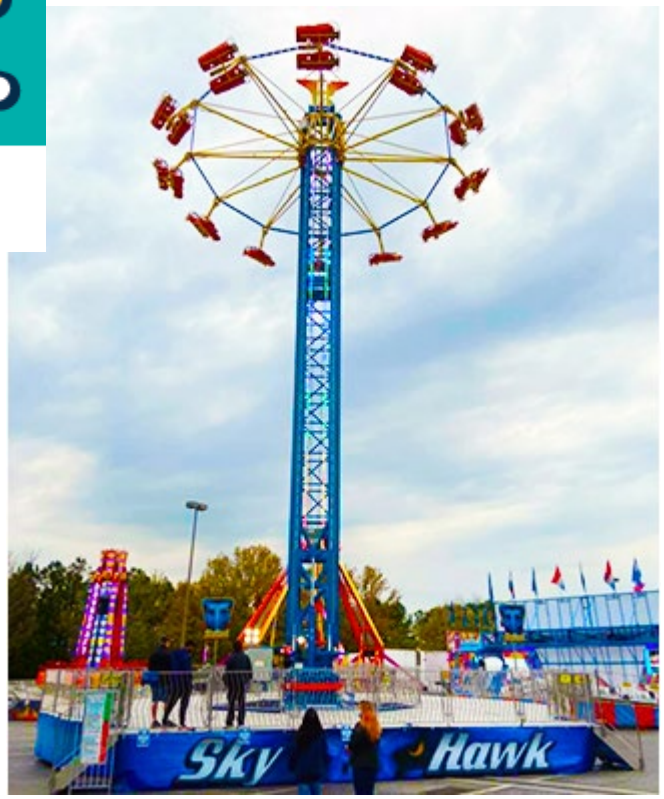
CompSci 94
Undetermined Repetition with While loop
October 14, 2021

