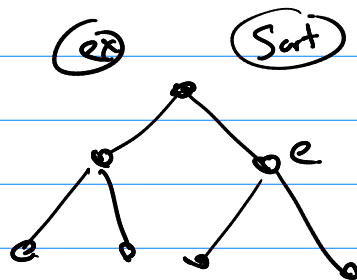


Math 322

Expression Trees

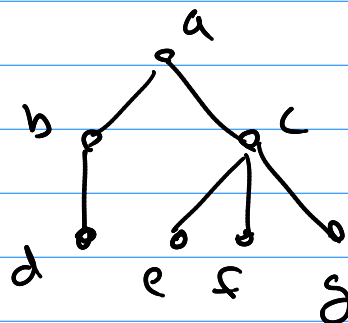
(1) Traverse!



short height = good
internal vertices = cross road
and we can skip $n-1$ children

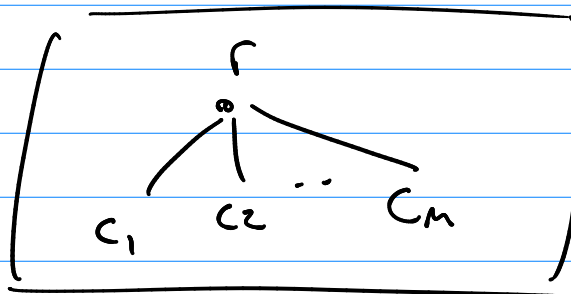
who is everyone?

get a linear order
of everyone?



In-Order Traversal

(n -ary)



1st child, root, everyone else

in-order sort : $c_1, r, c_2, c_3, \dots, c_n$

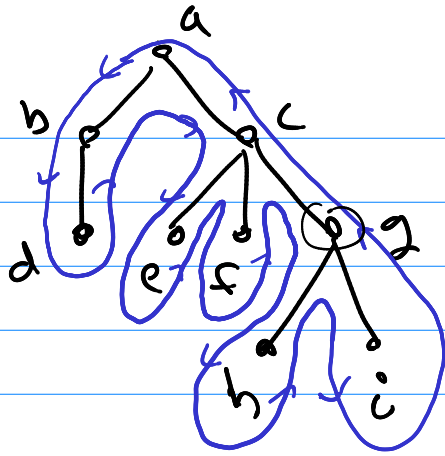
Pre-Order traversal : root, 1st child, rest

Pre-order sort : root, $c_1, c_2, \dots, c_n$

Post-Order traversal : 1st child, all children, root

Post-order sort : $c_1, c_2, \dots, c_n, r$

(ex)



pre-order: a, b, d, c, e, f, g, h, i

in-order: d, b, a, e, c, f, h, g, i

post-order: d, b, e, f, h, i, g, c, a

Traversals

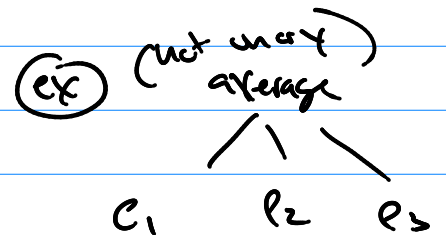
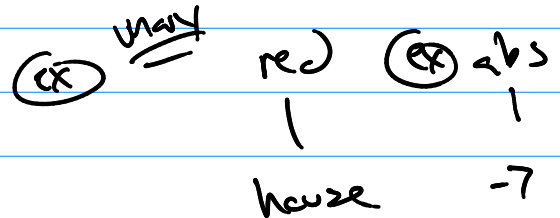
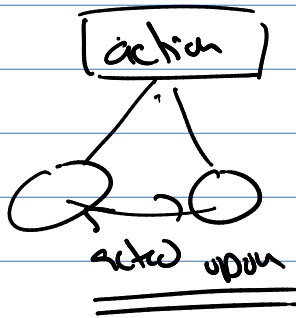
why?

(1) culture King pre-order

(2) Math $\rightarrow$ operations

unary ops

do something to one thing.

