

### The Dictionary (a.k.a. Map) ADT

Dictionary ADT

State:

- Set of **unique** (key, value) pairs
- Keys can be compared for equality

Operations:

- **insert(key val)** – places (key,val) in map. (If key already used, overwrites existing entry)
- **find(key)** – returns val associated with key
- **delete(key)**

We will tend to emphasize the keys, but don't forget about the stored values!

7/06/2022 6

6

### Simple implementations

For dictionary with  $n$  key/value pairs. (No duplicates allowed!)

	insert	find	delete
Unsorted Linked-List			
Unsorted Array			
Sorted Linked-List			
Sorted Array			

7/06/2022 9

9

### Tree Traversals

A *traversal* is an order for visiting all the nodes of a tree

- *Pre-order*: root, left subtree, right subtree
- *In-order*: left subtree, root, right subtree
- *Post-order*: left subtree, right subtree, root

(an expression tree)

7/06/2022 22

22

### Potential Balance Conditions

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1. Left and right subtrees of the **root** have equal **number of nodes**
  
2. Left and right subtrees of the **root** have equal **height**

7/06/2022 43

43

### Potential Balance Conditions

3. Left and right subtrees of every node  
have equal number of nodes
  
4. Left and right subtrees of every node  
have equal height

7/06/2022

45