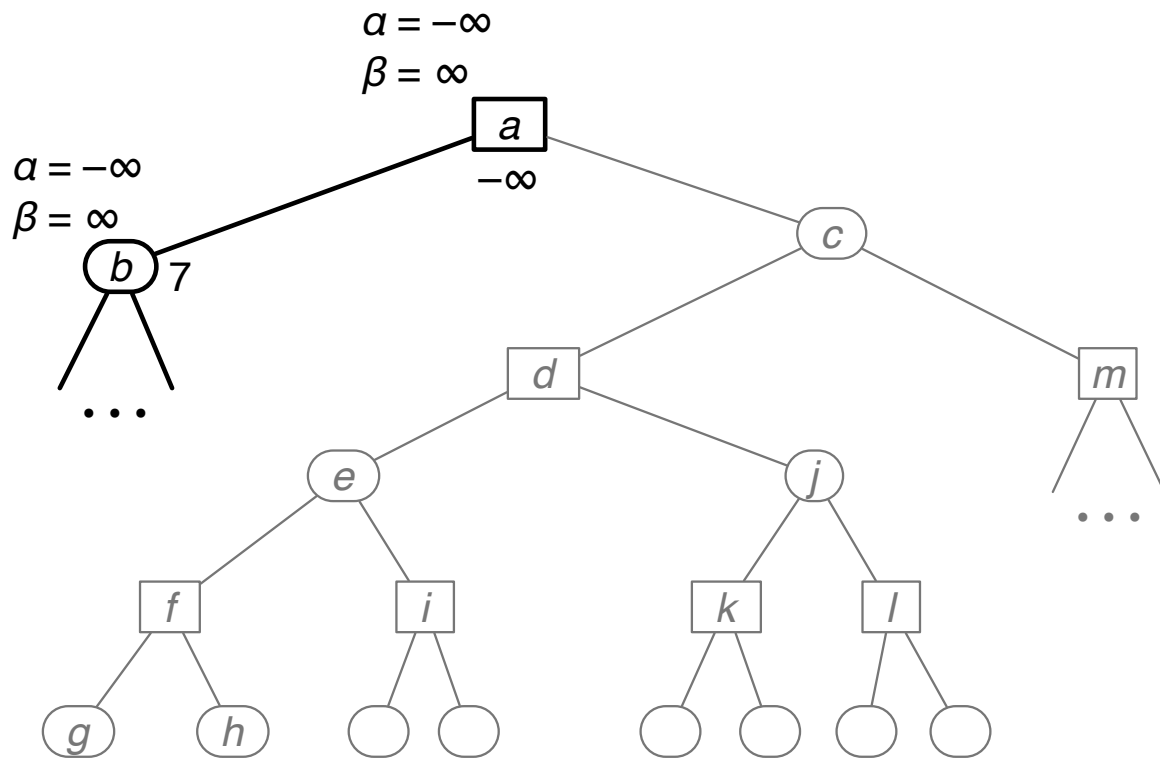


```

function Alpha-Beta( $h, d, \alpha, \beta$ )
  if  $h \in Z$  then return  $u(h)$ 
  else if  $d = 0$  then return  $e(h)$ 
  else if  $\rho(h) = \text{Max}$  then
     $v \leftarrow -\infty$ 
    for every  $a \in \chi(h)$  do
       $v \leftarrow \max(v, \text{Alpha-Beta}(\sigma(h, a), d-1, \alpha, \beta))$ 
      if  $v \geq \beta$  then return  $v$  //  $\beta$  cutoff
      else  $\alpha \leftarrow \max(\alpha, v)$ 
    return  $v$ 
  else
     $v \leftarrow \infty$ 
    for every  $a \in \chi(h)$  do
       $v \leftarrow \min(v, \text{Alpha-Beta}(\sigma(h, a), d-1, \alpha, \beta))$ 
      if  $v \leq \alpha$  then return  $v$  //  $\alpha$  cutoff
      else  $\beta \leftarrow \min(\beta, v)$ 
    return  $v$ 

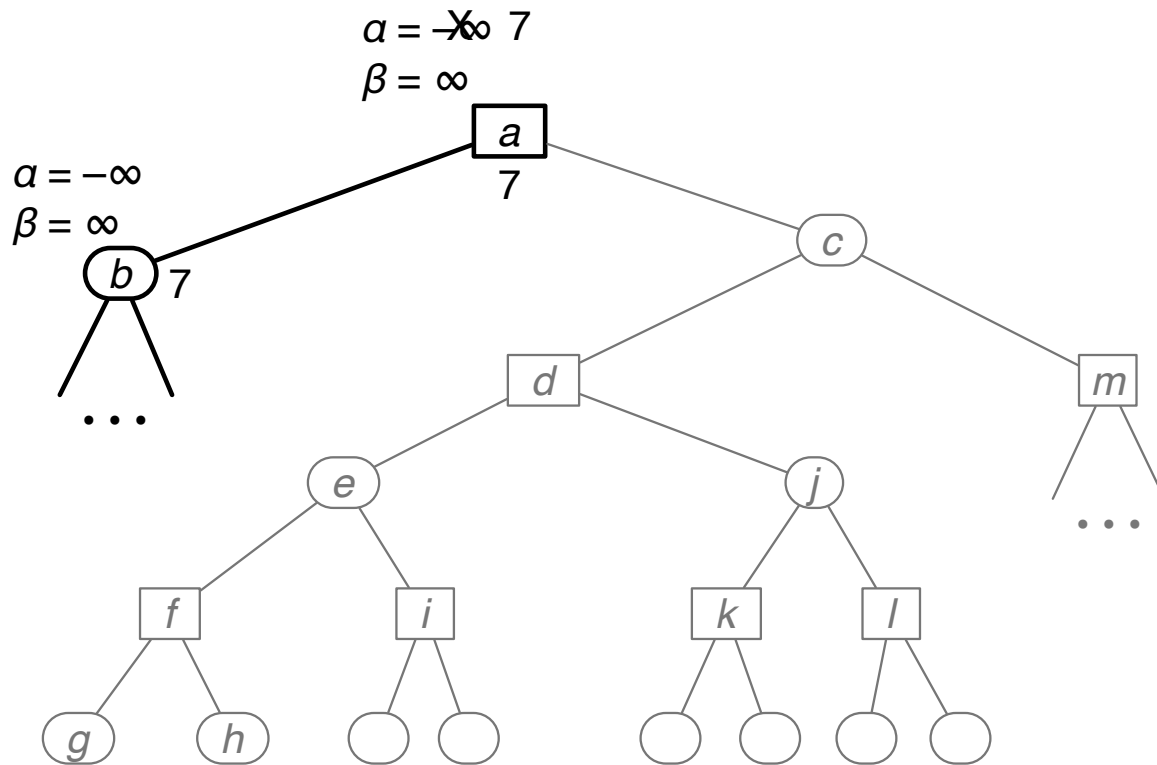
```



```

function Alpha-Beta( $h, d, \alpha, \beta$ )
  if  $h \in Z$  then return  $u(h)$ 
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    return  $v$ 

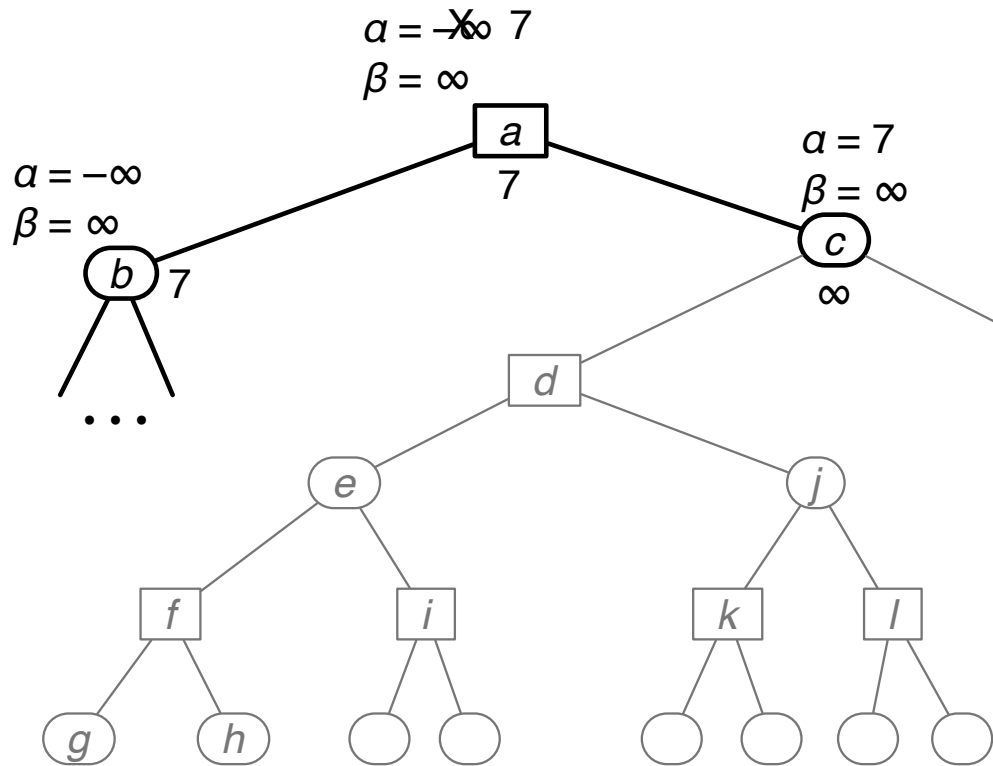
```



