

[illegible]

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Roll No. :- 25

Subject :- IS LAB

Branch / c/dss :- BEIT

D.O.P	D.O.C	Mark	Sign

## Alpha - Beta Pruning :-

Alpha-beta Pruning is search algorithm that seek to decrease the number of nodes that are evaluated by the minimax algorithm. In its search tree.

It is modified version of min-max algorithm. Alpha-beta pruning can be applied at any depth of tree, and sometime it not only prunes the tree leaves but also entire sub tree.

The Two-parameter can be defined as:-

a) Alpha ( $\alpha$ ): The highest ~~st~~-value choice. we have  
Initial value of alpha is  $-\infty$

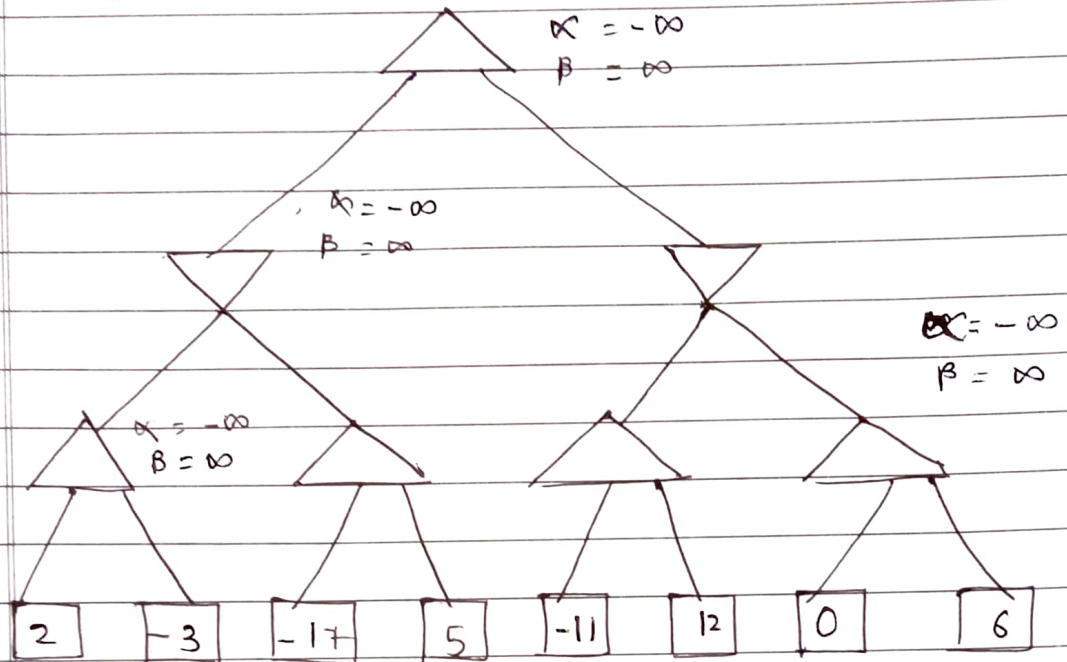
b) Beta ( $\beta$ ) :- The highest value. Initially value of Beta is  $+\infty$

### Rules and condition to performing an algorithm:-

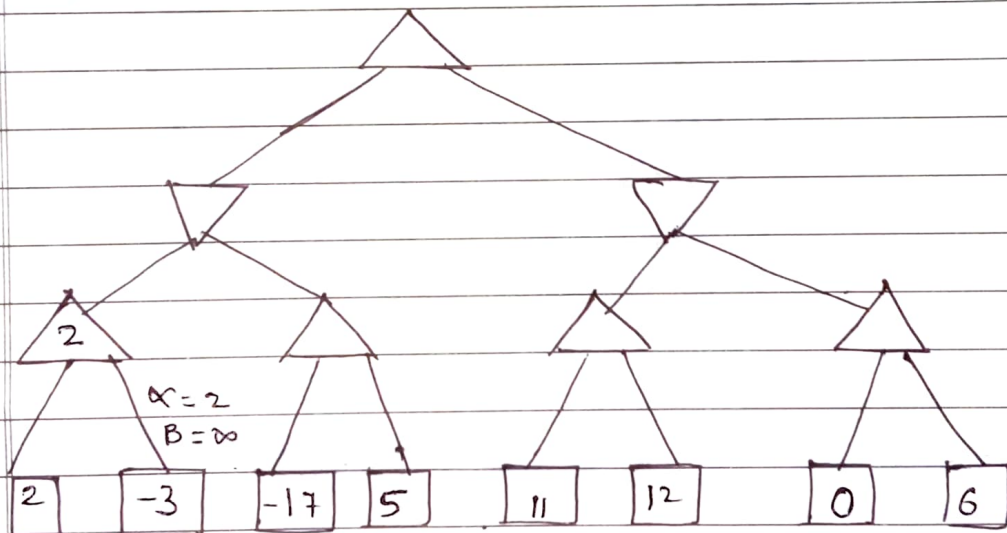
- 1) The max player will only update the value of alpha. ( $\alpha$ )
- 2) The min player will only update the value of Beta ( $\beta$ ).
- 3) We will only pass the alpha, beta values to the child nodes.
- 4) Node values will be passed to upper node instead of value of alpha and beta.

