CompSci 94
Arrays, Loops with Arrays
October 17, 2024

Prof. Susan Rodger

Announcements

- QZ and Videos for next time
- Assignment 4 out today, due Tue, Oct 29

- Exam 2 Thur. Oct 24
  - See old tests on calendar page on Oct 24 date

Exam 2 Logistics

- Exam 2 is on Tuesday, Oct 24
- Covers topics through today, Oct 17 lecture
- Old tests are on the calendar web page
- Exam 2 is on paper
- See Exam 2 reference sheet – part of exam
- Exam 2 is your own work
- Bring only pen or pencil

Exam 2 Topics

- Topics from last time (procedures with parameters, etc)
- Random numbers
- if statements, logic (and, or, not)
- count loops, constant variables, Saving objects
- while loops
- Arrays, as a variable
- Scene procedure

How to study for Exam 2

- You should practice writing code on paper!
  - Redo procedures we did in classwork or lecture
  - Start with blank sheet of paper and write code
- See old tests on course calendar page on 10/24 date
- Arrays – only understanding how to put them together and the two loops how they work

Review Randomness

- How do you generate a random number?
- How do you store a random number?
- How do you use a random number?
- What other type of random can you create?

Review Randomness

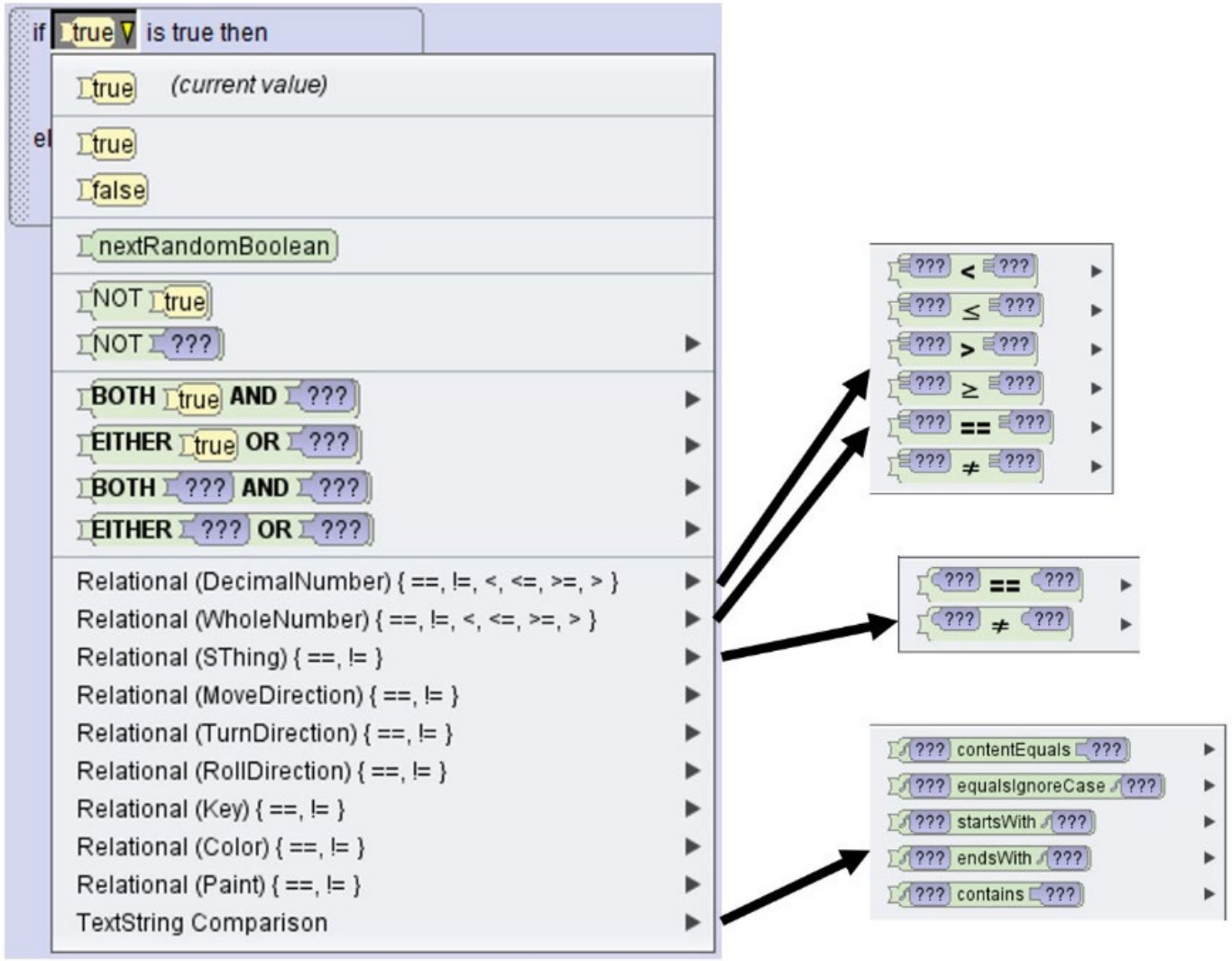
- How do you generate a random number?
  - When you use numbers there is an option for random to choose a "random" number from a specified range
- How do you store a random number?
  - Store it in a constant variable
- How do you use a random number?
  - Access the stored value in the variable
- What other type of random can you create?
  - Random boolean

If statement, loops and more

If, loops, and creating an array element.

if statement condition choices

Given below are the condition possibilities for an if statement



Looping structures - when and how to use each one

- Count loop

- While loop

Looping structures - when and how to use each one

- Count loop
  - When you know exactly how many times the loop will execute, like 4 times
- While loop
  - When the loop stops based on a condition
  - Make sure you update and get closer and closer to making that condition false….

