How Tall Are You?
Introducing Functions for Alice 3

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July 2008
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Step 1: Getting Started

In this tutorial you will be learning to use functions to ask how tall a character is. Using this information two characters will compare their height and give a specific response depending on who is the tallest.

A function in Alice is basically a question about information in your Alice world that Alice answers. You can ask how tall or wide an object is, how far away it is from another object, and many other questions.

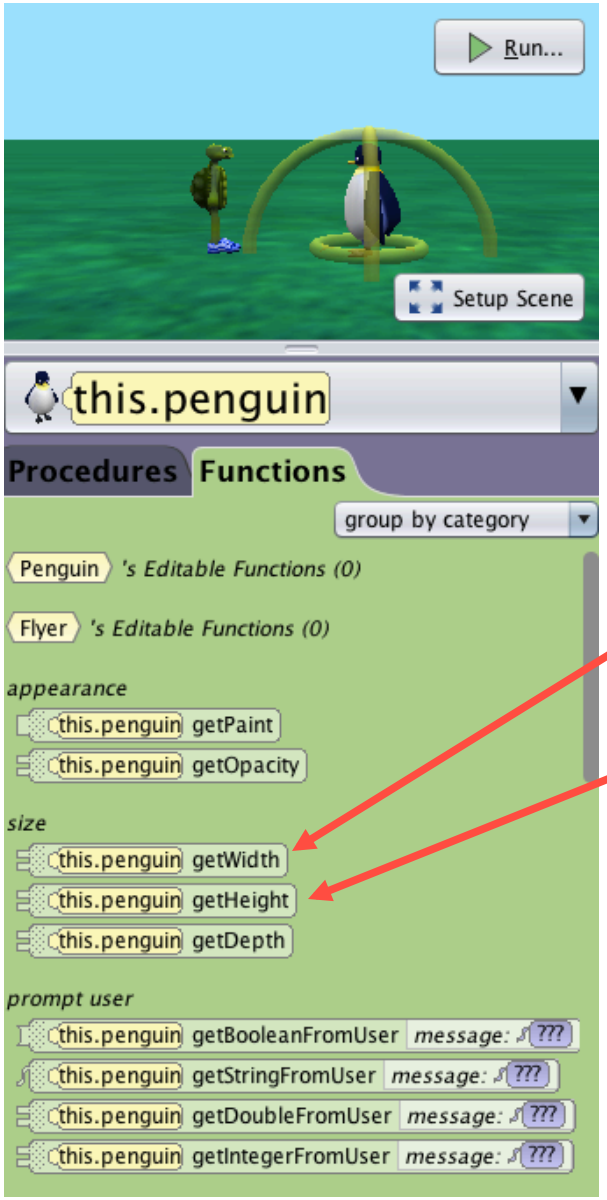
Step 1: Getting Started

Click on the Setup Scene button. Go into your Biped Class and click on new Tortoise (). Now go back up to the All Classes, and find the Flyers folder. Click on new penguin (), and add new Penguin (Adult) to your world.

Step 1: Getting Started

Using your object moving buttons, move the tortoise to the left of your viewing screen, and move the penguin to the right of your viewing screen. Resize so they are approximately the same size. Rotate them so they are facing each other.
Your world should look like the picture below.

Step 2: Understanding Functions



Click on Edit Code. Click on the this.penguin object. Then click on the Functions tab. You will see a LONG list of functions. Scroll down and look at the functions under size.

Each of these functions asks a question about the penguin, and then keeps the answer so that you can use it in your Alice world.

How wide is the penguin?

How tall is the penguin?

These functions can be very useful in Alice. What if, for example, you want to make something move up and stand on top of the penguin's head? You don't know how exactly how tall the penguin is. But Alice does!

Step 3: Using the True or False Functions

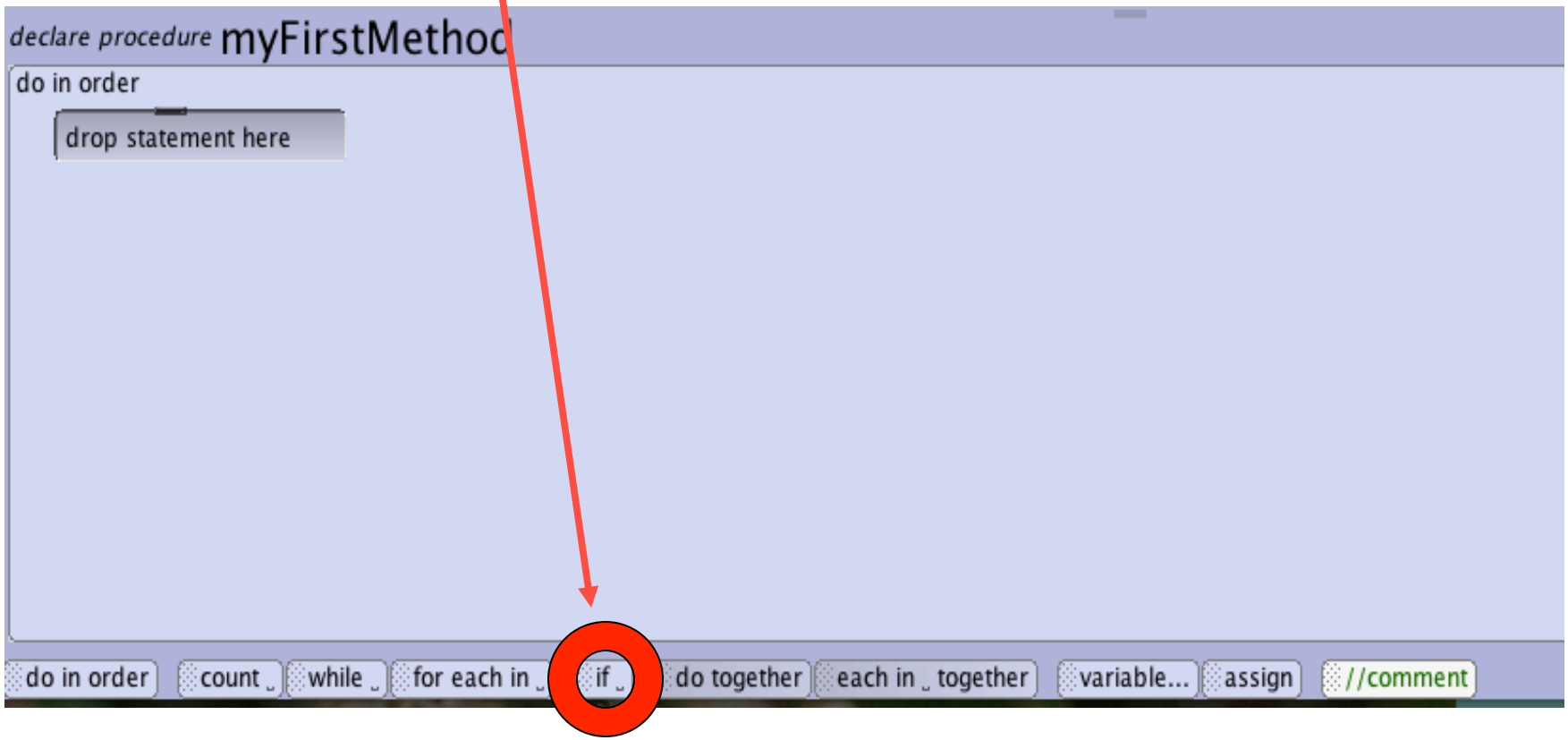
Some functions in Alice are statements to which the answer is either true or false, like the one on the previous page that says, "penguin is taller than." We want to know whether the penguin is taller than the tortoise. It's almost impossible to tell just by looking at them, because their heights are so close together. So we will use a function to know for sure.

