

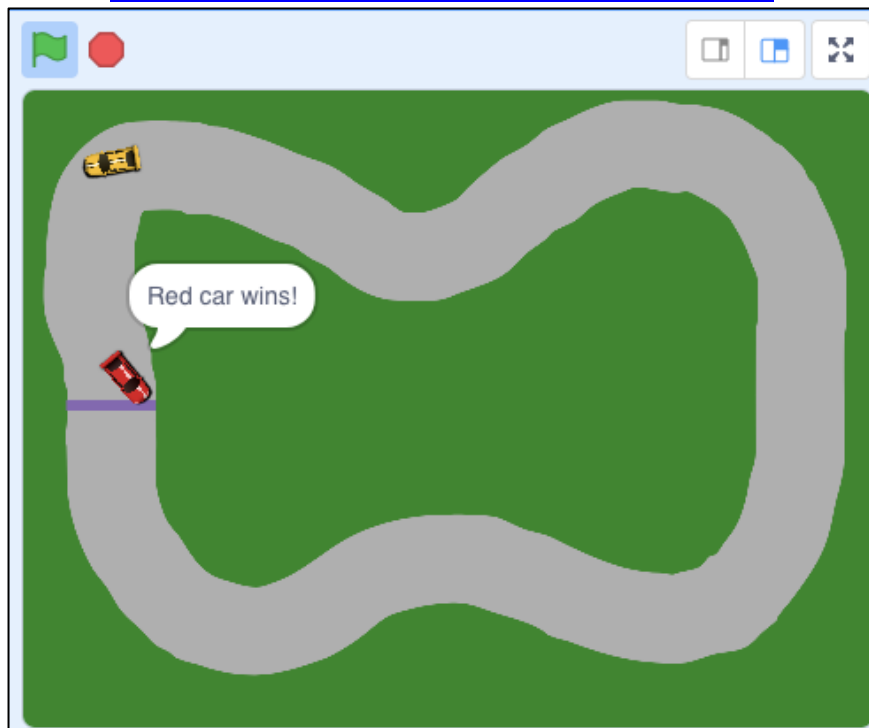


GameMaker Tutorial

How to Make a Racing Car Game in Scratch

Written by Rebekah Ilave
October 2019

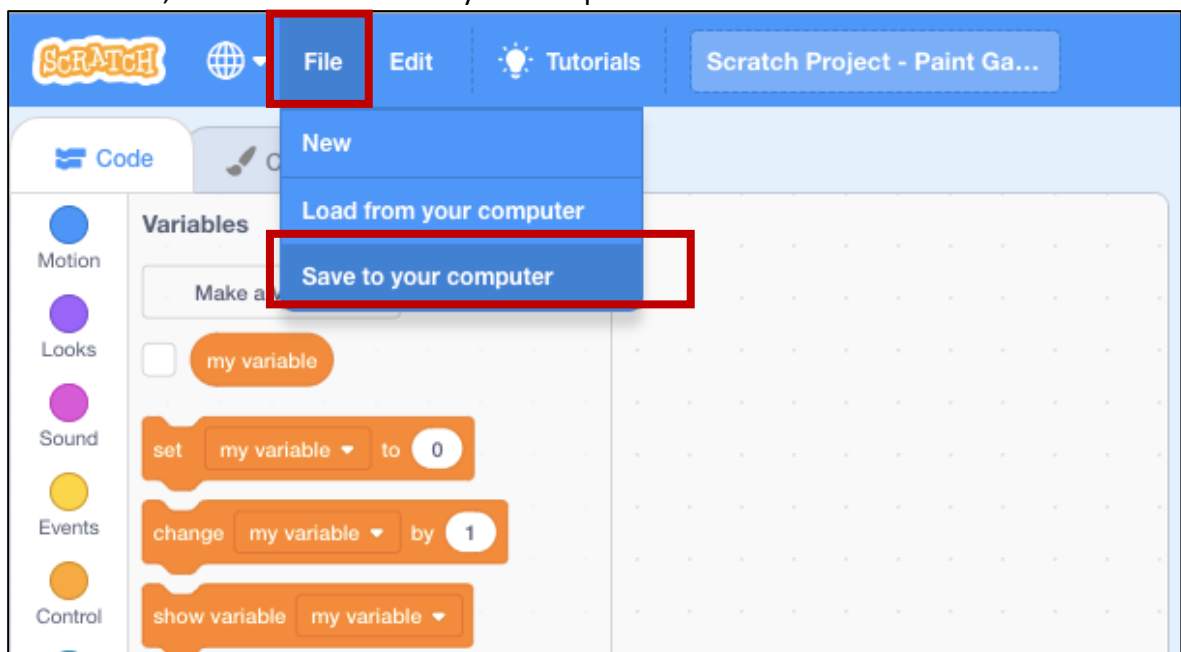
Source: Flipped Classroom Tutorials
https://www.youtube.com/watch?v=BXI7CfkV4_M



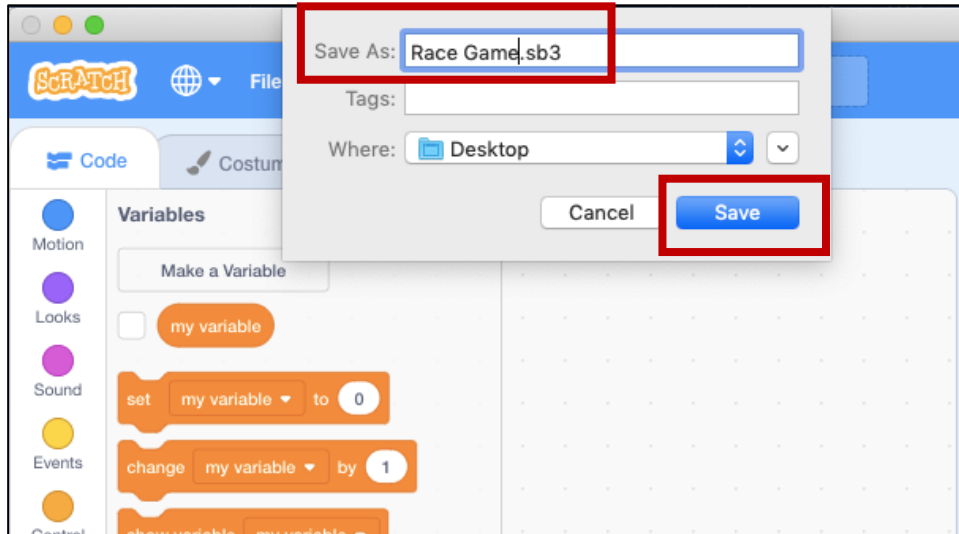
1. Create a new Scratch project. Open *Scratch Desktop* on your computer.



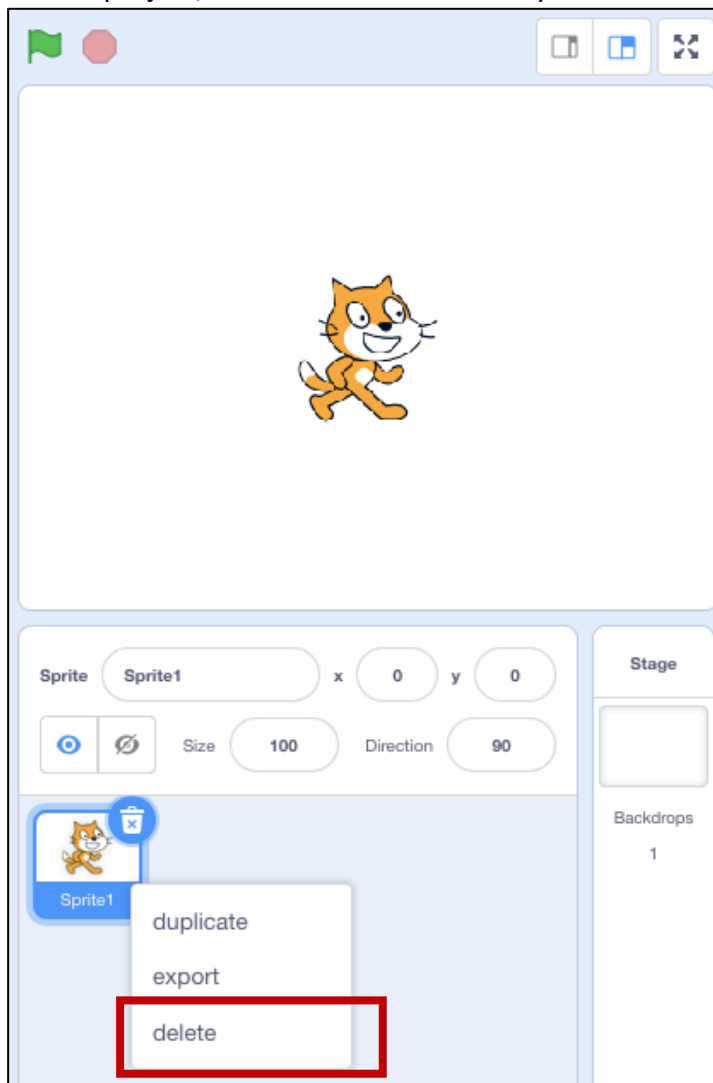
2. In Scratch, click on File > Save to your computer.



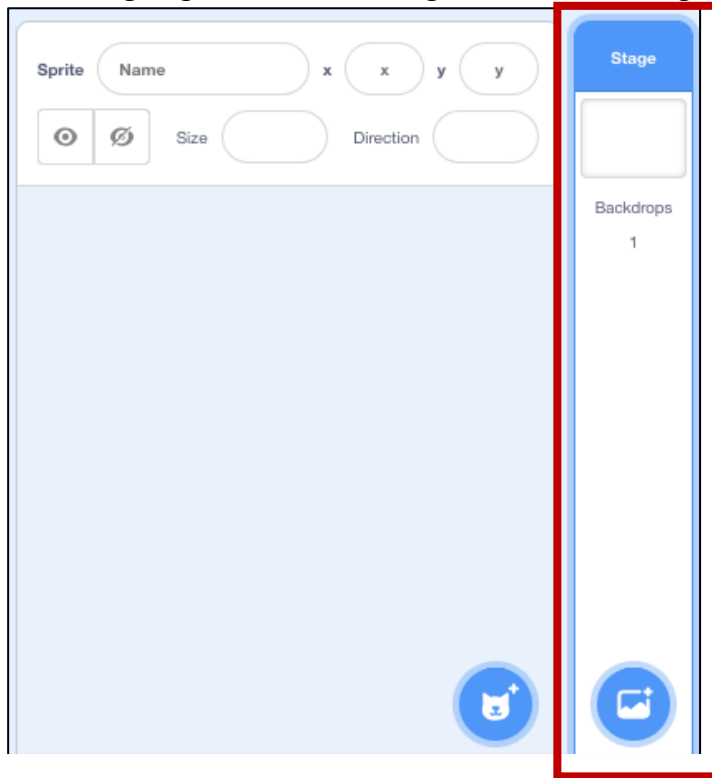
3. Name your Scratch Project. You can name it whatever you like. I'll call mine "Race Game". Click *Save*.



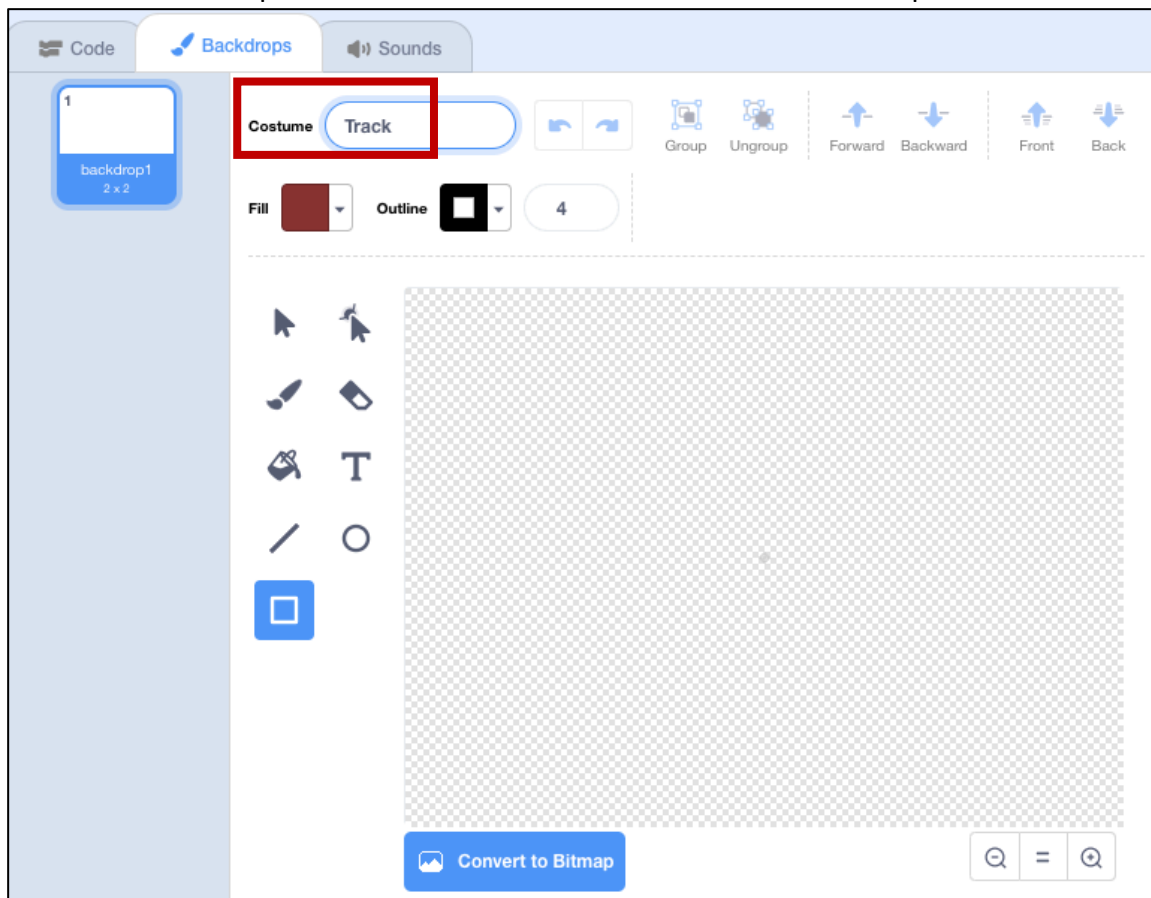
4. Right-click *Sprite1* (Scratchy the Cat) and select *delete*. We won't need Scratchy the Cat for this project, so we've deleted Scratchy.




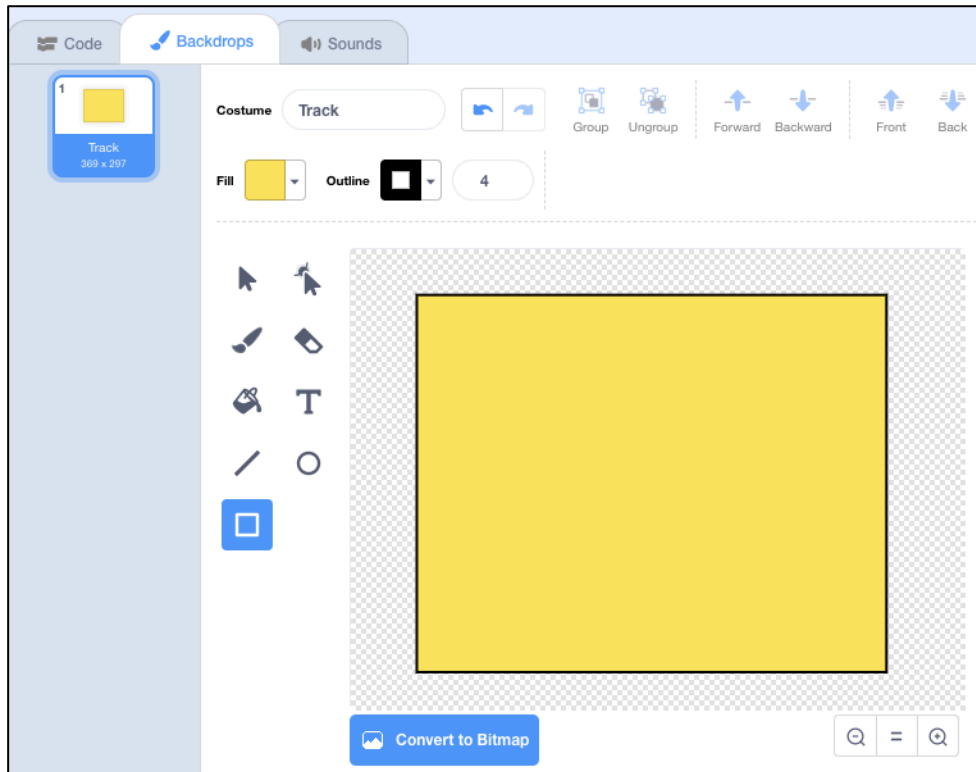
5. We're going to draw our racing track. Click on Stage so its highlighted in blue.



