

# Dragging and Dropping: Distance Relationships Between Objects



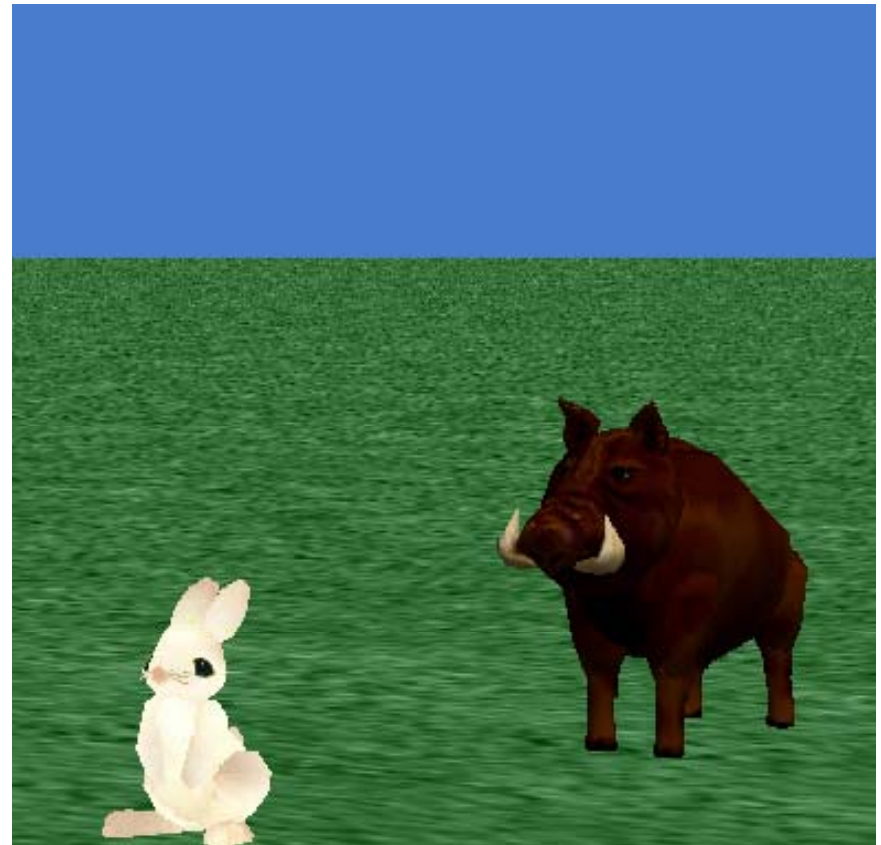
By Henry Qin: Edited and revised  
by Ruthie Tucker, under the  
direction of Professor Susan  
Rodger, Duke University 2008

# Introduction

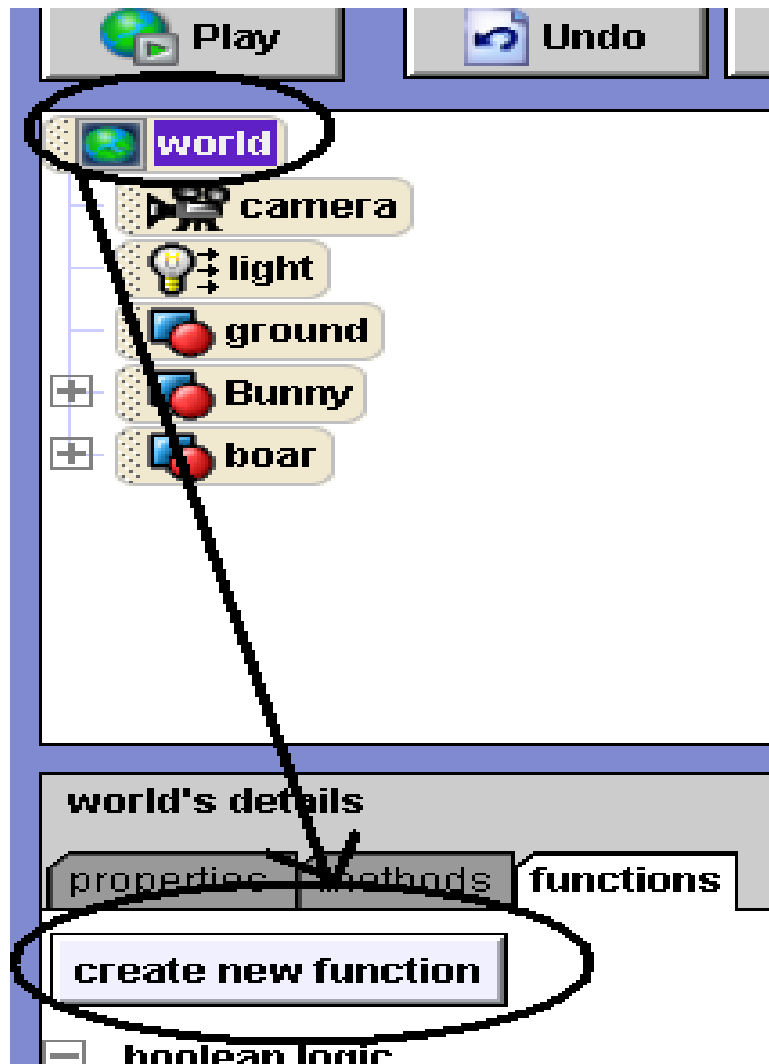
- This tutorial will demonstrate how to use a tool called a “Function” in Alice, to tell if one object is relatively close to another object.
- In order to do this we will build a simple world and a simple function to tell if two objects are on top of each other.