We are going to add commands so that when the Alice world starts:

- If the penguin is taller, it will say "Hah! I'm taller!", and do a victory spin
- If the tortoise is taller, he will say, "Hah! I'm taller!", and do a victory spin.

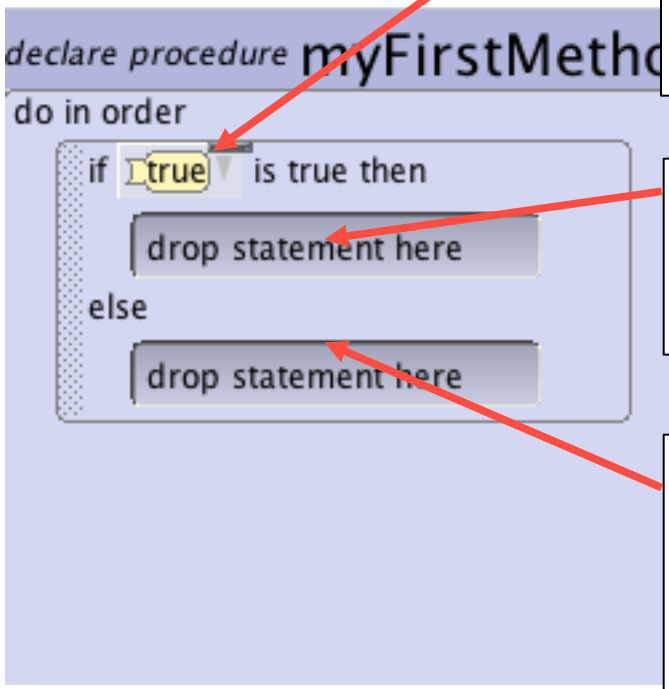
Step 3: True or False Continued...

Since we only want the penguin to say "Hah! I'm taller" ***if*** he is taller, we need to use something called an If Else statement. You will find it located below your method editor:



Drag in an If Else statement. Select true when you drop it. We will replace this later.

Step 3: True or False Continued...



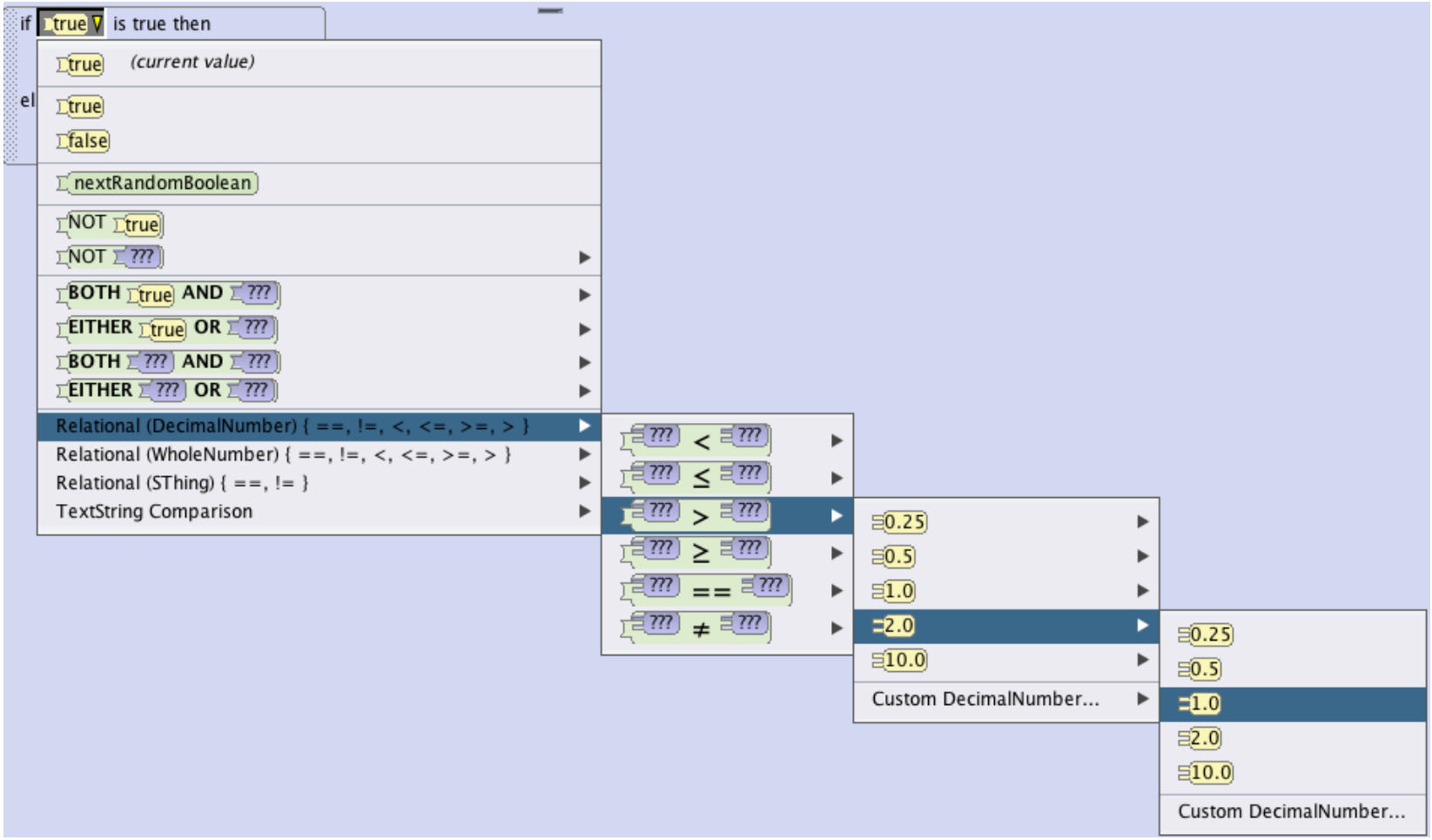
Here is where you put the question that is either true or false. For us, that will be penguin is taller than the tortoise. Since it is currently set at true, that means this If Else says, "If this statement right here is true, do whatever commands are right under it."

