Using Placeholders to Simplify your Methods: Learning Methods, Part 2

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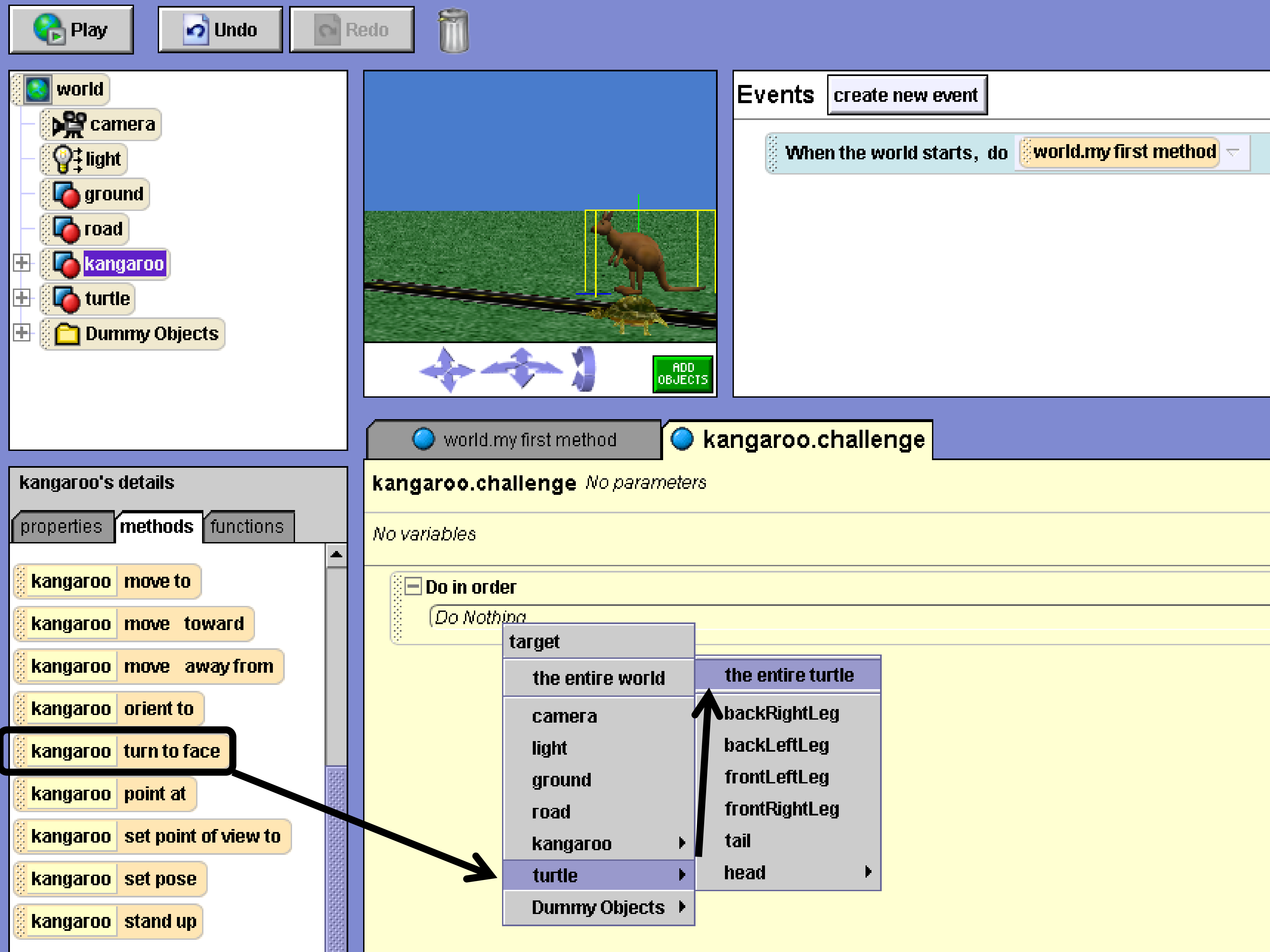
- We will now complete the world that you started in part one of the tutorial entitled "Methods." If you have not yet done Part One, you must go through that tutorial first.

Loading the World

- For this tutorial, you can use your completed version from part one of the Methods tutorial. That world was entitled methodStart.a2w.
- NOTE: You cannot double-click the file to open it; Windows will not know what to use, and even if you select Alice from a list of programs, the loading will fail.

Part 1: Parameters

- Now that the kangaroo and the turtle have raced, let's make a method for the kangaroo to hop back to the turtle and challenge him to a race again.
- Click on the kangaroo in the object tree, then click create new method in the methods tab, and name it challenge. Drag a Do in order into your new method.
- Then find the kangaroo’s turn to face method and drag it into the method editor. Then select turtle, and the entire turtle.
- See the screenshot on the next slide for an illustration.



