Announcements

• Read Chapter 4, Section 2 for next time
• Assignment 3 storyboard due Tuesday
  – World is due next Thursday
Review

- Fish circling around island

Show world

jagged

smooth
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

```
// 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