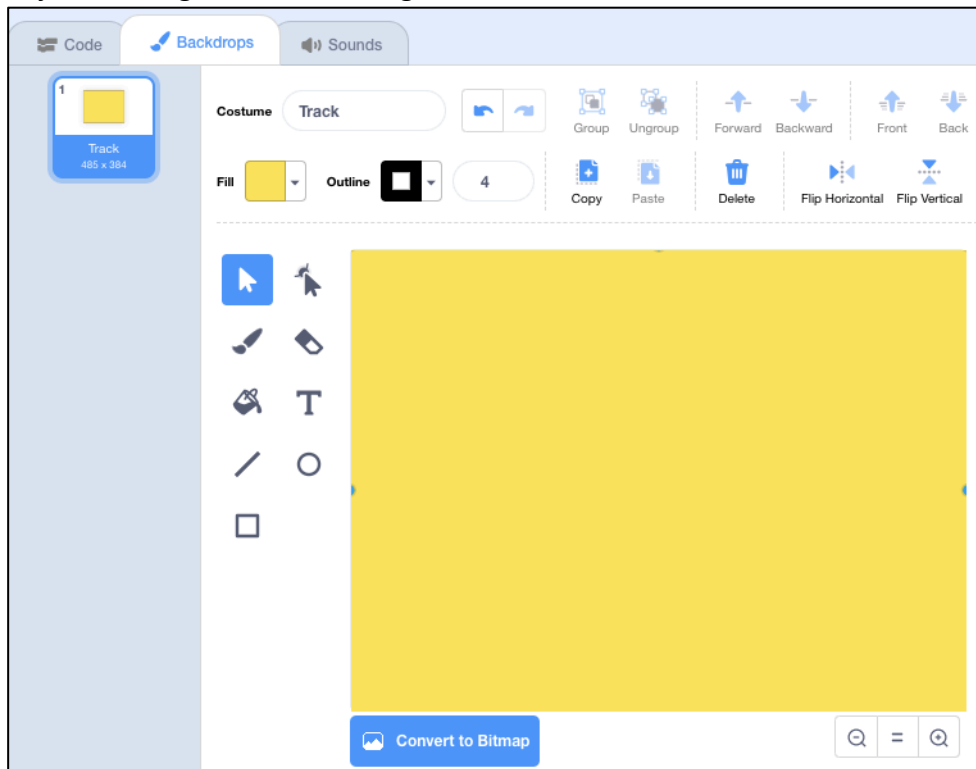
6. Click the Backdrops tab. Rename the Costume name from "backdrop1" to "Track".



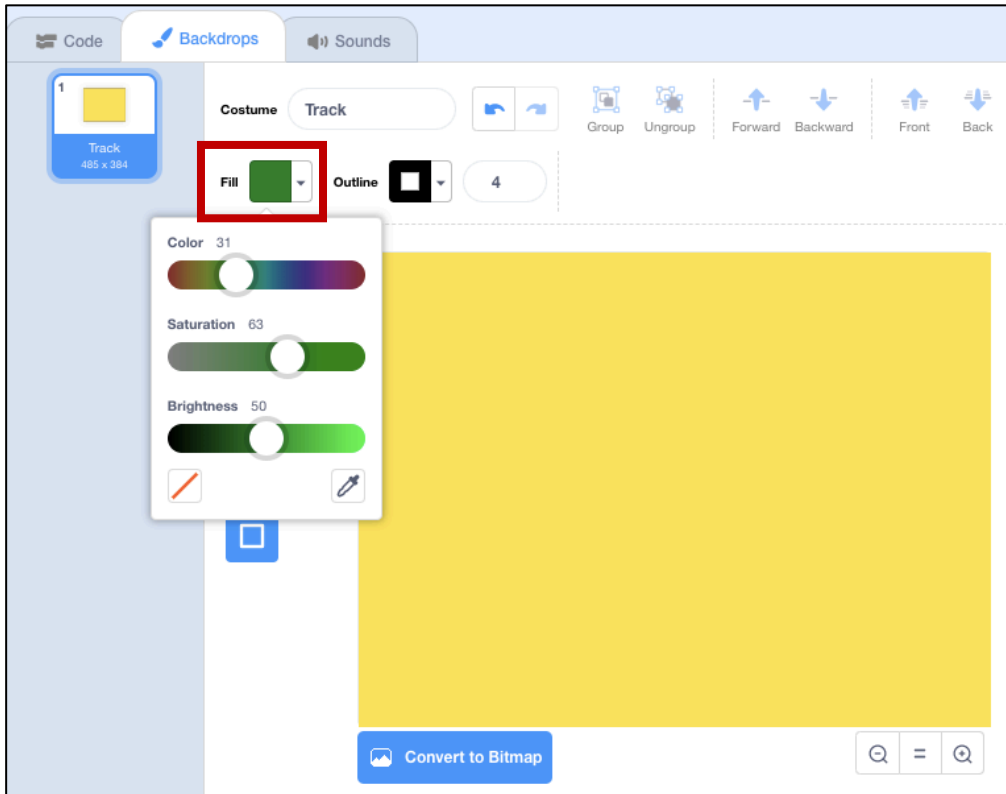
7. Now to draw our grass! Click on the rectangle tool: 
Draw a large rectangle on the canvas.



Select the Move tool: 
Adjust the edges so the rectangle fills the whole screen:

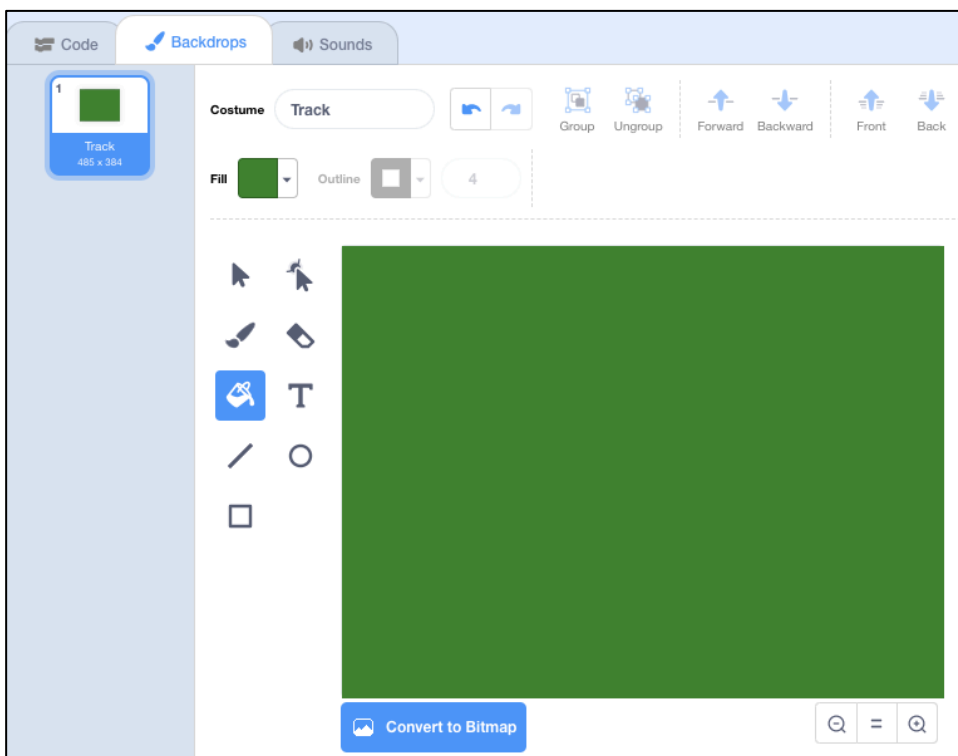



8. Click the Fill option and change the colour to dark green.

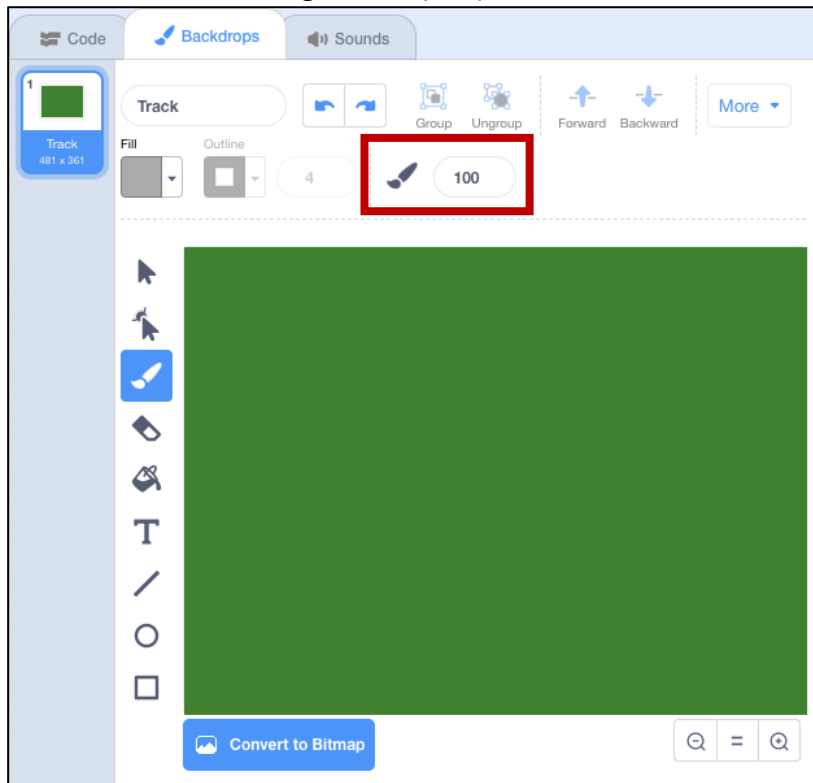


Click the Fill-with-colour tool: 

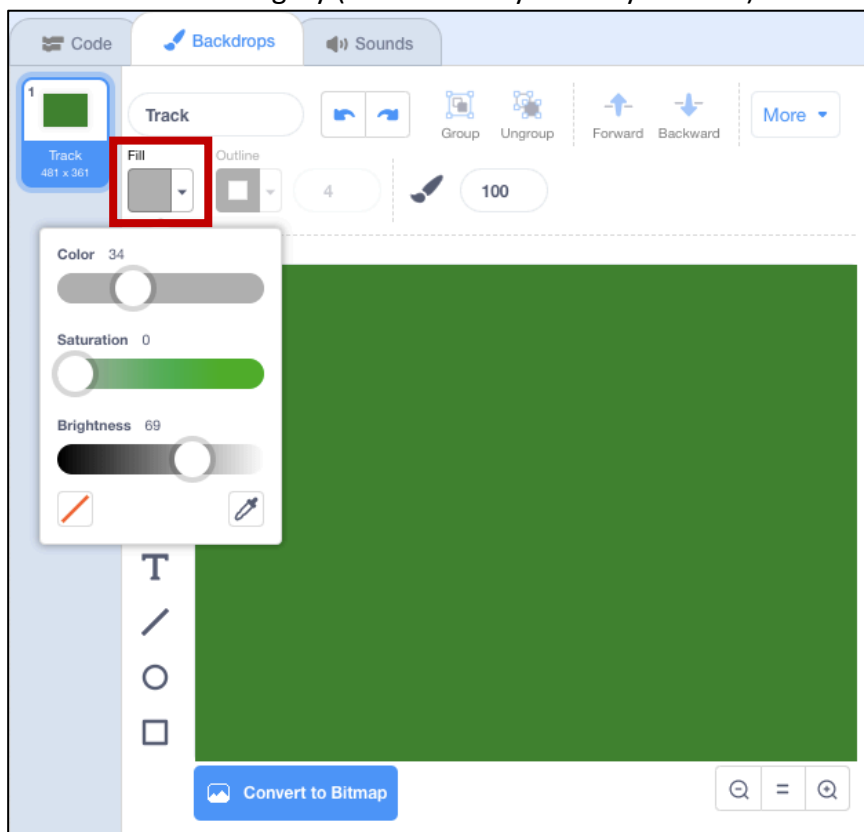
Click the canvas to turn it green. Now we have some beautiful grass for the racetrack!



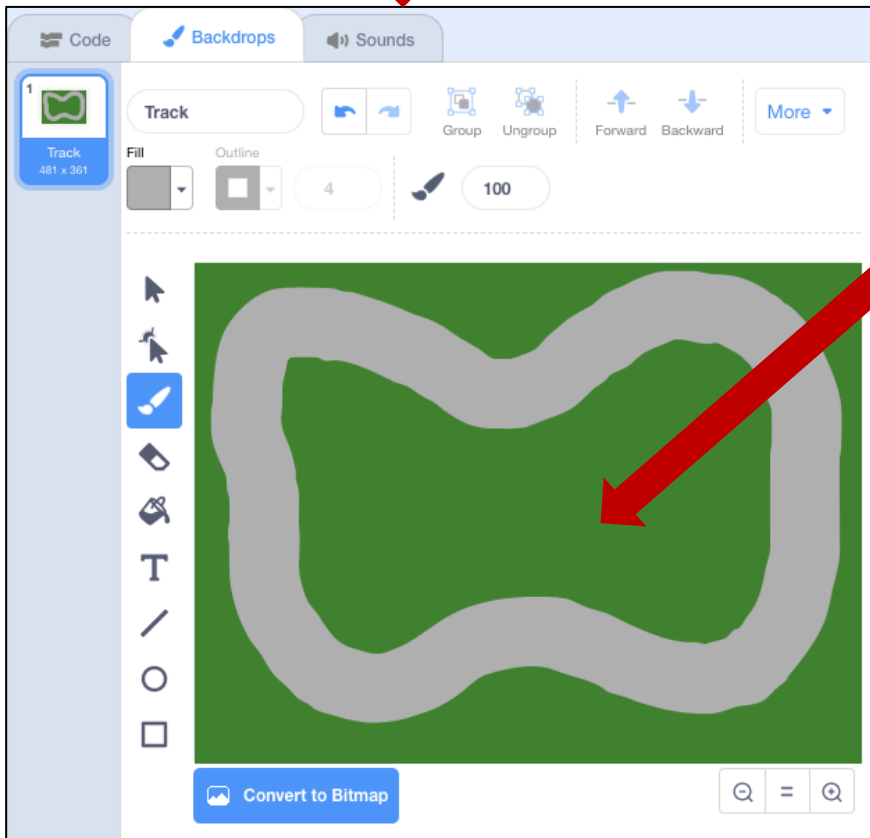
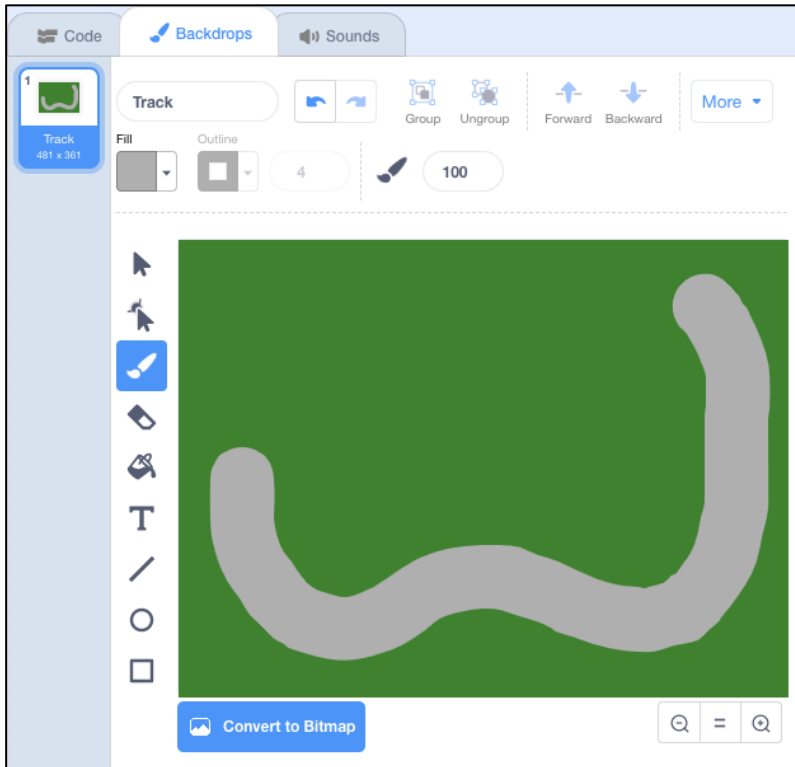
9. Now to draw the race track! Select the Brush tool: 
Make the brush the largest size (100):



Set the Fill colour to grey (or choose any colour you want) for the road.

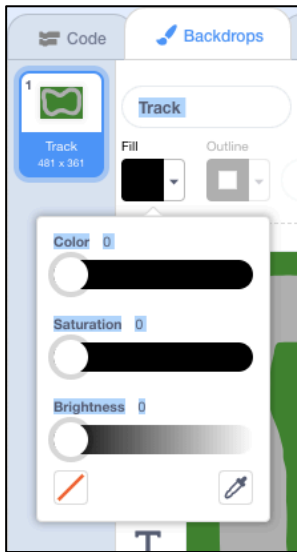


Draw a connected loop with twists and turns for your race track. Leave an empty space in the middle.



