CompSci 4
Chap 6 Tips & Techniques
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Announcements

• Read Chapter 7, Sec 1 for next time – Reading Quiz

• Don’t use copy to copy an object!
  – We will learn why later
  – Instead, import the object twice from the class folder

• Lecture on Chap 6, Tips and Techniques
  – Random numbers and random motion
  – We will also learn about variables

• Bug in Alice 2.0 – Random numbers don’t always work correctly, use Alice 2.2 for any program with Random numbers!
Random Numbers

• Random numbers are used in certain kinds of computer programs

• Examples
  – Security for web applications
  – Encryption for satellite transmissions
  – Gaming programs

• We will look at examples of using random numbers in animations
Built-in functions

- Alice provides built-in functions for generating random numbers
Example

- Move chicken forward a random amount

- The random number function returns a fractional value between 0 and 1
Demo: A range of values

• Can specify a different range of values by specifying a **minimum** and **maximum** value

• In this example, the random number will be a fractional value between 1 and 5
Demo: Integers (whole numbers)

- To generate a random integer value
  - Select `integerOnly` from the more option and make it true

- Random value selected from 1, 2, 3, or 4 - not 5!
Random Hopping

- Rabbit hops (moves up) a random amount
- Rabbit comes back down to the ground, the same random amount

- What happens? How do we fix it?
Local Variable - in a method

• A *local* variable in a method
  – Stores a value
  – Has an initial value
  – Its value can be changed (set)
  – Its value can be used *only in this method*
  – Like a special property, but only for this method

• To create a local variable in a method
  – Click on create variable
  – Give an initial value

• To use a variable’s value
  – Drag the variable into place
Example – create a local variable

- distance – will store distance bunny is to move up
Setting a Variable’s value

- Drag variable down and select value

- Result
Use Variable’s value - Demo

• Drag and drop distance into places where you want to use its value
Set Variable to Random Value - Demo

• Distance is set a random value
• Same value is then used to move up and down

• Use print to print out the value of the variable
Class Variables

- Use “create new variable” under properties to create a class variable for an object.
- This “class variable” will maintain the value throughout the running of the world unless you reset it.
Random Motion

• In some animations, we want an object to move to a random location. We call this **random motion**.

• For example, a goldfish swimming in a random motion.
Six Possible Directions

- Six move directions are possible
  - Forward, backward, left, right, up, down
- We will eliminate backward, fish do not swim backward
- To simplify code, take advantage of negative numbers
  - This instruction moves the goldfish right
Storyboard

• Only three move instructions needed
  – Up (move down if negative)
  – Left (move right if negative)
  – Forward (no backward motion)

• Two parameters (min, max) to restrict motion of fish to nearby location

```
fish.randomMotion
Parameters: min, max
Do together
  fish move up (or down) random distance
  fish move left (or right) random distance
  fish move forward random amount```
randomMotion

- Minimum distance for move forward is 0
Demo

• To call randomMotion method, specify min and max values
Demo

- Repeating the random fish motion over and over again…. (more on this next chapter)

- Change world.my first method
Classwork today

• Event handlers
• Random values
• Variables

• NO LOOPS