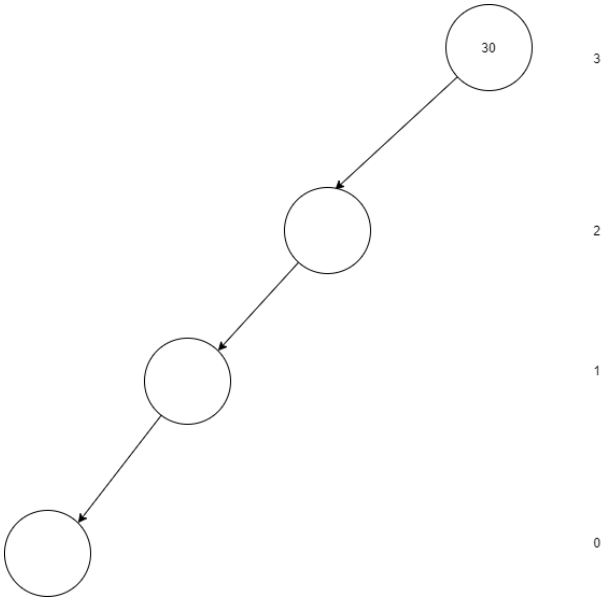
Name_____Kan Katpark___ID_____642115003_____Group_____

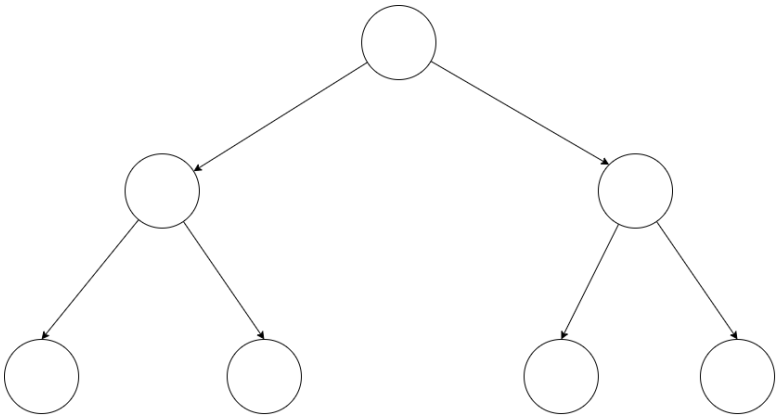
Tutorial 8

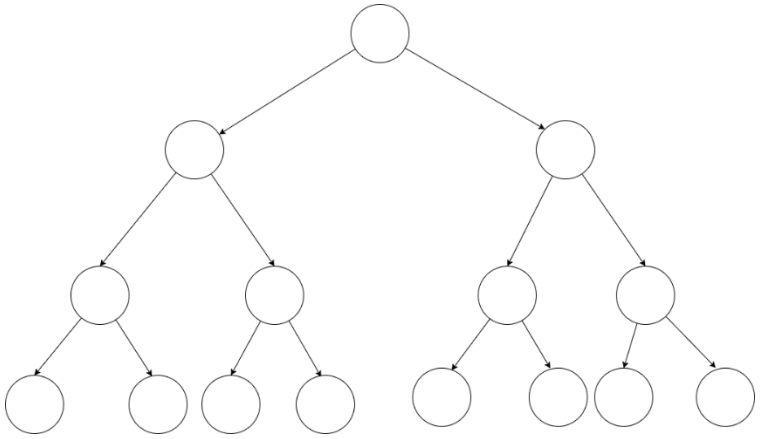
Binary Tree

1. Draw a Binary Tree stored integer number having root node = 30, there are 3 nodes on the left of the Tree and the height of this tree is 3

