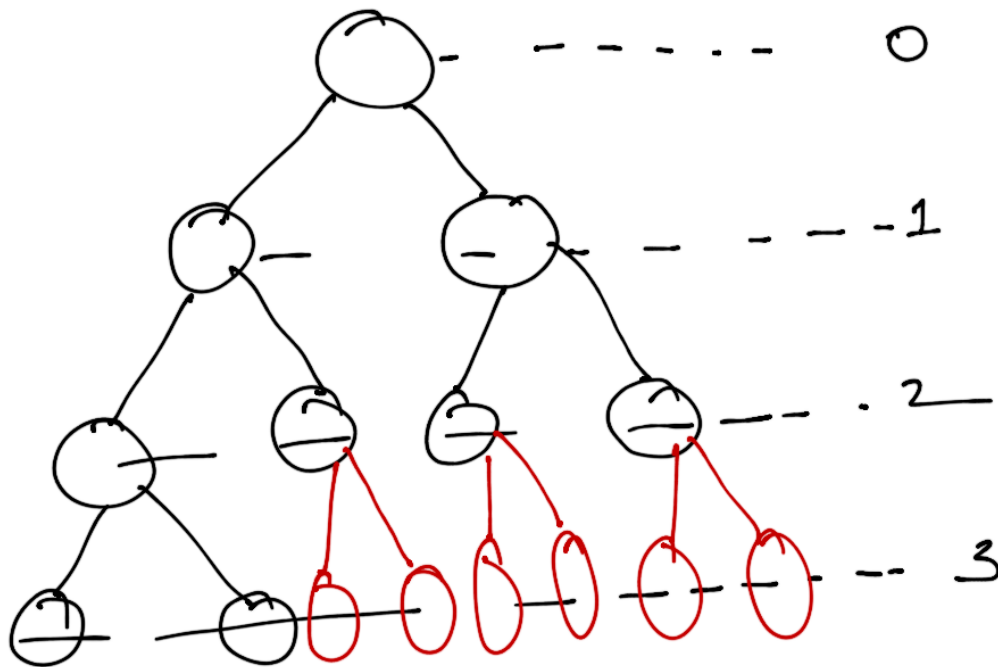


Perfect Binary Tree

→ All internal nodes have 2 children

→ All leaves are at the same level

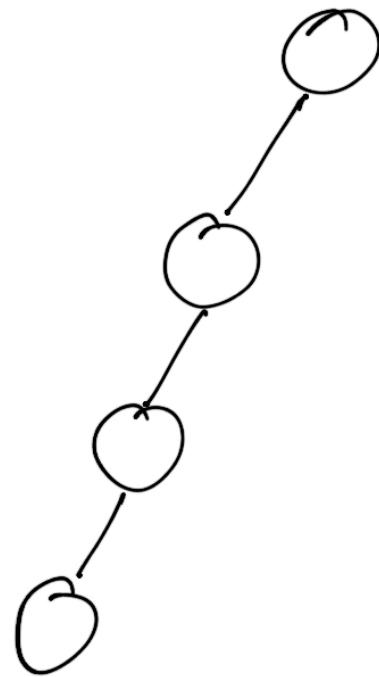


Is this CBT =

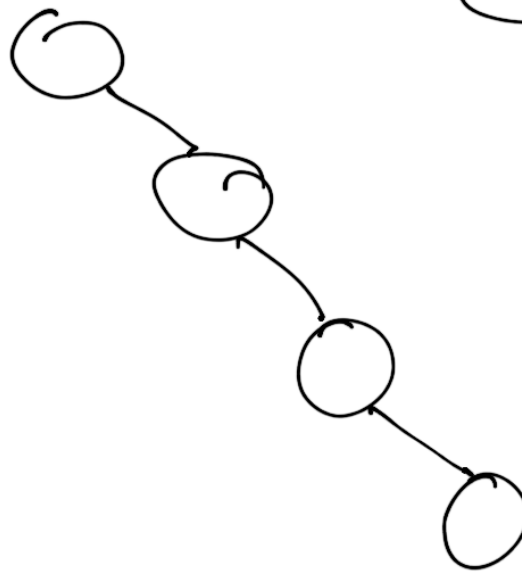
Is this FBT =

Degenerate Binary Tree

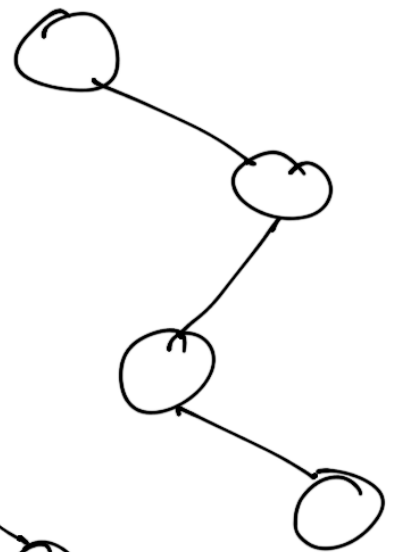
