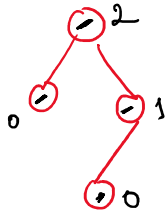
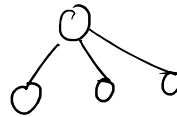


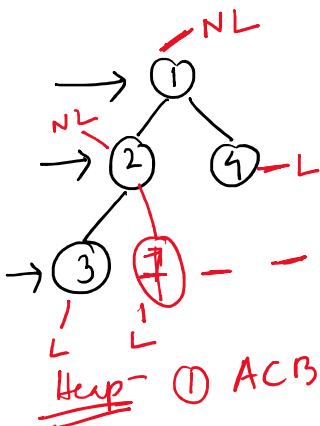
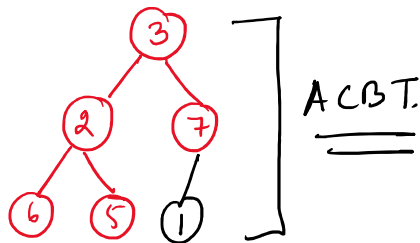
Binary Tree - Tree  $\rightarrow$  nodes  $\rightarrow$  0/1/2 children.



Leaf node - Node with 0 children  
 Non-leaf node - Node with 1/2 children.

Almost Complete Binary Tree  $\rightarrow$  Nodes are inserted <sup>always at</sup> last level.  
 $\rightarrow$  All levels are filled from left direction.

3 2 7 6 5 1



ACBT??

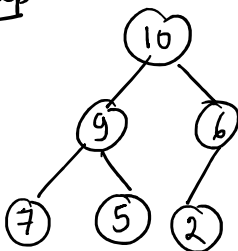
7 invert.

Heap - ① ACBT

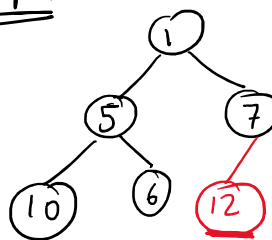
② Max Heap (Parents > child)

Min heap (Parents < child).

Max heap

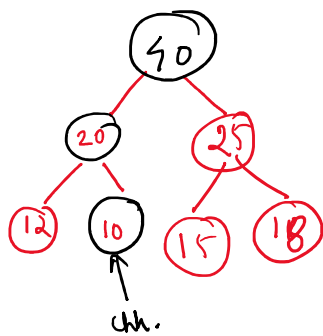
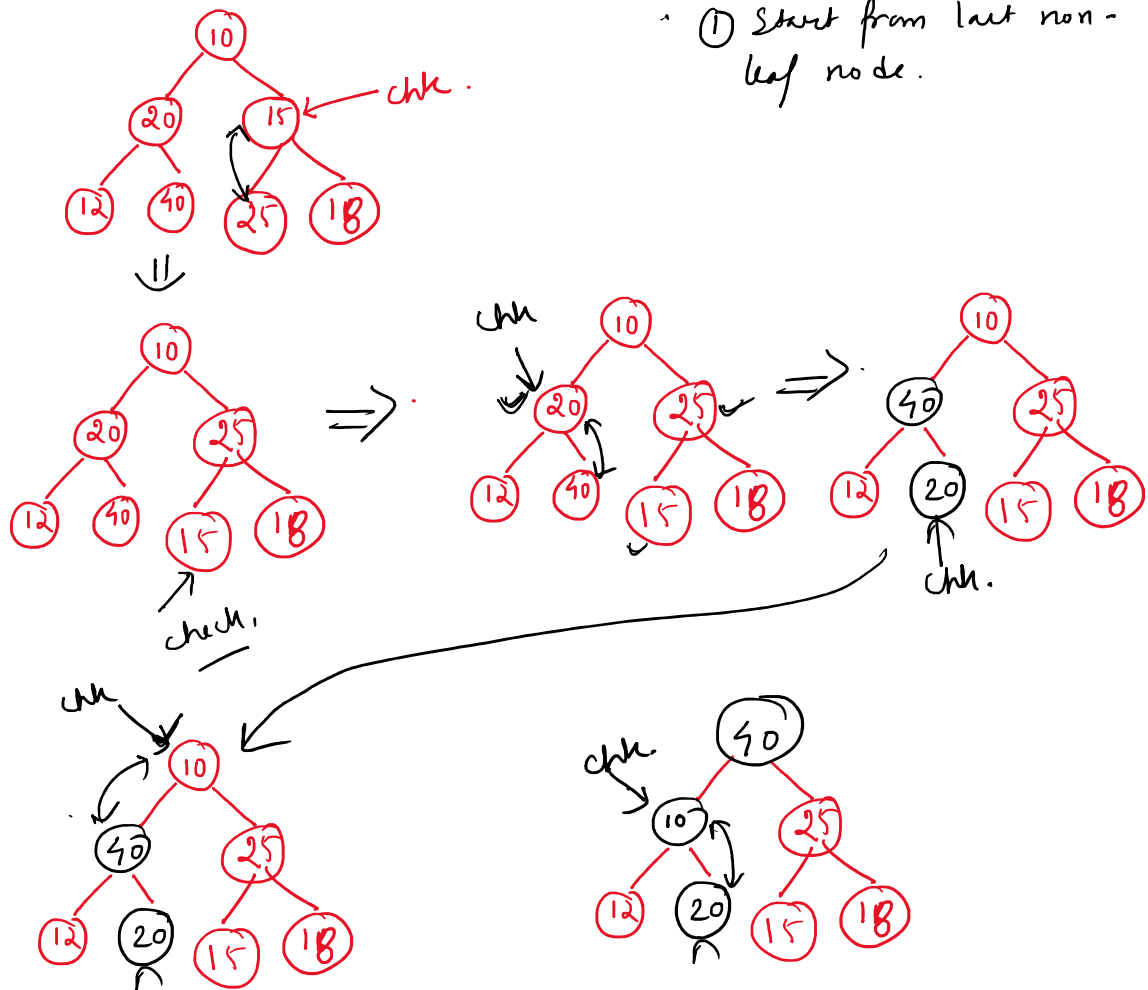


