Alpha-beta

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DoP	DoA	Marks	Sign

Alpha-Beta pruning:

⇒ Alpha Beta pruning = Alpha beta pruning is modified version of min max algo. It is an optimization technique for minmax algo.

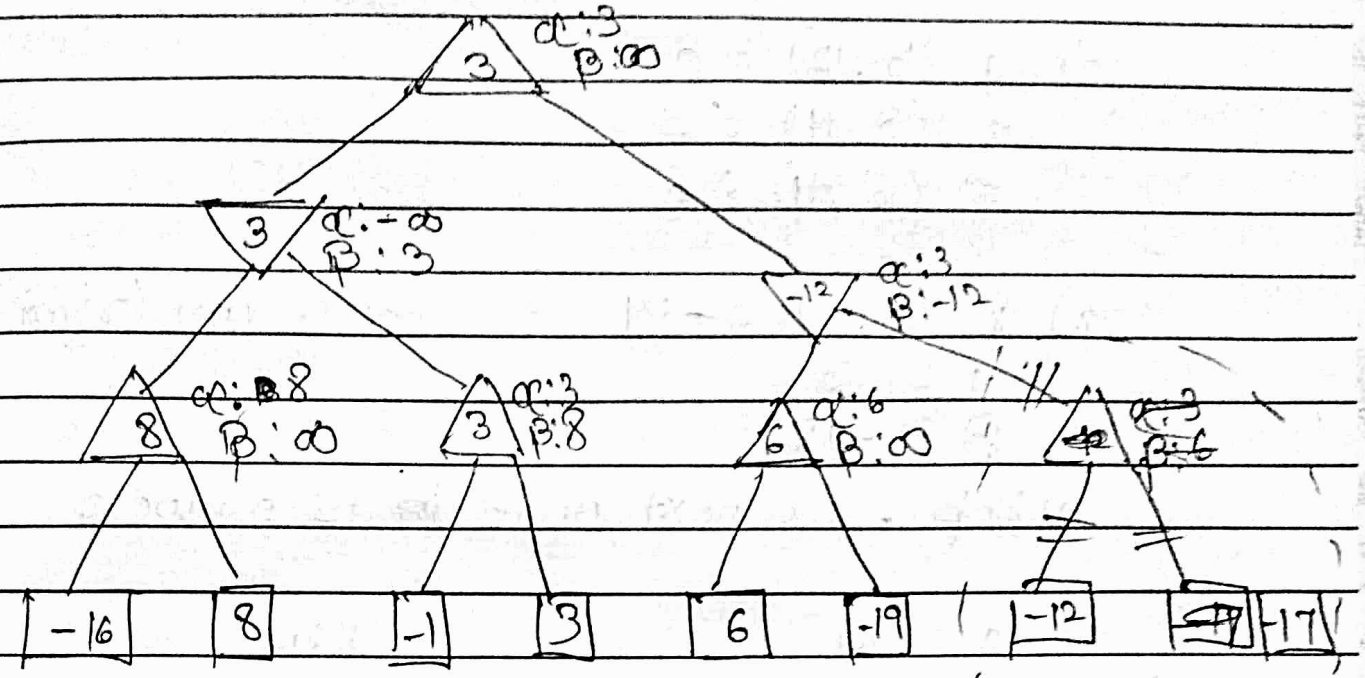
- Alpha (α) = The best (highest value).
  = Initial value of alpha is $-\infty$.

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

* Rules & Conditions:
1) Max player will only update value of Alpha.
2) Min player will only update value of β.
3) We will only pass alpha beta values to child nodes.
4) Node values will be passed to upper nodes of values of alpha and beta.

- Condition : $a \geq b$ or $b \leq a$.

- When alpha is greater than or equal to beta.



1) ~~α~~

1) $\alpha(-\infty, -16) = -16$
   $\alpha(-\infty, 8) = 8$
   $\alpha(-16, 8) = 8$
   - Max (Bottom left)

2) $\beta(\infty, -16) = -16$
   - Min (left)

3) $\alpha(-\infty, -1) = -1$
   $\alpha(-\infty, 3) = 3$
   $\alpha(-1, 3) = 3$
   - Max (Bottom left) (left node)

4) $\alpha(3, -12) \infty$
   - Top (max)

5) $\beta(8, 3) = 3$
   - Min (right)

6) β ~~$(-\infty$~~ $(-\infty, 3) = 3$
   - Max (Bottom right (right node)

