CompSci 4  
Chap 7 Sec 2  
Nov 1, 2005  

Prof. Susan Rodger  

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

Announcements  

• Read Chapter 9.1 for next time  
• Assignment 6 due Nov 8  
  – Finish classwork from Thursday first…  

What we will do today  

• Lecture on Chap 7 Sec 2 and Tips and Tech.  
  – While loop – indefinite loop  
  – Event Loops  
• Classwork  

Last time -Loop – definite number  

• What is the output?
**Repetition**

- Sometimes don’t know exactly how many times a set of instructions are repeated.
- Stopping is based on a condition
- Example:
  - Game of Chess, how many moves until win
  - Stop: when markers are in check mate position

**Indefinite Repetition**

- In programs where number of repetitions not known in advance, can use
  - While statement (today)
  - Recursion (Chap 8) - later

---

**Example**

- Common feature in popular “action films” is a chase scene
- Example: hungry shark chasing fleeing goldfish
  - Repeat: fish swim away from shark, and shark swim toward fish
  - Shark swim distance a little more than fish swim distance
  - Eventually, shark will catch up with fish and eat fish

---

**While statement**

- While some condition is true
  - execute instructions

- condition true? -> yes: execute instructions
- condition true? -> no: exit loop
Storyboard

World.chase

While goldfish more than .5 meters from shark
  Do in order
  shark point at goldfish
  Do together
    shark swim (toward goldfish)
    goldfish flee (away from shark)
shark eat goldfish

shark.Swim, shark.eat and goldfish.flee in book

World.chase

General “Rule of Thumb”

• As a general rule, a While loop should be written so the loop will eventually end
  – Requires statements inside the loop change the conditions of the world such that condition for While eventually becomes false
• If While loop never ends
  – Infinite while loop

Shark will catch goldfish

• How do you know the shark will eventually catch the goldfish?
  – Shark always moves 0.4 meters towards goldfish
  – Goldfish moves randomly away from shark at most .2 meters
  – Shark will eventually catch up, the loop will end
Practice – From Bunny eats Broccoli

- Replace with while loop, bunny hops until close to closestBroc (< 1 meter)

Practice – Eat Broccoli until all invisible

Assume method
- bunny.hopToClosestBroccoliAndEatIt exists

ReWrite with while loop
- Eat broccoli (broc1, broc2, and broc3) until gone (all invisible)
- Assume at least one of the brocs is visible when start
Classwork – Can Cinderella and Handsome Prince ever get together?

- **Objects**
  - Cinderella, HandsomePrince, ballCinderella, ballPrince

- **Setup**
  - Cinderella and Prince 10 units each from middle

- **Game**
  - Both Cinderella and Handsome Prince move forward randomly
  - If both reach the middle, they connect!
  - If either reach the middle alone, then that one starts over

---

**Setup**

- They start by touching hands.
  - ballCinderella (invisible) is at same location as Cinderella
  - ballPrince (invisible) is at same location as Prince

- They both turn and walk 10 units

- They turn and face.

---

**Play**

Repeat forever

- They both move randomly forward
- Cinderella gets to the middle first alone.
  - She turns around
  - Goes forward 10 units
  - She turns back around
- They are both in middle at same time
  - Message displayed and stop

---

**World. My first method**

Note: variable, where is it set and used?
What is repeated a lot?

- Turn around
- Move forward 10 units
- Turn back around

**Setup**

```plaintext
// Move Cinderella and Prince to starting positions at the same time
// They should move one unit at a time

Do together
world.turnAround personToTurn = handsomePrince
unit = unit
world.turnAround personToTurn = cinderella
unit = unit
```

**turnAround**

- Turn halfway around
- Move forward 10 units, 1 unit at a time
- Turn back around

**randomInt**

```plaintext
// returns integer from 1 to 3
randomInt = 1
random number minimum -1 maximum -3.99
floor randomInt
```

```plaintext
return randomInt
```
How to move forward randomly?
- Move forward randomly 1 to 3 units, but not past marker ball?
- Use randomInt

More Detailed Play
- Repeat over and over
  - Cinderella moves forward 1 to 3 units, but not past the ball
  - Prince moves forward 1 to 3 units, but not past the ball
  - If both are in the middle, display a message, then stop.
  - If just one in the middle, then that one starts over