Min heap??



Heapify  $\rightarrow$  Array  $\rightarrow$  Represent it in ACBT  $\rightarrow$  convert into Max/Min heap

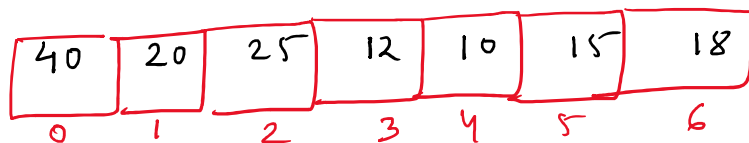
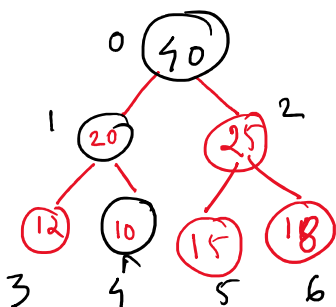
10 20 15 12 40 25 18. Convert it into Max Heap.



Max Heap.

Heap Sort -

Input array  $\rightarrow$  ACBT  $\rightarrow$  Heapify (Maxheap / Min heap)  $\rightarrow$  Sorted Order.



Algo -

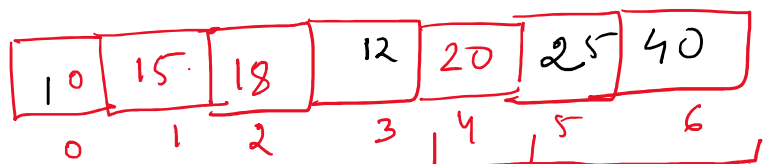
