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