CompSci 94
Variables and Array Indexing
October 29, 2024

Prof. Susan Rodger

Announcements

- Assignment 4 due tonight!

- 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) }
```
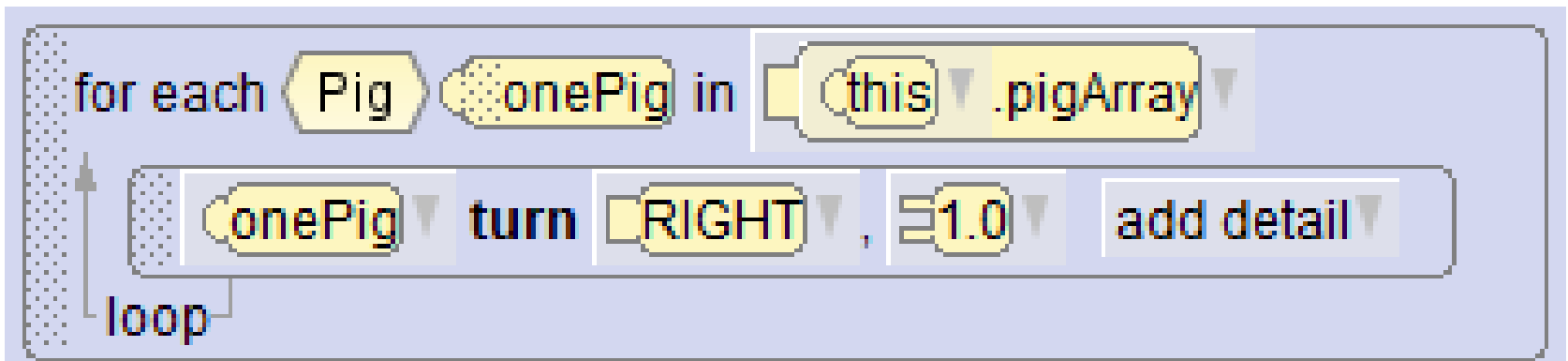
Review1 - What is the code for?

- 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**


