CS240

Nathan Sprague

November 12, 2014

Map ADT

Map ADT (or Dictionary or Associative Array)

- `m[k]` - Return the value `v` associated with key `k`.

- `m[k] = v` - Associate value `v` with key `k`, replacing existing value if there is one.

- `del m[k]` - Remove the item associated with key `k` from the map.

- `len(m)` - Return the number of items in the map.

- `iter(m)` - Return an iterator over the keys in the map.

- remove(key) - Remove key and its associated value from the map.

- `k in m` - Return True if the map contains an item with key `k`.

Python List-Based Map implementation

- Fill in the following table with the worst-case big-O times.

Unsorted Python List

`len(m)`	
`m[k] = v` (Already in Map)	
`m[k] = v` (Not in Map)	
`m[k]`	
`del m[k]`	

Sorted Python List

`len(m)`	
`m[k] = v` (Already in Map)	
`m[k] = v` (Not in Map)	
`m[k]`	
`del m[k]`	

Python List-Based Map implementation

- Fill in the following table with the worst-case big-O times.

Unsorted Python List

`len(m)`	$O(1)$
`m[k] = v` (Already in Map)	$O(n)$
`m[k] = v` (Not in Map)	$O(n)$
`m[k]`	
`del m[k]`	$O(n)$

Sorted Python List

`len(m)`	$O(1)$
`m[k] = v` (Already in Map)	$O(\log n)$
`m[k] = v` (Not in Map)	$O(n)$ [1]
`m[k]`	$O(\log n)$
`del m[k]`	$O(n)$ [1]

---

[1]Other items must be shifted.