→ All internal nodes have only 1 child



(i) _____



(ii) _____



(iii) _____

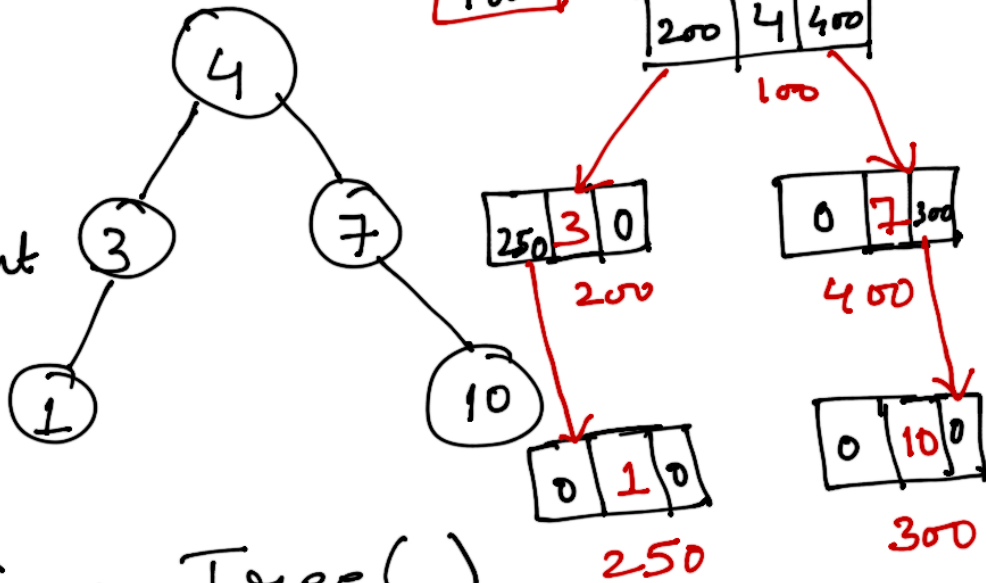
Binary Tree Implementation

Node

{ int data

Node Left, Right

}



Node createBinaryTree()

{

1 newnode = create a newnode

2 Print("Enter data")

3 x = value to insert in node

4 if ($x == -1$)

