Mini-Max Agorithm (module-3)

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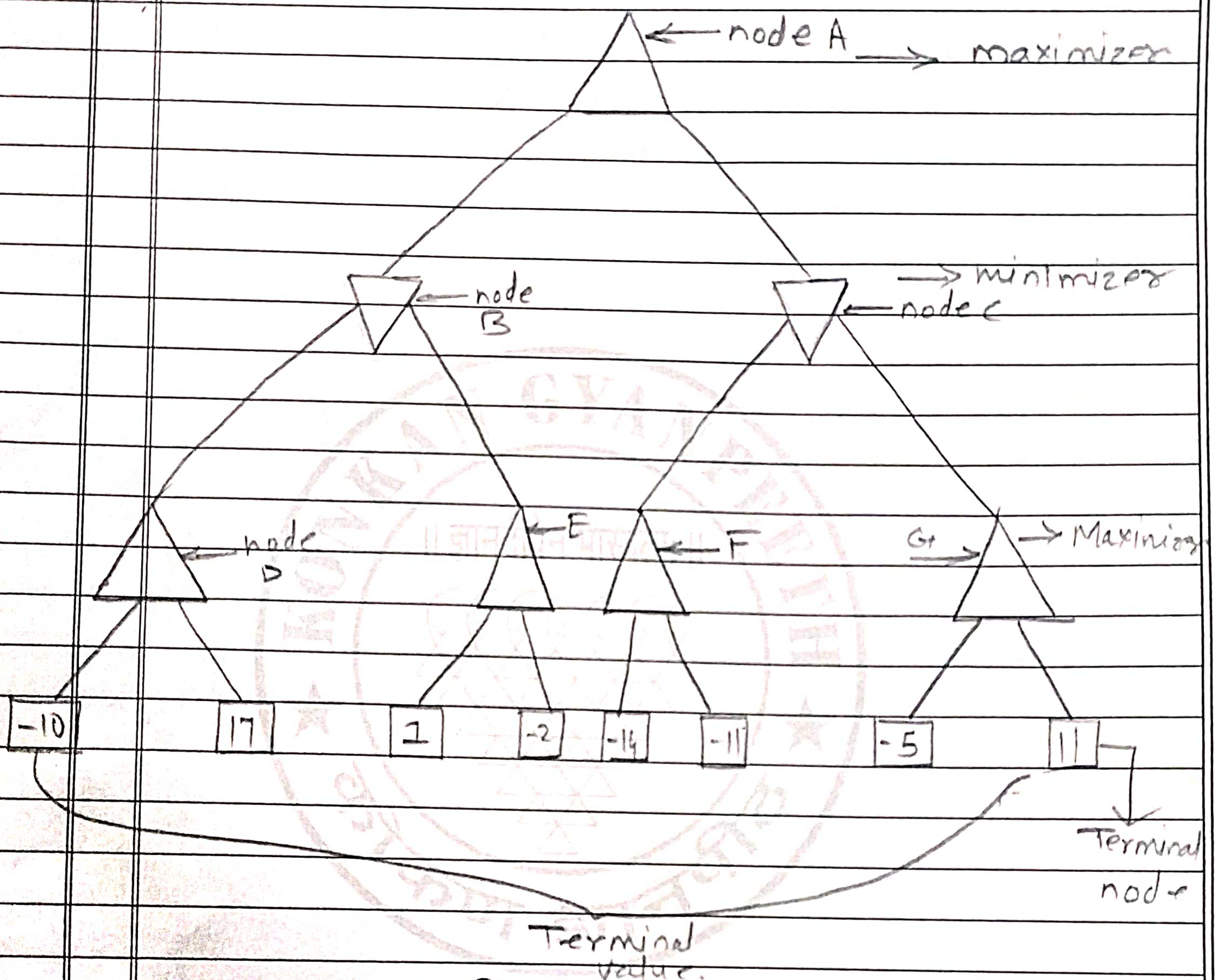
Mini-max Algorithm (Module-3)

* Mini-Max algorithm.

→ Mini-max algorithm is recursive or backtracking algorithm which is used in decision-making and game theory. It provides an optimal move for the player assuming that opponent is also playing optimally.