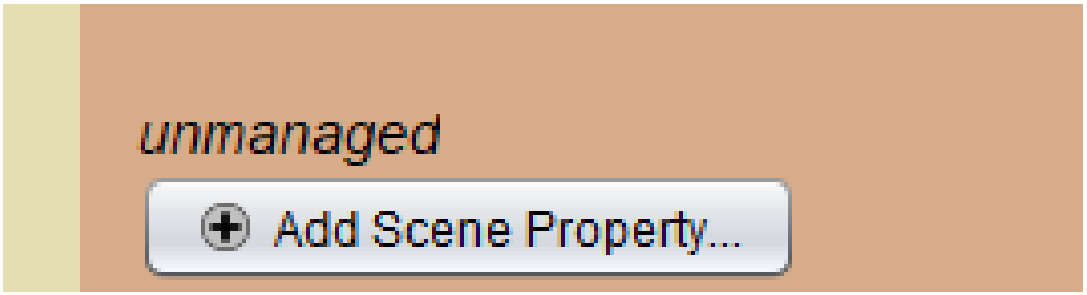
Now for today's topic - Arrays

How and Where does one create an array?

How and Where does one create an array?

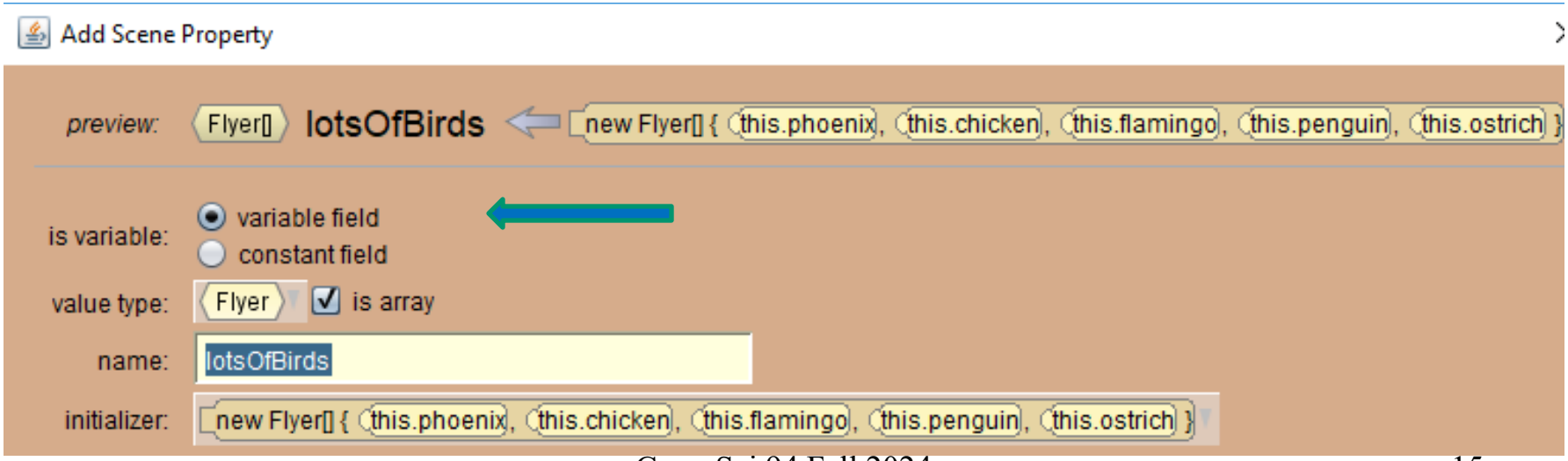
- Create as a Scene Property

- Go to bottom of page and add there.



Example – Build array of Flyers

- Pick variable, not constant
- Pick type
- Be sure to check box by “is array”
- Name: pick name to reflect multiple things
- Initialize: add Objects into the array



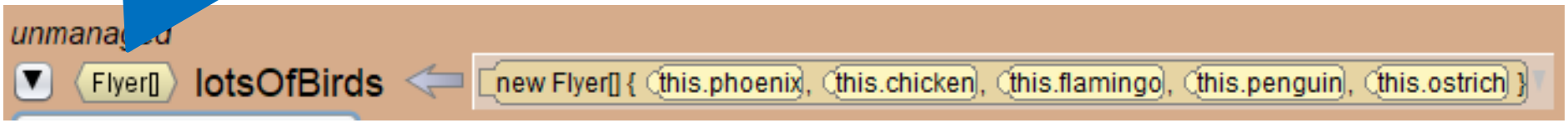
Result

unmanaged

Flyer[] lotsOfBirds ← new Flyer[] { this.phoenix, this.chicken, this.flamingo, this.penguin, this.ostrich }

Note the type is Flyer[ ], the brackets indicate lotsOfBirds is an array

Result



Q1. Arrays

- What is an array?

