Minimax Algorithm :

> Minimax is a kind of Backtracking Algorithm.

> It is used in game theory to find the optimal move for a player.

> It is widely used in two player turn - based games.

Eg :

Chess

Tic - Tac - Toe.

In Minimax Two players are called

=> Max

=> Min.

Max -> highest Value

Min -> Lowest Value.

The Minimax Algorithm proceeds all way down to Terminal node of the tree, then backtrack the tree.

Algorithm For Min-Max :

Minimax (s) =

Utility (s) if terminal in test (s).

Max a ∈ action(s)

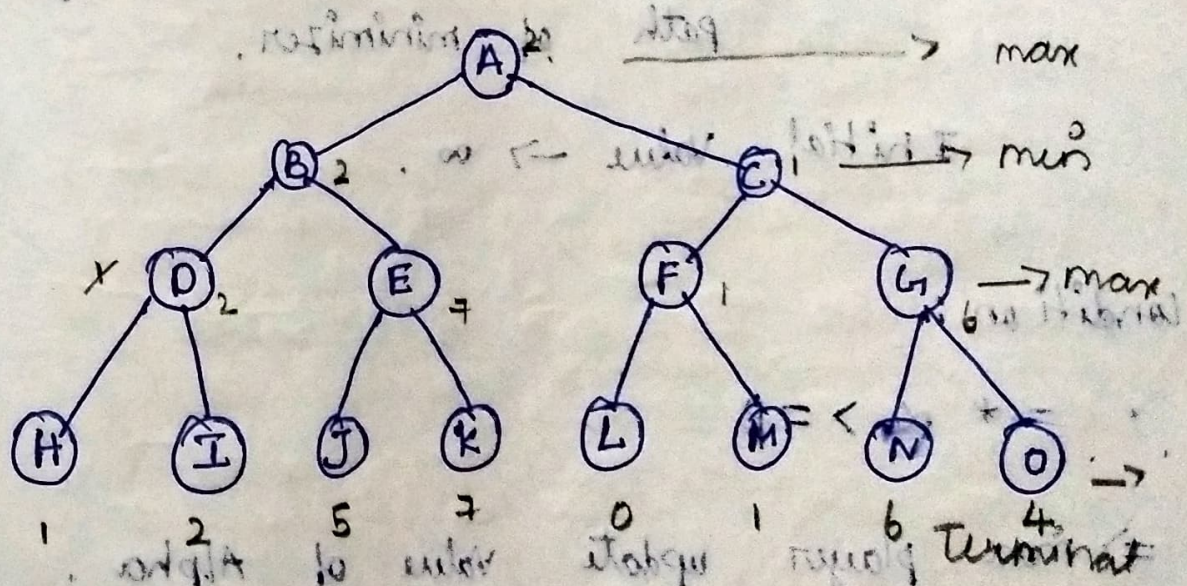
minimax (result (s,a)) If player (s) = max.

Min a ∈ action (s)

minimax (result (s,a)) If player (s) = min.

Example - Game tree :

max = -∞, min = ∞



max (-∞, 1)

max (1, 2) = 2.

Alpha beta pruning:

> Alpha Beta pruning is modified version of minimax Algorithm

> This is the technique by which it does not check each node of the game tree.

> α-β pruning is the pruning (cutting down) of useless branches in decision Trees.

