Lecture 5 - Sep 18

OOP Review

Exercise: Reference Aliasing & Arrays
Manual Management of Account IDs
Use of Static vs. Non-Static Variables

Announcements/Reminders

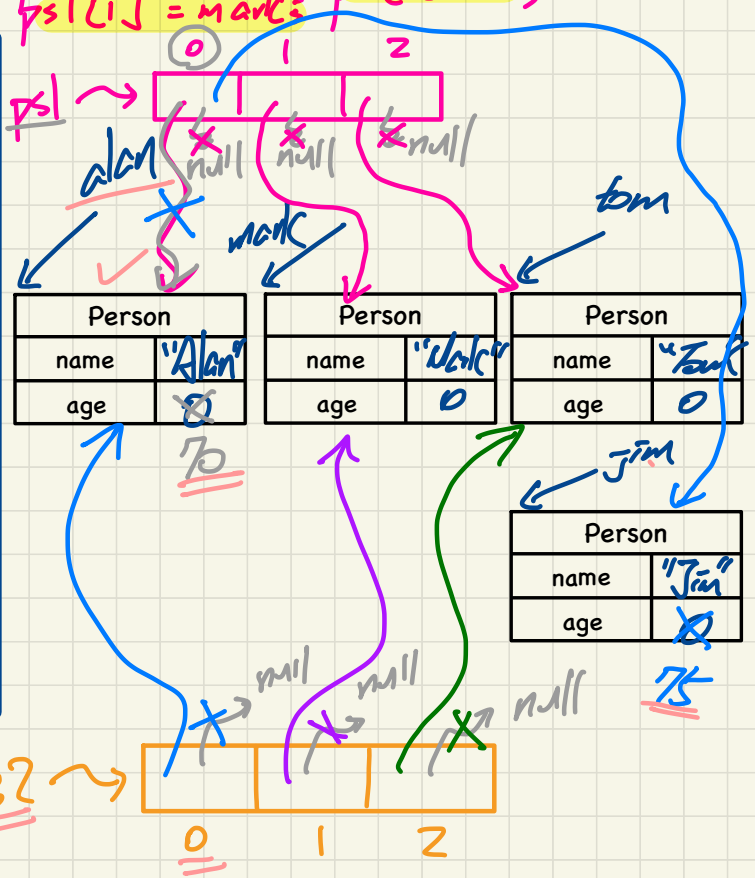
- Today's class: notes template posted
- Priorities:
  - + Review Lab0
  - + Complete Lab1
  - + Due: Next Tuesday (Sep 30)
- ProgTest0 (next Wednesday, Sep 24), Guide released
- Mock-up Programming Test 0 to be released

Copying Reference Values: Aliasing

** copy the addr. stored in alan into index 0 of array ps1.

* Person[] ps1 = new Person[3];
ps1[0] = alan; **
ps1[1] = mark;
ps1[2] = tom;

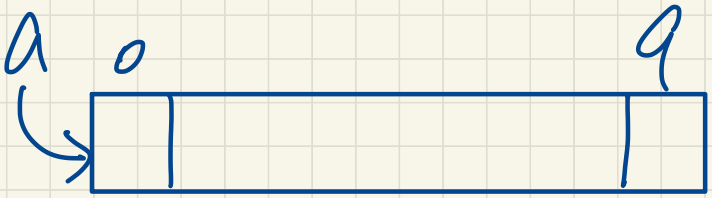
```
Person alan = new Person("Alan");
Person mark = new Person("Mark");
Person tom = new Person("Tom");
Person jim = new Person("Jim");
Person[] persons1 = {alan, mark, tom};
Person[] persons2 = new Person[persons1.length];
for(int i = 0; i < persons1.length; i ++) {
  persons2[i] = persons1[i]; }
persons1[0].setAge(70);
System.out.println(jim.getAge());
System.out.println(alan.getAge());
System.out.println(persons2[0].getAge());
persons1[0] = jim;
persons1[0].setAge(75);
System.out.println(jim.getAge());
System.out.println(alan.getAge());
System.out.println(persons2[0].getAge());
```



