Objects, Classes, Methods

- Classes define
  - the state (data), usually private
  - behavior (methods) for an object, usually public
- Many objects can be created based on one class.
- Method – sequence of instructions that access and/or manipulates the data of an object
  - Accessor method – access, don’t change data
  - Mutator method – 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()
  - Syntax Note: in code method name always followed by parentheses

Method Features

- Return values
  - Methods can return information
    - Accessor methods require that
    - Have return type in header specifying type of info
    - Use: \texttt{w = chick.getWeight();}
- Parameters
  - Methods may receive information thru parameters
    - Mutator methods usually require that
    - Method header includes parameter definition in parentheses
    - Use: \texttt{chick.newName("Elsa");}
- May have both parameters and return values

Constructing Objects - new

- The new operator
  - Used to create objects
- 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 = \texttt{new Chicken(2.0, 3.8, "Fred");}
  - Chicken two = \texttt{new Chicken(3.0, 4.5, "Sallie Mae");}
  - Chicken three = \texttt{new Chicken(6.0, 8.3, "Momma");}
Primitive Types

- Java builds in *primitive types* for dealing with numbers
  - Eight primitive types; only use few at first
    - `int` - holds whole numbers only
    - `double` – can deal with fractions
      - think scientific notation
  - These are *not objects*
    - They have no methods
  - Constants:
    - `int` – no decimal point: 256
    - `double` – contains decimal point: 3.14159265

Another Class - String

- Use the API methods for *String* class
  - To get to API from CompSci 6 web page
    - Click on “resources”
  - Print length of Chicken one’s name.
  - `length()` is a method in *String* class.

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

Object References

- Variable of type object – value is memory location

Assign: `one = two;`

- Now they reference the *same object*