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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`

Drag `isShowing` tile into editor and select new value `false`
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
  
  \[
  \text{score} \setext \text{to} \text{default string} \text{ more...}
  \]
  
  - 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