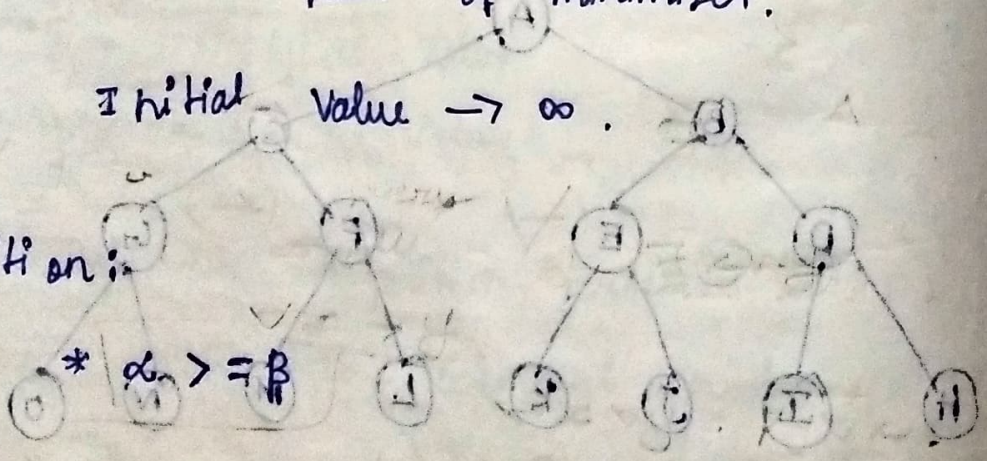
Parameters:

Alpha (α) => highest value choice along path of maximizer.

Initial value → $-\infty$

Beta (β) => Lowest value choice along path of minimizer.

Initial value → ∞.



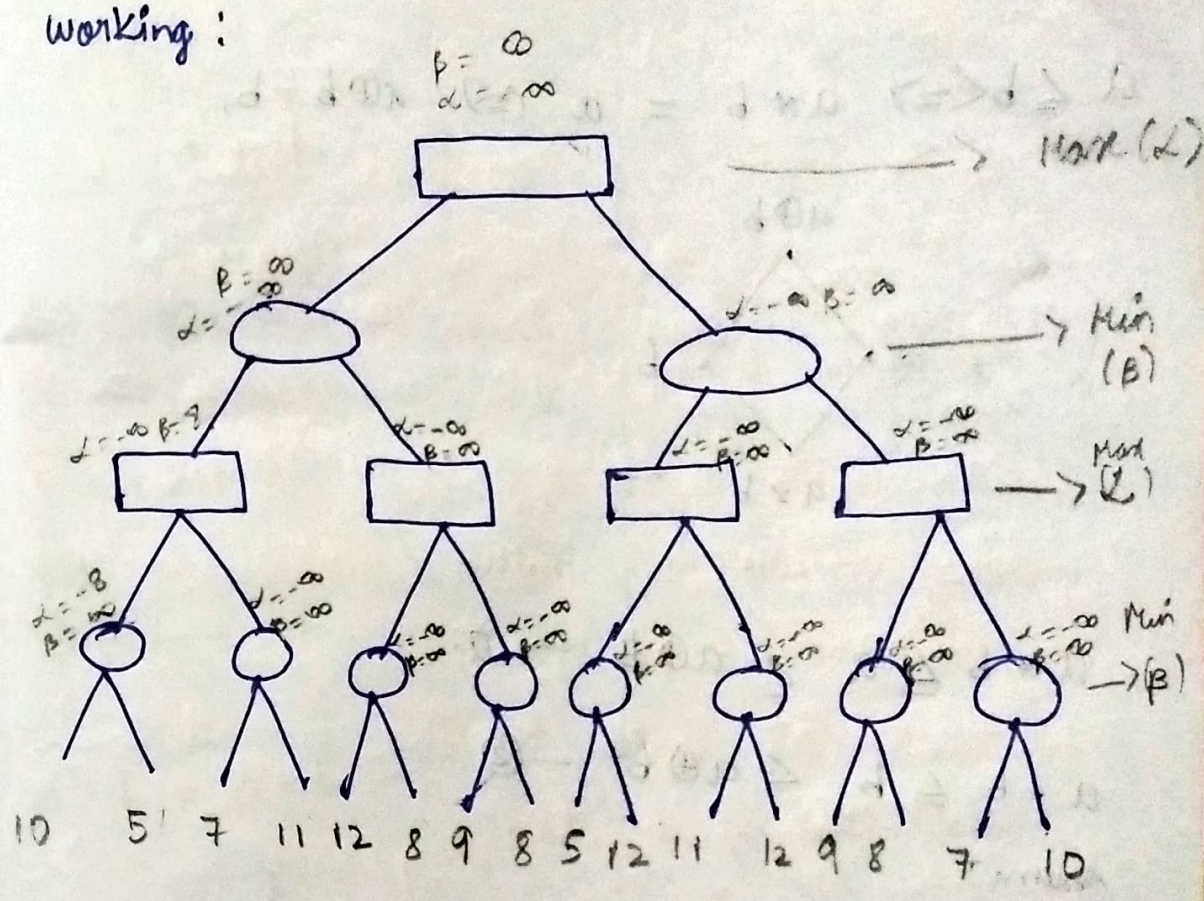
Condition:

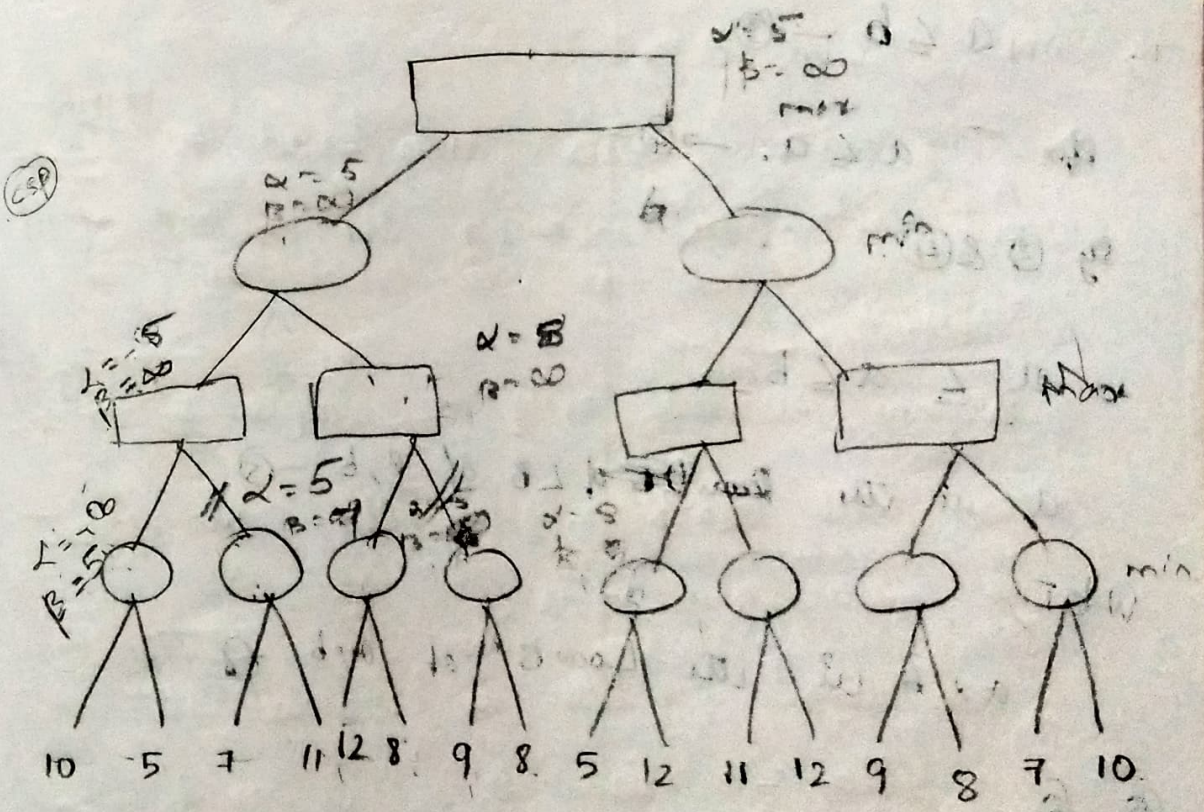
* $\alpha >= \beta$

=> max player update value of Alpha.

=> min player update value of Beta.

Working :





(-∞, 5)

5 | 7

(5, 8)