

CompSci 94

Variables and Array Indexing

October 26, 2021



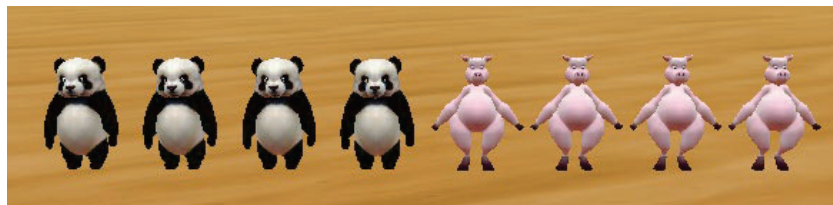
Prof. Susan Rodger

Announcements

- Assignment 4 due Thursday Oct 28
- Videos and online quiz for next class

Pig and Panda arrays

- Two arrays, animals are in the arrays from left to right as seen



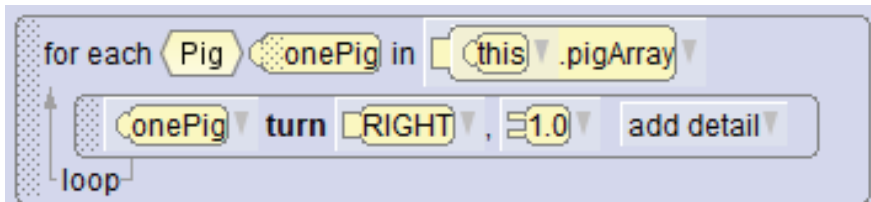
```
unmanaged
Pig[] pigArray ← new Pig[] { (this.pig), (this.pig2), (this.pig3), (this.pig4) }
Panda[] pandaArray ← new Panda[] { (this.panda), (this.panda2), (this.panda3), (this.panda4) }
```

Review1 - What is the code for?

- Code for Pigs to turn right one pig at a time?

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- Code for Pigs to turn right one pig at a time?
 - Use a “for each in” loop
 - Name a loop variable – I chose **onePig**

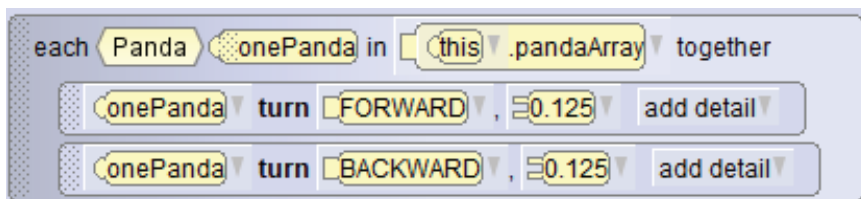


Review2 – What is the code for?

- Code for Pandas to bow **at the same time** (turn forward a little, then turn backward)?

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- Code for Pandas to bow **at the same time** (turn forward a little, then turn backward)?
 - Use “each in together” loop
 - Name a loop variable – I chose **onePanda**



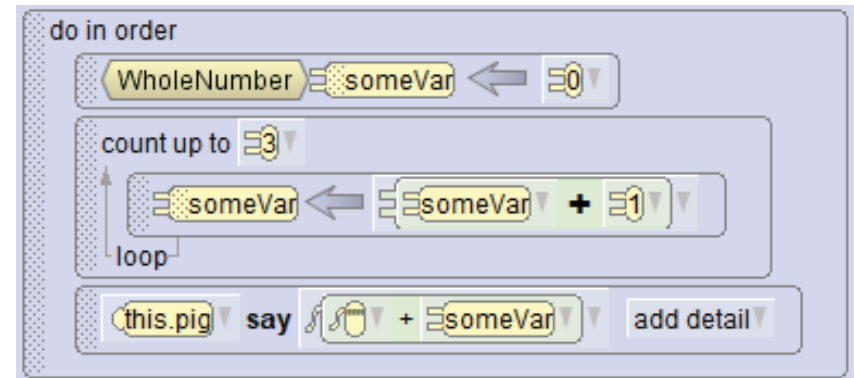
Q1 – Questions about variables

- What is the difference between a const variable and a variable?
- Which Alice construct do you use to change a variable?

