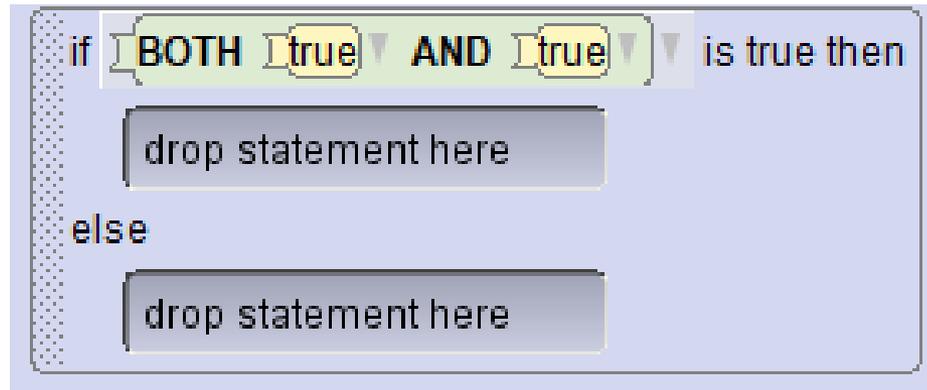


CompSci 94

Logic with Ifs, Nested Ifs

October 3, 2024



Prof. Susan Rodger

Announcements

- Assignment 3 due Tues. Oct 8
 - Also fill out reflect form!
- Next QZ and Videos due Tuesday when class starts
 - They are up!

Q1. Review Nested IF

- What happens if the diningTable has width 1.7 and depth 1.0?

```
if (this.diningTable.getWidth() > 1.5) is true then
  if (this.diningTable.getDepth() > 1.0) is true then
    this.alien say "table is larger than 1.5 square feet" add detail
  else
    this.diningTable say "hello" add detail
    this.diningTable resize 1.2 add detail
else
  this.diningTable say "Whoa" add detail
  this.diningTable resize 2.0 add detail
```

The image shows a Scratch script with the following structure:

- Outer if block:** Condition: `this.diningTable.getWidth() > 1.5`. If true, it enters a nested if block.
- Inner if block (nested):** Condition: `this.diningTable.getDepth() > 1.0`.
 - True branch:** `this.alien say "table is larger than 1.5 square feet"` followed by `add detail`.
 - Else branch:** `this.diningTable say "hello"` followed by `add detail`, and `this.diningTable resize 1.2` followed by `add detail`.
- Outer else branch:** `this.diningTable say "Whoa"` followed by `add detail`, and `this.diningTable resize 2.0` followed by `add detail`.

Q1. Review Nested IF

- What happens if the diningTable has width 1.7 and depth 1.0?
 - diningTable says hello and is resized larger by 1.2

```
if (this.diningTable.getWidth() > 1.5) is true then
  if (this.diningTable.getDepth() > 1.0) is true then
    this.alien say "table is larger than 1.5 square feet" add detail
  else
    this.diningTable say "hello" add detail
    this.diningTable resize 1.2 add detail
else
  this.diningTable say "Whoa" add detail
  this.diningTable resize 2.0 add detail
```

The image shows a Scratch code editor with the following nested if-else logic:

- Outer if:** `if (this.diningTable.getWidth() > 1.5) is true then`
 - Inner if:** `if (this.diningTable.getDepth() > 1.0) is true then`
 - `this.alien say "table is larger than 1.5 square feet" add detail`
 - else:**
 - `this.diningTable say "hello" add detail`
 - `this.diningTable resize 1.2 add detail`
 - else:**
 - `this.diningTable say "Whoa" add detail`
 - `this.diningTable resize 2.0 add detail`

Q2. Logic Review

- What are possible values of A and B
 - if **A and B** is True?
 - if **A or B** is True?
 - if **A or B** is False?

Q2. Logic Review

- What are possible values of A and B
 - if **A and B** is True?
 - A must be True, B must be True
 - if **A or B** is True?
 - Either A must be True or B must be True, or both
 - if **A or B** is False?
 - A must be False, B must be false

Logic Truth Table

A	B	not A	A and B	A or B
True	True	False	True	True
True	False	False	False	True
False	True	True	False	True
False	False	True	False	False

Logic Truth Table

A AND B is **true** only if both A and B are **true**

A	B	not A	A and B	A or B
True	True	False	True	True
True	False	False	False	True
False	True	True	False	True
False	False	True	False	False

Logic Truth Table

A OR B is **false** only if both A and B are **false**

A	B	not A	A and B	A or B
True	True	False	True	True
True	False	False	False	True
False	True	True	False	True
False	False	True	False	False

Example

- Suppose $x = 7$ and $y = 5$

if $x > 5$ or $y < 3$

if $x > 5$ and $y < 3$

Example

- Suppose $x = 7$ and $y = 5$

if $x > 5$ or $y < 3$

True because at least one of them is True

if $x > 5$ and $y < 3$

False because both of them are not True

Q3. Consider this code – Nested Ifs
How would you write it with ONE IF?