Play Undo Redo

world
camera
light
ground
road
kangaroo
turtle
Dummy Objects

Events create new event

When the world starts, do world.my first method

world.my first method | kangaroo.challenge

kangaroo.challenge *No parameters*

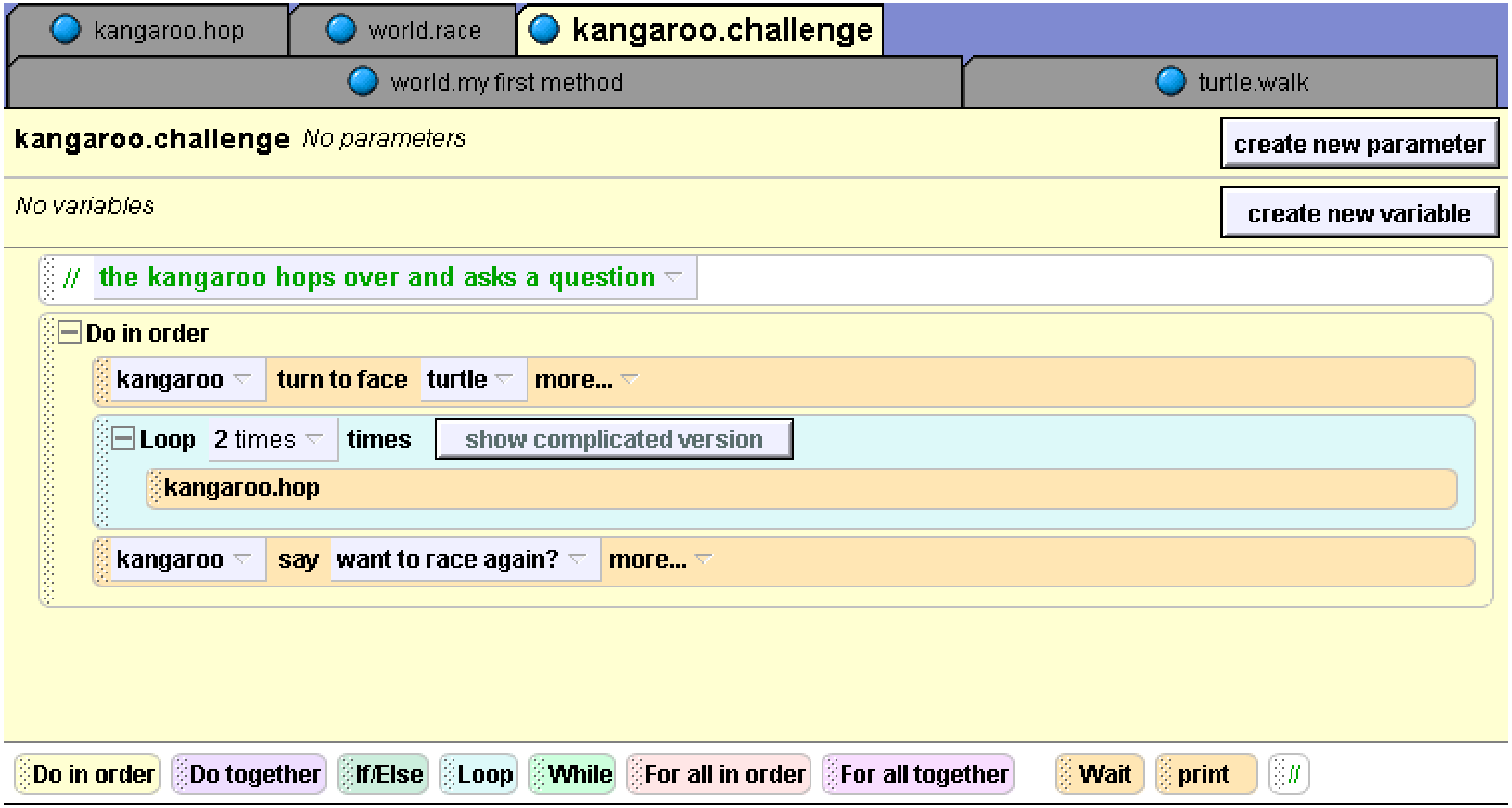
No variables

Do in order
Do Nothing

kangaroo's details
properties | methods | functions

kangaroo move to
kangaroo move toward
kangaroo move away from
kangaroo orient to
kangaroo turn to face
kangaroo point at
kangaroo set point of view to
kangaroo set pose
kangaroo stand up

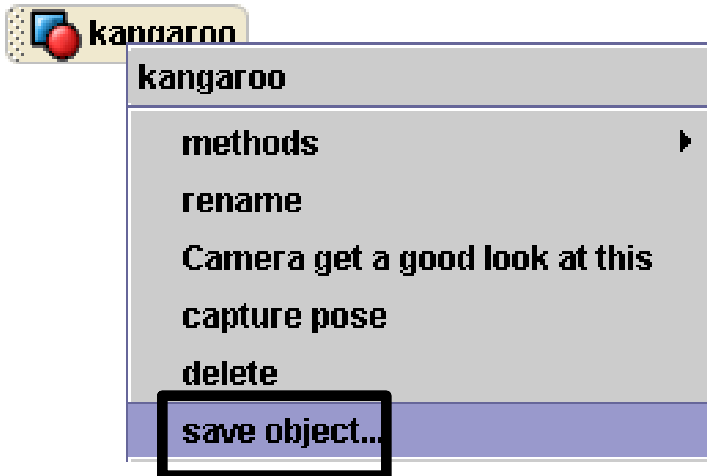
- Add a loop where the kangaroo executes hop two times. Then add code where he asks the turtle if he wants to race again. Your code will end up like this:

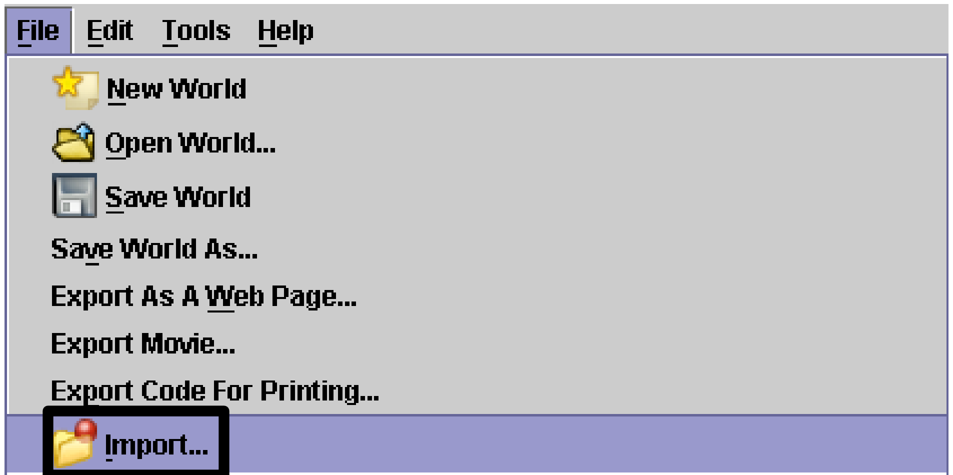


```
kangaroo.challenge No parameters
No variables
// the kangaroo hops over and asks a question
Do in order
    kangaroo turn to face turtle more...
    Loop 2 times times
        kangaroo.hop
    kangaroo say want to race again? more...
```

Saving Alice Objects

- In Alice, you can save an individual object, along with any new methods you have written for it. This allows you to be able to use the same character in more than one world without having to teach it new methods over and over.
- To do this, you can right-click on any object in the object tree and then choose save object.
- To import the character into a new world, just go to File, then Import, and find the object where you saved it.