5 { return 0; }

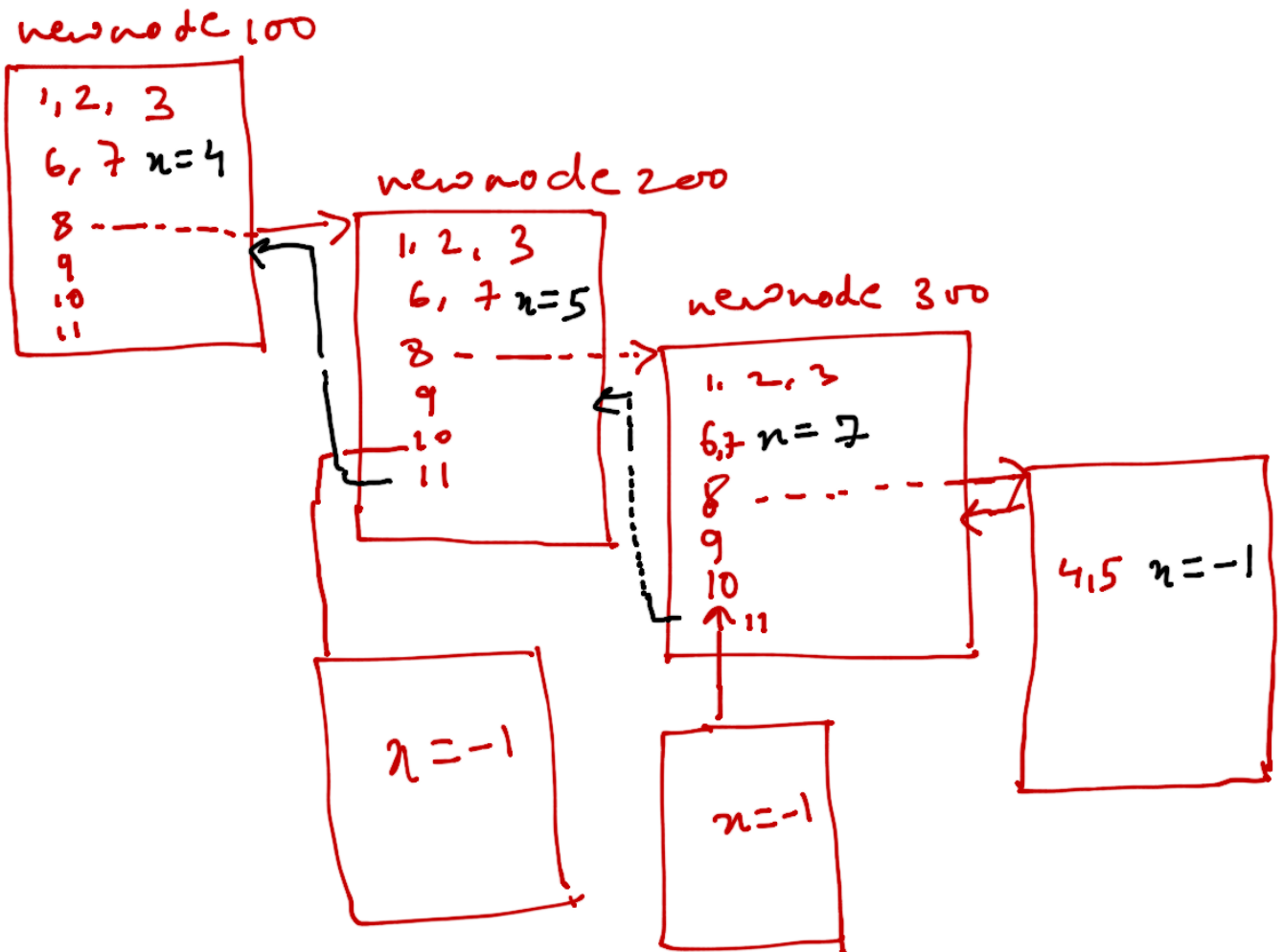
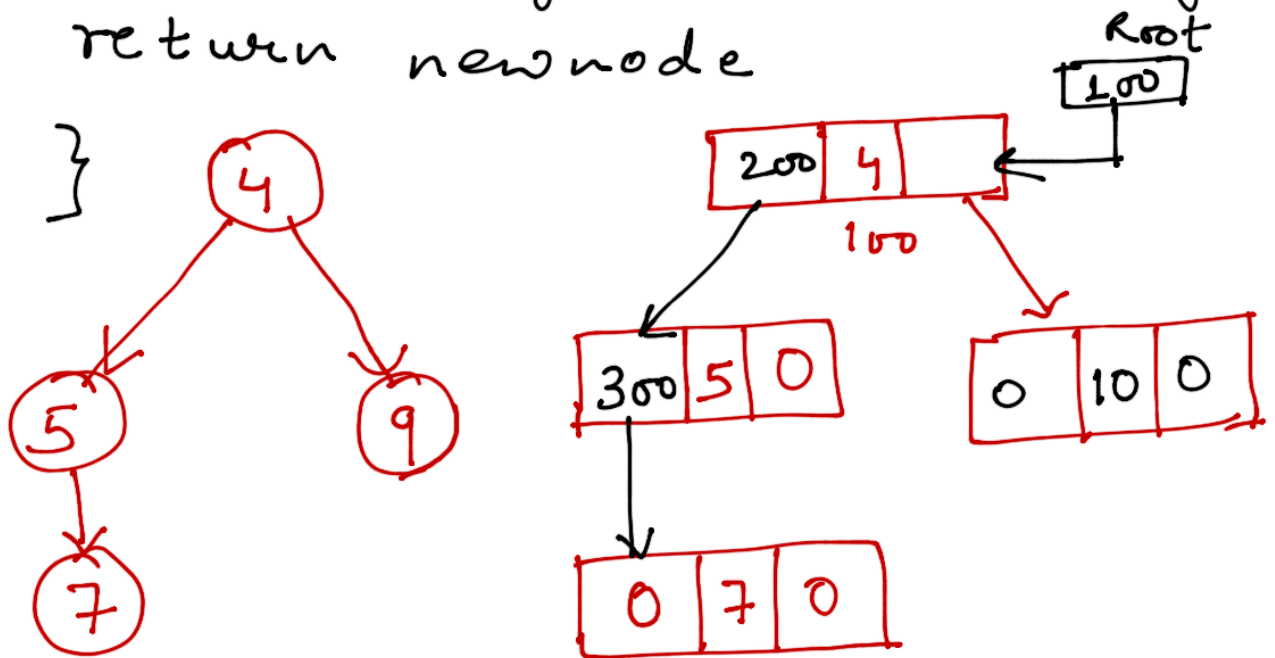
6 newnode \rightarrow data = x