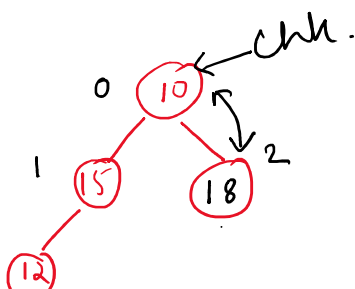
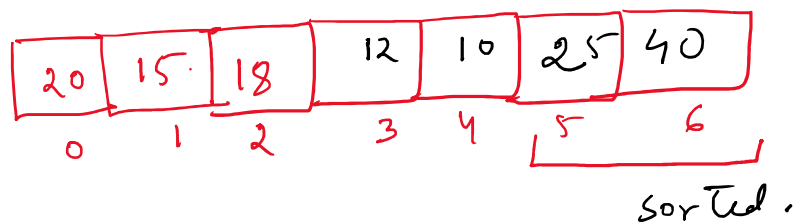
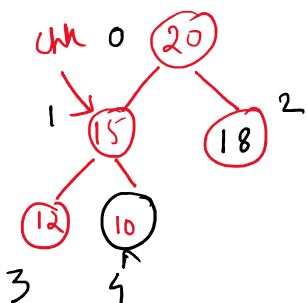
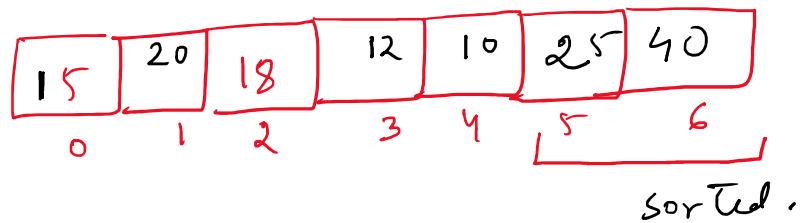
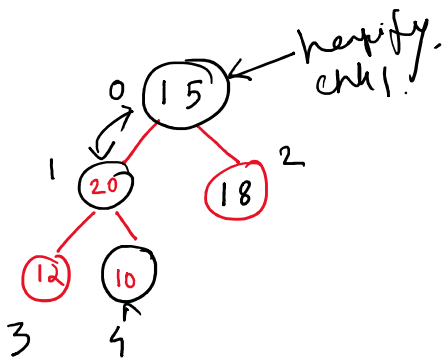
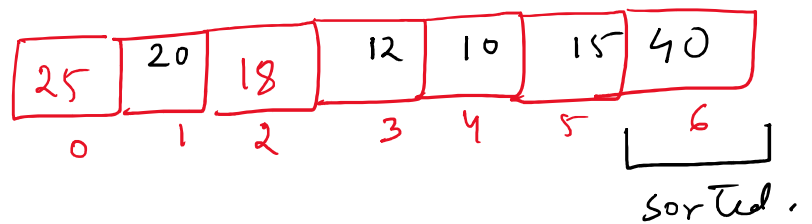
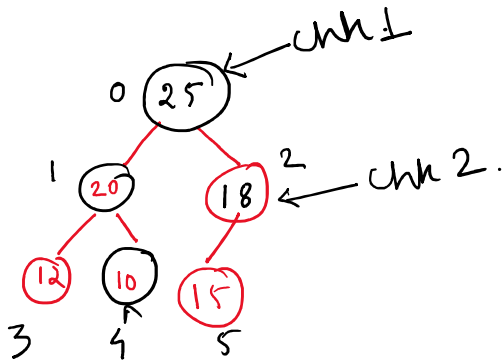
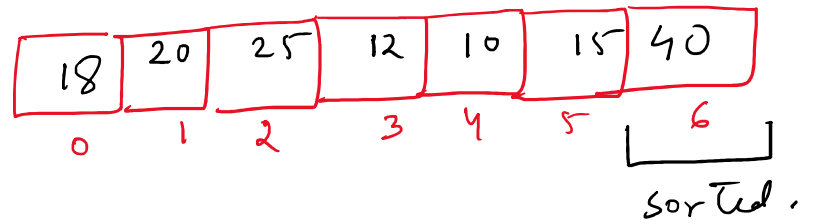
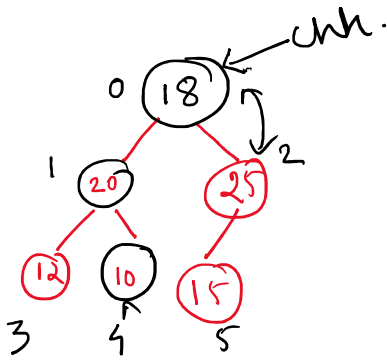
- ① Swap (Root value, Last Node value)
- ② Delete the last node.