Why use parameters

- If we save the kangaroo object and then and put it in a world where there is no turtle, what will happen? Alice will crash because the method kangaroo.challenge refers to a turtle that isn’t there in the new world! A class-level method should not have any references to other characters or world-level methods.
- In other words, instead of referring to the turtle in the first instruction of this method, we're going to use a parameter. A parameter is a place holder.

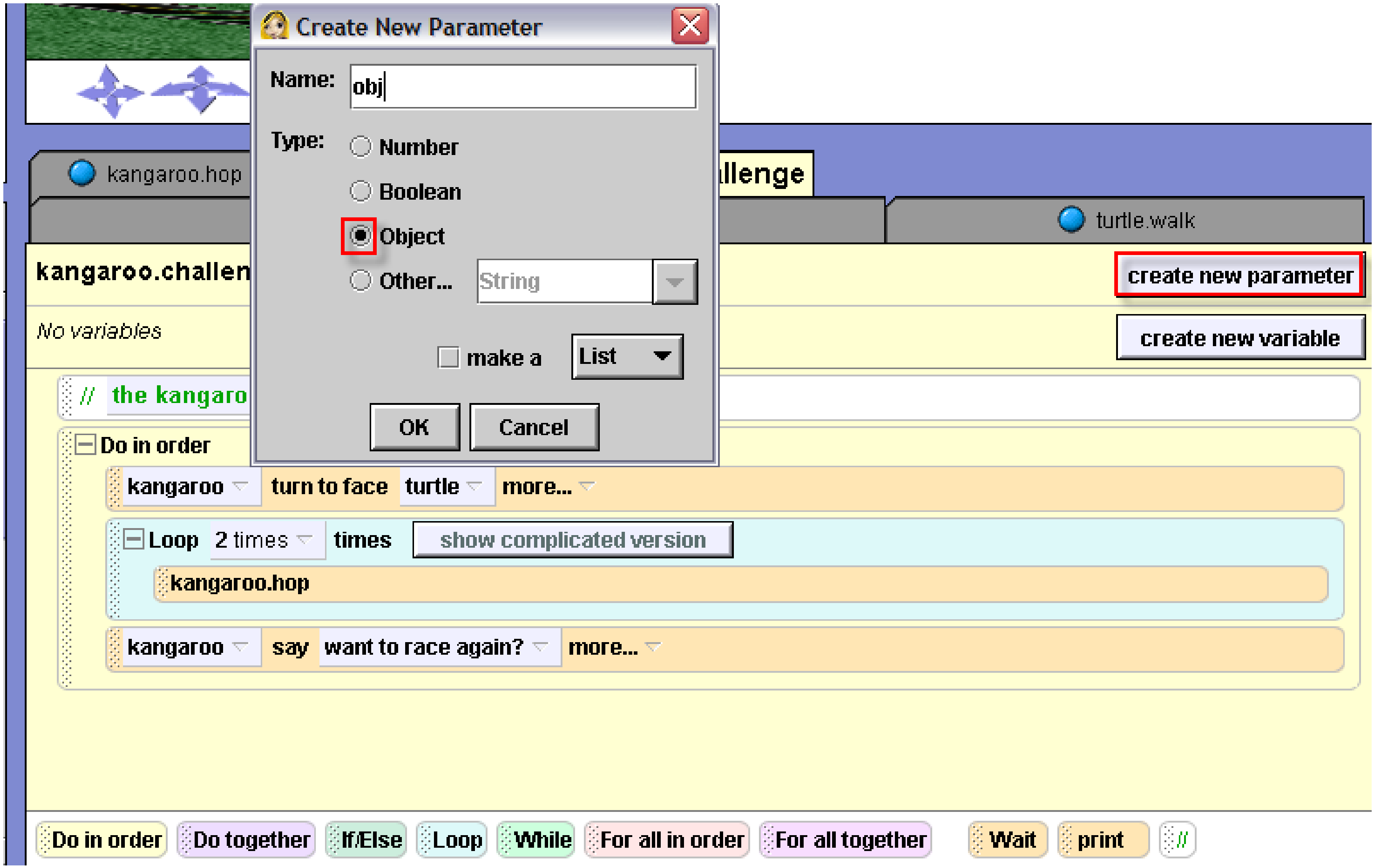
An example scenario

- For example, in another world, you may want your kangaroo to be able to challenge a turtle or a bunny or a penguin. We could write three different methods: one for the kangaroo to challenge the turtle, another for the kangaroo to challenge the bunny and a separate one for the kangaroo to challenge the penguin. With a parameter, we could do this very easily.

How to create a parameter

- In this case, a parameter is going to be a placeholder for an object that the kangaroo will challenge - such as a bunny, a penguin or a turtle.
- Click on the create new parameter button in the method editor, and name it obj. Select the type object, and then click OK.
- See the screenshot on the next slide for an illustration.

How to create a parameter (cont 1)



Create New Parameter

Name: obj

Type: ( ) Number ( ) Boolean [✓ Object] ( ) Other... String

☐ make a List

OK Cancel

kangaroo.hop

turtle.walk

kangaroo.challen

llenge

create new parameter

create new variable

No variables

// the kangaro

Do in order

kangaroo turn to face turtle more...