```
for each ( Pig ) ( onePig in [ ( this ) .pigArray ]
    ( onePig ) turn [ RIGHT ] , [ 1.0 ]  add detail
loop
```
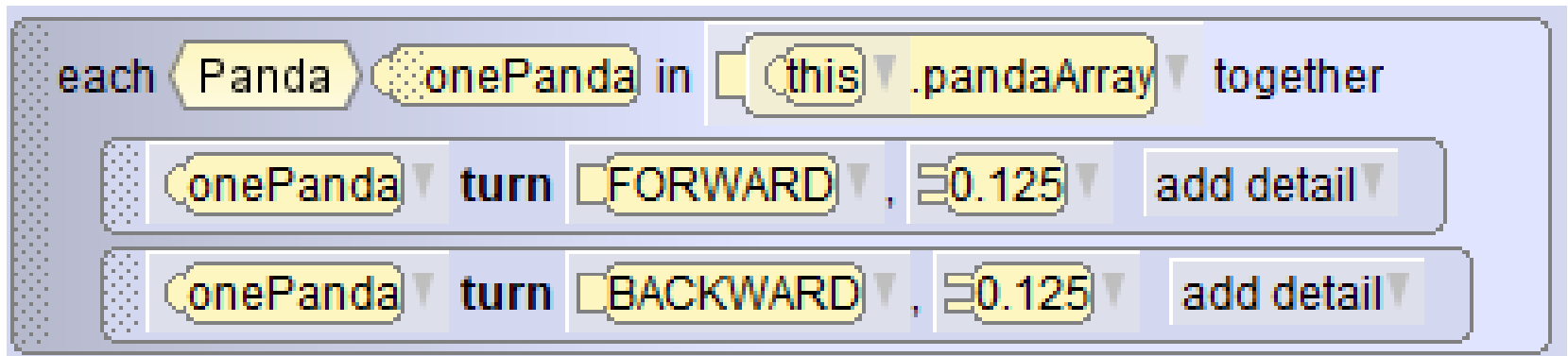
Review2 – What is the code for?

- 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**

each (Panda) onePanda in [(this) .pandaArray] together
  - onePanda turn [FORWARD], 0.125   add detail
  - onePanda turn [BACKWARD], 0.125   add detail
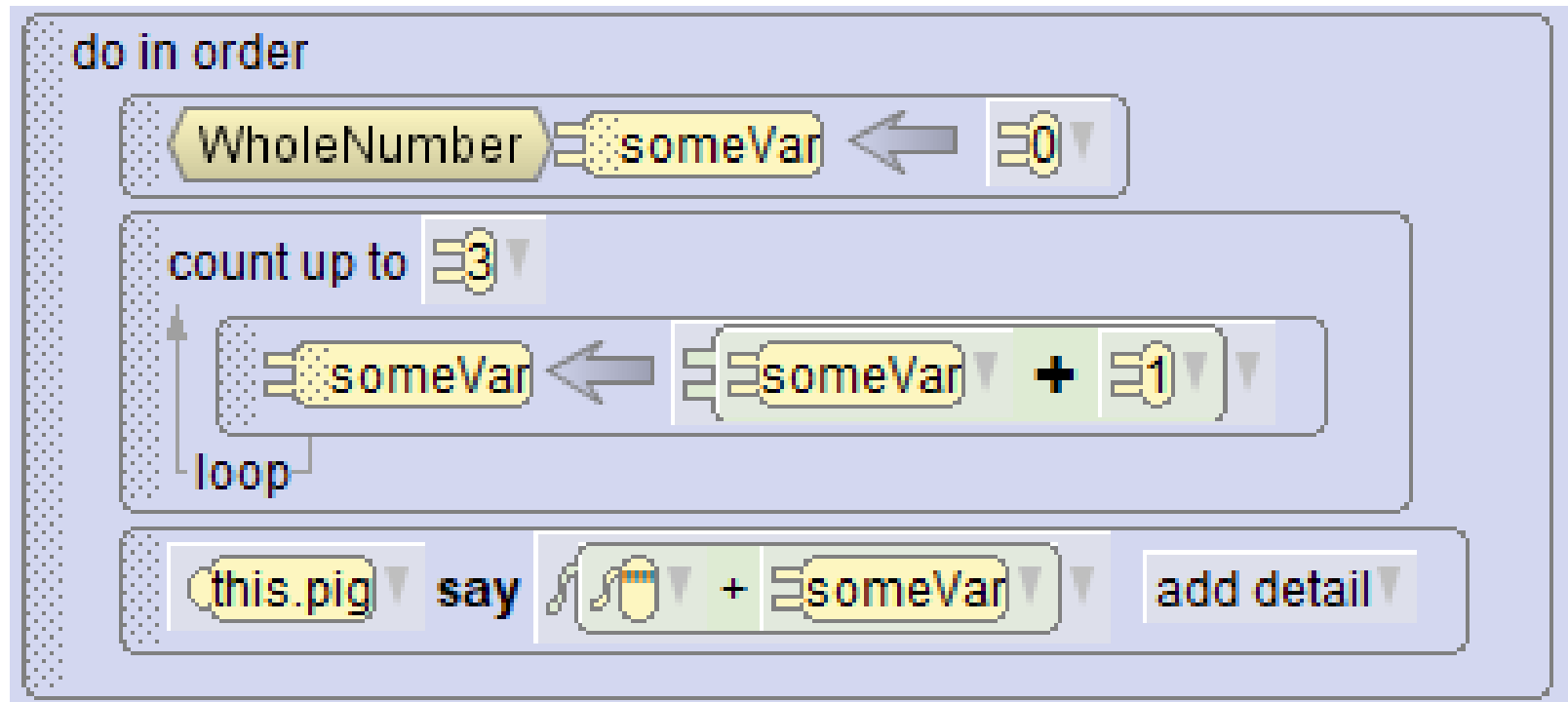
Q1 – Questions about variables

- What is the difference between a const variable and a variable?

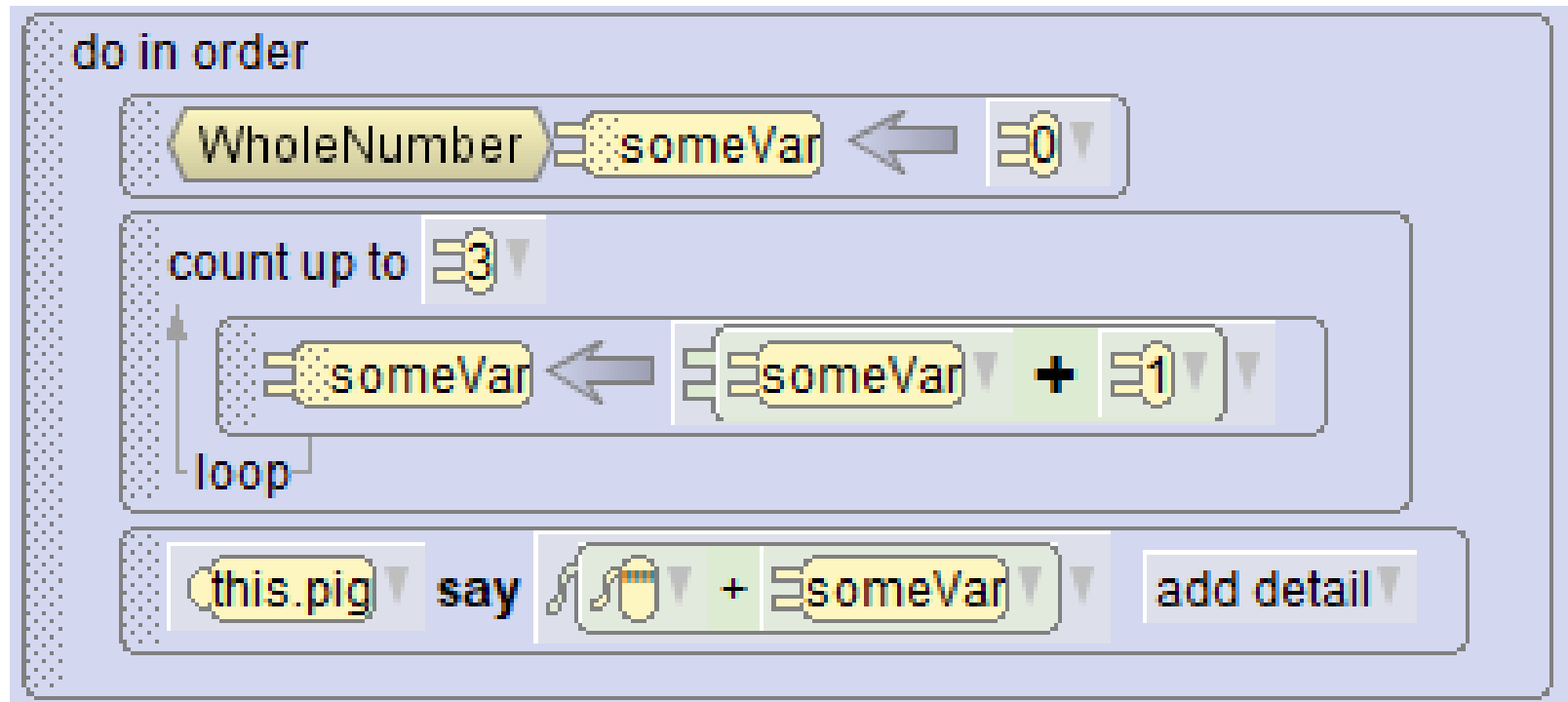- Which Alice construct do you use to change a variable?

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?


```
do in order
    WholeNumber = someVar ← = 0
    count up to = 3
        = someVar ← = someVar + = 1
    loop
    this.pig say ♪ [mouse] + = someVar    add detail
```

Q2 - What is the output of this code?


