Announcements

• Read Chapter 7, Sec 2, Reading quiz due
• Registration time coming up – CPS 6
  – CPS 4 prepares you to take CPS 6
  – CPS 6 need to know - Objects, methods, conditionals (if), repetition (loop), list or arrays (we will do)
  – Will review these topics in CPS 6 with Java
• Assignment 5 due today
• Assignment 6 out, Due Nov. 7
• Today
  – Definite loops (Chap 7.1)
  – More on variables (Timers/counters)

Repetition

• In many kind of animations, especially simulation and games, some actions happen again and again
  – Example
    • Games where targets randomly appear and are caught or shot down, then appear elsewhere
• Actions are made to happen again and again by running an instruction or method more than once

Example

• Bunny sneaks into garden and wants to eat broccoli. Bunny needs to hop several times over to broccoli
Bunny.hop

- Makes bunny hop up and down, making a sound and traveling .8 meters total
- See code in book
- How do we get bunny to hop many times over to the broccoli?

One solution

- What is the problem with this solution?

Counted Loop

- A counted loop is an alternative way to write repetitive code
- Repeats instructions a counted number of times

Demo - Code to hop 6 times

- The loop instruction executes a definite number of times, specified by a count
- Using a loop instruction
  - Saves time
  - Is convenient, easy to change the count
  - Can use a function in place of the count (must return a number)
Infinity times….

- If “infinity times” is selected for a loop, loop will run until the program is shut down

Example

- What happens if we make the other bunny hop up and down infinity times?

How do we fix this?

- How do we get both bunnies to move, one infinitely and one definitely?

- NOTE: Be Very Careful when using infinite loop! If something goes forever, it doesn’t stop!

More Complicated Loops

- It is possible to place a loop within another loop statement, this is **nested loops**
- Example in book: double ferris wheel
Demo - Ferris Wheel nested loops

Review: What is a Variable?

- Property that can be changed using *set*

Problem

- Given a cow that can randomly appear and disappear.
- Want to add a score to count the number of times user clicks on the cow.
- User gets specified amount of time to click (timer).
- Cow stops moving when time is up.
- User wins if a target number of clicks is achieved in the specified time. Cow tells user if they won or not.

Solution

- Add a new 3D text object
  - will keep track of times cow clicked on
  - type in “score,” as the name of the 3D text object
  - Then change its text value to 0
Add Mutable Variables

- What does Score need to keep track of?
  - current value
  - final value
  - increment value
- Add three mutable variables

Mutable Variables Added

- Three variables added
- Call to initialize

Increment Counter

- Add an event to increment score's value when mouse is clicked on cow
- Need to write a method to increase the score value
  - both variable and text displaying score must be changed

First, change score.value

- Drag value over and set to score.value
- Use math to increase by increment
Second, change the text value

- Each 3D text has a text value
- Drag this field and set
- A `world` built-in function can be used to display the number `value` as a string

Almost Done…

- Add another 3D text to just say the word `score`
  - I named it `scoreText`
  - Then changed text value to “score”
- Add code to repeat until target is reached
- Cow appears at end

ClassWork

- Start with ClickACow.a2w
- Add a Score
- Add a Timer – similar to score
  - Start at high value (say 20)
  - Count down instead
- Game is over when Timer runs down
  - If Target score is reached – you win