Condition to prune :  $a \geq b$  or  $b \leq a$

Step 1:-

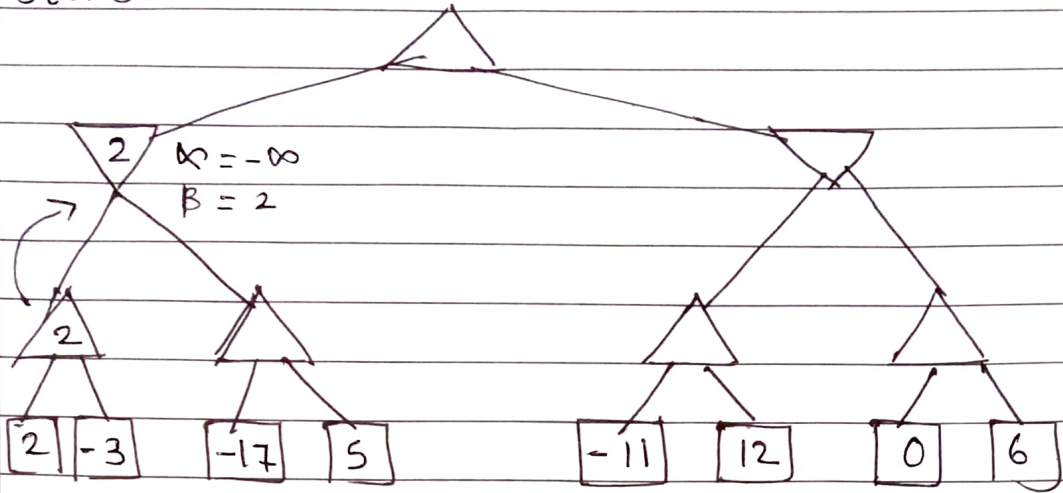


Step 2:-

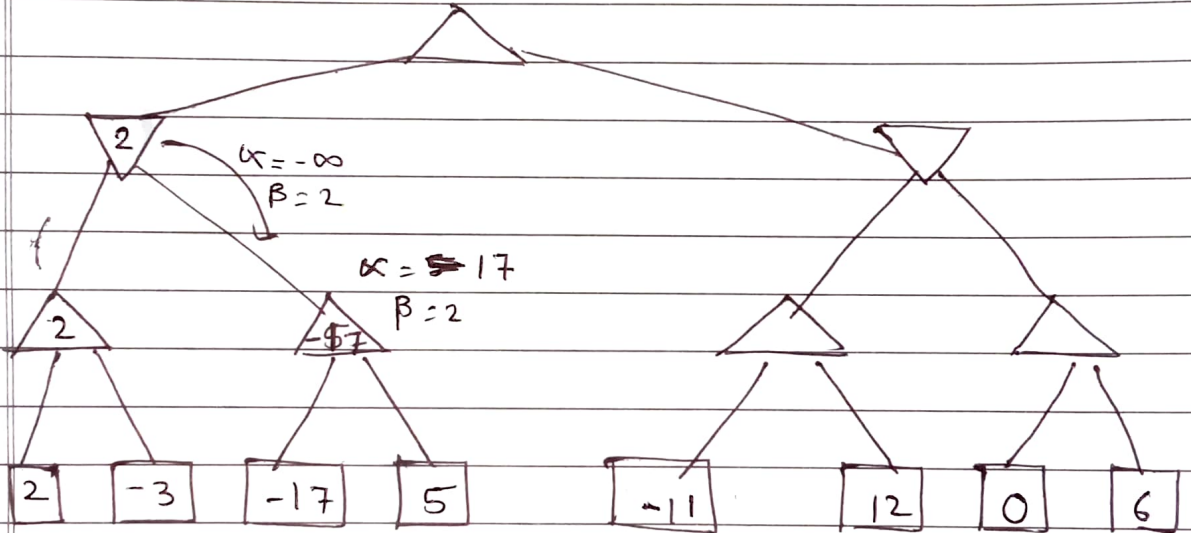


