CompSci 94
Undetermined Repetition with While loop
October 14, 2021

Prof. Susan Rodger

Announcements

- QZ and videos for next time

At the Raleigh Fair Grounds
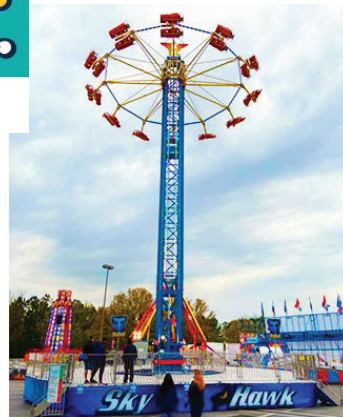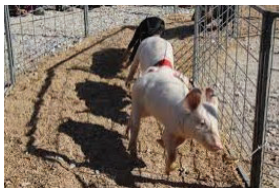
Alice 2 Fair Rides as objects
Double FerrisWheel
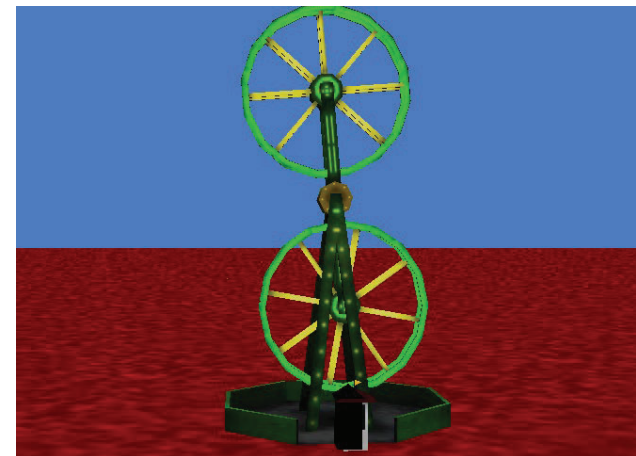
Slide 5

Slide 6

```
Loop 10 times  times  show complicat...
    ferrisWheel.doublewheel.wheel2  roll  left  0.1 revolutions  more...
    Wait  2 seconds
ferrisWheel.doublewheel  roll  left  0.5 revolutions  more...
Loop 10 times  times  show complicat...
    ferrisWheel.doublewheel.wheel1  roll  left  0.1 revolutions  more...
    Wait  2 seconds
Loop 10 times  times  show complicat...
    Do together
        ferrisWheel.doublewheel  roll  right  1 revolution  style = abruptly  duration = 2 seconds  more...
        Loop 2 times  times  show complicat...
            Do together
                ferrisWheel.doublewheel.wheel1  roll  left  1 revolution  style = abruptly  more...
                ferrisWheel.doublewheel.wheel2  roll  left  1 revolution  style = abruptly  more...
```
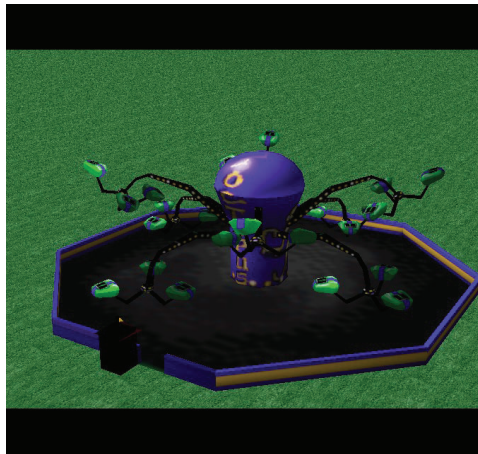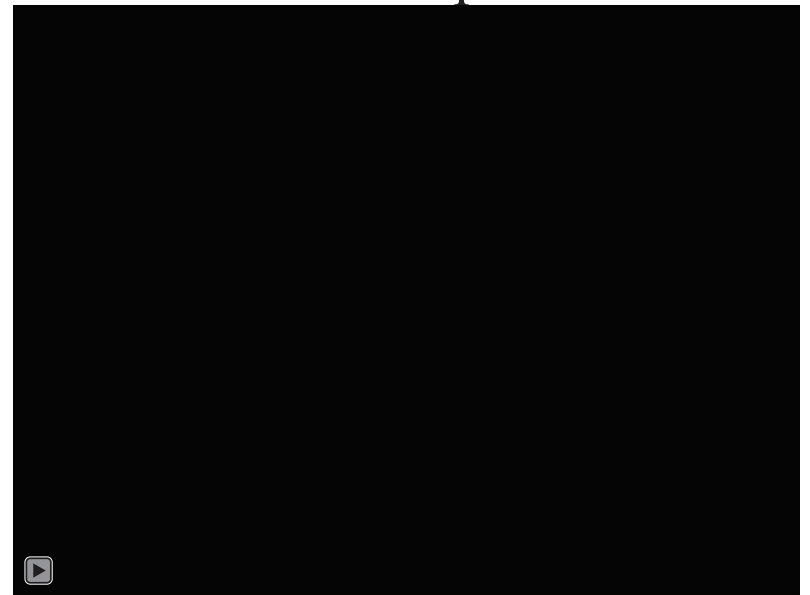
Slide 7