*** i

0 ps2[0] = ps1[0];
1 ps2[1] = ps1[1];
2 ps2[2] = ps1[2];

a[i]



① a != null

a.length == 10

② 0 ≤ i ≤ a.length - 1

Copying Arrays

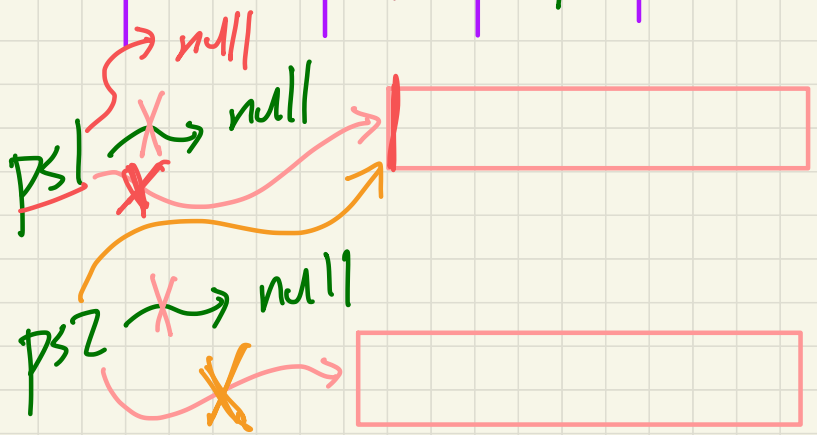
```
Person[] ps1;
Person[] ps2;
```
①

```
ps1 = new ...
ps2 = new ...
```

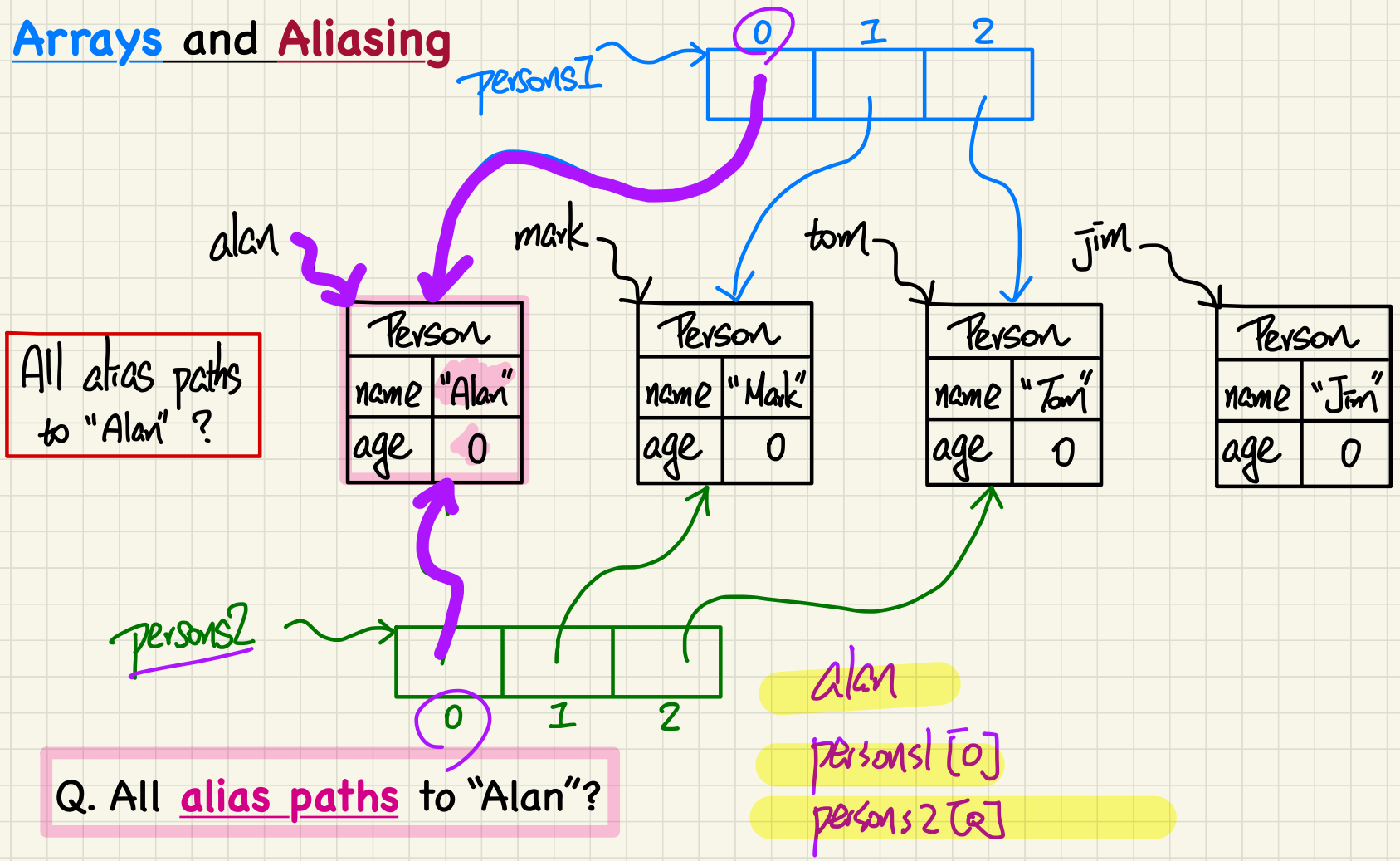
```
ps2 = ps1;
```
② Creating aliases at the array level.

```
ps1 = null;
```
④

