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...

Random number is spread out around 0.0 and 1.0

- We want to try to have each direction choice equally likely, so we split the possible values into four parts.
  - Four ways to move – assign them based on the value of amount
    - If amount is 0 to 0.25 – move left
    - If amount is .25 to .50 – move right
    - If amount is .50 to .75 – move forward
    - If amount is .75 to 1.0 – move backward
Where is the randomness? How many random numbers are we using?

- Other randomness? Yes!
- There is randomness in how far to move
- Two types of randomness
  - 1) randomness in which way to move
  - 2) randomness in how far to move
    - We aren’t saving this one in a variable but we could (see alternate solution on later slides)
    - Note these are DIFFERENT Numbers – note the different types of boxes for the two numbers on the next slide

Final Code (the rest of eatMovingItem)

Another way – use two random number variables

- Variable 1 - store the random number between 0 and 1 in amount and use that number to determine which direction to move (we already do this)
- Variable 2 – store a random number between 0 and .75 in a variable named howFarToMove and then use that variable for the distance to move.
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