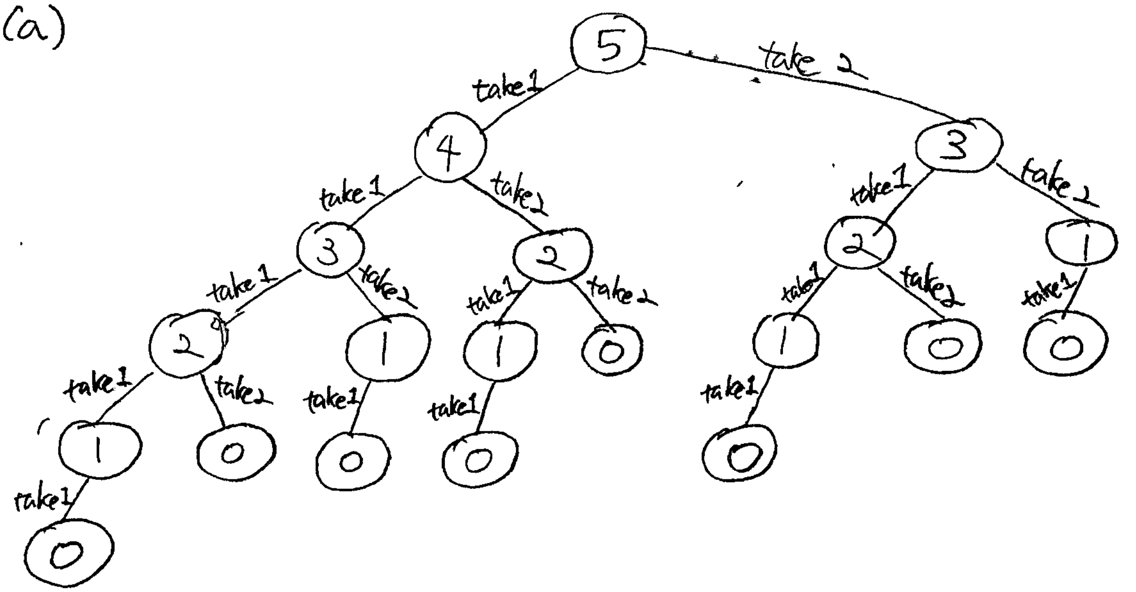
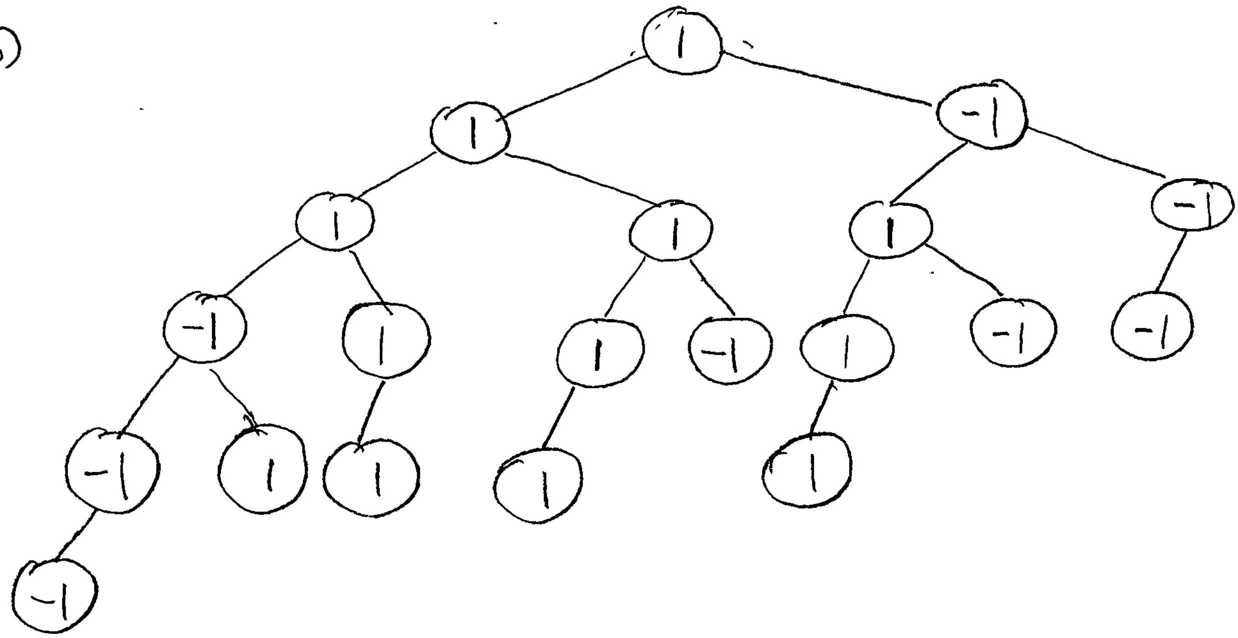
DONGWON PARK HOMEWORK 2, PART I