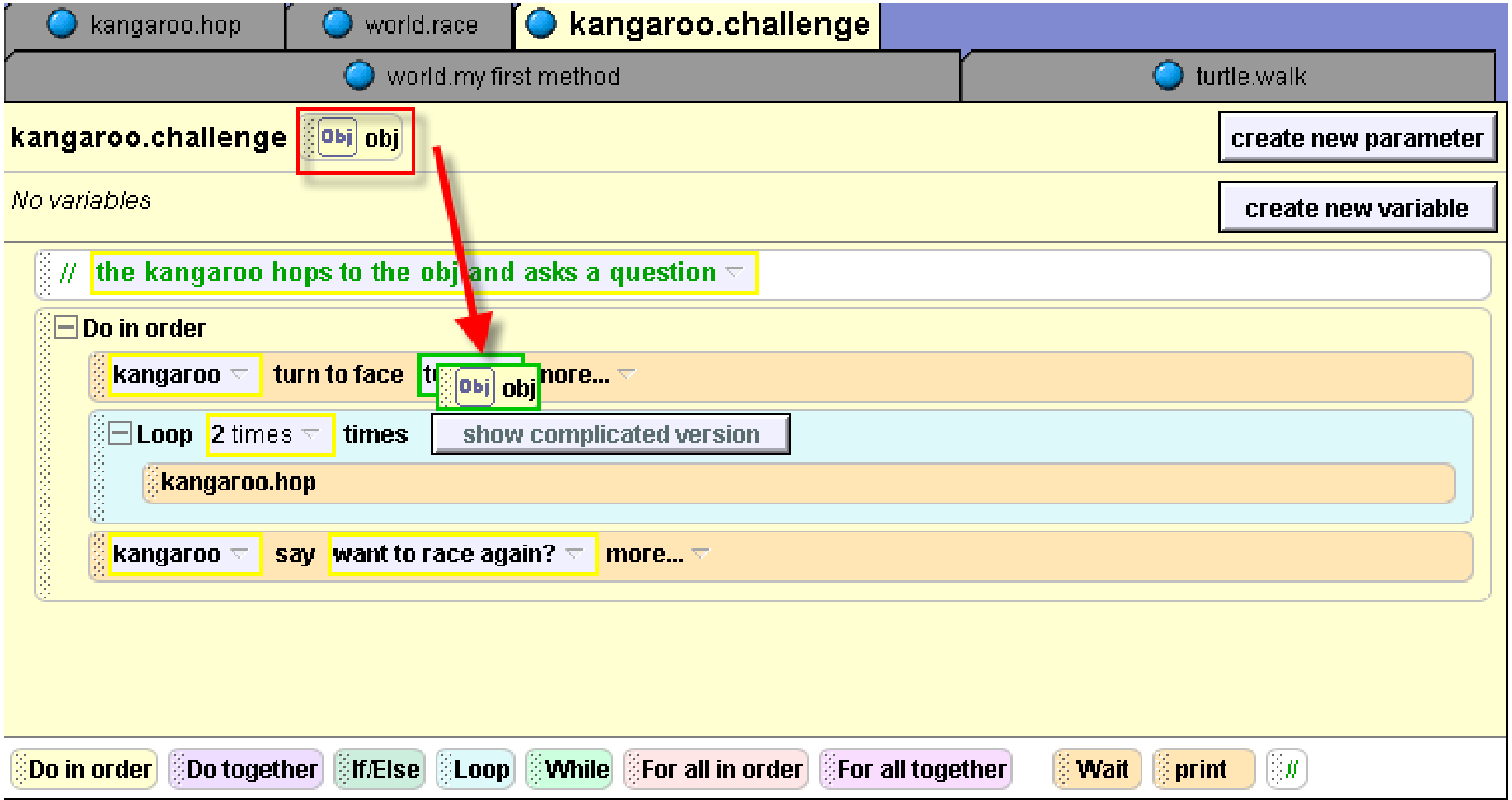
Loop 2 times times show complicated version

kangaroo.hop

kangaroo say want to race again? more...

Do in order | Do together | If/Else | Loop | While | For all in order | For all together | Wait | print | //

- Now, you can see that the obj parameter has appeared beside the name of the method. I've highlighted it with a red box. Drag obj into the method to replace the word turtle.



kangaroo.hop | world.race | kangaroo.challenge
world.my first method | turtle.walk

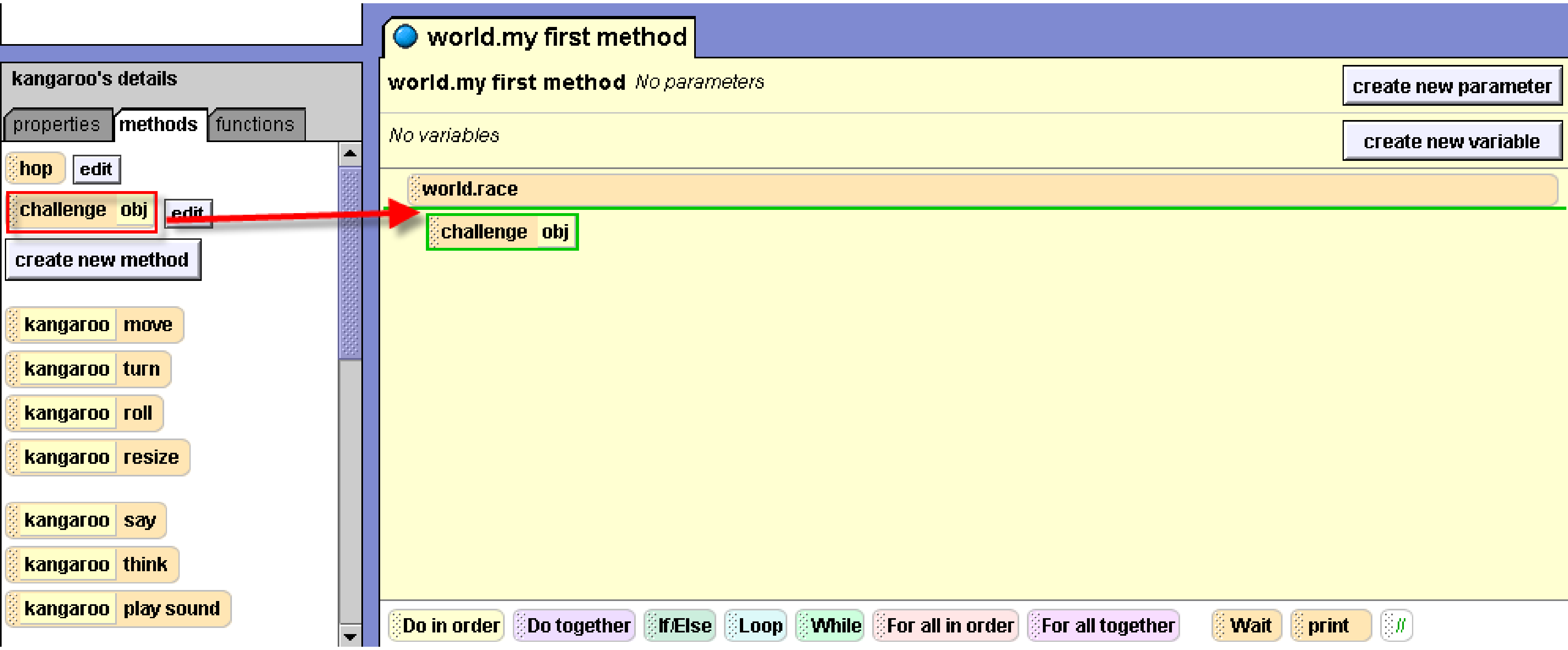
kangaroo.challenge obj | create new parameter
No variables | create new variable

```
// the kangaroo hops to the obj and asks a question
Do in order
    kangaroo turn to face obj more...
    Loop 2 times times   show complicated version
        kangaroo.hop
    kangaroo say want to race again? more...
```

