

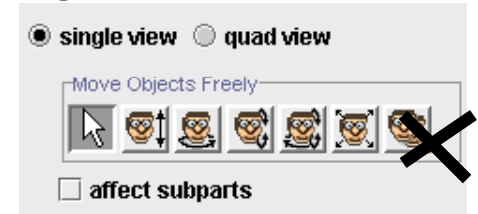
CompSci 4
Chap 6 Tips & Techniques
Oct 13, 2009



Prof. Susan Rodger

Announcements

- Read Chapter 7, Sec 1 for next time – Reading Quiz
- Assign 5 due Thur (SBoard) and Tues (program)
- 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, and variables
- Bug in Alice 2.0 –
 - Random numbers don't always work correctly with integers – use real numbers and use $<$, $<=$, $>$ or $>=$, but not $==$ or $!=$ and it works ok
- Alice 2.2 works fine with random numbers

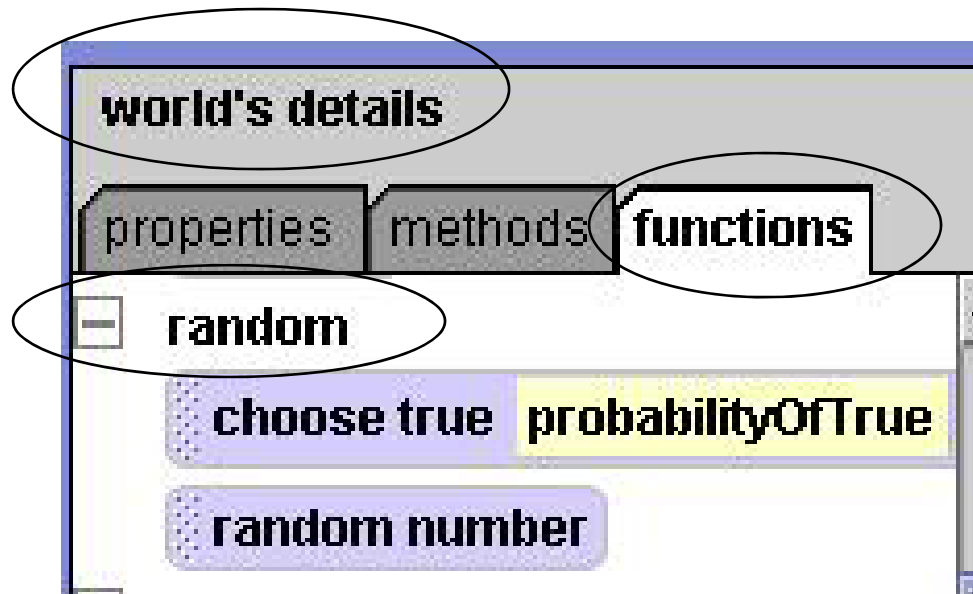


Random Numbers

- 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



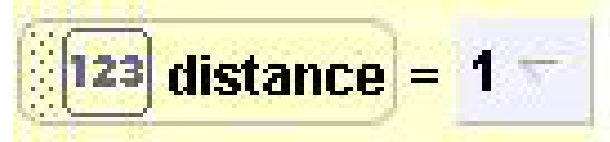
- Rabbit hops (moves up) a random amount
- Rabbit comes back down to the ground, the same random amount



- What happens? How do we fix it?