```
do in order
    WholeNumber someVar ← 0
    count up to 3
        someVar ← someVar + 1
    loop
    this.pig say [ 🖱 + someVar ]   add detail
```

- Pig says: 3

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

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

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

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 }
```

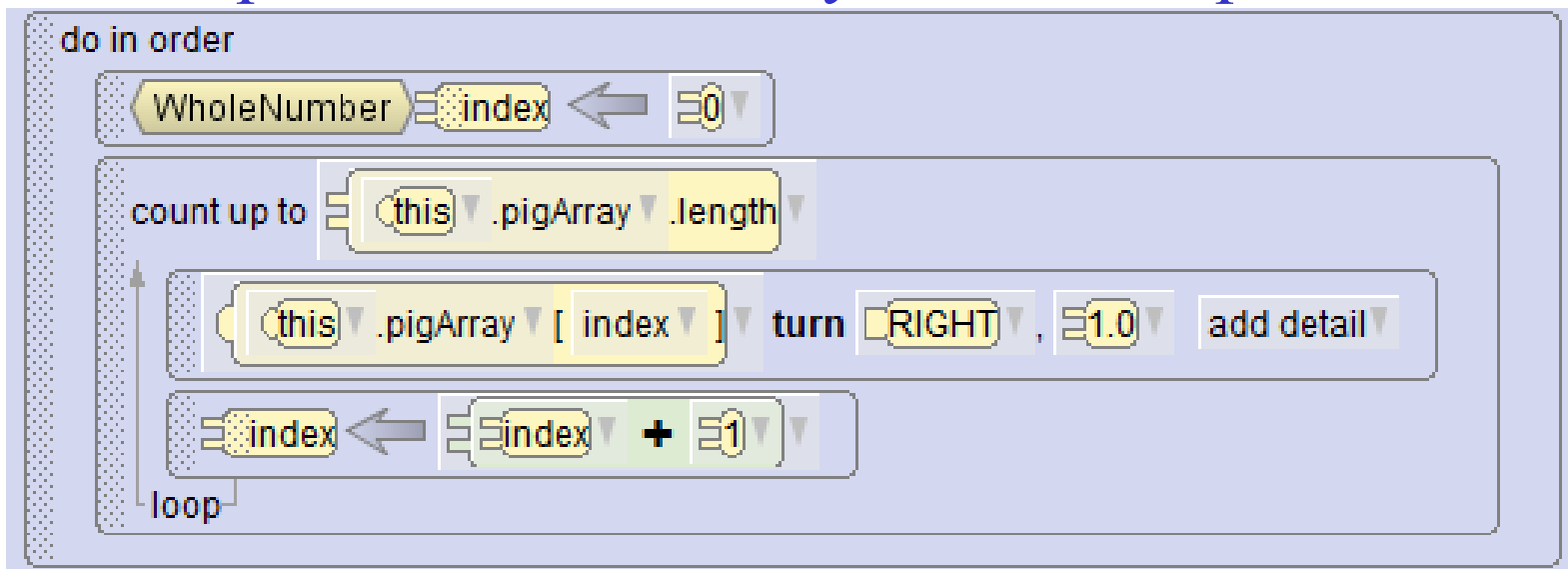# Q4 – How do I write an **array index loop** to have each pig turn right once?

- *Fill in the missing code:*

do in order
> WholeNumber = index ← 0
>
> count up to = this .pigArray .length
>
> loop

Q4 – How do I write an **array index loop** to have each pig turn right once?
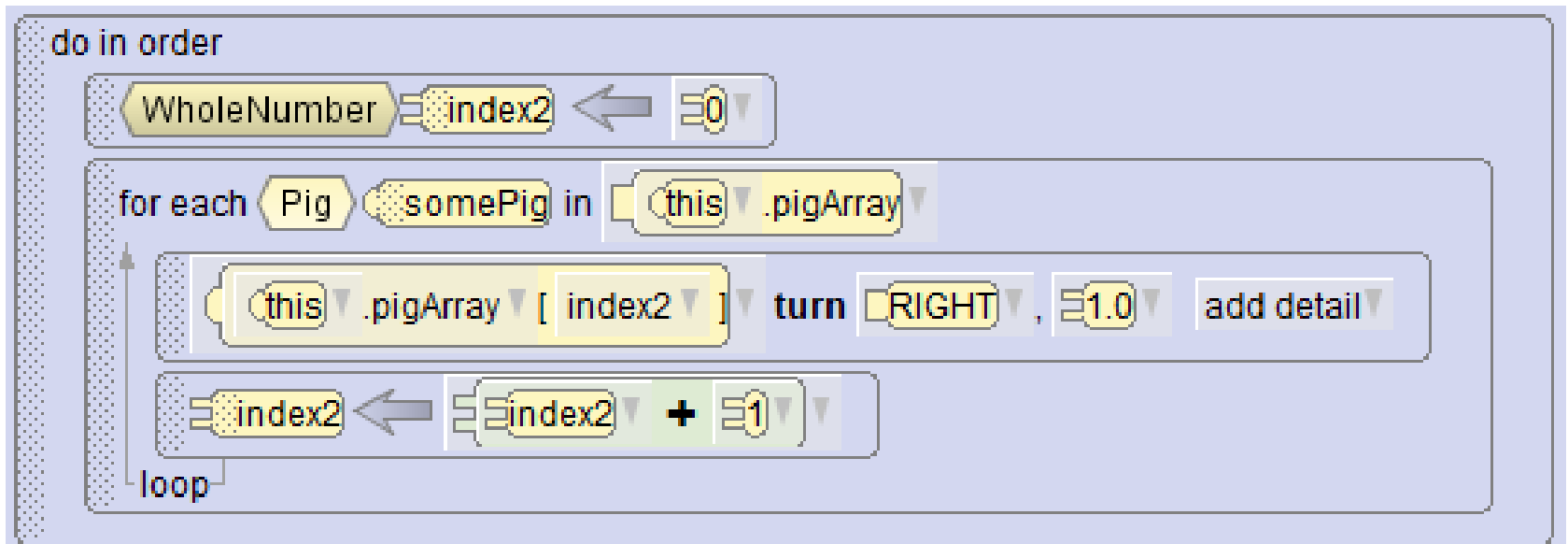
- Use a count loop
  - Create a variable set to 0
  - Use the variable to index in the array
  - Update the variable by 1 in the loop