Empty space
in the middle

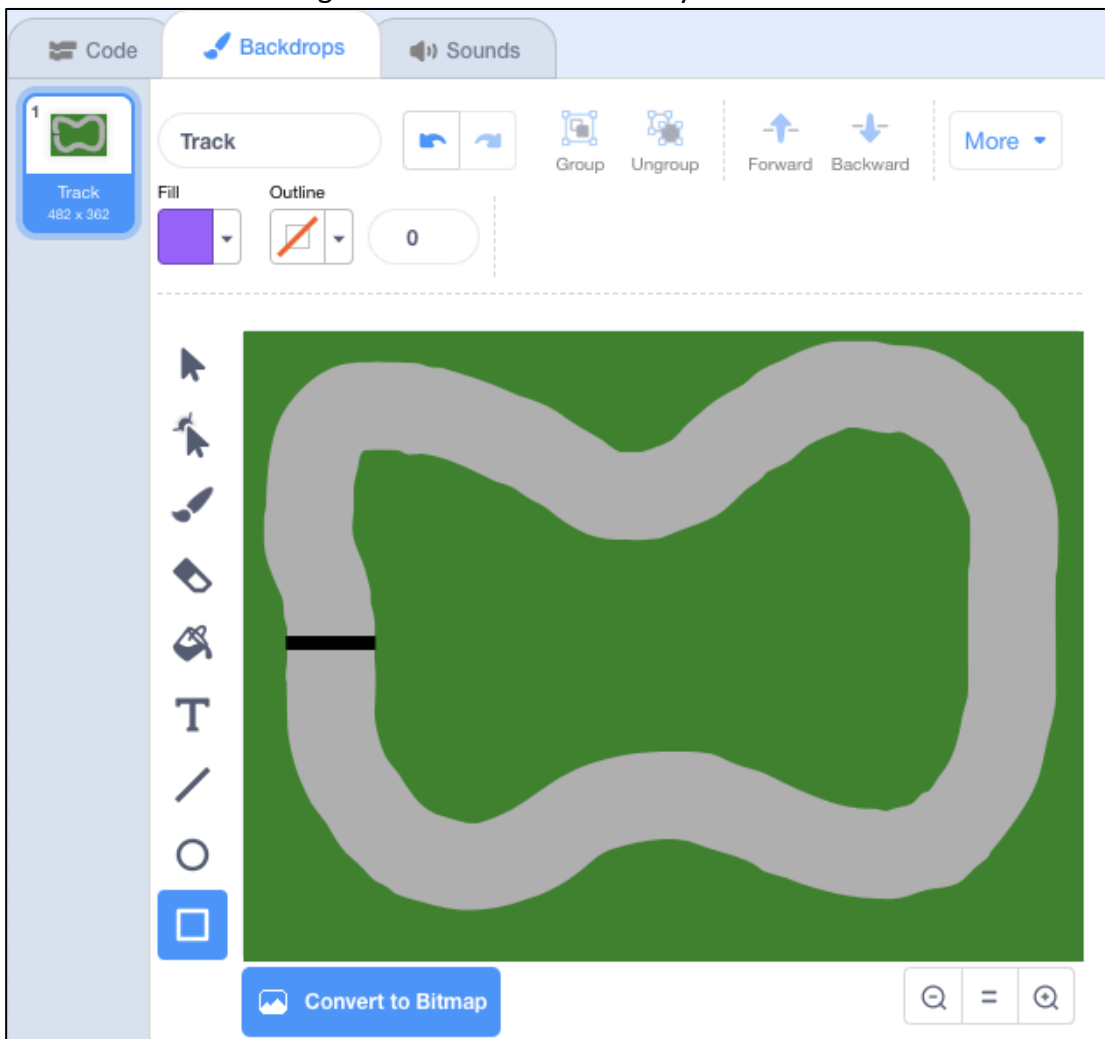
Select Fill colour to black



And choose the rectangle tool:



Draw a thin black rectangle to make a Finish line on your racetrack:



10. Now to add cars!

Remember: Websites for Free Sprites

There are lots of great websites with free 2D sprites that you can download and add to your game! These sprites are drawn by graphics artists and are shared over the internet for anyone to download.

For example, we downloaded the racing cars for this Racing Game from *DevianArt*

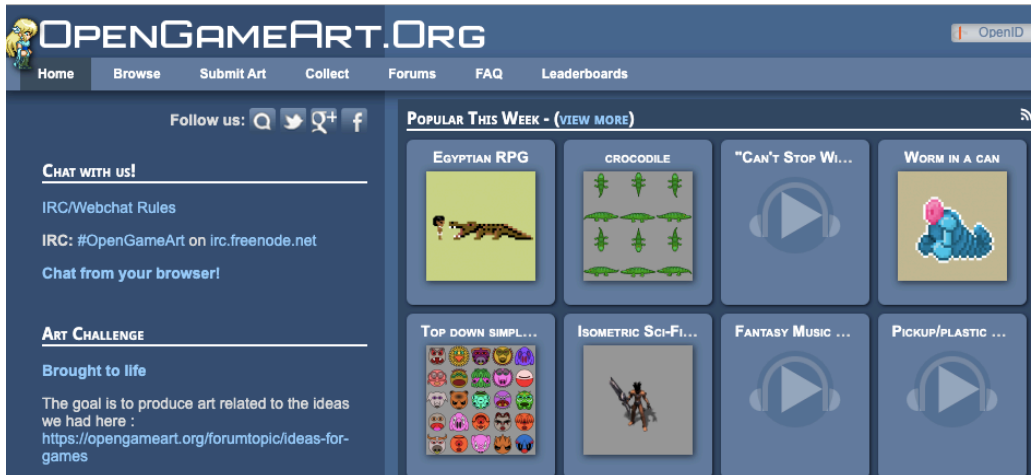
<https://www.deviantart.com/craig-lowe/art/Racing-Car-Sprites-426711548>



Other cool websites for free sprites are:

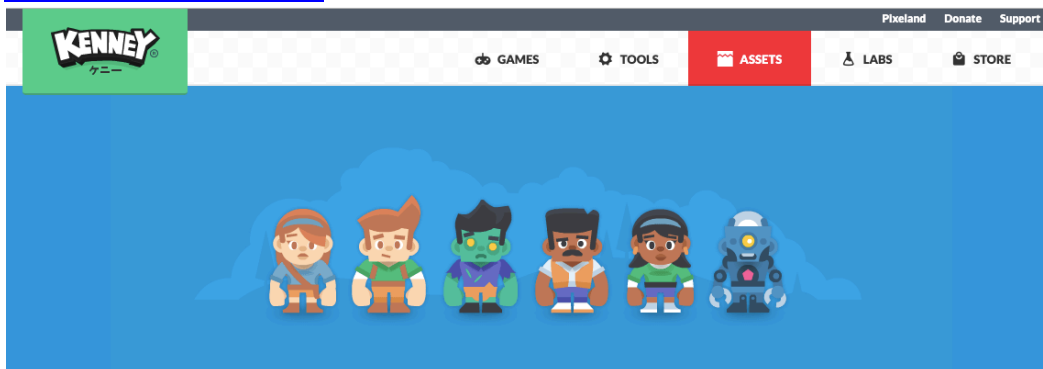
OpenGameArt.Org

<https://opengameart.org>

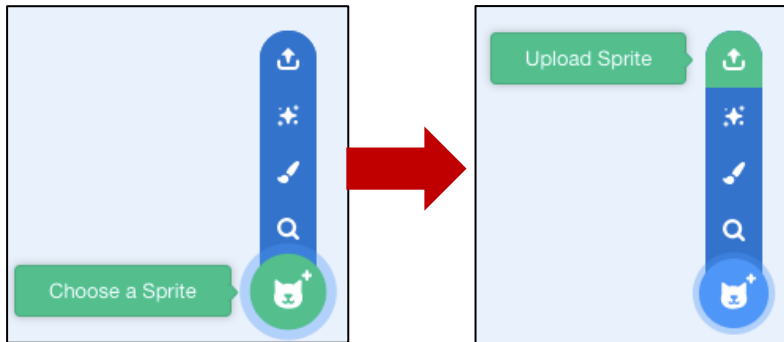


Kenny.nl

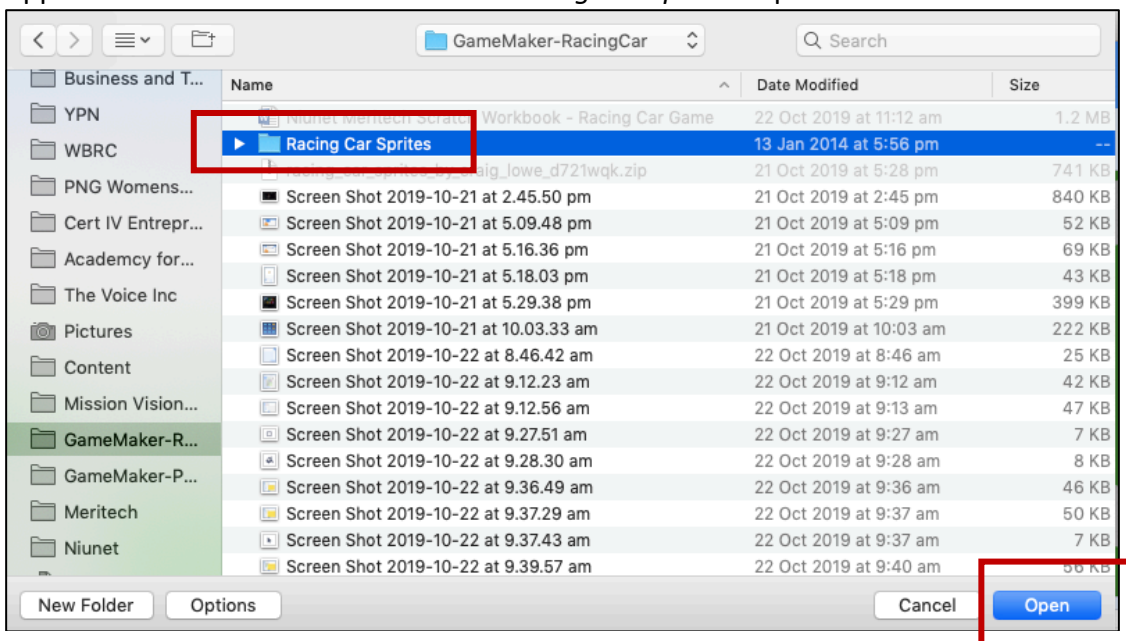
<https://kenney.nl/assets>



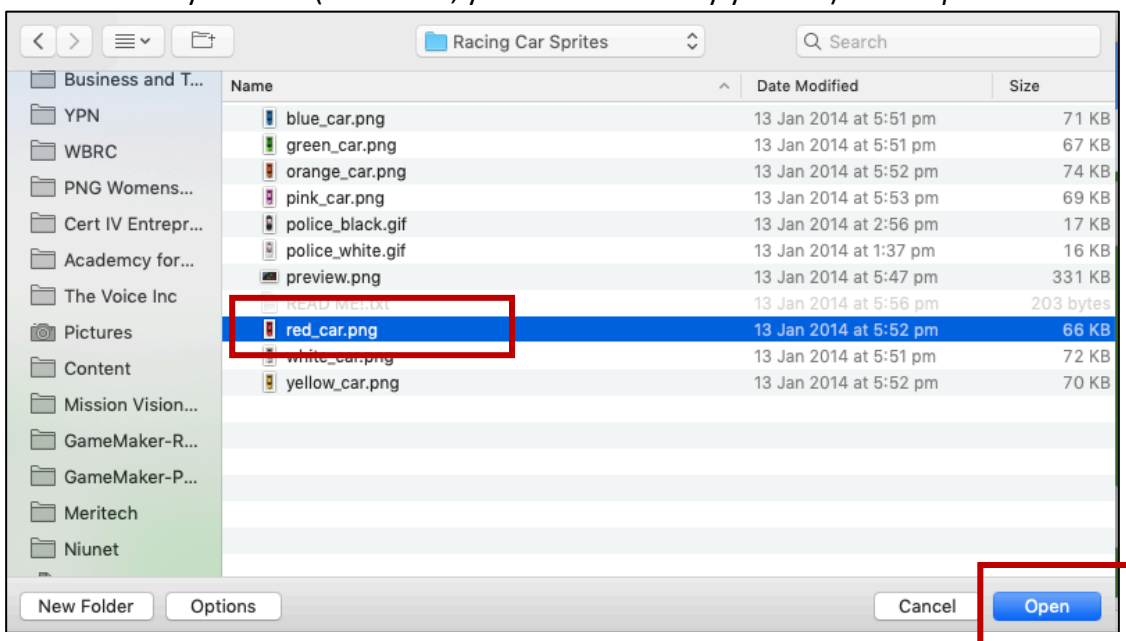
Hover over the “Choose a Sprite” button, then select “Upload Sprite”.



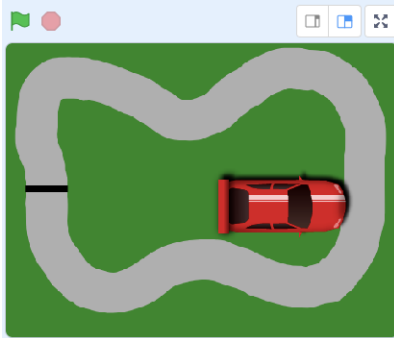
Go to the folder where you downloaded the *Meritech GameMaker Racing Car Game* zipped file. You will see a folder called *Racing Car Sprites*. Open it.



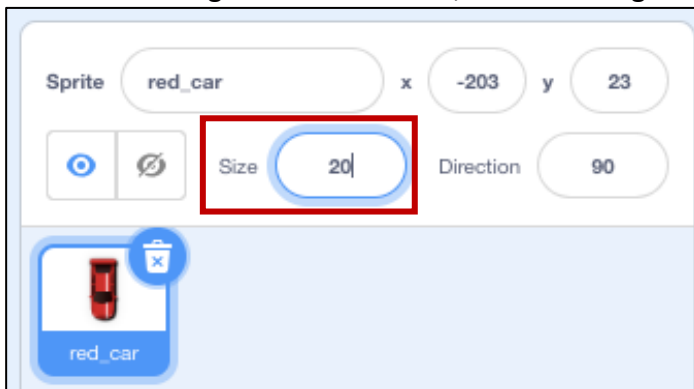
Select the car you want (choose red; you can choose any you like). Click *Open*.



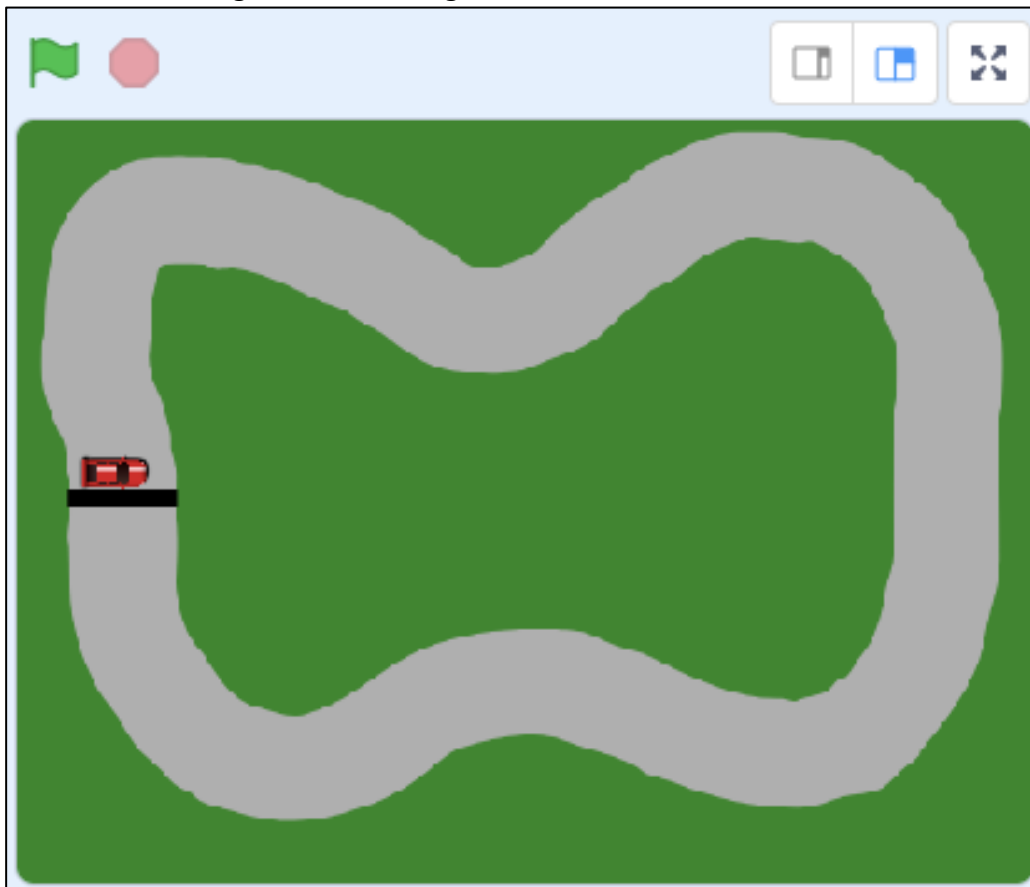
Now you have a car sprite on your game screen.



The car is too big for the race track, so let's change its size to 20.