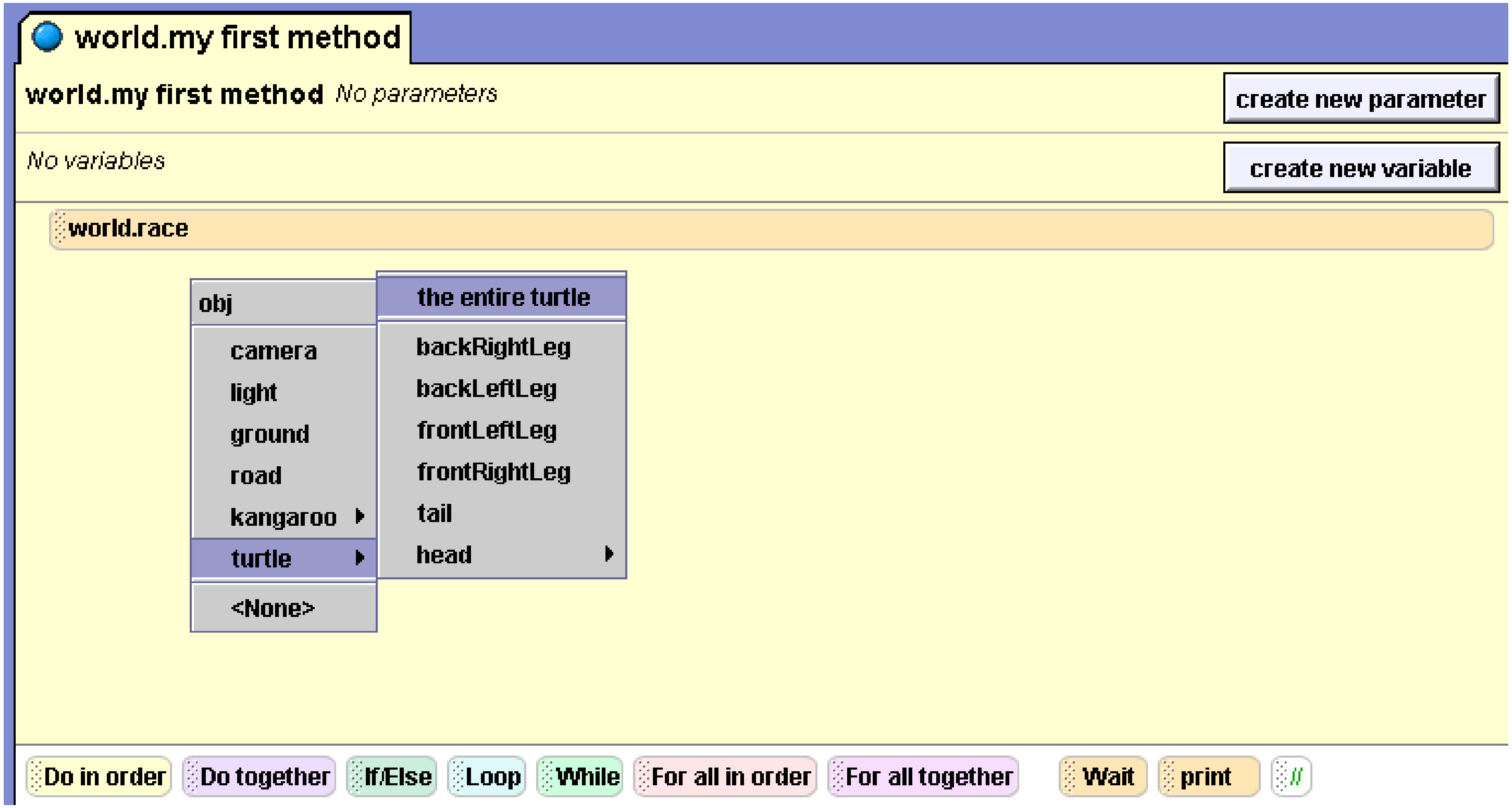
How to call a method that has a parameter

- To test your code, drag kangaroo.challenge into world.my first method underneath the world.race method that is already there.
- When you drag kangaroo.challenge into the method, once you release your mouse you will have to select turtle, then the entire turtle as the object. See the screenshots on the next two slides for an illustration.

Dragging kangaroo.challenge into world.race



- Selecting the turtle as the parameter argument:

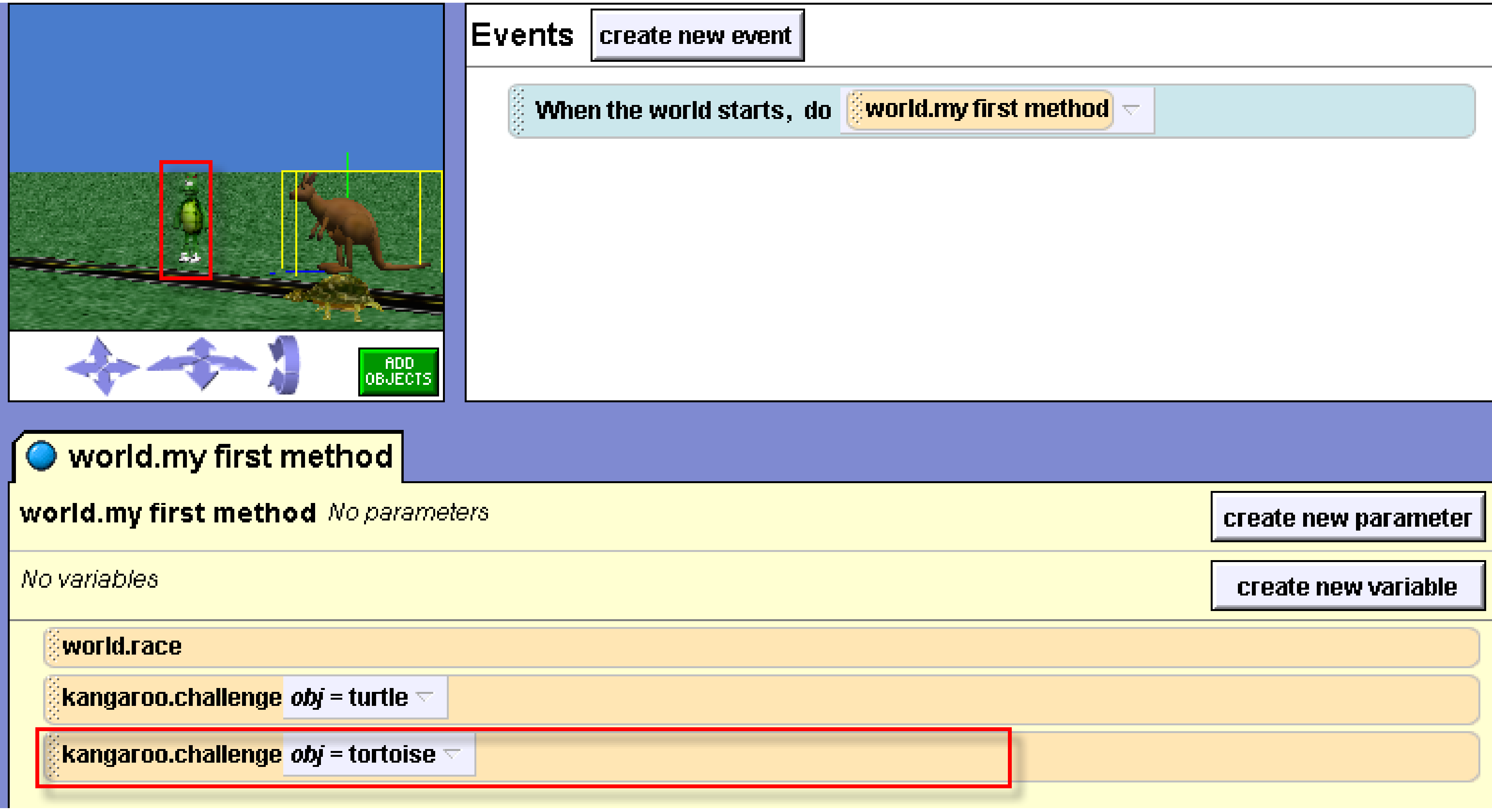


- Press the play button to test your world.

Testing kangaroo.challenge on another object

- To reinforce your understanding of parameters, let's call the method on another object. Add the tortoise (from the Animal folder) to your world by clicking on the Add objects button.
- Drag kangaroo.challenge into your world.my first method and select the tortoise as the parameter.
- See the screenshot on the next slide for an illustration.

- Play your world. Now after the race, the kangaroo challenges the turtle and then the tortoise.



```
When the world starts, do  world.my first method
```

world.my first method *No parameters*

No variables

```
world.race
kangaroo.challenge obj = turtle
kangaroo.challenge obj = tortoise
```

Testing kangaroo.challenge (cont 1)

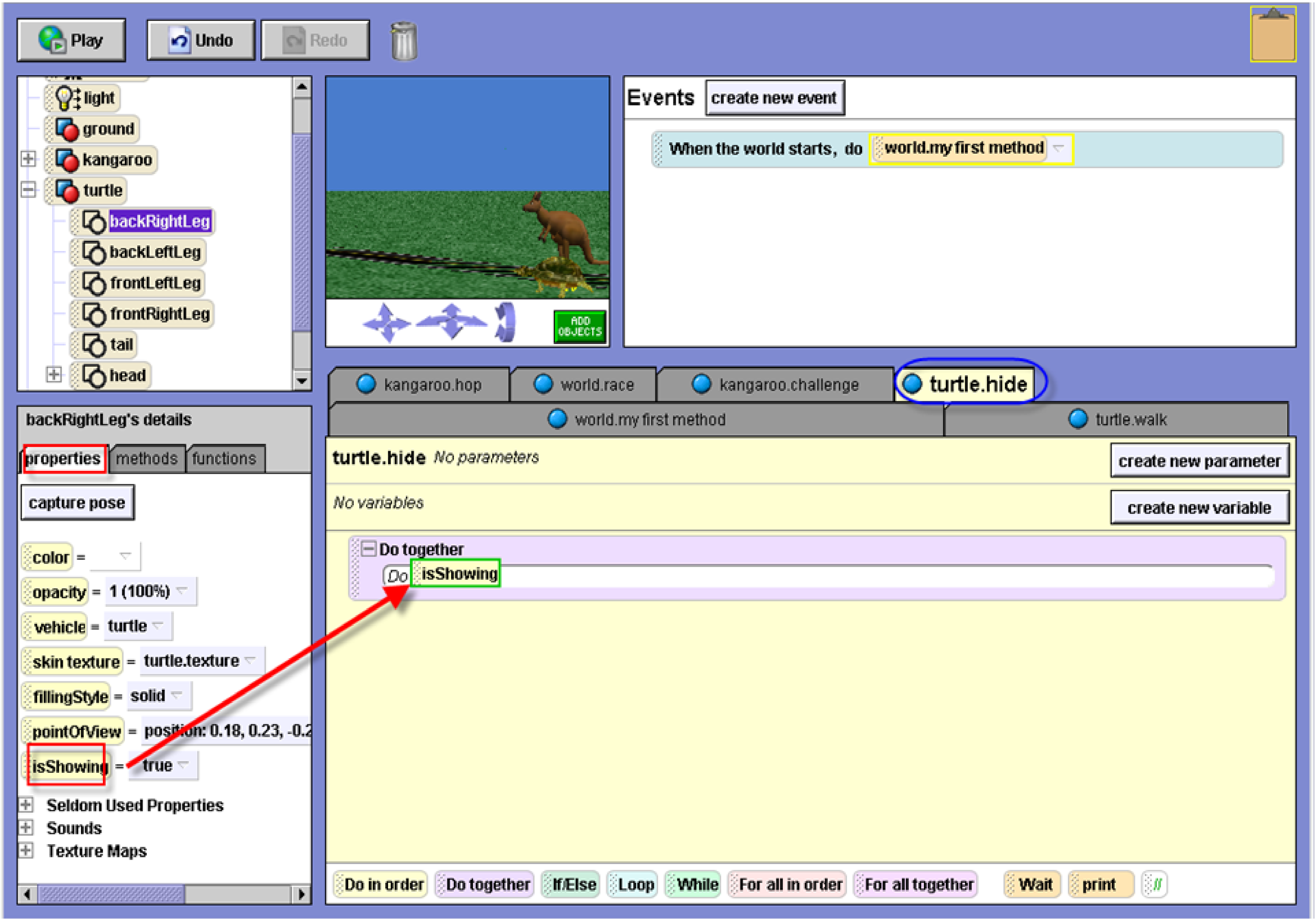
- Depending on where you placed the tortoise in your world, you may notice that having the kangaroo hop twice toward him does not look very good. Once you know how to use the built in function distance to you can improve the appearance of this method. For now, don't worry about it.
- Let's finish making the rest of our world. In world.my first method, delete the second call to kangaroo.challenge for the tortoise. If you want, you can delete the entire tortoise from your world.