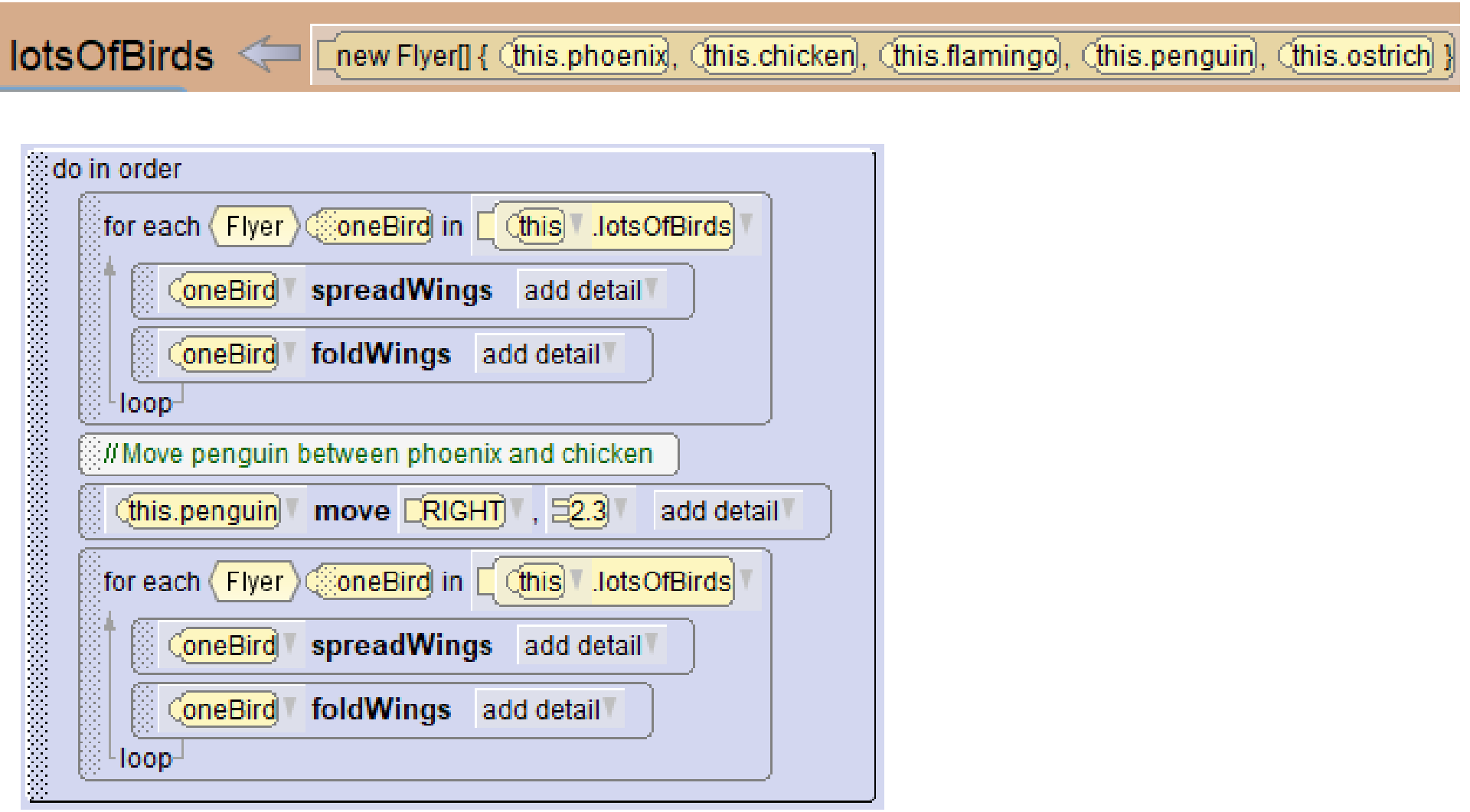
- Why create an array?

- Can an object be in more than one array?

