Java Fundamentals
2-8: IF and WHILE Control Structures
Project

This project will progress with you throughout the course. After each lesson there will be more to add until it builds into a complete animation that you can upload to YouTube or export as a local animation file.

Lesson Objectives:

- Use the IF control structure to effect execution of instructions
- Use the WHILE control structure to create a conditional loop for repetitive behavior

Instructions:

1. Open Alice 3 on your computer.
2. Either using the My Projects tab or the File System tab, browse for and open the Fish_7.a3p file.
3. Using the Save As command from the file menu, rename the file to Fish_8.a3p.
4. If you are not already in the code editor use the Edit Code button to go to the code editor.

   For this lesson you are going to experiment with IF and While structures in your animation.
5. You are going to add an ending to your current animation that follows this textual storyboard

   Clown fish will lower into the chest,

   Clown fish will disappear,

   Chest lid will close

   The Pajama fish will bob up and down,

   The Pajama fish will change colour,

   The Pajama fish will say Eeekk!!

   You can break it down further into control structure categories

   Do together

   Clown fish will lower into the chest,
   Clown fish will disappear,

   Do in order

   Chest lid will close

   Do together

   The Pajama fish will bob up and down,

The Pajama fish will change colour,

Do in order

The Pajama fish will say Eeekk!!

6. Add an IF statement at the bottom of the treasure chest do in order statement. Use true as the placeholder argument value.

7. From the function list of the Clown fish drag an isCollidingWith function on to the true placeholder value

An IF statement controls the flow of the program by executing one set of code lines if the IF condition is true and another set of lines of code if the IF condition is false. The else statement is optional you do not need to place code here.
You are going to execute all of the final part of the animation if the Clown fish collides with the treasure chest. You need to create a set of nested control structures for this.

8. Drag a do in order statement into the IF statement.

9. Drag two do together statements into the do in order statement.

Clown fish will lower into the chest and the Clown fish will disappear.

In the first do together statement add the code for the clown fish.

10. Use a move statement to move the fish down into the chest using a function to move it down half the height of the chest.

11. Use the setOpacity procedure to make the Clown fish invisible.

12. Both procedures should take two seconds to complete.

13. Test your code. Remember you can dis-able any previously tested code.

Chest lid will close

14. Copy the code that opened the lid of the chest using whatever method you prefer and place it between the two do together statements. Change the direction argument to forward.

The Pajama fish will bob up and down and change colour.

15. In the other do together statement drag a bob procedure from the Pajama fish.

16. Drag a set Paint procedure and choose yellow as the colour argument, change the duration to 2 seconds to match the duration of the bob procedure.

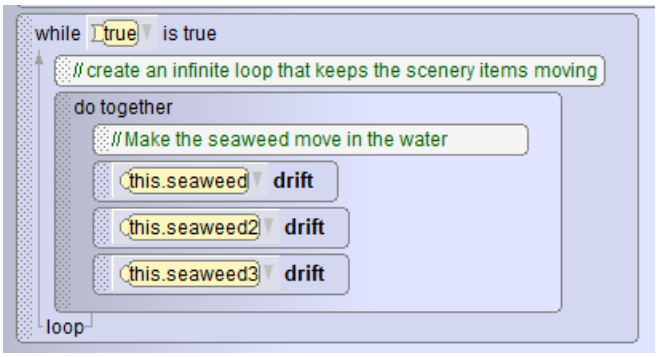
The Pajama fish will say Eeekk!!

17. Drag a say procedure under the do together statement that makes the Pajama fish say Eeeekkk!!! For 3 seconds. You can experiment with the colour scheme for your speech bubble using the detail options.

18. Re-enable all code that has been disabled and run the full program.

19. Your seaweed still only moves once. To fix that you can add a while statement choosing true as the argument. Add the while statement under the code for the seaweed.

