initial
X=3
O=3

4A

given state S
empty squares: (2,3), (3,2), (3,3)

```
O O X
X X _
O _ _
```

Branch 1 X(2,3) =

```
O O X
X X X
O _ _
```

⇒ X Wins

Branch 2 X(3,2)

```
O O X
X X _
O X _
```

⇒ O moves (2 options)

O(2,3)

```
O O X
X X O
O X _
```

(X must NOW play 3,3)

```
O O X
X X O
O X X
```

Draw

if O(3,3)

```
O O X
X X -
O X O
```

```
O O X
X X X
O X O
```

X Wins

X must play (2,3)

Branch 3 X(3,3) O(2,3)

```
O O X
X X _
O _ X
```

⇒ O has 2 moves

```
O O X
X X O
O _ X
```

X must play (3,2)

```
O O X
X X O
O X X
```

Draw

if O(3,2)

```
O O X
X X _
O O X
```

X(2,3)

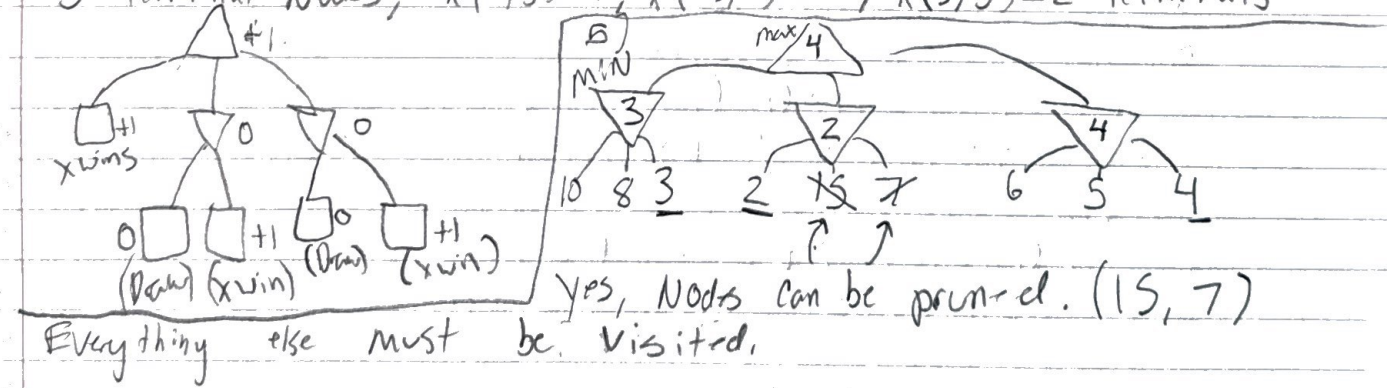
```
O O X
X X X
O O X
```

X Wins

4b 4 Layers, root, after X, after O, After X.

4c 5 Terminal Nodes; X(2,3)=1, X(3,2)=2, X(3,3)=2 Terminals

4D

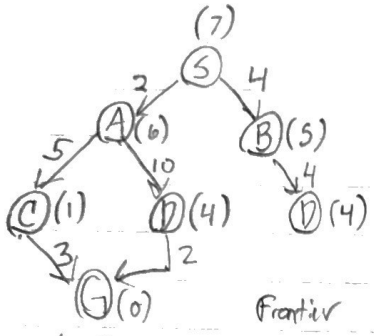


yes, Nodes can be pruned. (15, 7)

Everything else must be visited.

AI Hw1

(3A)



(3B&C)

	Frontier	Explored
expand S	g=0, h=7, f=7	{ }
Gen: A: g=2, h=6 → f=8, Parent=S		
B: g=4, h=5 → f=9, Parent=S		explored
	Frontier A:(2,6,8)	{S}
Expand A	B:(4,5,9)	
gen: C: g=2+5=7, h=1 → f=8, Parent=A		
D: g=2+10=R, h=4 → f=16, Parent=A		
	Frontier C:(7,1,8)	Explored
	B:(4,5,9)	{S,A}
Expand C	D:(12,4,16)	
Gen: G: g=7+3=10, h=0 → f=10, Parent=C		
Frontier B (4,S,A); G: (10,0,10), D: (12,4,16)		
Explored {S,A,C}; Expand B		
Gen: D vB: g=4+4=8, h=4 → f=12; Parent B		
Frontier G (18,0,10); D Becomes (8,4,12)		
explored {S,A,C,B}	Expand G, goal found	

Optimal path: S → A → C → G

Total Cost: 2+5+3 = 10