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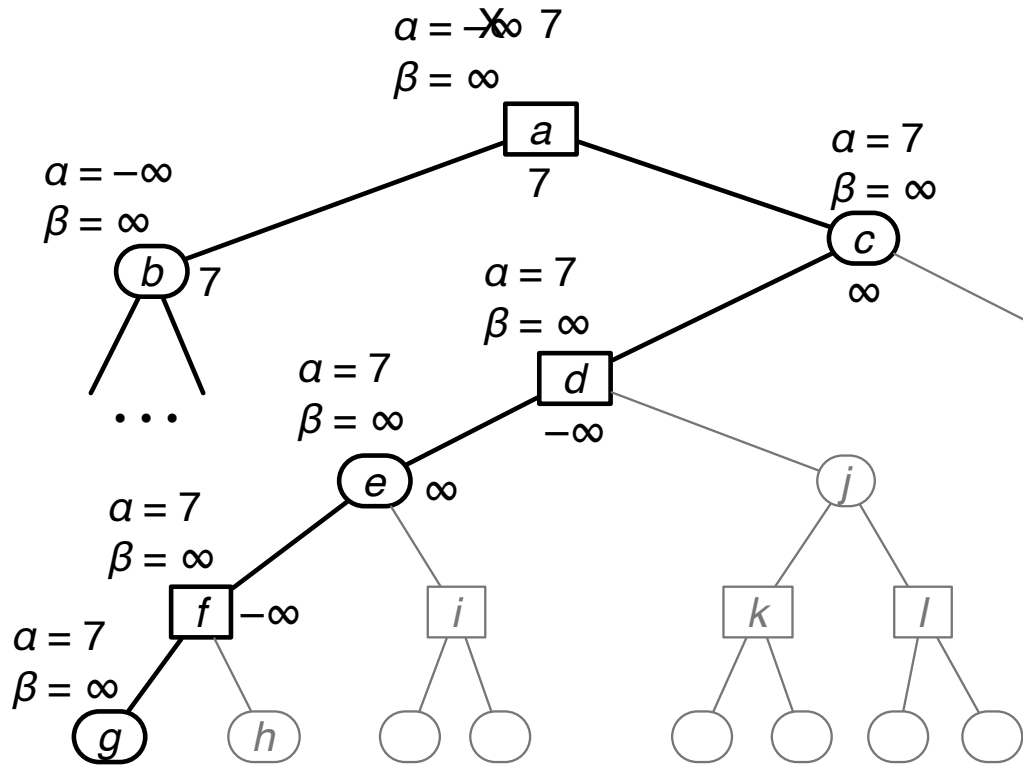
```



```

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      else  $\beta \leftarrow \min(\beta, v)$ 
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```



function Alpha-Beta(h, d, α, β)

