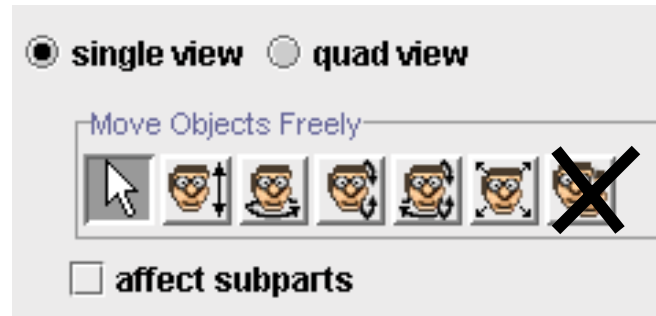# CompSci 4
Chap 6 Tips & Techniques
Oct 18, 2007

Prof. Susan Rodger

Note: Lecture given by Sam Slee

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 variablesh

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
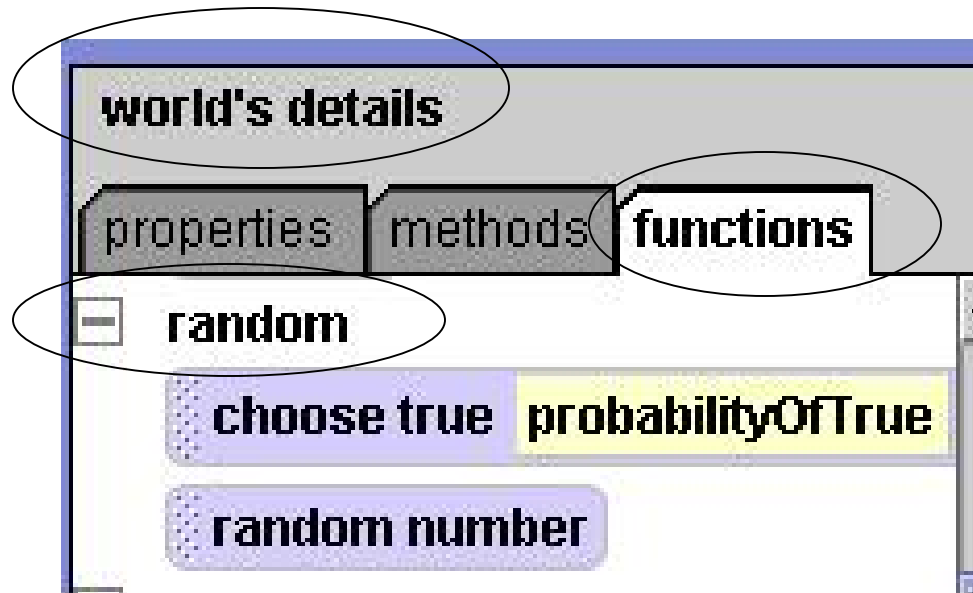
Example

- 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

Chicken ▽ | move forward ▽ | random number *minimum* = 1 ▽ *maximum* = 5 ▽ more... ▽ ▽ | more...

- 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

| bunny | move | up | random number | *minimum* = 0.5 | *maximum* = 3 | more... |
| bunny | move | down | random number | *minimum* = 0.5 | *maximum* = 3 | more... |

- 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 one instance of 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
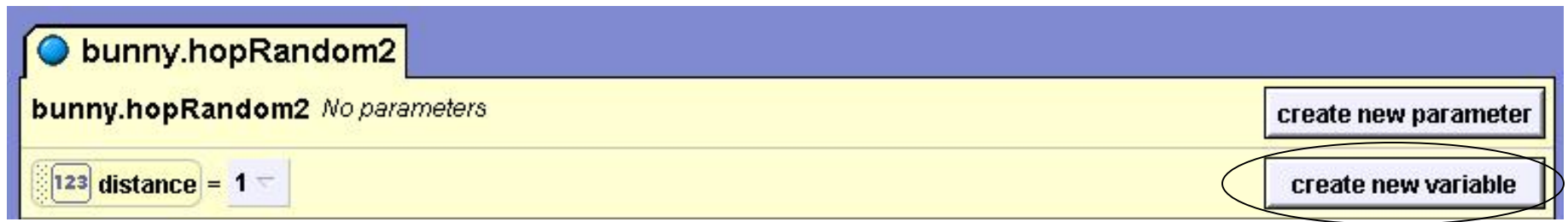
Setting a Variable's value

