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 checkmate position
• Indefinite Repetition
  – Where number of repetitions not known in advance
  – Use while statement

While statement
• While some condition is true
  – execute instructions
  no
  condition true?
  yes
  exit loop
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 (GenomeModel, food)
```

Final Code (the rest of `eatMovingItem`)

```
do in order
  this turnTo-face food; add detail!
```

```
if (this distance to food) > 5 is true
  this unt
```

```
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 < 0.75) 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 add detail!
```

```
```
```
```
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```
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