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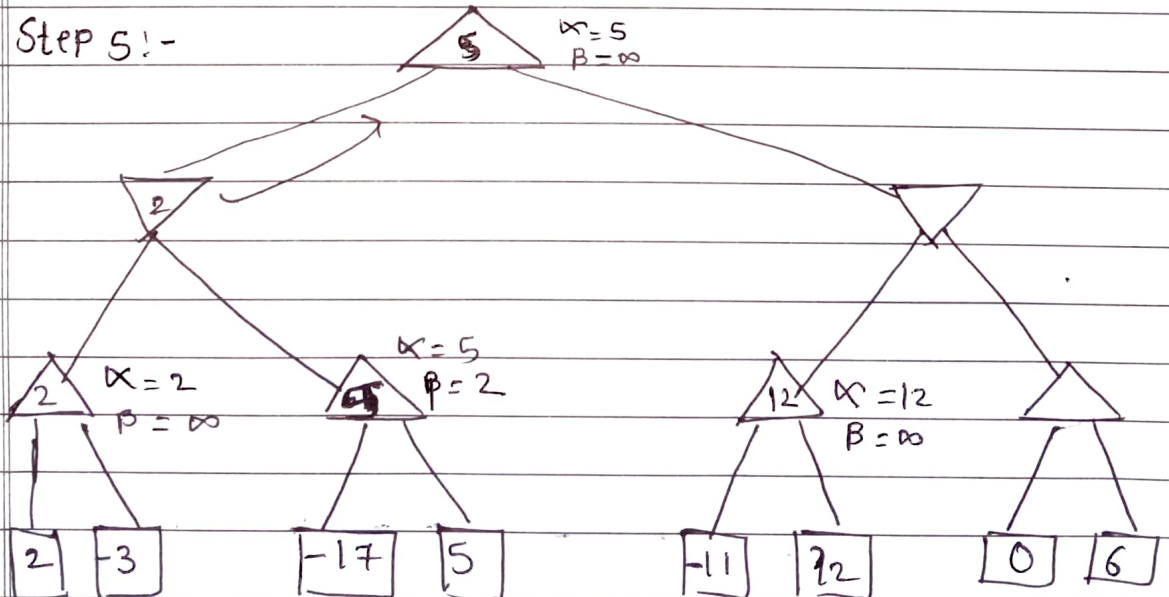
Step 3:-



Step 4: -

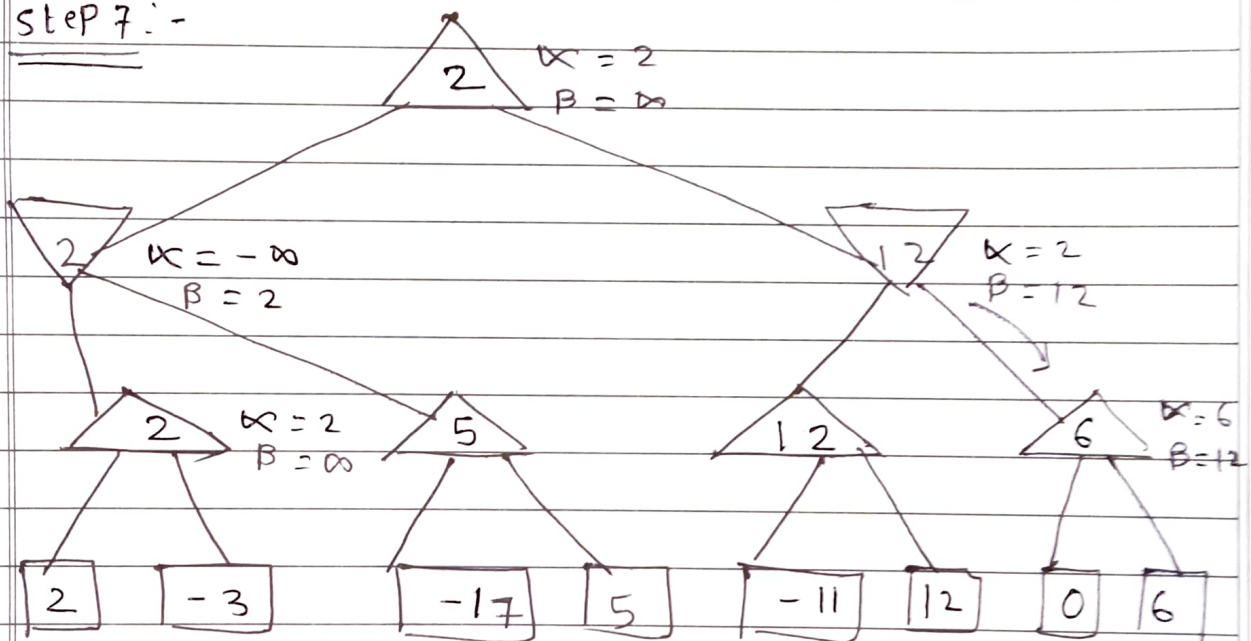
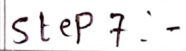


