Name: Makarand S. Khadakban

Class : BE - IT

Roll No.: 30

Batch : I2

Sem. : VII th

Sub. : IS Lab

D.O.P.	D.O.C.	Marks	Sign

Min-Max Algorithm :-

Min-max algorithm:

It is a recursive or backtracking algorithm which is used in decision making & game theory. It provides an optimal move for the player assuming that opponent is also playing optimally.

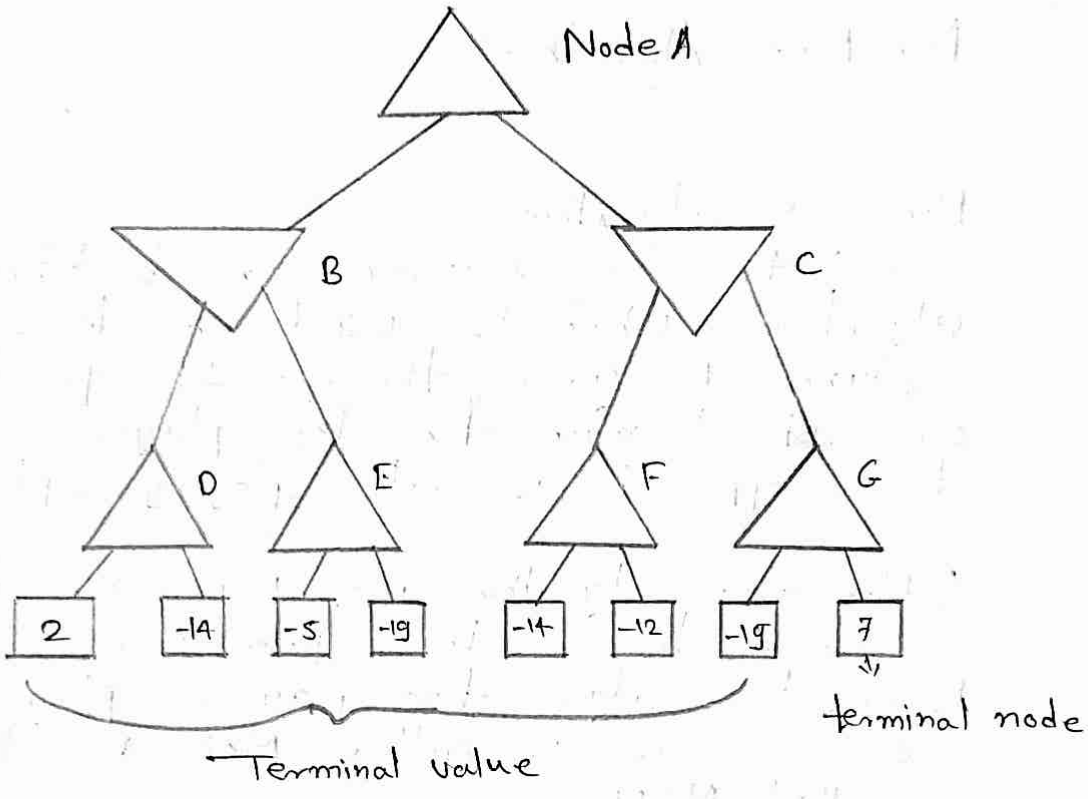
A] Min-max algorithm uses recursion to search through the game-tree

B] In this algo two players play the game, one is called MAX & other is called MIN.

C] Min-Max algorithm is mostly used for game playing in AI.

Step 1:

Lets take A is the initial state of the tree. Suppose maximizer takes first turn which has worst-case initial value = - infinity, & minimizer will take next turn which has worst-case initial value = + infinity


Node A
B
C
D
E
F
G
2
-14
-5
-19
-14
-12
-19
7
terminal node
Terminal value

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 maximizer & determines the higher nodes values. It will find the maximum among all.

For node D: $\max(2, -\infty) \Rightarrow \max(2, -14) = 2$

For node E: $\max(-5, -\infty) \Rightarrow \max(-5, -19) = -5$

For node F: $\max(-14, \infty) \Rightarrow \max(-14, -12) = -12$

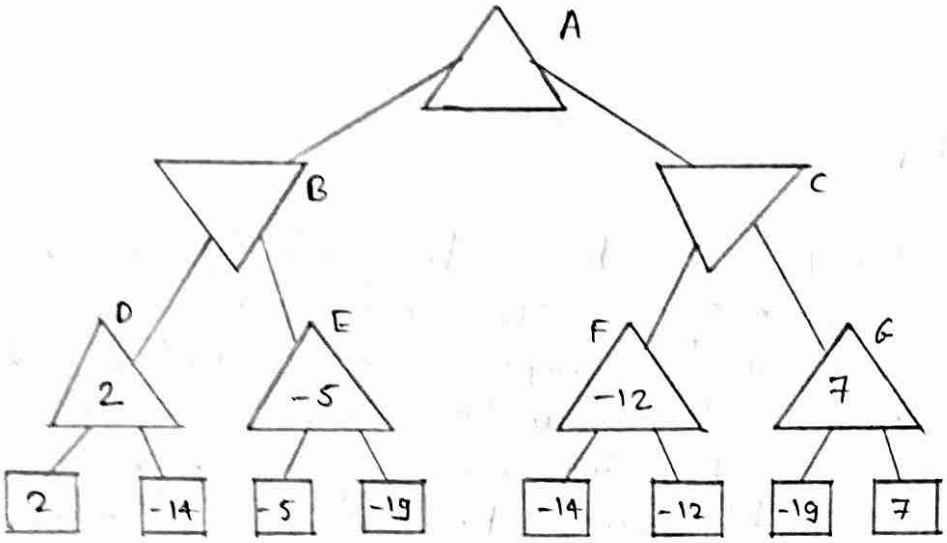
For node G: $\max(-19, -\infty) \Rightarrow \max(-19, 7) = 7$

