

CSE 101

2-15-22

1

• Pas: ext. 1 last day (Wed. 2/16)

• Pa 6 :

Example $b = 100, P = 2$

(88 21 33)

+ (65 91 79)

1 1 1 0
(153 112 112)

-100 -100 -100

(01 54 13 12)

vector-sum

normalize

Ex. Subtraction ($b=100, P=2$)

$$\begin{array}{r} (88 \quad 21 \quad 33) \\ - (65 \quad 91 \quad 79) \\ \hline \end{array}$$

$$\begin{array}{r} \begin{array}{ccc} -1 & -1 & 0 \\ (23 & -70 & -46) \\ & 100 & 100 \end{array} \end{array}$$

no-normalize

$$(22 \quad 29 \quad 54)$$

EX

65 91 79

88 21 33

-23 70 46

no-normalize

↑
leftmost
digit
negative

change sign
no-normalize
again

-1 -1 0

23 -70 -46

100 100

-1

-1

(22 29 54)

new list

↓
return
sign

note: can write helper funcs
in `BigInteger.cpp`, not in
class, just have off Prefix
`BigInteger::`

Dictionary ADT

State: a set of ordered pairs of the form $(key, value)$.

i.e. a state is a set

$$\{ (k_1, v_1), (k_2, v_2), \dots, (k_n, v_n) \}$$

option: keys are distinct.

operations

- $lookup(k)$: returns value associated with key k , or return nil if k not found.

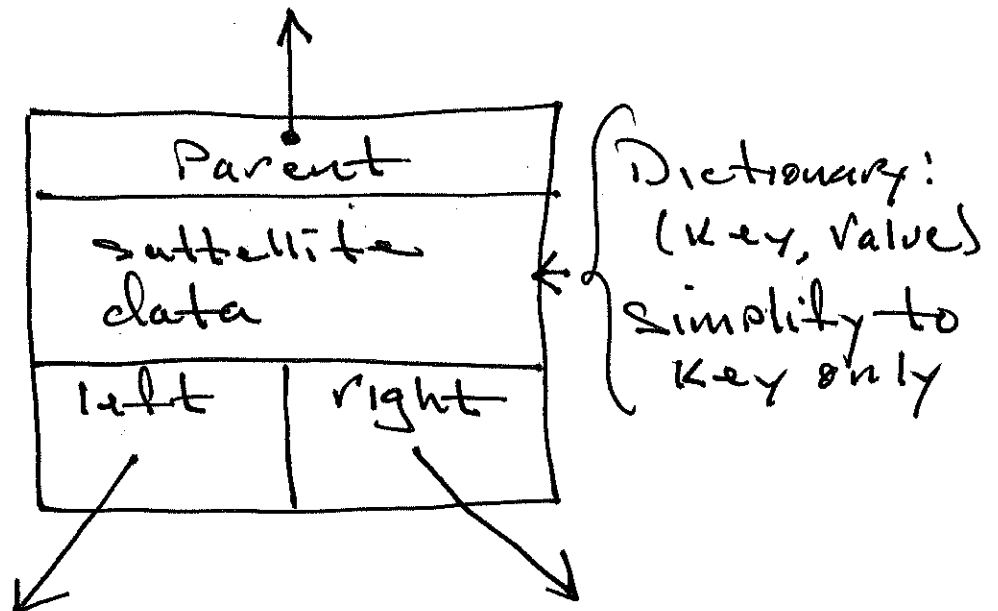
- $\text{insert}(k, v)$: adds new Pair to Dictionary, or overwrites value (k, v) if it exists.
- $\text{delete}(k)$: remove Pair (k, v) from dictionary. Pre: $\text{lookup}(k) \neq \text{nil}$.