Part 2: Properties

- Finally, we want to write a method to make the turtle go into his shell. Click on turtle in the object tree. Click on the methods tab and create a new method named hide (If you use the world given to you as a starter world, hide will have already been created, but there is no code in it).
- We are going to make all of the turtle's body parts invisible at the same time, except for his shell.
- To do this, first drag a Do together into the hide method.

Creating the turtle.hide method

- Then, click on the + sign beside turtle in the object tree. Click on the backRightLeg.
- In the details area, click on the properties tab. Click on isShowing and drag it into the Do together.
- Set the value to false. This will make the backRightLeg invisible. Click on more… on that line of code and set duration to 0.1.
- See the screenshot on the next slide for an illustration.



When the world starts, do world.my first method

turtle.hide *No parameters*

No variables

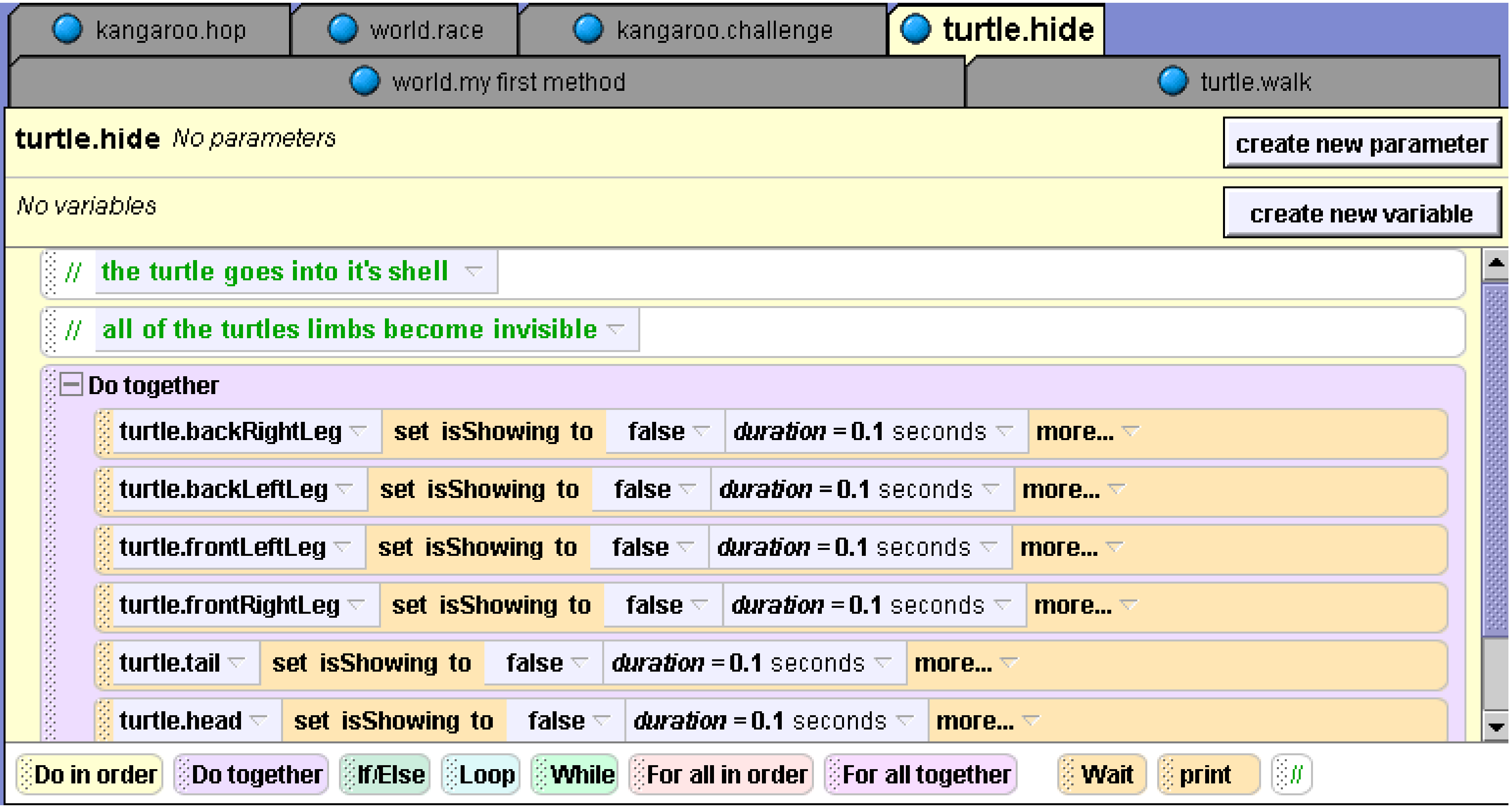
Do together
Do isShowing

color =
opacity = 1 (100%)
vehicle = turtle
skin texture = turtle.texture
fillingStyle = solid
pointOfView = position: 0.18, 0.23, -0.2
isShowing = true

Turtle.hide method (cont 1)

- Do the same thing for each of the body parts by clicking on each of these in the object tree- backLeftLeg, frontLeftLeg, frontRightLeg, tail and head - and dragging the isShowing property of each into the turtle.hide method.
- Your code should look like the screenshot on the following slide.