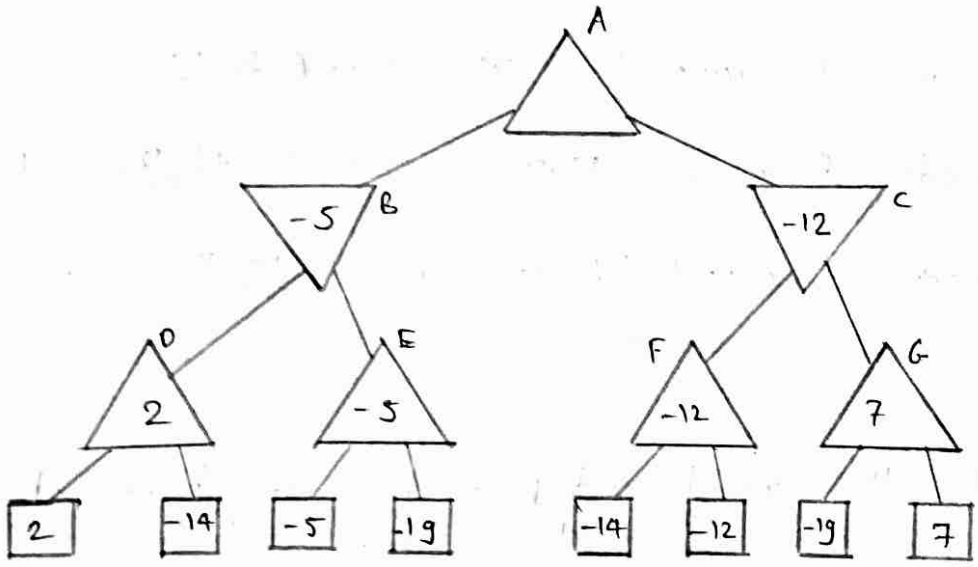
Step 3:

In the next step, it's a turn for minimizer, so it will compare all nodes value with ~~two~~ $+\infty$, & will find the third layer node value.

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

For node C: $\min(-12, 7) = -12$


A
B
C
D
E
F
G
2
-5
-12
7
2
-14
-5
-19
-14
-12
-19
7

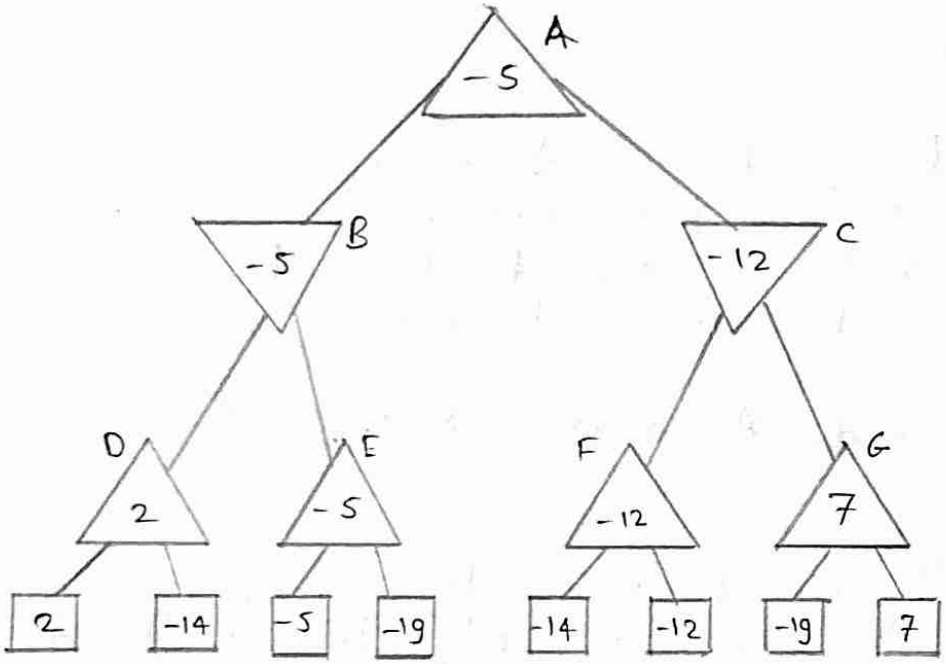

A
-5
B
-12
C
D
E
F
G
2
-5
-12
7
2
-14
-5
-19
-14
-12
-19
7

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 (-5, -12) = -5

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


A
-5
B
-5
C
-12
D
2
E
-5
F
-12
G
7
2
-14
-5
-19
-14
-12
-19
7