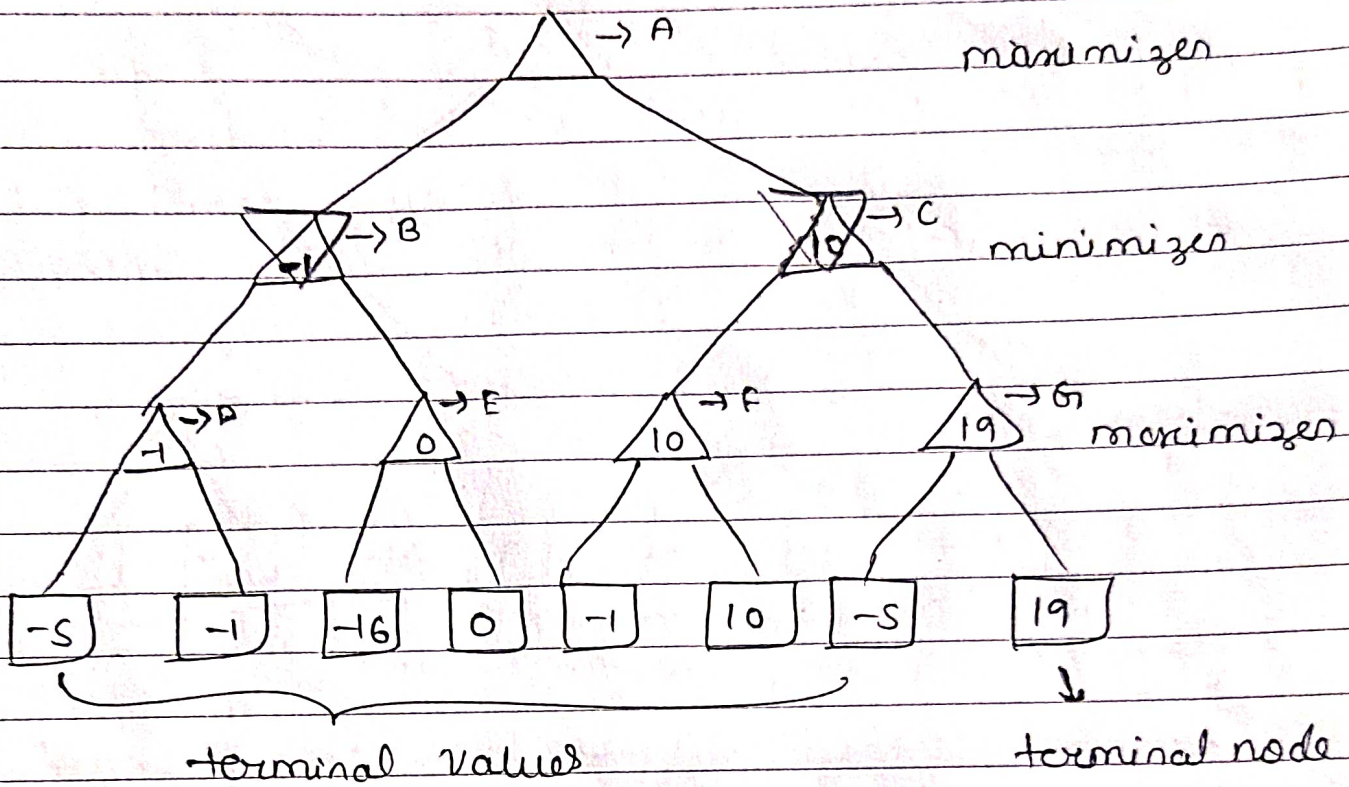
first we find the Utilities value for the maximizer, its initial value is $-\infty$. so we will compare each value in terminal state with initial value of maximizer & determines the higher nodes values. It will find the maximum among all.

