Announcements

• Read Chapter 4, Section 2 for next time
• Assignment 3 storyboards due Tuesday in class
  – World is due next Thursday night, Sept 23!

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

world.investigate  No parameters
No variables

Do together

robot move forward 1 meter more...

Do in order

robot.body.backLeftLegBase.upperJoint turn forward 0.1 revolutions duration 0.5 seconds

robot.body.backLeftLegBase.upperJoint turn backward 0.1 revolutions duration 0.5 seconds

robot.body.frontRightLegBase.upperJoint turn forward 0.1 revolutions duration 0.5 seconds

robot.body.frontRightLegBase.upperJoint turn backward 0.1 revolutions duration 0.5 seconds

How do we test this method?

react method

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

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

world.my first method  No parameters
No variables

Do in order

world.surprise

world.investigate

world.investigate

world.react
Classwork today

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