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


```
do in order
    WholeNumber  index2  ⟵  0
    for each  Pig  somePig  in  this .pigArray
        this .pigArray [ index2 ] turn RIGHT , 1.0  add detail
        index2  ⟵  index2  +  1
    loop
```
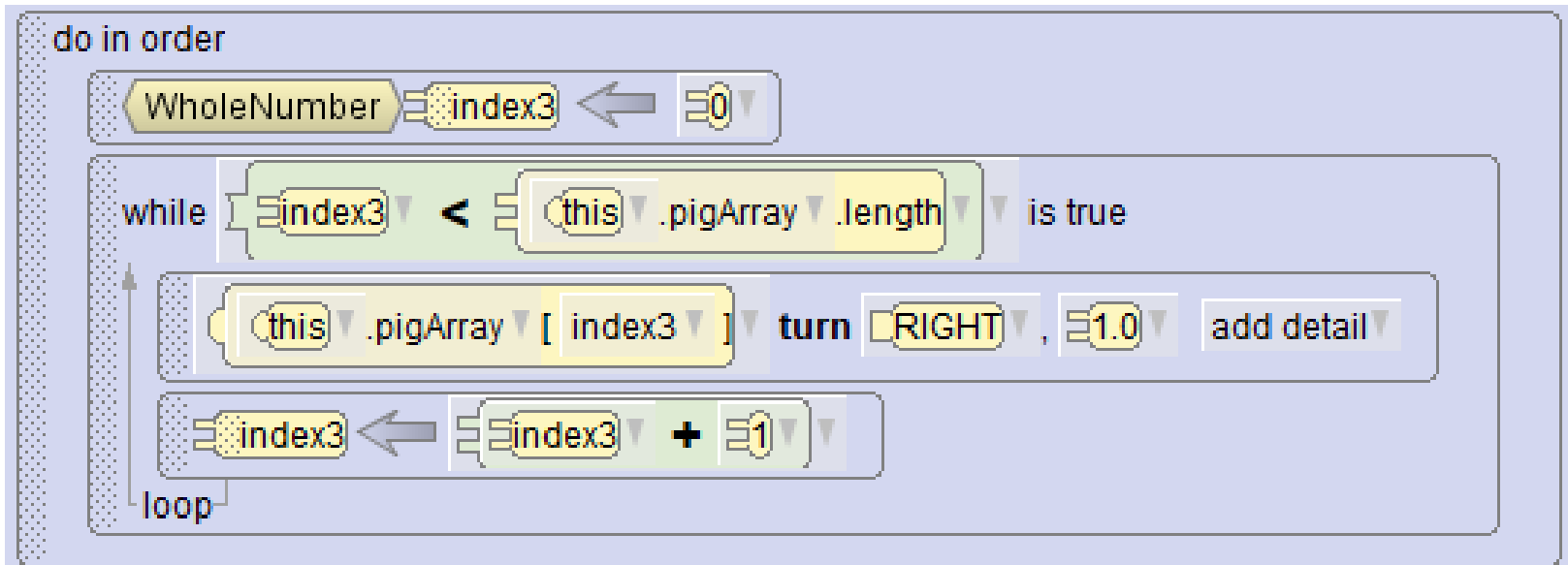
Q4 – How do I write an **array index loop** to have each pig turn right once?

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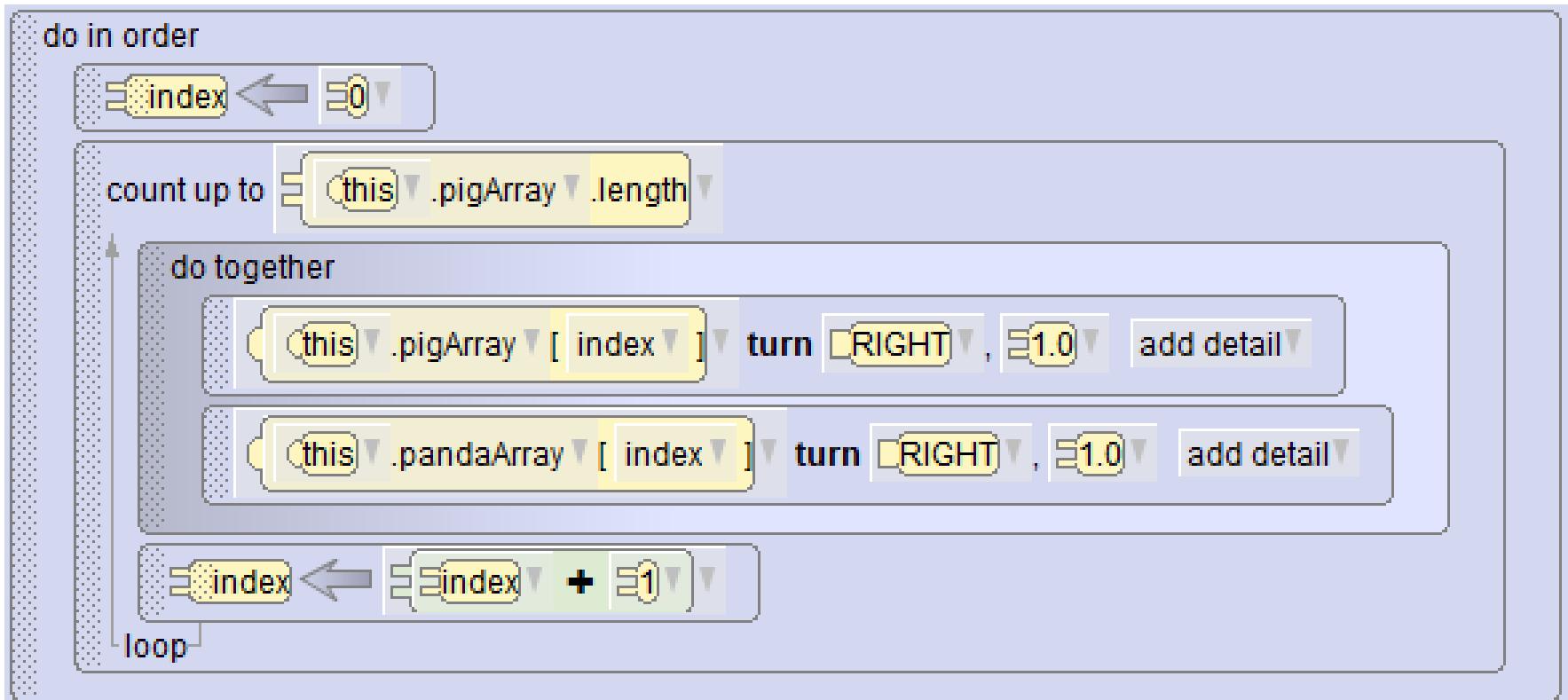 - Update the variable by 1 in the loop

