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Bubble Sort

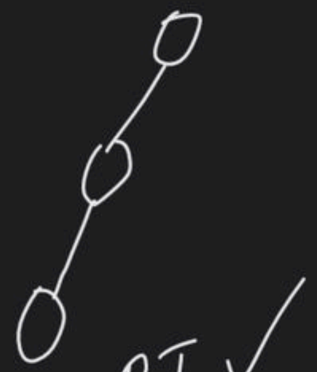
Complete Course on Algorithms - GATE

Subbarao Lingamgunta • Lesson 40 • May 10, 2023

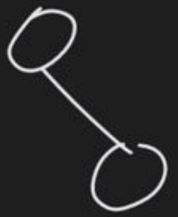
HeapSort

Binary Tree

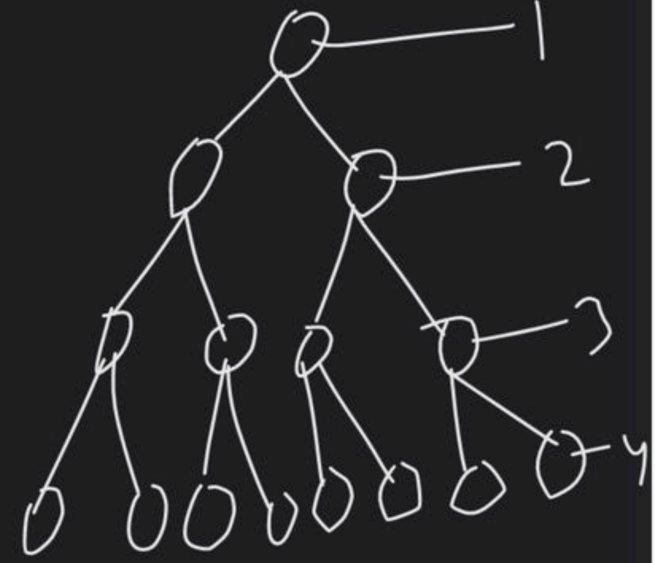
Almost complete Binary Tree



BT ✓
ACBT ✓

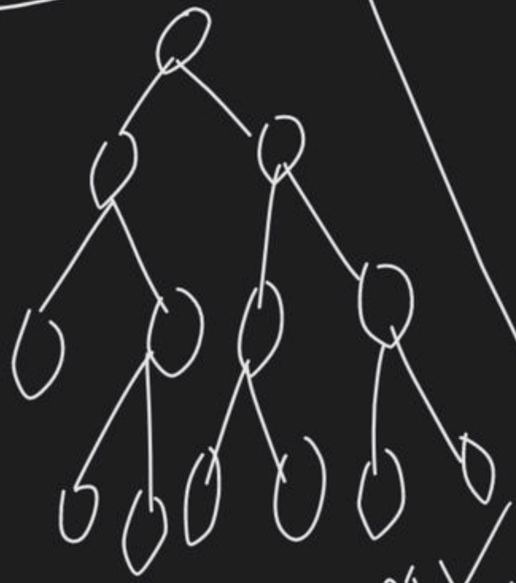


BT ✓
ACBT ✓



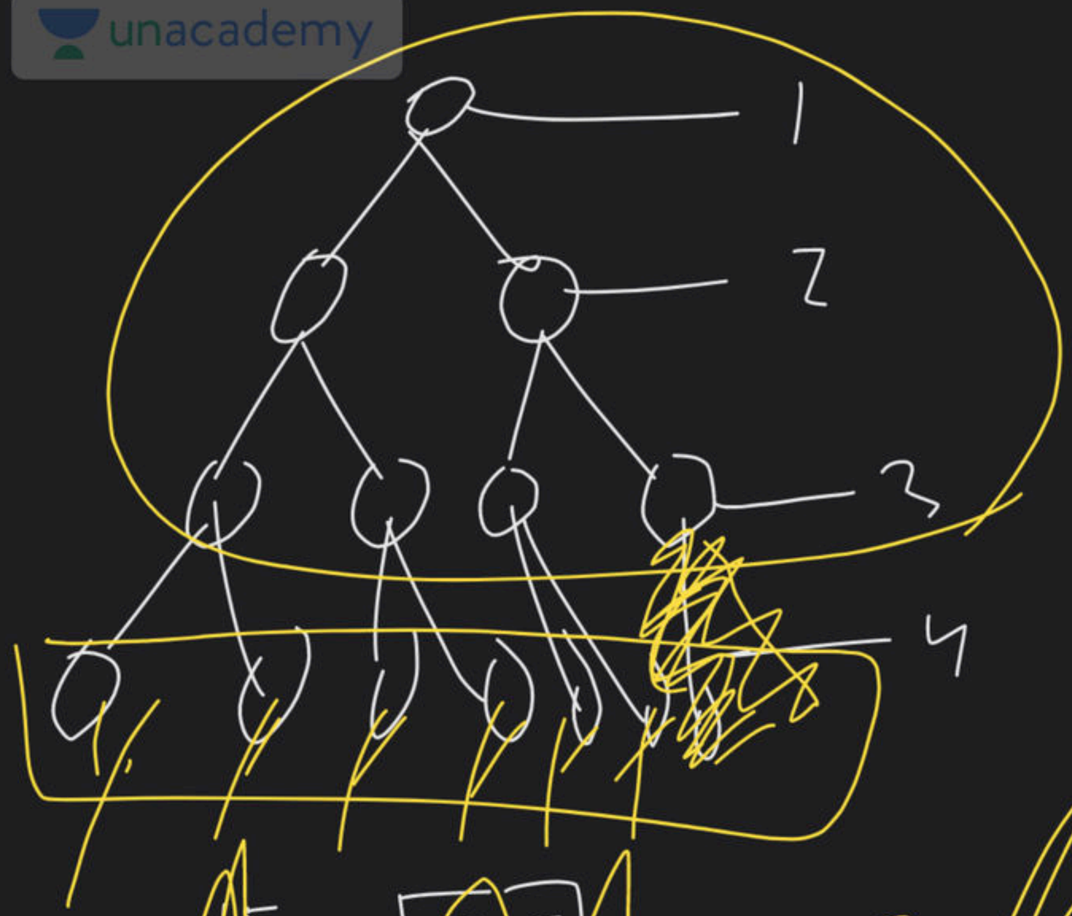
BT ✓
ACBT ✓
CBT ✓ (≡ L)