This is where you put whatever you want to happen if the answer to your question is true. This is where we'll tell the penguin to say "Hah! I'm taller!"

This is where you put whatever you want to happen if the answer to your question is NOT true. If it is not true, it will skip everything above the Else, and go straight to whatever is here. This is where we'll tell the tortoise to say "Hah! I'm taller!", because if our statement is false, and the penguin is NOT taller, that means the tortoise is taller!

Step 3: True or False Continued...

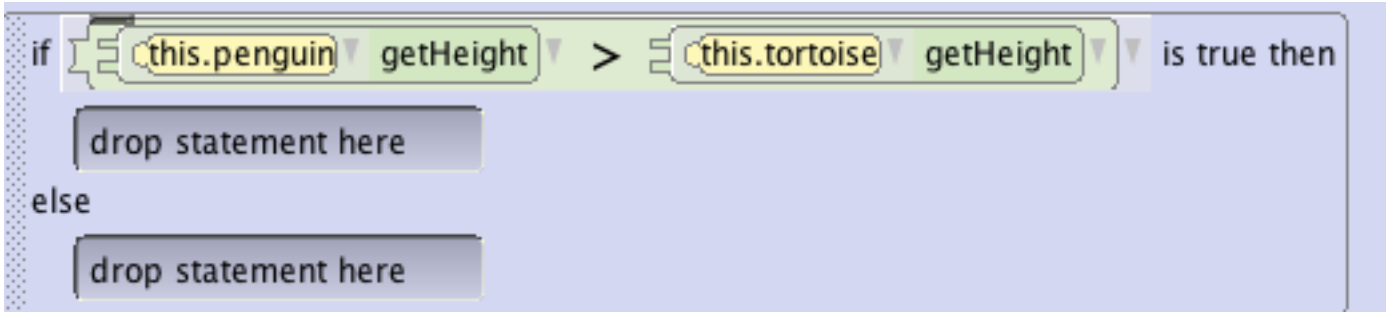
So let's construct our question. Click on true in the If Else statement. Click on Relational (Decimal Number). Click on the greater than > symbol, and pick 2.0 for the first value and 1.0 for the second value.



Step 3: True or False Continued...

So let's construct our question. Go to the penguin's functions and drag this.penguin getHeight over the 2.0 in the if else statement.

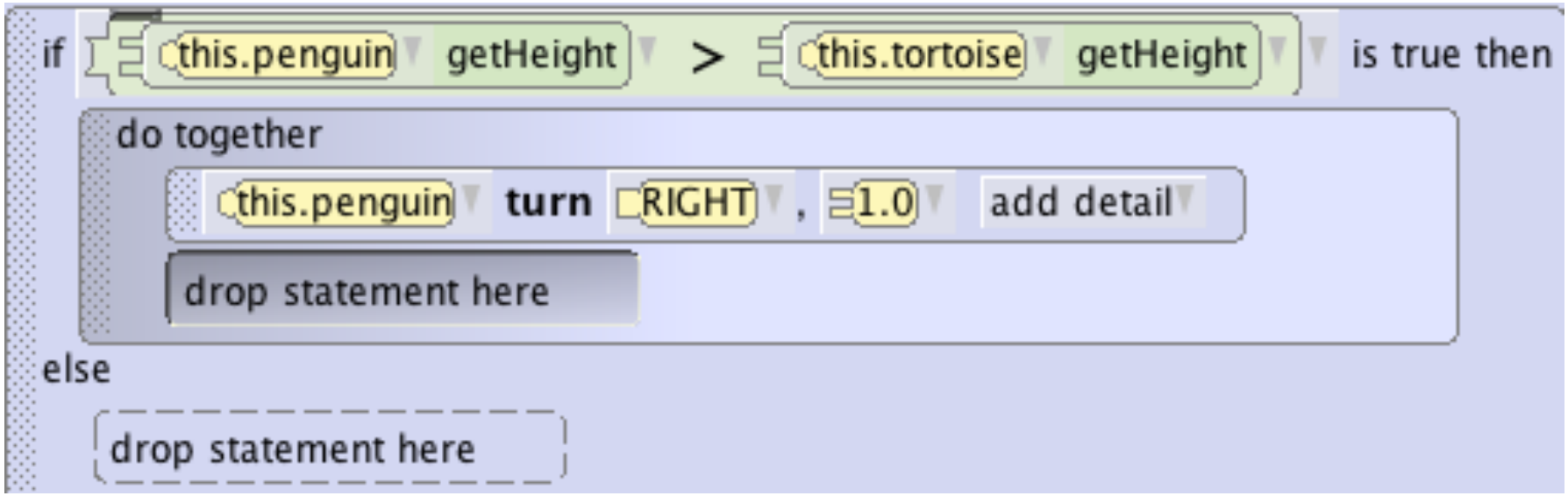
Next, go to the tortoise's functions and drag this.tortoise getHeight over the 1.0 in the if else statement.