Prof. Susan Rodger

Announcements

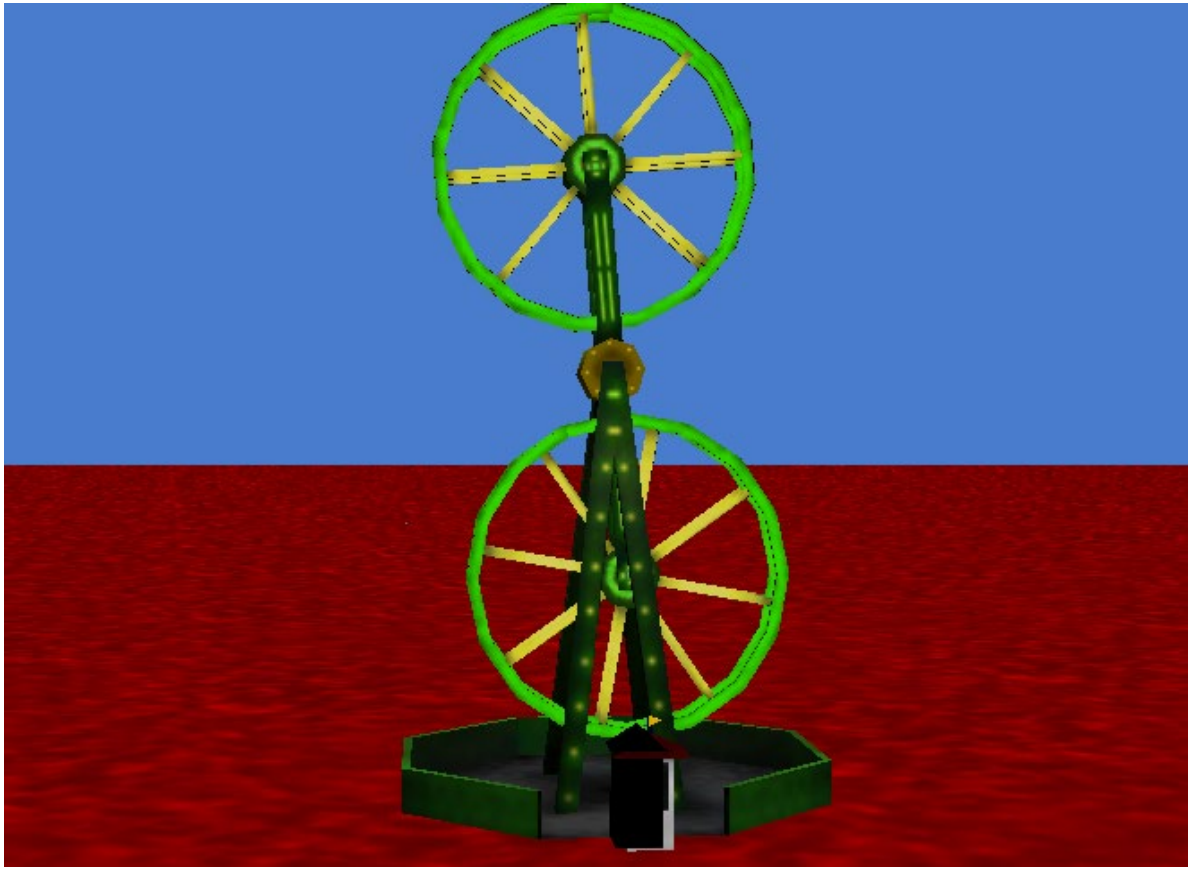
- QZ and videos for next time

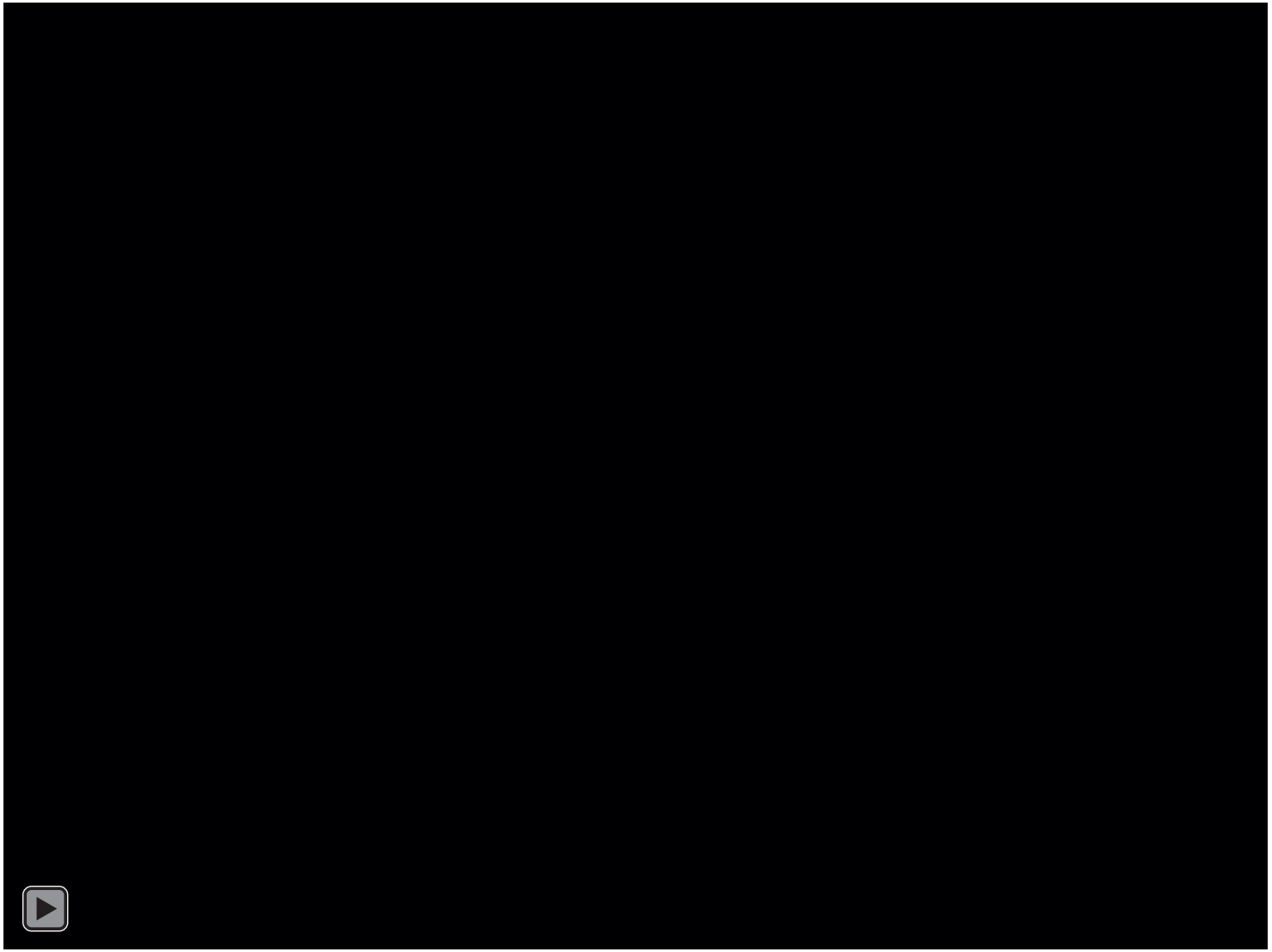
Ezzell's Somethin' Good
Shrimp & Grits on a Stick

