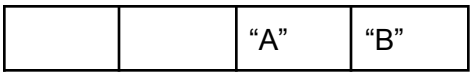
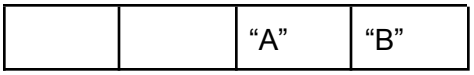
Class worksheet for Brown CS 200, Feb 23 2022 (author: Milda Zizyte)

Drawing before and after of `addLast` to ArrayList with wraparound



(start = 2, end = 3)

`addLast(“C”)`:



(start = ___, end = _____)

Test class

```
package ArrayLists;

import org.junit.Assert;
import org.junit.Test;

public class TestArrList {
   ArrList theList;

   @Test
   public void testAddLast() {
        this.theList = new ArrList(4);
        this.theList.addLast("A");
        Assert.assertEquals("A", this.theList.get(0));
   }

   @Test
   public void testAddLastWraparound() {
        this.theList = new ArrList(4);
        this.theList.addLast("A");
        this.theList.addLast("B");
        this.theList.addLast("C");
        Assert.assertEquals("C", this.theList.get(2));
   }
}
```

New/updated methods in ArrList class

```
public class ArrList {
   String[] theArray;
   int eltcount;
   int start;
   int end;

   public ArrList(int initSize) {
       this.theArray = new String[initSize];
       this.start = initSize / 2;
       this.end = this.start;
       this.eltcount = 0;
   }

   public boolean isEmpty() { return this.eltcount == 0;}
   public boolean isFull() { return this.eltcount == this.theArray.length;}

   public String get (int index) {
       if ((index >= 0) && (index < this.eltcount)) {
           return this.theArray[(start + index) % this.theArray.length];
       }
       throw new IllegalArgumentException("array index " + index + " out of
bounds");
   }

   private void resize(int newSize) {
       String[] newArray = new String[newSize];
       for (int index = 0; index < this.theArray.length; index++) {
           newArray[index] = this.theArray[index];
       }
       this.theArray = newArray;
   }

   public void addLast(String value) {
       if (this.isFull()) {
           this.resize(this.theArray.length * 2);
       }
       if (this.eltcount != 0) {
           this.end = this.end + 1;
           if (this.end == this.theArray.length) {
               this.end = (this.end % this.theArray.length) + 1;
           }
       }
       this.theArray[this.end] = value;
       this.eltcount = this.eltcount + 1;
   }

}
```

Banking classes and methods

Account class:

```
Account(int num, Customer c, double bal)
```

Customer class:

```
public Customer(String nm, String pwd)
public void addAccount(Account newAcct)
public void closeAccount(int acctNum)
public boolean hasAccount(int acctNum)
```

BankingService class:

```
public void addAccount(Account newA)
public double withdraw(int forAcctNum, double amt)
public double addInterest(double percentage)
```

Predicted outputs:

```
BankingService B = new BankingService();
Customer kCust = new Customer("kathi", "cs200");
Account kAcct = new Account(100465, kCust, 150);
kCust.addAccount(kAcct);
B.addAccount(kAcct);
System.out.println("Kathi's balance is " + kAcct.balance);
```

What is the output here?

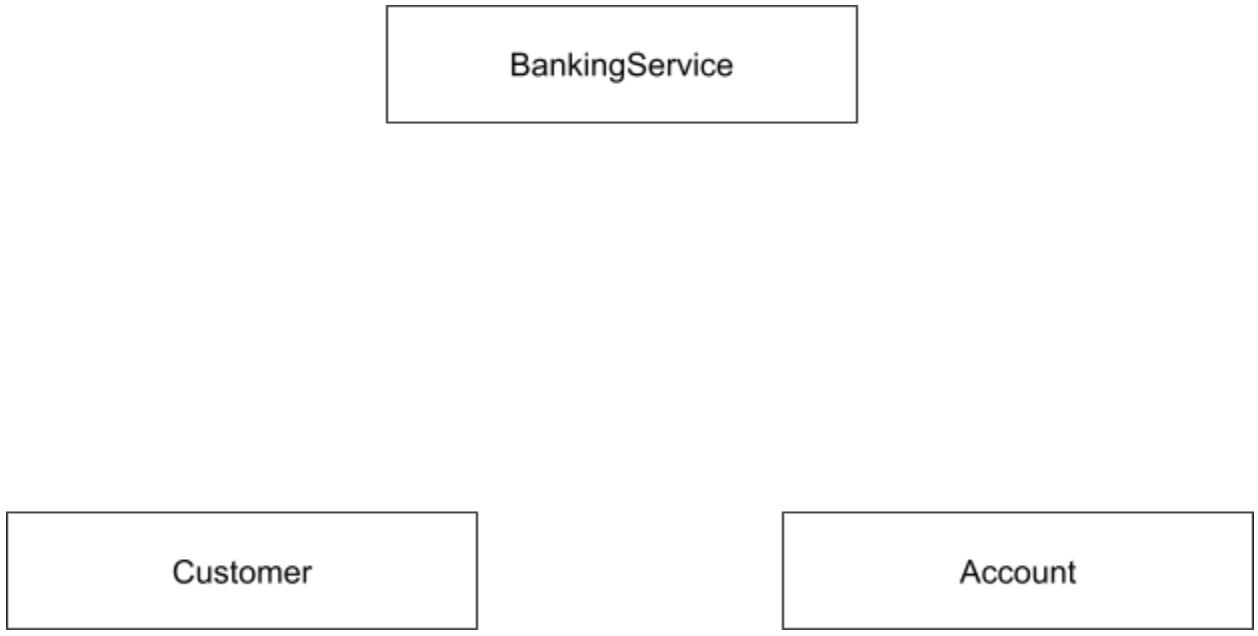
```
B.withdraw(100465, 30);
System.out.println("Kathi's balance is " + kAcct.balance);
```

What is the output here?

```
Customer mCust = new Customer("milda", "csci0200");
Account mAcct = new Account(100023, mCust,111);
mCust.addAccount(mAcct);
B.addAccount(mAcct);

Account kChecking = new Account(100041, kCust, 330);
kCust.addAccount(kChecking);
B.addAccount(kChecking);

B.withdraw(100023, 11);
kCust.closeAccount(100065);
B.withdraw(100041, 30);

double interestThisMonth = B.addInterest(0.01);

System.out.println("Total interest added this month: " + interestThisMonth);
```

What is the output here?

Class hierarchy/containment



Before removeAccount

After removeAccount