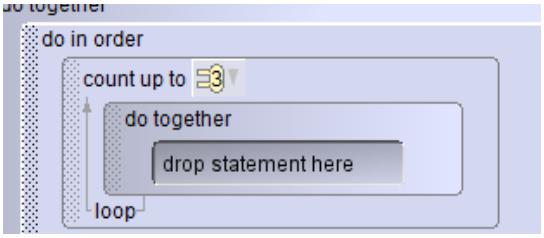
20. Drag the do together statement into the while loop. This creates an infinite loop as the value true is never changed so the code will execute as long as the program is running.



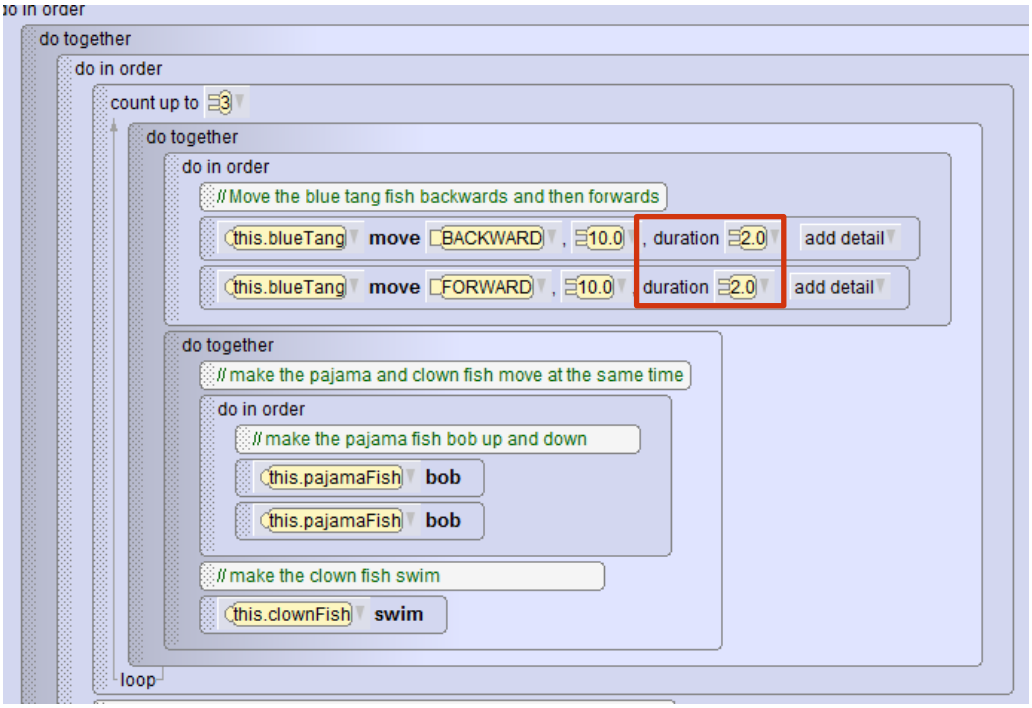
21. You can also use a count loop that will allow you to have the fish swim for a set number of times at the beginning of the program.

    Drag a count loop statement above the code block that makes the Blue Tang fish swim. Select 3 as the argument value, this is how many times the code will be executed.

22. You want the Blue Tang, Clown and Pajama fish to move at the same time so drag and drop a do together statement into the count.



23. Now drag the control statements that control the fish into the do together statement.



You will need to change the duration for the Blue Tang fish to 2.0 seconds. Remember the swim procedure takes four seconds to complete so if you don't match the timings the Blue Tang will sit still on screen waiting for other procedures to complete.

24. Test your program by running it.
25. One last bit of code clean up. It is always good to create code blocks for code that logically goes together. The code that makes the Blue Tang fish shake its head and say "No more swimming today!" is currently not within a code block. Add a do in order statement and drag the code into it.
26. Add any additional comments that you feel are necessary.
27. Save, Run and test your program.
28. Exit Alice 3.