Arrays

October 25, 2018

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Class Today

• Group elements together in an array
• Elements perform action one at a time
• Elements perform action all together
• Calculating the smallest in an array

• Reminder: Assignment 5 due Oct 30
Setup for Lecture today

• Put in four objects, all must be Bipeds:
  – Biped: teenPerson, bunny, cheshireCat, Hare
The Story

- Our group of four will do the following.
  - **One at a time** they turn all the way around and then kick their right leg up and down.
  - **All together** they turn all the way around and kick their right leg up and down in synch.
  - **One at a time** they each say how tall they are.
  - **The tallest person** says they are the tallest.
  - Change the sizes and again **the tallest person** should say they are the tallest.
Array for grouping items together

• Arrays are NOT visual, but movements in them are!

• Each element in the array is in a particular slot number.

<table>
<thead>
<tr>
<th>teenPerson</th>
<th>bunny</th>
<th>cheshireCat</th>
<th>hare</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

• Note size of array is 4, elements are in positions 0 to 3
Create a variable of type array (in myFirstMethod)

• Be sure to check the box that it is an array variable, which means you can store multiple values in it.
• Type is Biped, you can store lots of Bipeds in it.
• Give the variable a name – I gave it `club`
• Click on Custom Array and add in the four Bipeds
• (see next slide)
Biped variable named club
One at a time, turn and kick leg

- One way but lots of code!

- Need six more lines for cheshireCat and hare

- What if we had 10 creatures?
Better way – use “for each in”

• Apply commands to each item in an array
How to use – for each in

• for each Biped \texttt{crew} in \texttt{club}
  – Crew is a variable to represent each item one at a time in the array \texttt{club}
Play it, they turn and kick one at a time
Turn and kick together

• Use “for each together”

• Create a new variable for this loop, I named mine **crew2**

• Have each one turn and kick together
Play it and they turn together and kick together
For each person in club, have them say how tall they are

• Note: used another variable crew3!
How do you calculate the tallest person?

- When there are two creatures?
- When there are three creatures?
- When there are four creatures?

- When there are ten creatures?
- When there are 100 creatures?
How do we determine who is the tallest?

What if we add in more creatures?

Algorithm

• Assume first person is the tallestSoFar
• Compare tallestSoFar to second person,
• If second person is taller, update tallestSoFar to the second person
• Compare tallestSoFar to third person
• If third person is taller, update tallestSoFar…
Algorithm to find the tallest

• Create variable for tallestSoFar and set to first person in the array
• For each item in the array, if they are taller than the tallestSoFar, reset tallestSoFar to them
Scene Function tallest

- Note need a parameter that is an array of Biped
- Get first item in array as “creatures[0]”
Use tallest function

• Have the tallest say, “I’m the tallest”
• Shrink the hare by 0.5
• Have the tallest say, “I’m the tallest”
• Increase the bunny by 4 times
• Have the tallest say, “I’m the tallest”

• See next slide
Who’s the tallest?
What happens if you add in two more bipeds in the array?

- Add them to the array
myFirstMethod Code (part1)
myFirstMethod code (part 2)
This lecture covered

• Creating an array of objects
• For each object in the array (one at a time) execute code with “for each in “
• For each object in the array (together) execute code with “each in together”
• Writing a function that calculates a value by looking at all the elements in an array
• An array is NOT visible, but actions to an array are!