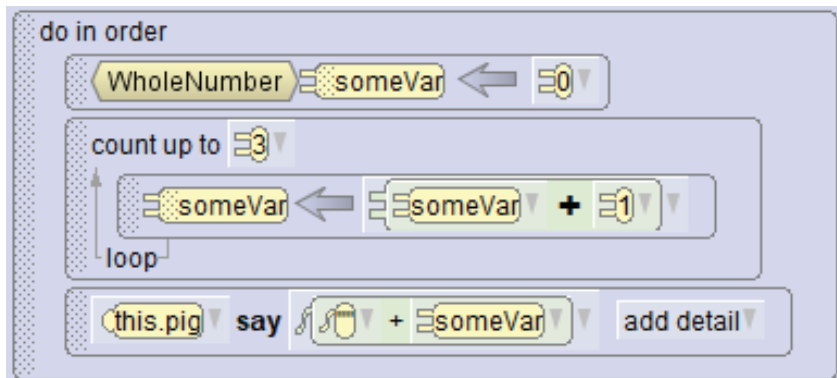
Q1 – Questions about variables

- What is the difference between a const variable and a variable?
 - Const variable can only store one value when it is created
 - Variable can store a value that can change
- Which Alice construct do you use to change a variable?
 - Assign tile

Q2 - What is the output of this code?



Q2 - What is the output of this code?



- Pig says: 3

The code consists of the following blocks in order:

- do in order** block containing:
 - WholeNumber** block with `someNum` and value `0`.
 - count up to** block with value `3`, containing a **loop** block with an **Assign** block: `someNum ← someNum + 1`.
 - this.pig4 say** block with a **Math** block: `someNum`.
 - add detail** block.

A dropdown menu is open over the `someNum` block in the `say` block, showing the following options:

- `1` (current value)
- `0`
- `1`
- `2`
- `3`
- Random
- Decimal to Whole Number
- Math
- Custom WholeNumber...
- array length:
 - `this.pigArray.length`
 - `this.pandaArray.length`
- TextString
- DecimalNumber
- SThing

- Q3 -- Consider this code.
Why isn't somenum a choice?

do in order

WholeNumber `someNum` ← `0` add detail

count up to `3`

loop

`someNum` ← `someNum` + `1` add detail

`this.pig4` say `add detail` + `1`

1 (current value)

0

1

2

3

Random ▶

Decimal to Whole Number ▶

Math ▶

Custom WholeNumber...

array length:

`this.pigArray.length`

`this.pandaArray.length`

TextString ▶

DecimalNumber ▶

SThing ▶

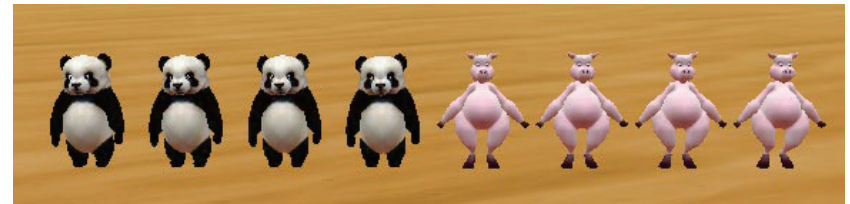
Q3 – Consider this code.
Why isn't somenum a choice?

- It is not in scope! It is not in the do in order!

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Pig and Panda arrays again

- Two arrays, animals are in the arrays from left to right as seen



unmanaged

Pig[] pigArray ← `new Pig[] { (this.pig, (this.pig2, (this.pig3, (this.pig4)`

Panda[] pandaArray ← `new Panda[] { (this.panda, (this.panda2, (this.panda3, (this.panda4)`

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14

Q4 – How do I write an **array index loop** to have each pig turn right once?

- Fill in the missing code:

do in order

WholeNumber `index` ← `0`

count up to `this.pigArray.length`

loop

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15

Q4 – How do I write an **array index loop** to have each pig turn right once?