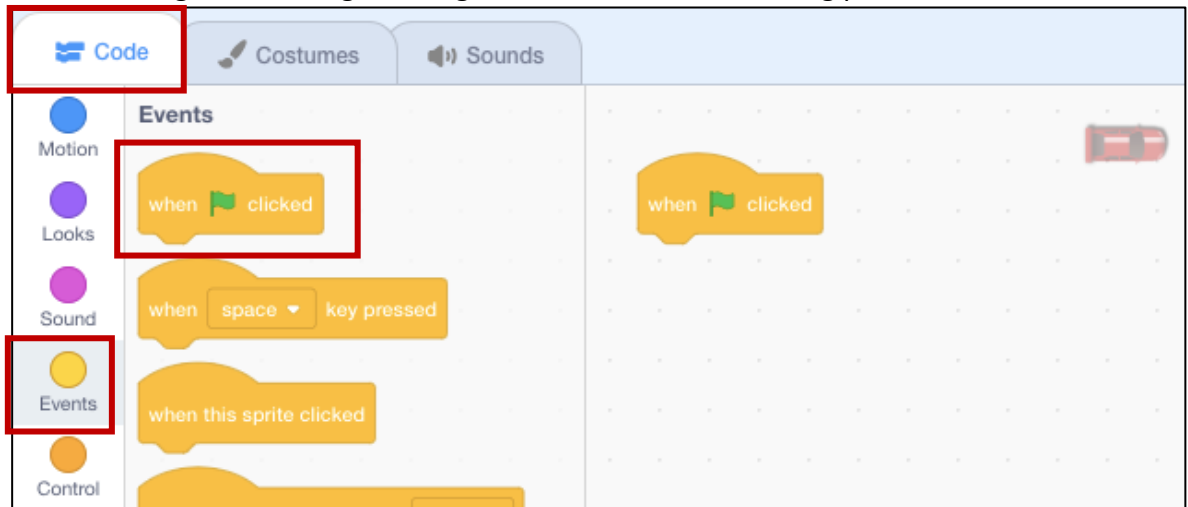
Now click and drag the car on the game screen so that it sits behind the finish line:



11. The car is pointing in the wrong direction at the starting line, so let's fix that now.

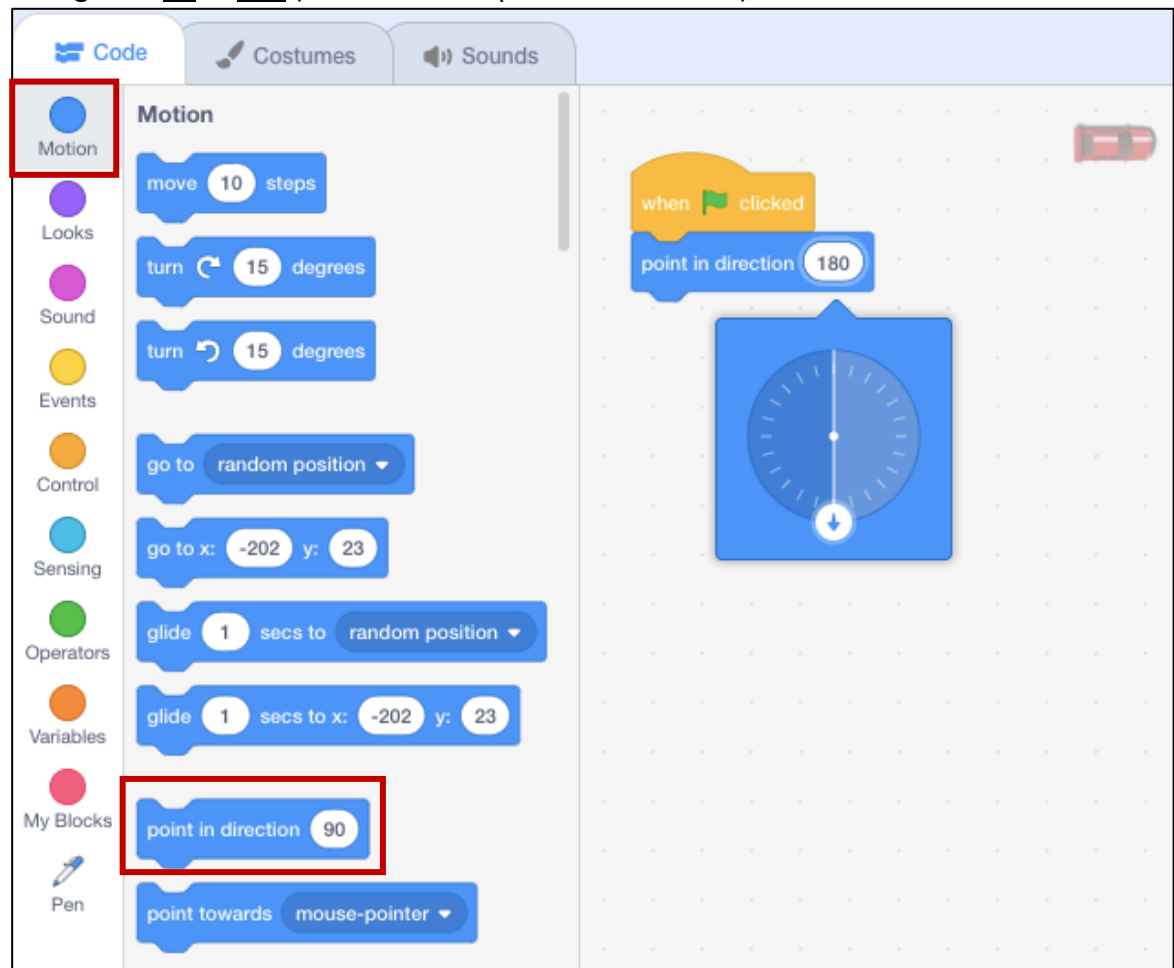
Click on the *Code* tab, then click the *Events* button.

Click and drag the "when green flag clicked" block to the coding panel.



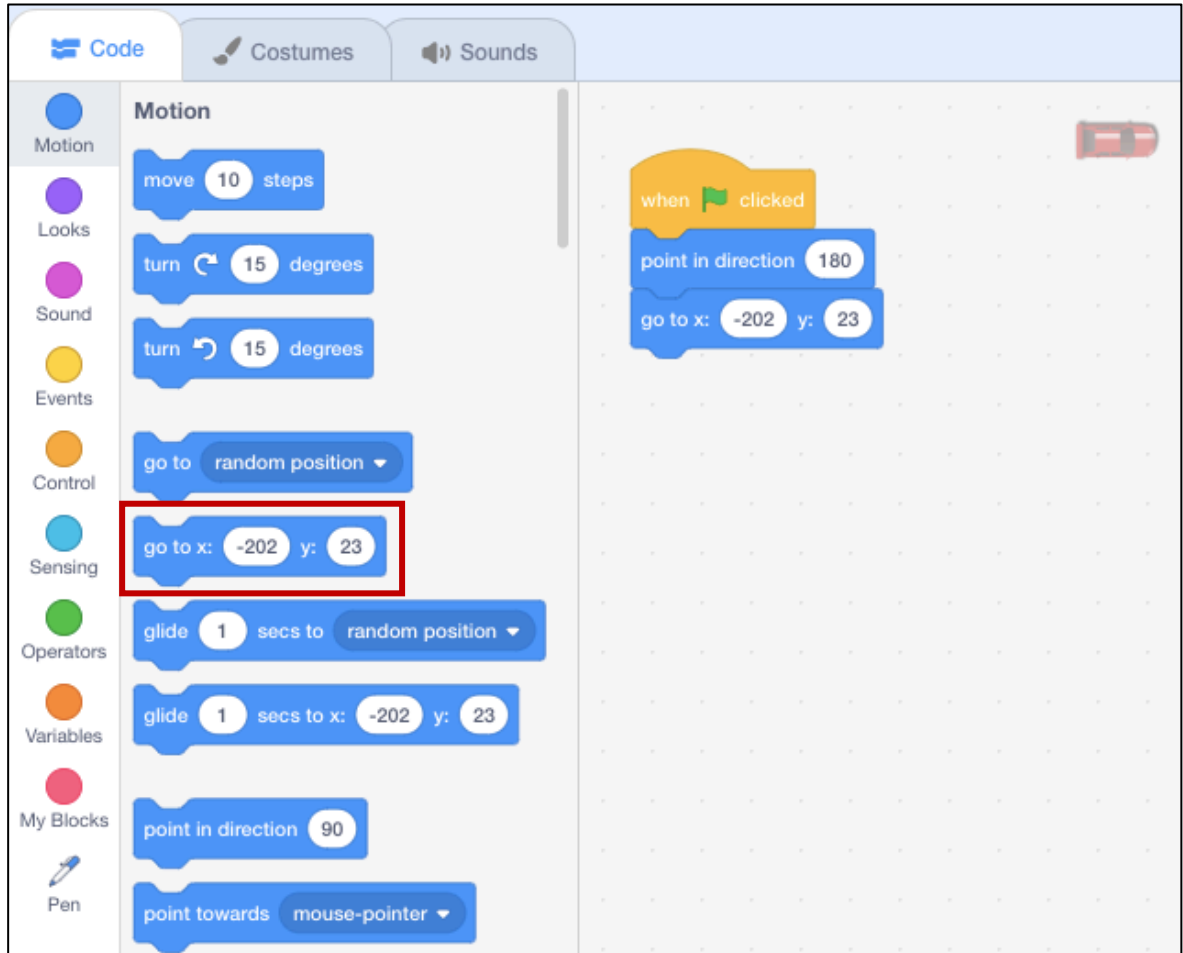
Click the "Motion" button.

Click and drag the "point in direction 90" block under the "when green flag clicked" block. Change the 90 to 180 (so that the car points downwards):




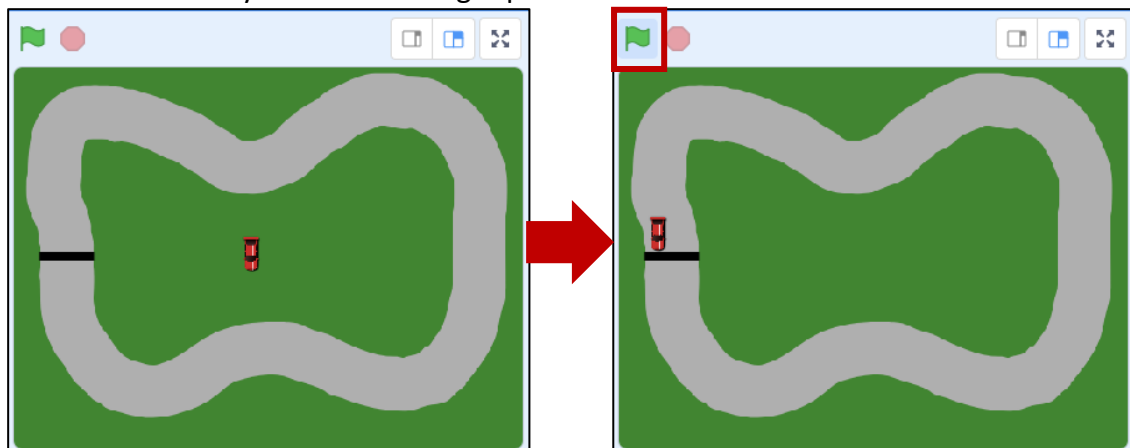
Next, to make sure the car always starts in the same place, we're going to code the sprite to always return to the line at the start of the game.

Click and drag the "go to x: ___ y: ___" block under the "point in direction 180" block.



Now it doesn't matter wherever the car is clicked and dragged to anywhere on the game screen.

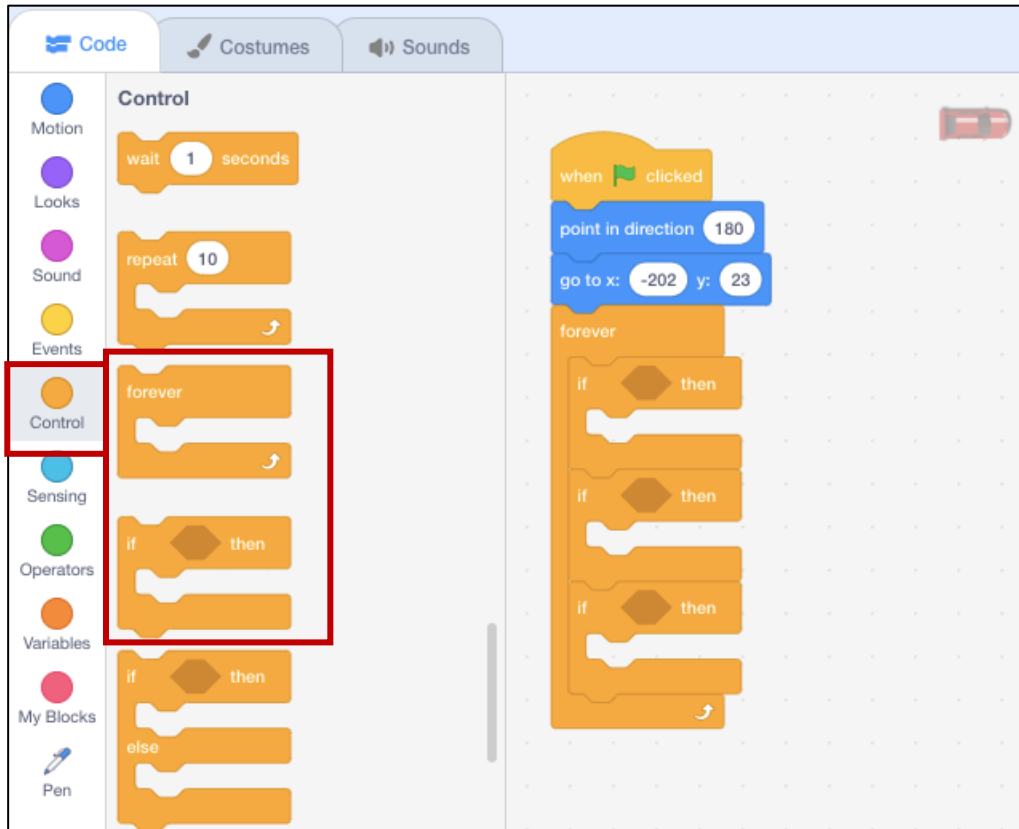
Whenever we click the green flag: 
The car will already return to the right place!



12. Now to code the controls for the player who is racing the red car!

Click the *Controls* button.

Click and drag a “forever” block and connect it under the “go to x: ____ y: ____” block. Click and drag 3 “if ____ then” blocks **into** the forever block. (Putting one block with a function **into** another code block with a function creates **nested logic**).

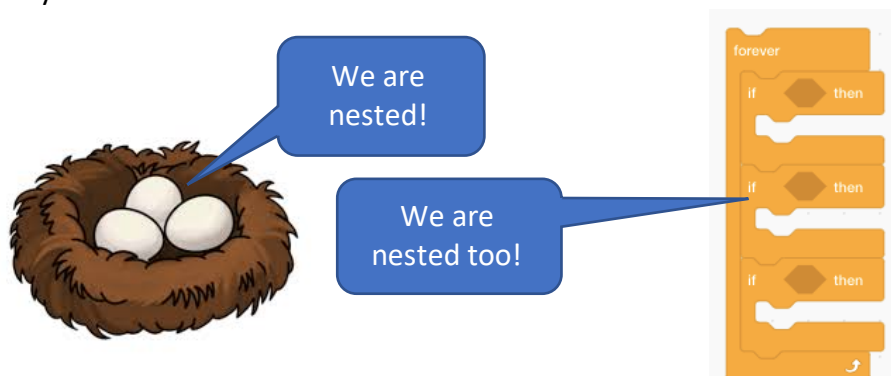


Remember: Nested logic

Nested describes code that performs one function that is *contained within* code that performs another function.

Below, we have 3 “if ____ then” blocks (code that performs one function) *contained within* a “forever” block (code that performs a another function).

Because it is code-*within*-code, it’s like eggs-*within*-a-nest.
That’s why it’s called nested!

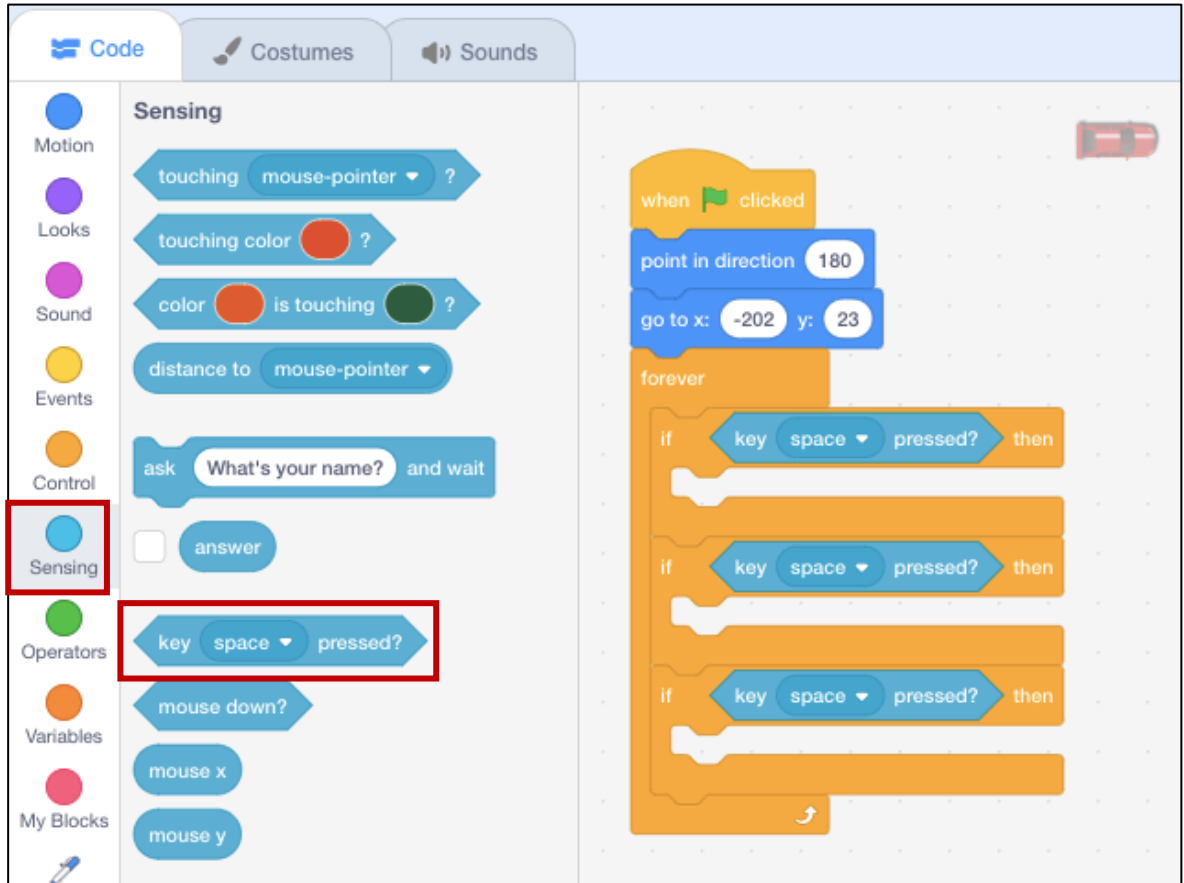


To **sense** when the keyboard buttons are being pressed, we'll use **Sensing** scripts.