Now, the if else statement will ask the penguin's height is greater than the tortoise's height.

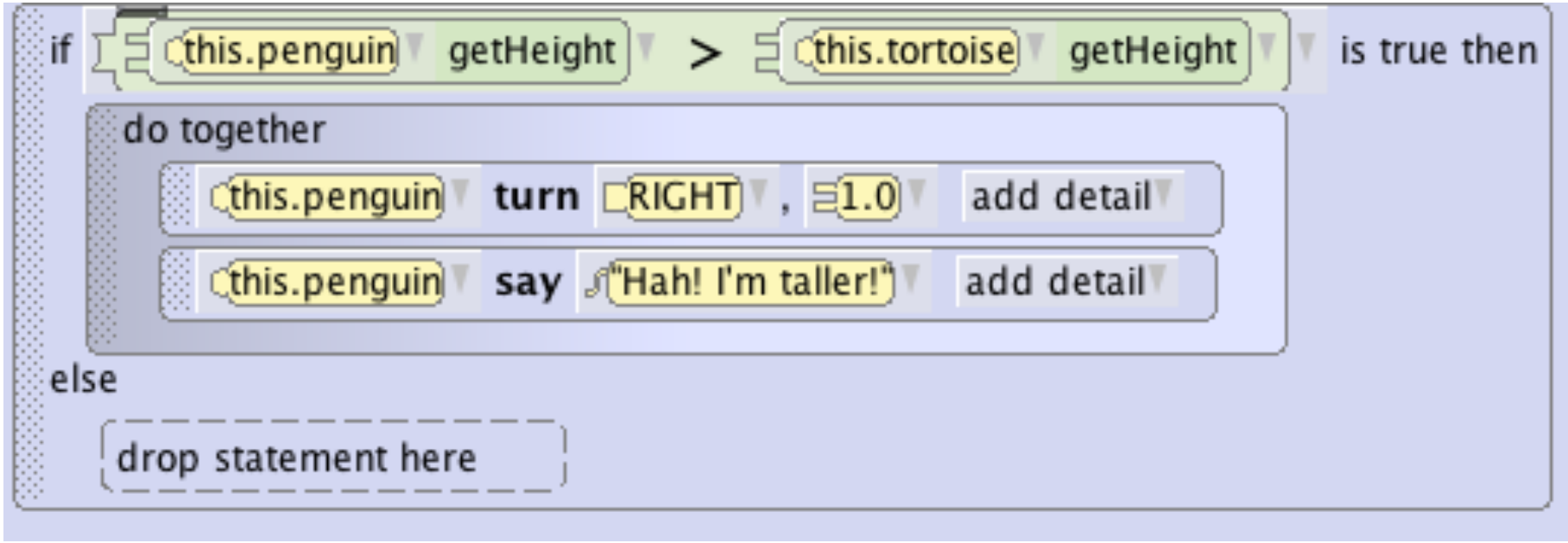
Step 3: True or False Continued...

Get a Do together from the bottom of your method editor and drag and drop it into the If/Else right below If. Then, click on penguin in the object tree, and go to his procedures list. Drag and drop penguin turn into the Do together. When you drop it, select right, and then 1 . Your code will look like this.



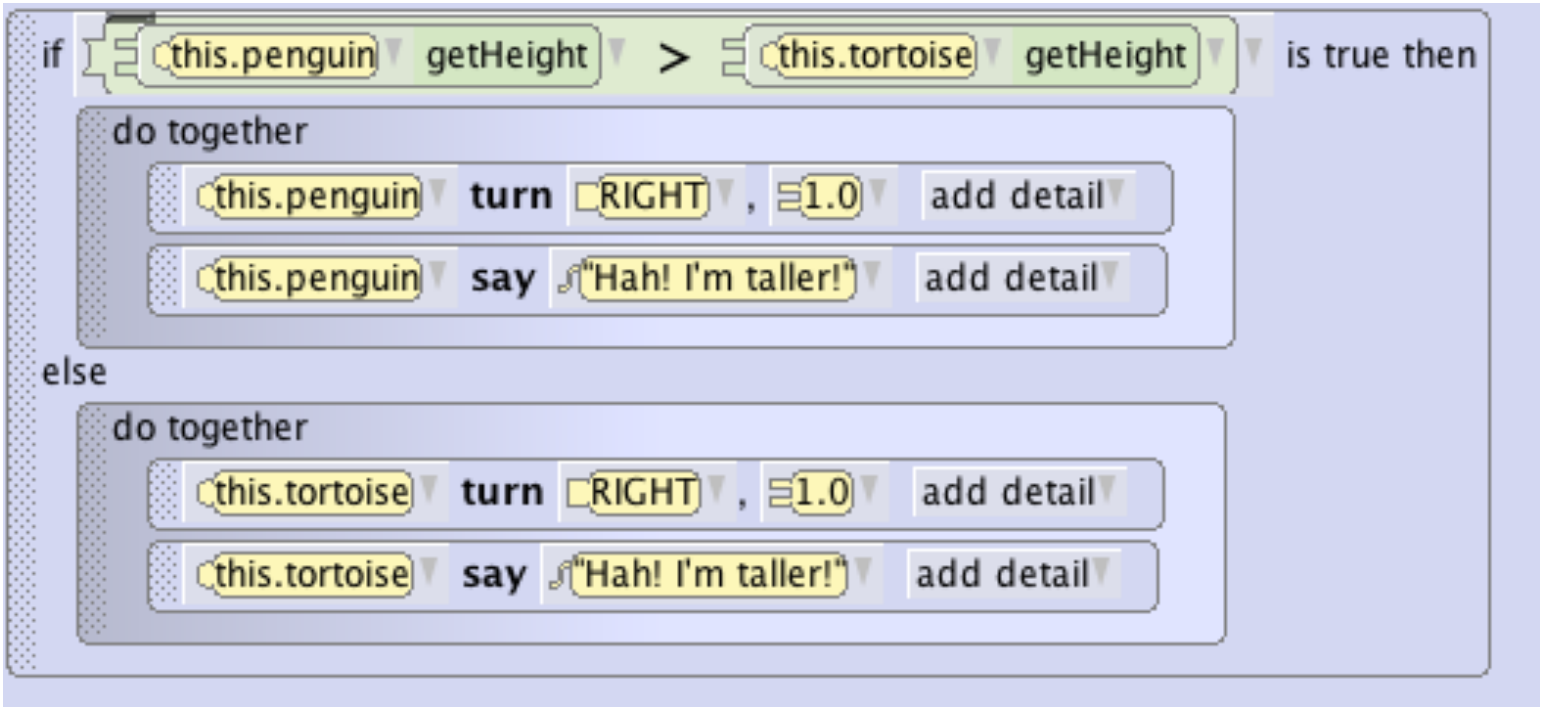
Step 3: True or False Continued...