- Use a count loop
 - Create a variable set to 0
 - Use the variable to index in the array
 - Update the variable by 1 in the loop

do in order

WholeNumber `index` ← `0`

count up to `this.pigArray.length`

loop

`this.pigArray[index]` turn `RIGHT`, `1.0` add detail

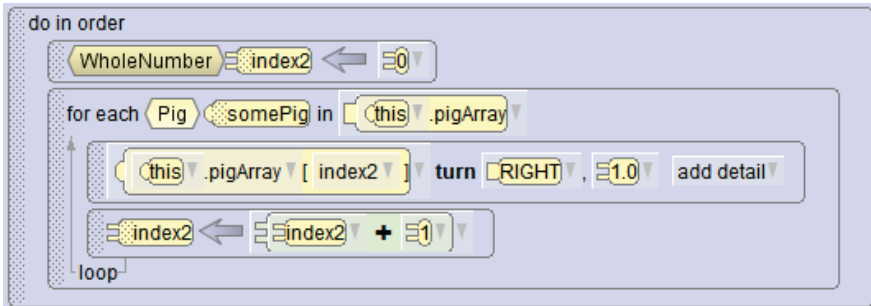
`index` ← `index` + `1`

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16

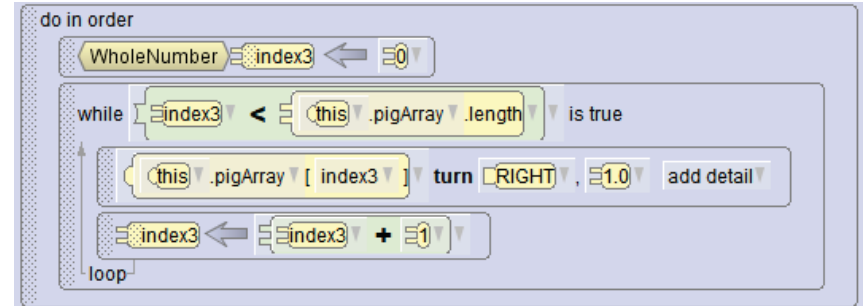
Q4 – How do I write an **array index loop** to have each pig turn right once?

- **Or could use a for each in loop**
 - Create a variable set to 0
 - Use the variable to index in the array
 - Update the variable by 1 in the loop



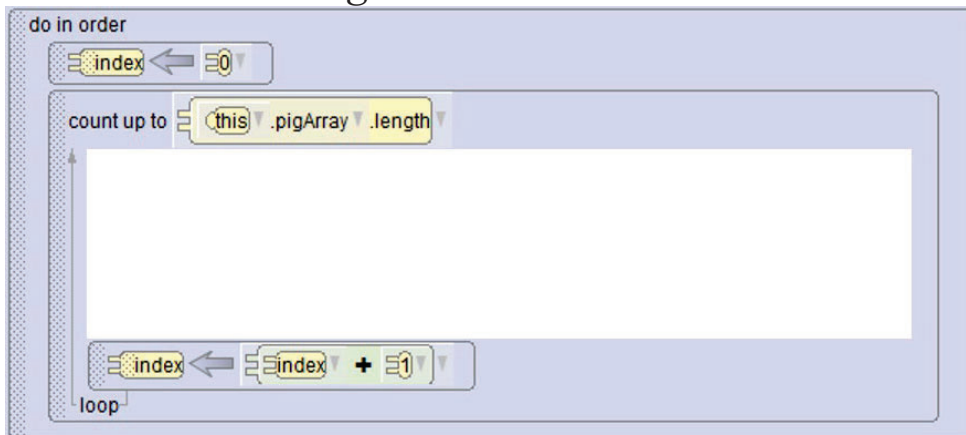
Q4 – How do I write an **array index loop** to have each pig turn right once?

- **OR could use a while loop**
 - Create a variable set to 0
 - Use the variable to index in the array
 - Update the variable by 1 in the loop



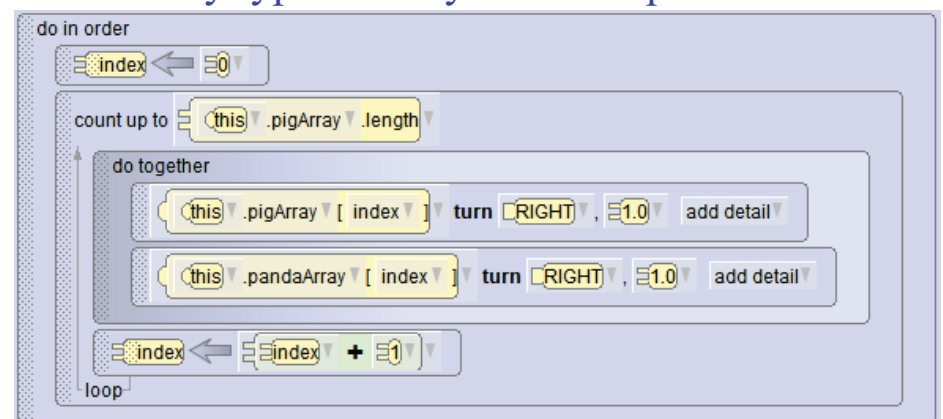
Q5 – How do I write code to have each pig turn right once one at a time, with one of the pandas turning with each pig?