# Building the World

- To set up this world, you can either download it off the repository or build it from scratch.
- To build it simply choose a grass scene, in Alice and add a bunny and a boar from the Web gallery.

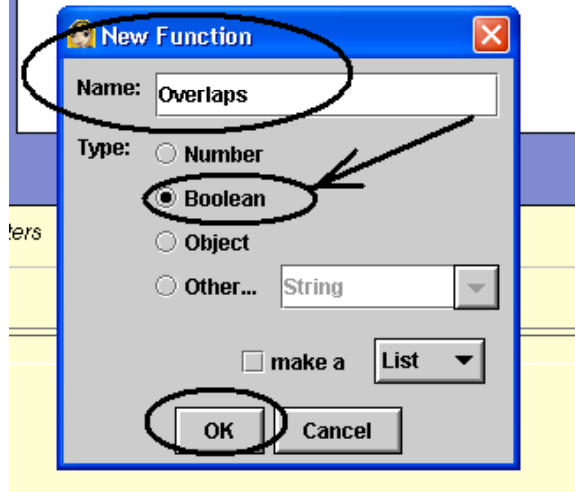


# Writing the function



- The first thing that we need to do is create a function in world.
- Click on world and then the functions tab
- Click on the gray “Create new function” button.

# Writing the function

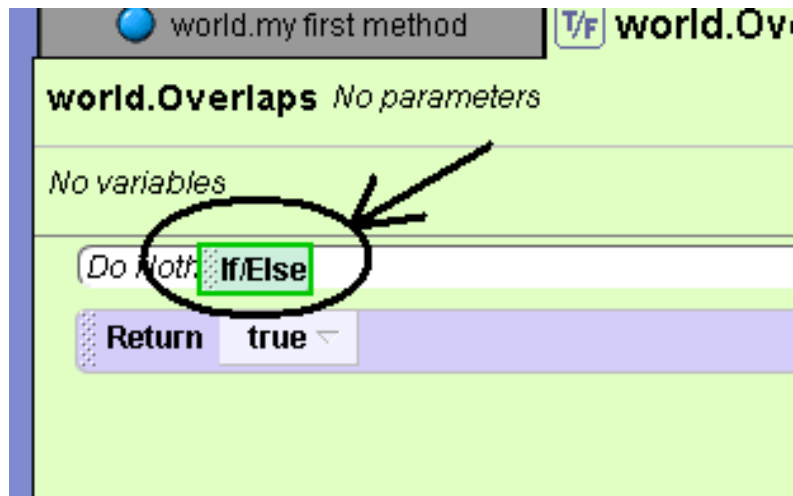


- After you write the name a green box should appear on your screen that looks like this.

- We are going to name this one “overlaps.”
- Make sure you select the Boolean type.

