

PA5 due Tuesday  
PA2 Late/Resubmit due Tuesday

### Map and HashTable

#### Hash Function

```
int getIndex(String k) {
    return k.length();
}
```

# of buckets = 6  
(i.e. the size of the array)

key	index
Smith	1
Johnson	2
Williams	3
Brown	4
Jones	5
Garcia	6
Miller	7
Davis	8
Rodriguez	9
Martinez	10

Draw the picture of the HashTable using Separate Chaining (no expandCapacity)

index	key
0	Garcia, 65; & Miller, 75
1	Johnson, 25
2	Williams, 35; & Martinez, 105
3	Rodriguez, 95
4	Smith, 15; & Brown, 45; & Jones, 55; & Davis, 85

#### Mapping keys to values

```
class KeyValuePair<K, V> {
    K key;
    V value;
}
```

What is the run-time for this HashTable (do picture first):

set()

Worst Case:  $\Theta(n)$  or  $\Theta(n)$  w/ no expand capacity

Best Case:  $\Theta(1)$

What conditions make up the best case for set()? empty list for a bucket (no collision) even distribution

get()

Worst Case:  $\Theta(n)$

Best Case:  $\Theta(1)$

What conditions make up the best case for get()? Empty bucket 1 element in bucket 1st element in a chain even distribution  $\rightarrow \log(n)$

$N=10$   
Set  $\rightarrow$  add max 5 letter names  
 $\rightarrow$  LL add  $\Theta(n)$   
 $\rightarrow$  AL add  $\Theta(1) \rightarrow [\Theta(n) \text{ expand capacity}]$   
 $\rightarrow$  LL prepend  $\Theta(1)$

get("Davis")  
4 comparisons

get("Greys")  
4 comparisons

get("Greg")  
0 comparisons

key value  
Map < String, Integer >

Array List < Key Value Pair < String, Integer > > contents;

AL < Key Value Pair < S, I > [ I ] contents = [ 6 ]