- *Fill in missing code:*



Q5 – How do I write code to have each pig turn right once one at a time, with one of the pandas turning with each pig?

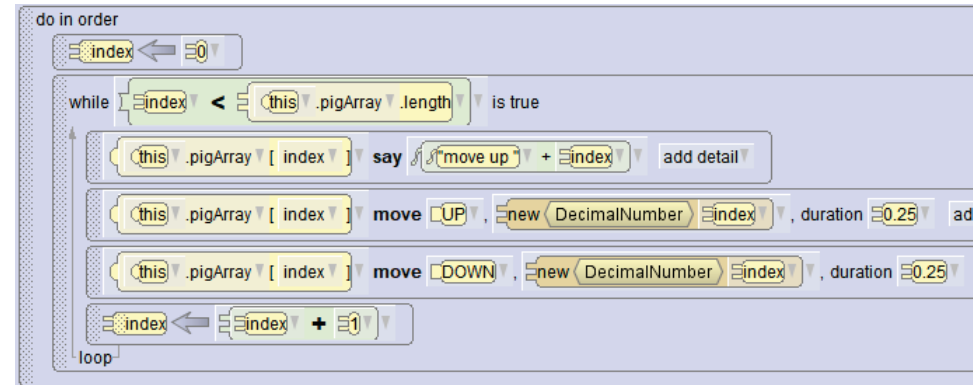
- Use any type of array index loop



Q5 continued

- Notice the pigs and pandas arrays must be the same size for this to work!

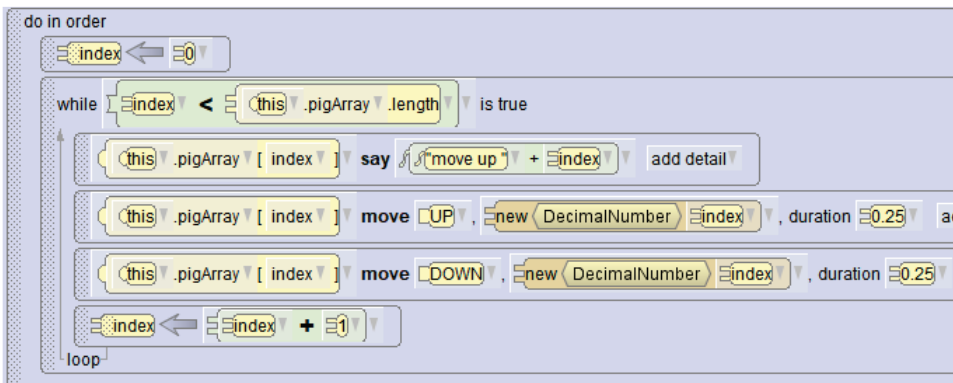
Q6 – What does this code do?



```
do in order
  index ← 0
  while index < this.pigArray.length is true
    this.pigArray[index] say "move up" + index add detail
    this.pigArray[index] move UP, new DecimalNumber index, duration 0.25 ad
    this.pigArray[index] move DOWN, new DecimalNumber index, duration 0.25
    index ← index + 1
  loop
```

Q6 – What does this code do?

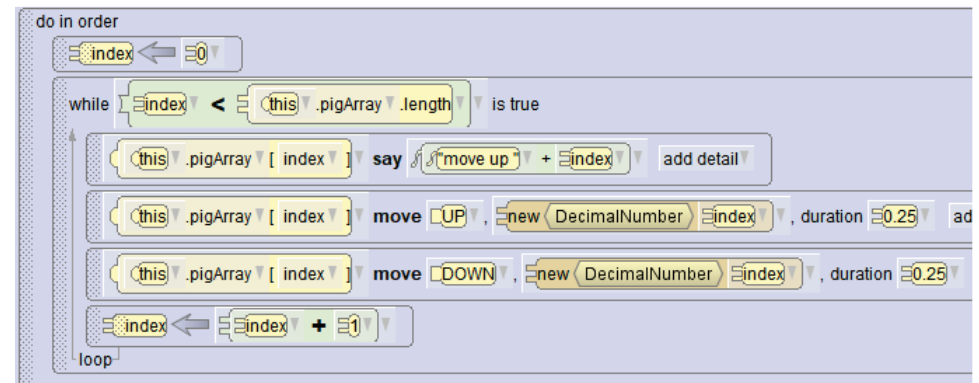
- each pig moves up and down one at a time with the next pig moving one unit more. That is, the first pig 0 units, second pig 1 unit, third pig 2 units, etc.



```
do in order
  index ← 0
  while index < this.pigArray.length is true
    this.pigArray[index] say "move up" + index add detail
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    index ← index + 1
  loop
```

Q6 – What does this code do?