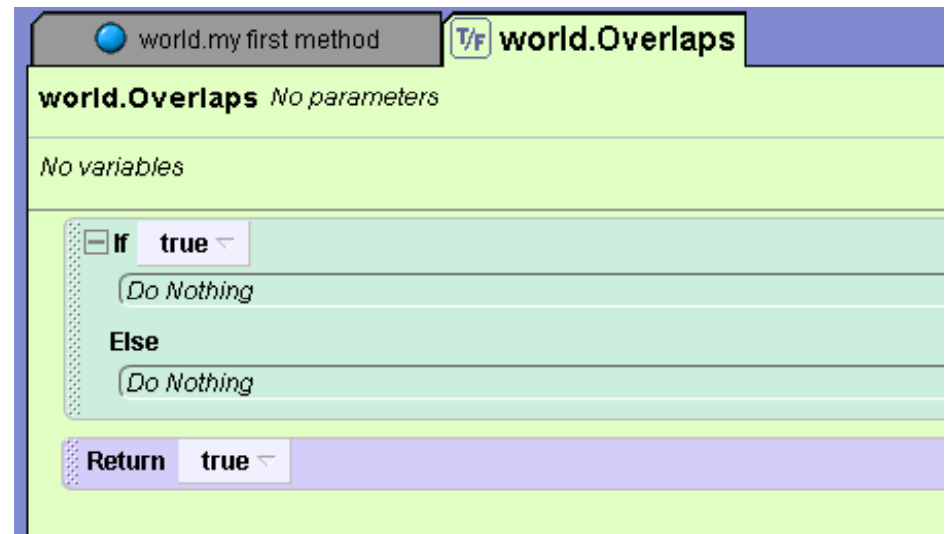


# Writing the function

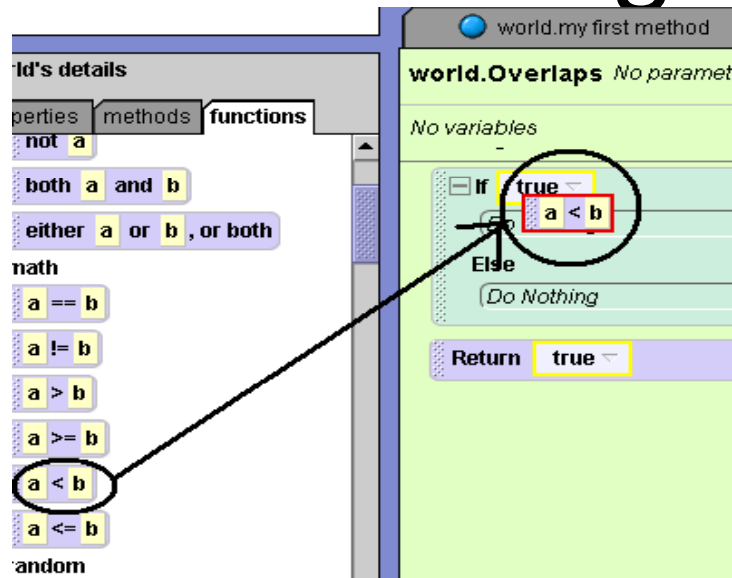


- Now your screen should look like this.

- Next we need to drag an if/else statement into the place that currently says “do nothing.”



# Writing the function

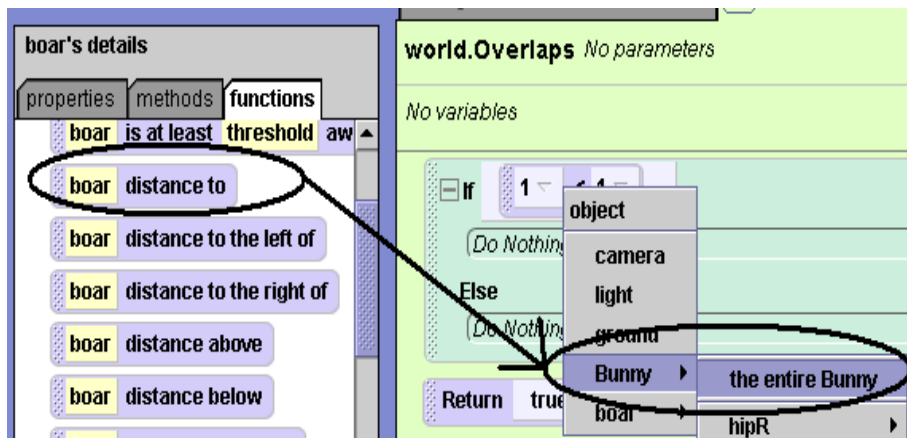


- Just pick any numbers for A and B, they are simply place holders.
- Your screen should now look like this.

- Now lets go to world level functions and drag the  $a < b$  tab over from the logic column.