Then, find penguin say, and drag it into the Do together. When the menu pops up, click on Custom TextString, and type in "Hah! I'm taller!".



Step 3: True or False Continued...

Drag and drop another Do together into the If/Else, this time right under the Else. Click on tortoise in the object tree and look at his methods list. Find tortoise turn, and then drag and drop that into the newest Do together. When you drop it, select right, and then 1. Next, find tortoise say and put it in the Do together. Tell him to say "Hah! I'm taller!"
Your code will look like this.

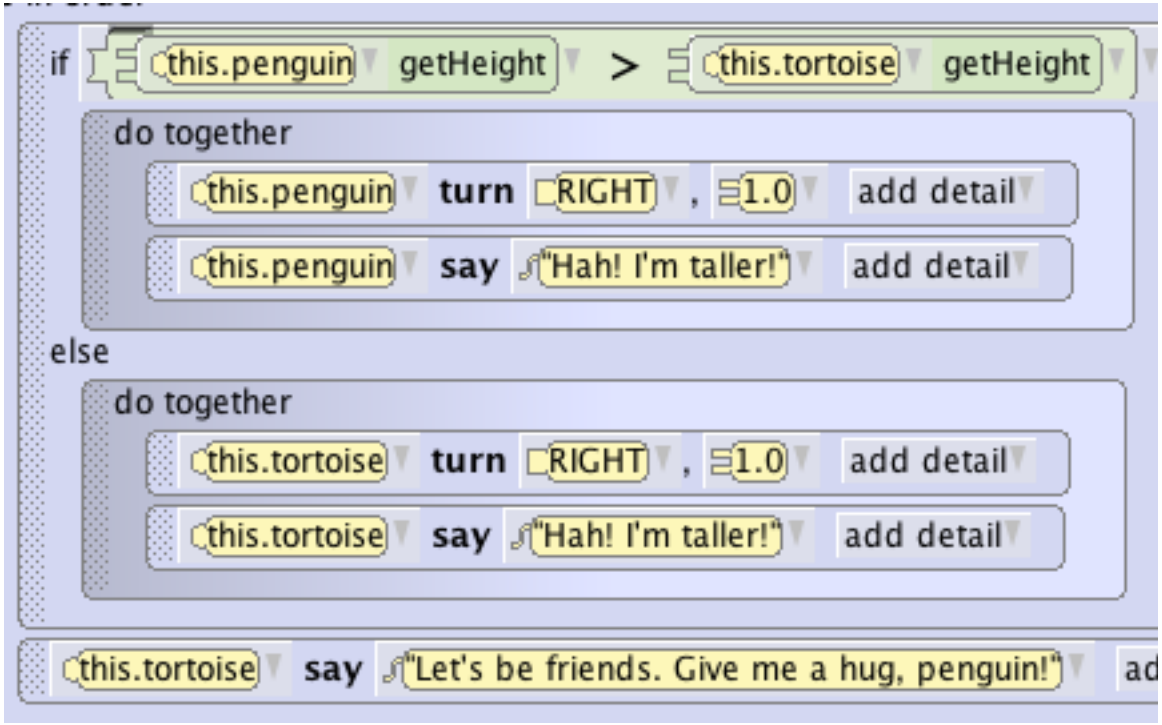


Step 3: True or False Continued...

It seems that the penguin is taller. To test and make sure your function is working correctly, go to the Set Up screen and use your object buttons to resize the tortoise and make him clearly taller than the penguin. Now, play your world again. This time, the tortoise will say that he is taller! You can change him back to his normal size after you test this out.

Step 4: Using Number Functions

Now we're going to use one of the functions that is a question whose answer is a number. We're going to make the penguin move right up to the tortoise and give him a hug. The only problem is, we don't know how far to tell him to move! That's why we'll use a function!



First we'll tell the tortoise to say something. He's tired of competing with the penguin about their height, and he wants to be friends.