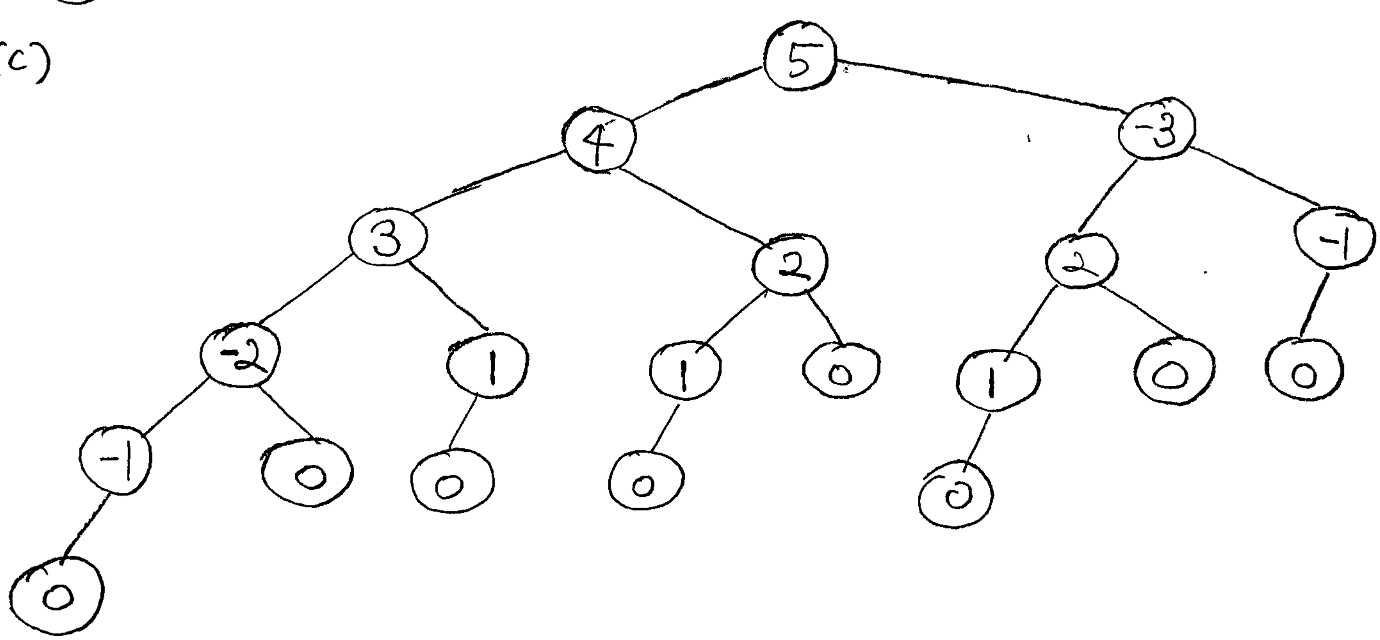
1. (a)



(b)



(c)

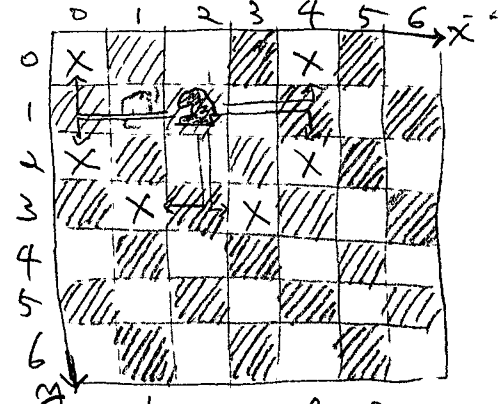


2. (a) Variables:

- each position (x, y) on a $n \times n$ sized chess board.
- So, there are n^2 variables.

(b) Domain = { True, False }

- if there is a knight on a position (x, y), then the value of (x, y) is True.



a knight on a (2, 1). on a 7x7 sized chess board

(c) Constraints: For a given position (x, y), which (x,y) = True, all possible position (x', y'), which a knight on a (x, y) can move to (x', y'), should be False, for $x' \geq 0$ and $y' \geq 0$.

