

ALPHA BETA PRUNING

function alpha-beta-search (state) returns actions

$V \leftarrow \text{max-value}(\text{state}, -\infty, +\infty)$

return an action in $\text{Actions}(\text{state})$ with value V

function max-value (state, α , β) returns utility value

if terminal-test (state) return utility (state)

$V \leftarrow -\infty$

each
for a in $\text{Actions}(\text{state})$ do

$V \leftarrow \text{max-value}(V, \text{min-value}(\text{result}(s, a), \alpha, \beta))$

if $V \geq \beta$ return V

$\alpha \leftarrow \text{max}(\alpha, V)$

return V

function min-value (state, α , β) returns utility value

if terminal-test (state) then return utility (state)

$V \leftarrow +\infty$

for each a in $\text{Actions}(\text{state})$ do
 $V \leftarrow \text{min-value}(C_r, \text{max-value}(\text{result}(s, a), \alpha, \beta))$
 if $V \leq \alpha$ return V
 $\beta \leftarrow \min(\beta, V)$

return V

$$q \vdash V \wedge r \vdash V \equiv (q \wedge r) \vdash V$$

$$q \vdash V \wedge r \vdash V \equiv (q \vee r) \vdash V$$

$$q \vdash A \vee r \vdash A \equiv (q \vee r) \vdash A$$

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