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:*

```
do in order
    index ⟵ 0
    count up to  this .pigArray .length




    index ⟵ index + 1
    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?

- Use any type of array index loop


```
do in order
    index ⬅ 0
    count up to  this.pigArray.length
        do together
            this.pigArray[index] turn RIGHT, 1.0  add detail
            this.pandaArray[index] turn RIGHT, 1.0  add detail
        index ⬅ index + 1
    loop
```
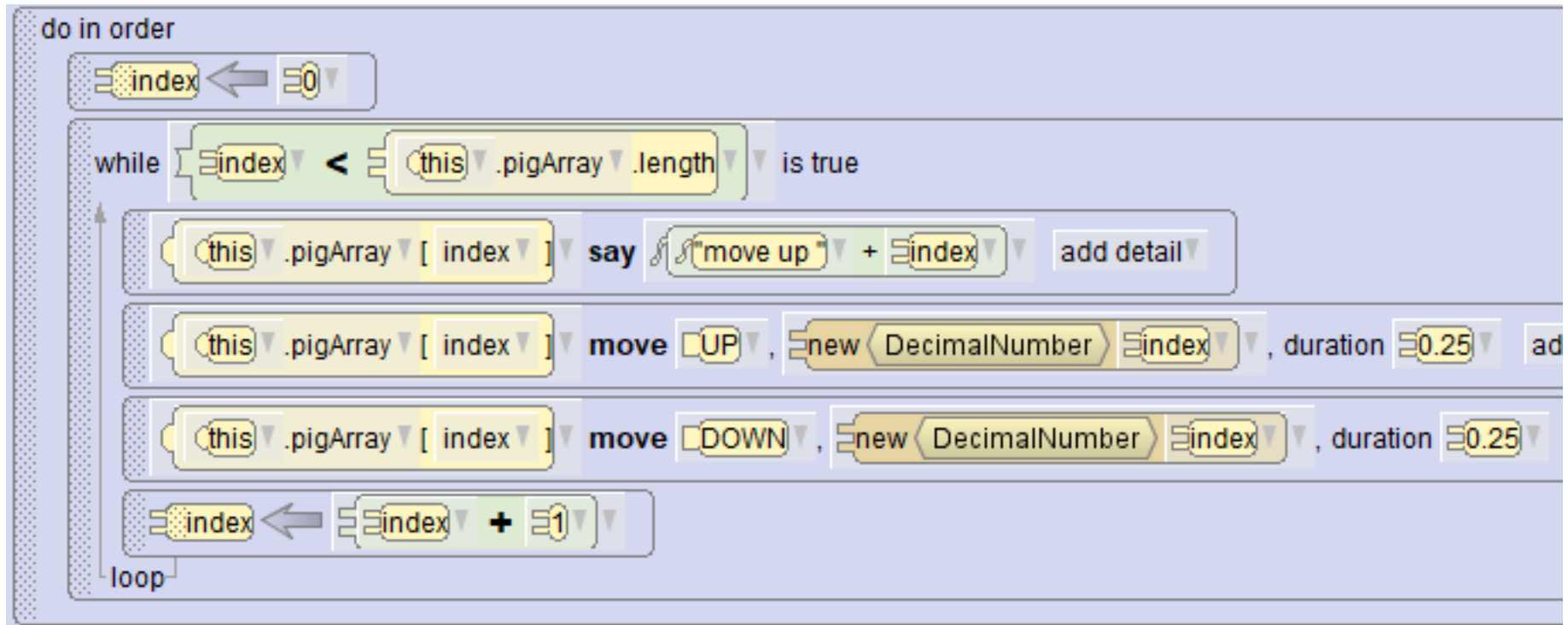
Q5 continued

- Notice the pigs and pandas arrays must be the same size for this to work!
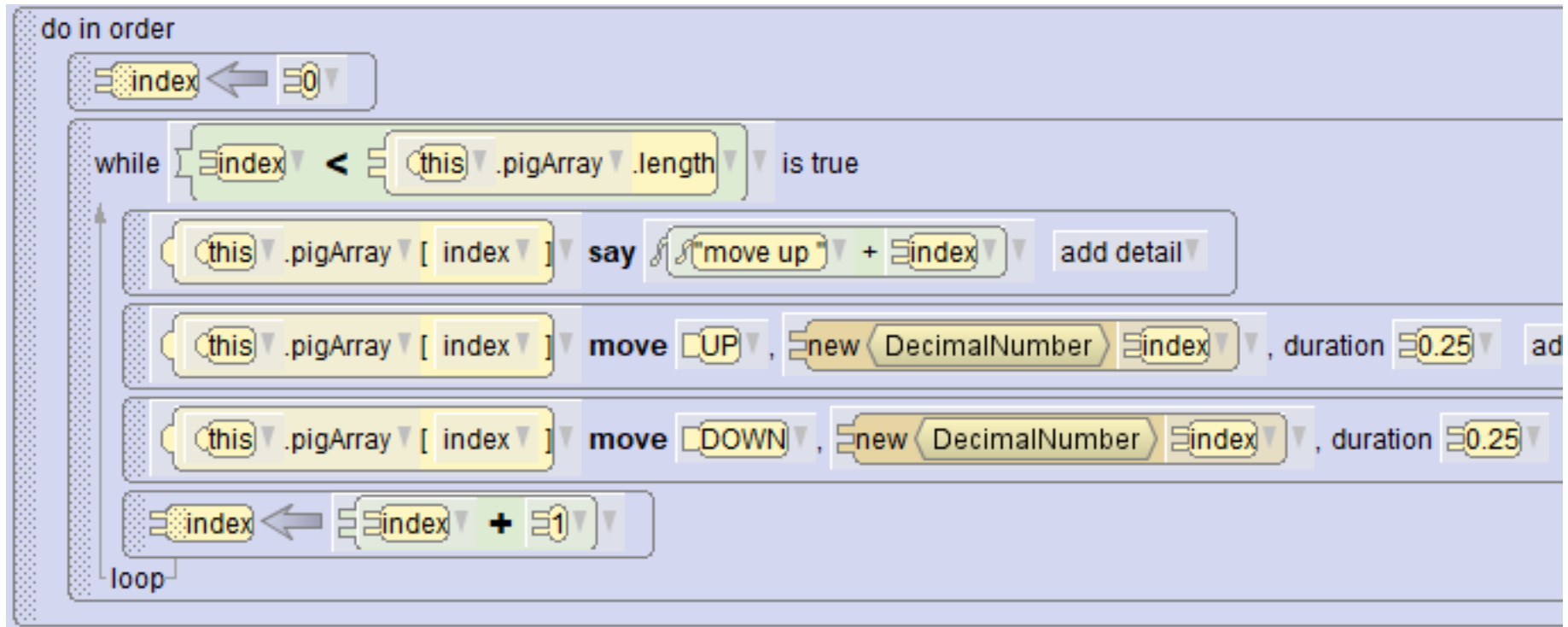
Q6 – What does this code do?

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.

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

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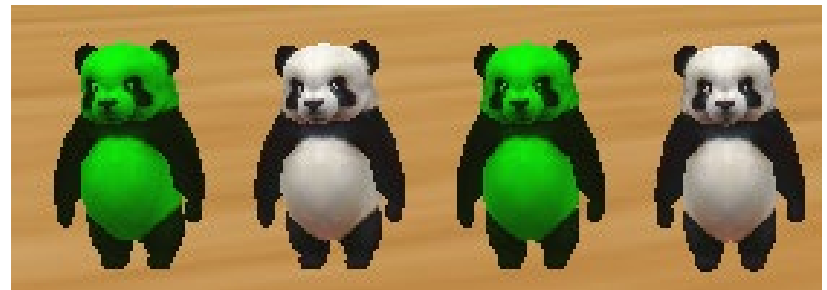
Q7 – How do you write code to color every other panda green in array?

- 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
```