Step 5:-



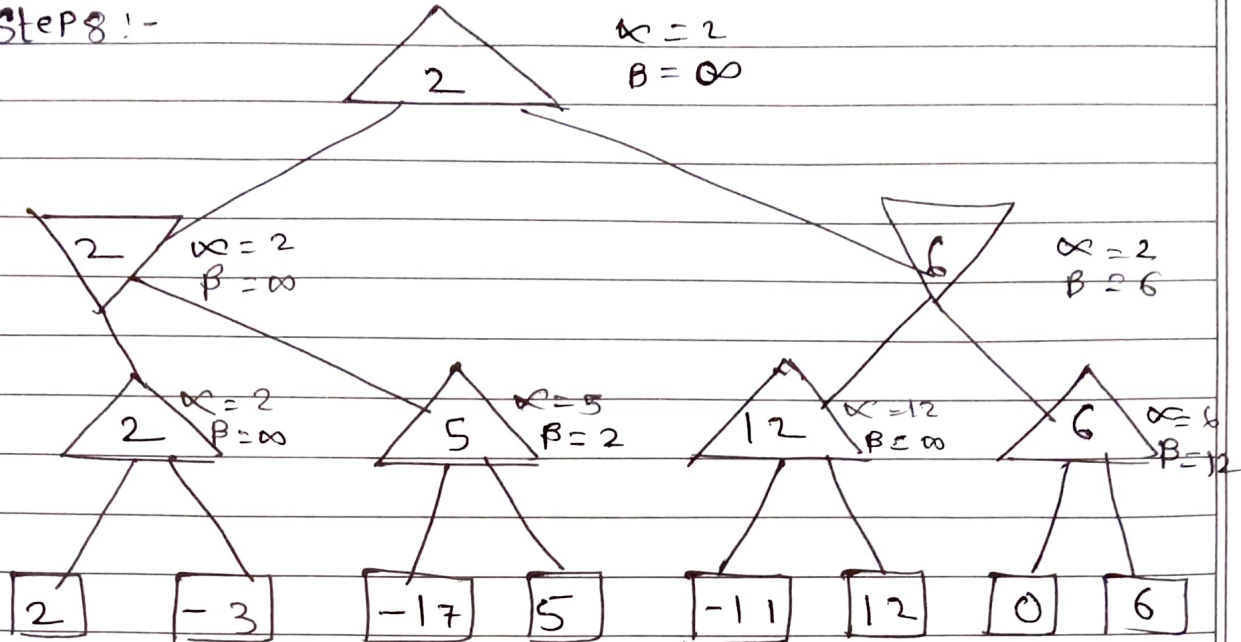


Step 6! -

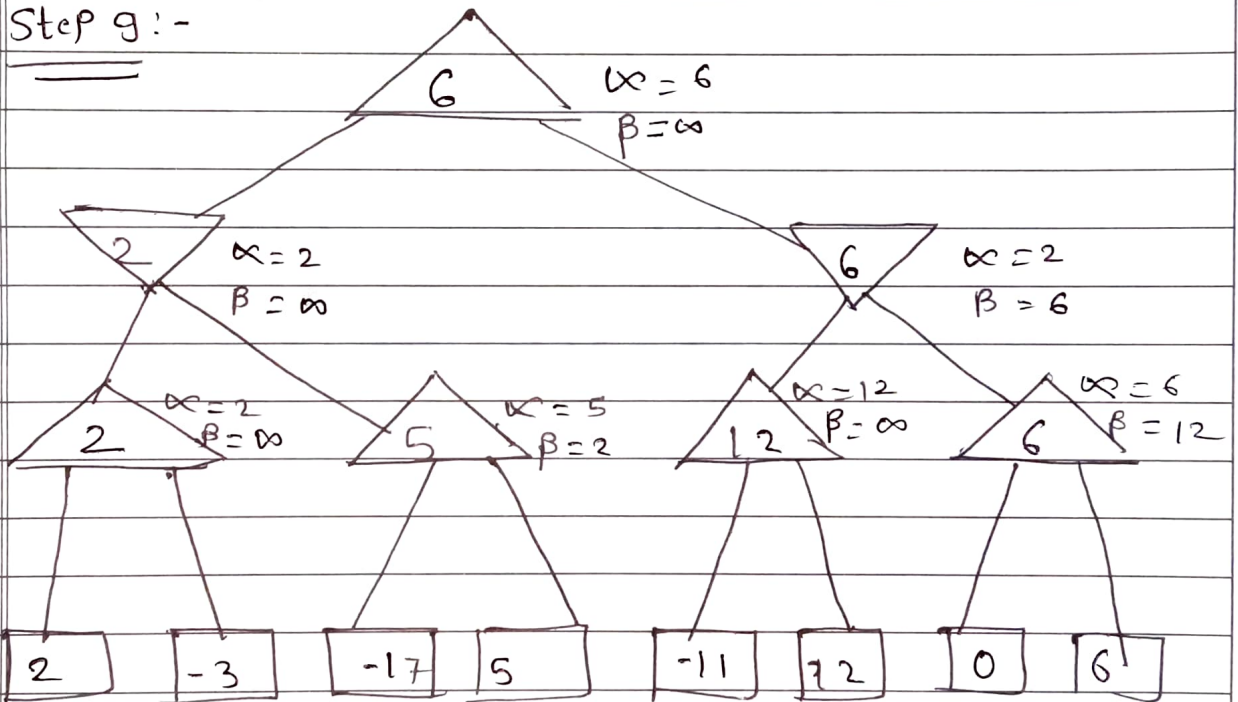


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Step 8 :-

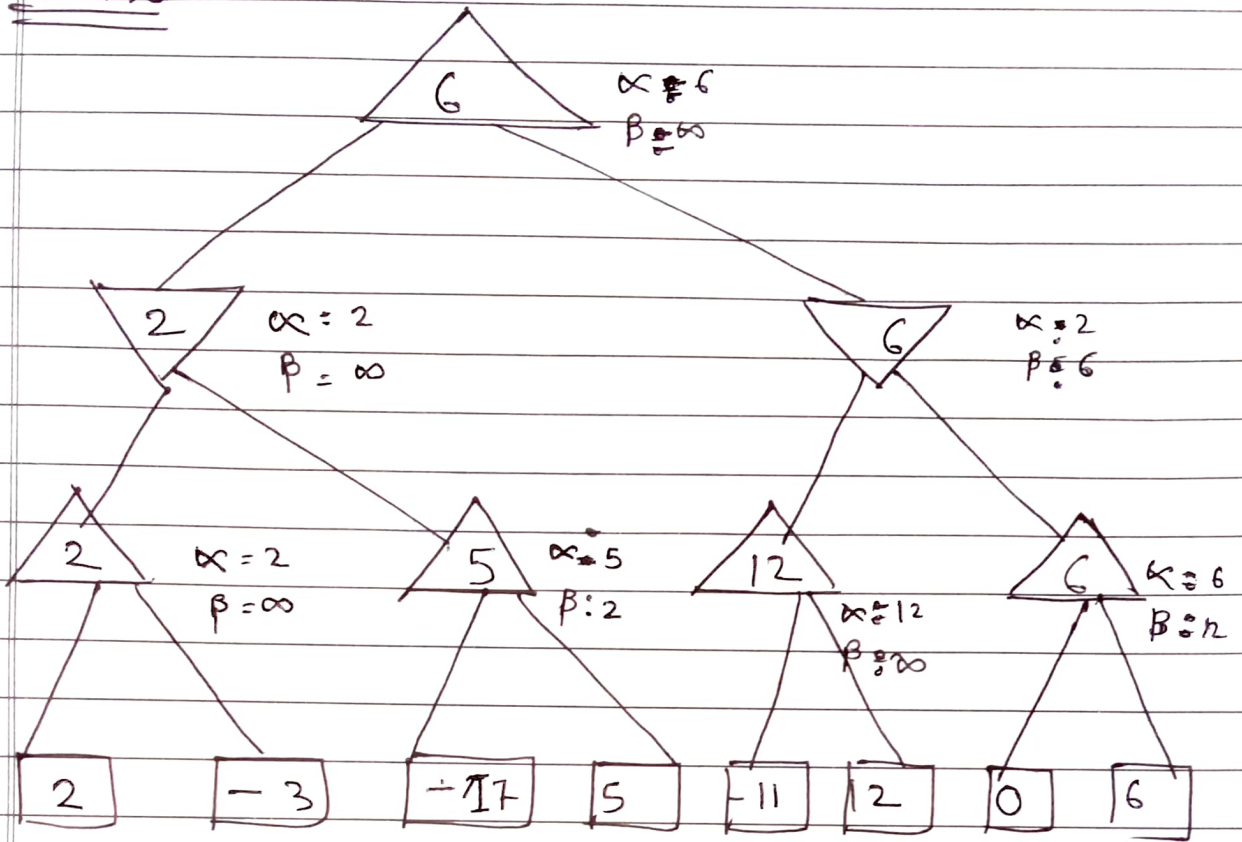


Step 9 :-



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Step 1:-



Turned when  $b \leq a$

$$1) \quad x \in (-\infty, 2) \Rightarrow 2$$

