

CS 331: Artificial Intelligence

Alpha-Beta Practice

ALPHA-BETA Pseudocode

```

function ALPHA-BETA-SEARCH(state) returns an action
  inputs: state, current state in game
  v ← MAX-VALUE(state, -∞, +∞)
  return the action in SUCCESSORS(state) with value v

function MAX-VALUE(state, α, β) returns a utility value
  inputs: state, current state in game
  α, the value of the best alternative for MAX along the path to state
  β, the value of the best alternative for MIN along the path to state

  if TERMINAL-TEST(state) then return UTILITY(state)
  v ← -∞
  for a, s in SUCCESSORS(state) do
    v ← MAX(v, MIN-VALUE(s, α, β))
    if v ≥ β then return v
    α ← MAX(α, v)
  return v
    
```

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ALPHA-BETA Pseudocode

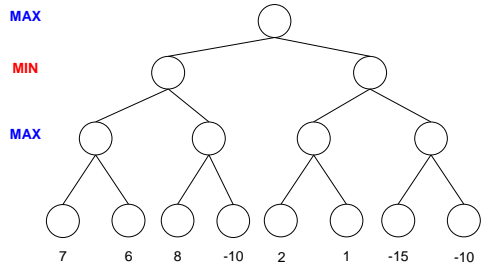
```

function MIN-VALUE(state, α, β) returns a utility value
  inputs: state, current state in game
  α, the value of the best alternative for MAX along the path to state
  β, the value of the best alternative for MIN along the path to state

  if TERMINAL-TEST(state) then return UTILITY(state)
  v ← +∞
  for a, s in SUCCESSORS(state) do
    v ← MIN(v, MAX-VALUE(s, α, β))
    if v ≤ α then return v
    β ← MIN(β, v)
  return v
    
```

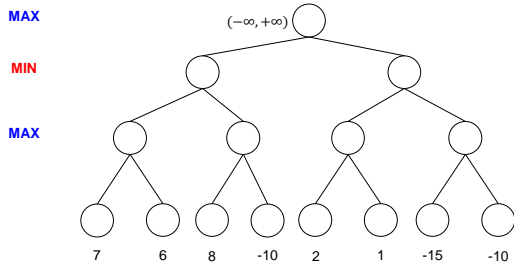
3

Run Alpha-Beta Pruning



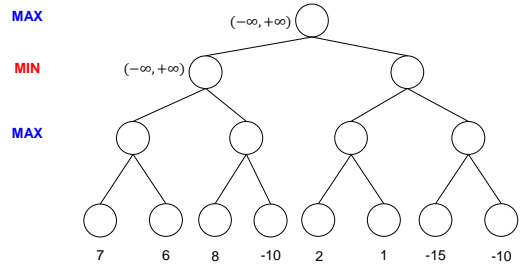
4

Solution



5

Solution



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