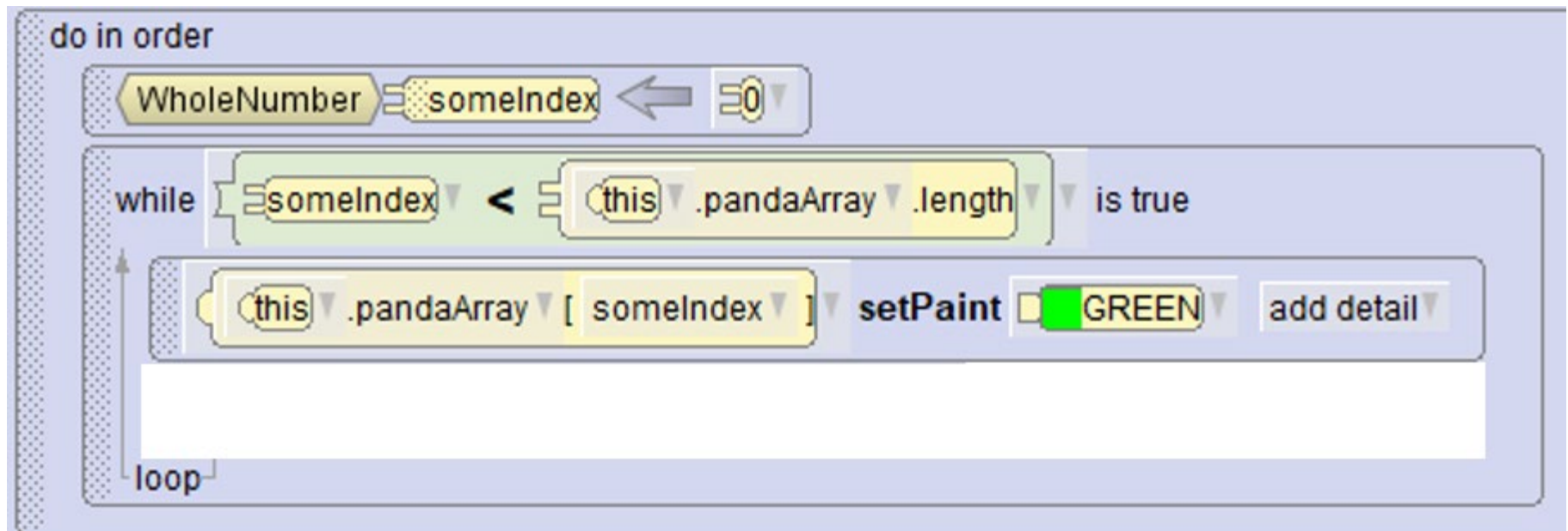# Q7 – How do you write code to color every other panda green in array?