- Drag variable down and select value

bunny.hopRandom2

bunny.hopRandom2 *No parameters*
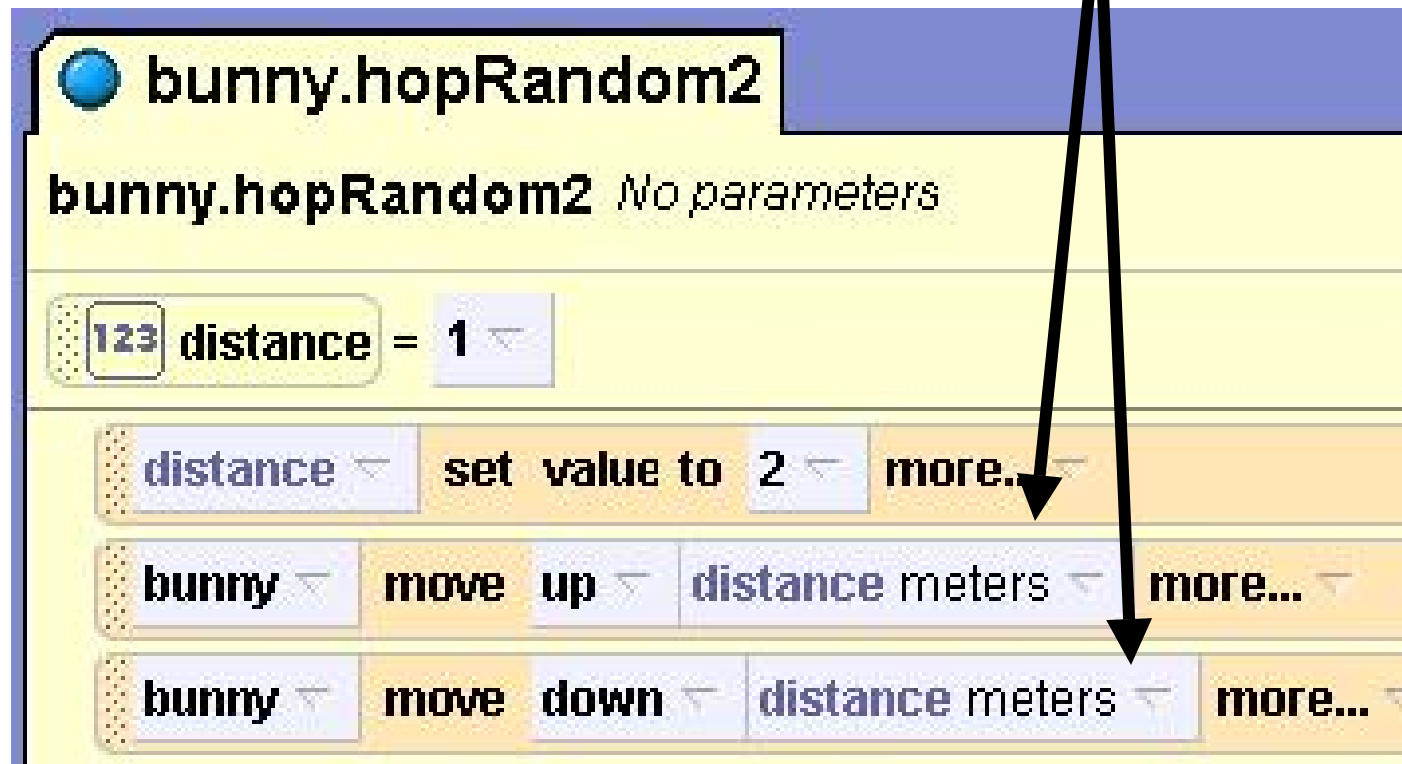
| 123 distance | = 1 |

Do Nothing

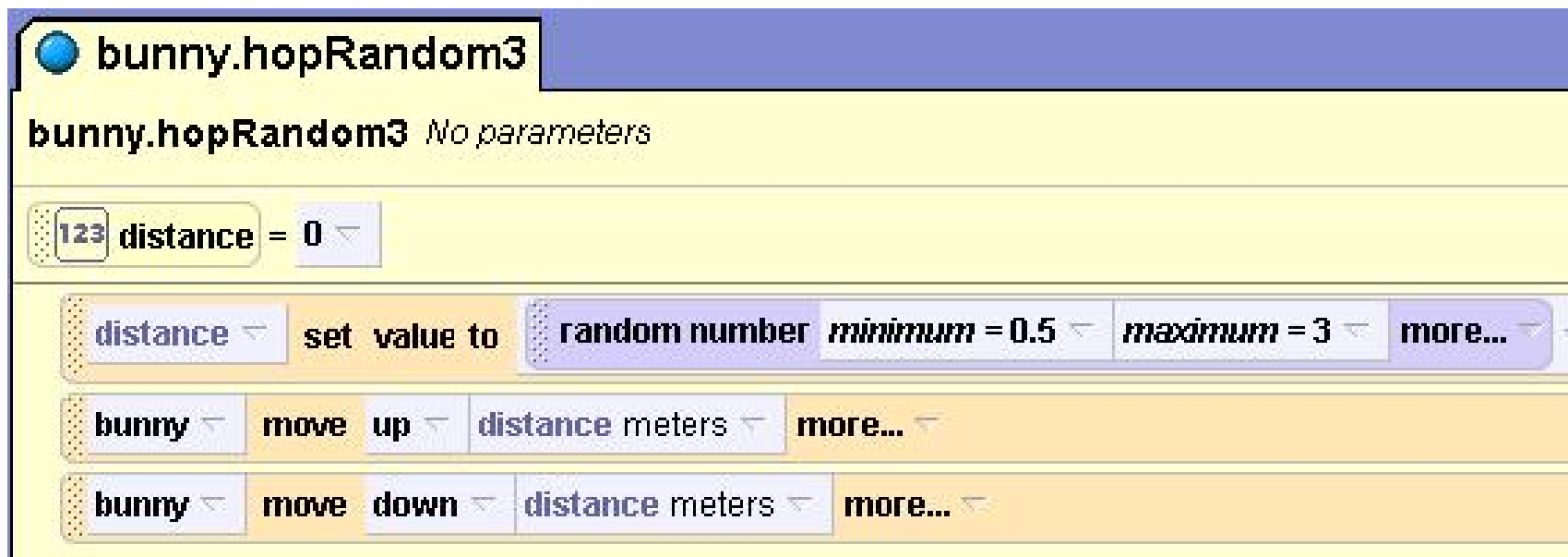| set value	►	value
increment bunny.hopRandom2.distance by 1		0.25
decrement bunny.hopRandom2.distance by 1		0.5
		1
		2

