

Arrays of Objects

15-110 Summer 2010
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Array review

- Can an array have data of different types?
- How do you declare a variable `isOn` to be an array that holds `true/false` values?
- Has any space in memory been made available for the array?
- When you create an array you must specify
 - 1.
 - 2.
- Can you change the values stored in the array?
- Can you change the length of an array?
- How do you get the length of an array?

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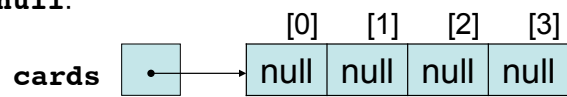
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Array of Objects

- Arrays can store references to objects in addition to primitive values.
- E.g.,

```
GiftCard[] cards = new GiftCard[4];
```
- Creating an array does **not** create the objects.
- Instead each element of the array is initialized to **null**.



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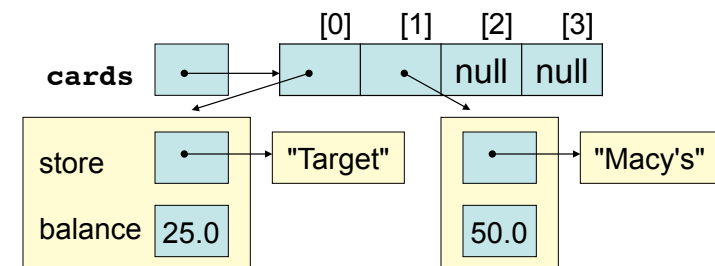
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Creating the Objects in the Array

- To fill the array, you need to create the objects in addition to creating the array.

```
cards[0] = new GiftCard("Target", 25.0);  
cards[1] = new GiftCard("Macy's", 50.0);
```



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Using an Array of Objects


- As before, you can use an array element (array name with an index) in the same way you use a variable that is a reference to an object.
- E.g., Add \$20 to the gift card at index 1.


```
cards[1].addMoney(20.0);
```


That is, `cards[1]` is a reference to a `GiftCard` object on which to invoke the `addMoney()` method.

NullPointerException

- If program attempts to use `null` when an object is required, Java throws a **NullPointerException**:

- Invoke a method of a `null` object:


```
cards[3].buyGoods(30.0); (Error)
```
- Access or modify a field of a `null` object:


```
b = cards[2].balance; (Error)
```
- Access length or element of a `null` as if it were an array:


```
int[] data;  
if (data.length > 0) (Error)
```

Arrays as a Field of a Class

- When a class has a field that is an array, do not create the array when you declare the field.
- The constructor should create the array.

```
public class Wallet {  
    GiftCard[] cards; // declare the field  
    ...  
    public Wallet(int numCards, String store,  
                  double value) {  
        cards = new GiftCard[numCards];  
        for (i = 0; i < numCards; i++) {  
            cards[i] = new GiftCard(store, value);  
        }  
    }  
    ...  
}
```