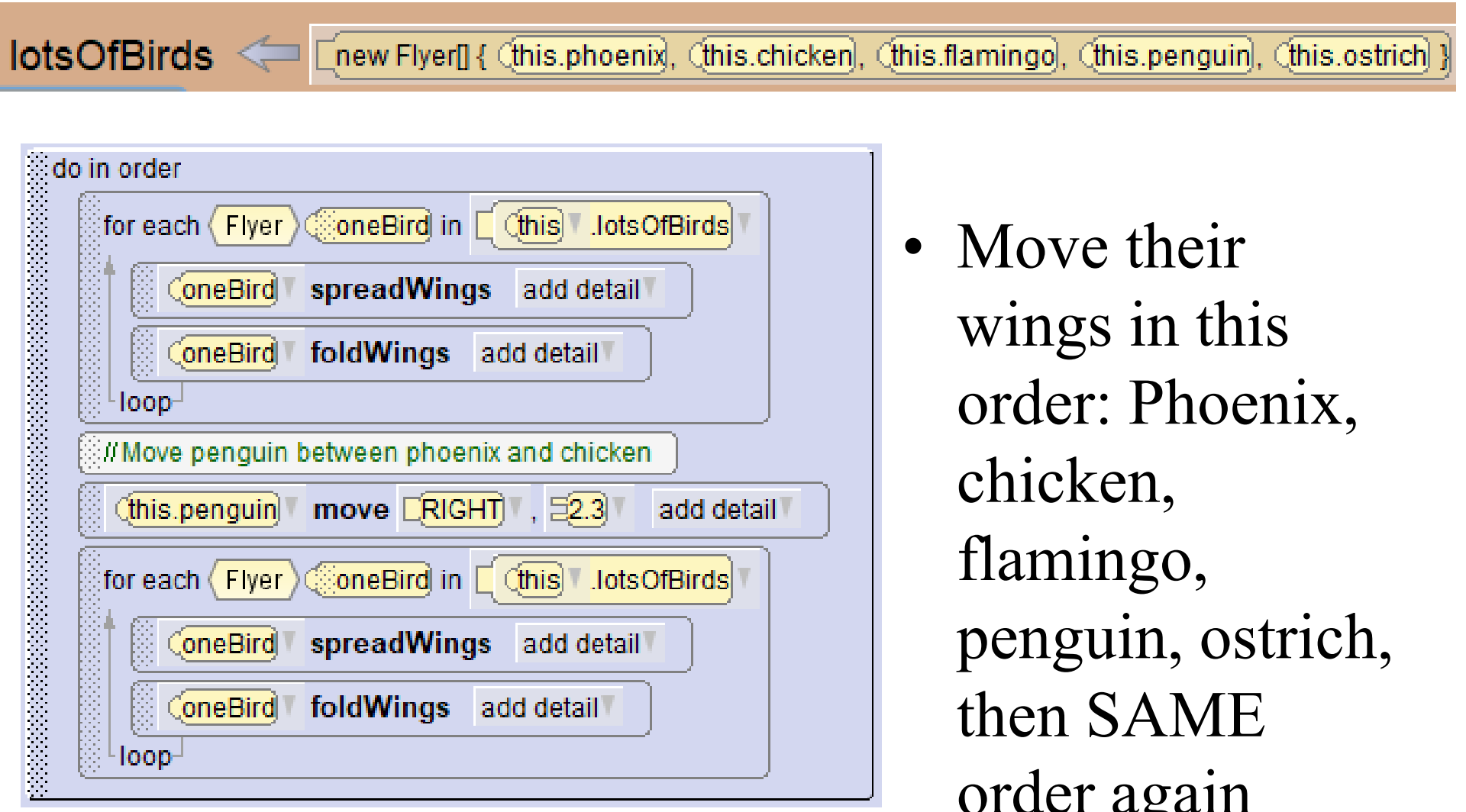
Q1. Arrays

- What is an array?
  - A group of similar objects
  - Examples: All flyers, all decimalNumbers, all SJointedModel
- Why create an array?
  - Can have just one instruction for every item in the array
  - Less code
- Can an object be in more than one array?
  - Yes!

Q2. What is the order the birds do something here?