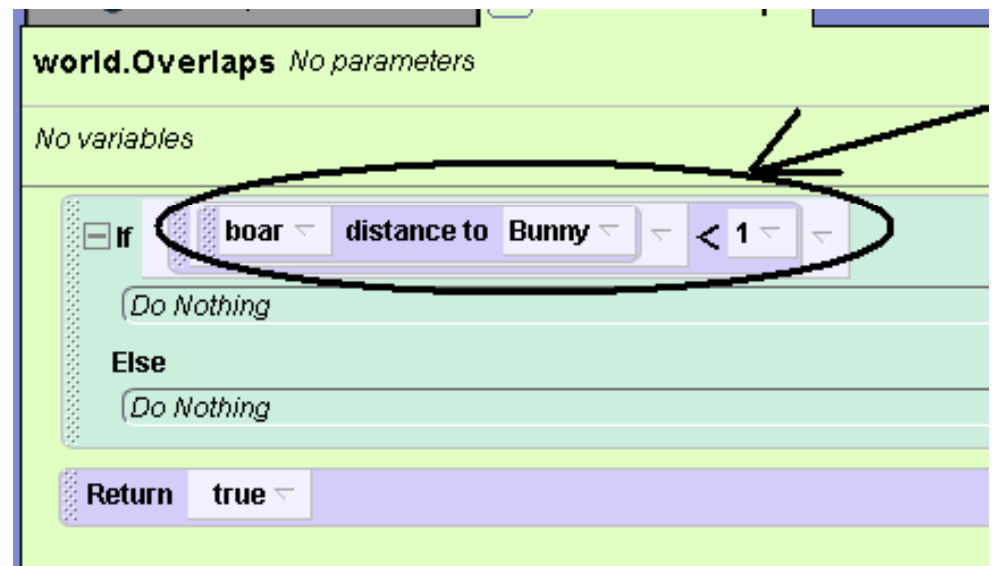


# Writing the function



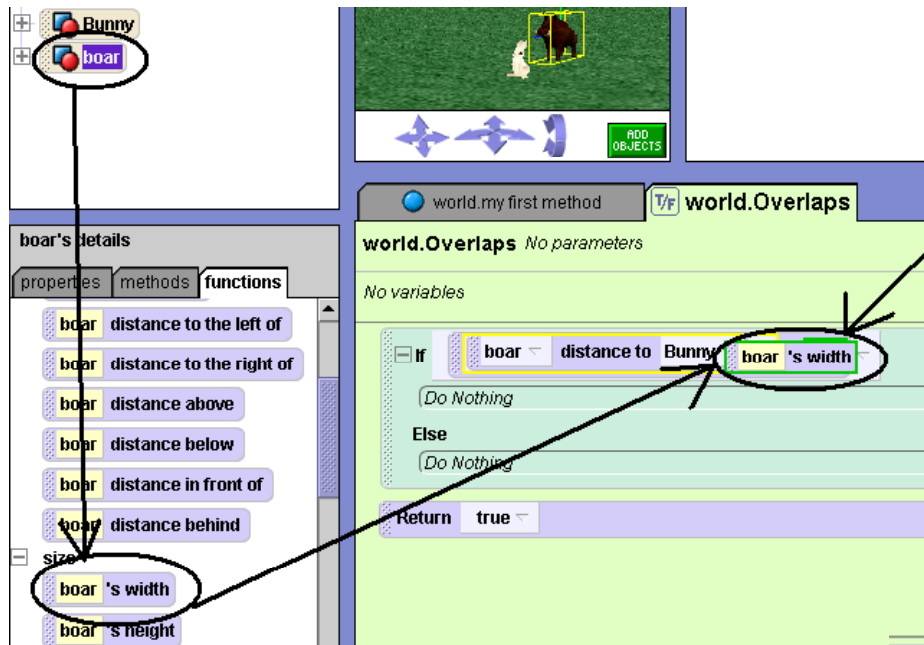
- For the first number we are going to go to the boar's functions and choose "boar distance to" bunny.

- Your screen should now look like this.