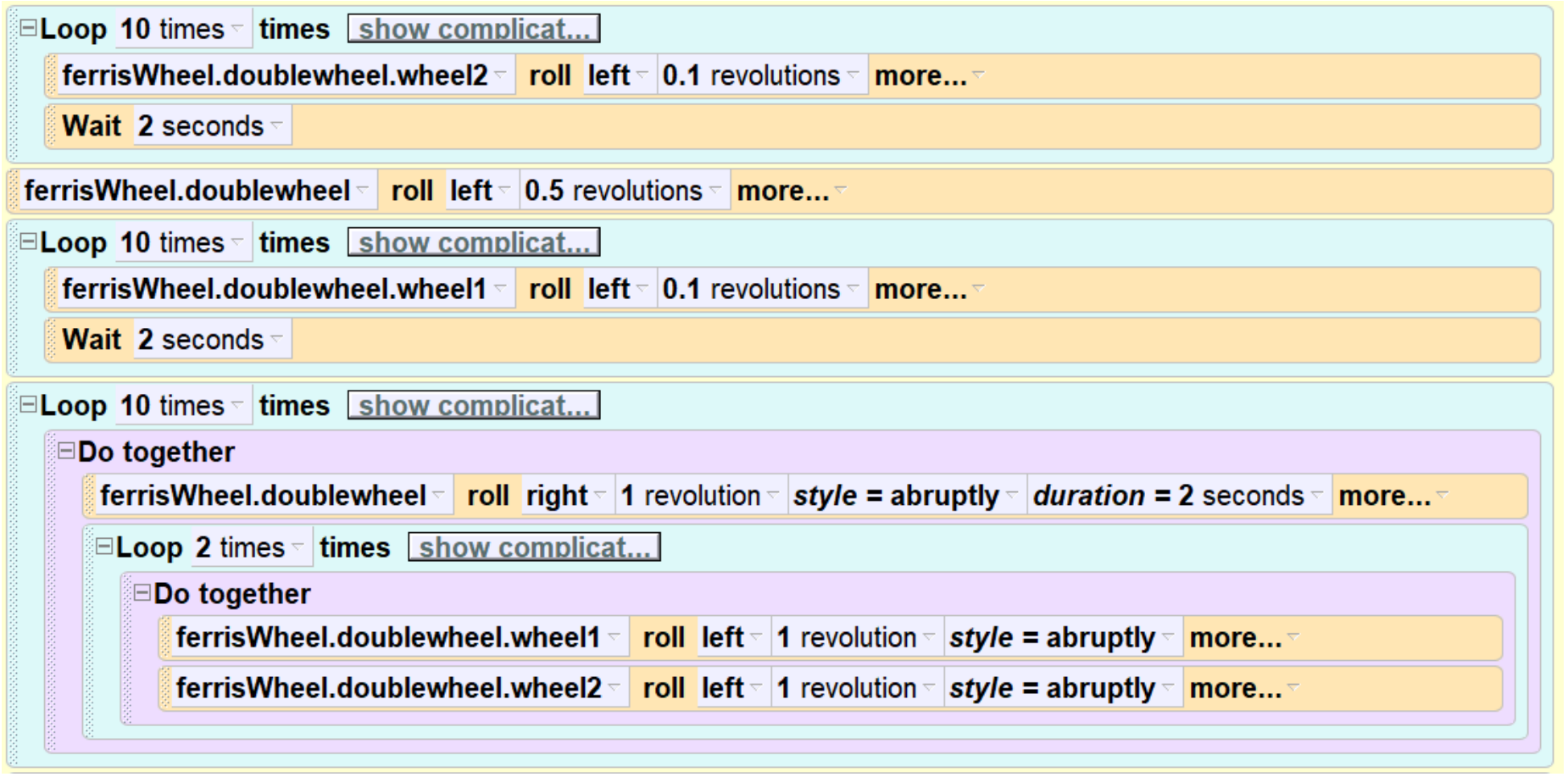


At the Raleigh Fair Grounds

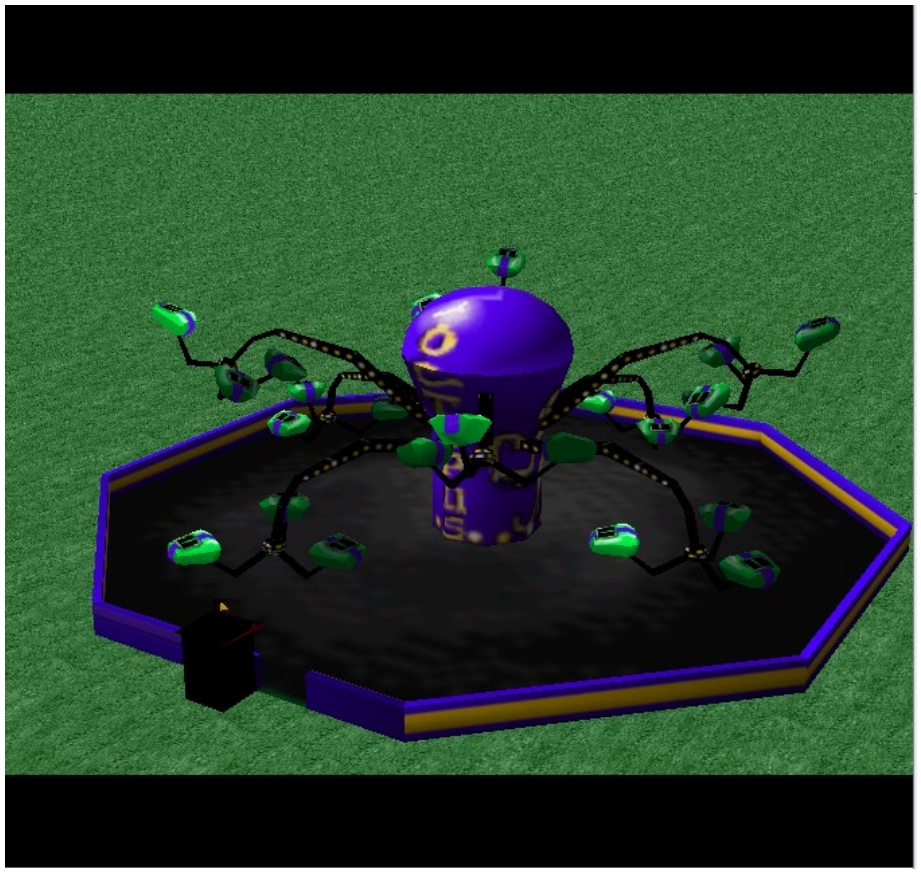
Alice 2 Fair Rides as objects
Double FerrisWheel






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...