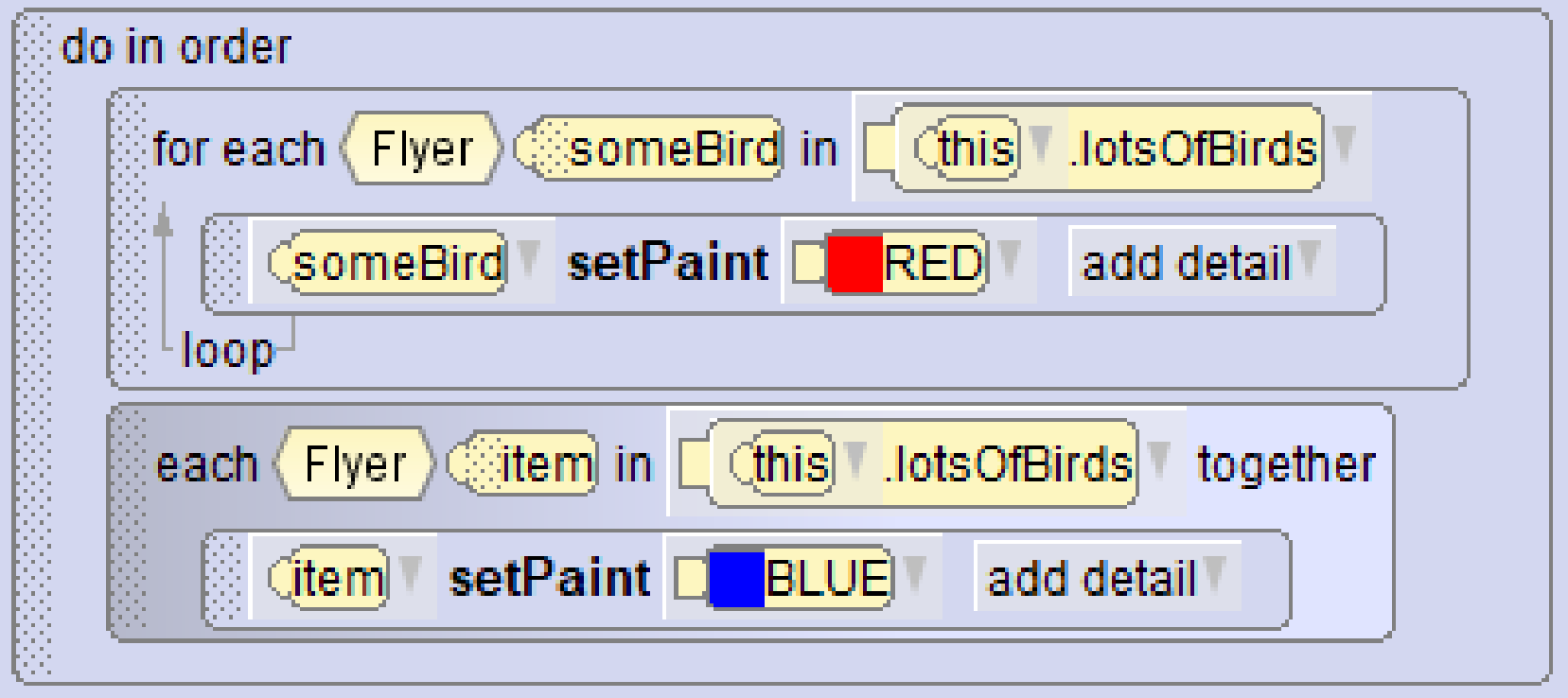


Q2. What is the order the birds do something here?



- Move their wings in this order: Phoenix, chicken, flamingo, penguin, ostrich, then SAME order again

Q3. What does this code do?