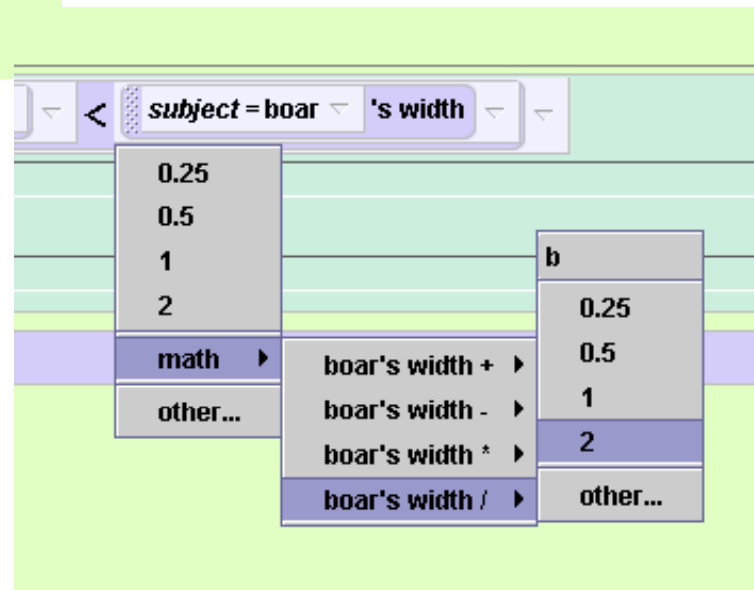


# Writing the function



- Now find the function inside of boar's functions labeled "boar's width." Drop on top of the number in the second space.

- Now, click on math and select "/2" to divide the width in half.



# Writing the function

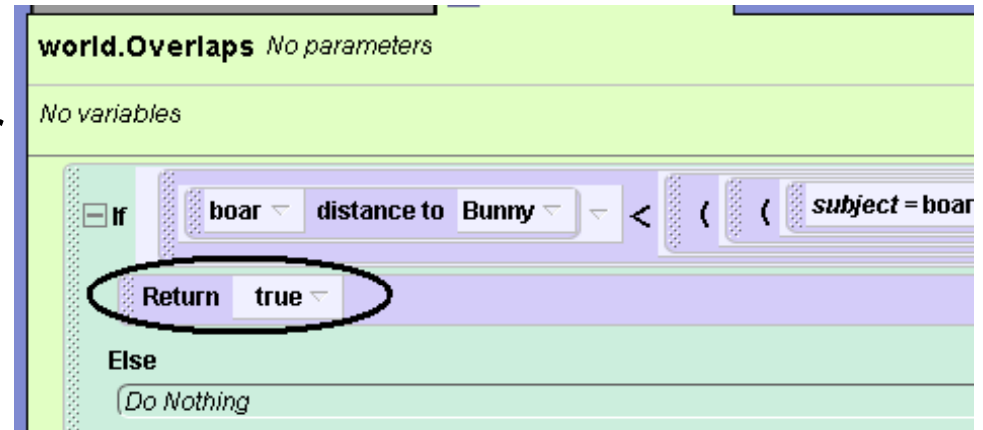
- Now we need to add a plus arrow and do the same expression over again.

The image shows a Scratch code editor window with the following components:

- Function Name:** `world.Overlaps` (No parameters)
- Variables:** No variables
- Code Blocks:**
  - If block:** `boar` distance to `Bunny`
  - Then block:** `( ( subject = boar 's width / 2 ) + ( subject = boar 's width / 2 ) )` (This entire expression is circled in black)
  - Else block:** `Do Nothing`
  - Return block:** `true`

# Writing the function

- This function is going to check and see if the boar is closer than the length of the boar's width to the bunny.
- In other words, is the boar on top of the bunny?
- Thus we want to return "true" if the boar is on top of the bunny.
- Add this return function to your code.



# Writing the function

- We will return false in the “else” category.

