

# CompSci 100e

## Program Design and Analysis II



January 27, 2011

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# Announcements

- Apt-0127 due tonight
- Apt-0201 due Tuesday
- Lab 02 Friday and Monday
  - Thesaurus APT

# Object, Classes, Methods

- Classes define
  - the state (data), usually private
  - behavior (methods) for an object, usually public
- There can be many objects created based on a class.
- Method – sequence of instructions that access the data of an object
  - Accessor – access, don't change data
  - Mutator – changes the data

# Example - class Chicken

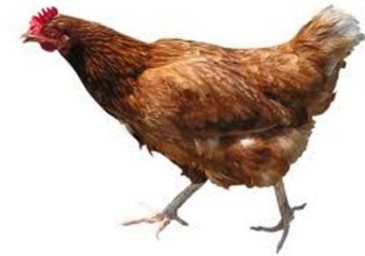
- State
  - weight, height, name
- Behavior (methods)
  - Accessor methods
    - getWeight, getHeight, getName
  - Mutator methods
    - eat – adds weight, adds some height if under 12.0
    - sick – lose weight
    - changeName



# Constructing Objects - new



- Create three chickens
  - “Fred”, weight 2.0, height 3.8
  - “Sallie Mae”, weight 3.0, height 4.5
  - “Momma”, weight 6.0, height 8.3



- Use Chicken constructor

Chicken one = new Chicken(2.0, 3.8, "Fred");

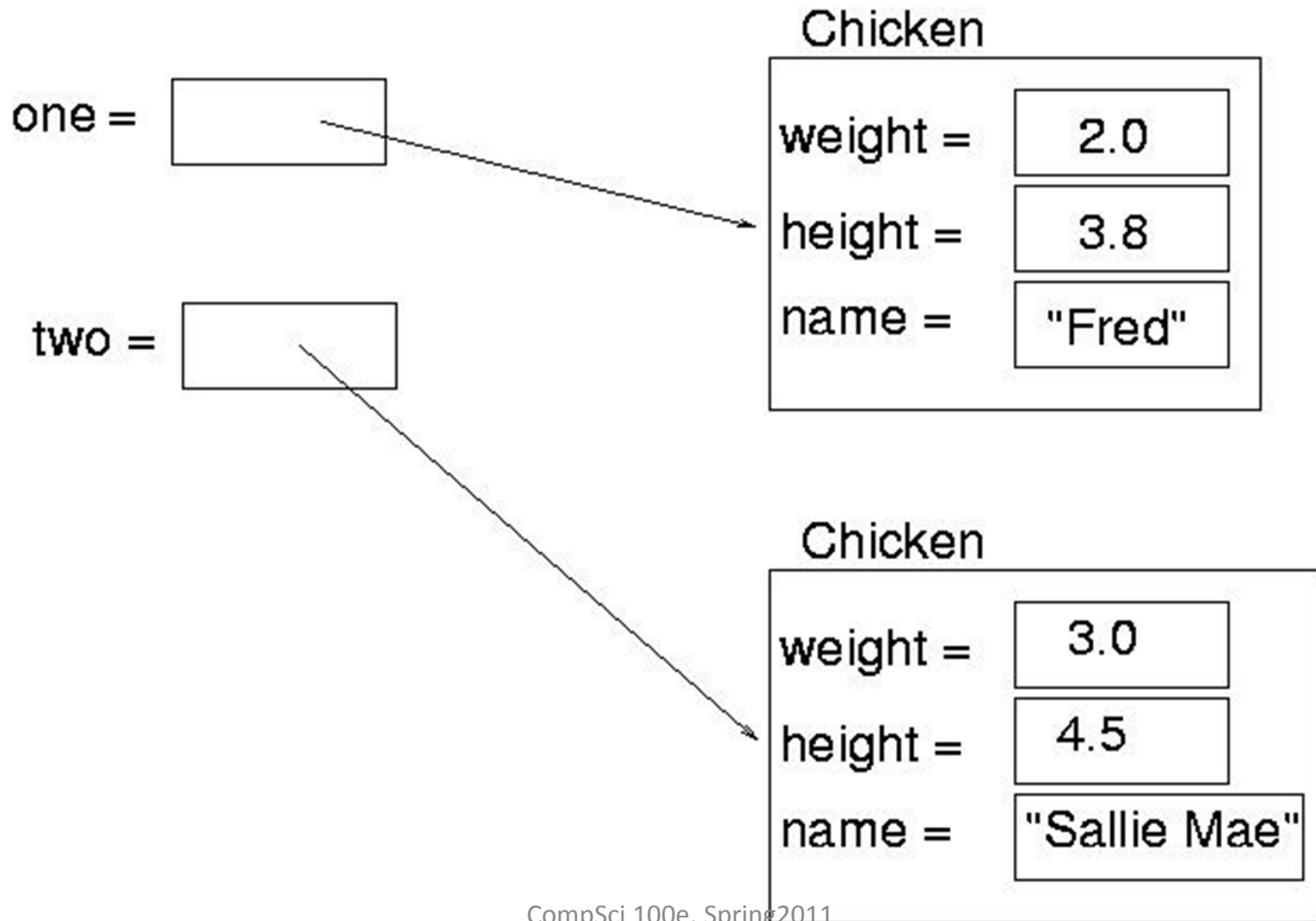
Chicken two = new Chicken(3.0, 4.5, "Sallie Mae");