- NOTE: Use an array index loop in two places – One for index, one for how far to move up/down



```
do in order
  index ← 0
  while index < this.pigArray.length is true
    this.pigArray[index] say "move up" + index add detail
    this.pigArray[index] move UP, new DecimalNumber index, duration 0.25 ad
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    index ← index + 1
  loop
```

Q7 – How do you write code to color every other panda green in array?

- Start with no color



- Color every other green (1st one, 3rd one, etc.)



Q7 – How do you write code to color every other panda green in array?

- What is the missing line of code?

```
do in order
  WholeNumber someIndex ← 0
  while someIndex < this.pandaArray.length is true
    this.pandaArray[someIndex] setPaint GREEN add detail
  loop
```

Q7 – How do you write code to color every other panda green in array?

- One way, use array index, increment by 2
- Must use while loop, doesn't work w/count loop

```
do in order
  WholeNumber someIndex ← 0
  while someIndex < this.pandaArray.length is true
    this.pandaArray[someIndex] setPaint GREEN add detail
    someIndex ← someIndex + 2
  loop
```

Another possible way?

How do you write code to color every other panda green in array?

- Another way? Does this work?

```
do in order
  WholeNumber someIndex ← 0
  while someIndex < this.pandaArray.length is true
    if someIndex INTEGER_REMAINDER 2 == 0 is true then
      // index is even
      this.pandaArray[someIndex] setPaint GREEN add d
    else
      drop statement here
  loop
```

29

How do you write code to color every other panda green in array?

- Another way? Does this work?

```
do in order
  WholeNumber someIndex ← 0
  while someIndex < this.pandaArray.length is true
    if someIndex INTEGER_REMAINDER 2 == 0 is true then
      // index is even
      this.pandaArray[someIndex] setPaint GREEN add d
    else
      drop statement here
  loop
```

NO! Does this:



30

How do you write code to color every other panda green in array?

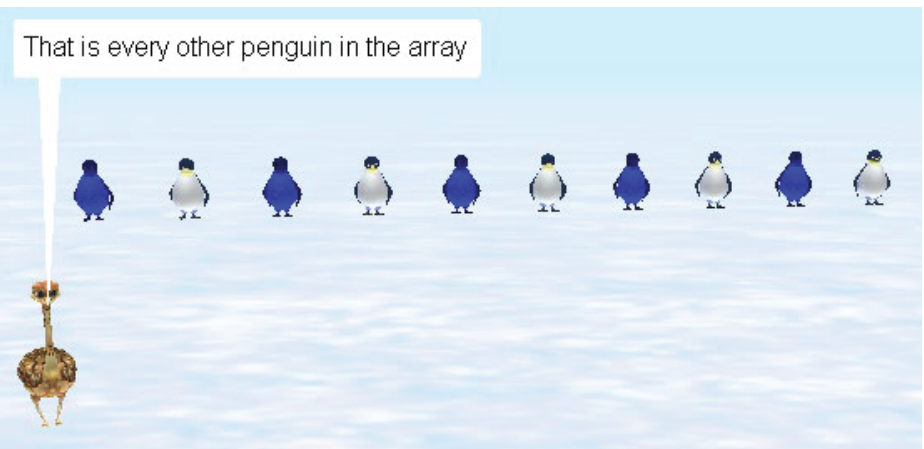
- **Correct Code** – update someIndex

```
do in order
  WholeNumber someIndex ← 0
  while someIndex < this.pandaArray.length is true
    if someIndex INTEGER_REMAINDER 2 == 0 is true then
      // index is even
      this.pandaArray[someIndex] setPaint GREEN add d
    else
      drop statement here
    someIndex ← someIndex + 1
  loop
```

31

Class Today

- Array of penguins



32