- Mini-max algorithm uses recursion to search through the game-tree.
- ~~Mini~~ In this algorithm two players players play the game, one is call MAX and other is called MIN.
- Min-max algorithm is mostly used for gameplaying in AI. Such as chess chess, checkers, tic-tac-toe. This Algorithm computes the minimax decision. For the current state

Step 1: In the first step, the algorithm generats the entire game-tree and apply the utility function to get the utility values for the terminated states. In the below tree diagram let's take A is the initial state of the tree. Suppose maximizer takes first turn which has worst case initial value = - infinity, and minimize will take next turn which has worst-case initial value = +infinity.



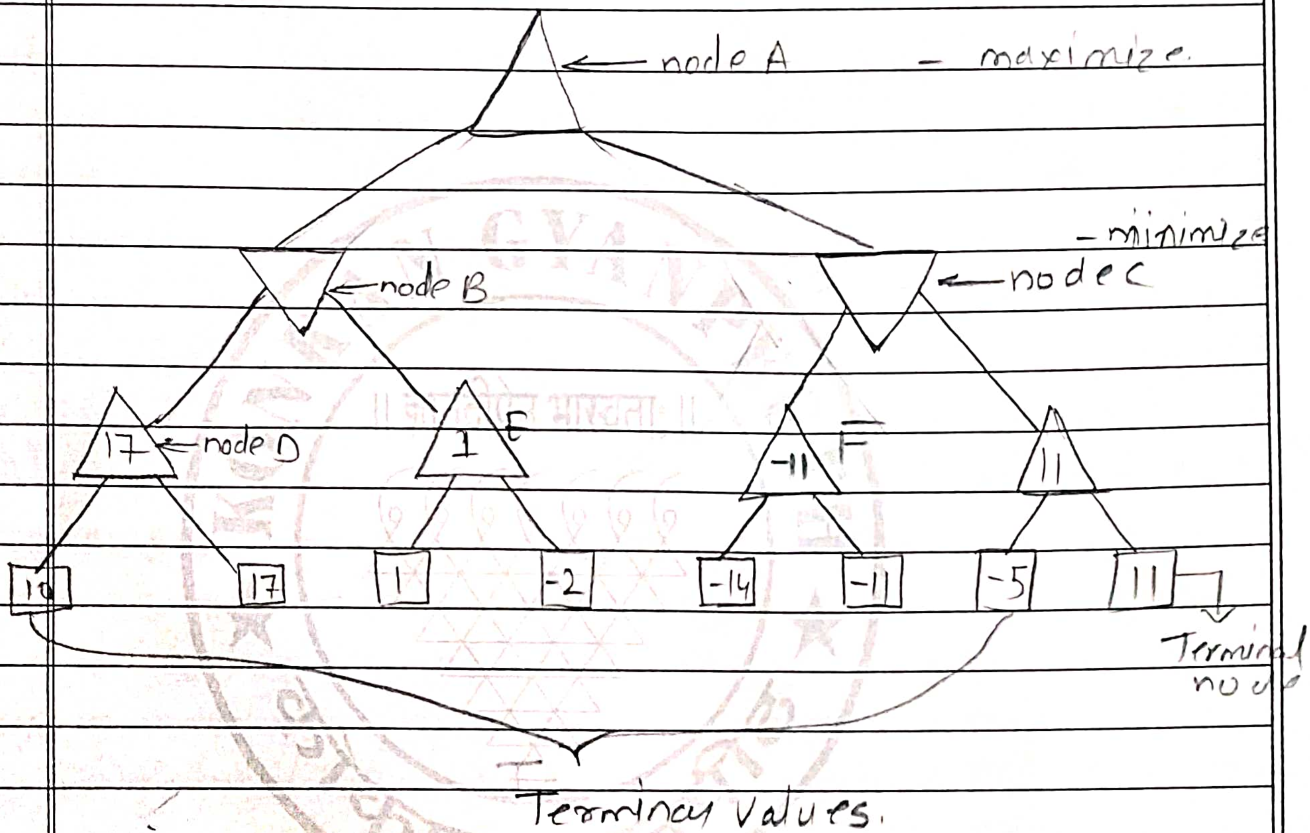
Step 2 :- Now, First we find the utilities value for the maximizer its initial value is $-\infty$, so we will compare each value in terminal state with initial value of maximizer and determines the higher nodes values It will find the maximum among the all.