- Max (Bottom Left)

$$x \in (-\infty, -3) \Rightarrow -3$$

$$a(2, -3) = 2$$

2)  $\beta (\infty, 2) = 2$

- Min (left)

3)  $\propto (-\infty, -17) = -17$

- Min (left)

$$\times (-2, 5) = 5$$

$$\alpha(-17, 5) = 5$$

4)  $\alpha(2, 6) = 6$

- Top (max)

5)  $\beta(2, 5) = 5$

- ~~Top~~ min right

6)  $\beta(-\infty, 6) = 6$

- max ~~right~~ max  
Bottom right

7)  $\alpha(2, 6) = 6$

$\alpha(6, -11) = 6$

$\alpha(2, -11) = 2$

8)  $\beta(\infty, -11) = -11$

- min right

$\alpha =$

9)  $\alpha = 6$

$\beta = \infty$

$\alpha = (6, 2) = 6$

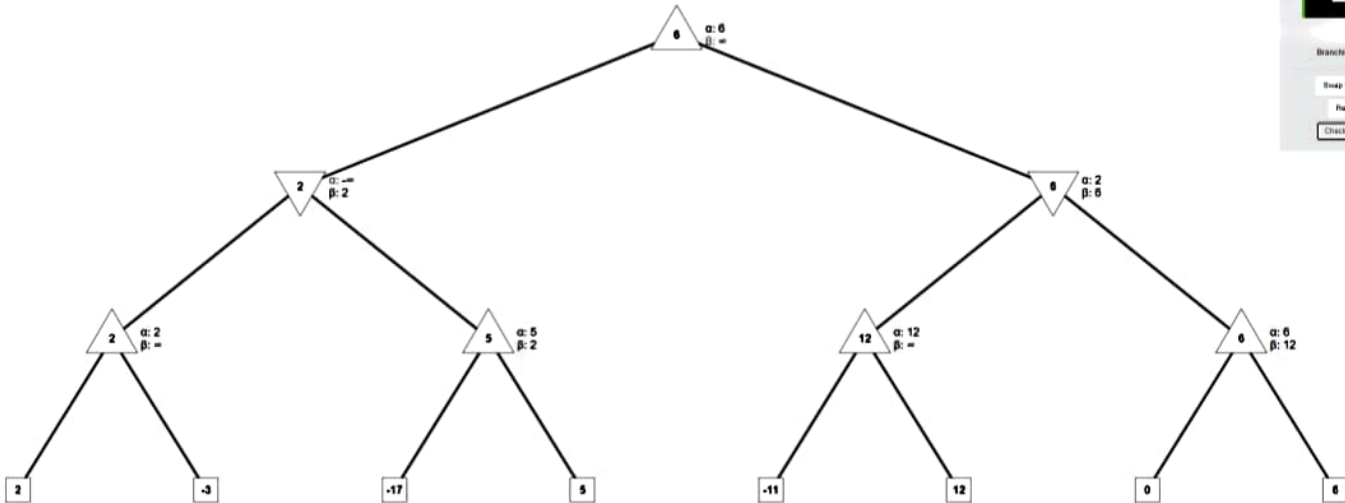
- max


10)  $\alpha(6, 2) = 6$

$\beta = \infty$

Solution.






 Screenshot has been saved to Gallery

Depth

Branching Factor