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Class : BEIT

Subject : ISLAB

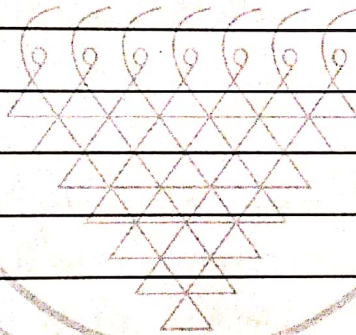
DOP

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Alpha - Beta pruning:

Alpha - Beta pruning is modified version of min max algorithm. It is an optimization technique for minmax algo.

- Alpha ( $\alpha$ ) = The best (highest value)  
= Initial value of alpha is  $-\infty$ .

- Beta ( $\beta$ ) = The best (highest value)  
= Initial value of Beta is  $+\infty$ .

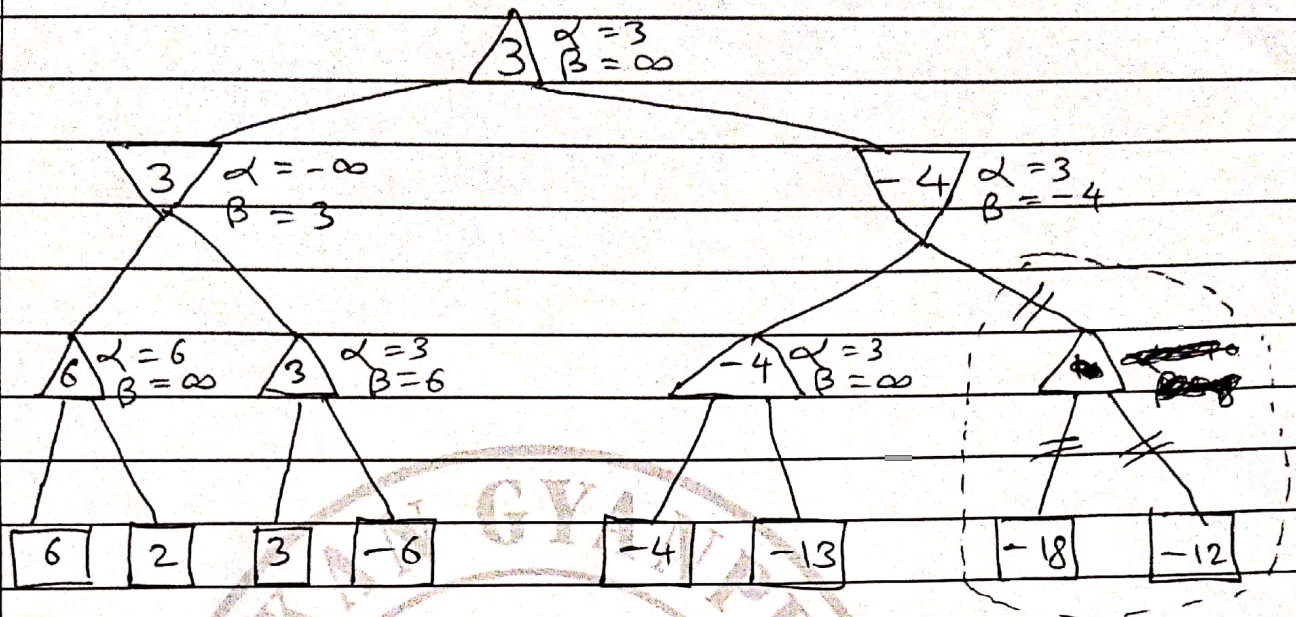
\* Rules and conditions:

- 1) The max player will only update the value of alpha.
- 2) The min player will only update the value of Beta.
- 3) We will only pass the alpha, beta values to child nodes.
- 4) Node values will be passed to upper nodes instead of values of alpha and beta.

Condition to prune :  $a \geq b$  or  $b \leq a$ .

When alpha is greater than ~~its~~ or equal to beta.





1)  $\alpha(-\infty, 6) = 6$

$\alpha(-\infty, 2) = 2$

$\alpha(6, 2) = 6$

- max (Bottom left)

2)  $\beta(\infty, 6) = 6$

- min (left)

3)  $\alpha(-\infty, 3) = 3$

$\alpha(-\infty, -6) = -6$

$\alpha(3, -6) = 3$

- max (Bottom left) (left node)

4)  $\alpha(3, -4) = -4$

- Top (max)

5)  $\beta(6, 3) = 3$

- Top Min (right)

6)  $\beta(-\infty, 3) = 3$

- Max (Bottom Right) (right node)



$$\begin{aligned} 7) \alpha(3, -4) &= 3 \\ \alpha(3, -13) &= 3 \\ \alpha(-4, -19) &= -4 \end{aligned}$$

$$8) \beta(\infty, -13) = -13 \quad \text{min (right)}$$

$$\alpha = 3$$

$$\beta = -4$$

$\alpha \geq \beta$ , so the next node is pruned

$$9) \alpha = 3 \quad \text{Max}$$

$$\beta = \infty$$

$$\alpha(3, -4) = 3 \quad \text{Solution}$$

# Alpha-Beta Pruning Practice

$\alpha\beta$  Cutoff

Start Animation

Depth - +

Branching Factor - +

Swap Min/Max Regenerate Tree

Reset Tree Show Solution

Check Answer Correct!