Click the "Sensing" button.

Drag and drop a "key space pressed" block into the gap in first "if ___ then" block.

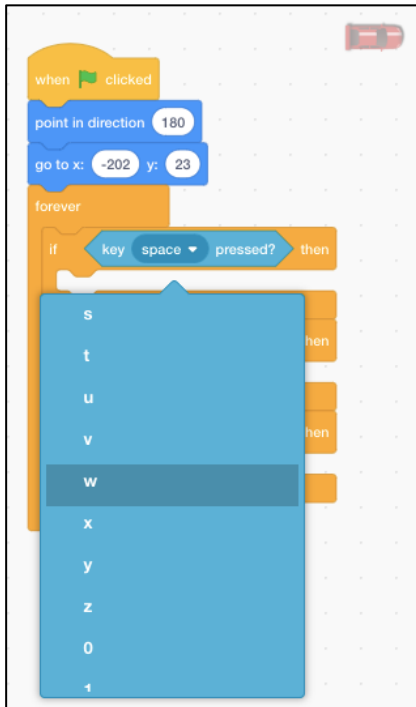
Repeat for the other 2 "if ___ then" blocks.



Because the red car is on the left of the screen, we'll code the controls to be the **W, A and D** keys on the left side of the keyboard to be the **forward, left and right** game controls.



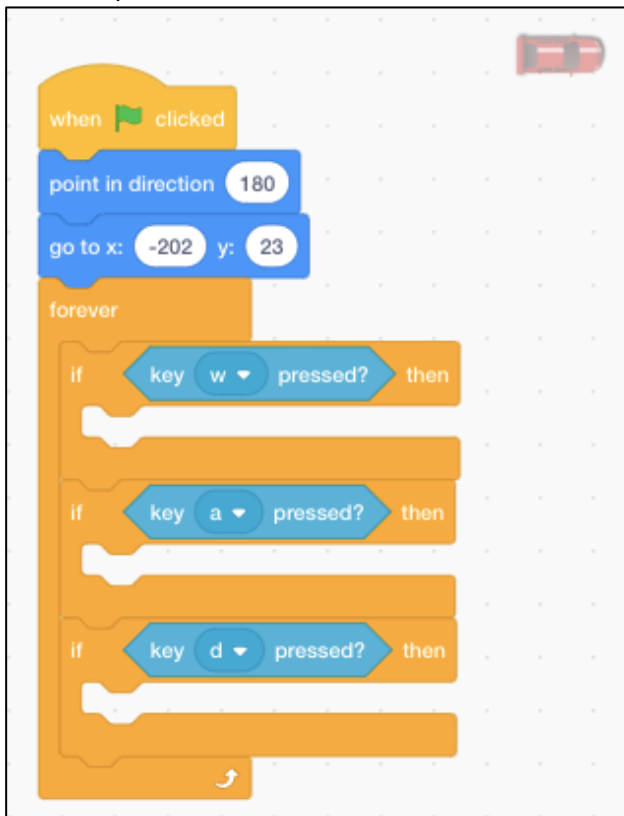
In the first Sensing block: “key space pressed?” block, click the drop-down menu, then select “w”.



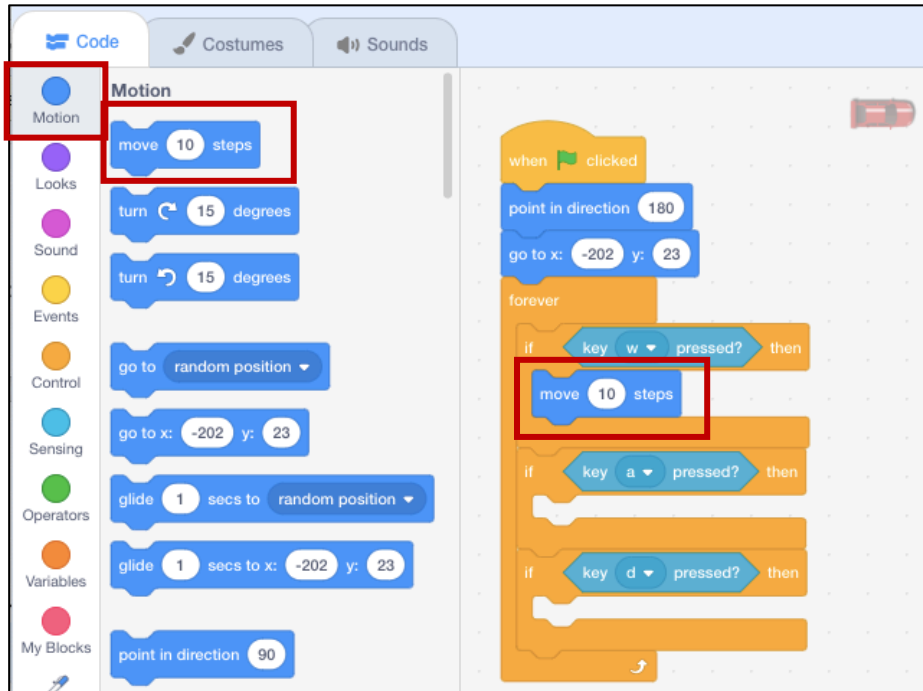
In the second Sensing block: “key space pressed?” block, click the drop-down menu, then select “a”.

In the last Sensing block: “key space pressed?” block, click the drop-down menu, then select “d”.

Your script should now look like this:



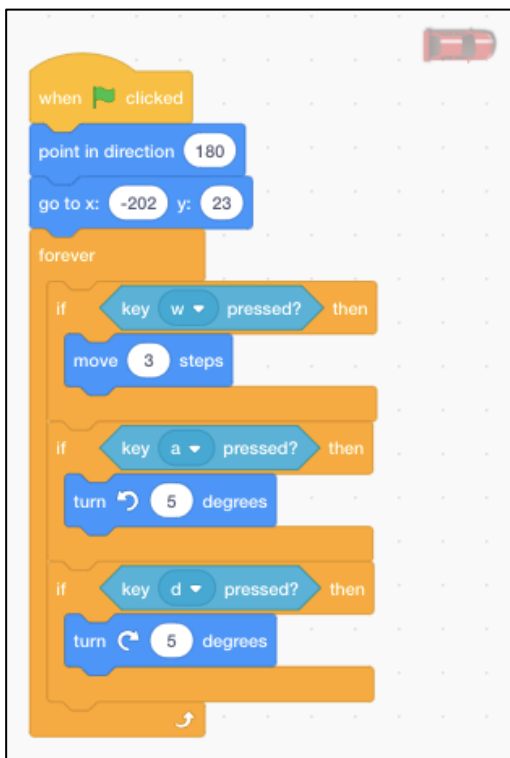
14. Click the “Motion” button. Then click and drag the “move ___ steps” block into the first “if key w pressed? then” block. Change the 10 to 3.




Click and drag the “turn **left** 15 degrees” block into the “if key a pressed then” block. Change the 10 to 5.

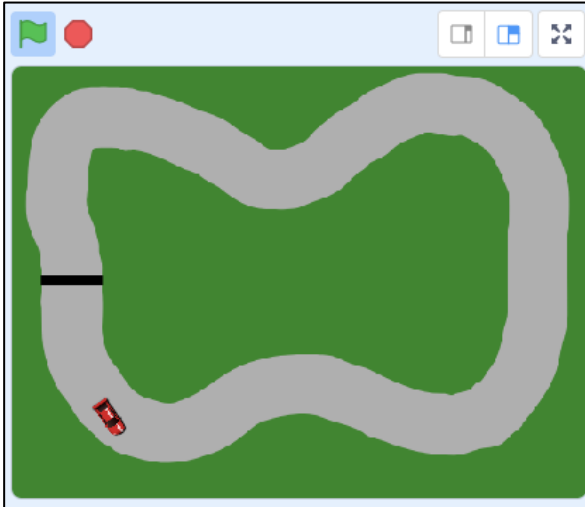
Click and drag the “turn **right** 15 degrees” block into the “if key d pressed then” block. Change the 10 to 5.

Your code should look like this:



Now when you click the green flag: 

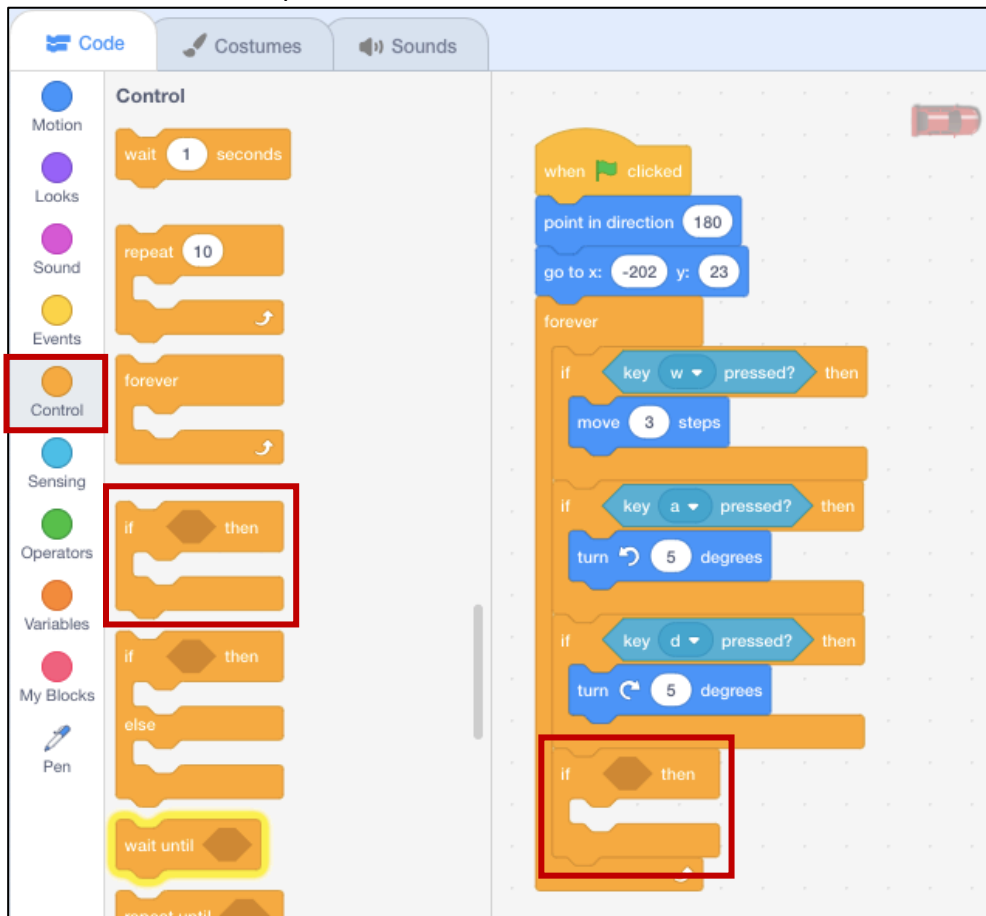
You can drive the car using the W, A and D keys on your keyboard! Try it now.



15. We can race around the track, which is great! But there's no reason to stay on the track because driving on the green grass and grey track gives you the same speed. So let's slow down the car when it drives on the green grass.

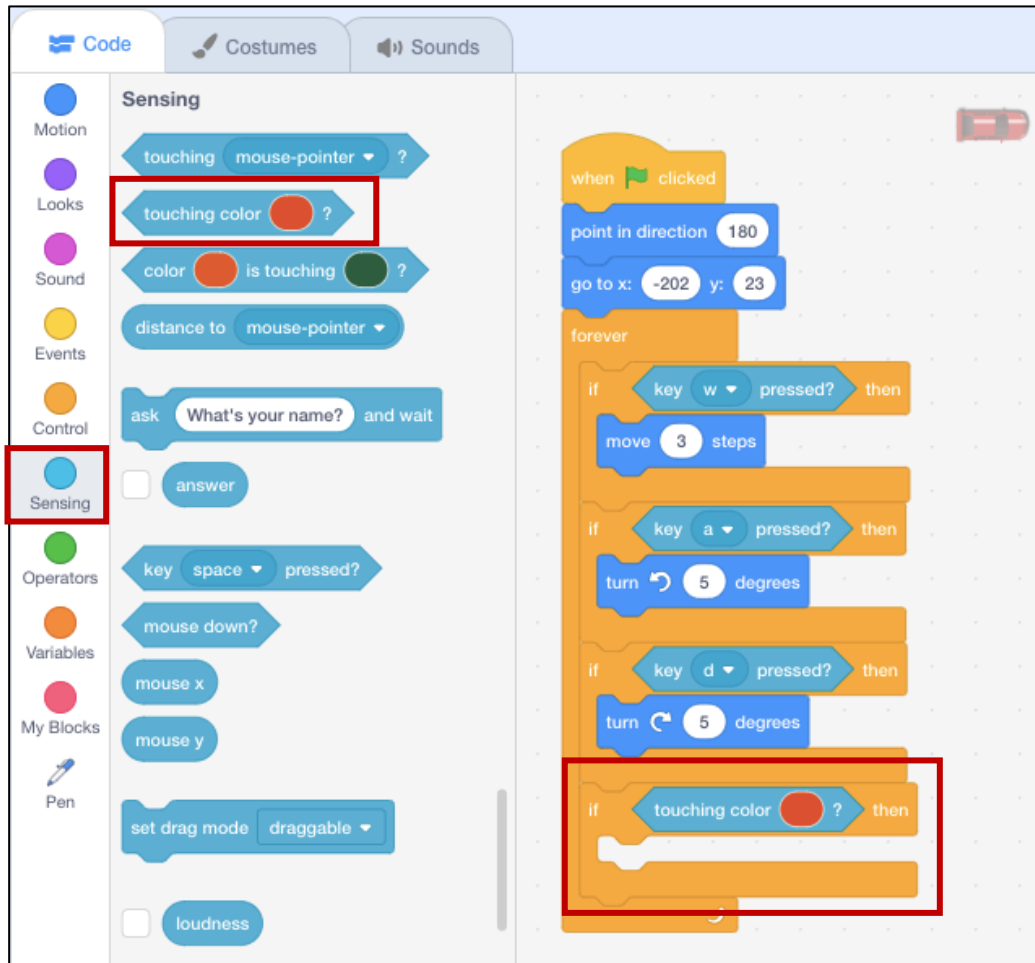
Click the "Controls" button.

Click and drag an "if ___ then" block to the bottom of the "if key d pressed? then" block, inside the forever loop.

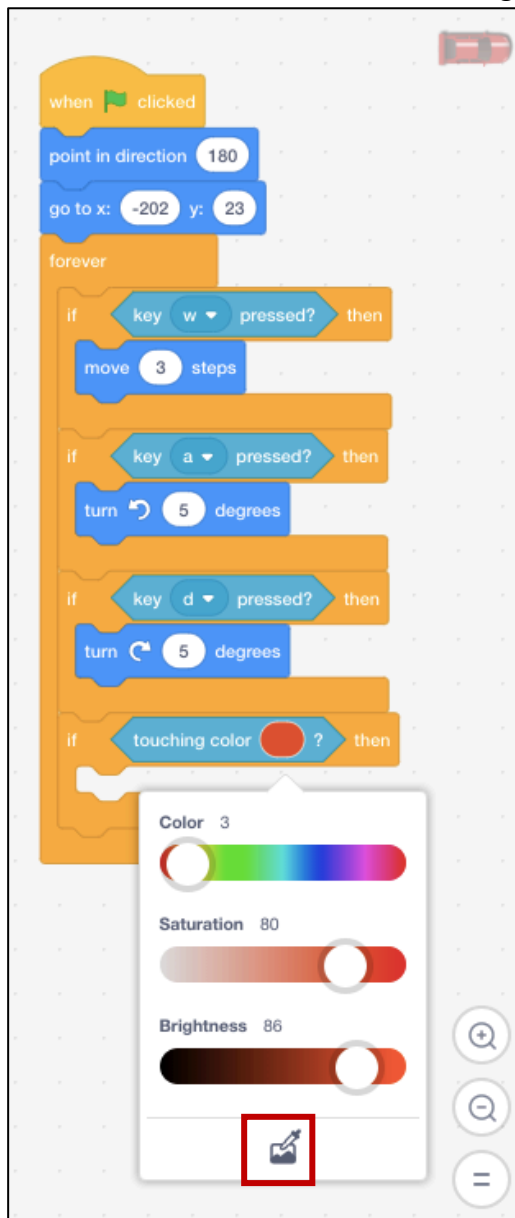


Click the “Sensing” button.

