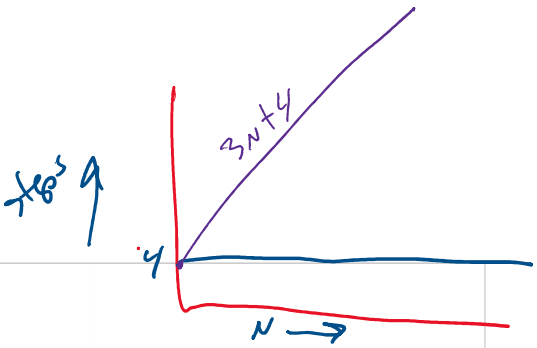
CSE12 - Lecture 9

Wednesday, October 18, 2023 8:00 AM

PA2 → slip day → Thur @8am

PA3 released today



Lecture 9

Counting Steps

N → # of elements in the structure

ArrayList Insert - ignore ExpandCapacity

```
public void insert(int index, String s) {
  //expandCapacity();   //ignore
  for (int i = size - 1; i >= index ; i--) {
    this.elements[i+1] = this.elements[i];
  }
  this.elements[index] = s;
  this.size += 1;
}
```

	Best Case	Worst Case	Avg Case
	0	0	0
	1+1+0	1+(N+1)+N	1+(N/2+1)+N/2
	0	N	N/2
	1	1	1
	1	1	1
	4	3N+4	3/2 N +4

Worst case index = 0

size=	cond	update	body
N=5	1	1	1
i=4			
3			
2			
1			
0	N+1	N	N
-1			

best case index = 5

N=5

i=4

cond	body	update
1	0	0

ArrayList ExpandCapacity

```
private void expandCapacity() {
  int currentCapacity = this.elements.length;
  if(this.size < currentCapacity) { return; }
  String[] expanded = new String[currentCapacity * 2];
  for(int i = 0; i < this.size; i += 1) {
    expanded[i] = this.elements[i];
  }
  this.elements = expanded;
}
```

allocate new array with default value

Best Case	Worst Case	Avg Case
1	1	
1+1	1+0	
0	1+2N+2N	
0	1+(N+1)+N	
0	N	
	1	
3	7N+6	

ArrayList Insert - with ExpandCapacity

```
public void insert(int index, String s) {
  expandCapacity();
  for (int i = size - 1; i >= index ; i--) {
    this.elements[i+1] = this.elements[i];
  }
  this.elements[index] = s;
  this.size += 1;
}
```

Best Case	Worst Case	Avg Case
3	7N+6	
1+1+0	1+(N+1)+N	
0	N	
1	1	
1		
7	10N + 10	

add()

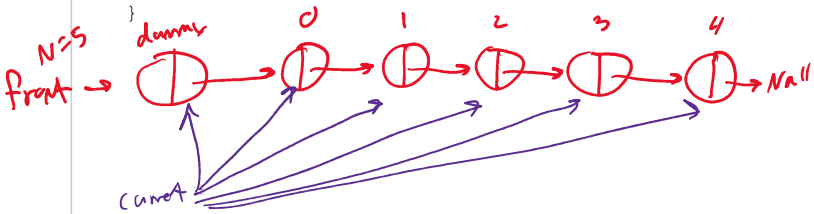
3+2=5 7N+6+2 = 7N+8

Name: _____ PID: _____ Code: 93727

Counting Steps - where size of the contents is *n*

LinkedList Add

```
public void add(String s) {
  Node current = this.front;
  while(current.next != null) {
    current = current.next;
  }
  current.next = new Node(s, null);
  this.size += 1;
}
```



Best Case	Worst Case	Avg Case
1	1	
N+1	N	
N	1	
1	1	
2N+4		

LinkedList Insert

```
public void insert(int index, String s) {
  Node current = this.front;
  for(int i = 0; i < index; i += 1) {
    current = current.next;
  }
  current.next = new Node(s, current.next);
  this.size += 1;
}
```

Best Case	Worst Case	Avg Case
1	1	
1+1+0	1+(N+1)+N	
0	N	
1	1	
1	1	
5	3N+5	

LinkedList Get

```
public String get(int index) {
  Node current = this.front.next;
  for(int i = 0; i < index; i += 1) {
    current = current.next;
  }
  return current.value;
}
```

index = 0 | index = N-1 | index = N/2

Best Case	Worst Case	Avg Case
1	1	1
1+1+0	1+N+(N-1)	1+(N/2+1)+N/2
0	N-1	N/2
1	1	1
4	3N+1	3/2 N+4

ArrayList Get

```
public String get(int index) {
  return this.elements[index];
}
```

Best Case	Worst Case	Avg Case
1	1	1