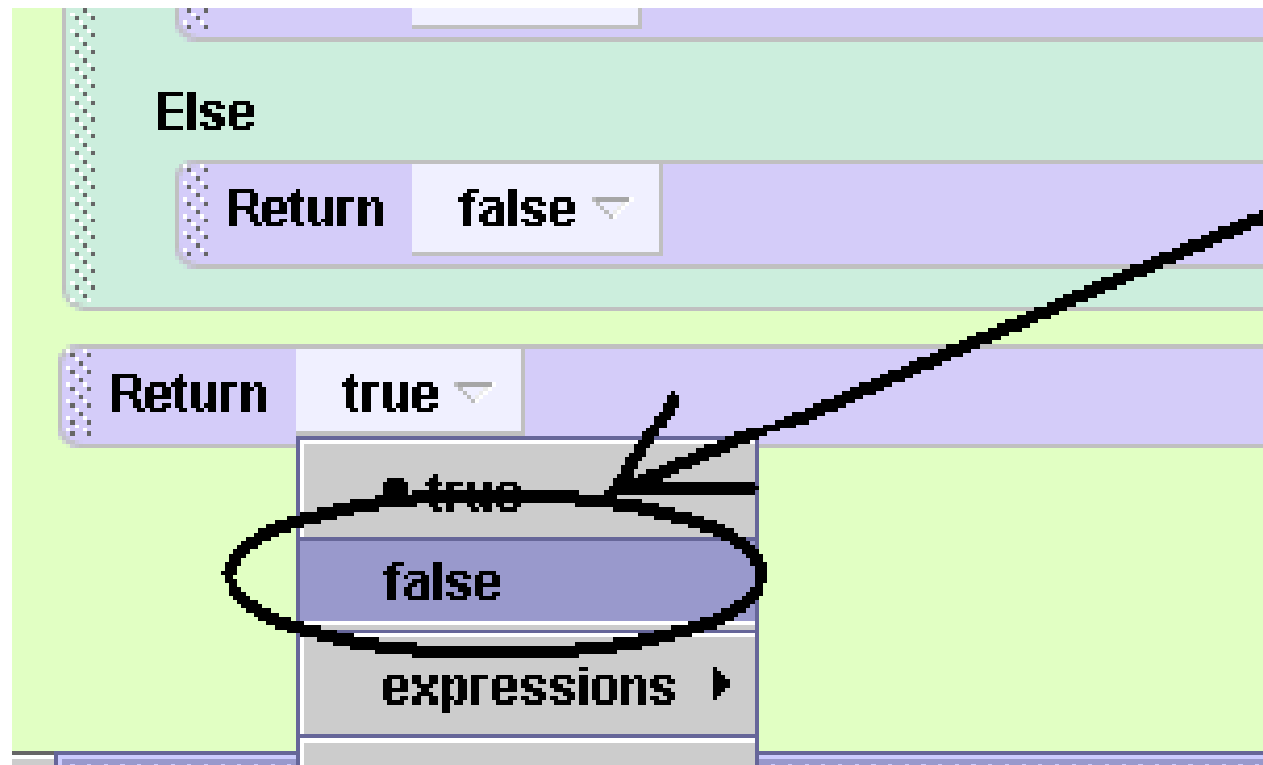
The image shows a Scratch code editor window with a tab titled "world.my first method" and a function block titled "world.Overlaps" with a "T/F" icon. The function block has the text "world.Overlaps No parameters" and "No variables". The code inside the function block is as follows:

```
if (boar distance to Bunny < ( ( ( SU. ) ) ) )  
  return true  
else  
  return false  
return true
```

The "else" branch and its "Return false" block are circled in black.

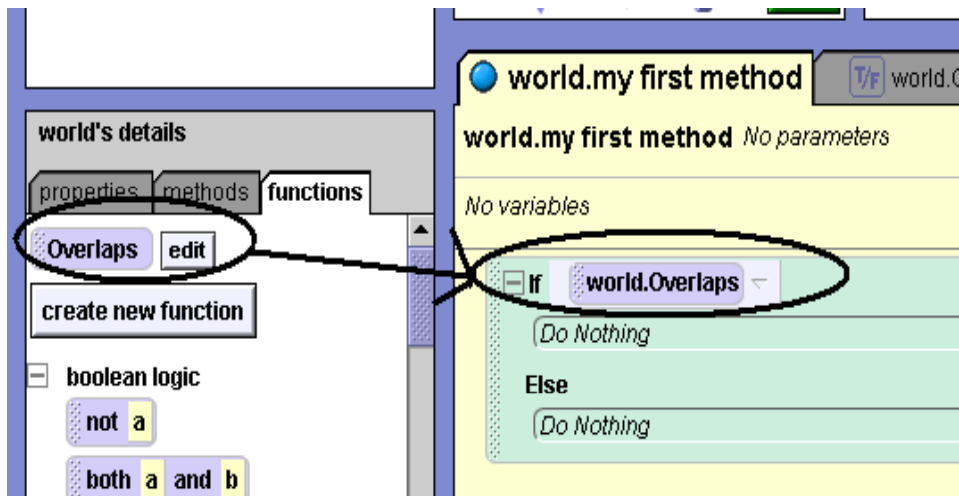
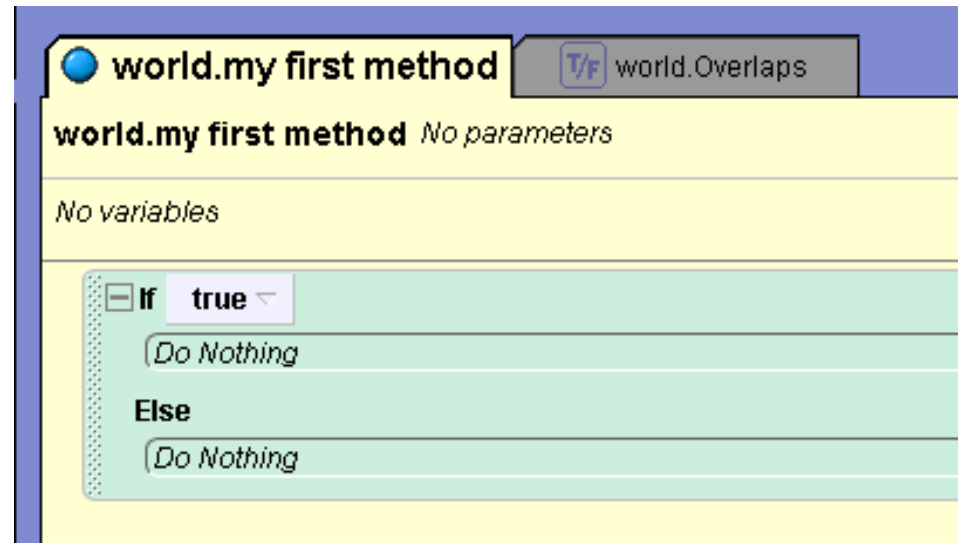
# Writing the function