Alice 2 - Octopus Ride



Alice 2 Octopus Ride

world.my first method | Octopus.octopusAnimation

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
```

world.my first method | **Octopus.octopusAnimation**

Octopus.octopusAnimation *No parameters* — create new parameter

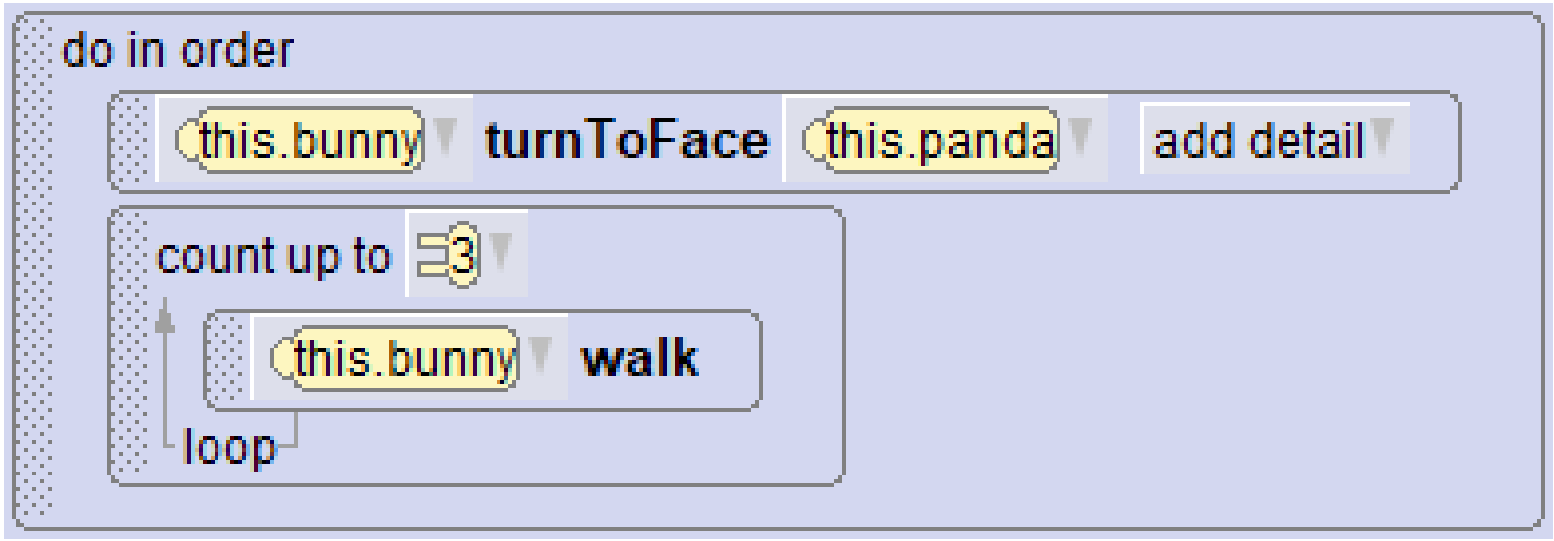
No variables — create new variable

- **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
    - Octopus.baseAnimation

Back to Alice 3….

Looping – exact number of times

- Count loop



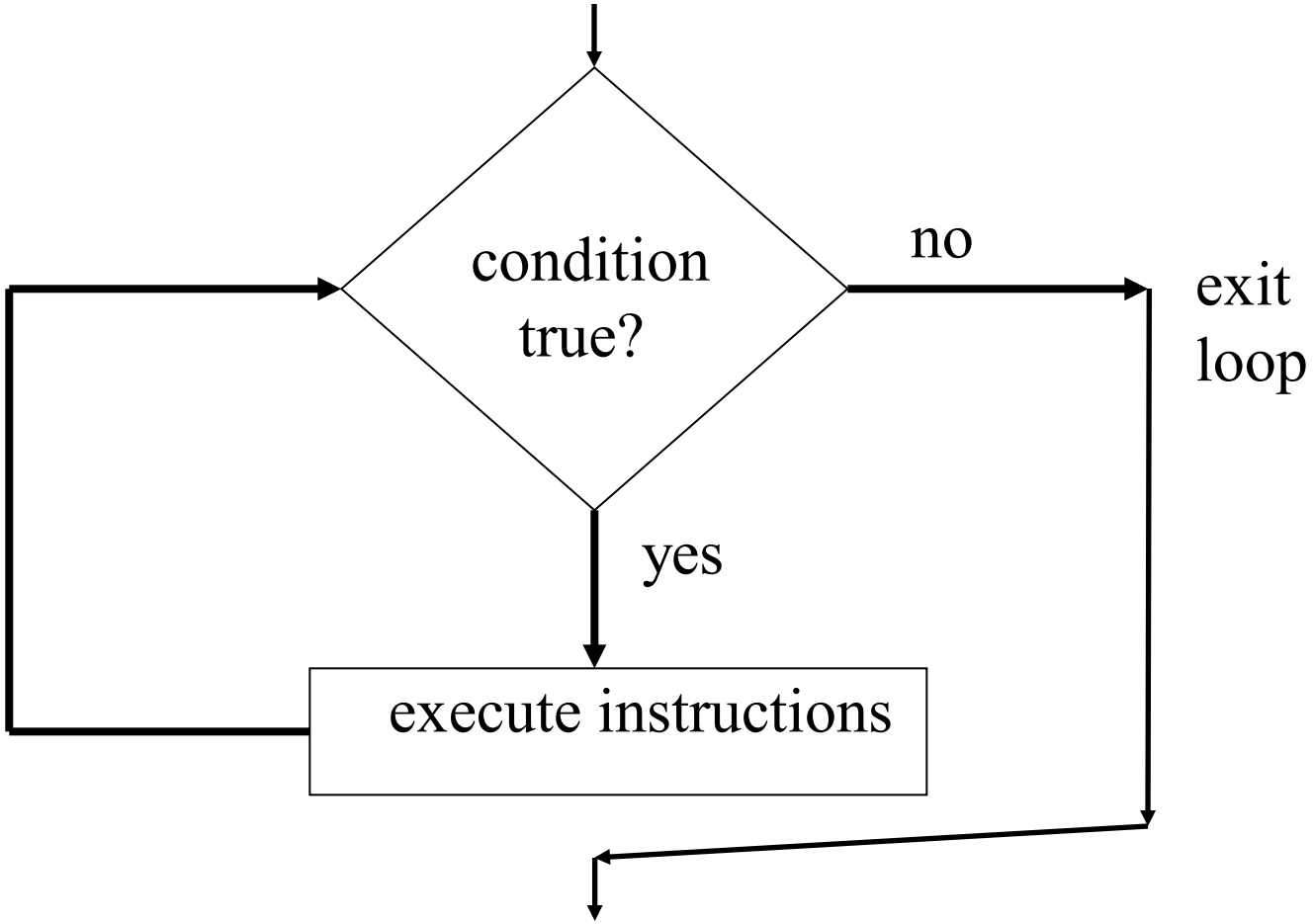
- How many steps to get to the panda?
  - 3, 6, 8?

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

