

PA5 due tomorrow
 PA2 Late/Resubmit due tomorrow

Hash Function (same as previous)

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

of buckets = 4
 (i.e. the size of the array)

expandCapacity() called in set()

LoadFactor = 0.75

```
set("Smith", 1);
set("Johnson", 2);
set("Williams", 3);
set("Brown", 4);
set("Jones", 5);
set("Garcia", 6);
set("Miller", 7);
set("Davis", 8);
set("Rodriguez", 9);
set("Martinez", 10);
```

Draw the picture of the HashTable using Separate Chaining (using expandCapacity)

Does the run-time change with expandCapacity()? *no*

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

Worst Case *$\Theta(n)$*

Best Case *$\Theta(1)$*

What conditions make up the best case for set()? *no collisions, or 0, 1, 2 items in bucket*

Worst Case *$\Theta(n)$*

Best Case *$\Theta(1)$*

What conditions make up the best case for get()? *even distribution*

Why is the hash function important?

size >= expand capacity
 capacity

LoadFactor = 0.75

key	hash	index	LP
Smith, 1	5	5	1/4 → 0.25
Johnson, 2	6	6	2/4 → 0.5
Williams, 3	3	3	3/4 → 0.75, 3/8
Brown, 4	0	0	4/4 → 1.0
Jones, 5	1	1	5/4 → 1.25
Garcia, 6	2	2	6/4 → 1.5
Miller, 7	3	3	7/4 → 1.75
Davis, 8	0	0	8/4 = 2.0
Rodriguez, 9	1	1	9/4 = 2.25
Martinez, 10	2	2	10/4 = 2.5

re-hash →

0	→
1	→
2	→
3	→
4	→
5	→ { Smith, 1, Brown, 4, Jones, 5, Davis, 8 }
6	→ { Garcia, 6, Miller, 7 }
7	→ { Williams, 3, Martinez, 10 }
8	→ { Rodriguez, 9 }
9	→
10	→
11	→
12	→
13	→
14	→
15	→

clustering
 ↓
 bad hash function