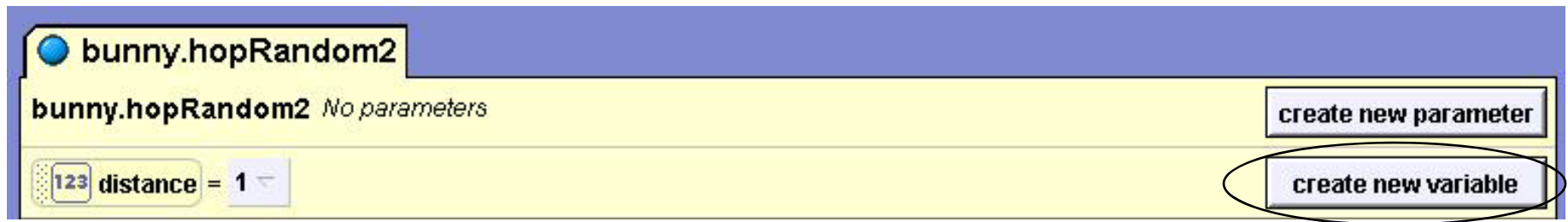
Local Variable - in a method

- 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

 bunny.hopRandom2

bunny.hopRandom2 *No parameters*

 distance = 1 ▾

Do Nothing

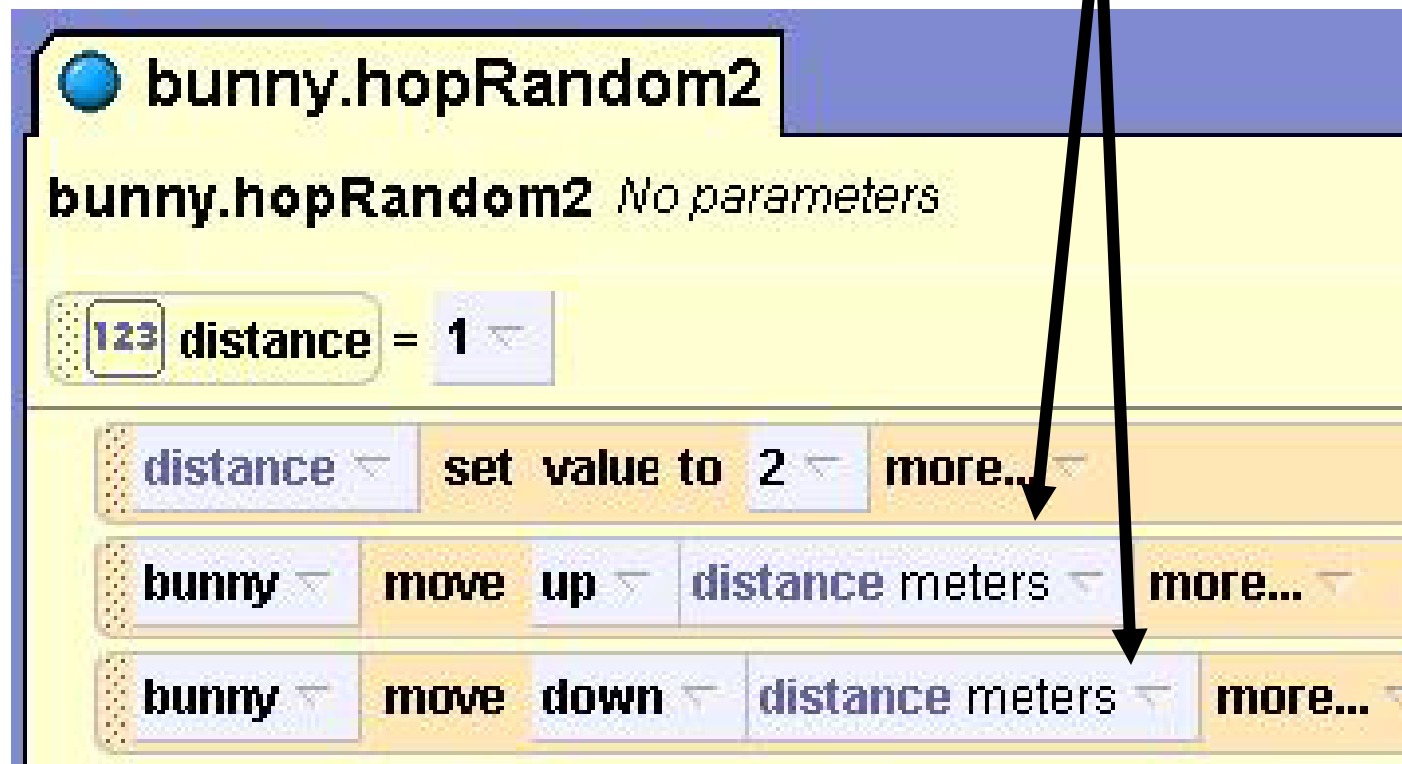
set value ▸	value
increment bunny.hopRandom2.distance by 1	0.25
decrement bunny.hopRandom2.distance by 1	0.5
	1
	2

- Result

distance ▾ set value to 2 ▾ more...