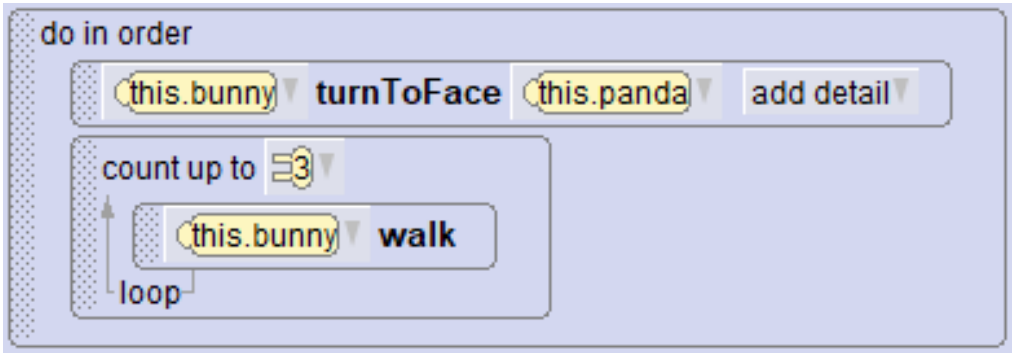


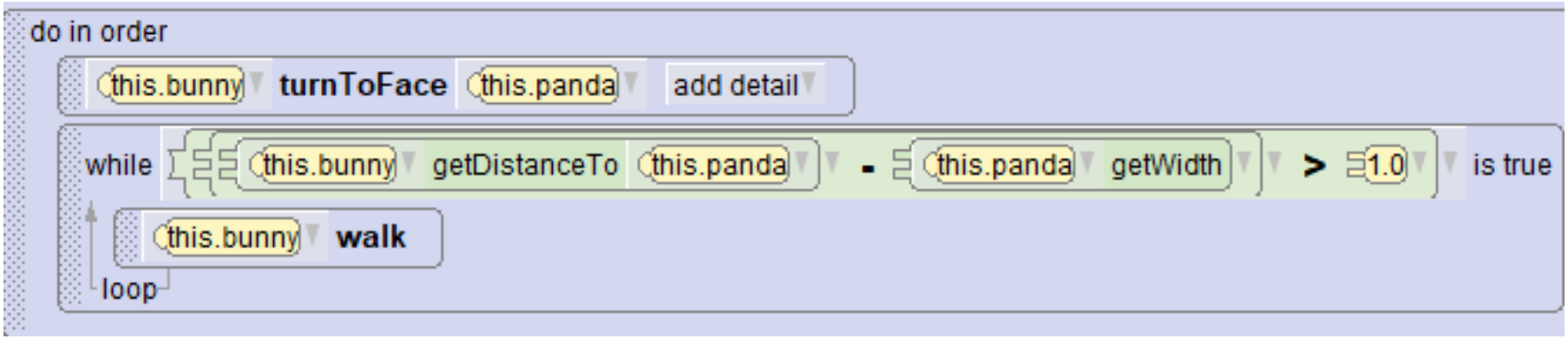
- While some condition is true
  - execute instructions

General "Rule of Thumb"

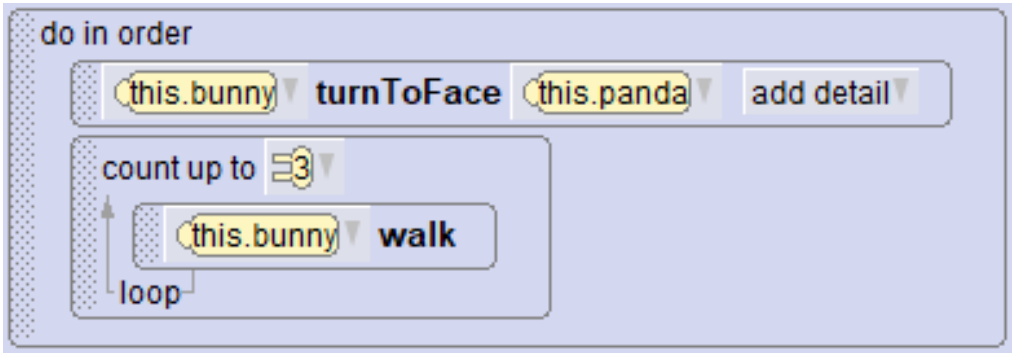
- As a general rule, a While loop should be written so the loop will eventually end
  - Requires statements inside the loop change the conditions of the world such that condition for While eventually becomes false
- If While loop never ends
  - Infinite while loop

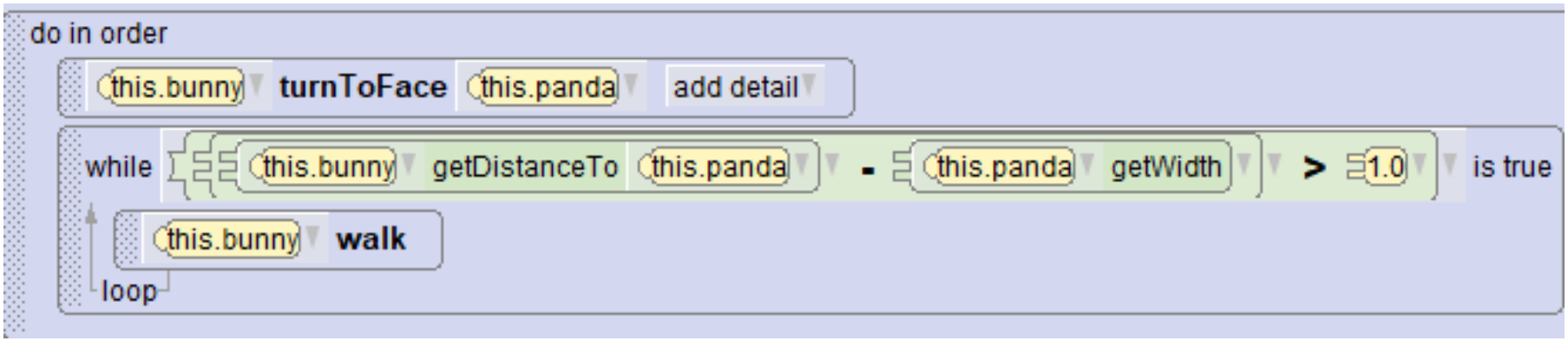
Q1 Compare – What is difference?





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?