if $h \in Z$ then return $u(h)$

else if $d = 0$ then return $e(h)$

else if $\rho(h) = \text{Max}$ then

$v \leftarrow -\infty$

for every $a \in \chi(h)$ do

$v \leftarrow \max(v, \text{Alpha-Beta}(\sigma(h, a), d-1, \alpha, \beta))$

if $v \geq \beta$ then return v // β cutoff

else $\alpha \leftarrow \max(\alpha, v)$

return v

else

$v \leftarrow \infty$

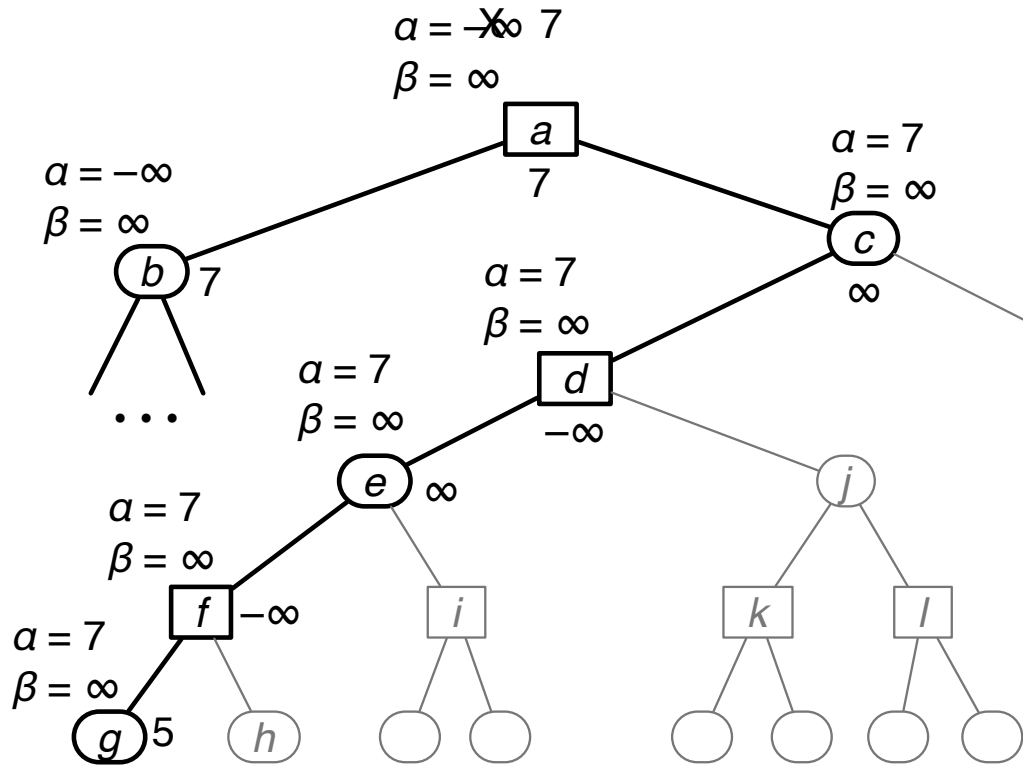
for every $a \in \chi(h)$ do

$v \leftarrow \min(v, \text{Alpha-Beta}(\sigma(h, a), d-1, \alpha, \beta))$

if $v \leq \alpha$ then return v // α cutoff

else $\beta \leftarrow \min(\beta, v)$

return v



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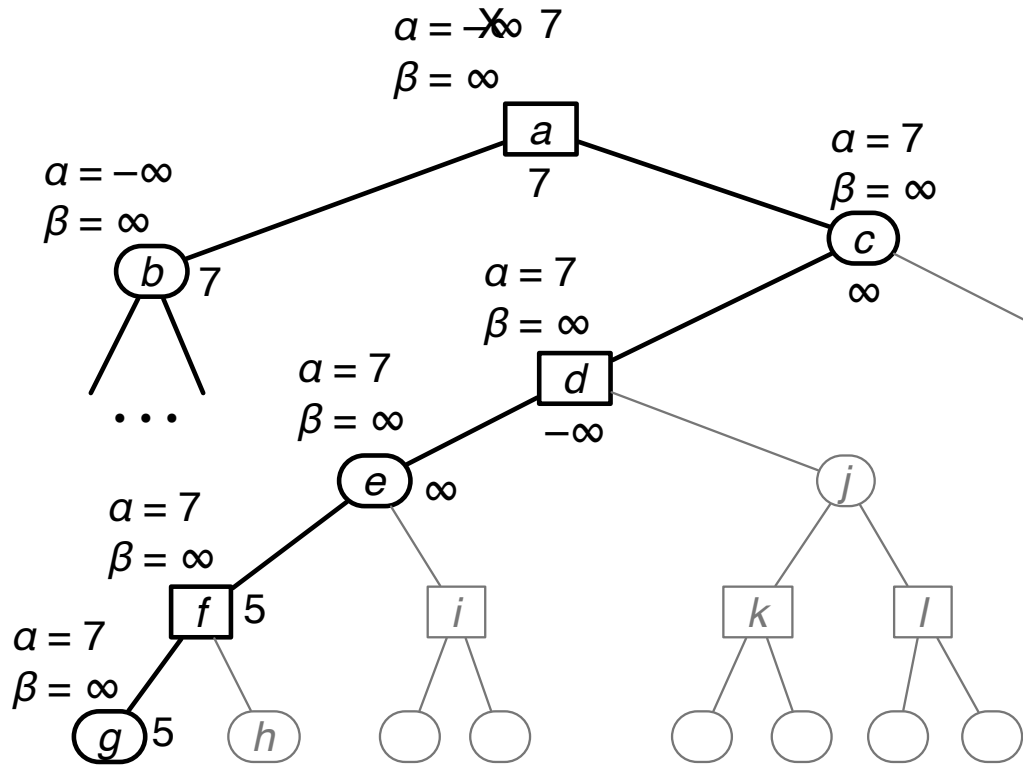
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$v \leftarrow \min(v, \text{Alpha-Beta}(\sigma(h, a), d-1, \alpha, \beta))$

if $v \leq \alpha$ then return v // α cutoff

else $\beta \leftarrow \min(\beta, v)$

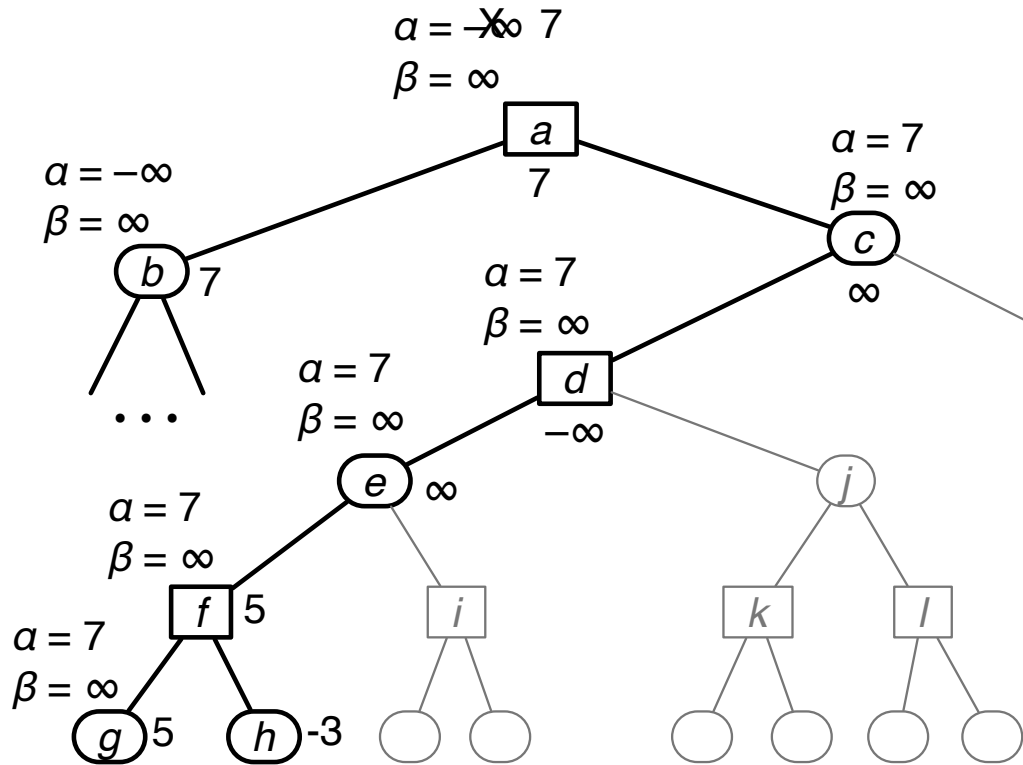
return v



```

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$v \leftarrow -\infty$

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if $v \geq \beta$ then return v // β cutoff

else $\alpha \leftarrow \max(\alpha, v)$

return v

else

$v \leftarrow \infty$

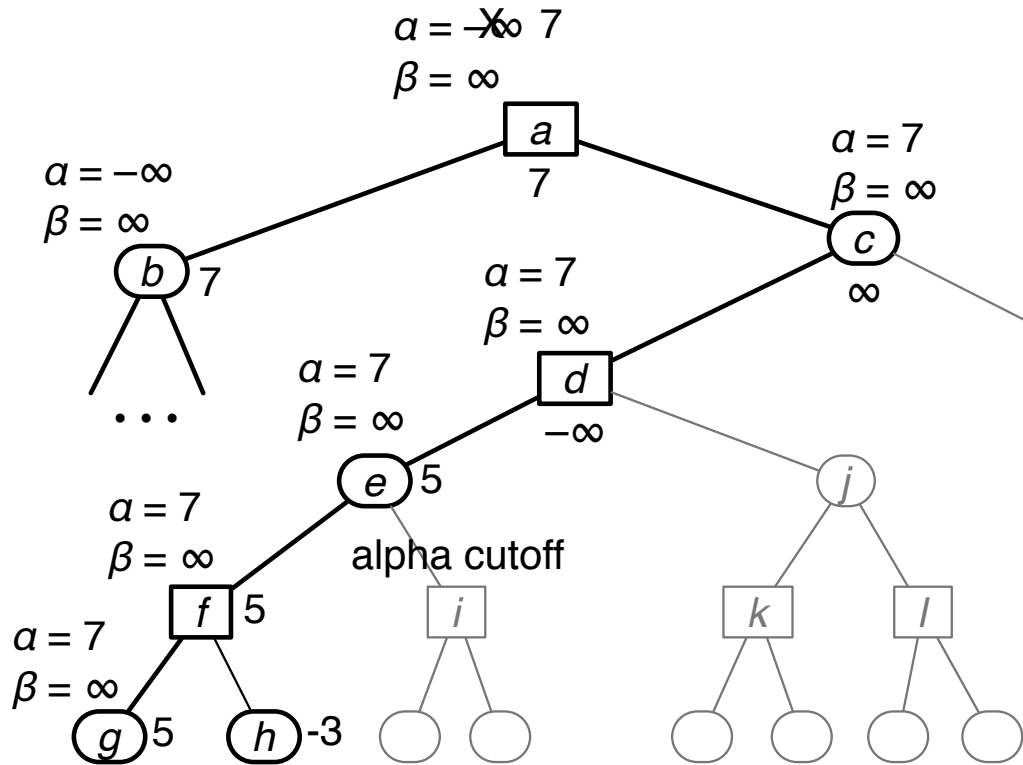
for every $a \in \chi(h)$ do

$v \leftarrow \min(v, \text{Alpha-Beta}(\sigma(h, a), d-1, \alpha, \beta))$

if $v \leq \alpha$ then return v // α cutoff

else $\beta \leftarrow \min(\beta, v)$

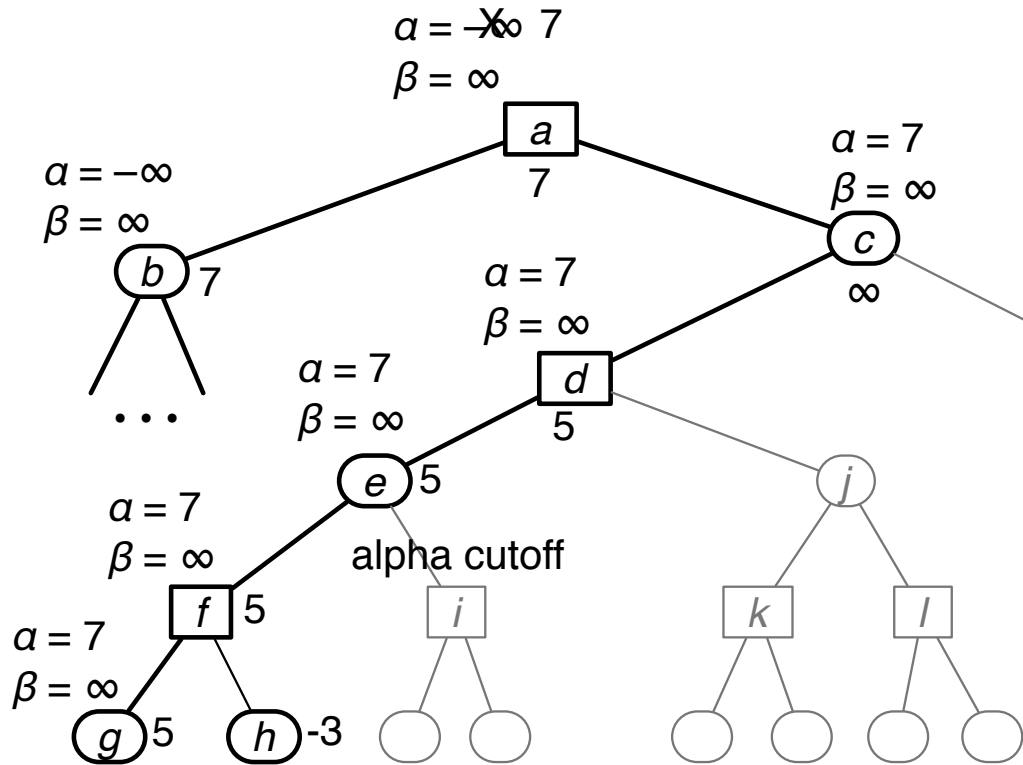
return v



