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Date

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Class :- BE - IT

Subj. :- ISLAB

(2) Alpha - Beta Pruning :-

Alpha-Beta Pruning :-

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

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

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

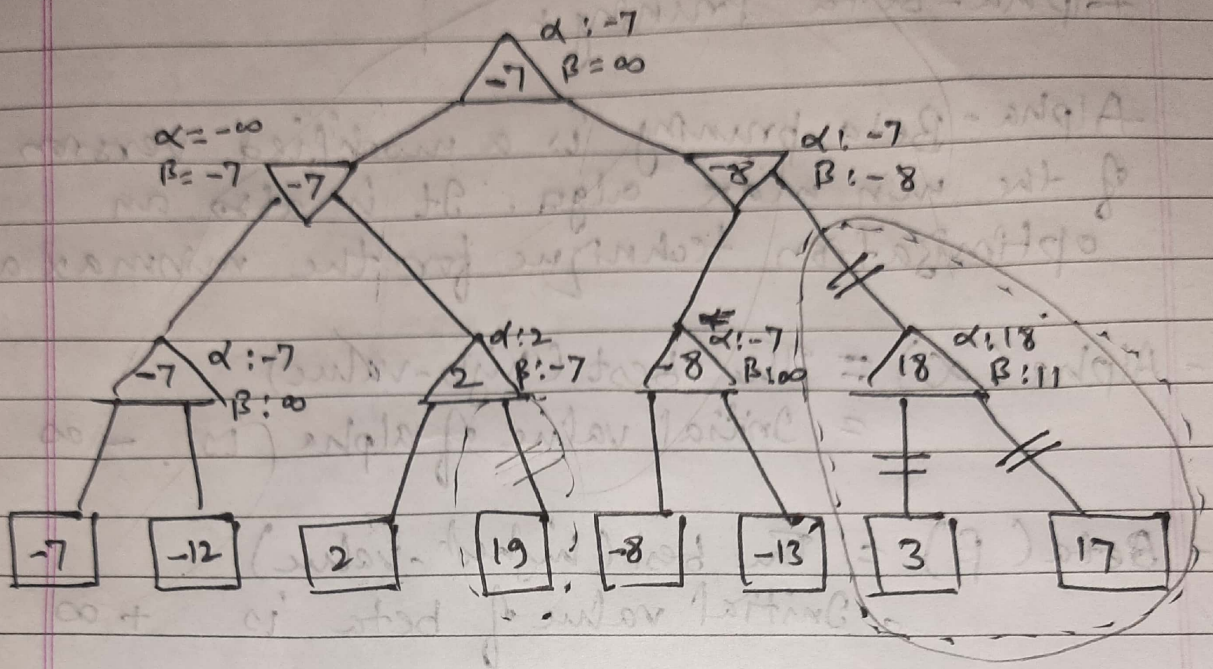
→ Rules & conditions:

1) The MAX player will only update the value of α.
2) The MIN player will only update the value of β.
3) We will only pass the alpha, beta values to the child nodes.
4) Node values will be passed to upper nodes instead of α, β values.

- condition of prune : $\alpha \leq \beta$ or $\beta \leq \alpha$.

Now,

when α is greater than equal to β.



1) $\alpha(-\infty, -7) = -7$
$\alpha(-\infty, -12) = -12$
$\alpha(-7, -12) = -7$

~~α (Max (Bottom~~

— MAX (Bottom left)

2) $\beta(\infty, -7) = -7$

— MIN (left)

3) $\alpha(-\infty, 2) = 2$
$\alpha(-\infty, 19) = 19$
$\alpha(2, 19) = 19$

— MAX (Bottom left) (left node)

4) $\alpha(-7, -8)$

— Top (MAX)

5) $\beta(-7, 2) = -7$

- MIN (right)

6) $\beta(-\infty, -8) = -8$

— MAX (Bottom right) (right node)

7) $\alpha(-7, -8) = -7$

$\alpha(-7, -13) = -7$

$\alpha(-8, -13) = -8$

8) $\beta = (\infty, -13) \leq -13$ — MIN (right)

$\alpha = -7$

$\beta = -8$

$\boxed{\alpha \geq \beta}$

So, the next node is pruned.