```
while [this.falcon] isAbove [this.ground] add detail is true
    [this.falcon] move [DOWN], [0.25] add detail
loop
```

```
while [this.pig] isAbove [this.ground] add detail is true
    [this.pig] move [DOWN], [0.25] add detail
loop
```

Q2. What happens when run?

```
while [this.falcon] isAbove [this.ground] add detail is true
    [this.falcon] move [DOWN] , [0.25] add detail
loop
```

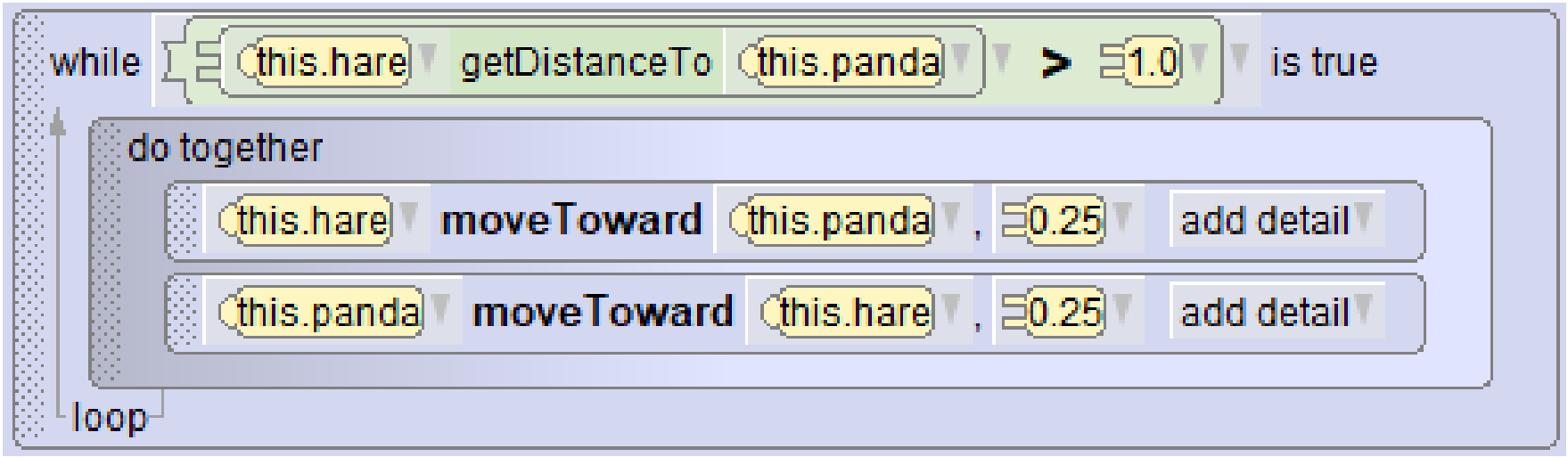
```
while [this.pig] isAbove [this.ground] add detail is true
    [this.pig] move [DOWN] , [0.25] add detail
loop
```

- 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?