Therefore,

$$\boxed{\begin{array}{l} \text{if } (x, y) == \text{True}: \\ \quad \text{all } (x', y') \text{ must be False, where } x' \geq 0 \text{ and } y' \geq 0 \end{array}}$$

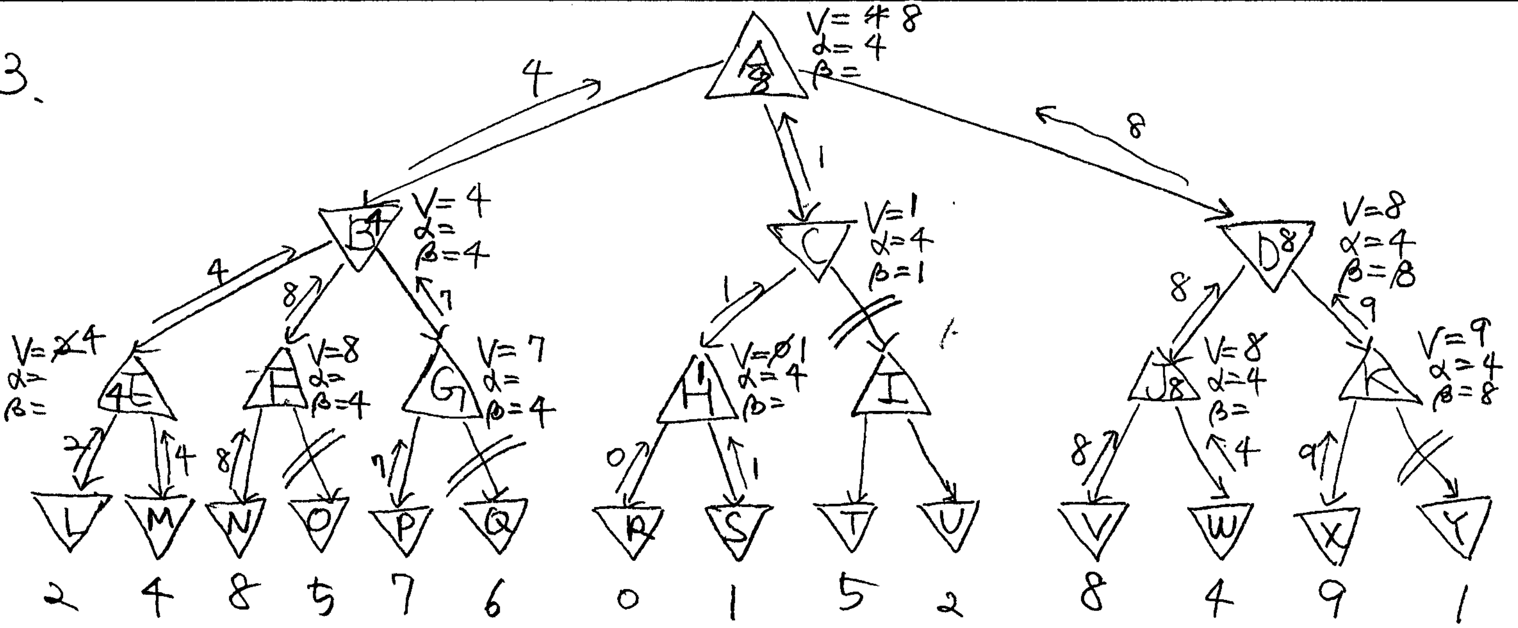
ex) For the Knight on a position (2, 1) from the figure, there are 8 possible (x', y') positions, and there are 6 valid possible (x', y') positions where $x' \geq 0$ and $y' \geq 0$.

for (x, y) $(2, 1)$ $\rightarrow$

$$\left.\begin{array}{ll} ① (x' = x+2,\ y' = y+1) & = (4, 2) \\ ② (x' = x+2,\ y' = y-1) & = (4, 0) \\ ③ (x' = x-2,\ y' = y+1) & = (0, 2) \\ ④ (x' = x-2,\ y' = y-1) & = (0, 0) \\ ⑤ (x' = x+1,\ y' = y+2) & = (3, 3) \\ ⑥ (x' = x-1,\ y' = y+2) & = (1, 3) \end{array}\right\} \text{6 valid moves.}$$

$$\begin{array}{ll} ⑦ (x' = x+1,\ y' = y-2) & = \cancel{(3, -1)} \\ ⑧ (x' = x-1,\ y' = y-2) & = \cancel{(1, -1)} \end{array}$$

3.



(a) A should choose D, because by minimax algorithm, the Max node A will get ~~the~~ maximum value 8 if it goes to D.

(b) Node O, Q, T, U and Y.

By comparing its value with known α or β value, it knows it is not necessary to go further to other sides.

For ex) for a node 'F', after taking 8 from N, its known β value is 4, then its parent 'B' will not choose any other possible values from 'F' because node 'B' already has a value 4, which is lesser.