```

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  if  $h \in Z$  then return  $u(h)$ 
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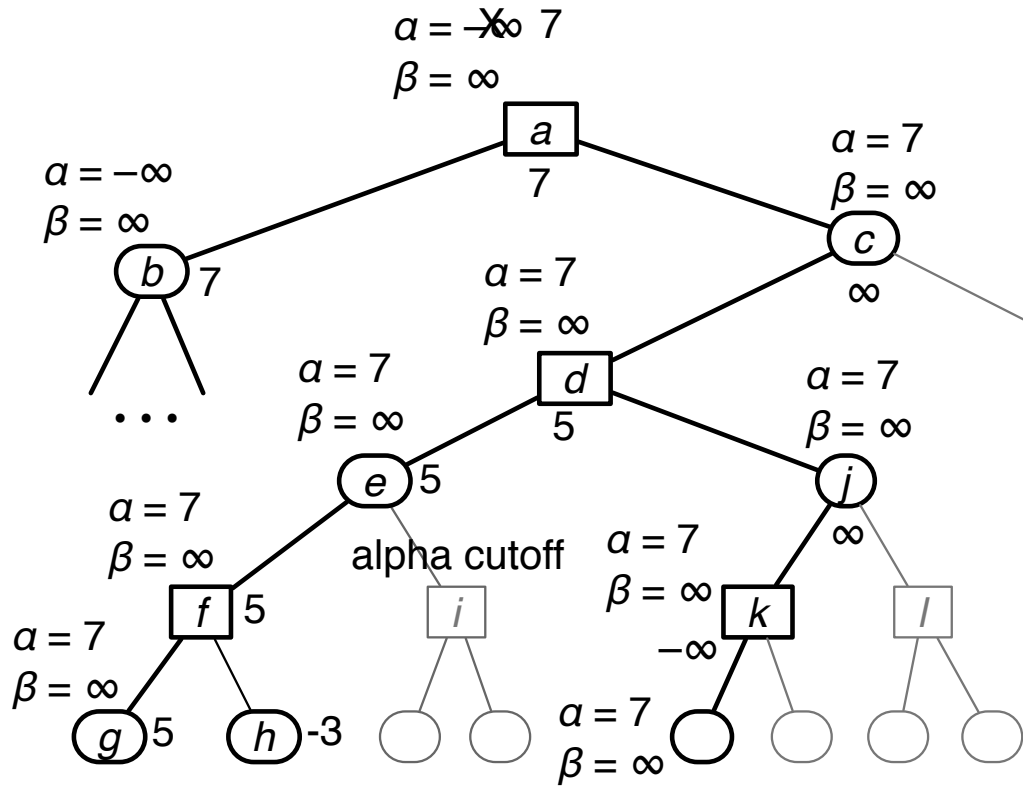
```