```
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
```

Q3 What happens, when does the loop stop?

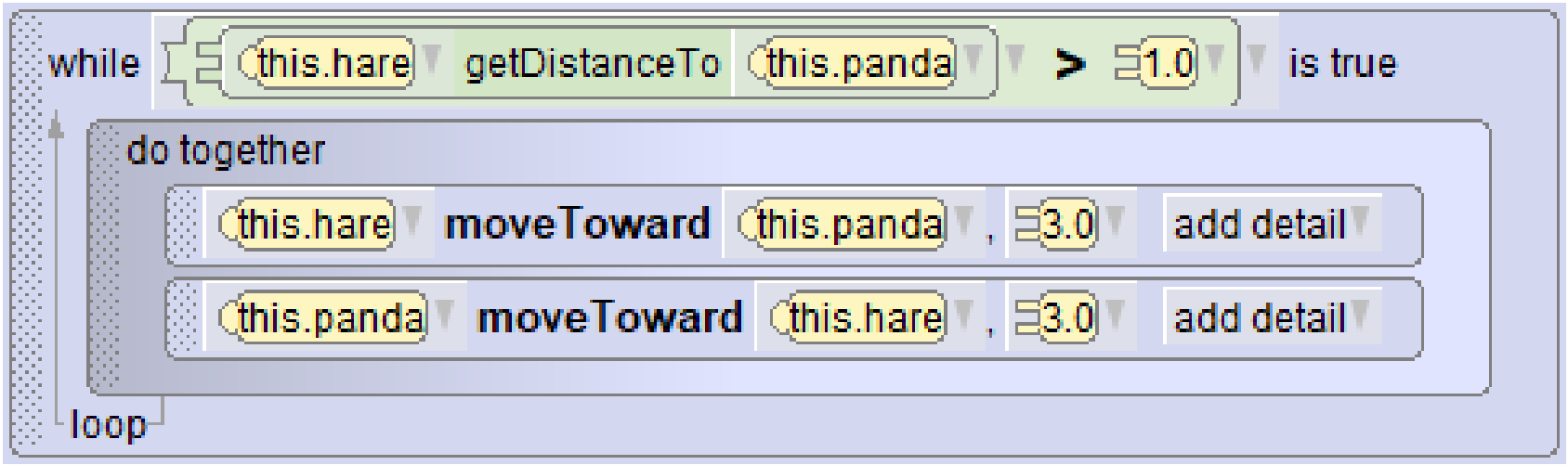


- They move towards each other repeatedly until their distance is less than or equal to 1.0

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

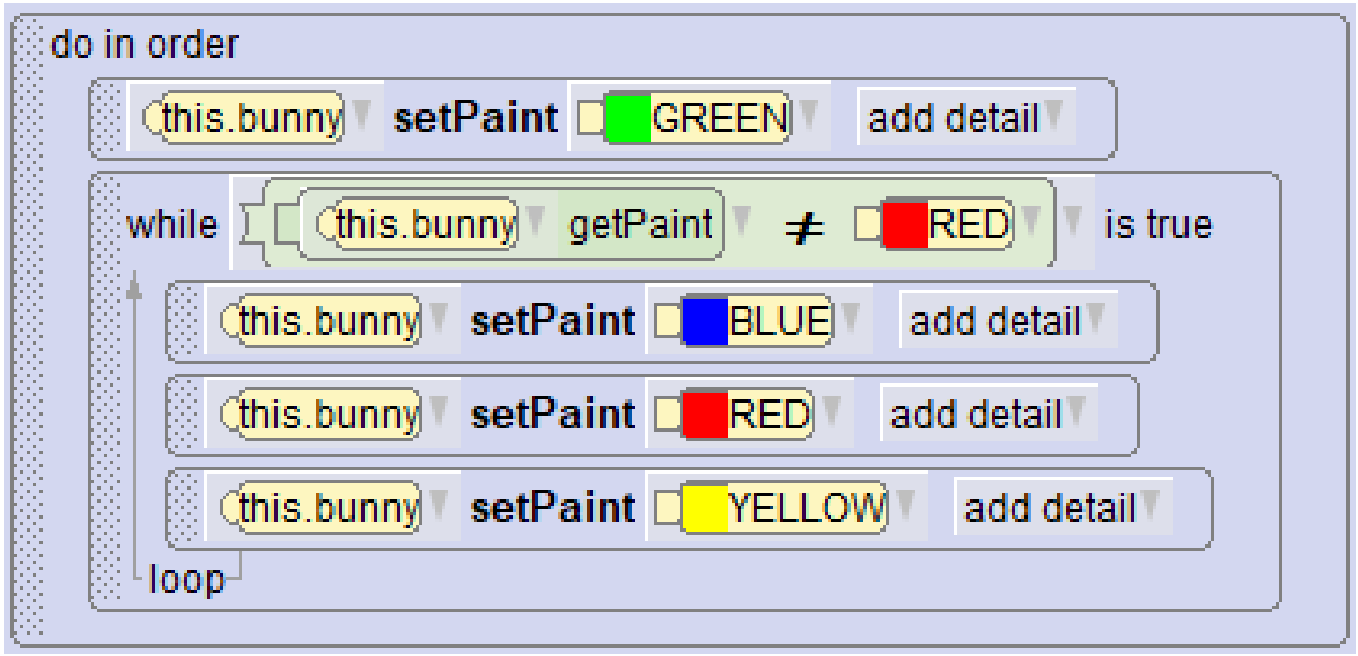
```
while [this.hare getDistanceTo this.panda] > [1.0] is true
    do together
        this.hare moveToward this.panda, 3.0 add detail
        this.panda moveToward this.hare, 3.0 add detail
    loop
```

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