7 Print("Enter left child")

8 newnode \rightarrow left = createBinaryTree()

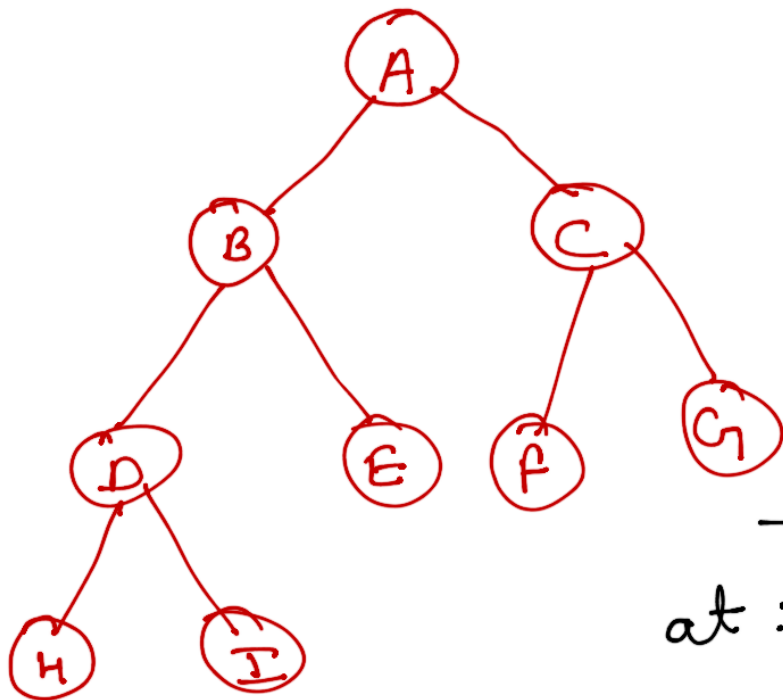
9 Print("Enter right child")