	①	②	③	④
ps1==null	T	F	F	T
ps2==null	T	F	F	F
ps1==ps2	T	F	T	F



Arrays and Aliasing



Managing Account IDs: Manual


```
public class Account {
  private int id;
  private String owner;
  public int getID() { return this.id; }
  public Account(int id, String owner) {
    this.id = id;
    this.owner = owner;
  }
}
```

explicit parameter; presumably should not clash with existing id's

Goal: auto. generate & manage id's

```
class AccountTester {
  Account acc1 = new Account(1, "Jim");
  Account acc2 = new Account(X, "Jeremy");
  System.out.println(acc1.getID() != acc2.getID());
}
```

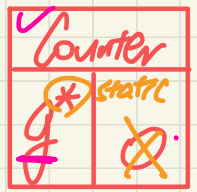
1. burden on the Account user to specify unique id's.

2. when id's are duplicated, not a compilation error (logical error)

Declaring Global Variables among Objects

* Each Counter object has its own copy (instance-specific value).

** All Counter objects share a single/unique copy (global var.)




```
public class Counter {
    private int l;
    static int g = 0;
    public Counter() {
        this.l = 0;
    }

    public int getLocal() {
        return this.l;
    }

    public void incrementLocal() {
        this.l ++;
    }

    public void incrementGlobal() {
        g ++;
    }
}
```

* non-static variable (attribute)

** static var init. as soon as it's decl.

static variable

non-static var init. in constructor.

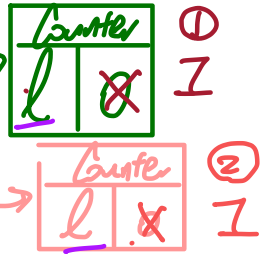
C1 C2

this.g ++; (compiles with a warning)

```
public class CounterTester {
    public static void main(String[] args) {
        Counter c1 = new Counter();
        Counter c2 = new Counter();

        System.out.println("c1's local: " + c1.getLocal());
        System.out.println("c2's local: " + c2.getLocal());
        System.out.println("Global accessed via c1: " + c1.g);
        System.out.println("Global accessed via c2: " + c2.g);
        System.out.println("Global accessed via Counter: " + Counter.g);

        c1.incrementLocal();
        c2.incrementLocal();
        c1.incrementGlobal();
        c2.incrementGlobal();
        Counter.g = Counter.g + 1; // Counter.global ++;
    }
}
```



Accessing static variables: ClassName.nameOfStaticVar.

Counter.g