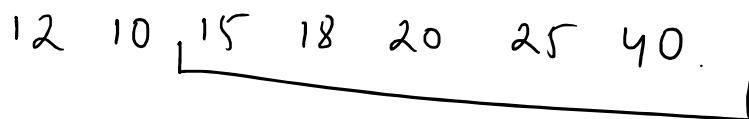
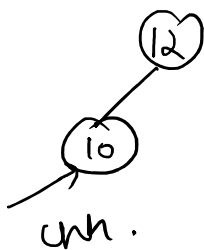
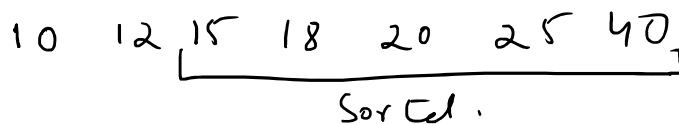
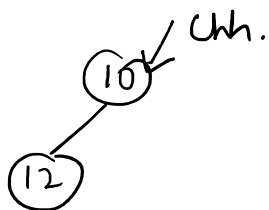
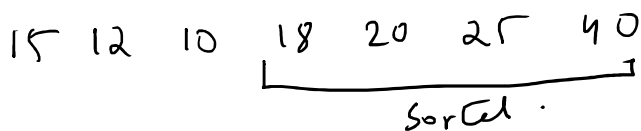
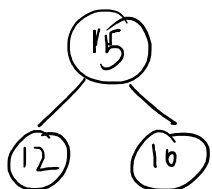
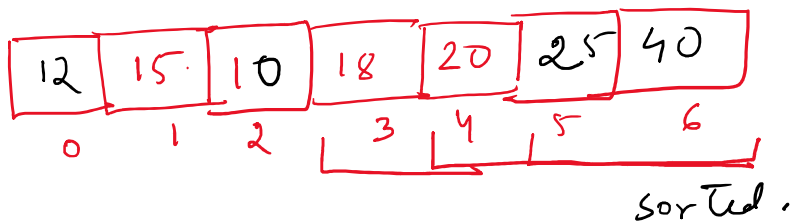
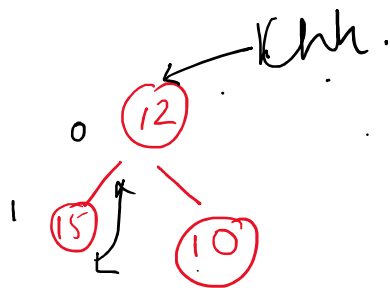
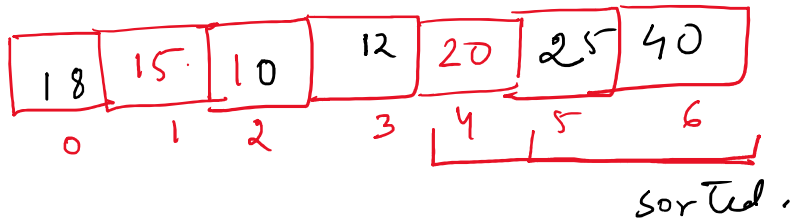
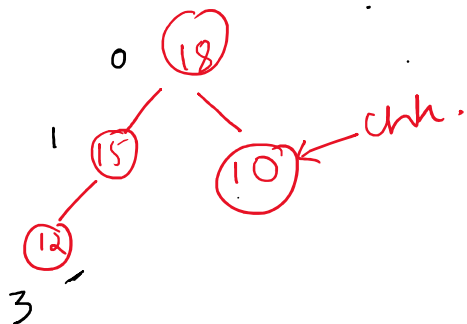
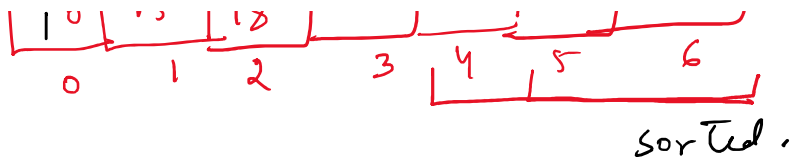
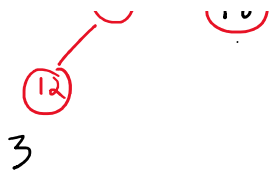
3 4 5 6

value /

(2) Delete the last node.

(3) Heapify (Root).





← new

10

10 12 15 18 20 25 40

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Sorted.