Announcements

• Read Chapter 4, Section 2 for next time
• Assignment 3 storyboards due Tuesday
  – World is due next Thursday night, Sept 18!
What we will do today

• Lecture on Chap 4, Sec 1
• Classwork
  – Create three animations
    • Snowpeople mods including flipping hats
    • Helicopter
    • Cameras moving
  – Get checked off today and for last time
Larger Programs

• Programs start to increase in size – many lines of code
• Games and “real world” applications have thousands, even millions of lines of code
• Want to organize large programs into small manageable pieces
Classes, Objects and Methods

• Object-oriented programming uses classes, objects and methods as basic components.

• These components help you:
  – Organize large program into small pieces
  – Design and think about an intricate program
  – Find and remove errors (bugs)
In your programs, you’ve used

- **Classes**
  - In Alice, classes are predefined as 3D models

- **Objects**
  - An object is an instance of a class
    - Class: Chicken
    - Objects: Chicken, Chicken2
In your programs, you’ve also used

• Built-in (predefined) methods
  – Examples: move, turn to face, say

• World.my first method
  – Example: robot on the moon from chapter 2, wrote code where an alien surprised the robot
  – All the code in World.my first method
Modifying the Program

• Modify program to get robot to try twice to move toward the alien or the alien go up and down twice.

• To make modification, add more lines of code
  – makes the program code longer and more difficult to read and think about

• Show alien world from last time
A Solution

• A solution to the problem is to
  – Define our own method
  – Name the new method surprise

• Then, can drag-and-drop the surprise method into the edit box, just like the built-in methods
Demo: The Solution

- First associate new method with the world
- Select World tile
- Select methods tab
- Click on “create new method”
- Demo
World-level method

- surprise is a world-level method because it
  - Is defined as a method for World
  - Has instructions that involve more than one object (robot, alienOnWheels)
Using the surprise method

• This method is executed by calling (invoking) the method from my first method

For testing, invoke temporarily when world starts
investigate method
react method

```plaintext
world.react No parameters

No variables

Do in order

// alien disappears

alienOnWheels move down 1 meter duration = 0.5 seconds

// robot turns and speaks

robot turn to face camera more...

robot.neck set color to more...

robot say Houston, we have a problem! duration = 2 seconds more...
```
Why write our own Methods?

• Saves time – can call method again and again without rewriting code
• Reduces code size – call method instead of rewriting same code
• Allows us to think at higher level
  – Think “surprise” instead of “alien moves up, alien says something, robot turns around…”
  – Technical term for “think at a higher level” is abstraction
World.myFirstMethod now

• Move robot forward twice as far by invoking “investigate” twice
Classwork today

- Modify snowpeople to add two methods
  - catchAttention
  - Fliphats
- Move the camera with an object
  - skyride – download from CompSci 4 page
- Create airport/helicopter world with new method
  - circleTower