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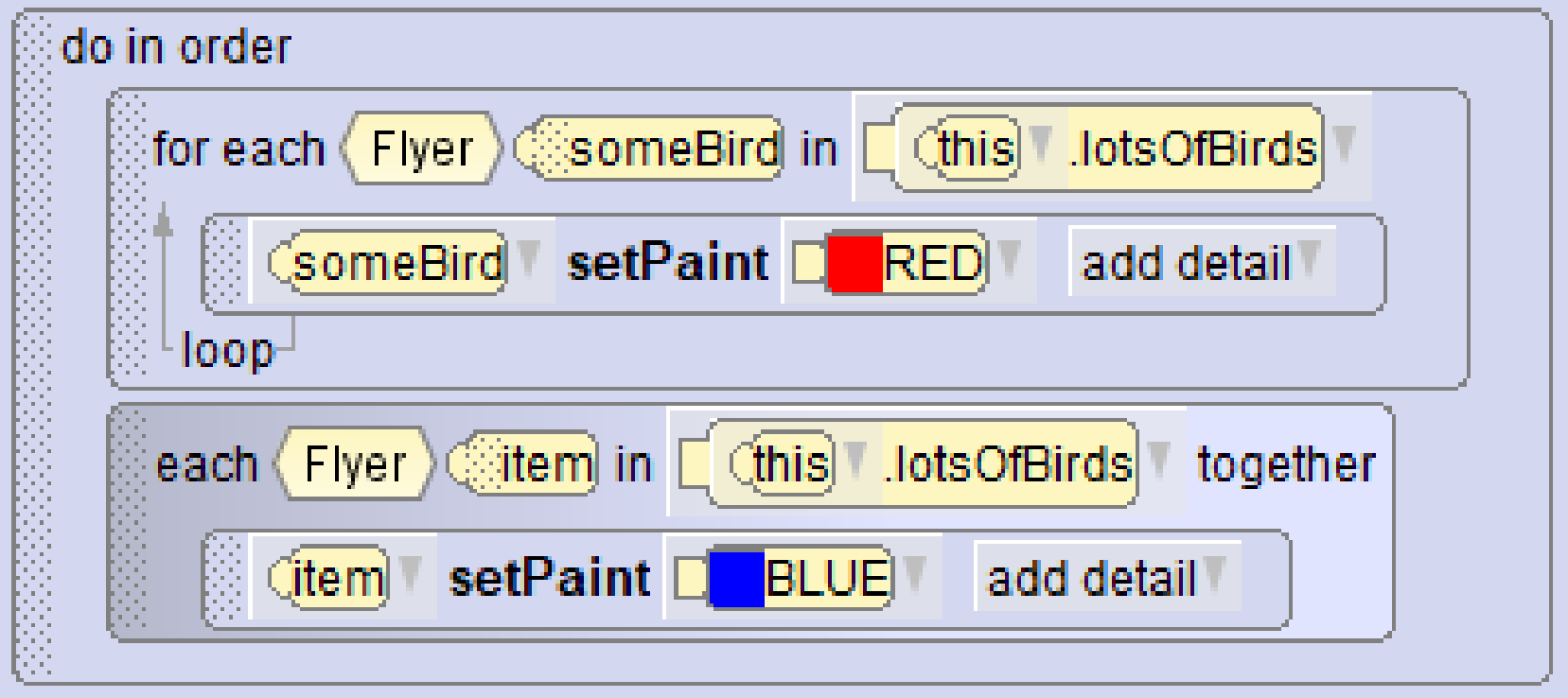
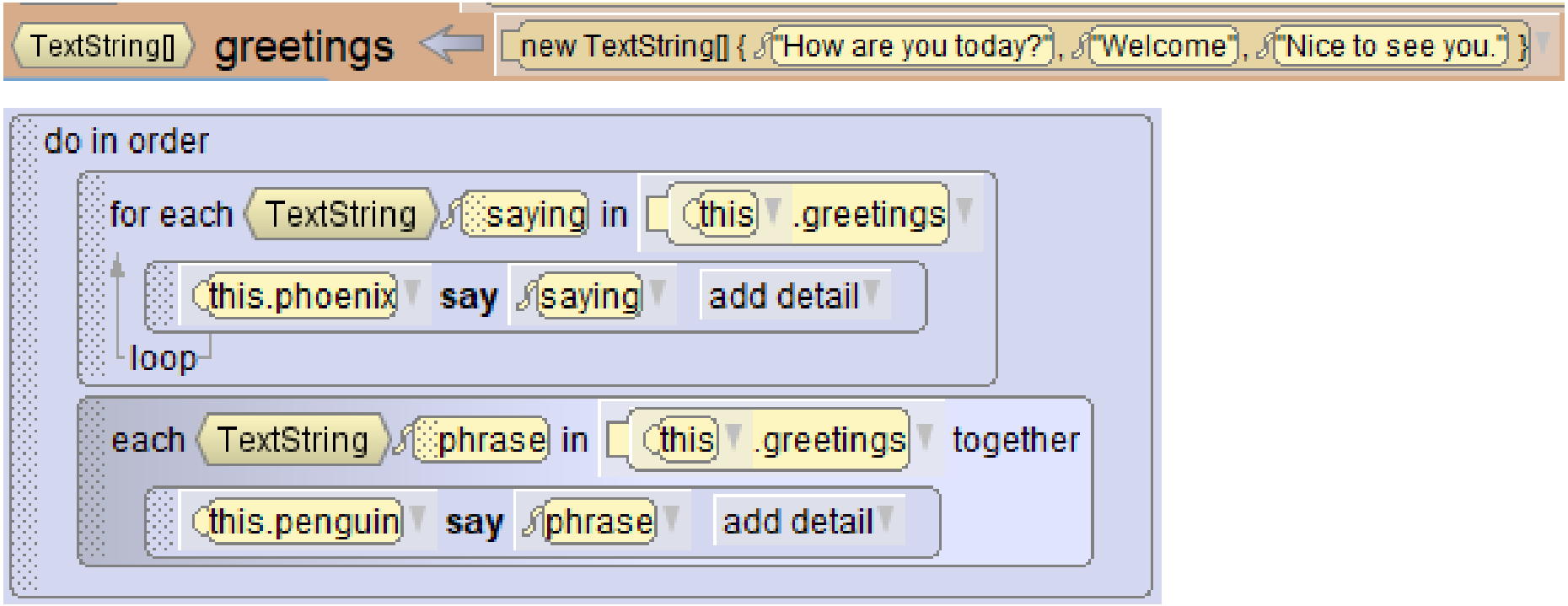


- The birds in array lotsOfBirds turn red one at a time. Then at the same time they all turn blue.

Q4. What does this code do?