- 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
```
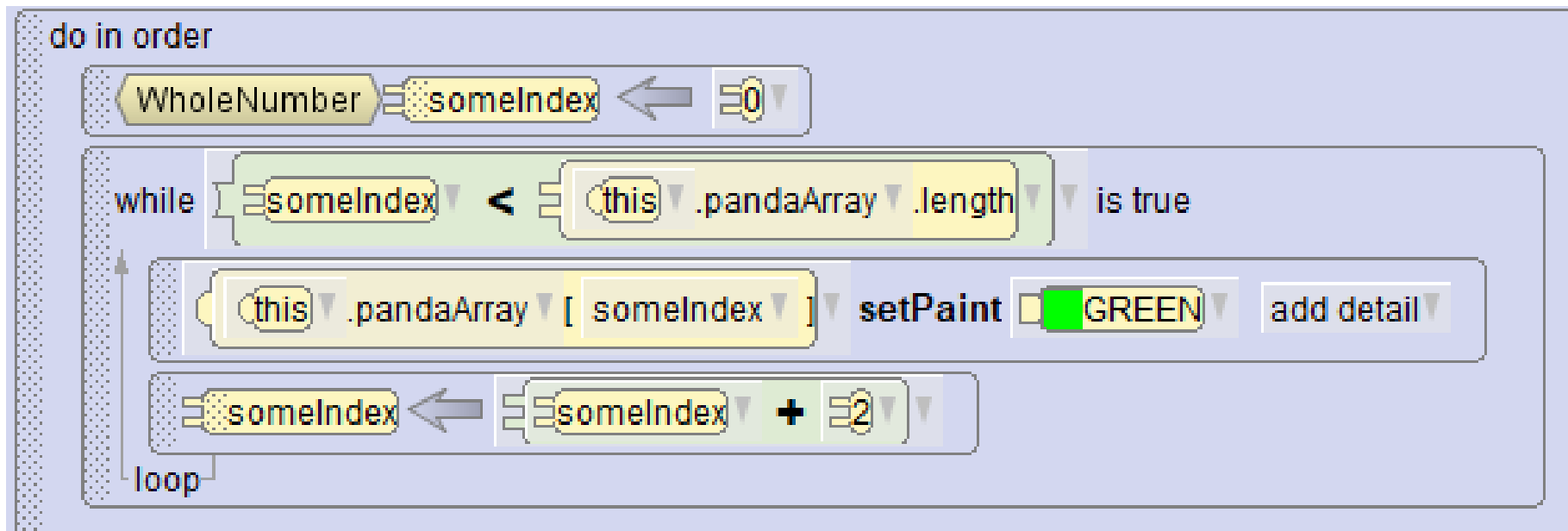
Another possible way?

How do you write code to color every other panda green in array?
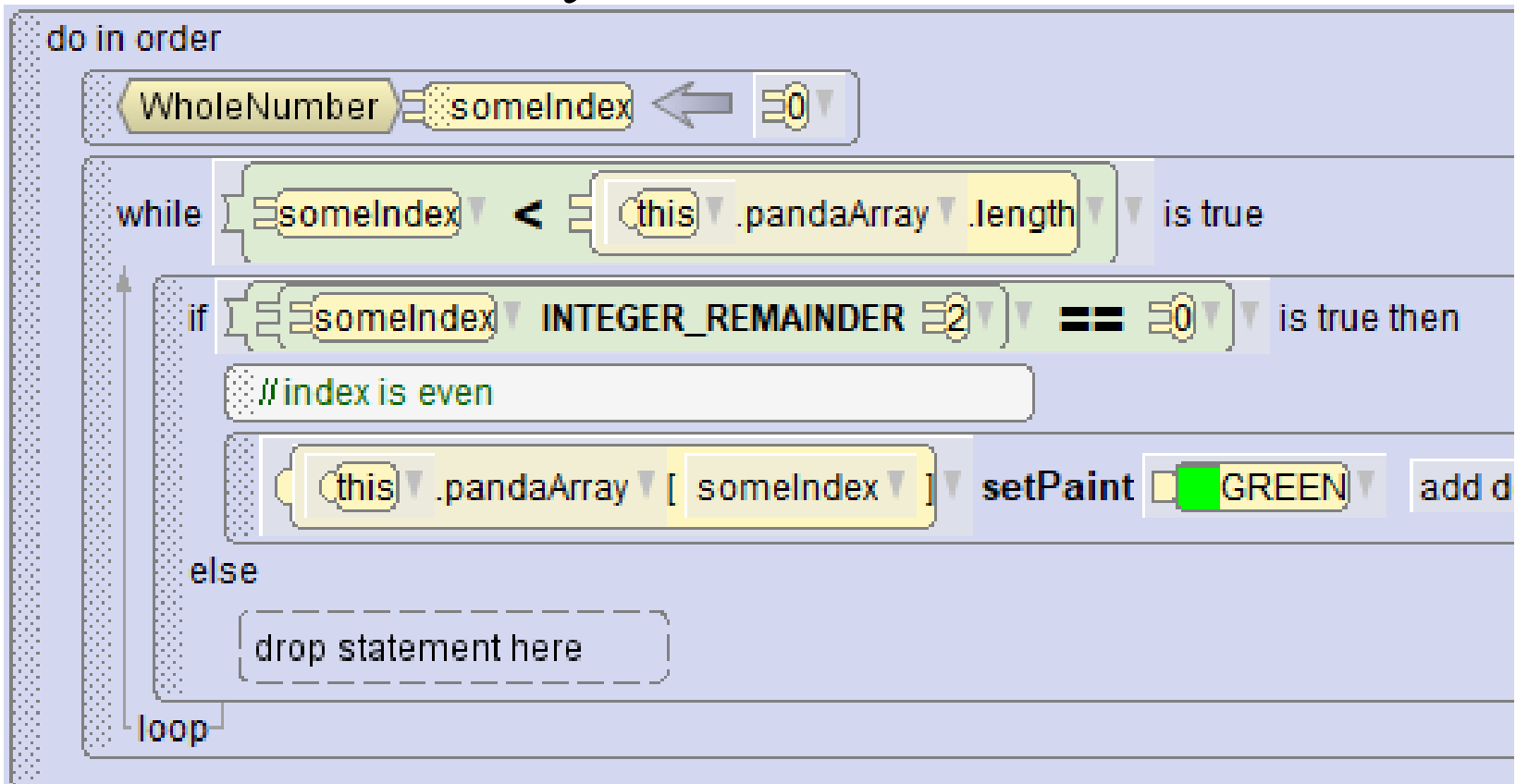
- Another way? Does this work?