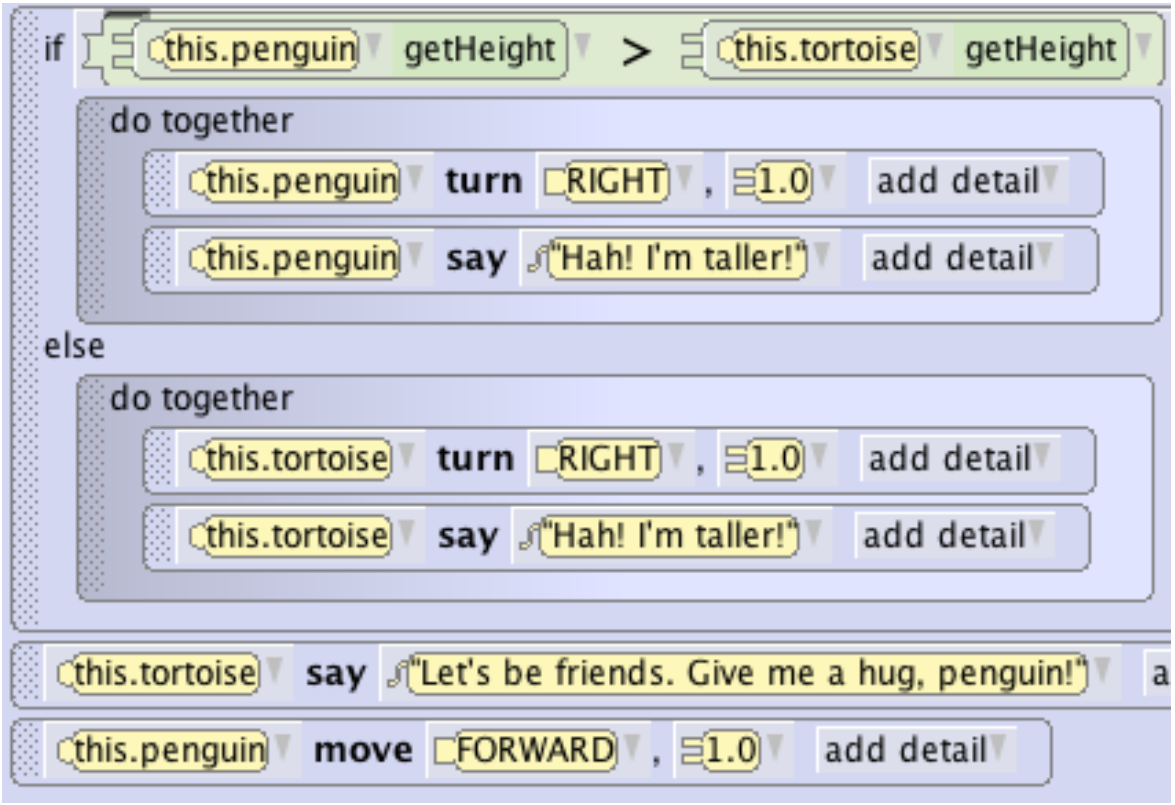
Click on this.tortoise, then click on Procedures. Find tortoise say, and drag it under your If Else statement.

Make him say "Let's be friends. Give me a hug, penguin!"

Step 4: Number Functions Continued...

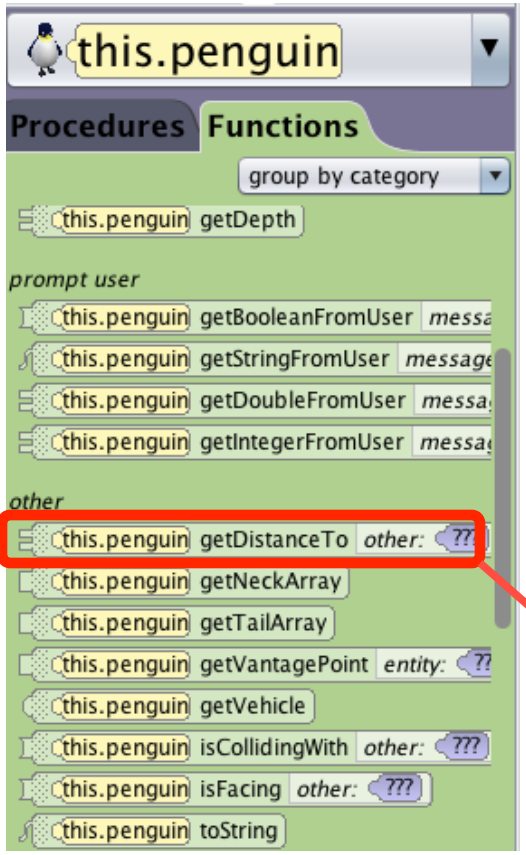
Now we want the penguin to move right up to the guy to hug him.

Click on penguin in your object tree and then click on procedures. Find the penguin move and drag it into your method editor under everything else. We don't know exactly how far yet, so just put 1 meter for now.



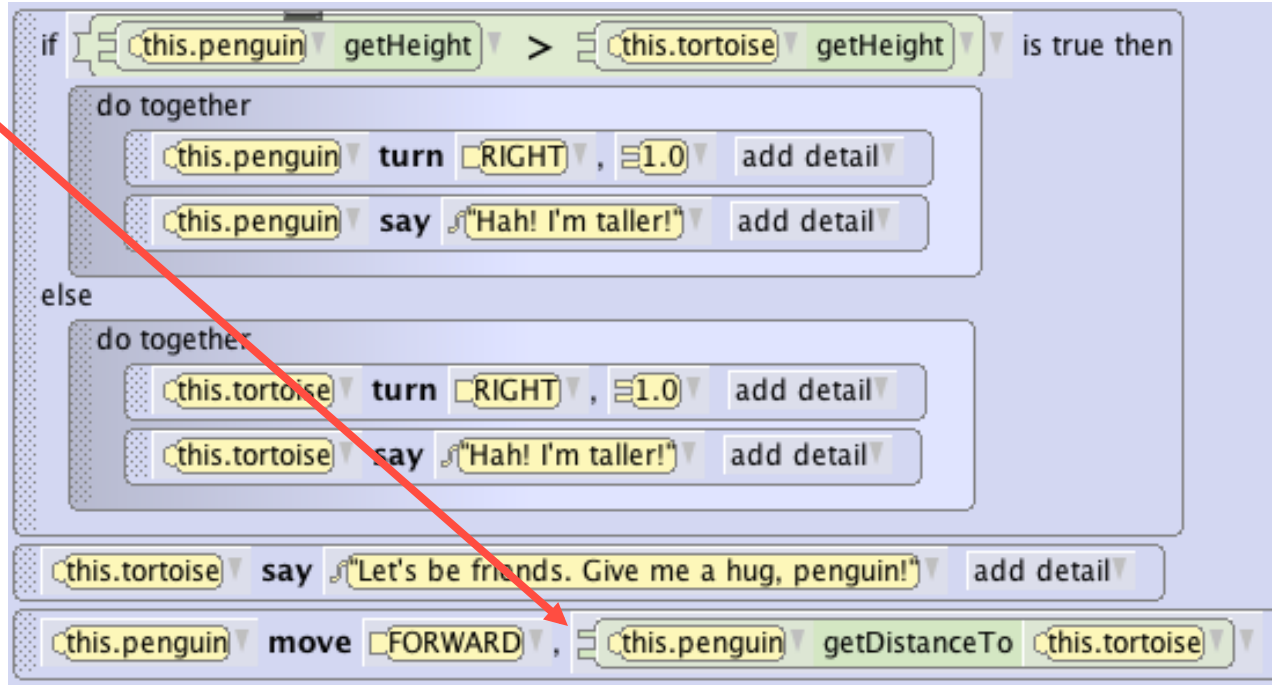
Play your world just to see what it looks like.