- For node D $\max(10, -\infty) \Rightarrow \max(10, 17) = 17$

- For node E $\max(10, -\infty) \Rightarrow \max(1, -2) = 1$

- For node F - max (-14, -∞) ⇒ max (-14, -11) = -11

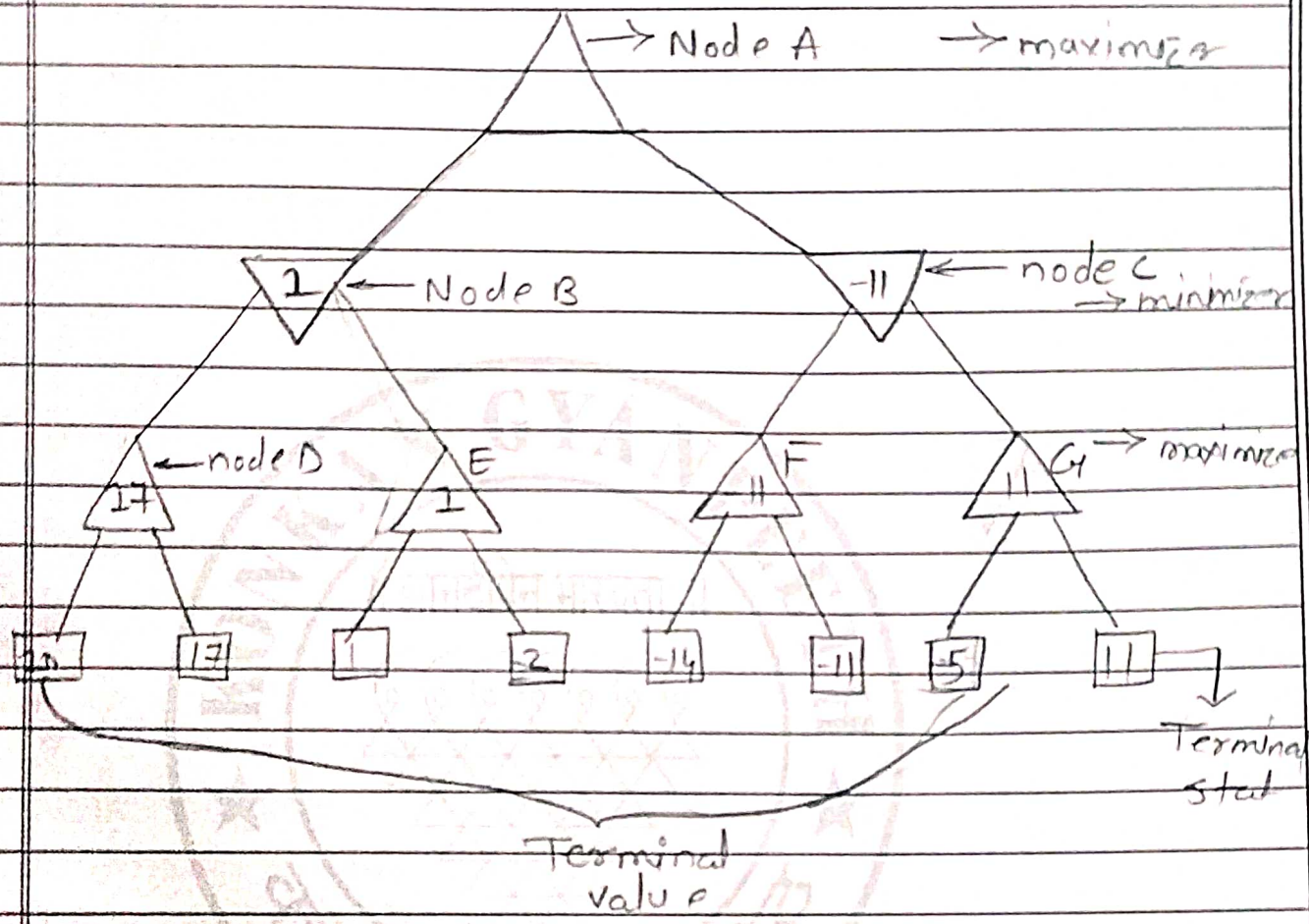
- For node G · max (-5, -∞) ⇒ max (-5, 11) = 11



Step 3 :- In the next terminal values step, its a turn for minimizer, so it will ~~find th.~~ compare all node values with +∞, and will find the 3rd layer node value