```

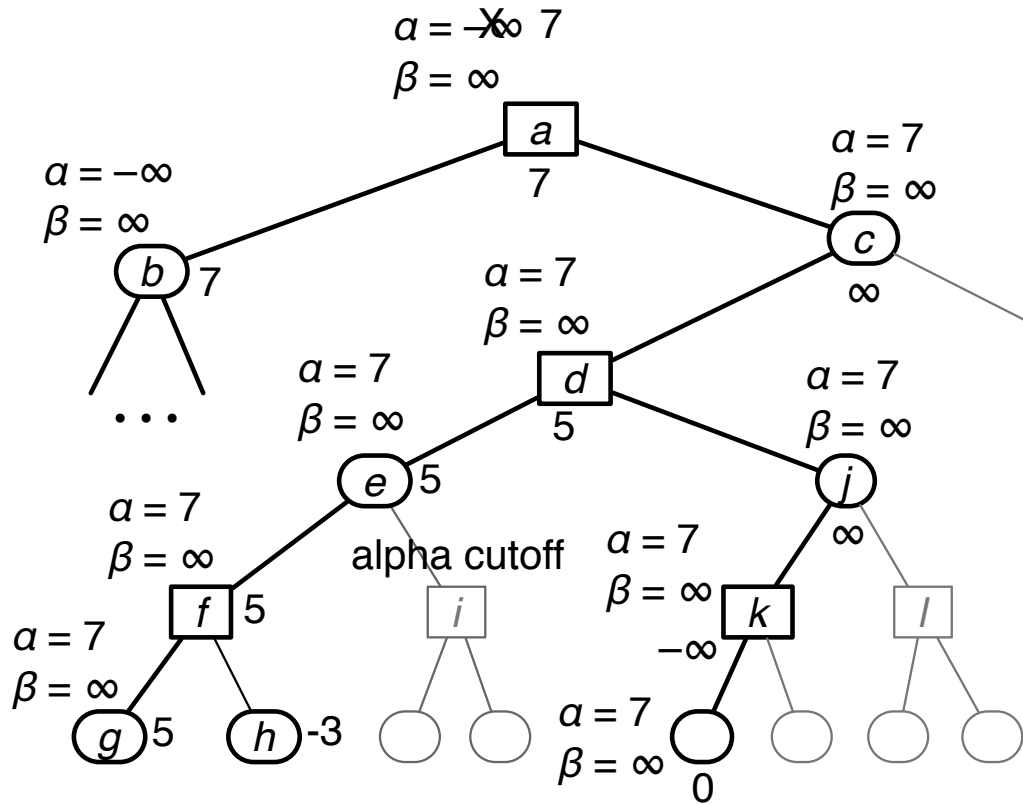
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      else  $\beta \leftarrow \min(\beta, v)$ 
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```



```

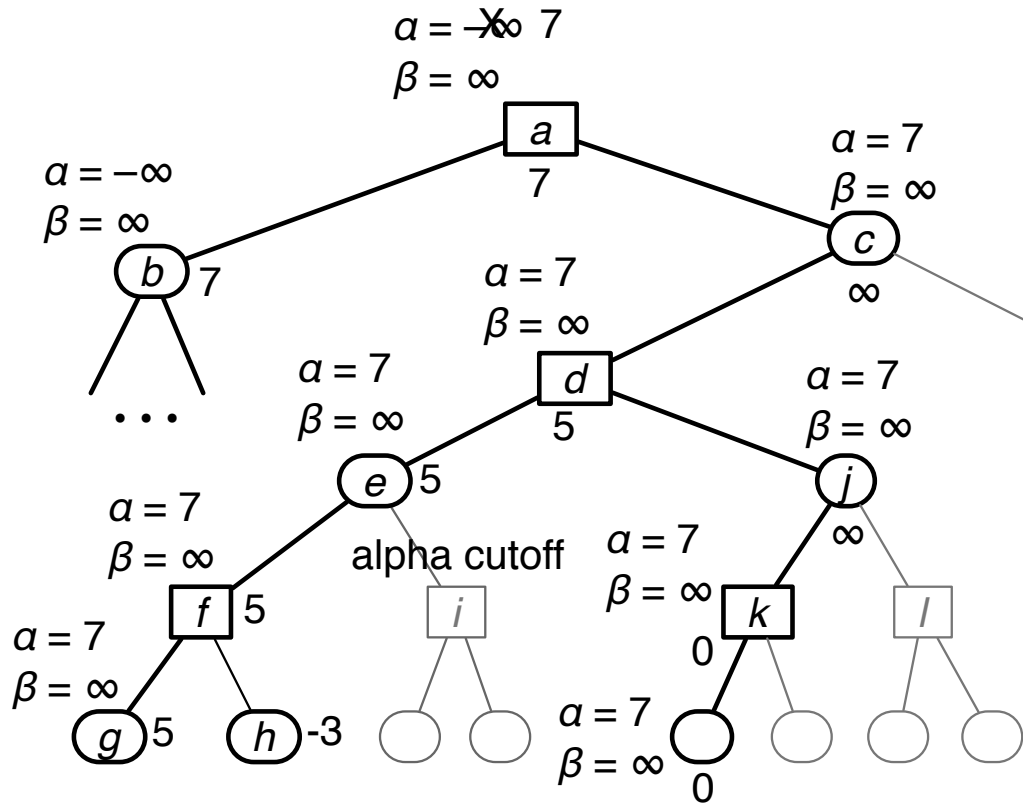
function Alpha-Beta( $h, d, \alpha, \beta$ )
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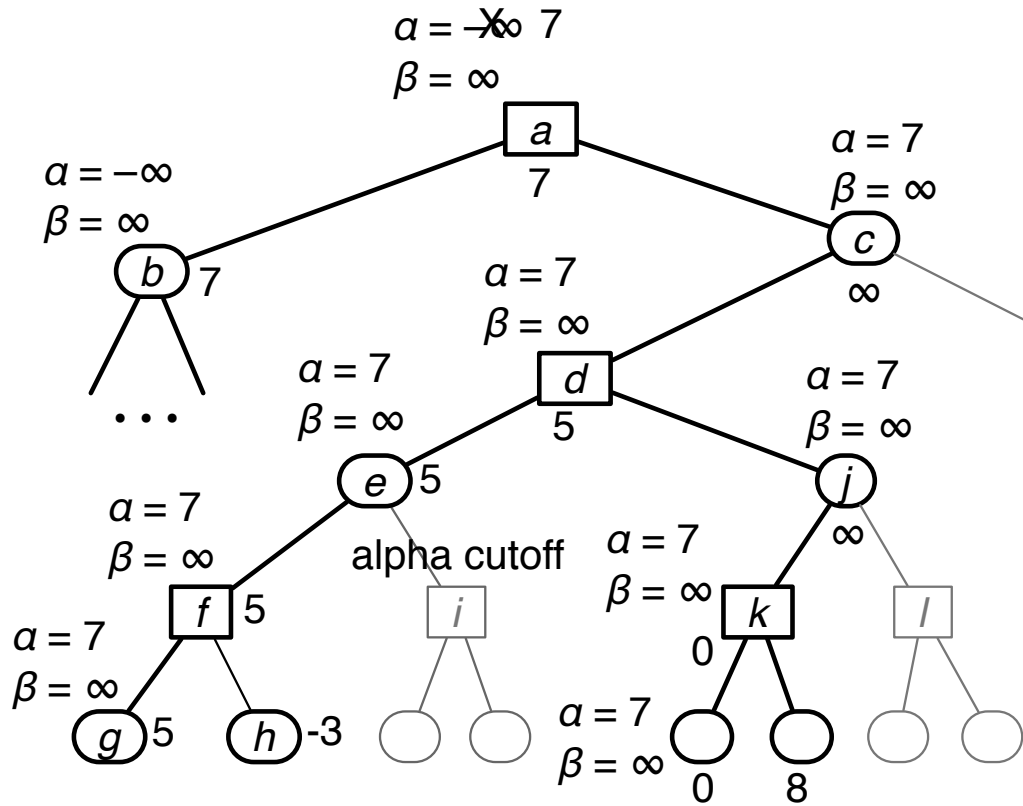
```



```

function Alpha-Beta( $h, d, \alpha, \beta$ )
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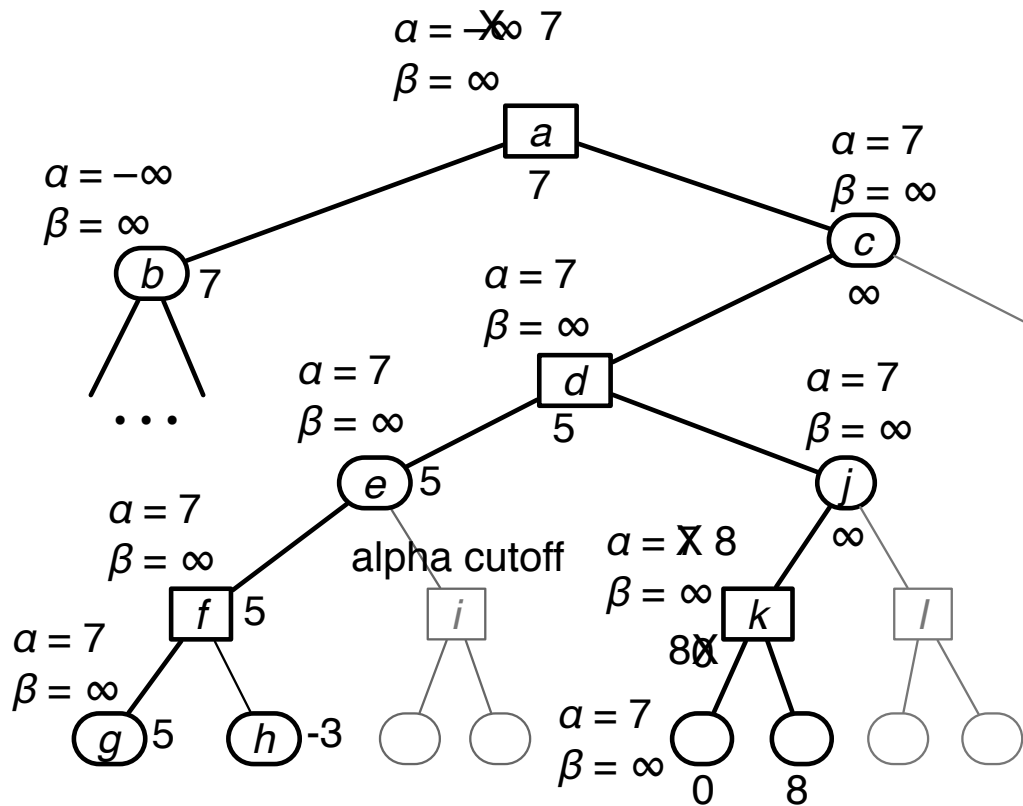
