CompSci 4
Chap 7 Sec 2
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Announcements

• Read Chapter 9.1 for next time
• Assignment 6 due Nov 6
• Today
  – Lecture on Chap 7 Sec 2 and Tips and Tech.
    • While loop – indefinite loop
    • Event Loops
Last time - Loop – definite number

• What is happens when this code runs?
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
While statement

- While some condition is true
  - execute instructions

```
condition true?  
    yes
  
execute instructions
```

no -> 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
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

No parameters

No variables

- **Do in order**
  - **While**
    - goldfish
    - distance in front of shark
    - more...
    - > 0.5

- **Do in order**
  - shark
  - point at goldfish
  - duration = 0 seconds
  - style = abruptly

- **Do together**
  - shark.swim
  - goldfish.flee

- shark.eat
  - what = goldfish
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
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
Practice – From Bunny eats Broccoli

- Replace with while loop, bunny hops until close to broccoli (< 1 meter)
Using While with Events

• Create new event “while something is true”

We call this a "BDE"
BDE – Begin During End

- Event – actions occur at different times
- When the event is first true
  - Begin action
- While the event is still true
  - During action repeats
- When the event condition is false
  - End action occurs
Example – Penguins meeting

• While 2 penguins are > 3 meters apart
  – Turn to face each other (Begin)
  – Move towards each other repeatedly (During)
  – Bow to each other (End)
Penguins Event Code

- **When the world starts**, do `world.my_first_method`
- **While** `penguin` distance to `penguin2` > 3
  - **Begin**: `world.PenguinsFaceEachOther`
  - **During**: `world.PenguinsMoveForward distance = 1`
  - **End**: `world.PenguinsEnding`
Penguin Begin and During parts

world.PenguinsFaceEachOther  No parameters

No variables

- Do together
  - penguin  turn to face  penguin2  more...
  - penguin2  turn to face  penguin  more...

world.PenguinsMoveForward  123 distance

No variables

- Do together
  - penguin  move  forward  distance meters  more...
  - penguin2  move  forward  distance meters  more...
Penguin End Part

world.PenguinsEnding  No parameters

No variables

- Do in order
  - Do together
    - penguin  turn  forward  .12 revolutions  more...
    - penguin2  turn  forward  0.12 revolutions  more...
  - Do together
    - penguin  turn  backward  .12 revolutions  more...
    - penguin2  turn  backward  0.12 revolutions  more...
How do we get this event to happen again?
Classwork

• World 1 - Modify game from last time
• World 2 - Start a new world with snow background
  – Add a penguin and a fish resting on the ice
  – Create a BDE that moves the penguin over to the fish and eats it (fish disappears)