NAME :- FAISAL. H. KHAN

CLASS :- BE - IT

ROLL NO. :- 28

SUBJECT :- IS LAB

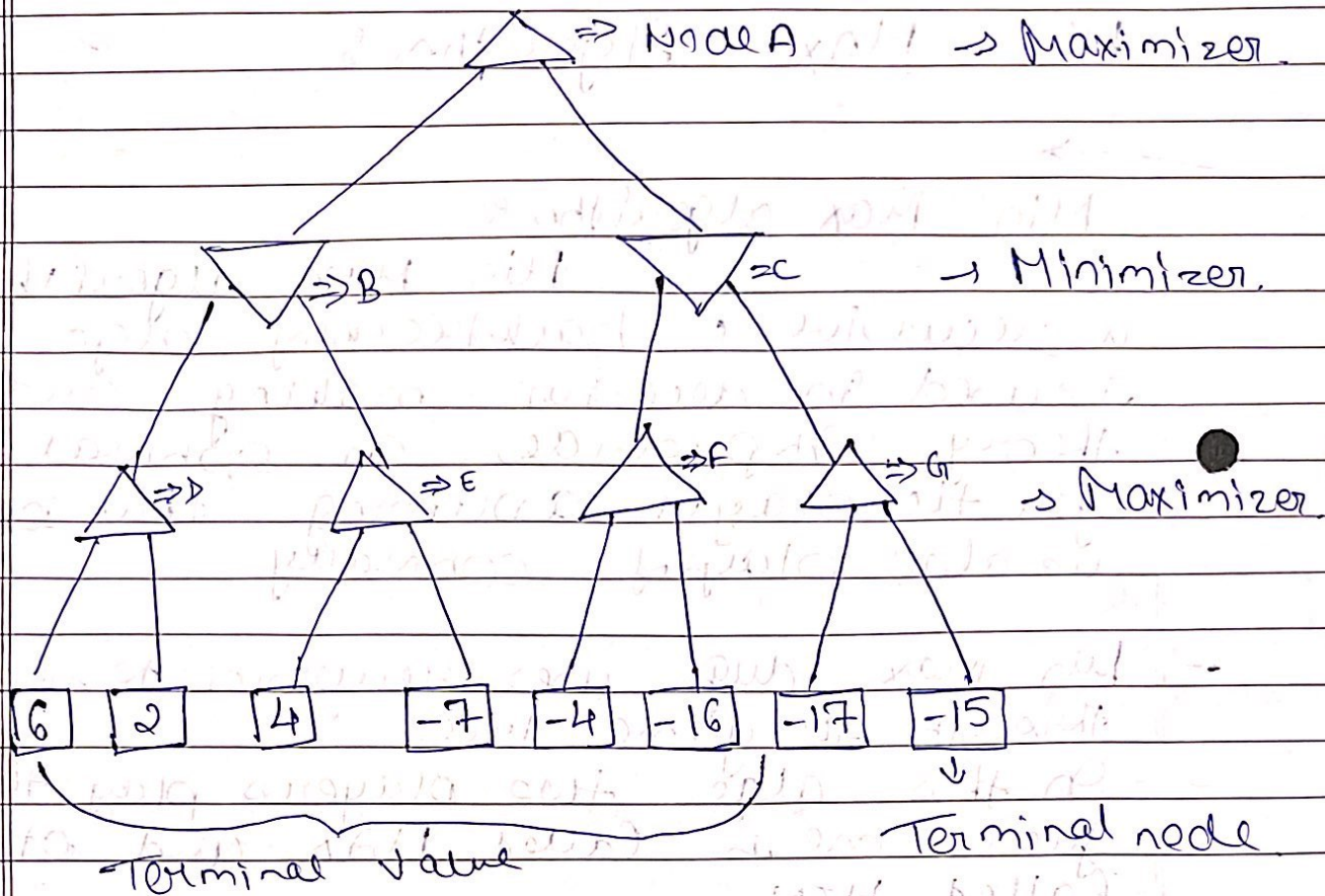| DOP	DOA	REMARK	SIGN

Min - Max Algorithm :

→

Min Max algorithm :

Min Max algorithm is a recursive & backtracking 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 is playing in AI.

Step 1 :
Let take A is the initial state of the tree. Suppose maximizer takes first turn (when or) which has worst-case initial value = -infinity, and minimizer will take next turn which has worst-case initial value = + infinity.

