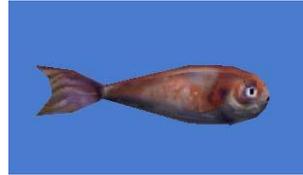


CompSci 4

Chap 6 Tips & Techniques

Oct 10, 2013



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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
 - Variables – for storing values to use later.



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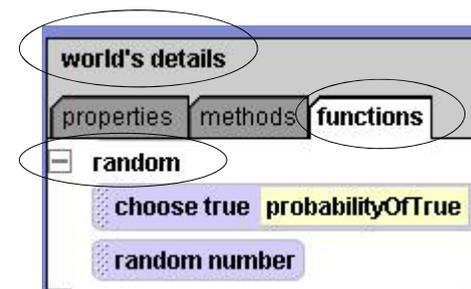
Random Numbers

- 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

3

Built-in functions

- Alice provides built-in functions for generating random numbers



4

Example



- Move chicken forward a random amount



- The random number function returns a fractional value between 0 and 1

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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

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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!

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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?
- (disable this code)

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Local Variable - in a method

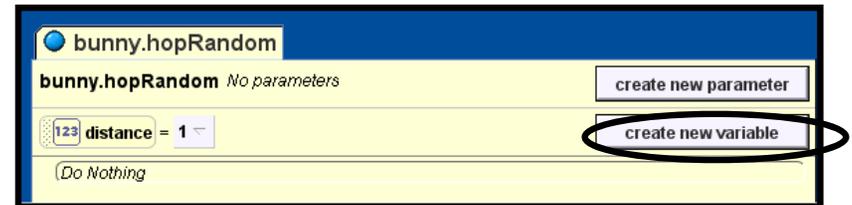
- A *local* variable in a method
 - Stores a value
 - Has an initial value
 - Its value can be changed (set)
 - Its value can be used *only in this method*
 - Like a special property, but only for this method
- To create a local variable in a method
 - Click on create variable
 - Give an initial value
- To use a variable's value
 - Drag the variable into place



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Example – create a local variable

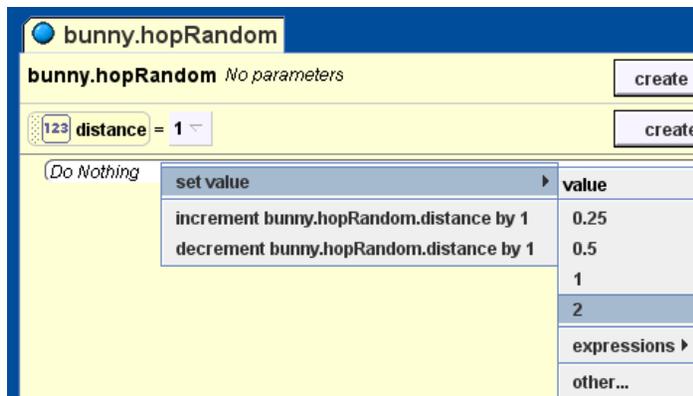
- distance – will store distance bunny is to move up, so same distance can be used to move down



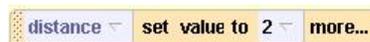
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Setting a Variable's value

