

CompSci 100e

Program Design and Analysis II



January 27, 2011

Prof. Rodger

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



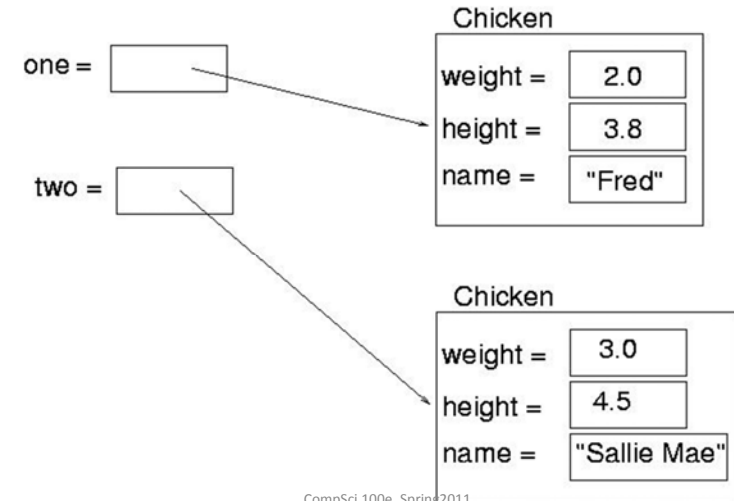
- Create three chickens
 - “Fred”, weight 2.0, height 3.8
 - “Sallie Mae”, weight 3.0, height 4.5
 - “Momma”, weight 6.0, height 8.3

- 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");
```

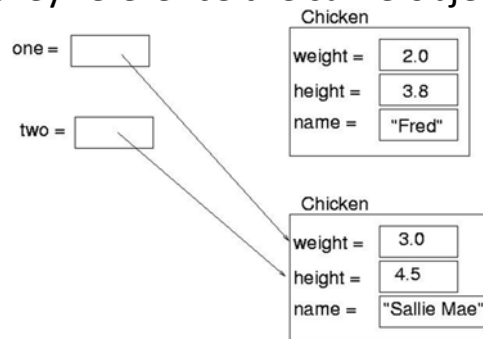
Object References

- 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:
 - `nextInt(int n)` - returns integer from 0 up to but not including n
 - `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`