- Result

distance ▽ set value to 2 ▽ more... ▽

Use Variable's value - Demo

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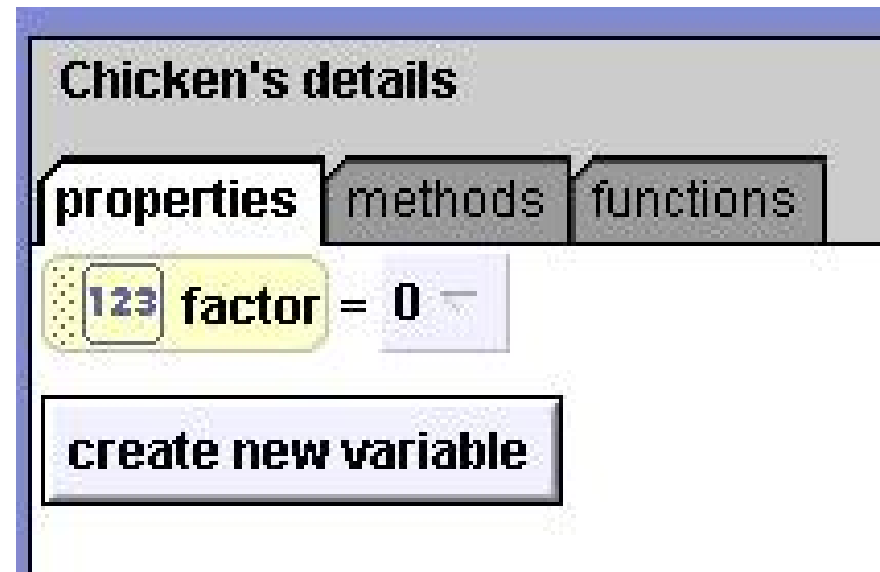
Set Variable to Random Value - Demo

- 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

Chicken's details

properties | methods | functions

123 factor = 0

create new variable

- 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

goldfish   move left   -1 meters   more...

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

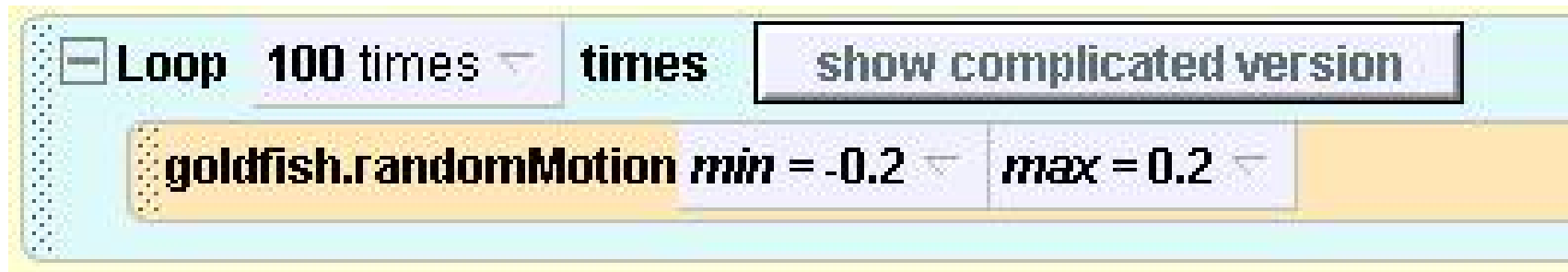- Minimum distance for move forward is 0

Demo

- To call randomMotion method, specify min and max values

goldfish.randomMotion *min* = -0.2 ▽ *max* = 0.2 ▽

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