Alice 2 - Octopus Ride

Slide 8

Alice 2 Octopus Ride

Slide (top-left)

world.my first method *No parameters*　　create new parameter

No variables　　create new variable

// Ride the Octopus
// Don Slater　June 19, 2008
// <None>
// See Octopus animation from above
Octopus.octopusAnimation
// Move camera to one of the pods facing forward
camera　set point of view to　Octopus.Center.Arm3.pods　more...
camera　set vehicle to　Octopus.Center.Arm3.pods　more...
// get in the pod
camera　move up　.2 meters　more...
camera　move forward　(*subject* = Octopus.Center.Arm3.pods　's width　/ 2)　more...
// Sit in the pod
Do together
　camera　turn left　0.25 revolutions　more...
　camera　move backward　0.5 meters　more...
　camera　turn forward　0.05 revolutions　more...
// Ride the Octopus Pod
Octopus.octopusAnimation

Slide (top-right)

Octopus.octopusAnimation *No parameters*　　create new parameter

No variables　　create new variable

Loop 1 time　time　[show complicat...]
　Wait 2 seconds
　Do together
　　Loop 6 times　times　[show complicat...]
　　　Do together
　　　　Octopus.podsAnimation *pods* = Octopus.Center.Arm1.pods
　　　　Octopus.podsAnimation *pods* = Octopus.Center.Arm2.pods
　　　　Octopus.podsAnimation *pods* = Octopus.Center.Arm3.pods
　　　　Octopus.podsAnimation *pods* = Octopus.Center.Arm4.pods
　　　　Octopus.podsAnimation *pods* = Octopus.Center.Arm5.pods
　　　　Octopus.podsAnimation *pods* = Octopus.Center.Arm6.pods
　　　　Octopus.podsAnimation *pods* = Octopus.Center.Arm7.pods
　　　　Octopus.podsAnimation *pods* = Octopus.Center.Arm8.pods
　　Loop 3 times　times　[show complicat...]
　　　Do together
　　　　Octopus.armsAnimation *armUp* = Octopus.Center.Arm1　*armDown* = Octopus.Center.Arm2
　　　　Octopus.armsAnimation *armUp* = Octopus.Center.Arm3　*armDown* = Octopus.Center.Arm4
　　　　Octopus.armsAnimation *armUp* = Octopus.Center.Arm5　*armDown* = Octopus.Center.Arm6
　　　　Octopus.armsAnimation *armUp* = Octopus.Center.Arm7　*armDown* = Octopus.Center.Arm8

Slide (bottom-left)

Back to Alice 3….

Slide (bottom-right)

Looping – exact number of times

- Count loop

```
do in order
    (this.bunny)  turnToFace  (this.panda)   add detail
    count up to  3
        (this.bunny)  walk
    loop
```
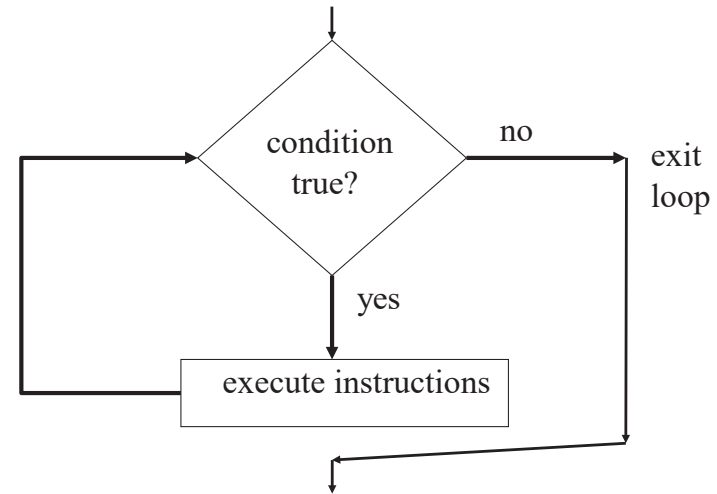
- How many steps to get to the panda?