BT ✓
ACBT ✓



BT ✓
ACBT ✓

4-L-CBT = $2^4 - 1$
K-L-CBT = $2^K - 1$
N-L-CBT = $2^N - 1$
nodes



$\frac{n}{2} = \lceil 0.5 \rceil$

$= \Theta(1)$

$\frac{n}{2} = \lceil 1.5 \rceil = \Theta(n)$

$\frac{n}{2} = \lceil 2.5 \rceil = \Theta(n)$

① K-level CBT contain $= 2^K - 1$ nodes

② CBT — contain < n-nodes / K-levels

$n = 2^K - 1$

$2^K = n+1$

$\log_2 2^K = \log_2 (n+1)$

$K = \log_2 (n+1)$

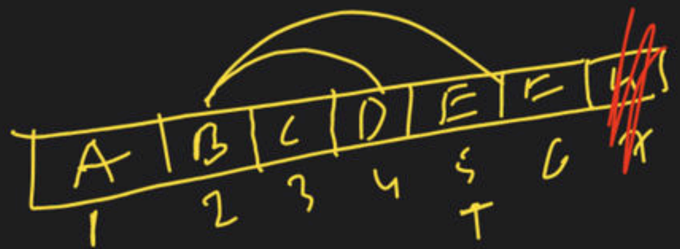
③ A CBT (ACBT) contain n-nodes

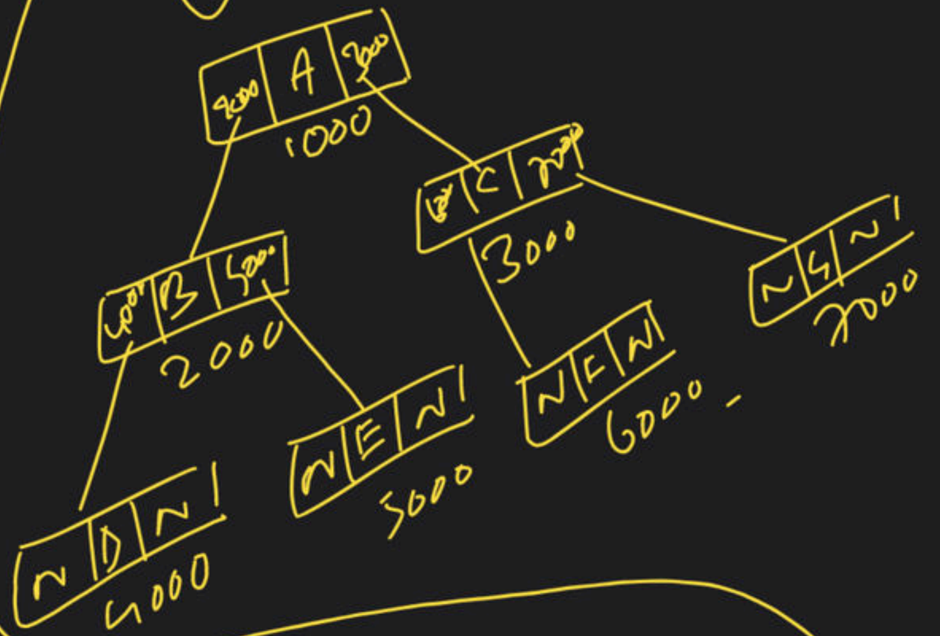
No. of leaf nodes $= \lceil n/2 \rceil$

No. of non-leaf $= \lfloor n/2 \rfloor$

Binary Tree representation

① Array Repn ② Linked List Repn



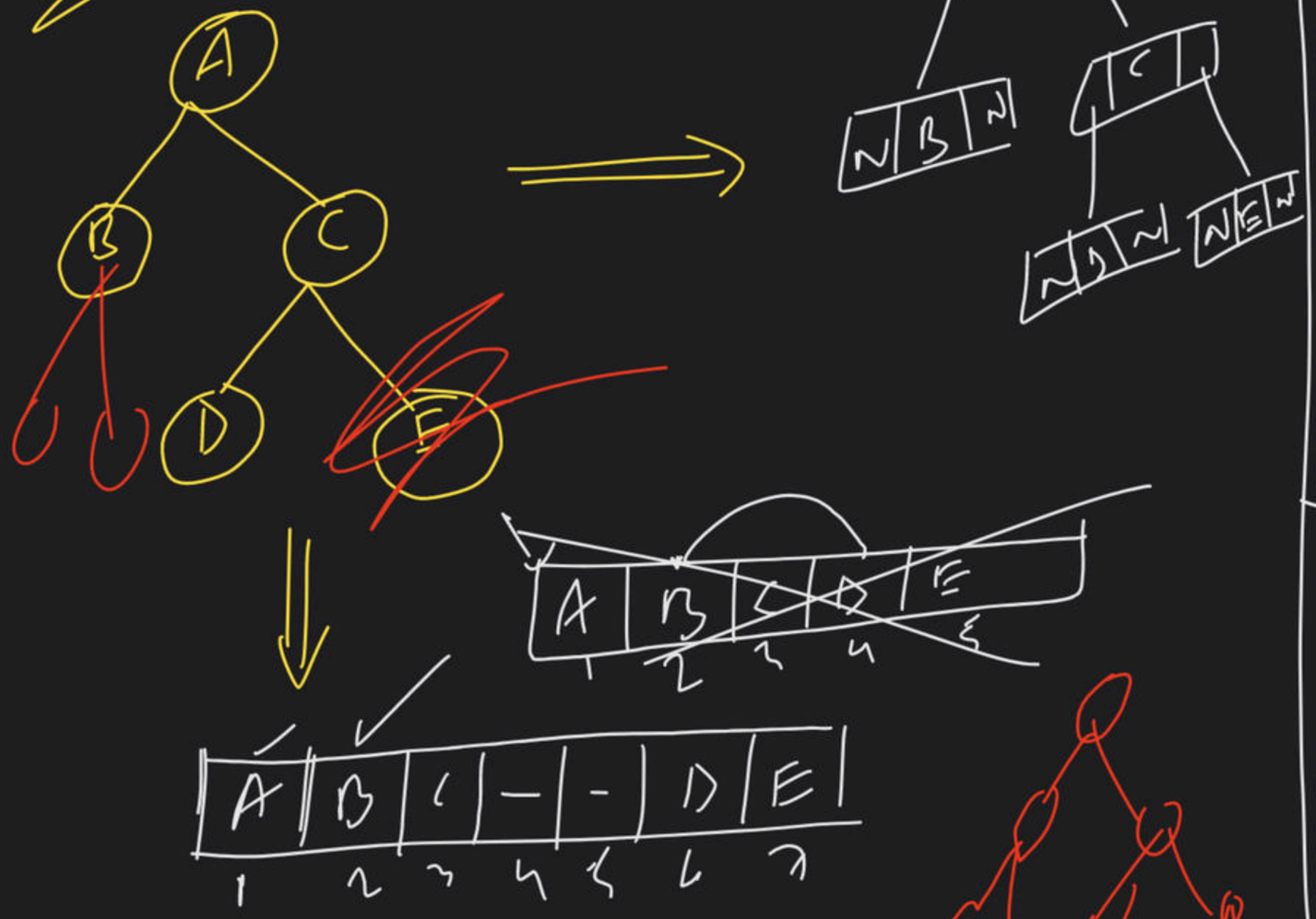


If a node is stored in its place of array in array repn the