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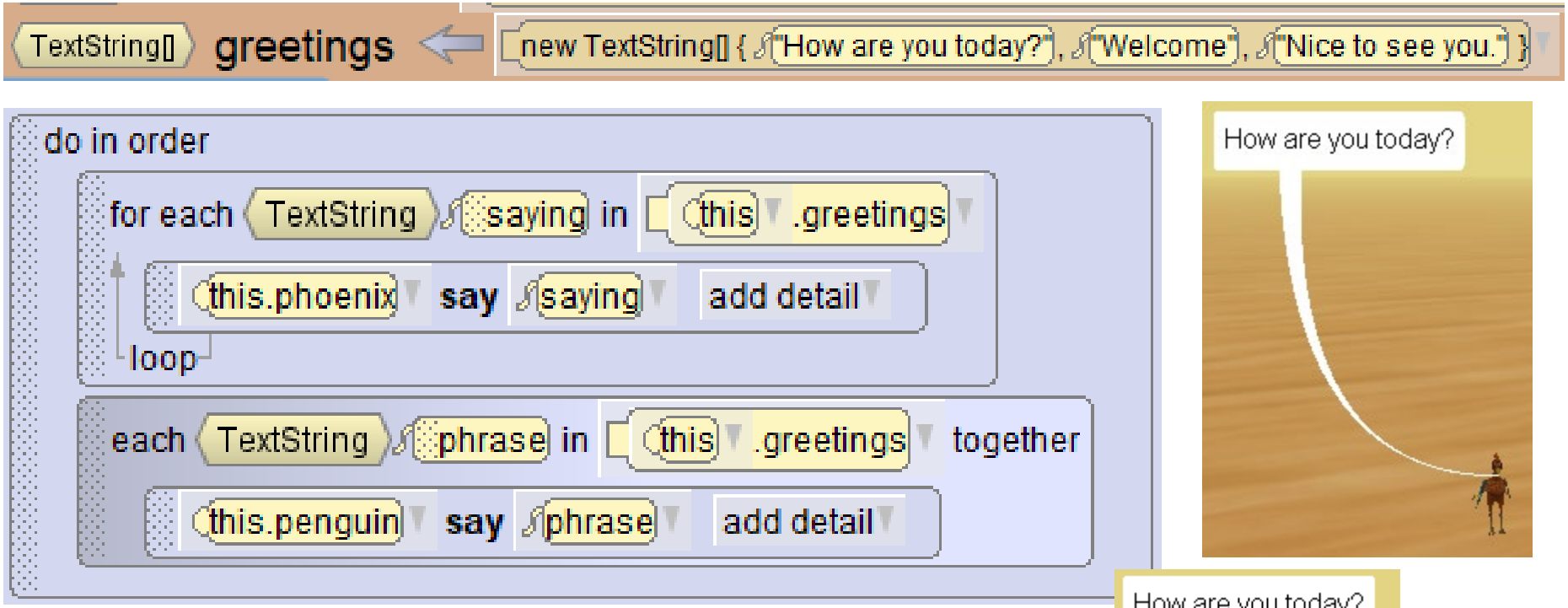


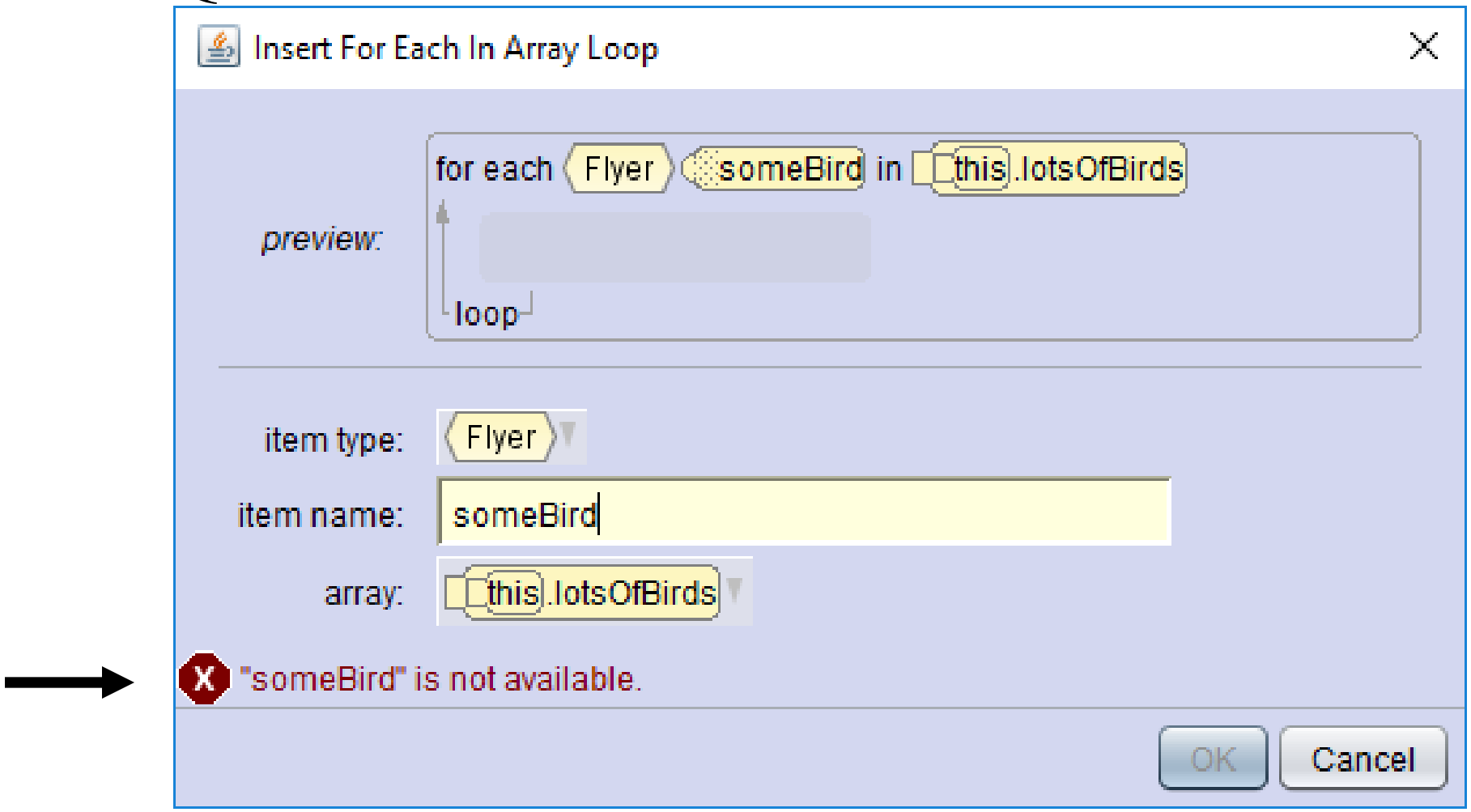
- Phoenix says greetings one at a time
- Then Penguin says the greetings all at once

Q5. What does this code do?

