CompSci 94
While loops, randomness
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Class Today

• Looping based on a condition – while loop

• Randomness
  – Random variable
  – Making choices based on a random number
Setup for Lecture today

• Put in the following objects:
  – Flyer: Chicken
  – Props: pumpkin, cake, colaBottle, pricklyPearCactus
Story for lecture

• The chicken will walk over to each item and eat it.

• One of the items will randomly move around to make it harder to
Fancy walk –
Taught my chicken how to strut
• Take one step with legs and neck moving…
Looping – exact number of times

• Count loop

• How many steps to get to the cake?
  – 3, 6, 8?
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
  – Where number of repetitions not known in advance
  – Use **while** statement
While statement

While some condition is true
– execute instructions
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
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
While – walk towards until close

• While condition is true – keep going
• Must have an update inside the loop
EatItem Finish up – eat the item

• After loop, eat the item
Random Numbers

- Random numbers are used in certain kinds of computer programs

- Examples
  - Security for web applications
  - Encryption for satellite transmissions
  - Gaming programs

- We will look at examples of using random numbers in animations

- Example – variable assigned a random number between 0.0 and 1.0
Where is the randomness? How many random numbers are we using?

- This code is inside the while…
Final Code

```
declare procedure eatMovingItem with parameter: SJointedModel food Add Parameter...

do in order
  this turnToFace food add detail

  while this getDistanceTo food > 0.5 is true
    this strut
    DecimalNumber amount ← nextRandomRealNumberInRange 0.0, 1.0

    if amount < 0.25 is true then
      food move LEFT, nextRandomRealNumberInRange 0.0, 0.75, duration 0.5, add detail
    else
      if amount < 0.5 is true then
        food move RIGHT, nextRandomRealNumberInRange 0.0, 0.75, duration 0.5, add detail
      else
        food move FORWARD, nextRandomRealNumberInRange 0.0, 0.75, duration 0.5
      else
        food move BACKWARD, nextRandomRealNumberInRange 0.0, 0.75, duration 0.5

  this turnToFace food, duration 0.0 add detail
```

loop
Final Code (the rest of eatMovingItem)
MyFirstMethod
This lecture covered

• While loops – loop that continues based on a condition
  – When the condition is false it halts
  – There must be some kind of update in the loop

• Random numbers