CompSci 4
Chap 6 – Problem Solving
Mar 29, 2005

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Announcements

• Read Chapter 7.1 for next time
• Assignment 7 is extended, due Tuesday April 5!
What we will do today

- Problem Solving – Chapter 6
- Practice writing methods and functions
- Talk about assignment 7
Problem To Solve

• Given three animals standing in a row
• Resize each of them randomly by 1 (no change) to 4 times its size
• Whichever is taller, spin around once to the right, once to the left
• Sort the animals by their height
• Display message “In order” whenever in order by increasing height
Objects in the world

- Animals – chicken, rabbit, and penquin
- Balls (will be invisible always)
  - tennisball1 – represent position 1
  - tennisball2 – represent position 2
  - tennisball3 – represent position 3
- 3D text – “In order!
  - Invisible until animals in order by height
Random Integers

• Bug in Alice with “integers only” and how they are used…..

• Return ?
world. my first method
makeTallerAnimalSpinAround

- Need to know which of the three animals is taller
makeTallerAnimalSpinAround

• Use isTaller3
Another way – whichIsTaller3?
How do we use whichIsTaller3?

• How do we turn the taller of the three around once to the left?
How do we check if items are sorted by increasing height?

• Check if object in position 1 is shorter than object in position 2 which is shorter than object in position 3

• How do we know which animal is in a position?
isSortedByIncreasingHeight

// return true if object 1 is the shortest, object 3 is the tallest and object 2 is between the 2 in height
whichObjectIsClosestTo

// returns the object closest to ball
CheckIfSortedByHeight

- Use isSortedByIncreasingHeight
- Use whichObjectIsClosestTo

// return true if the three objects are standing in order by increasing height
// Don't know which object is in position 1, position 2, or position 3
SortAnimalsByHeight

• How? Lots of answers
One way – moveAnimalsToSortedPositionIfAnimal1IsTallest

- 3 parameters – anim1, anim2, anim3
- If anim1 is the tallest, then compare other 2 and move each to corresponding tennisball
- If anim1 is not the tallest, don’t do anything
world.moveAnimalsToSortedPositionIfAnimal1IsTallest

<table>
<thead>
<tr>
<th>Obj</th>
<th>anim1</th>
<th>Obj</th>
<th>anim2</th>
</tr>
</thead>
</table>

No variables

```javascript
// If anim1 is taller than other two animals, compare heights of anim2 with anim3, and
// move animals to positions, otherwise, don't do anything.
```
SortAnimalsByHeight

// Sort Animals by height. Don't know their current positions
Problem is Solved!

• Demo
Assignment 7 - Gatekeeper

• Demo

• Useful things to do
  – When S is typed – show answer
  – Display tennis balls til program is working
  – Randomly set gatekeeper – game different each time played
Assignment 7 – Gatekeeper

Useful functions

• World.SwapPlayers (obj player)
  – Swap player with player furthest away
• World.whichObjectNearBall (obj ball)
  – Return object closest to ball
• World.NearWhichBall (obj player)
  – Returns ball that player is closest to
• World.whichObjectIsGateKeeper
  – Returns object that is gatekeeper
Assignment 7 – Binary Code Game

• Demo
• Useful info
  – When S is typed show answer
  – Randomly set answer
  – How do you tell if lever is up or down?
    • Use invisible sphere – two colors
    • Don’t compare sphere’s position with lever – bug in Alice so this doesn’t work
Assignment 7 – BCG Useful Functions

• changeSphereColor (obj sphere)
  – changes color of sphere to other color

• switchFlip (obj switch)
  – Change lever position (and sphere color)
  – Check if valid code and if so, indicate

• isValidCode
  – Return true if code is valid

• isSwitchUp (obj switch)
  – Returns true is lever is up

• whichSphereIsClosest (obj switch)
  – Returns sphere that is closest to switch