Lecture Set #9: Review of Aliasing & Mutability, Floating Point Calculation Issues

1. Aliasing and Mutability
2. Floating Point calculation Issues
3. Example class development: Password

Taking Care of Corner Cases

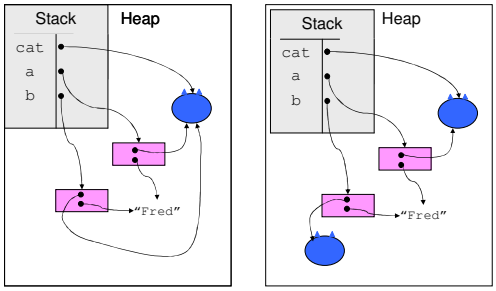
- FancyWord example from CVS
  - String of "" was a corner case that we needed to test for
  - Write new test cases or new asserts in the test cases that already exist to take care of this
- What about null references as corner cases?

```
public void testNullAndEmpty(){
  FancyWord a = new FancyWord(null);
  assertEquals(null,a.toString());
  FancyWord b = new FancyWord("");
  assertEquals("",b.toString());
}
```


What about Strings and Aliasing?

- `String` objects are *immutable*; fields cannot be changed once created
  - Mutable objects: fields (values of instance variables) can be changed (e.g. Cat, Student, etc.)
  - Immutable objects: fields (values of instance variables) cannot be changed
  - See `String` API: http://java.sun.com/j2se/1.3/docs/api/java/lang/package-summary.html
- In the Cat and CatOwner example:
  - when one object is assigned to another, an alias is created
  - Cat a = new Cat("Fluffy");
  - Cat b = a;

Which picture represents the current status of memory?



Floating Point Calculations

What will this print?

```
public class SimpleMath {
   public static void main(String[] args) {
        if (3.9 - 3.8 == 0.1) {
              System.out.println("I am a very smart computer.");
        } else {
              System.out.println("I can't do simple arithmetic.");
        }
   }
}
```

- I can't do simple arithmetic.
- Why?
- Conversion of floating point to binary leads to precision errors!
- What can we do?

Floating Point Calculations (cont.)

Two important rules:

- You can never use == to compare floating point values. Instead, check if two numbers are within a certain tolerance of each other.
- Never use floating point values to represent money, e.g., 3.52 to represent $3.52. Instead, use integer 352 to represent 352 pennies.