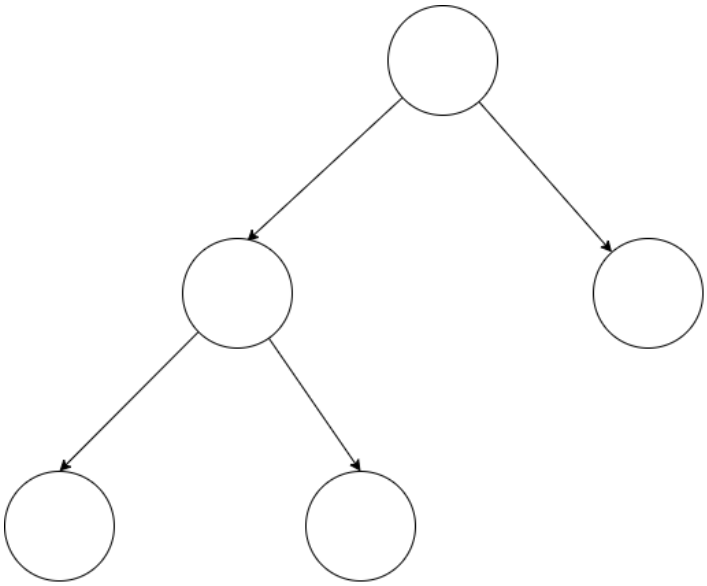


2. Give 2 example of Full Binary Tree





3. Give 2 example of complete binary tree which is not a full binary tree



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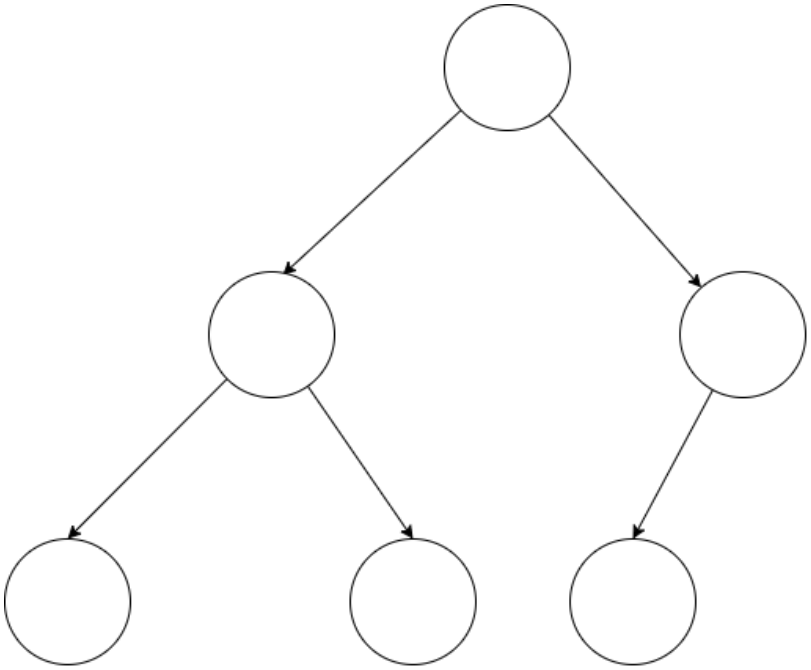

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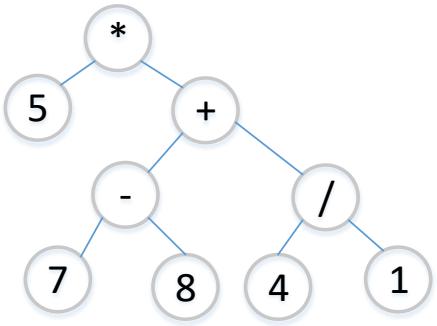
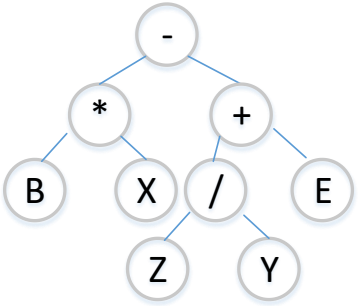
4. Binary Tree can be used to represented mathematical expression. We usually use “Infix” expression in everyday life i.e. a+b to say “a plus b”, but there are 2 more possible formats which are “prefix and postfix” i.e. “+ab and ab+” respectively. Use the inorder, preorder, and postorder traversals to determine the infix, prefix, and postfix expression from the following tree

4.1



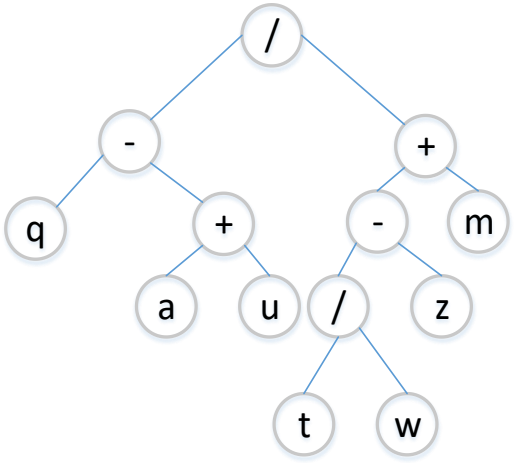
Infix: 5 * ((7-8)+(4/1))

4.2



Prefix: -*BX+/ZYE

4.3



Postfix: qau+-tw/z-m+/

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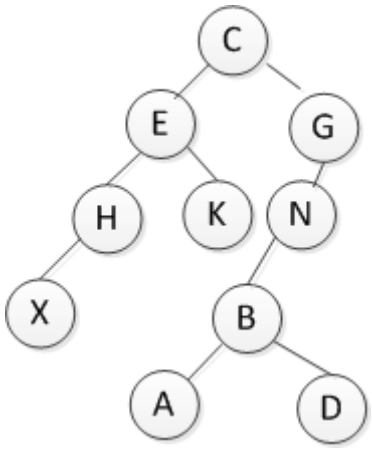
5. From the following tree:



In order Traversal : XHEKCABDNG

Pre-order Traversal: CEHXKGNBAD

Post order Traversal: XHKEADBNGC

6. Infix to prefix expression conversion using stack

(2+**45**^6/(7+8))

6.1 Reverse the infix expression

))8+7(/6^**45**+2(

6.2 Make every ‘(‘ as ‘)’ and every ‘)’ as ‘(‘

((8+7)/6^**45**+2)

6.3 Convert expression to postfix form

Expression	**Stack**	**Output**	**Comment**
((8+7)/6^**45**+2)			Initial
(8+7)/6^**45**+2)	(		Push
8+7)/6^**45**+2)	((		Push
+7)/6^**45**+2)	((	8	Keep
7)/6^**45**+2)	((+	8	Push
)/6^**45**+2)	((+	87	Keep
/6^**45**+2)	(	87+	Pop stack until find (
6^**45**+2)	(/	87+	Push
^**45**+2)	(/	87+6	Keep
45+2)	(/^	87+6	Push
+2)	(/^	87+6**45**	Keep
+2)	(	87+6**45**^/	+ priority is smaller than ^ and /
2)	(+	87+6**45**^/	Push
)	(+	87+6**45**^/2	Keep
		87+6**45**^/2+	Pop all and End

6.4 Reverse the expression and show the result

Postfix : 87+6**45**^/2+

Infix : +2/^**45**6+78

Result = +2/^**45**6+78