```
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
```

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
```
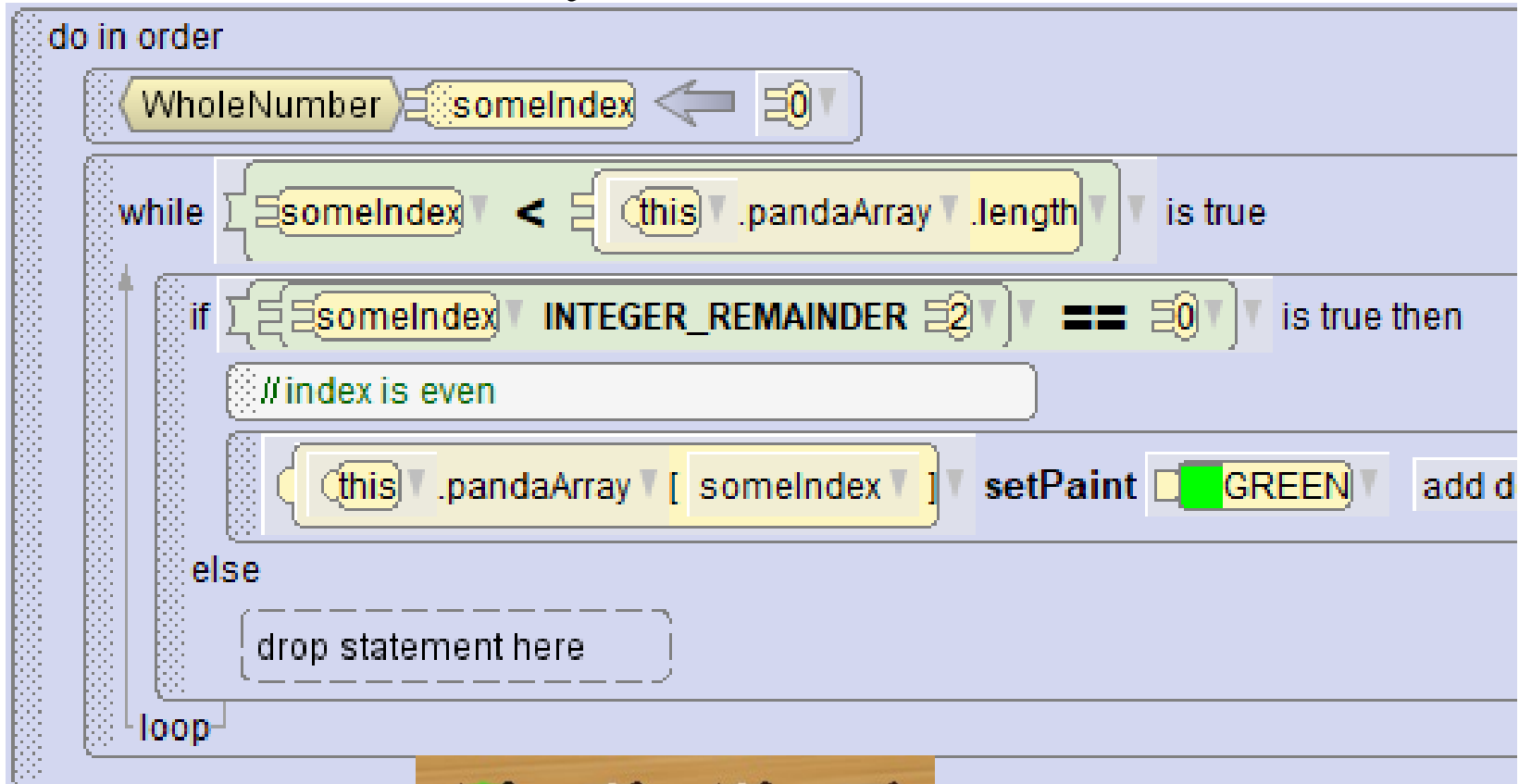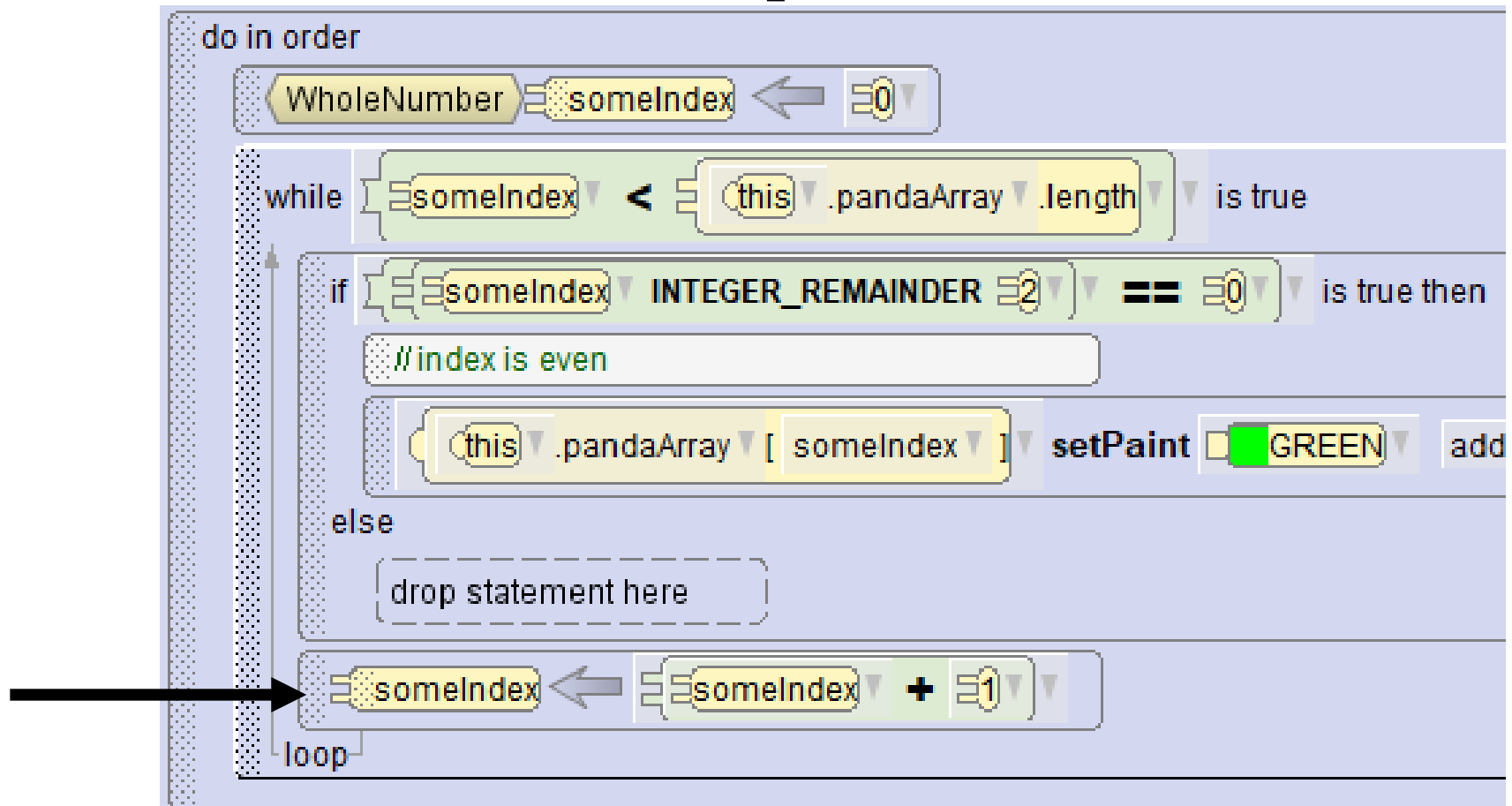
NO! Does this:

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

- **Correct Code** – update someIndex

Class Today

- Array of penguins

That is every other penguin in the array