```



```

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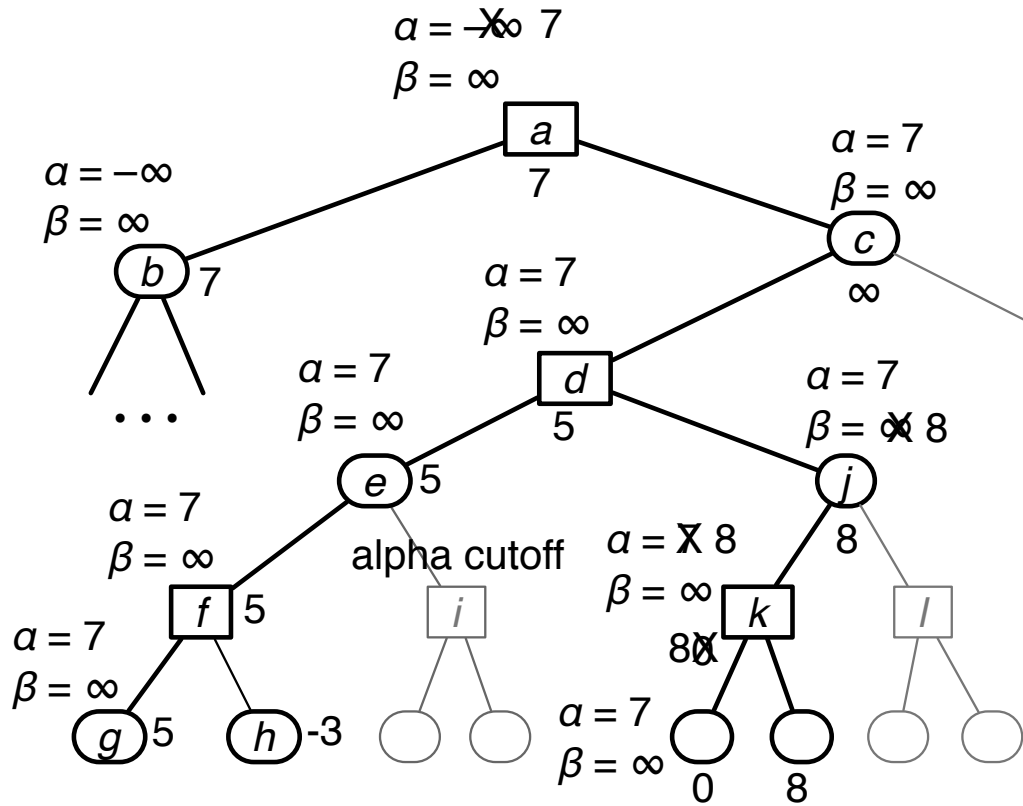
```



```

function Alpha-Beta( $h, d, \alpha, \beta$ )
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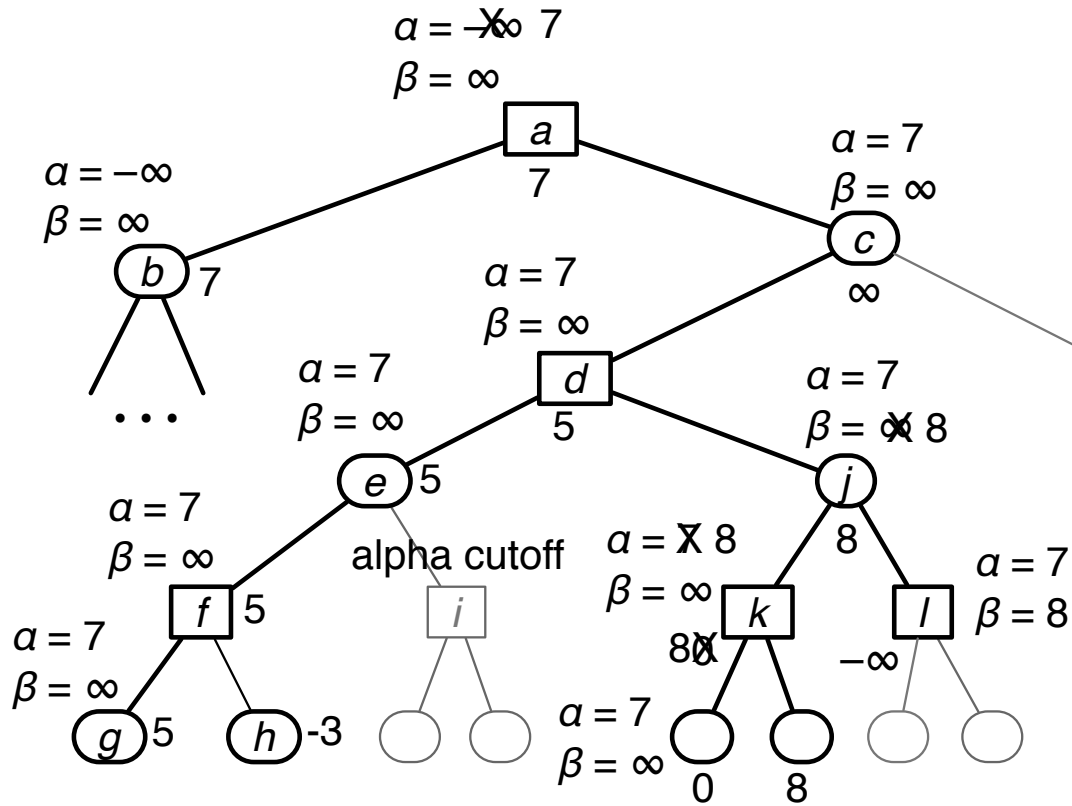
```



```

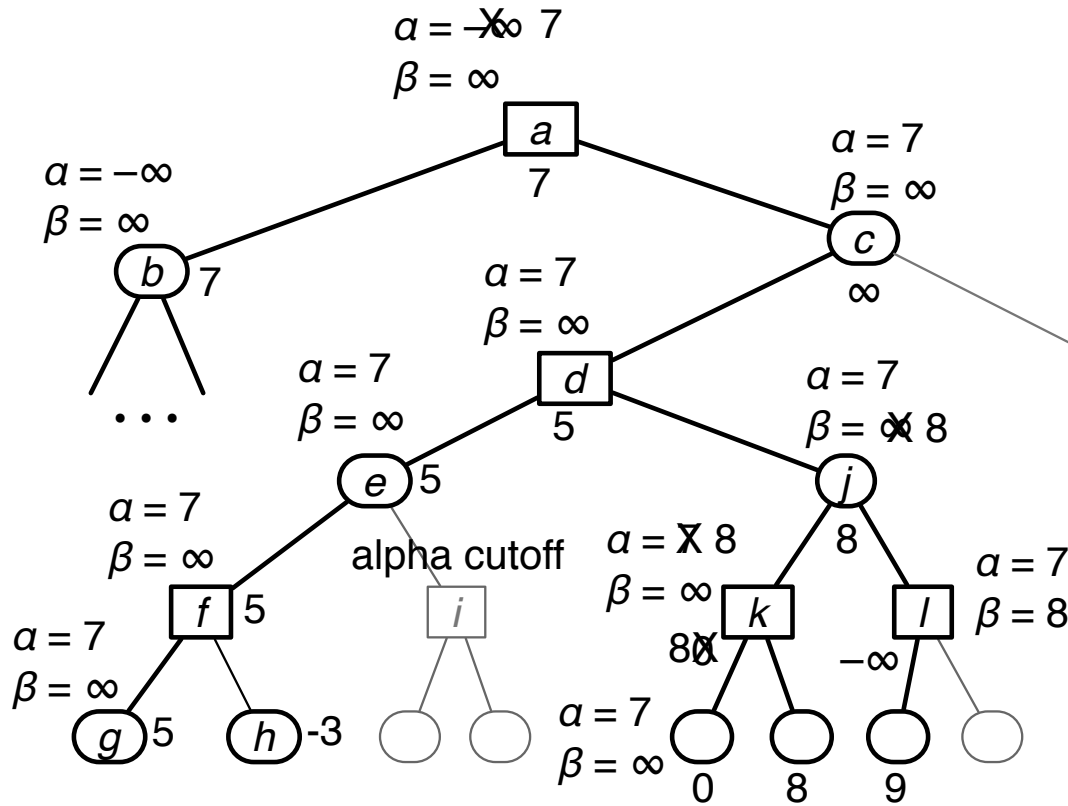
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      else  $\beta \leftarrow \min(\beta, v)$ 
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```

