Prof. Susan Rodger

Note: thanks to Wanda Dann and Steve Cooper for slide ideas
Announcements

• Read Chapter 7, Sec 2 for next time
• Registration time – CPS 6
  – CPS 4 prepares you to take CPS 6
  – For 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 7 due Tuesday, April 5
What we will do today

• Lecture on Chap 7, Sec 1
  – Definite Loops
• Classwork
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)
Let’s Modify this animation

- Want the bunny to hop over to the closest broccoli and eat it
- Then hop to the next closest broccoli and eat it
- Move broccoli so not all together
- Only do with 3 broccoli
  - easy to expand to more broccoli
First write whichBroccoliClosest

```java
// returns the broccoli that is closest to the bunny
```
Write method bunny.eatBroccoli

- Make bunny turn to face closest broccoli
- Then hop over to it stopping in front of it
- Then eat the broccoli
  - Make it invisible and move it far away
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?
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

[Diagram showing nested loops with parameters like roll, revolution, style, and duration]
Modify `bunny.eatBroccoli`

- For each of the broccoli do
  - Make bunny turn to face closest broccoli
  - Then hop over to it stopping in front of it
  - Then eat the broccoli
Classwork today

• Copy file fishGameSetup
• Write function moveTheSame
  – 14 times do
    • Each fish moves .1 m towards appropriate tennisball
    • Then wiggles a little
Classwork (cont)

• Write moveForwardRandomly
  – Do the following 10 times
    • Two fish move randomly .1 to .5 m each time
    • One fish moves steady .2 meters each time
    • Fish move together in same time units
    • Fish must wiggle after each .1m of movement
    • Fish that reaches tennisball first (<.15m) says “I win” for 10 seconds

• Don’t worry about fish still moving after winner declared.