Chicken three = new Chicken(6.0, 8.3, "Momma");



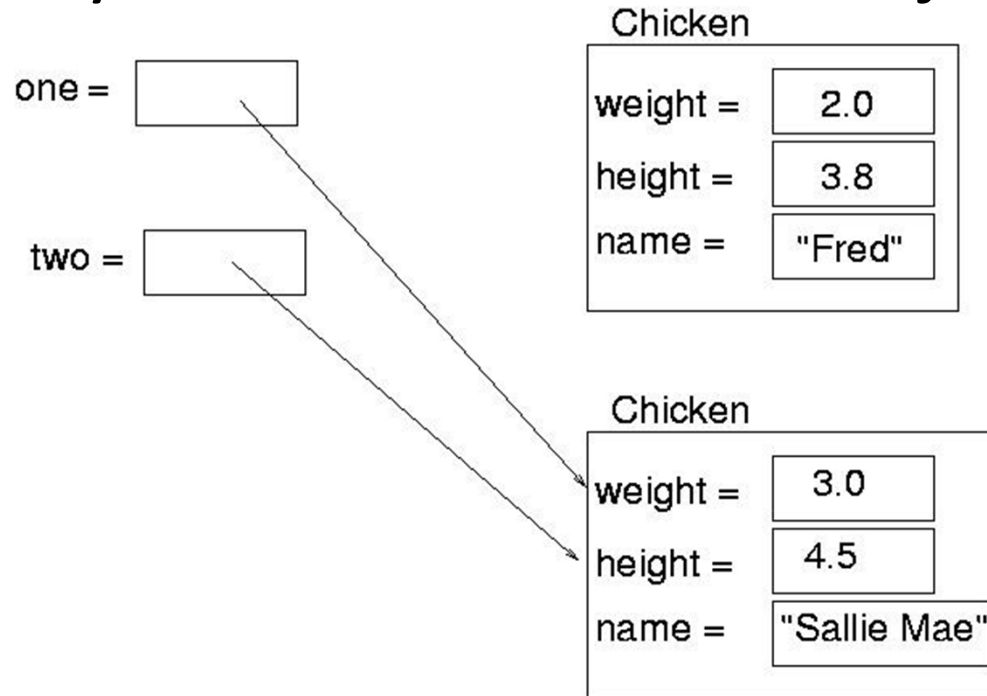
# Object References

- Variable of type object – value is memory location



# one = two;

- Now they reference the same object



```
System.out.println(one.getName() + " has " +  
    one.getName().length() + " letters.");
```

```
System.out.println(two.getName() + " has " +  
    two.getName().length() + " letters.");
```

# Parts of a Class

- State
  - Data
- Constructors
  - Initialize state when object is created
- Accessor methods
  - Accessing data
- Mutator methods
  - Modify data – change the state



# Class Example

- Chicken class – `Chicken.java`
  - Defines state and behavior of Chicken
- Farm class – `Farm.java`
  - Creates Chickens with “new”
  - Invokes the Chicken constructor
  - Calls chicken methods on Chickens to access or change state

# What happens here?

How many Chickens are constructed?

```
Chicken x, y;  
Chicken z = new Chicken(1.0,  
    2.1, "baby");  
x = new Chicken(10.3, 8.1,  
    "ed");  
y = new Chicken(6.2, 6.3, "mo");  
Chicken temp = x;  
x = y;  
y = temp;  
z = x;
```

# Generating Random Numbers

- `java.util.Random` class in Java library  
    `Random generator = new Random();`
  - Methods:
    - `int nextInt(int n)` - returns integer from 0 up to but not including `n`
    - `double nextDouble()` – returns double between 0.0 and 1.0
- ```
int num = generator.nextInt(10);
```

# Examples

- Go over Chicken.java, Farm.java
- Go over Skier.java, SkiRace.java, RunSkiRace.java