- Finally, lets turn the final return to false.



# Testing the function

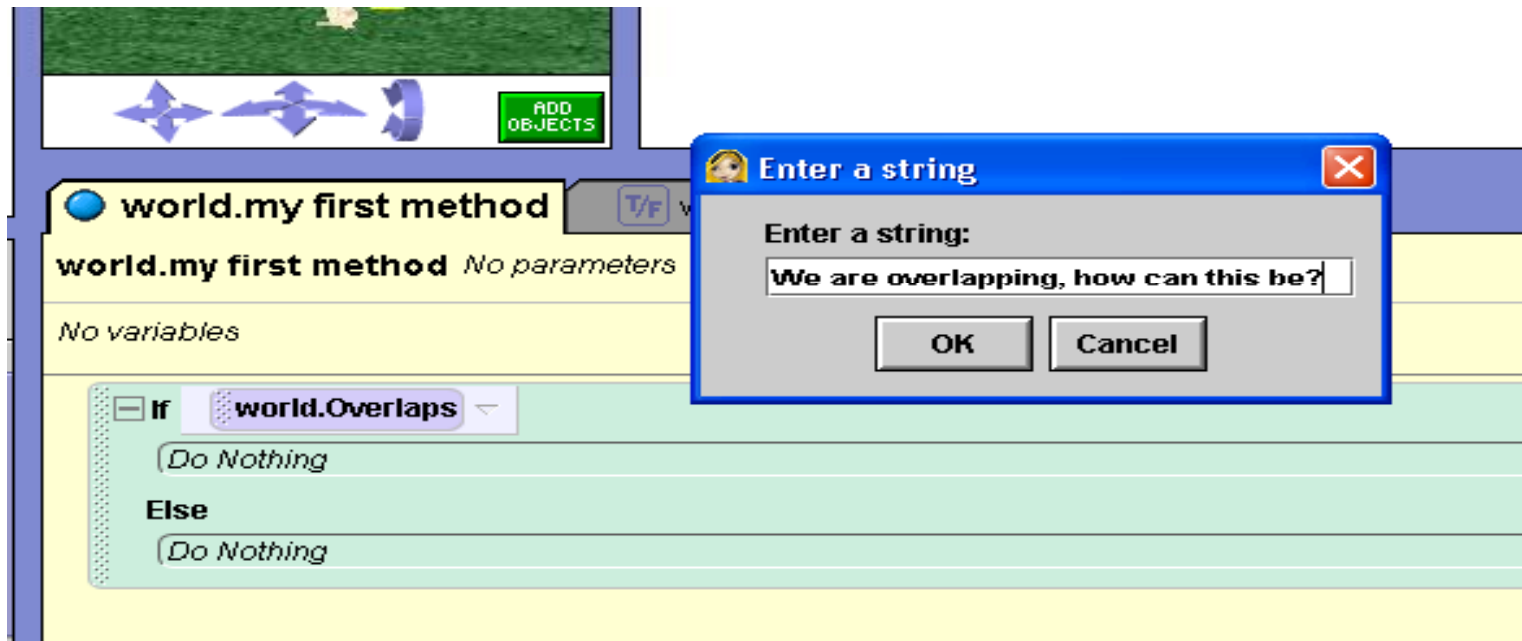
- Now we need to write a method to call this function.
- Lets go into World.myfirstmethod and drop in an “if statement.”