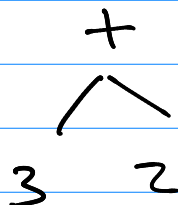


red
|
house

pre order: red house
in order: house red
post order: house red

not unary

binary



pre-order: +, 3, 2
in-order: 3, +, 2
post-order: 3, 2, +

n-ary

average

c1 p2 p3

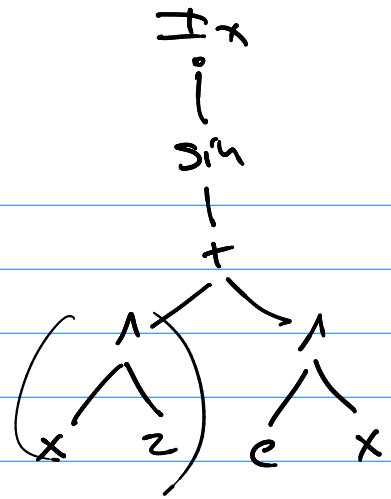
pre-order: ave, c1, p2, p3
in-order: c1, ave, p2, p3
post-order: c1, p2, p3, ave

Math tree $\equiv$ expression tree

traditional notation

$$\int_x \sin(x^2 + e^x)$$

$$\int_x () = \int () dx$$



pre-order $\equiv$ prefix notation

in-order = infix notation

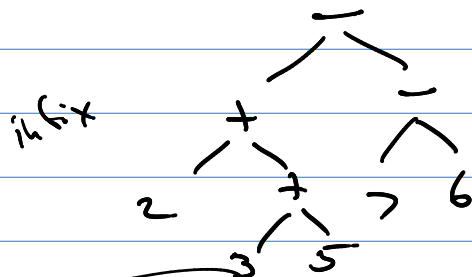
post-order = postfix notation

$\int_x, \sin, +, 1, x, 2, 1, e, x$

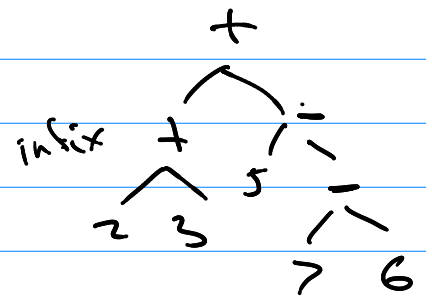
$x, 1, 2, +, e, 1, x,$ $\sin, \int_x$

$x, 2, 1, e, x, 1, +, \sin, \int_x$

$2, +, 3, +, 5, 1, 7, -, 6$



Post fix $2, 3, 5, +, +, 7, 6, -, -$



Post fix $3, 2, +, 5, 7, 6, -, -$

Exam 2

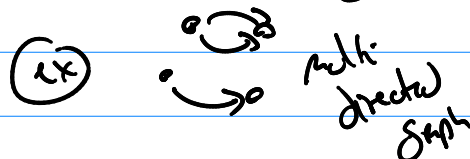
11 probs @ 10pts

10pts = 100%

draw graphs

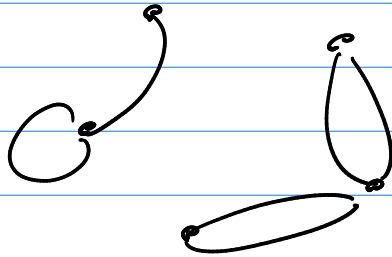
8 probs

① Name that graph $\equiv$ draw given a name

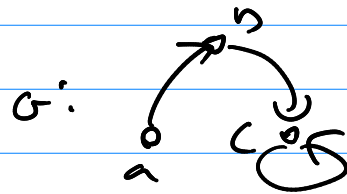


(2) draw graphs with specific properties.

(ex) pseudo graph with 5 vertices and only 2 have odd degree



(3) Paths in graphs



give paths with specific properties

(ex) not a path : a, b, c, a
! no edge !

(4/5) about isomorphic graphs
1) is not isomorphic (explain)
2) is isomorphic (show)

(6) Euler Path / Circuit problem (tree or cat puzzle)

(7) Hamilton Circuit

(8) Dijkstra's Algorithm (given a weighted graph)
run

trees | ch 10

3 probs.

find fake?

- (1) Decision Tree involving (cons)
- (2) tree traversals
- (3) notation (expression trees)