Click and drag a “touching colour ____?” block **into the gap** in the “if ____ then” block.

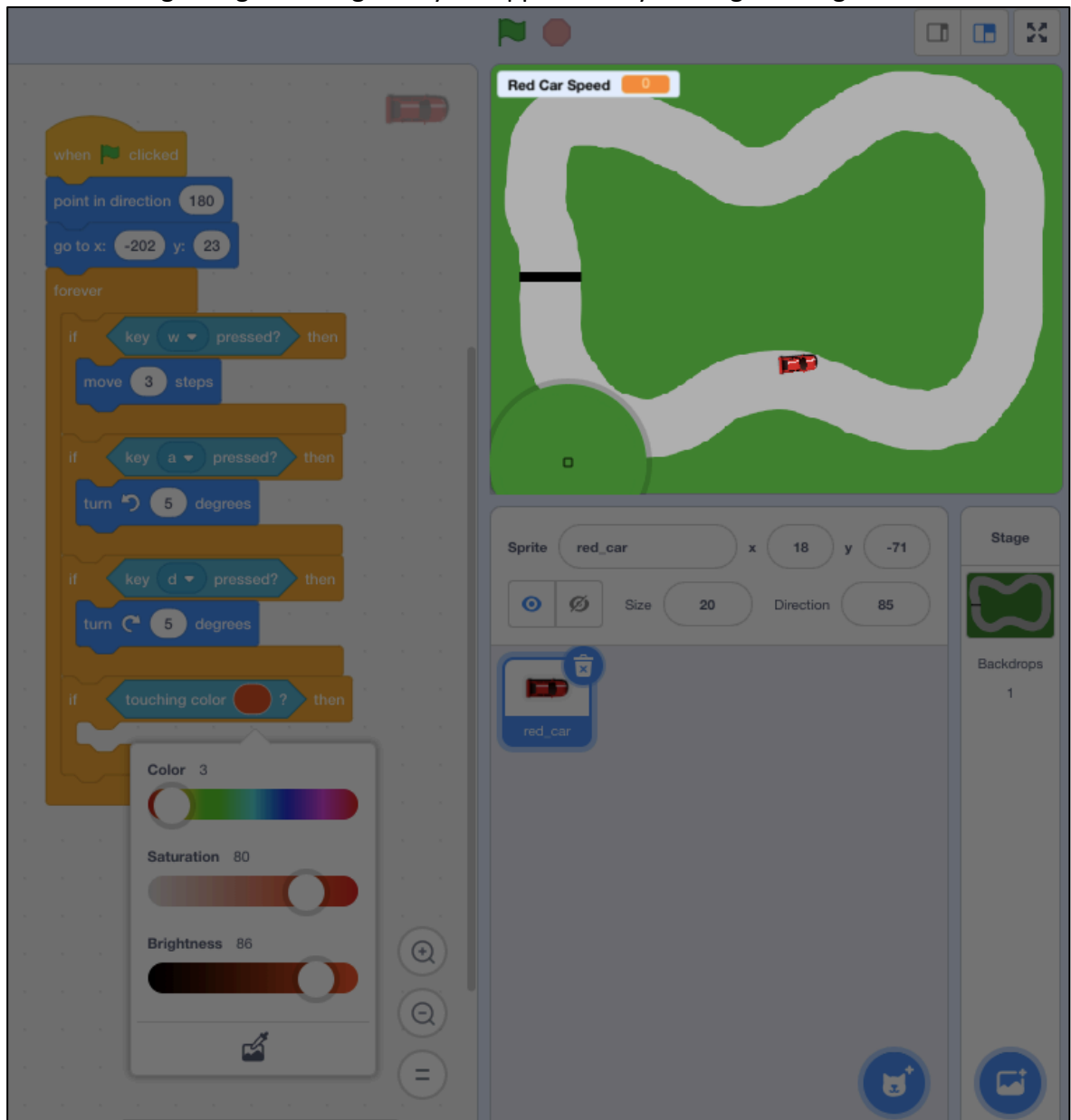


Click on the colour inside the “touching colour ____” block.

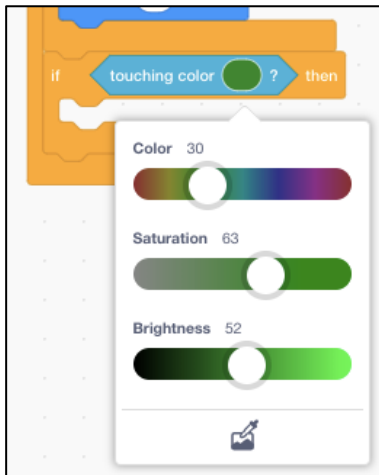


Select the eye dropper tool: 

The rest of the screen will go slightly dark, but the game screen will be bright. Choose the colour of the green grass using the eye dropper tool by clicking on the game screen:

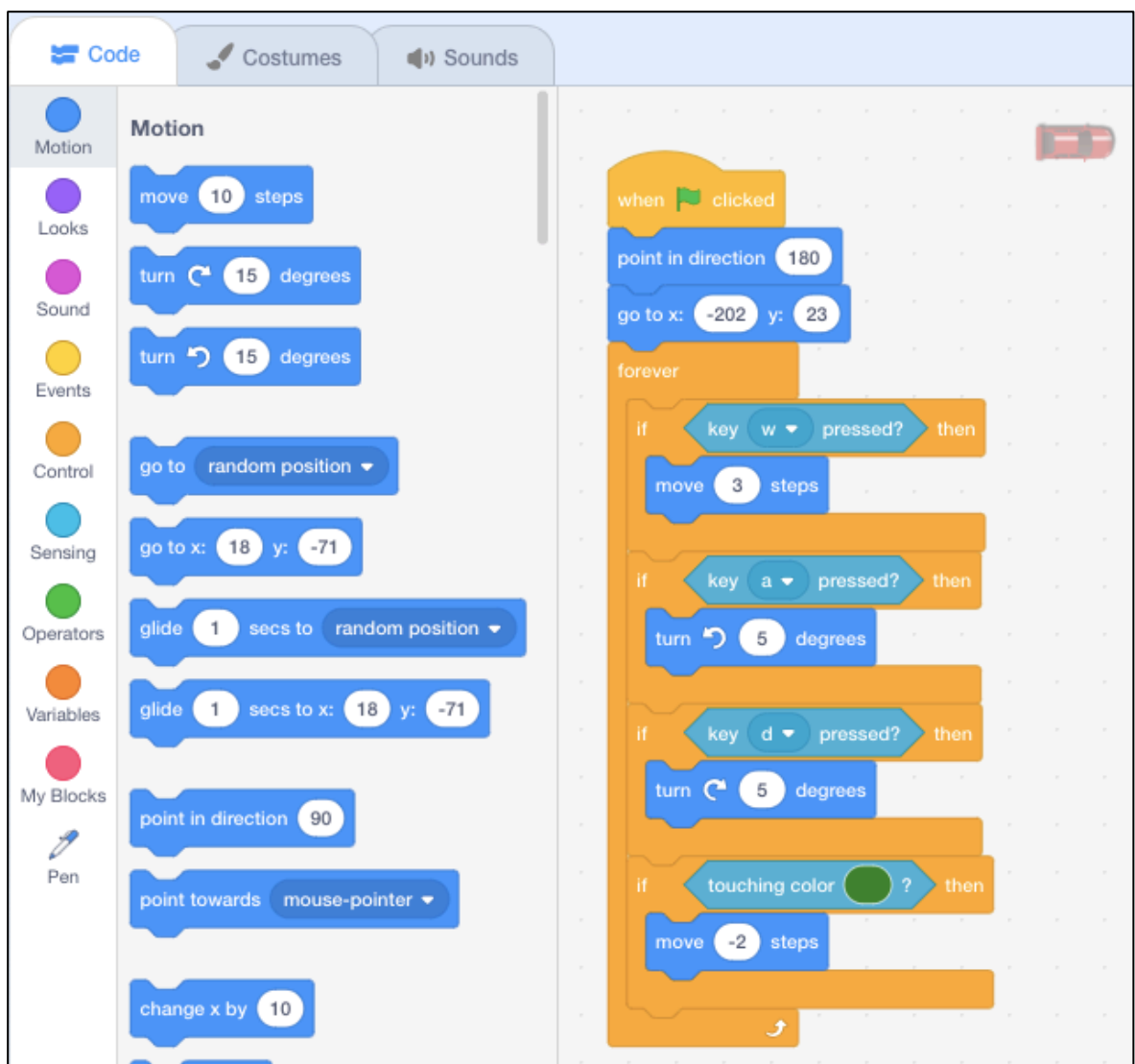


Now the selected colour will be exactly the same as the green grass!

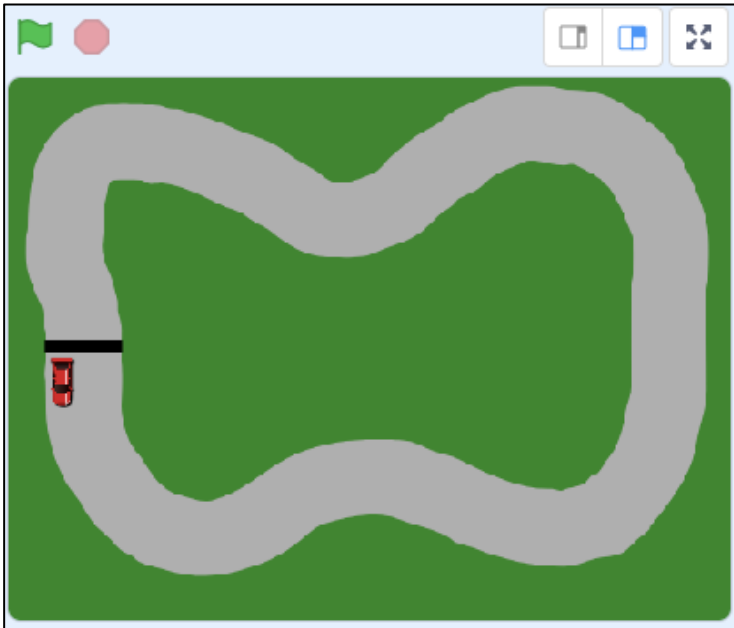


Click the “Motion” button.

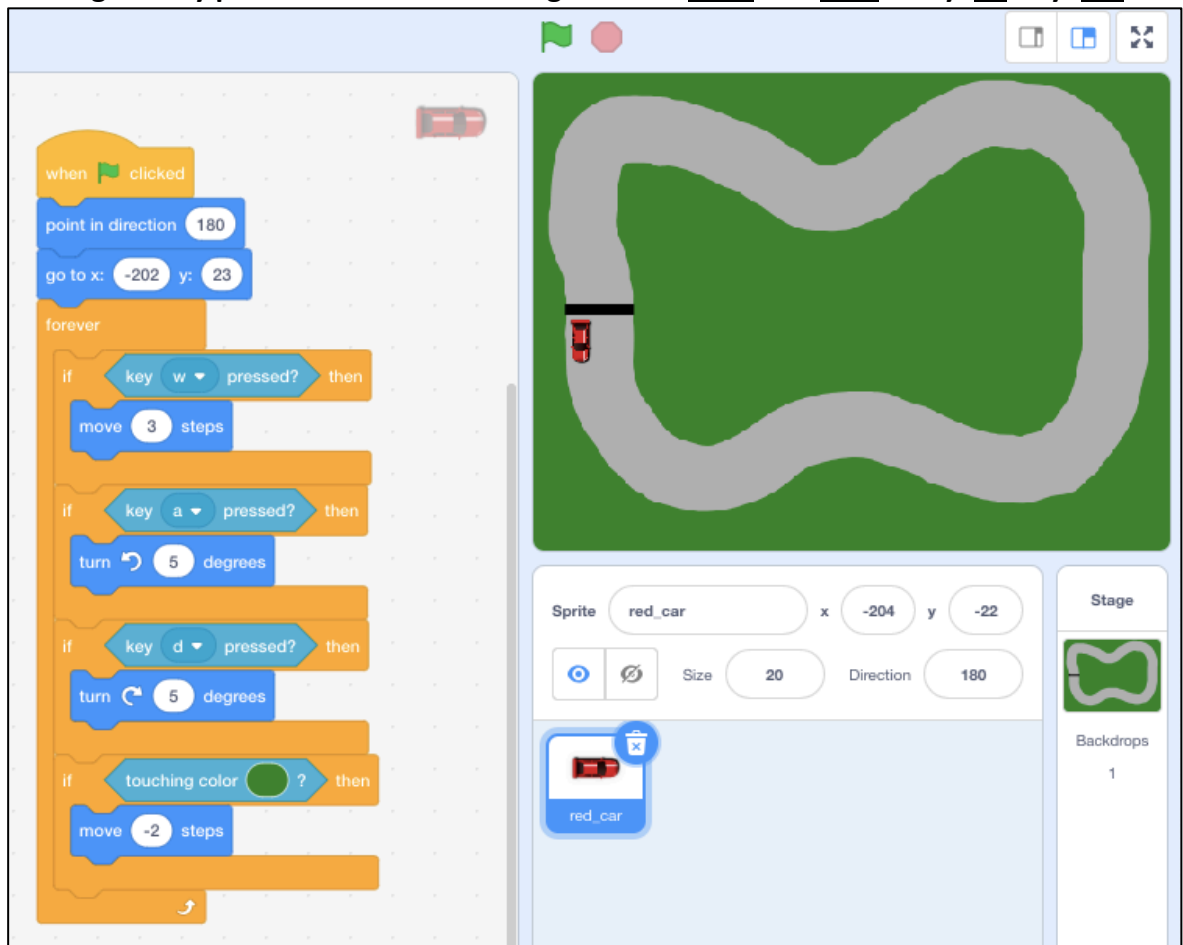
Click and drag the “move ___ steps” block into the “if touching colour green? then” block. Change 10 to -2 (because we want the car to slow down).



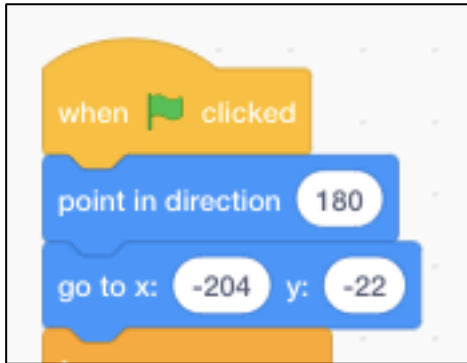
16. We're almost done! Now to end the game when a car crosses the finish line! Whoops we need to move our red car in front of the finish line! Click the red car on the game screen and drag it in front of the finish line:



Make sure you change the numbers in the “go to x: ___ y: ___” block to the new starting x and y positions. Mine will change from x: -202 to x: -204 and y: 23 to y: -22

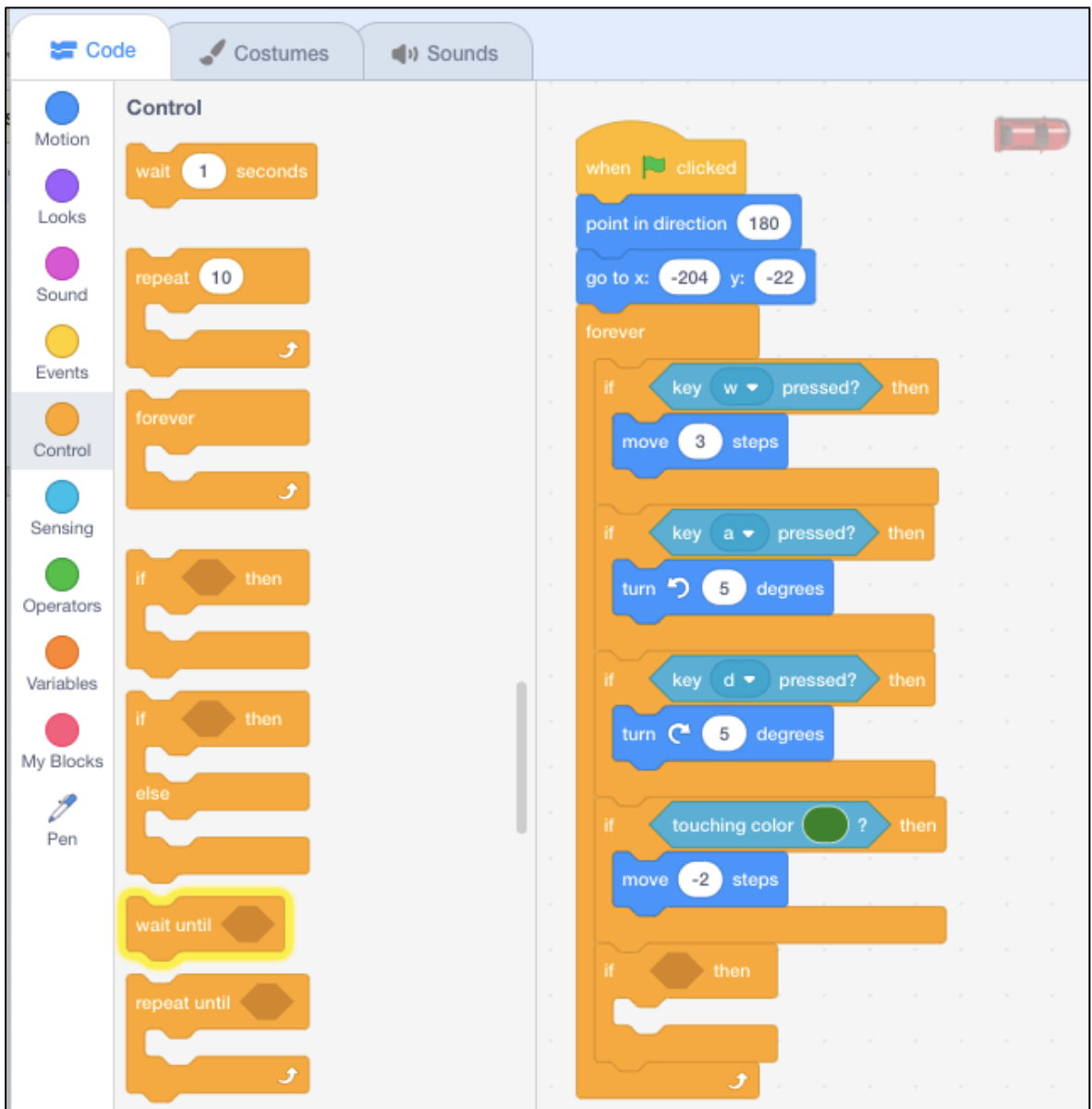


So now my code looks like this:



Click the "Control" button.