 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
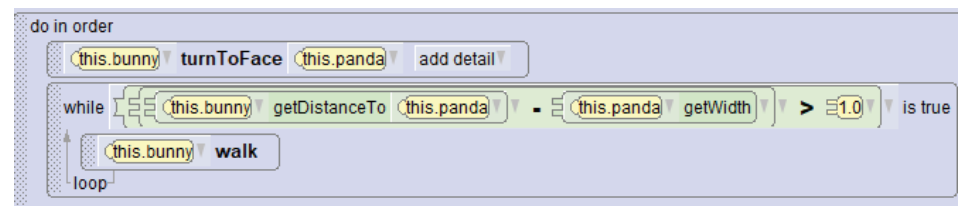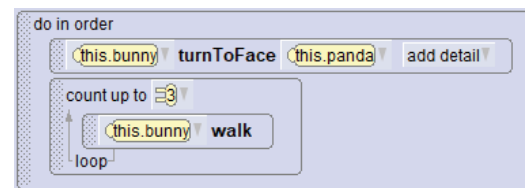 - Use **while** statement

While statement

- While some condition is true
  - execute instructions

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

Q1 Compare – What is difference?

Q1 Compare – What is difference?

- While loop stops when bunny is close to panda
- Count loop bunny just walks three times

Q2. What happens when run?

Q2. What happens when run?

- First loop, falcon moves down until partially in the ground
- Second loop, nothing happens since the condition is never true. The pig is not above ground.

Q3 What happens, when does the loop stop?

Q3 What happens, when does the loop stop?

```
while [ this.hare getDistanceTo this.panda > 1.0 ] is true
    do together
        this.hare moveToward this.panda , 0.25    add detail
        this.panda moveToward this.hare , 0.25    add detail
    loop
```

- They move towards each other repeatedly until their distance is less than or equal to 1.0

Q4 What happens, when does the loop stop? (numbers different)

```
while [ this.hare getDistanceTo this.panda > 1.0 ] is true
    do together
        this.hare moveToward this.panda , 3.0    add detail
        this.panda moveToward this.hare , 3.0    add detail
    loop
```

Q4 What happens, when does the loop stop? (numbers different)

```
while [ this.hare getDistanceTo this.panda > 1.0 ] is true
    do together
        this.hare moveToward this.panda , 3.0    add detail
        this.panda moveToward this.hare , 3.0    add detail
    loop
```

- They move way too much compared to how close they are suppose to be. This could be an infinite loop!

Q5 What happens when this runs?

```
do in order
    this.bunny setPaint GREEN    add detail
    while [ this.bunny getPaint ≠ RED ] is true
        this.bunny setPaint BLUE    add detail
        this.bunny setPaint RED    add detail
        this.bunny setPaint YELLOW    add detail
    loop
```

Q5 What happens when this runs?


```
do in order
  this.bunny  setPaint  GREEN   add detail
  while  this.bunny  getPaint  ≠  RED   is true
    this.bunny  setPaint  BLUE   add detail
    this.bunny  setPaint  RED   add detail
    this.bunny  setPaint  YELLOW   add detail
  loop
```

- This is an infinite loop! The bunny is never red when the condition is tested. So the condition is always true!

Q6 What code could I use to stop this loop?

```
do in order
  // How do I stop this loop? What do I put in place of true?
  while  true  is true
    this.bunny  resize  1.3   add detail
  loop
```

Q6 What code could I use to stop this loop?

```
do in order
  // How do I stop this loop? What do I put in place of true?
  while  true  is true
    this.bunny  resize  1.3   add detail
  loop
```

- Continue while height smaller than some number. Stop when height is bigger.

```
while  this.bunny  getHeight  <  2.0   is true
  this.bunny  resize  1.3   add detail
  this.bunny  say  "my height " + this.bunny  getHeight   add detail
loop
```

Class Today

- Catching dinner