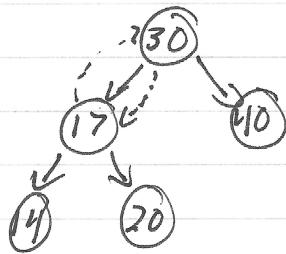


# Fast insertion into a sorted array

## Binary Search Tree

- stronger invariant than heap



node  $x$  :  $\text{key}(x)$

Pointers : unlike a heap

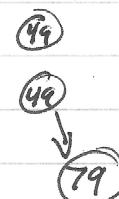
$\text{parent}(x)$

$\text{left}(x)$

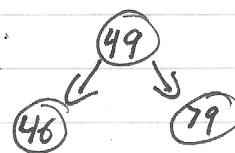
$\text{right}(x)$

Invariant: For all nodes  $x$ , if  $y$  is in the left subtree  
of  $x$   $\text{key}(y) \leq \text{key}(x)$   
 $y$  is the right .....  $\text{key}(y) \geq \text{key}(x)$

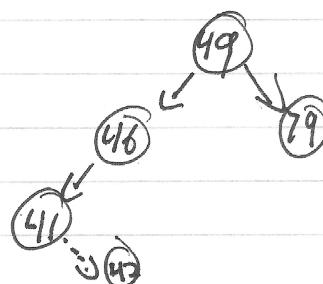
Insert      Insert 49  
                Insert 79



Insert 46



Insert 41



Insert 42  
( $k=3$ )

42 with 49 ✓  
42 with 46 ✓  
41 with 42 X