⇒ Node A → Maximizer

⇒ B → Minimizer

⇒ C

⇒ D ⇒ E ⇒ F ⇒ G → Maximizer

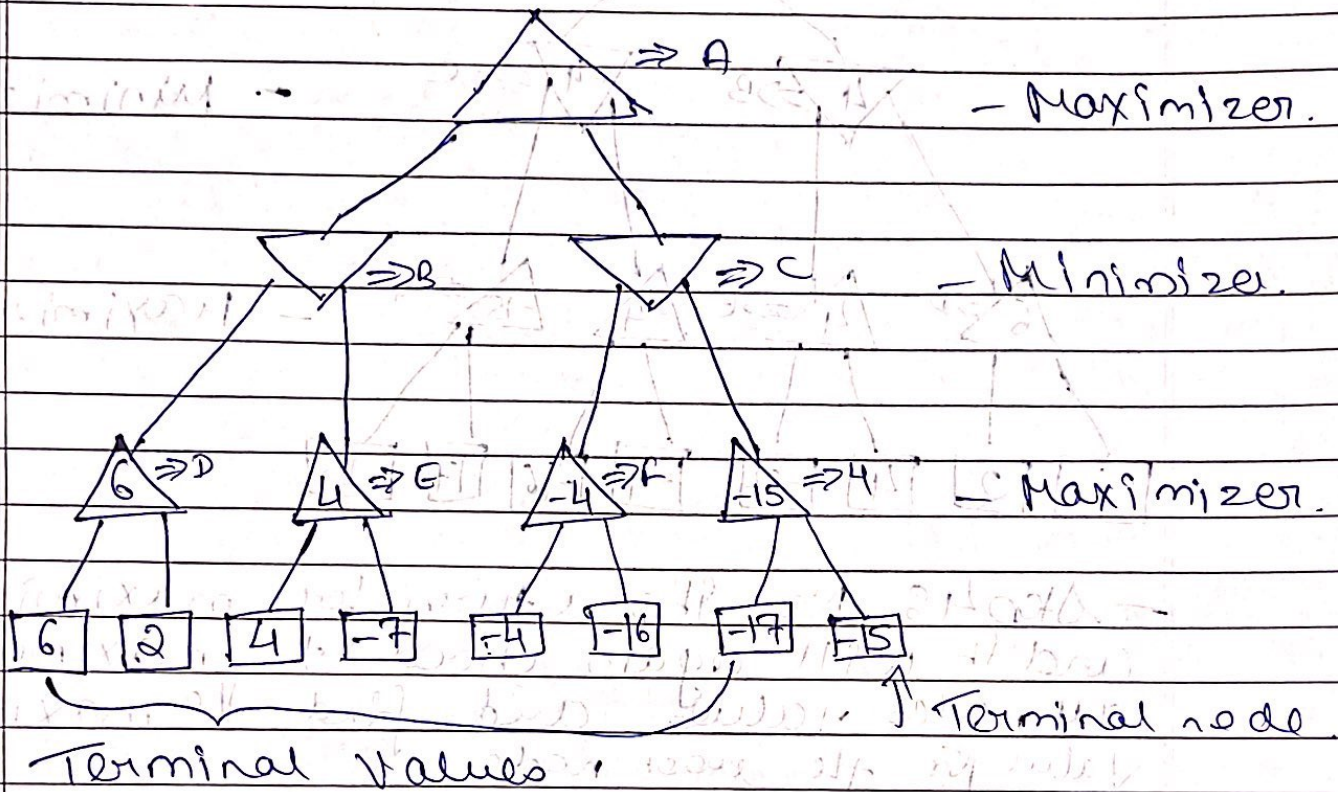| 6 | 2 | 4 | -7 | -4 | -16 | -17 | -15 |

Terminal value

Terminal node

Step 2:

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

For node D : Max $(6, -\infty) \Rightarrow$ Max $(6, 2) = 6$

For node E :- Max $(4, -\infty) \Rightarrow$ Max $(4, -7)$ -4

For node F :- Max $(-4, -\infty) \Rightarrow$ Max $(-4, -16) = -4$

For node G: Max $(-17, -\infty)$ ⇒ Max $(-17, -15) = -15$

— Maximizer.