for node D: $\max(-5, -\infty) \Rightarrow \max(-5, -1) = -1$
for node E: $\max(-16, -\infty) \Rightarrow \max(-16, 0) = 0$
for node F: $\max(-1, -\infty) \Rightarrow \max(-1, 10) = 10$
for node G: $\max(-5, -\infty) \Rightarrow \max(-5, 19) = 19$



Step 3:

for node: B: ~~max~~ min $(-1, 0) = -1$
for node: C: $\min(10, 19) = 10$



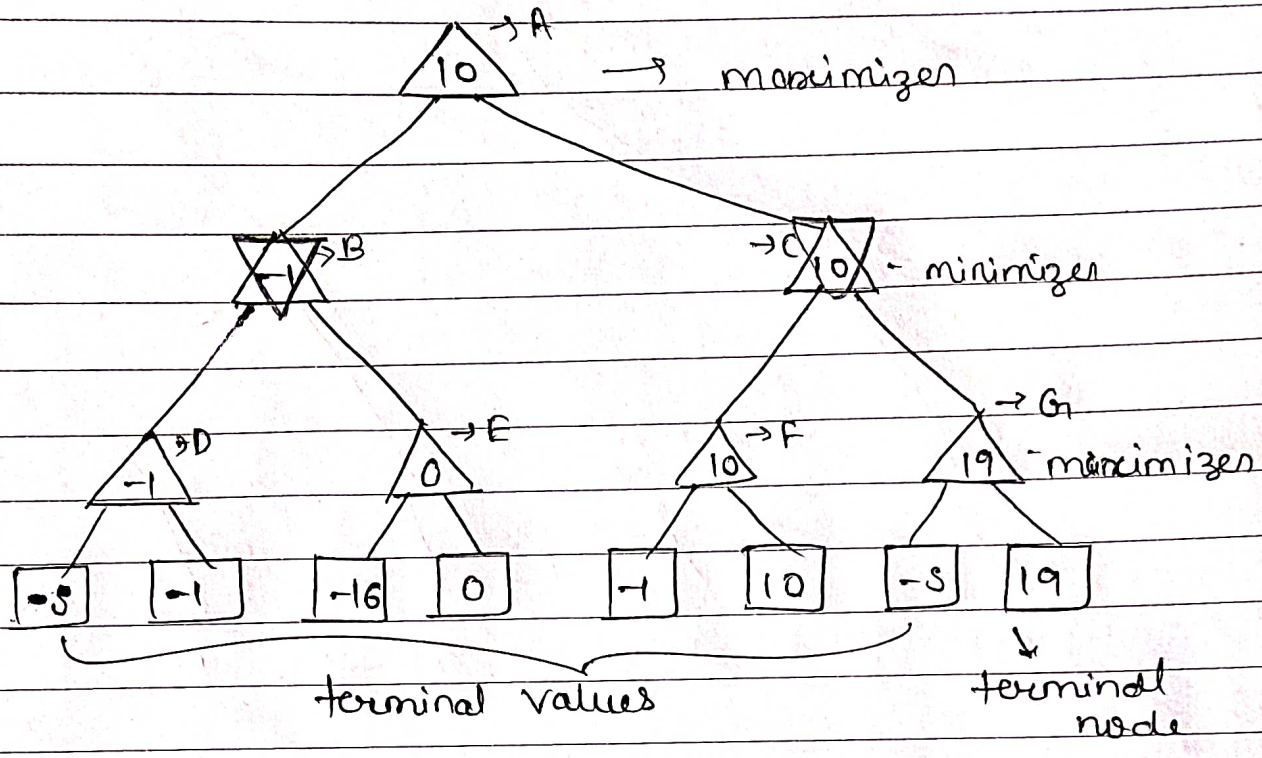
Step 3:

- ~~Step 4~~: In this step, its a turn for minimize. So it will compare all nodes value with two. & will find the 3rd layer node value.

- Step 4:

Now its a turn for maximizer. & it will again choose the maximum of all nodes values & find the maximum value for the root node.

for node A: max(-1, 10) = 10



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