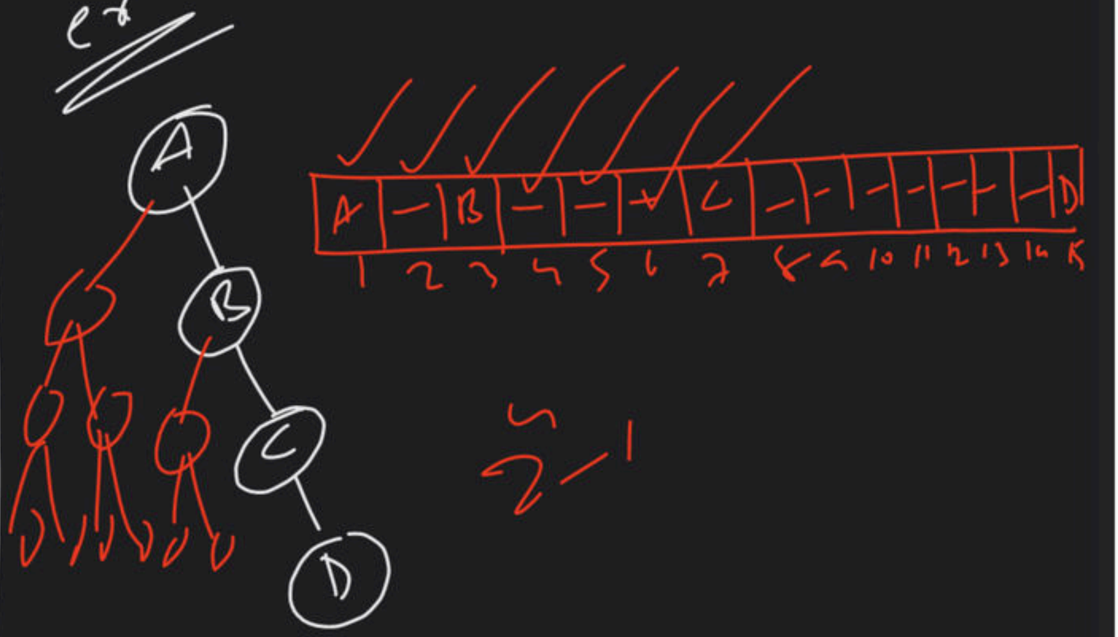
① Parent(i) = $\lfloor i/2 \rfloor$

② Left-child(i) = 2i
Right " = (2i)+1

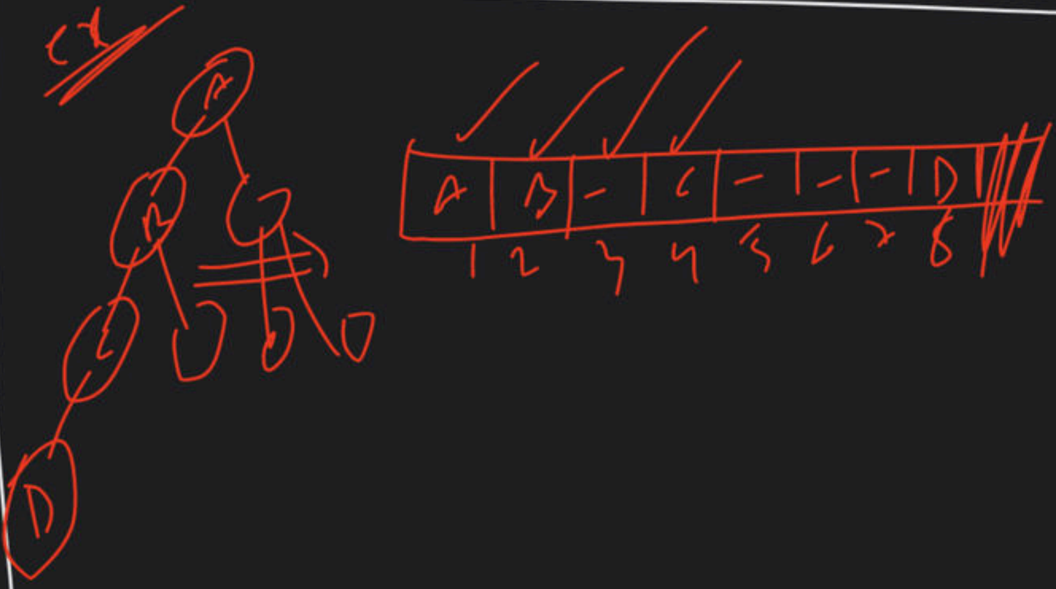
ex



ex



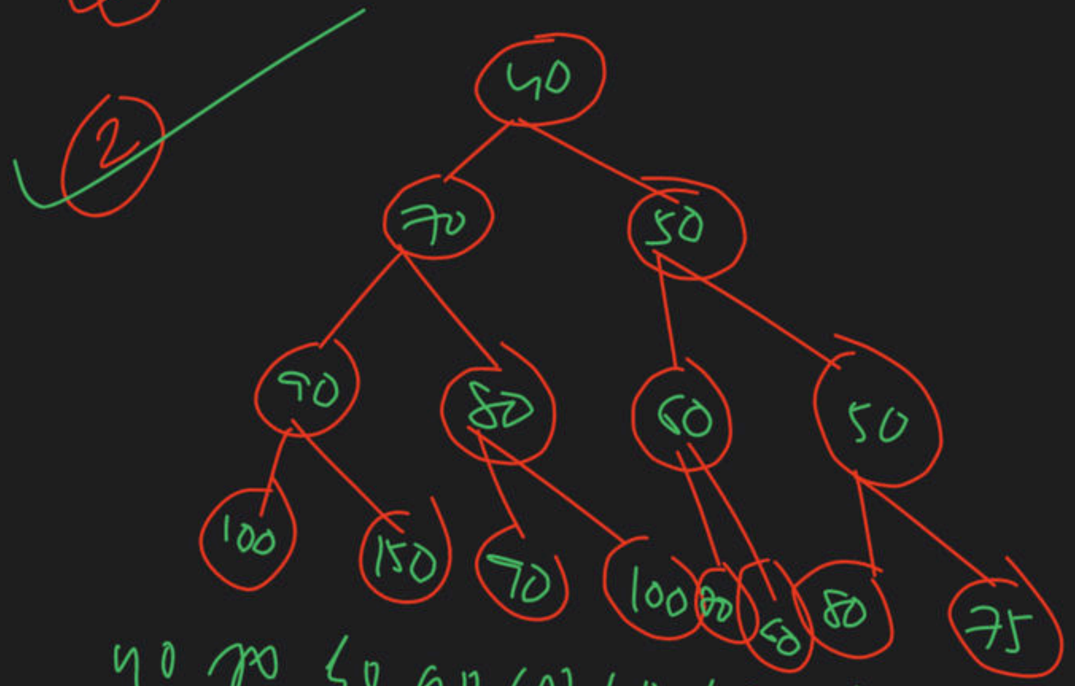
ex



Heap Tree

Minheap Tree

1. ACBT



40 70 50 90 80 60 80 100 150 90 101 80 60 80 75

Maxheap

1. ACBT 2.

200 100 90 60 50 10 20 3 4 60 30 5