Click and drag an "if ___ then" block under the "if touching colour green? then" block:



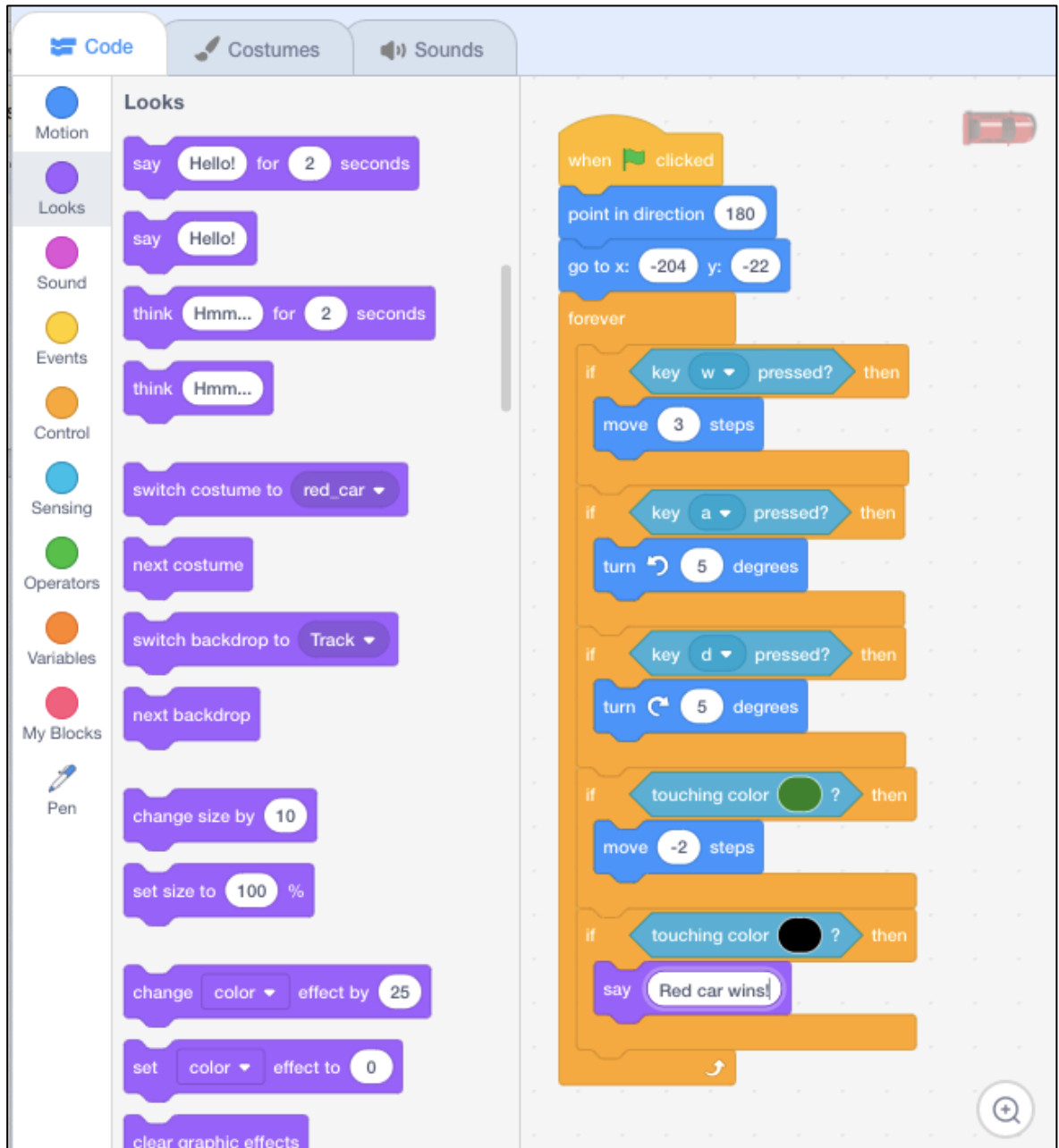
Click the “Sensing” button.

Click and drag a “touching color ___?” block into the last “if ___ then” block.

Change the color to **black** using the eye dropper tool:



Click on the “Looks” button.
Click and drag a “say ____” block into the last “if ____ then” block.
Change *Hello* to *Red car wins!*

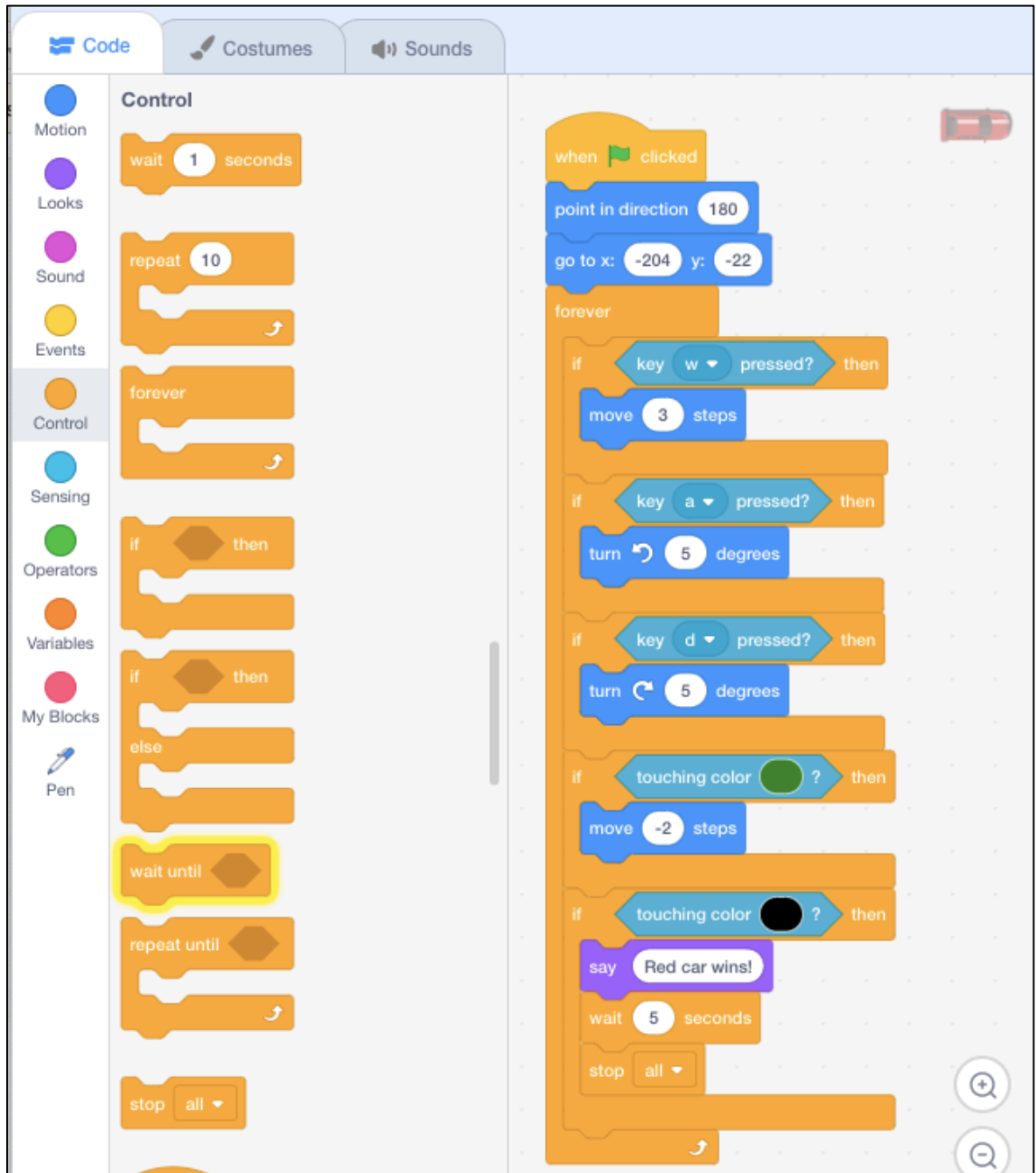


Click the “Control” button.

Click and drag the “wait 1 seconds” block under the “say Red car wins!” block.

Change 1 to 5 seconds.

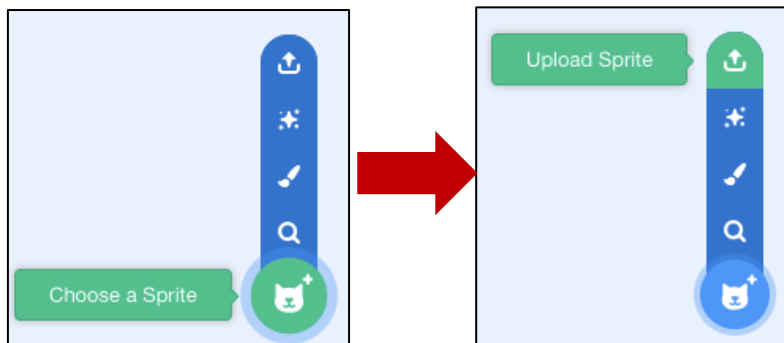
Click and drag the “stop all” block under the “wait 5 seconds” block



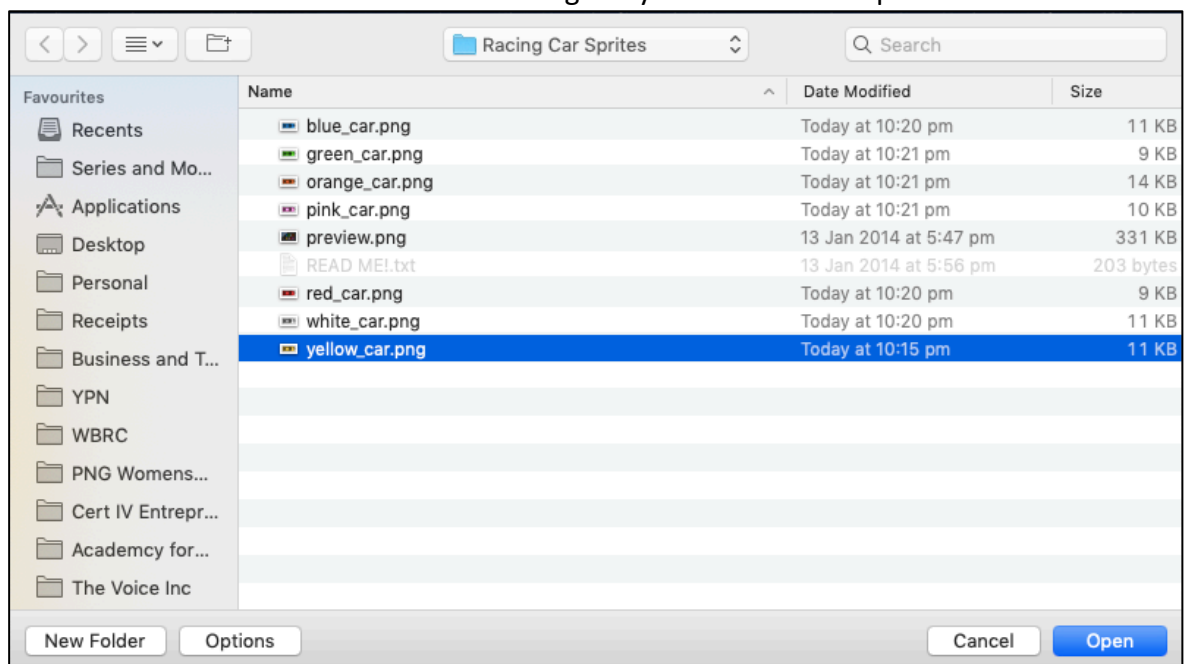
Now when you race around the track and touch the finish line, the game stops and the red car says “Red car wins!”

17. Finally, let's add a competitor!

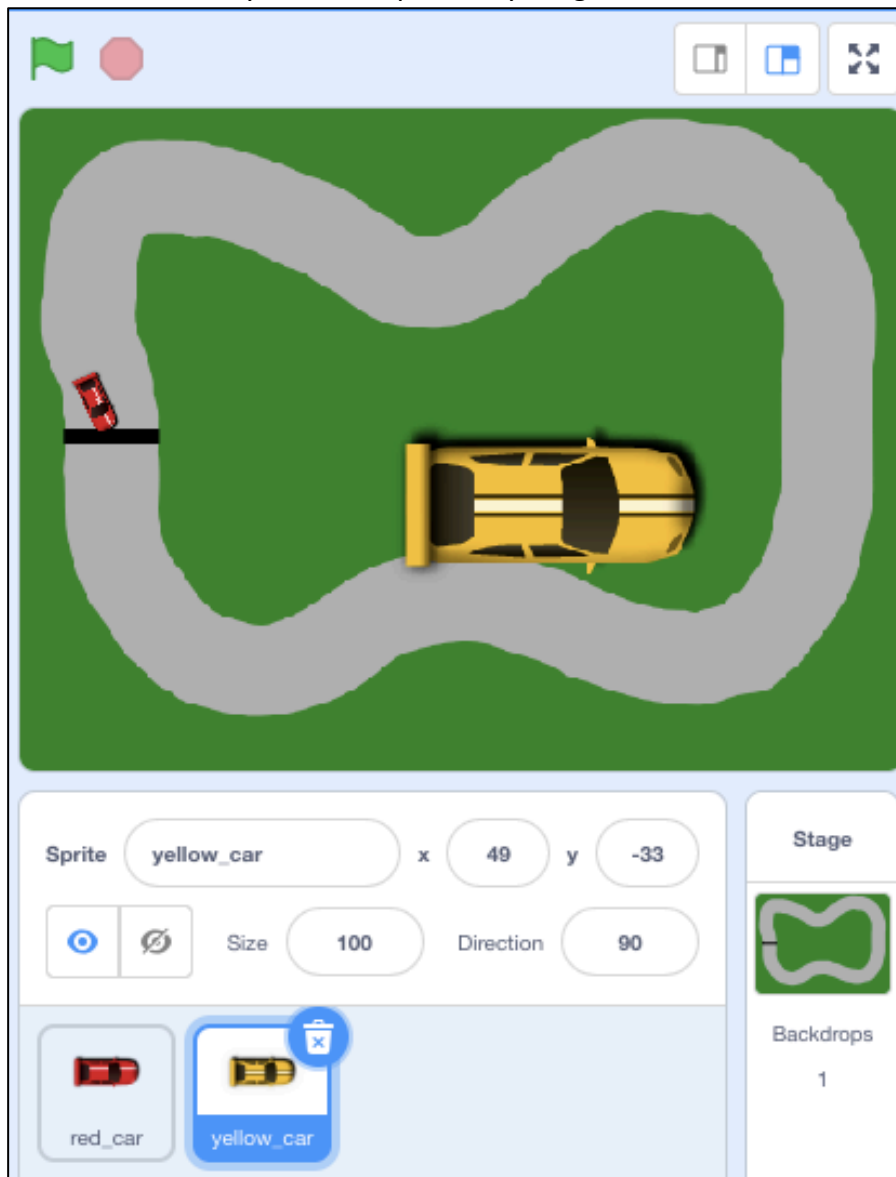
Hover over the "Choose a Sprite" button, then select "Upload Sprite".