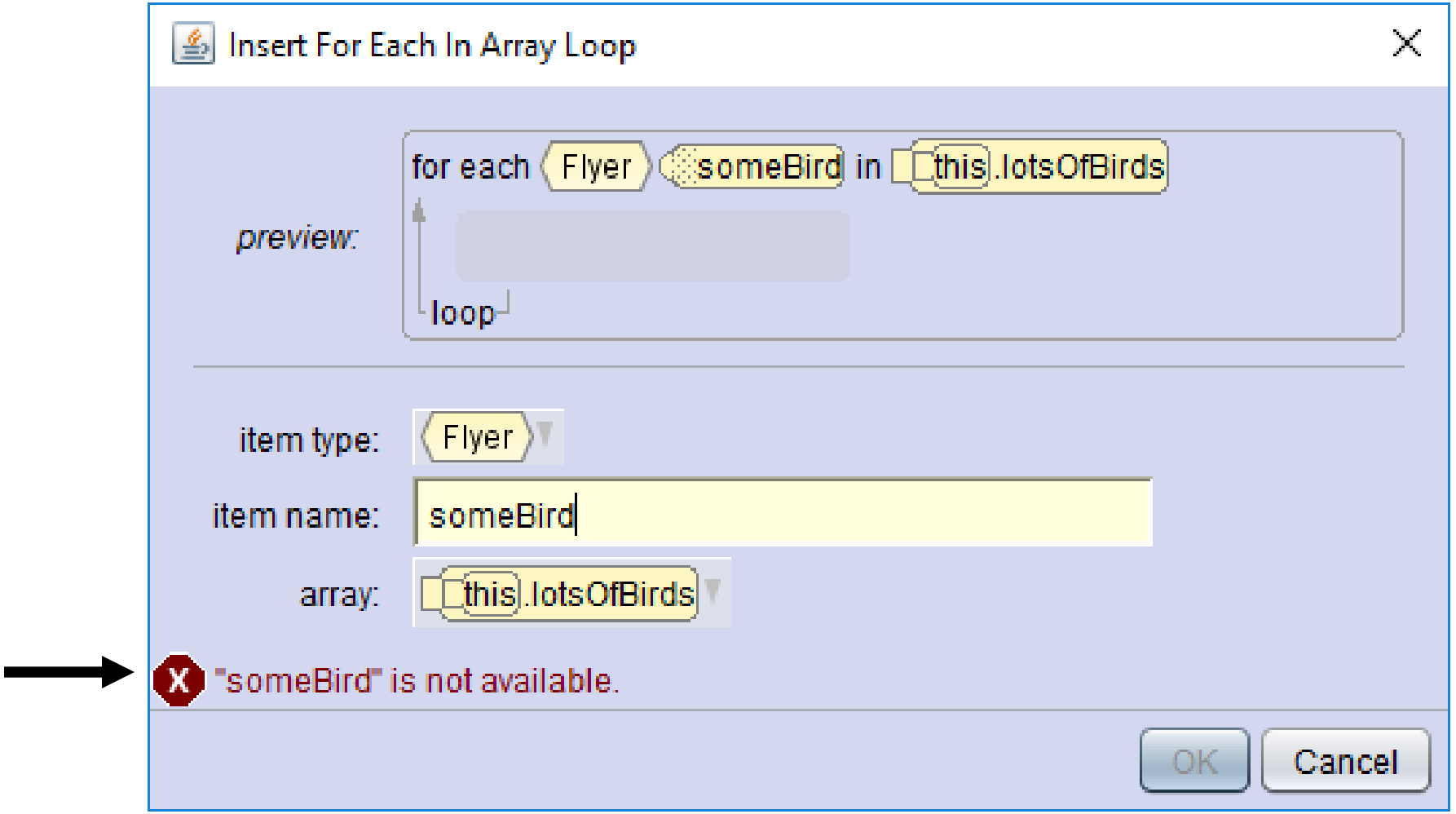
Q5. What does this code do?

- Each bird in the array lotsOfBirds, one at a time, says the phrases in the array greetings, one at a time.

Q6. What does this error mean?



Q6. What does this error mean?



- This name already exists. You must use a different name for each array loop!

BE CAREFUL!

- When naming loop variable

- Don’t CUT and PASTE ARRAY LOOP code

BE CAREFUL!

- When naming loop variable
  - Don't use the name of anything else in your program.
    - Don't use penguin, etc.
    - Use someBird, someBird2, someBird3
- Don't CUT and PASTE ARRAY LOOP code
  - This can lead to using a variable from the wrong loop. Your Alice code will freeze!

Class Today

- Iterating through Arrays