- Now drop in your “overlaps” function on top of the “if statement.”

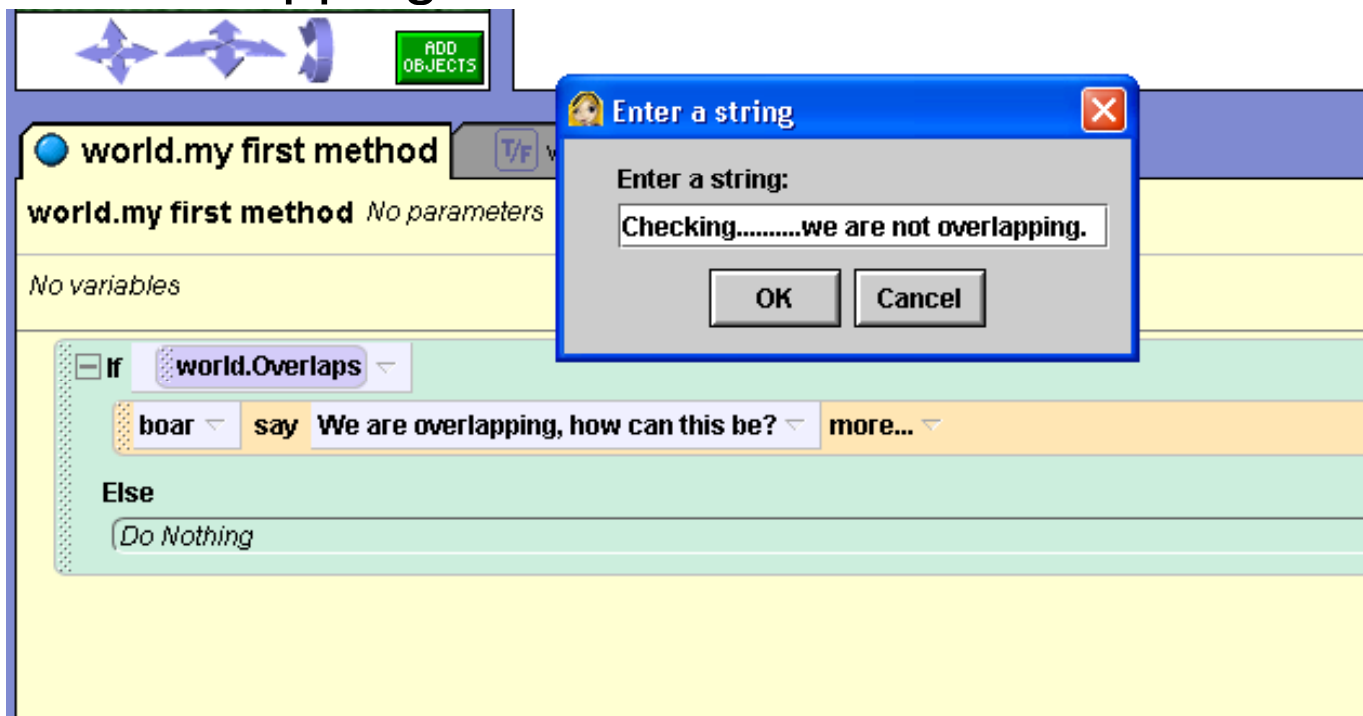
# Testing the function

- Now we want the boar to say something.
- Let's have him say, " We are overlapping, how can this be?"



# Testing the function

- Now, in the else statement have the boar say, “Checking....we are not overlapping.”





# Testing the function

- Now play your world.
- Since the boar is next to the bunny he should say “Checking.....we are not overlapping.”



# Testing the function

- Now drag the boar on top of your bunny and play it again.
- The boar should say “ we are overlapping, how can this be?”



# Finishing up

- You can use functions like this in your Alice worlds to determine if objects in your world are within a certain distance of each other.
- *That's all folks!*