

Complete expandCapacity for the Circular ArrayList

```

public class CAList<E> implements List<E> {
    E[] contents;
    int size;
    int start;

    @SuppressWarnings("unchecked")
    public CAList(int capacity) {
        this.contents = (E[]) (new Object[capacity]);
        this.size = 0;
        this.start = 0;
    }

    private int indexOf(int index) {
        int ans = (this.start + index) %
            this.contents.length;
        System.out.println("Index for " + index +
            " is " + ans);
        return ans;
    }

    public E get(int index) {
        // ASSUME index is in bounds
        int toLookup = this.indexOf(index);
        return this.contents[toLookup];
    }

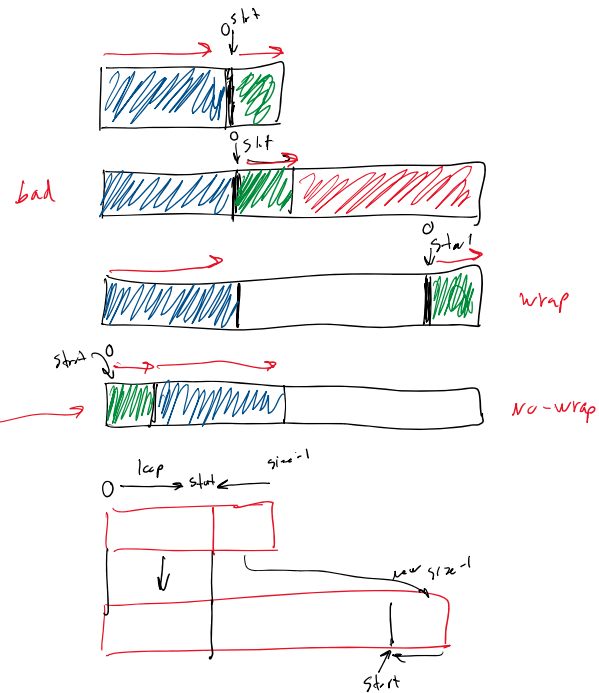
    public void prepend(E value) {
        expandCapacity();
        this.size += 1;
        this.start -= 1;
        if (this.start == -1) {
            this.start = this.contents.length - 1;
        }
        this.contents[this.start] = value;
    }

    public static void main(String[] args) {
        CAList<Integer> a = new CAList<>(20);
        System.out.println(a);
        a.prepend(30);
        System.out.println(a);
        a.add(40);
        System.out.println(a);
        a.prepend(20);
        System.out.println(a);
        a.add(70);
        System.out.println(a);
    }
}

```

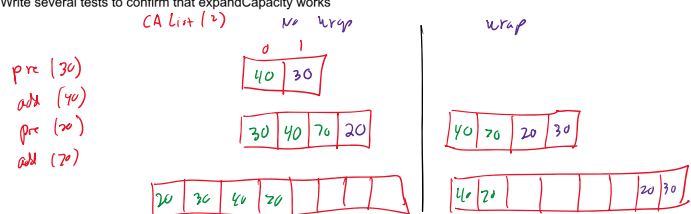
// save old memory
 E[] oldArray = this.contents;
 // create new array
 E[] newArray = (E[]) new Object[2 * current capacity];
 // iterate through old array
 for (int i=0; i < this.size; i++) {
 // new Array [i] = old Array [i];
 newArray[i] = oldArray[this.indexOf(i)];
 }
 // copy contents
 this.contents = newArray;
 // reset start
 start = 0;
 }

0 1 2 3 4 5 6 7
 40 70 20 30
 start = 0
 size = 4
 6 + 3 - 1 = 8



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Write several tests to confirm that expandCapacity works



What is the run-time of prepend()?

Worst Case

expand capacity $\Theta(n) + \Theta(1) \rightarrow \Theta(n)$

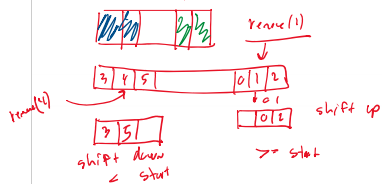
Best Case

$\Theta(1)$

Average Case

$\Theta(1)$ amortized

How would implement remove on a Circular ArrayList?



How would implement insert on a Circular ArrayList?