Step 4: Number Functions Continued...



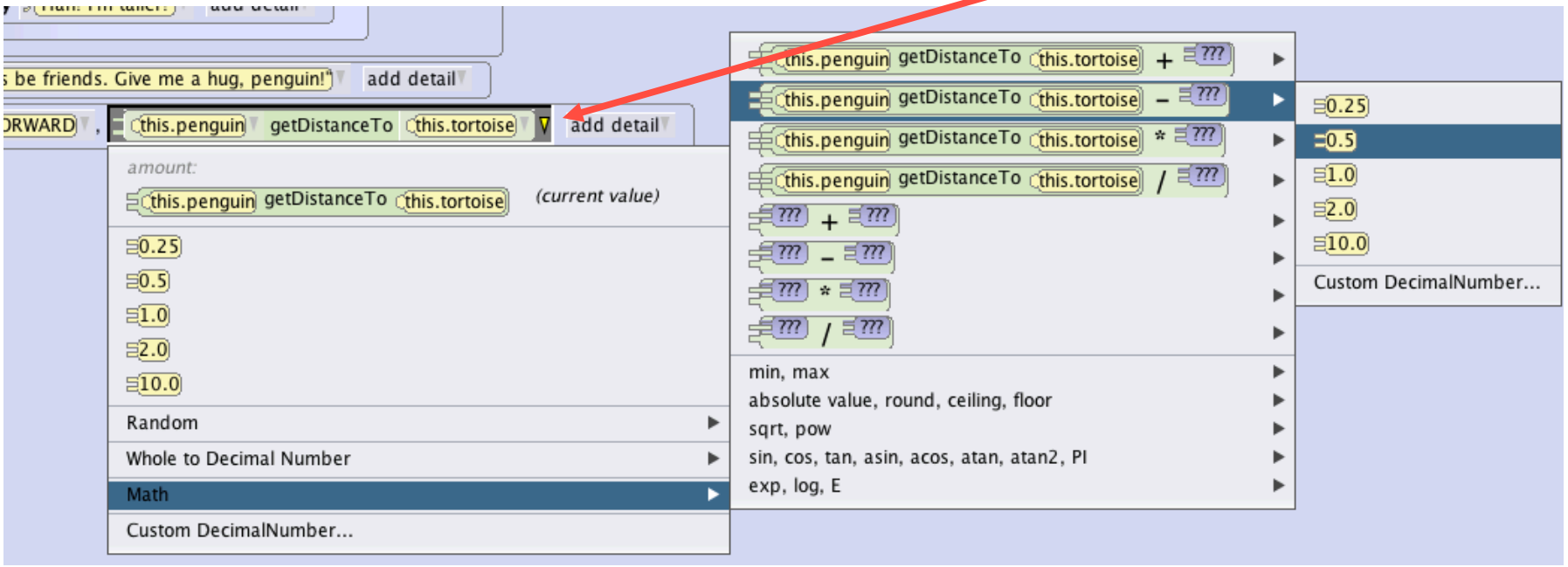
Now we're going to use a function to tell the penguin how far forward to move. Click on penguin in your object tree, and then click on the functions tab. Find the function under "other" called get distance to.

Drag that function over the 1 meter on your penguin move forward command and drop it there. On the menu that pops up, select tortoise.

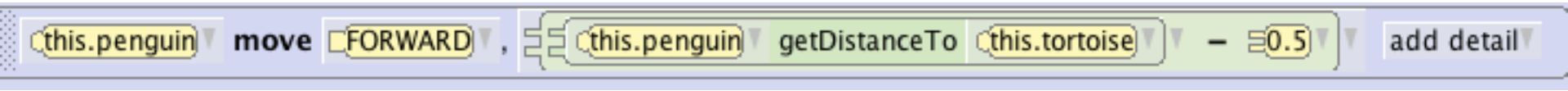


Step 4: Number Functions Continued...

Try playing your world. What happens? The penguin moves too far, into the body of the tortoise. It would be nice if the penguin would stop about 0.5 meters in front of tortoise. We can select math, followed by "-", followed by a number. Click here to apply math.