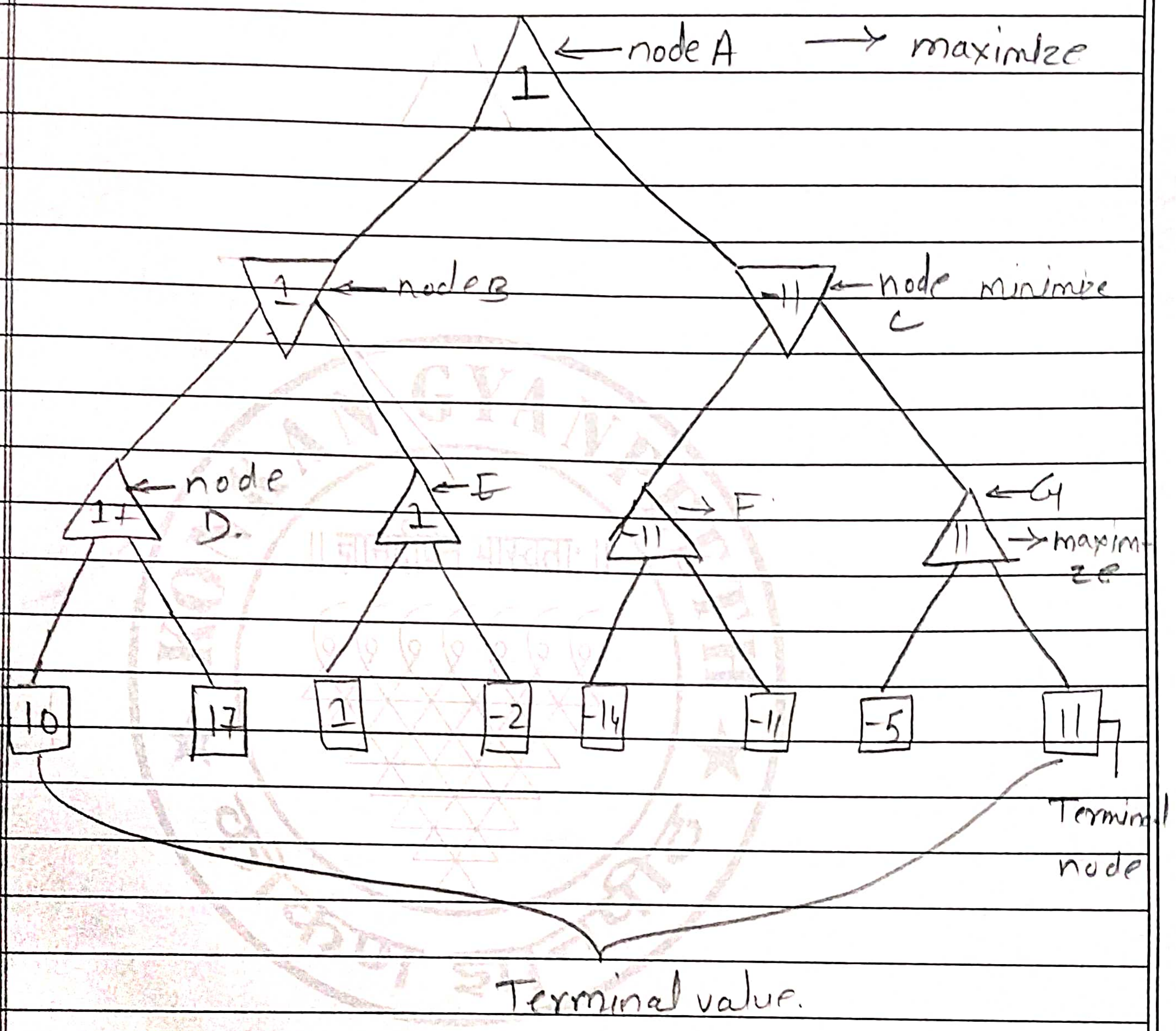
- For node B = min (17, 1) = 1

- For nod C = min (-11, 11) = -11



Step 4 :- Now it's a turn for maximizer, and it will again choose the maximum of all nodes values and find the maximum value for the the root node. In this game tree, there are only 4 layers, hence we reach immediately to the root node, but in real games there will be more than 4 layers

-For node A max(1, -11) = 1.



That was the complete workflow of the minimax algorithm with two player game.