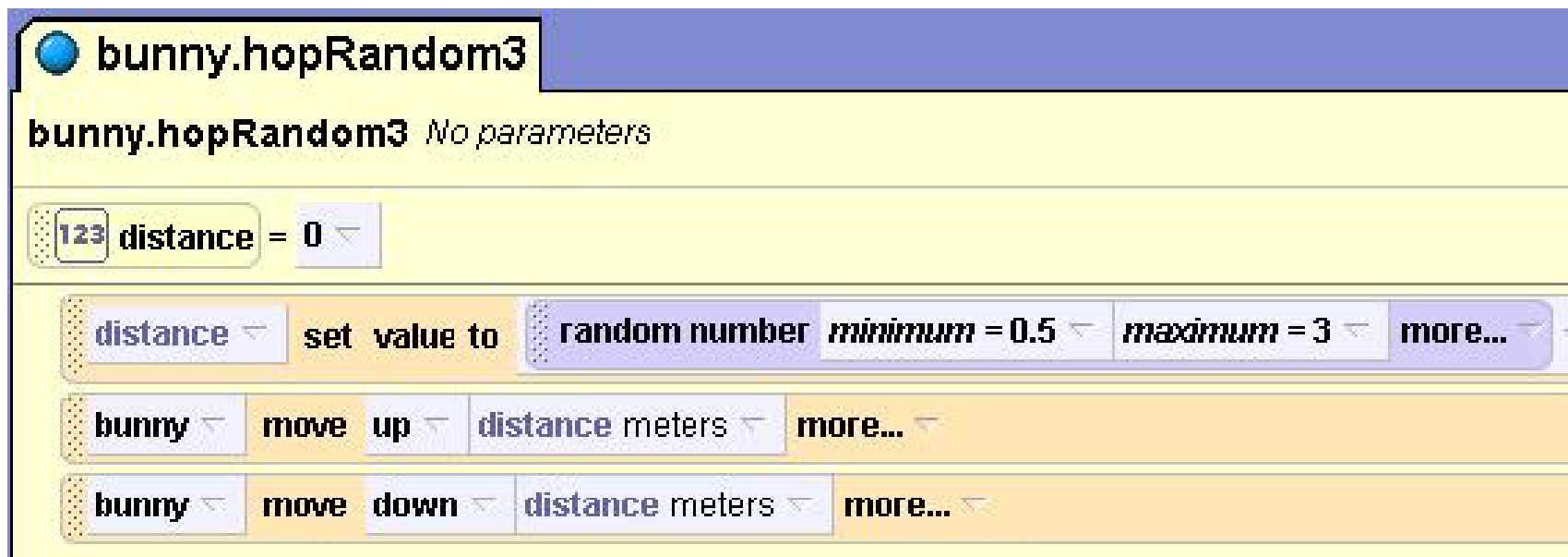
Use Variable's value - Demo

- Drag and drop distance into places where you want to use its value



Set Variable to Random Value - Demo

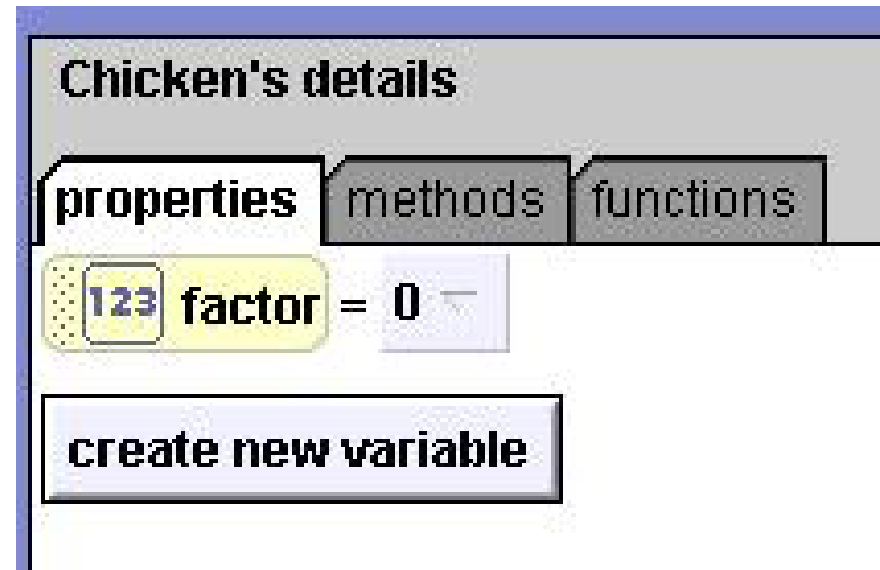
- Distance is set a random value
- Same value is then used to move up and down



- Use print to print out the value of the variable



Class Variables



- 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

goldfish.randomMotion [123] min , [123] max

No variables

☐ Do together

goldfish ▾ move up ▾ random number minimum = min ▾ maximum = max ▾ more... ▾

goldfish ▾ move left ▾ random number minimum = min ▾ maximum = max ▾ more... ▾

goldfish ▾ move forward ▾ random number minimum = 0 ▾ maximum = max ▾ more... ▾

- Minimum distance for move forward is 0

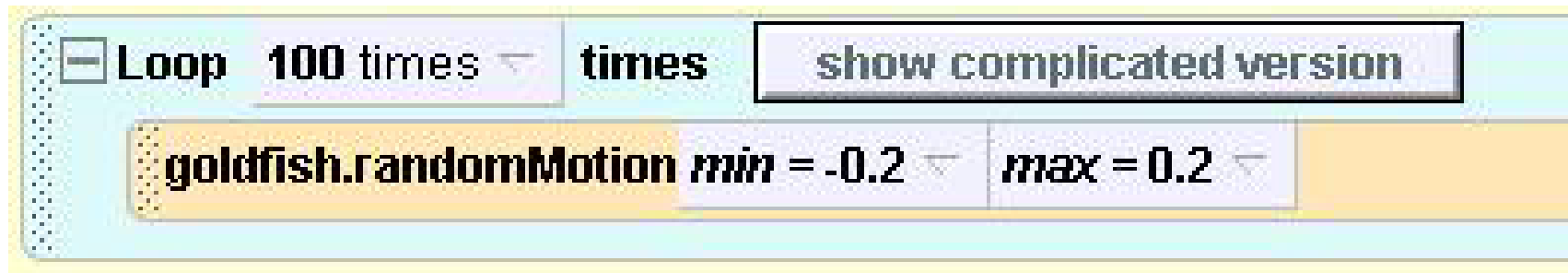
Demo

- 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