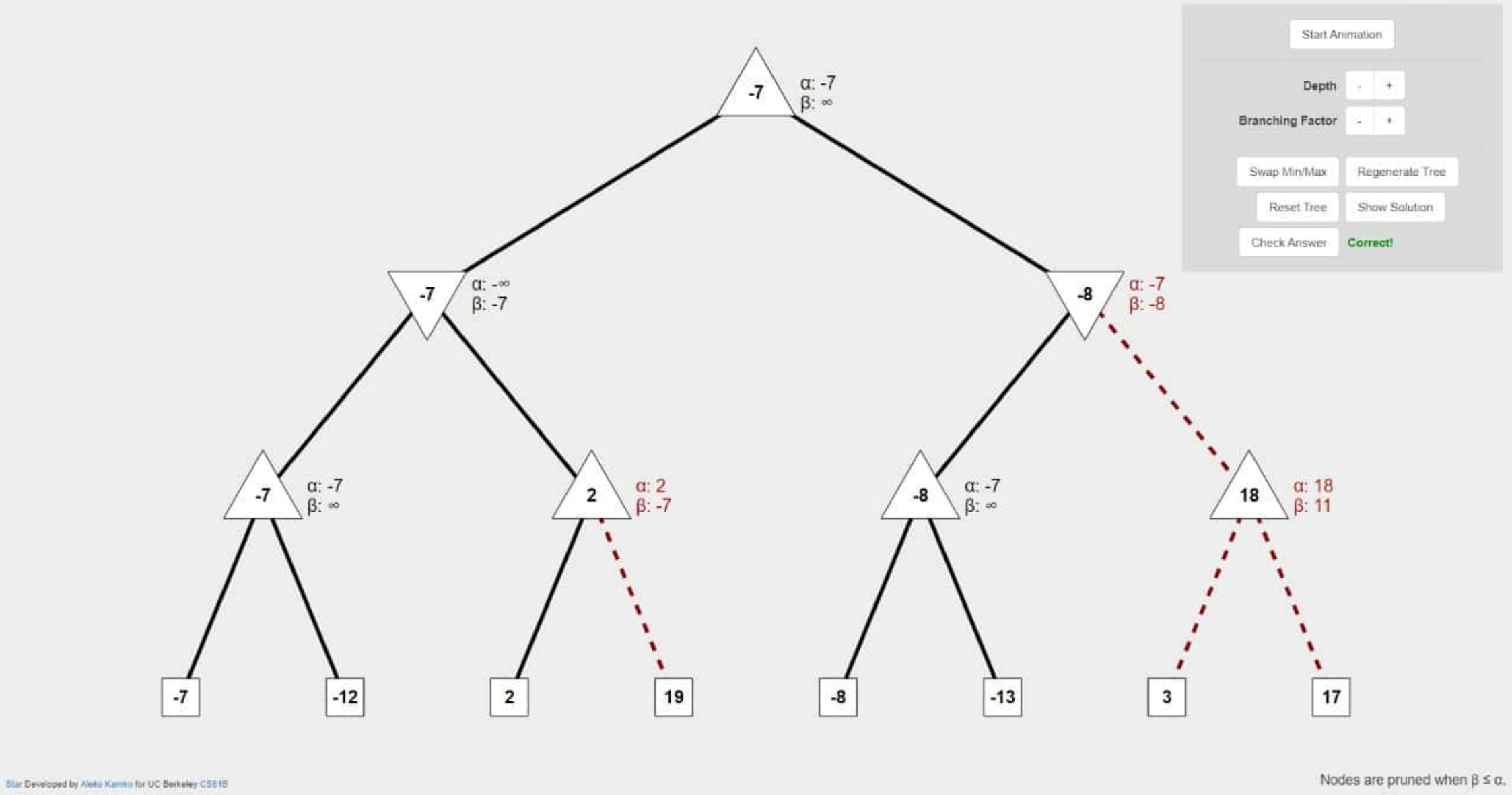
9) $\alpha = -7$ — MAX

$\beta = \infty$

$\alpha(-7, -8) = -7$ ——— (Solution).

Alpha-Beta Pruning Practice

αβ Cutoff



Star Developed by Aleks Kamko for UC Berkeley CS61B

Nodes are pruned when $\beta \leq \alpha$.