The code for turtle.hide (cont 2)

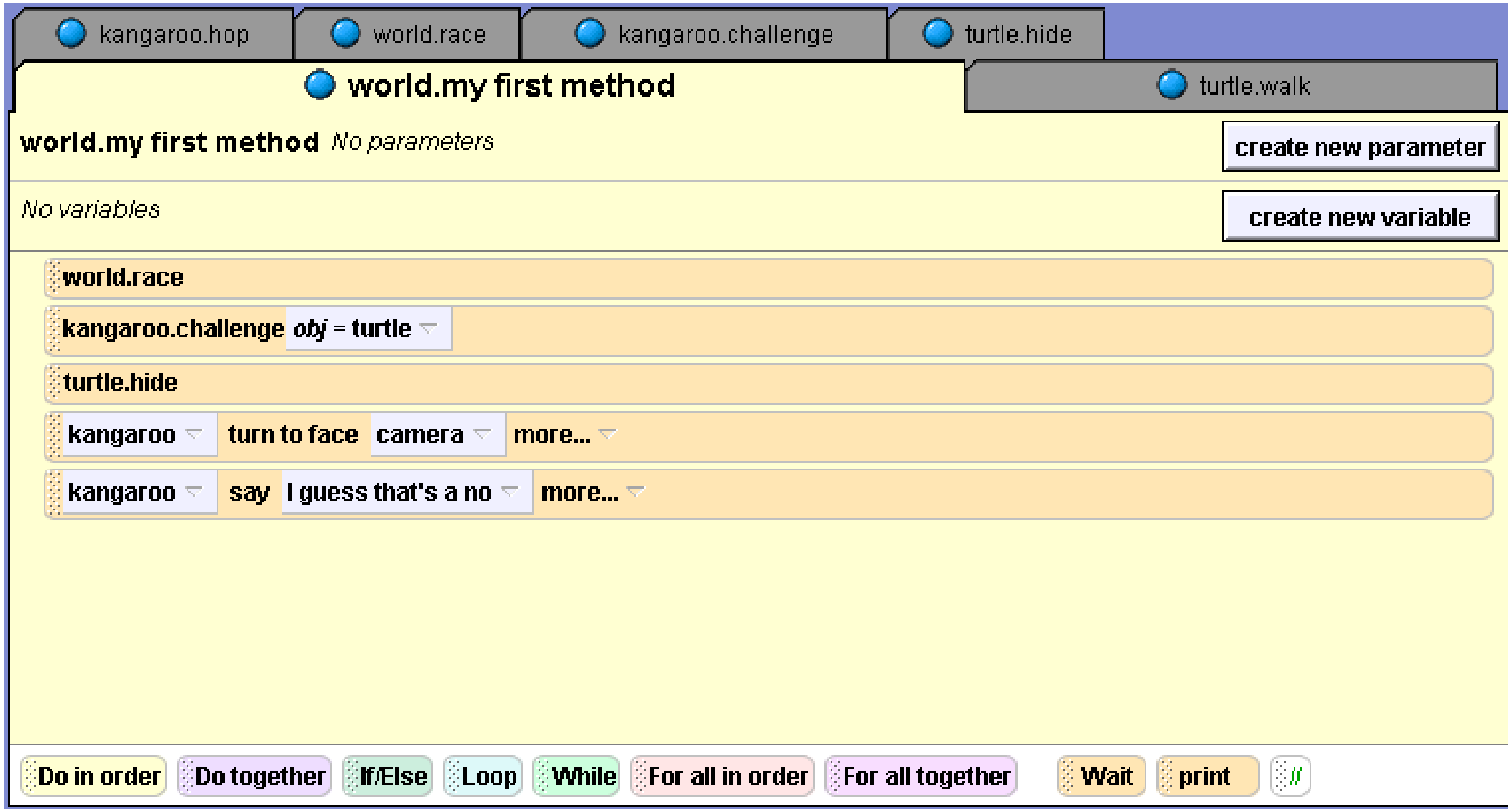


```
turtle.hide No parameters
No variables
// the turtle goes into it's shell
// all of the turtles limbs become invisible
Do together
    turtle.backRightLeg set isShowing to false duration = 0.1 seconds more...
    turtle.backLeftLeg set isShowing to false duration = 0.1 seconds more...
    turtle.frontLeftLeg set isShowing to false duration = 0.1 seconds more...
    turtle.frontRightLeg set isShowing to false duration = 0.1 seconds more...
    turtle.tail set isShowing to false duration = 0.1 seconds more...
    turtle.head set isShowing to false duration = 0.1 seconds more...
```

Turtle.hide (cont 3)

- Now drag the turtle.hide method into your world.my first method underneath kangaroo.challenge.
- If you want, you can have the kangaroo say something at the end.

- Here is my final code in world.my first method:



```
world.my first method  No parameters
No variables
world.race
kangaroo.challenge obj = turtle
turtle.hide
kangaroo turn to face camera more...
kangaroo say I guess that's a no more...
```

- Press play to watch your entire animation.

Recap

- If you want to write a method in which an object interacts with another character, you can either write a world-level method or write a class-level method with parameters
- A class-level method with parameters is a good choice if you want to be able to save your object out so that it can perform your new method in different worlds.

Recap continued

- Keep in mind that parameters are not only used in class-level methods. For example, if you have five characters in your world and you want them to all flip together, you can write one world level method with an object parameter that flips. Then in a Do together, call the method for each of the objects in your world.