```

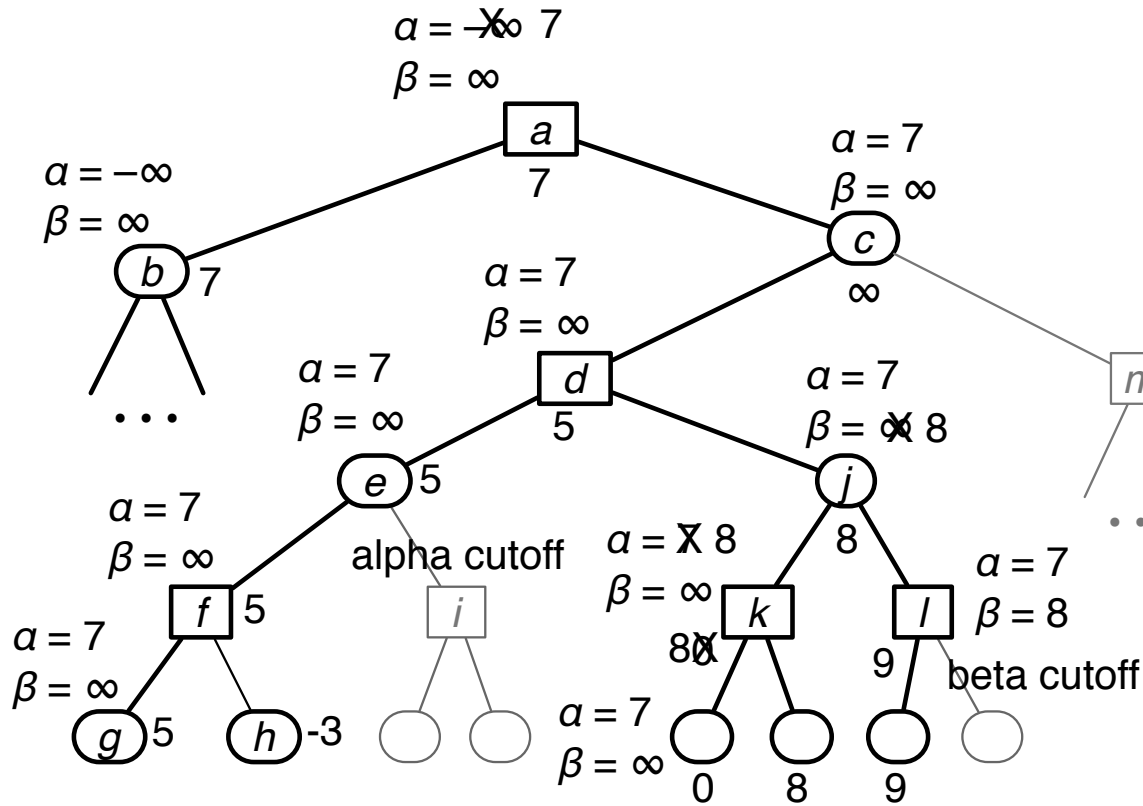
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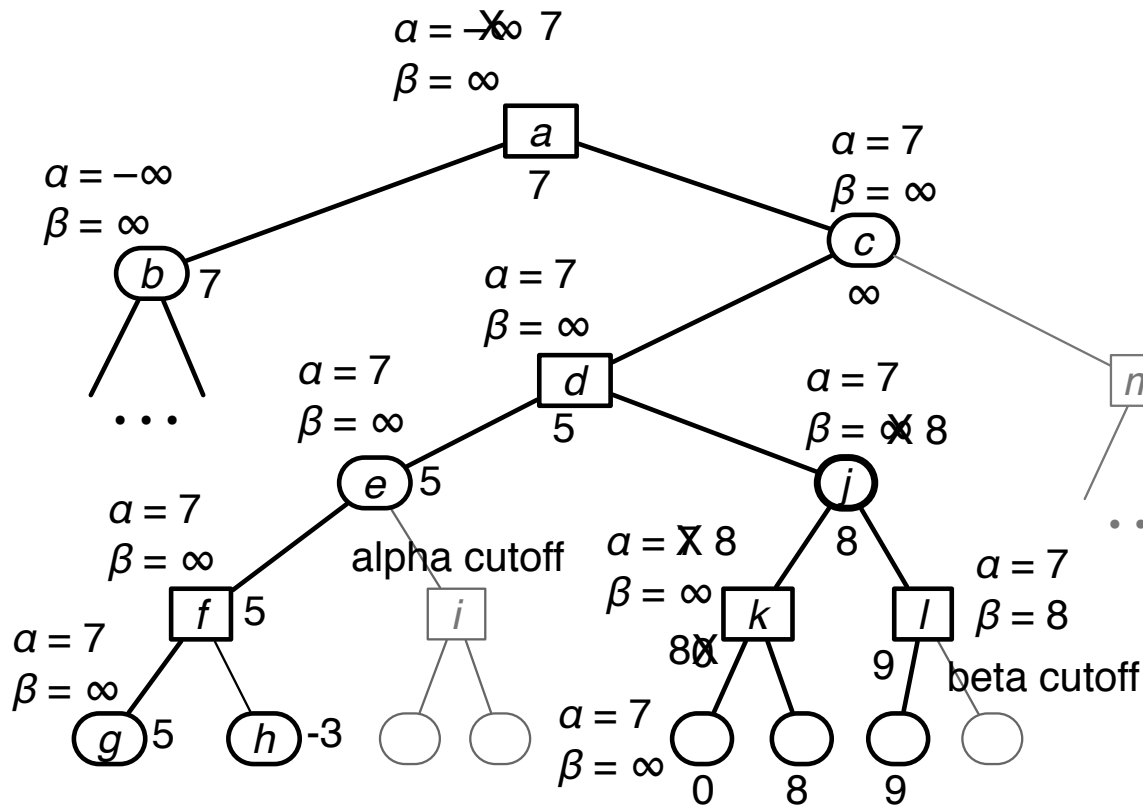
```



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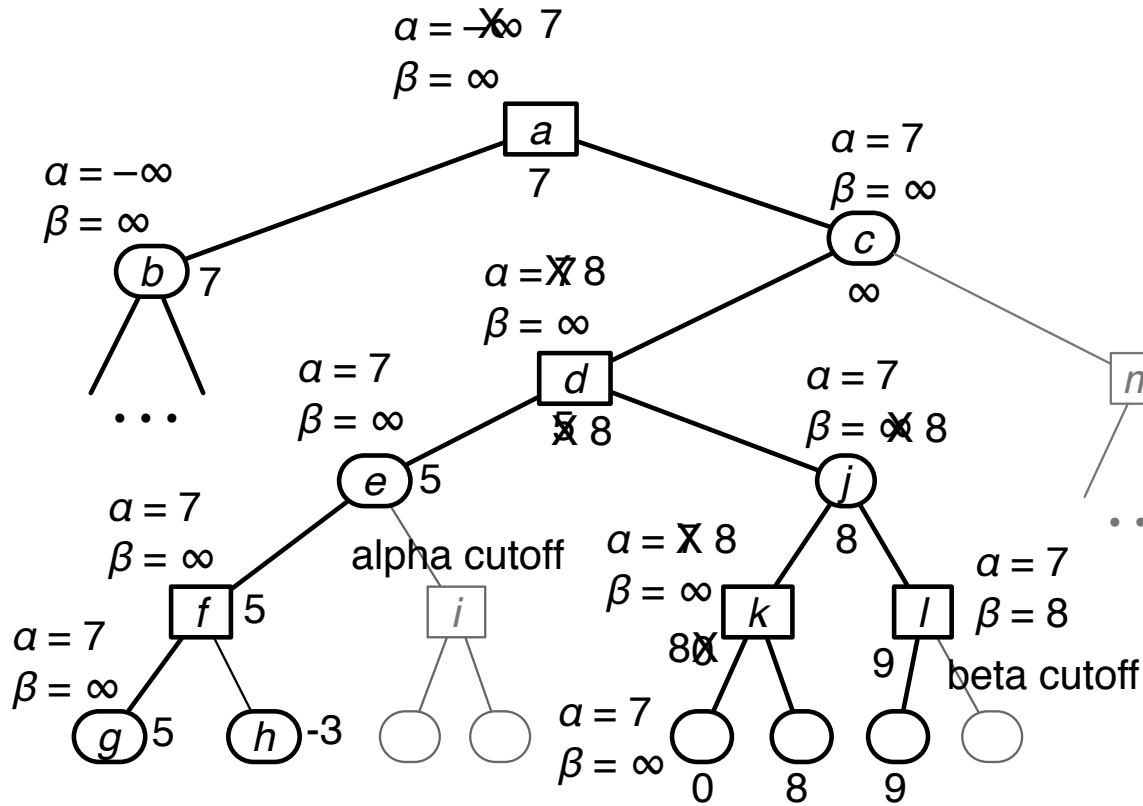
```



```

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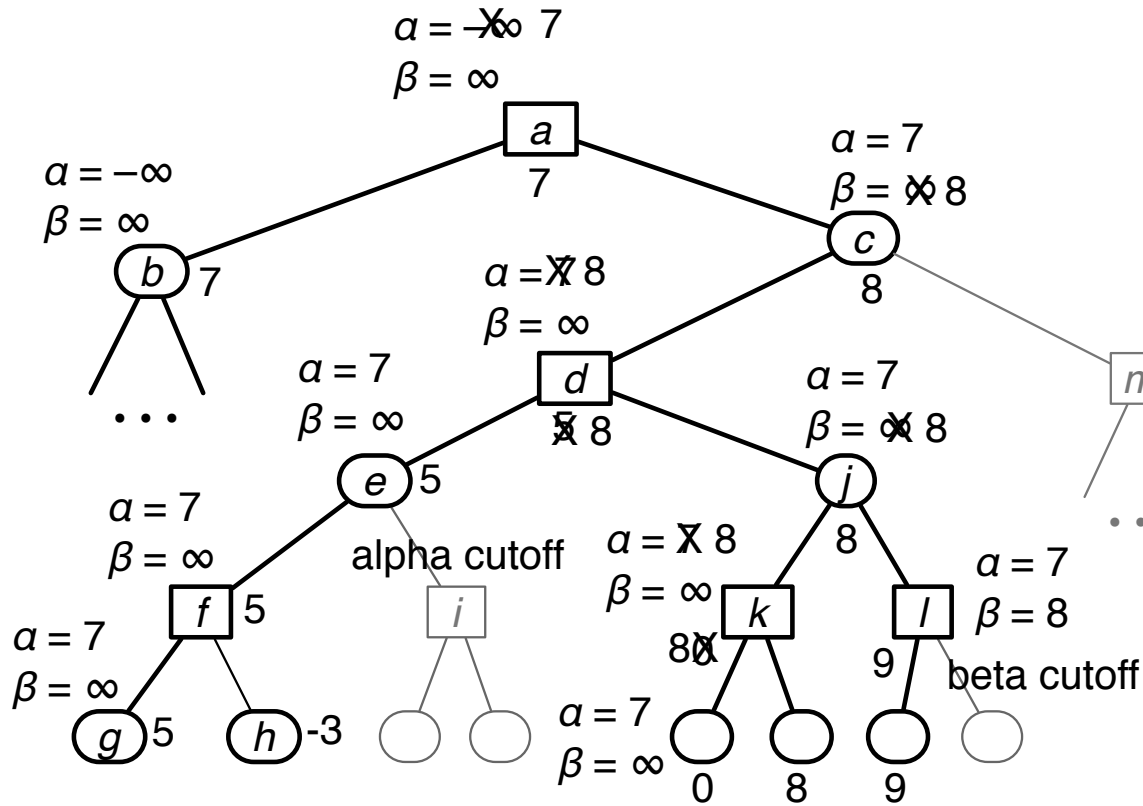
```



```

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     $v \leftarrow \infty$ 
    for every  $a \in \chi(h)$  do
       $v \leftarrow \min(v, \text{Alpha-Beta}(\sigma(h, a), d-1, \alpha, \beta))$ 
      if  $v \leq \alpha$  then return  $v$  //  $\alpha$  cutoff
      else  $\beta \leftarrow \min(\beta, v)$ 
    return  $v$ 