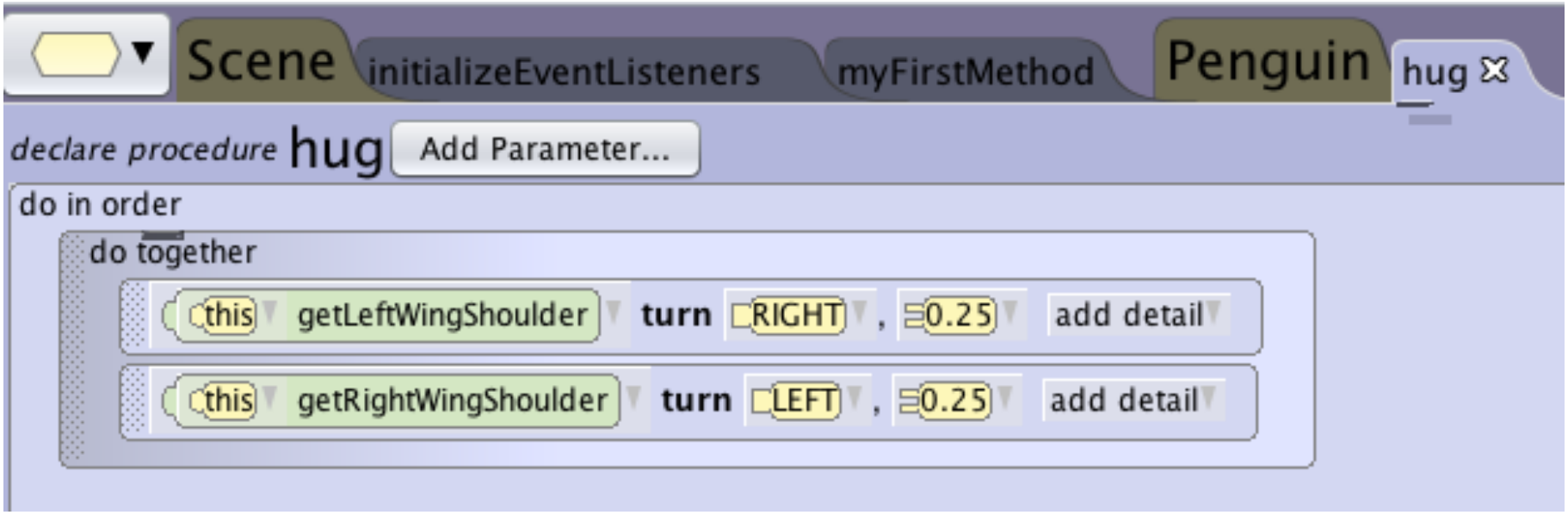
Your code for this line will then look like this:



Step 5: Finishing Up

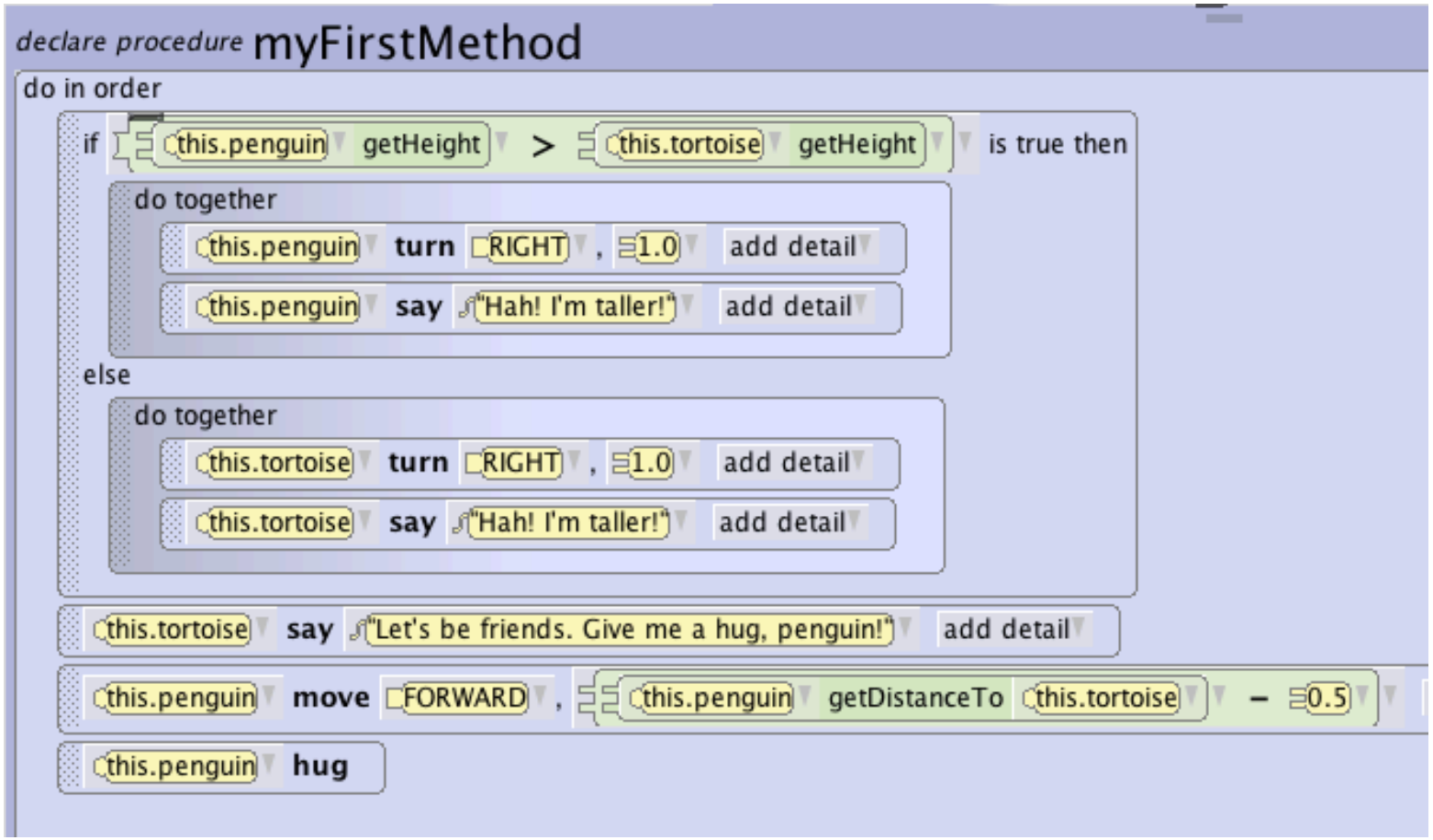
The last thing you need to do is make the penguin hug the guy.

Go to classes, then penguins, and click on add Penguin procedure. Call it hug. In this method, experiment until you find code that makes the penguin hug the guy. My code for penguin.hug looks like this.



Step 5: Finishing Up

Now click on the my first method tab of your method editor. Make sure you have clicked on penguin in the object tree, and then look at the penguin's procedures list. Find penguin.hug, and drag it into the bottom of your method editor. Your final code will look like this.



Step 5: Finishing Up Continued...

Play your world, and see the plot unfold! Now you know the basics of using functions. We only used two functions in this tutorial, but there are MANY functions in the Alice world that can be useful. Try some more functions on your own and explore how they work!