7) $\alpha(3,12) = 3$

$\alpha(3,19) = 3$

$\alpha(6,19) = 6$

8) $\beta(\alpha, 19) = -19$ — min(right)

$\alpha = 3$

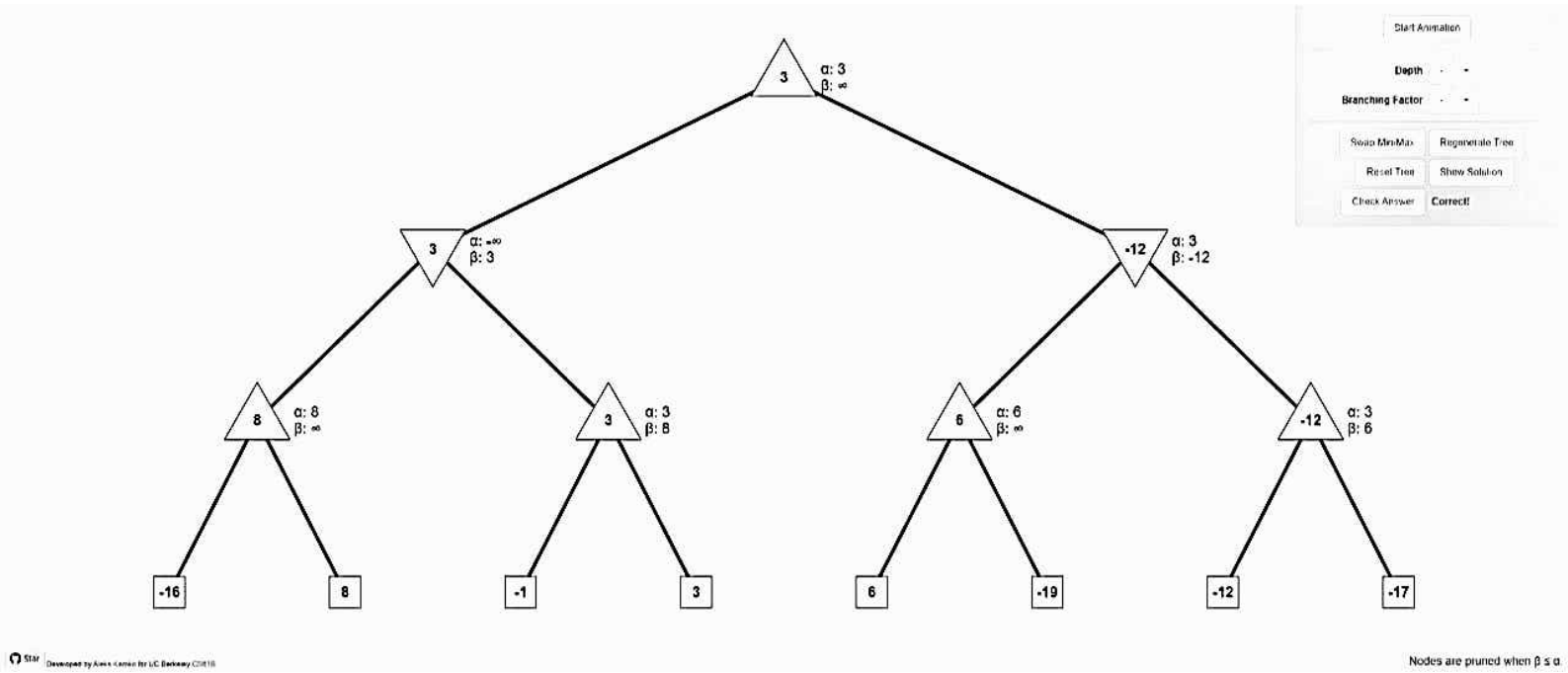
$\beta = -12$

$\alpha \geq \beta$. So next node is pruned.

9) $\alpha = 3$ Max

$\beta = \infty$

$\alpha(3,12) = 3$ Soluth.


Start Animation
Depth - +
Branching Factor - +
Swap MinMax
Regenerate Tree
Reset Tree
Show Solution
Check Answer
Correct!
3
α: 3
β: ∞
3
α: -∞
β: 3
-12
α: 3
β: -12
8
α: 8
β: ∞
3
α: 3
β: 8
6
α: 6
β: ∞
-12
α: 3
β: 6
-16
8
-1
3
6
-19
-12
-17
Star
Developed by Alex Kamen for UC Berkeley CS188
Nodes are pruned when β ≤ α