

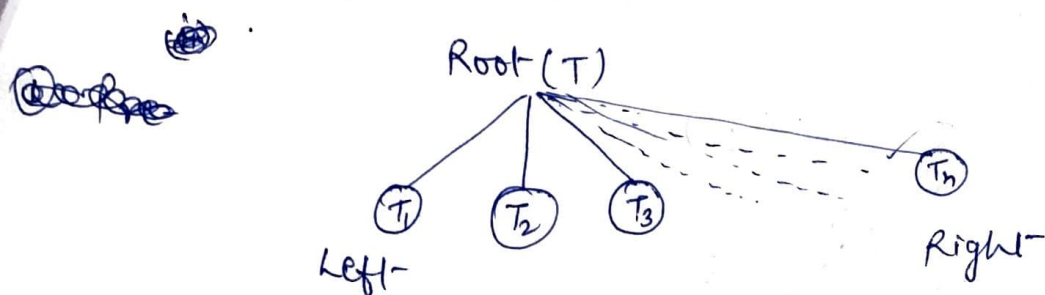
Tree Traversal

* a listing of the vertices of a tree

* used for data retrieval

mainly 3 types :-

(i) Pre-order (ii) in order (iii) Post order



① Pre-order traversal :-

$R, T_1, T_2, T_3 \dots T_n$ (prefix form/notation)

② In order traversal :-

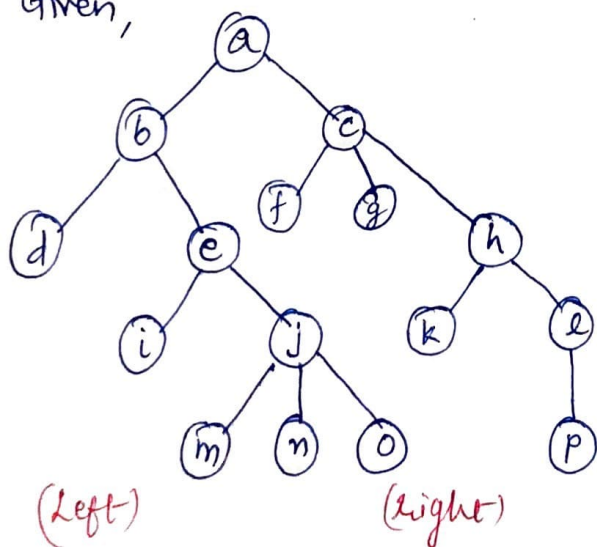
$T_1, R, T_2, T_3 \dots T_n$ (Infix notation)

③ Post order traversal :-

$T_1, T_2, T_3, T_4 \dots T_n, R$ (postfix notation)

Ex 1 - Determine the order in which pre-order, in order, postorder traversal visits the vertices of the given ordered rooted tree also write prefix, infix & postfix notation

Given,



(i) Prefix notation :- $R, T_1, T_2, T_3 \dots T_n$

$a b d e i j m n o c f g h k l p$

(ii) Infix notation :- $T_1, R, T_2, T_3 \dots T_n$

$d b i e m j n o a f c g k h p l$

(iii) Post fix notation :- $T_1, T_2, T_3, T_4 \dots T_n, R$

$d i m n o j e b f g k p l h c a$

Ex 2 Represent the expression

$(x+2)^3 * (y-(3+x))-5$ using a binary tree

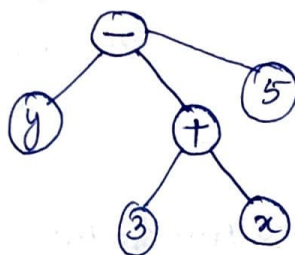
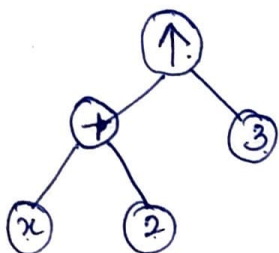
Also write Prefix, Infix, Postfix notation

Solⁿ:- Given expression

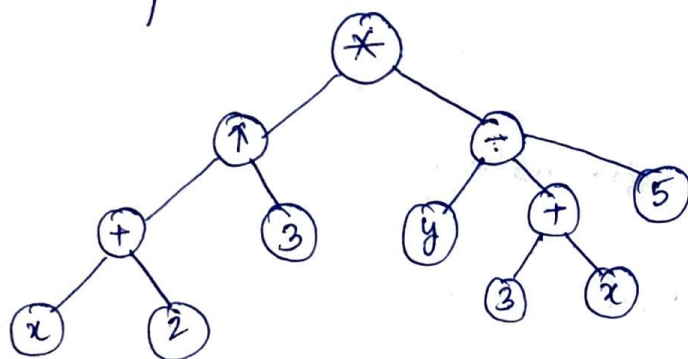
$(x+2)^3 * (y-(3+x))-5$ ^{Precedence} using BODMAS Rule

Separate into 2 parts

$(x+2)^3 * (y-(3+x))-5$



finally add these two trees.



Prefix notation = - - - - -

Infix notation = - - - - -

Postfix notation = - - - - -

Ex 3 what is the value of these prefix expression

(a) $+ * + \overline{5} 3 2 1 4$
 $\quad \quad \quad \uparrow \quad \uparrow$
 $\quad \quad \quad 5-3=2$

$+ * + 2 2 1 4$
 $\quad \quad \quad \uparrow \quad \uparrow$
 $\quad \quad \quad 2+2=4$

$+ * 4 1 4$
 $\quad \quad \quad \uparrow \quad \uparrow$
 $\quad \quad \quad 4 \times 1 = 4$

$+ 4 4$
 $\quad \quad \quad \uparrow \quad \uparrow$
 $\quad \quad \quad 4+4=8$

∴ Value of expression is 8 (Ans)
Ans

What is the value of these postfix expression

$$5 \ 2 \ 1 \ - \ - \ 3 \ 4 \ + \ + \ *$$

$2-1=1$

$$5 \ 1 \ - \ 3 \ 4 \ + \ + \ *$$

$5-1=4$

$$4 \ 3 \ 4 \ + \ + \ *$$

$4+1=5$

$$4 \ 3 \ 5 \ + \ *$$

$3+5=8$

$$4 \ 8 \ *$$

$4 \times 8 = 32$

\therefore value of expression is 32

H.W. Q.7, Q.8, Q.9, Q.10, Q.17, Q.18, Q.19, Q.20
Q.23, Q.24, Q.25 (Page no. 661)

book \rightarrow Kenneth H. Rosen