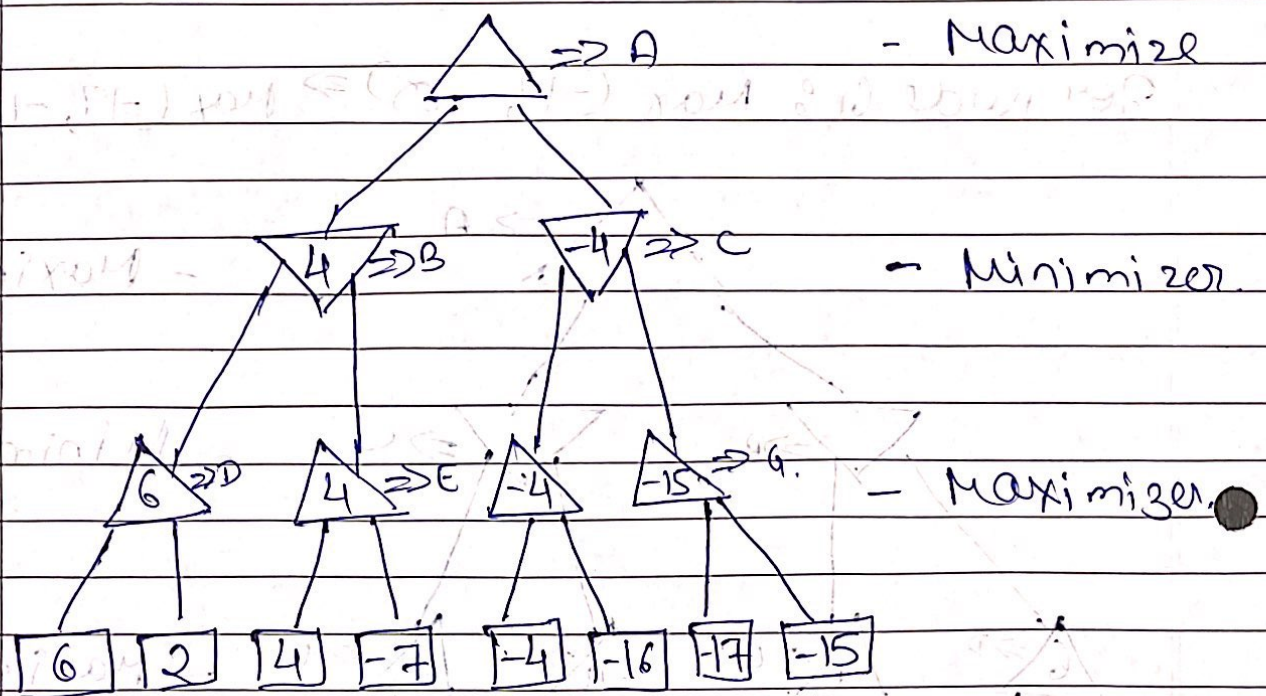— Minimizer.

— Maximizer.

Terminal node

Terminal values

Step 3:

In the next step, it's a turn for minimize, so it will compare all nodes value with two, and will find the 3rd layer node value.
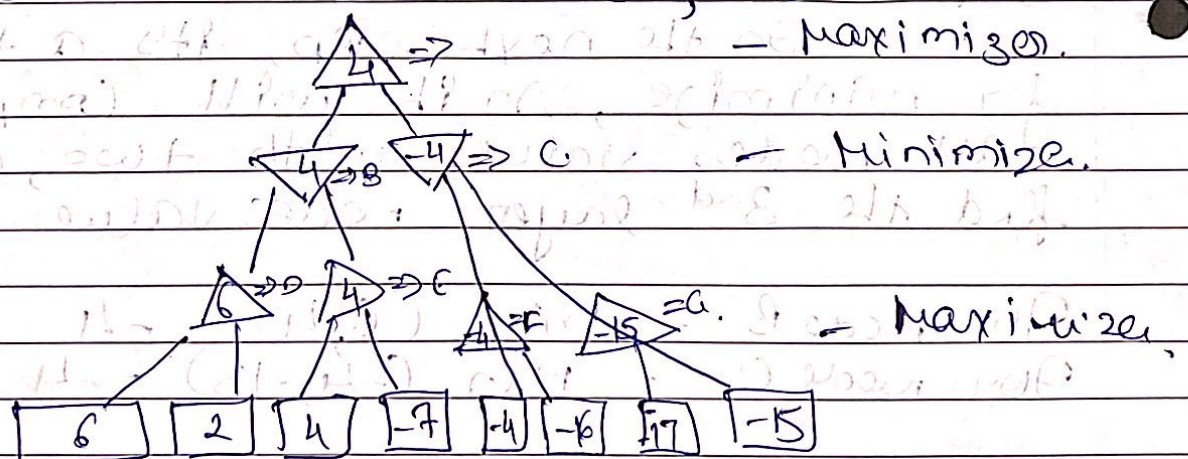
For node B — min $(6, 4) = -4$

For node C — Min $(-4, -15) = -4$

$\Rightarrow A$ — Maximize

$4 \Rightarrow B$ $-4 \Rightarrow C$ — Minimizer.

$6 \Rightarrow D$ $4 \Rightarrow E$ -4 $-15 \Rightarrow G$ — Maximizer.

| 6 | 2 | 4 | -7 | -4 | -16 | -17 | -15 |

— Step4: Now Its a turn for maximizer and it will again choose the maximum of all nodes values and find the maximum value for the most node.

For node A : max $(4, -4) = 4$.
$4 \Rightarrow$ — Maximizer.

$4 \Rightarrow B$ $-4 \Rightarrow C$ — Minimize.

$6 \Rightarrow D$ $4 \Rightarrow E$ $4 \Rightarrow F$ $-15 \Rightarrow G$. — Maximizer.

| 6 | 2 | 4 | -7 | -4 | -6 | 17 | -5 |

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