Rewrite Code - one IF with AND



```
if BOTH (this.diningTable.getOpacity() > 0.99) AND (this.alien.isBehind(this.diningTable))
    this.alien.serveFood()
else
    this.alien.say("No service today").addDetail()
```

Q4. What does bunny say?



Bunny is red
to start.



Q4. What does bunny say?

```
if BOTH (this.bunny.getPaint() == RED) AND (this.panda.getHeight() > this.bunny.getHeight())
  this.bunny.say("first")
else
  if (this.panda.getHeight() <= this.bunny.getHeight())
    this.bunny.say("second")
  else
    if (this.bunny.getPaint() != RED)
      this.bunny.say("third")
    else
      this.bunny.say("fourth")
```

Bunny is red
to start.



Bunny says:
second

Q5. Bunny different. What does bunny say?

```
if BOTH { this.bunny.getPaint() == RED } AND { this.panda.getHeight() > this.bunny.getHeight() }
  this.bunny.say("first").addDetail()
else
  if { this.panda.getHeight() <= this.bunny.getHeight() } is true then
    this.bunny.say("second").addDetail()
  else
    if { this.bunny.getPaint() != RED } is true then
      this.bunny.say("third").addDetail()
    else
      this.bunny.say("fourth").addDetail()
```

Bunny is
green to start.



Q5. Bunny different. What does bunny say?

```
if BOTH { this.bunny.getPaint() == RED } AND { this.panda.getHeight() > this.bunny.getHeight() }
  this.bunny.say("first")
else
  if this.panda.getHeight() ≤ this.bunny.getHeight() is true then
    this.bunny.say("second")
  else
    if this.bunny.getPaint() ≠ RED is true then
      this.bunny.say("third")
    else
      this.bunny.say("fourth")
```

Bunny is green to start.



Bunny says:
third

Q6. Give an example to make bunny say fourth

The image shows a Scratch script with the following logic:

- if** BOTH `this.bunny.getPaint() == RED` AND `this.panda.getHeight() > this.bunny.getHeight()`
 - `this.bunny.say("first")` add detail
- else**
 - if** `this.panda.getHeight() ≤ this.bunny.getHeight()` is true then
 - `this.bunny.say("second")` add detail
 - else**
 - if** `this.bunny.getPaint() ≠ RED` is true then
 - `this.bunny.say("third")` add detail
 - else**
 - `this.bunny.say("fourth")` add detail

Q6. Give an example to make bunny say fourth

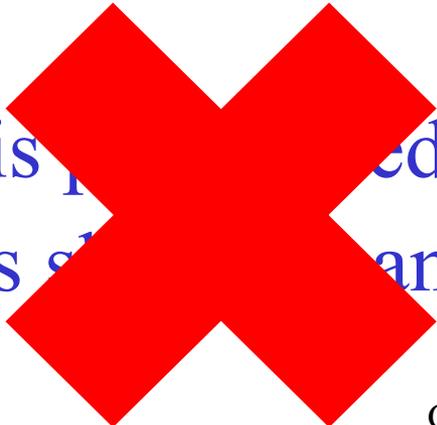


Bunny is painted red AND
Panda is shorter than bunny

Give an example to make bunny say fourth

```
if BOTH { this.bunny.getPaint() == RED } AND { this.panda.getHeight() > this.bunny.getHeight() }
  this.bunny.say("first")
else
  if { this.panda.getHeight() <= this.bunny.getHeight() } is true then
    this.bunny.say("second")
  else
    if { this.bunny.getPaint() != RED } is true then
      this.bunny.say("third")
    else
      this.bunny.say("fourth")
```

Bunny is red AND
Panda is shorter than bunny



NO!!!!!!!!!!!!!!!!!!!!

No way bunny will
ever say fourth!

Class Today

- Nested Ifs, Logic – and/or/not

