K.G.C.E.
Karjat - Raigad

AI Alpha-Beta Pruning.

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D.O.P.	D.O.A.	Sign	Remark

* Alpha - Beta Pruning:

a) Alpha - Beta pruning is a modified version of the min-max algo. It is an optimization ~~tor~~ ~~tuning~~ recursive for the min-max algorithm.

b) Alpha (α) = The First (high-value)
- Initial value of alpha is -∞.

c) Beta (β) = The First (highest-value)
- Initial value of beta is +∞.

d) Rules & condition:

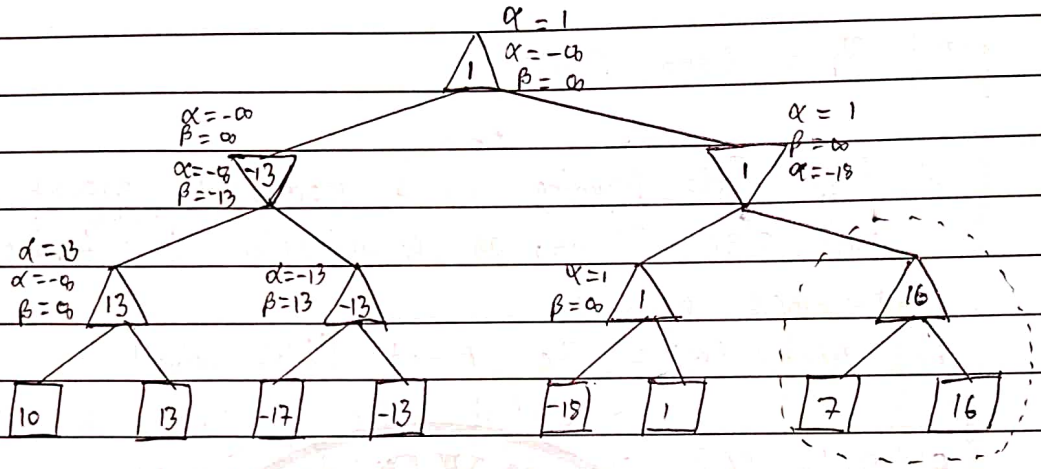
(i) The max player will only update the value of alpha.

(ii) The min player will only update the value of beta.

(iii) We will only pass the alpha, beta values to child nodes.

(iv) Node values will be passed to upper nodes instead of values of alpha & beta.

* Condition to prune: a >= b or b <= a ~~ner~~
- when alpha is greater than or equal to beta.



a) $\alpha(-\infty, 10) = 10$

$\alpha(-\infty, 13) = 13$ - max (Bottom left)

$\alpha(10, 13) = 13$

b) $\beta(\infty, 13) = 13$ - min (Left)

c) $\alpha(-\infty, -17) = -17$

$\alpha(-\infty, -13) = -13$ - max (Bottom left node)

$\alpha(-17, -13) = -13$

d) $\alpha(-13, 1) = 1$ - Top (max)

e) $\beta(13, \infty) = 1$ - min (right

f) $\beta(+\infty, 1) = 1$ - max (Bottom right)

g) $\alpha(1, 1) = 1$

$\alpha(1, -18) = 1$

h) $\beta(\infty, -18) = -18$

$\alpha = 1$, $\beta = -18$ - min (right).

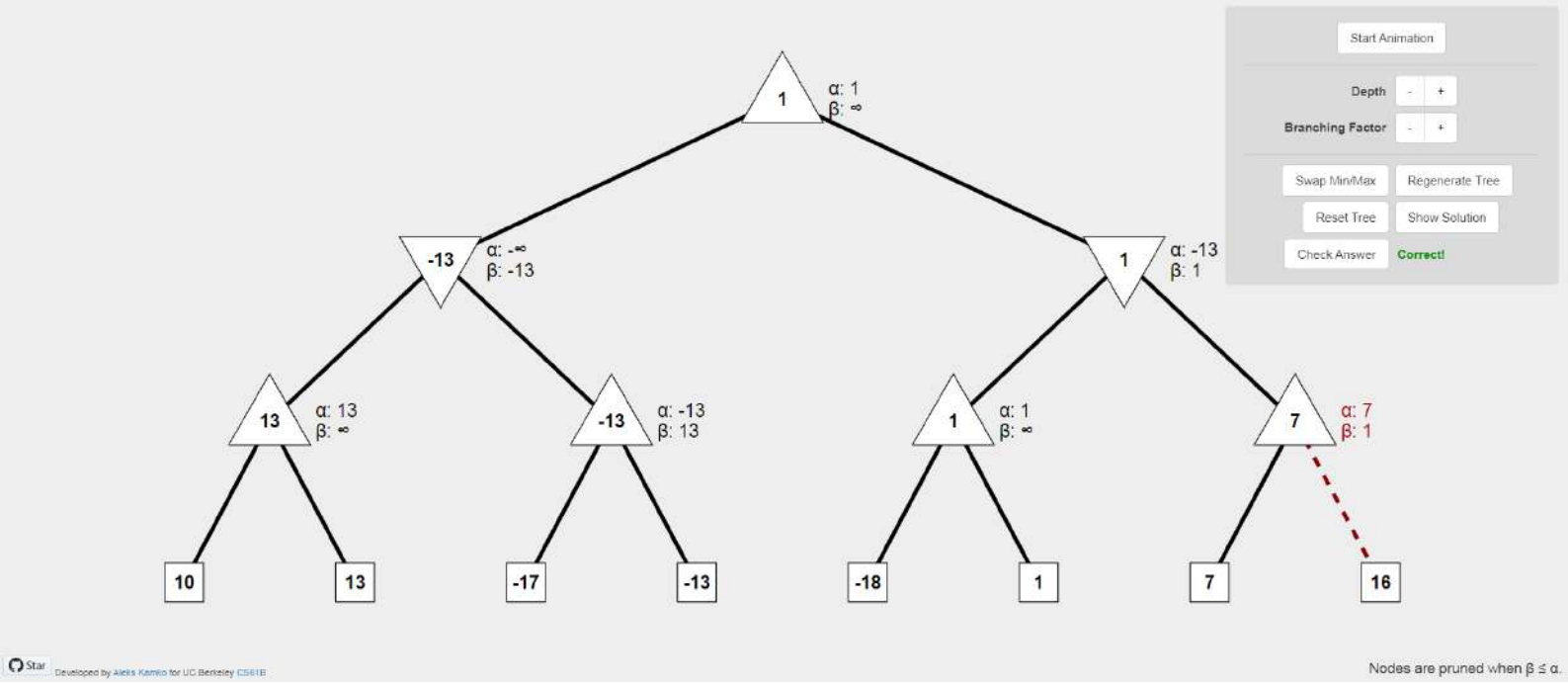
$\therefore \alpha \geq \beta$ so the node is pruned.

i) i.e. $\alpha = 1$, $\beta = \infty$

$\therefore \alpha(1, 1) = 1$ is the solution.

Alpha-Beta Pruning Practice

αβ Cutoff



Star Developed by Aleks Kamko for UC Berkeley CS61B

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