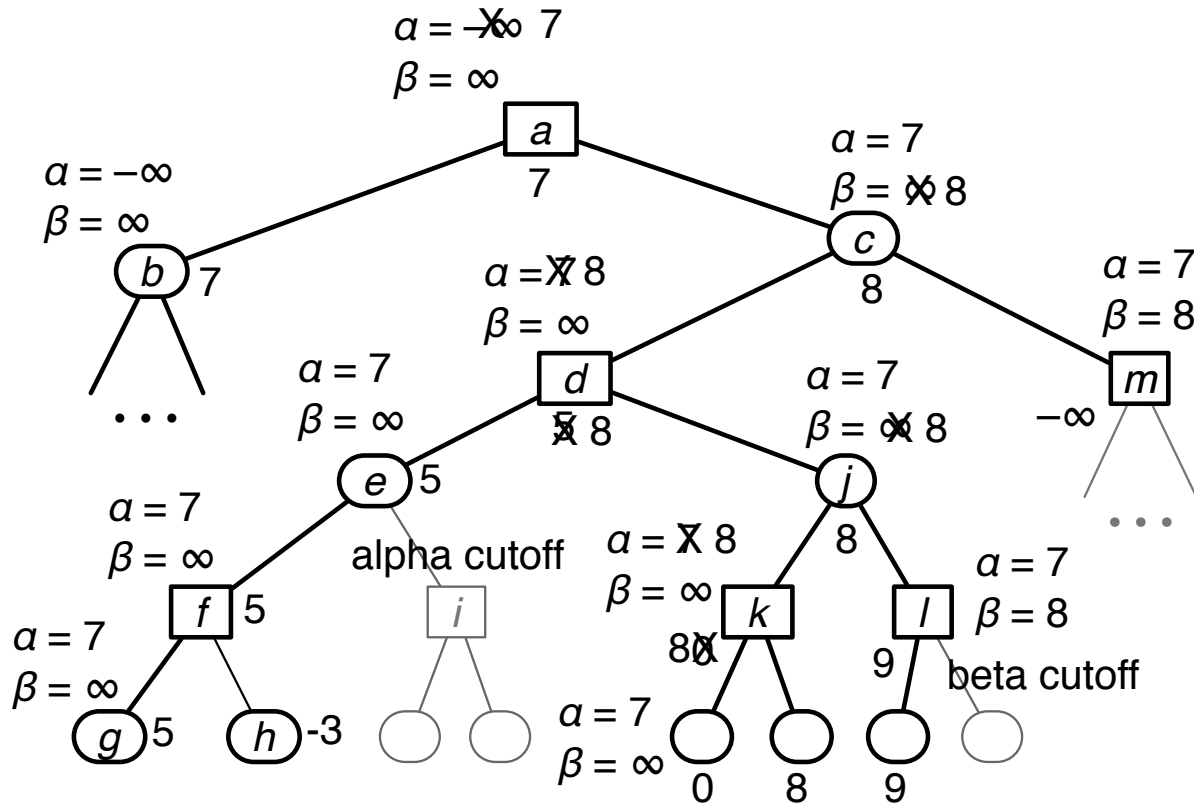
```



```

function Alpha-Beta( $h, d, \alpha, \beta$ )
  if  $h \in Z$  then return  $u(h)$ 
  else if  $d = 0$  then return  $e(h)$ 
  else if  $\rho(h) = \text{Max}$  then
     $v \leftarrow -\infty$ 
    for every  $a \in \chi(h)$  do
       $v \leftarrow \max(v, \text{Alpha-Beta}(\sigma(h, a), d-1, \alpha, \beta))$ 
      if  $v \geq \beta$  then return  $v$  //  $\beta$  cutoff
      else  $\alpha \leftarrow \max(\alpha, v)$ 
    return  $v$ 
  else
     $v \leftarrow \infty$ 
    for every  $a \in \chi(h)$  do
       $v \leftarrow \min(v, \text{Alpha-Beta}(\sigma(h, a), d-1, \alpha, \beta))$ 
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```