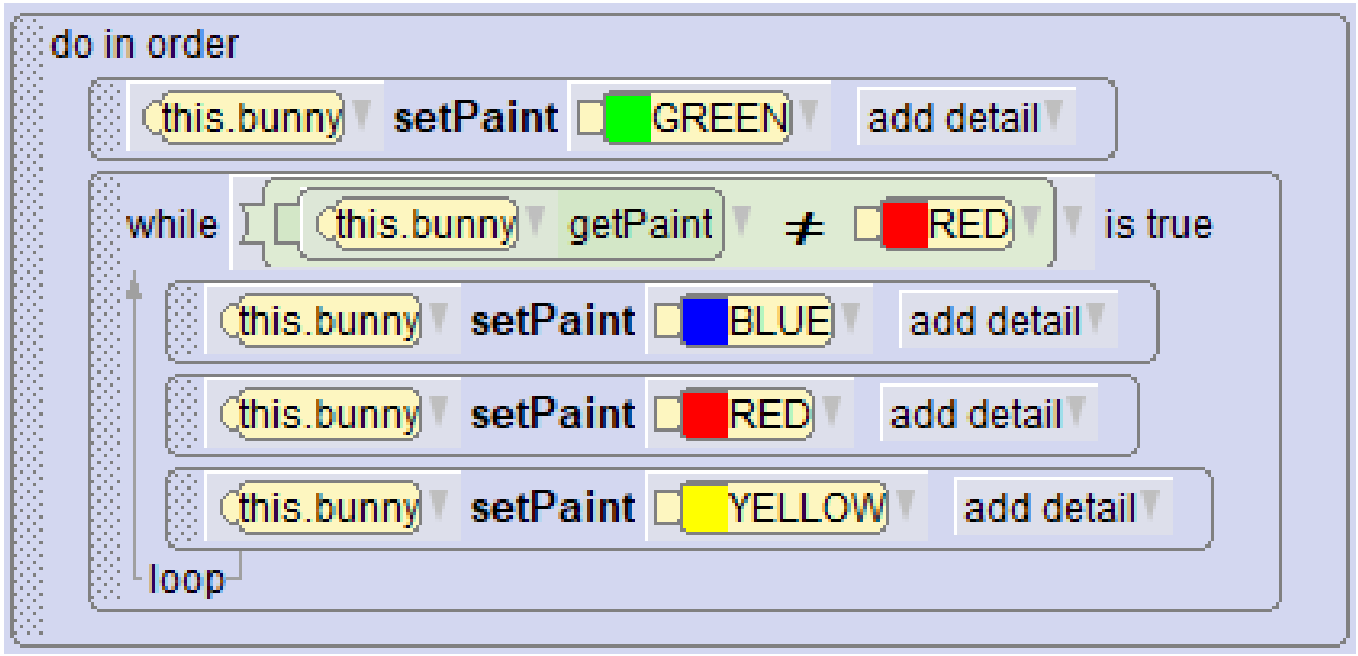


- They move way too much compared to how close they are suppose to be. This could be an infinite loop!

Q5 What happens when this runs?

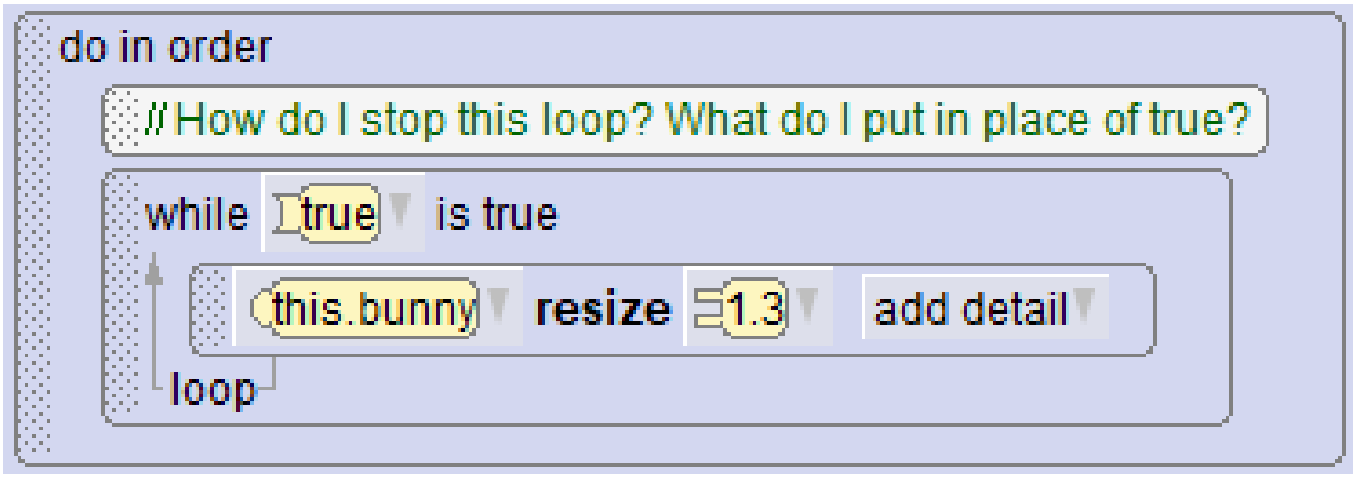


Q5 What happens when this runs?

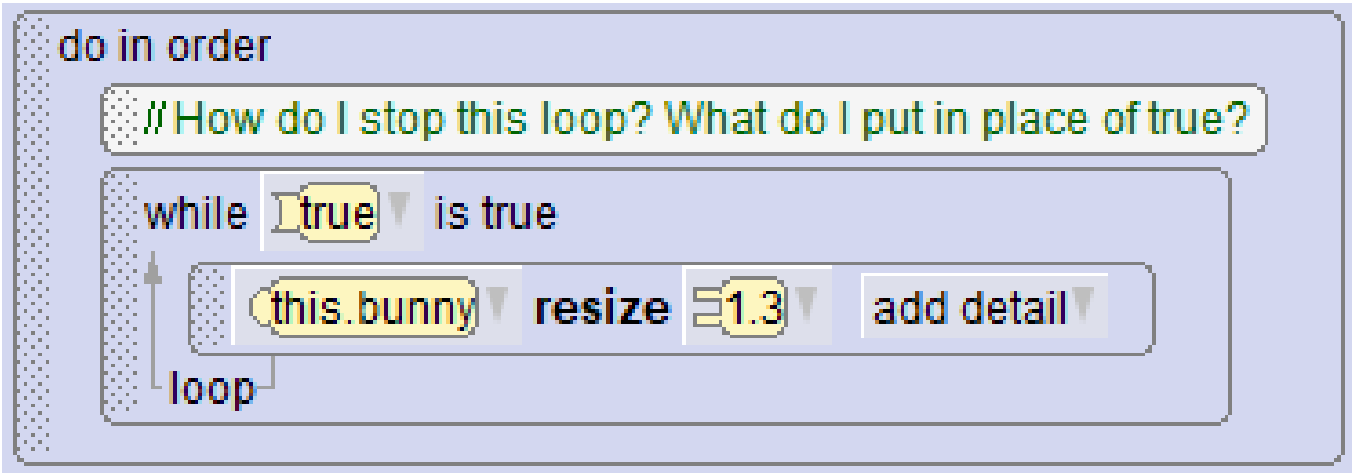


- This is an infinite loop! The bunny is never red when the condition is tested. So the condition is always true!

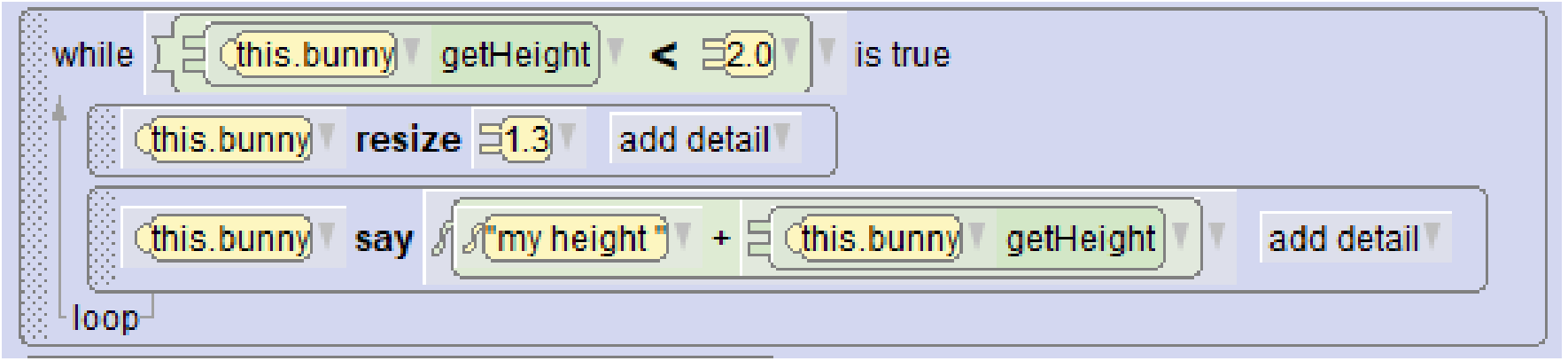
Q6 What code could I use to stop this loop?



Q6 What code could I use to stop this loop?



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



Class Today

- Catching dinner