

# Alpha beta pruning

## Algorithm

function Alpha-Beta-Search (state) returns an action

$V \leftarrow \text{Max-Value}(\text{state}, -\infty, +\infty)$

return the action in Actions(state) with Value  $V$

function Max-Value (state,  $\alpha, \beta$ ) returns a Utility Value

if Terminal-Test(state) then return UTILITY(state)

$V \leftarrow -\infty$

for each  $a$  in Actions (state) do

$V \leftarrow \text{Max}(V, \text{Min-Value}(\text{Result}(s, a), \alpha, \beta))$

if  $V \geq \beta$  then return  $V$

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

return  $V$

function MIN-VALUE (state,  $\alpha, \beta$ ) returns a Utility Value

if TERMINAL-Test(state) then return UTILITY (state)

$V \leftarrow +\infty$

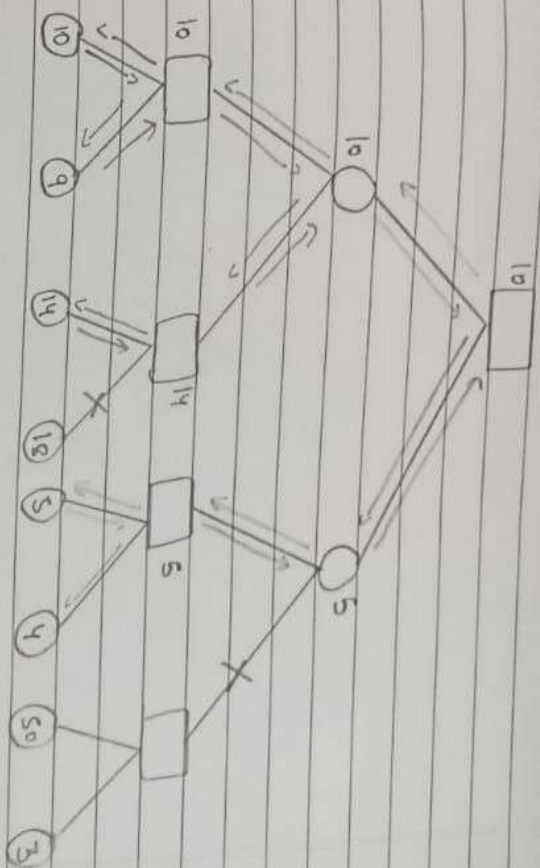
for each  $a$  in Actions (state) do

$V \leftarrow \text{Min}(V, \text{Max-Value}(\text{Result}(s, a), \alpha, \beta))$

if  $V \leq \alpha$  then return  $V$

$\beta \leftarrow \text{Min}(\beta, V)$

return  $V$



## Output

Enter leaf node values separated by spaces: 10 9 14 18 5

Enter the maximum depth of the tree: 3

The optimal value is: 10

17/12/24