Implementation

Binary search tree (BST)

(see chap. 12 in CLRS)

Node



BST Properties

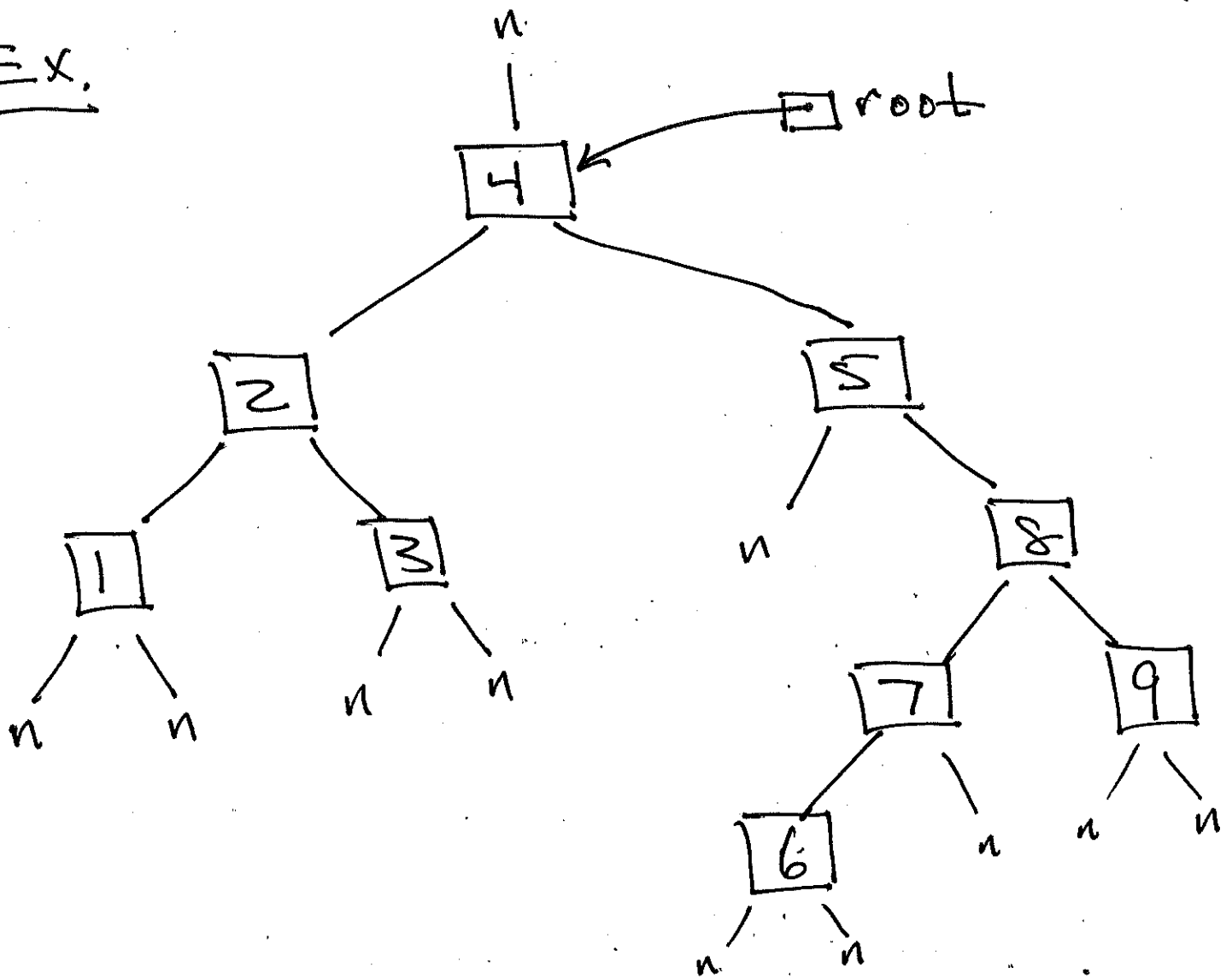
Let x, y be nodes in a BST.

Then

(1) if y is in left subtree of x ,
then $\text{key}[y] \leq \text{key}[x]$

(2) if y is in the right subtree
of x , then $\text{key}[x] \leq \text{key}[y]$.

Ex.



Defn

- a leaf is a node having no children
- an internal node is a non-leaf.

Implementation Recommend: dummy node called ~~nil~~ NIL as a field.