- Drag variable down and select value



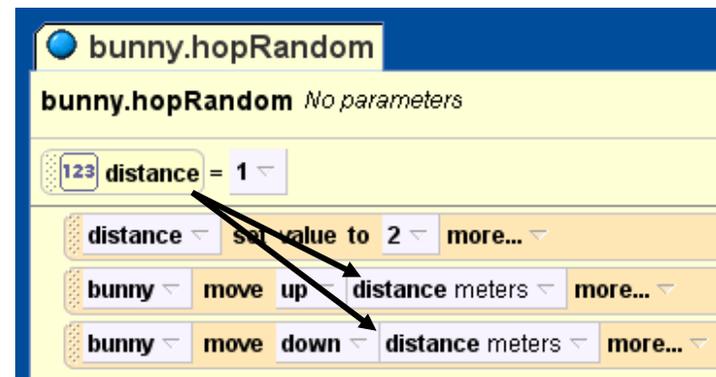
- Result



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Use Variable's value - Demo

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

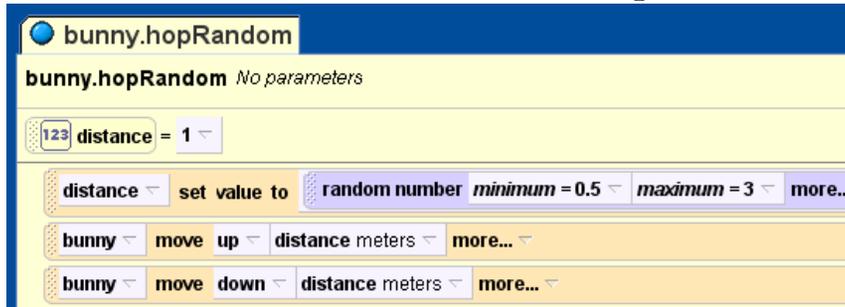


- Create an event to press H and bunny hops

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Set Variable to Random Value - Demo

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

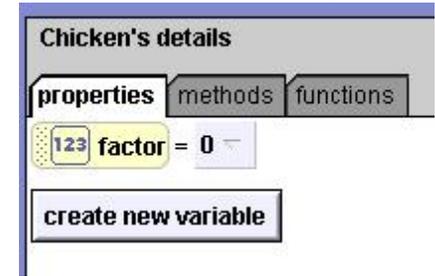


- Use print to print out the value of the variable



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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
- The variable should be associated with the class in some way

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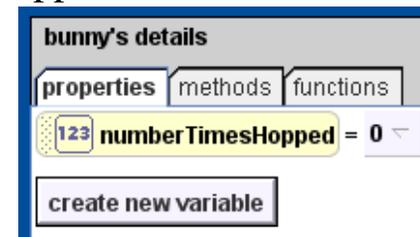
Example

- Create an event for hopRandom to occur when you press h.
- Create another event for the bunny to say how many times it has hopped.
- We need to keep track of the number of times the bunny has hopped. How do we do that? Where do we do that?

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Create class property (variable)

- Create variable to keep track of number of times hopped



- Increment it each time bunny hops

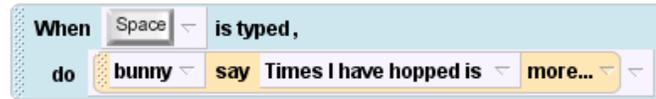


- Where does the increment go?

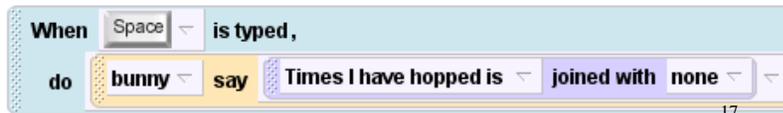
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Now have bunny say how many times hopped?

- Add an event



- Now we want to join another string with this, under World functions, string, drag in “a joined with b”



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Bunny say how many times hopped (cont)

- We want the number “numberTimesHopped” displayed as a string.
- Drag over world function, string, “what as a string” over none, select “expressions”, then bunny.numberTimesHopped



- Now Play! Hop bunny then press space

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Reflection

- When do you use local variable and when do you use class variable?

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Another Example

- Create an event so that when you click on a kangaroo, every other time it hops or spins.
- What type of information do you need to save?

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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.



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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



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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

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randomMotion



- Minimum distance for move forward is 0

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Fish Demo

- To call randomMotion method, create an event that will happen forever (but not interfere with anything else!)
- Create event for “When the world starts”

When the world starts , do **Nothing** ▾

- Right click on this event and change it to:



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Fish Demo (cont)

- In the “During part” drag in the method and set min to -0.2 and max to 0.2

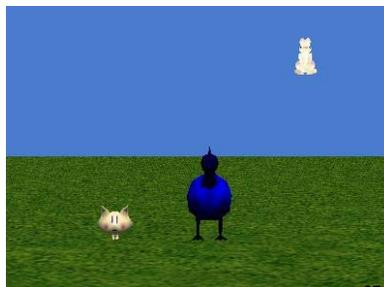


- While the world is running, this method will repeat the random fish motion over and over again.... (more on repeating next chapter)

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Classwork today

- Discuss how to
 - Event handlers
 - Random values
 - Variables
- You do not need the event “while the world is running”
- NO LOOPS



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