- 10 newnode \rightarrow Right = createBinaryTree
- 11 return newnode



Array Implementation of Binary Tree

— Sequential Representation



A	B	C	D	E	F	G	H	I
0	1	2	3	4	5	6	7	8

If a node is at i^{th} index

→ Left child would be at: $[2i + 1]$

→ Right child: $[2i + 2]$

→ Parent: $\left\lfloor \frac{i-1}{2} \right\rfloor$

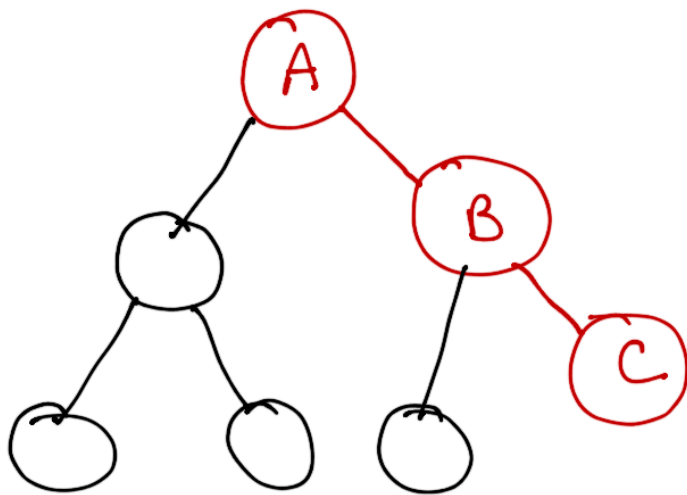
A	B	C	D	E	F	G	H	I
1	2	3	4	5	6	7	8	9

If a node at i^{th} index

→ Left child = $2i$

→ Right child = $2i + 1$

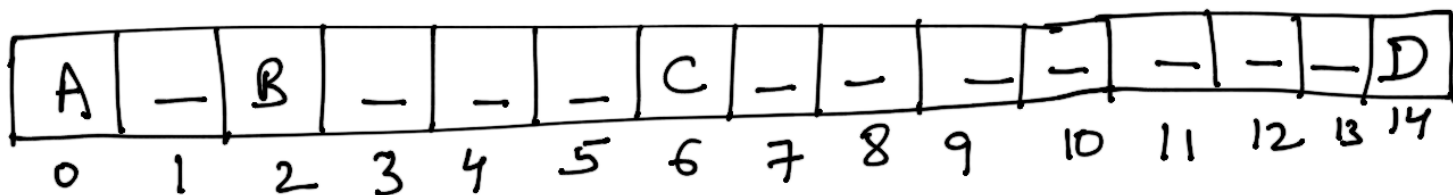
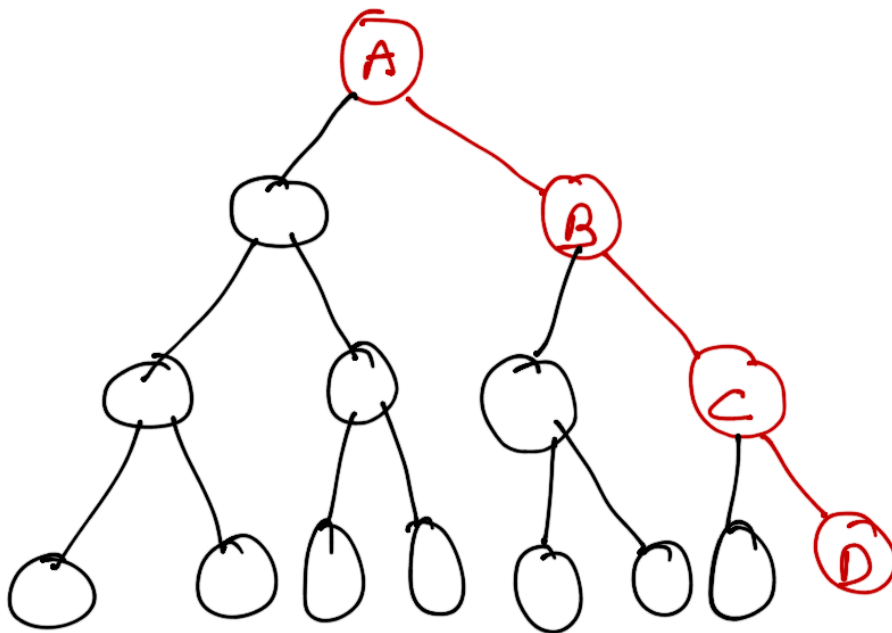
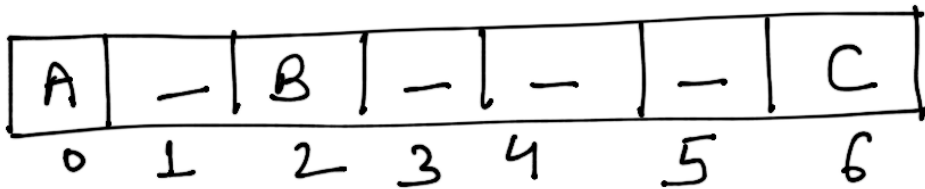
→ Parent = $\left\lfloor \frac{i}{2} \right\rfloor$



$i = 2$ for 'B'

$$\begin{aligned}
 \text{Right child} &= 2^i + 2 \\
 &= 2 \times 2 + 2 \\
 &= 6
 \end{aligned}$$

C

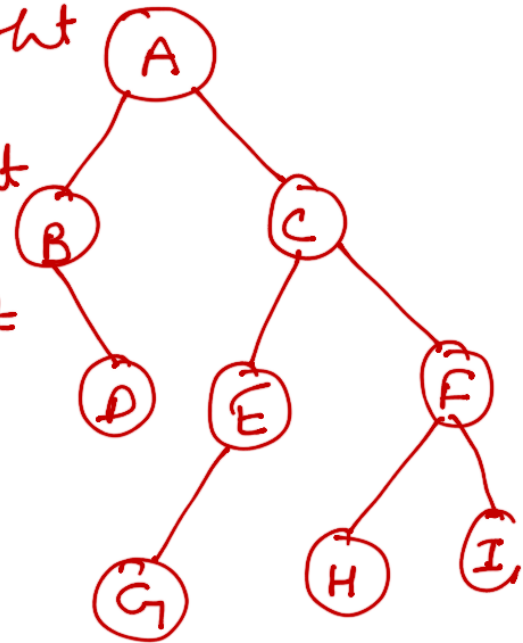


Tree Traversal

Inorder - Left, Root, Right

Preorder - Root, Left, Right

Postorder - Left, Right, Root



Inorder

B D A G E C H F I

Preorder

A B D C E G F H I

Postorder

D B G E H I F C A