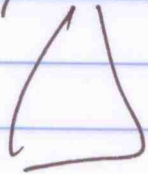


Argument
Red/Black Tree w/ local info

no elts



$\Theta(\lg n)$

insert/delete

change tree

search/insert

non destructive

max/min

h^{th} largest

$\Theta(\lg n)$

once min
 h -times search repeatedly

$\Theta(h \lg n)$

$h = n/2 \rightarrow \cancel{\Theta(n \lg n)} \quad \Theta(\lg n)$

local

Add information to the tree



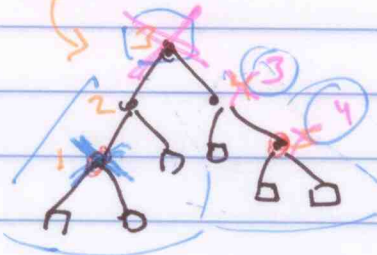
add "h" to tree nodes

ordinal position

in that sub tree

$a_1, \dots, a_n, a_3 \leq a_4 \leq a_5$

Compute BD
in $\Theta(\text{height})$!

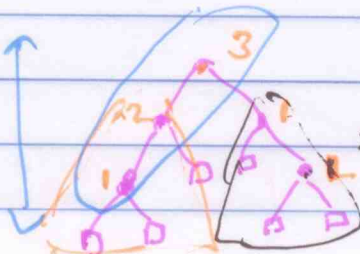


$\Theta(\lg n)$



$\Theta(n)$

h - local index
value
in root
of subtree



$h \neq 3$ - same
 $h > 3$ - $h-3$

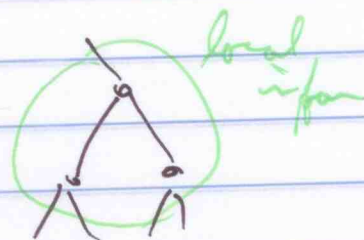
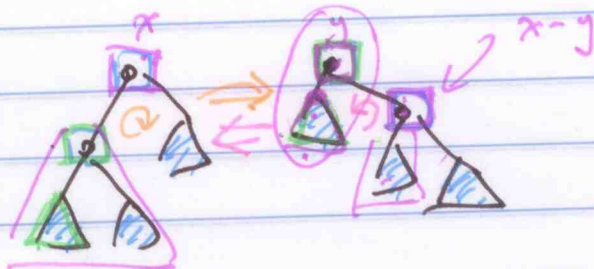
\downarrow
 $2a$

Insert

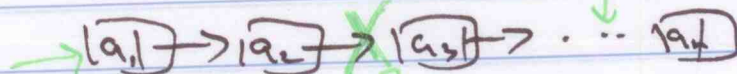


delete

rotation

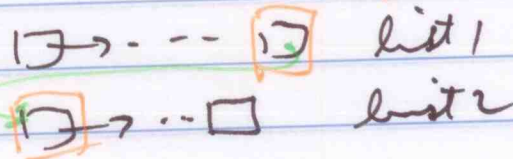


Use R/B trees to implement list.

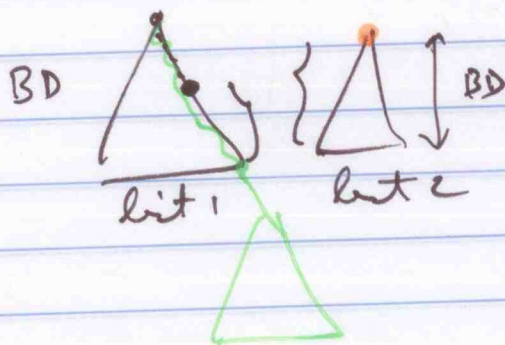


Split a list

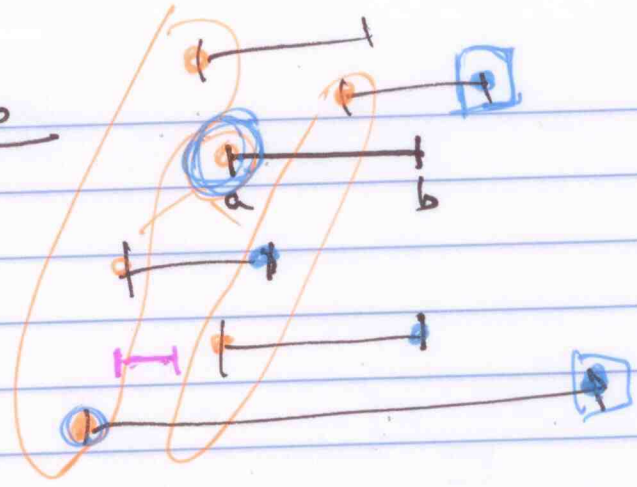
Concatenate lists



$\Theta(\log \text{length})$



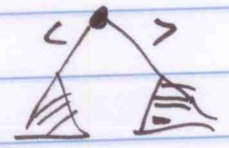
Interval trees



Insert
Delete } as before

Search for overlap. — i

1) lexicographic
low(i) left endpoint



Segment w/ MAX value in subtree