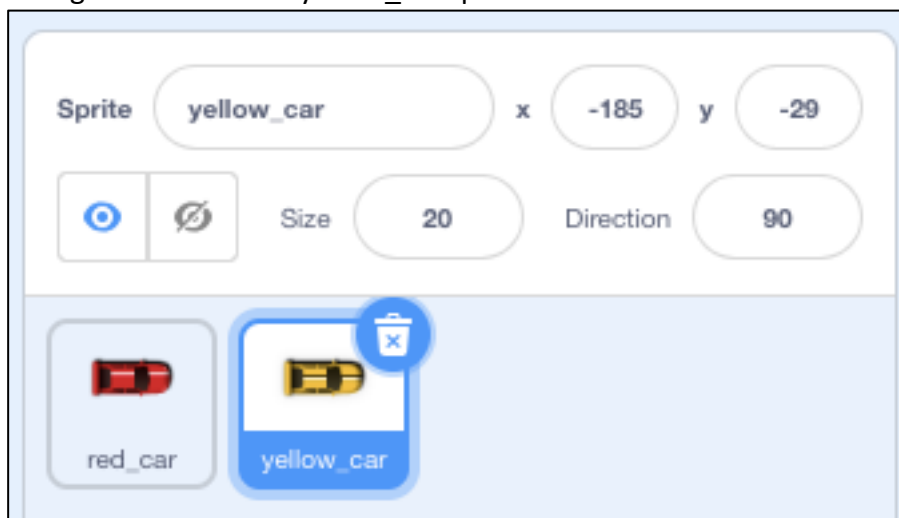
Select a different-coloured car. I'm selecting the yellow-car. Click Open.



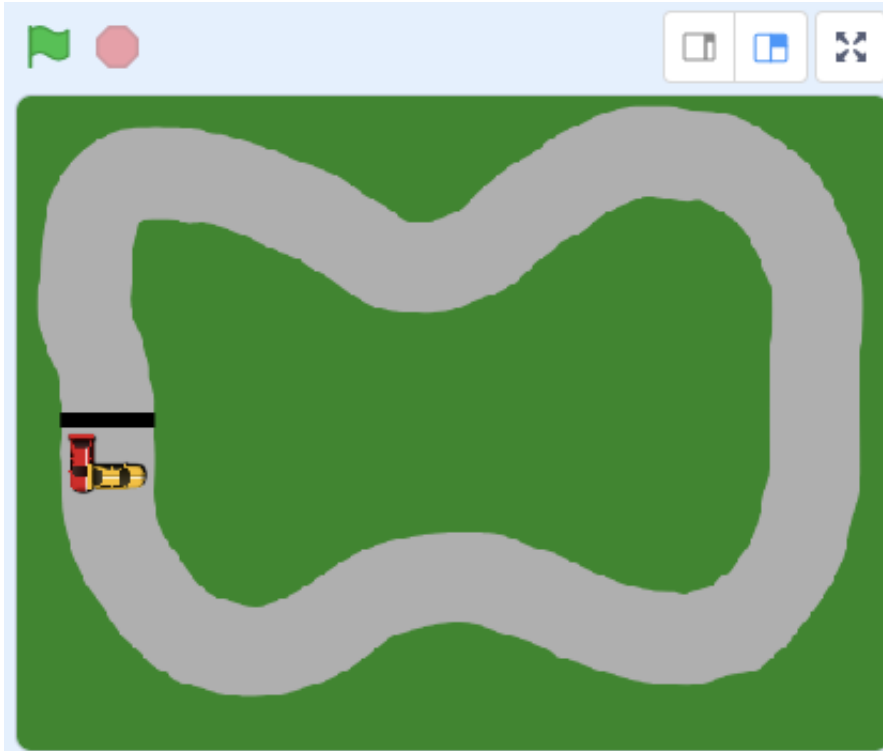
You now have the yellow car sprite on your game screen:



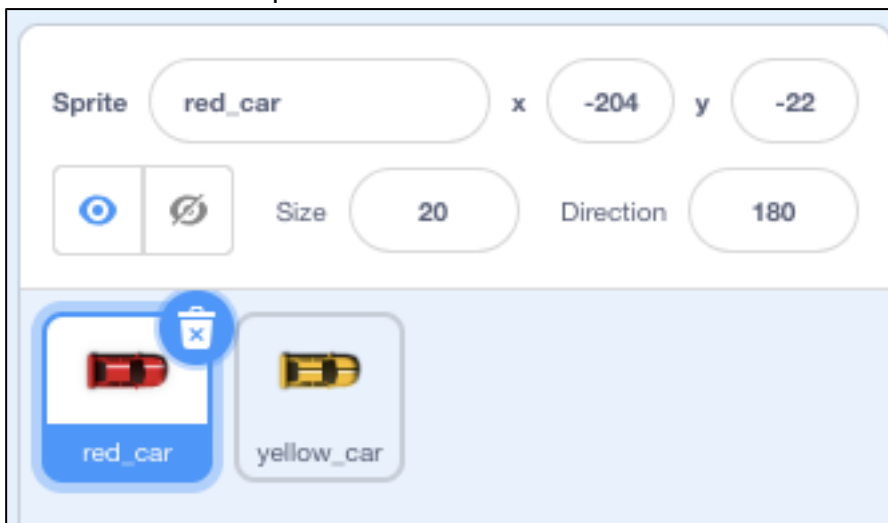
Change the size of the yellow_car sprite to 20:



And move the yellow car so it's in front of the finish line with the red car:

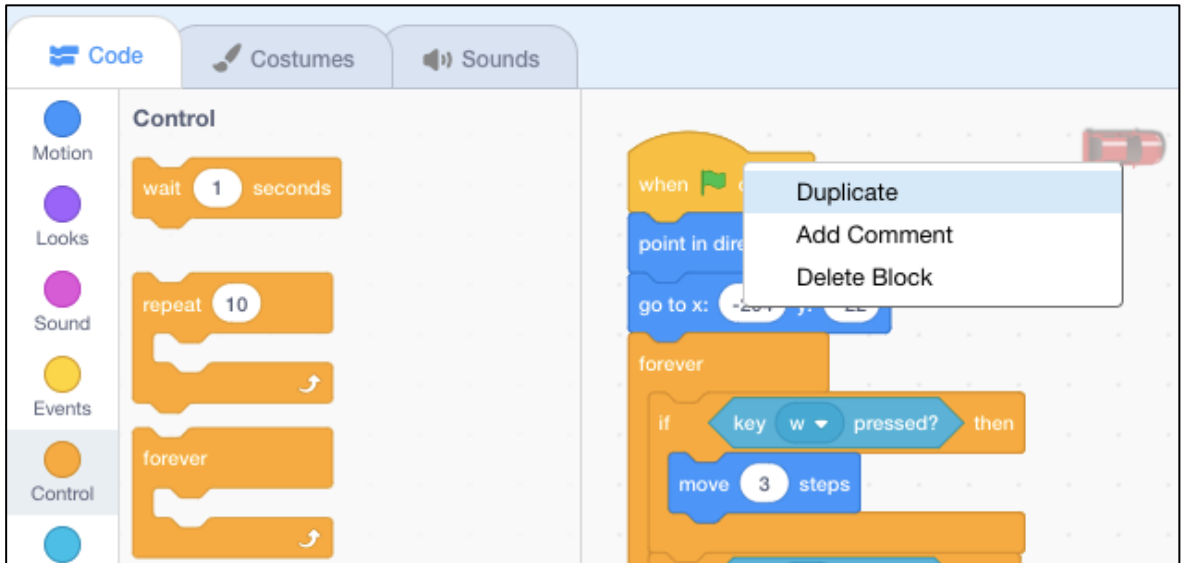


Click on the red car sprite:

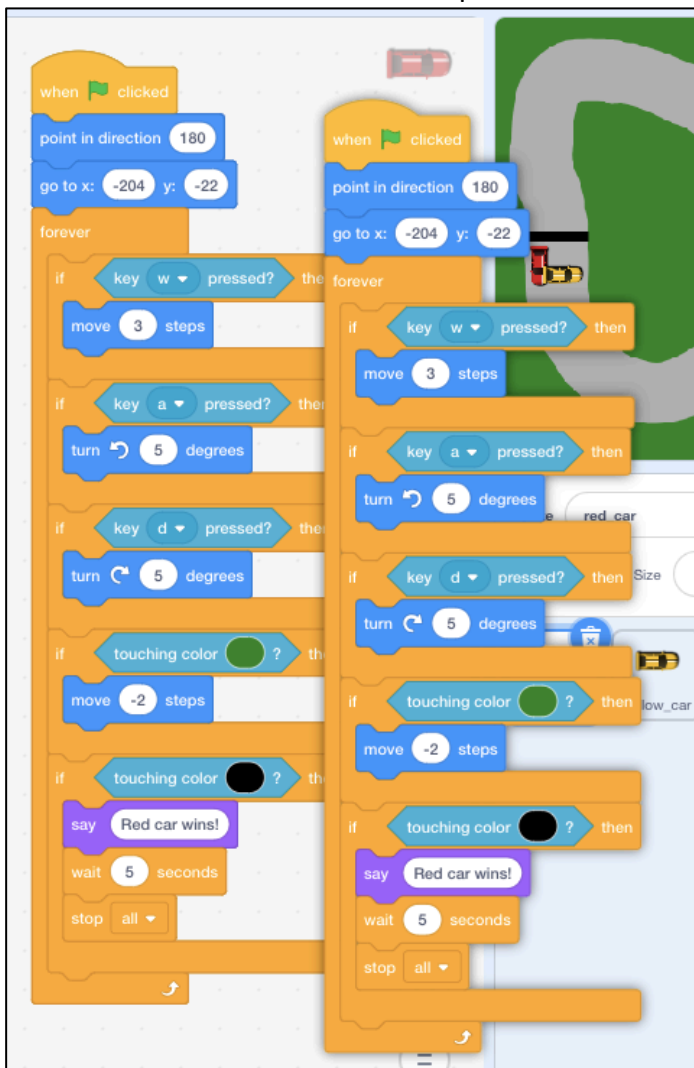


Click on the “Code” tab.

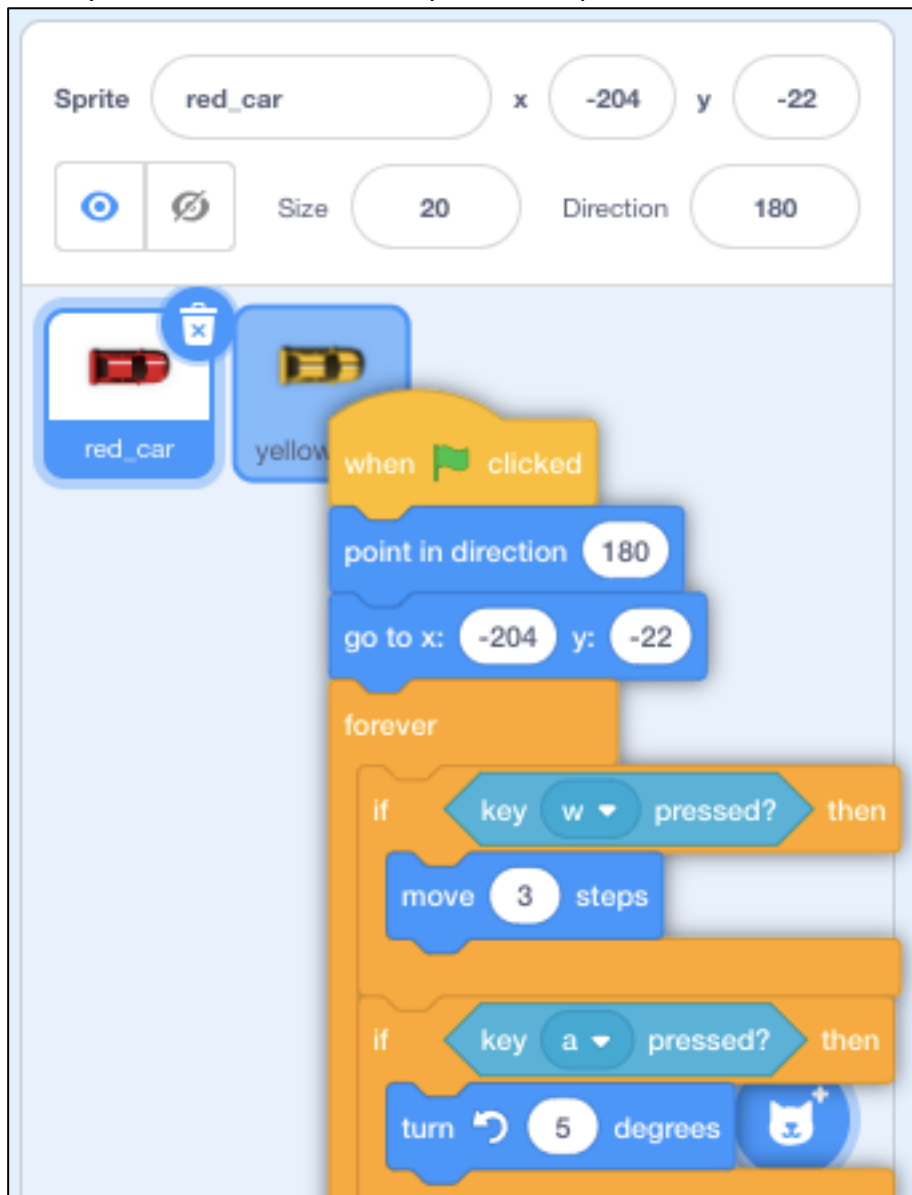
Right-click the “When green flag clicked” block, and select Duplicate.



Your cursor will now be stuck to duplicate code!



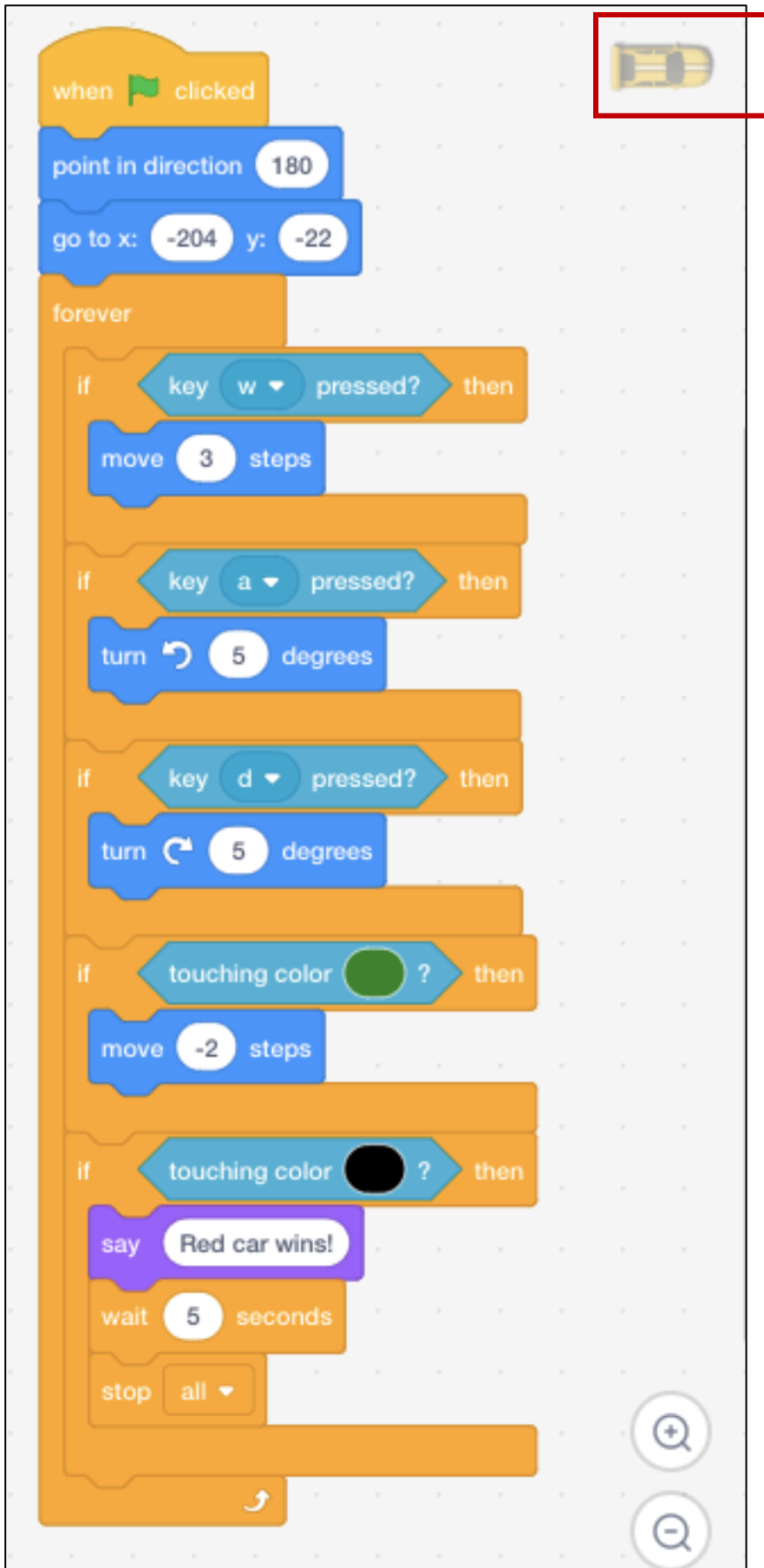
Move your cursor/mouse to the yellow car sprite and click on it:



The screenshot displays the GameMaker interface. At the top, the 'Sprite' panel shows 'red_car' selected, with coordinates x: -204 and y: -22. Below this, the 'Size' is set to 20 and 'Direction' to 180. The 'Sprite' panel also shows a 'yellow' car sprite selected. The 'Script' panel shows a 'when clicked' event with a 'yellow' car sprite selected. The script contains the following blocks:

- when clicked
- point in direction 180
- go to x: -204 y: -22
- forever loop:
 - if key w pressed? then
 - move 3 steps
 - if key a pressed? then
 - turn 5 degrees

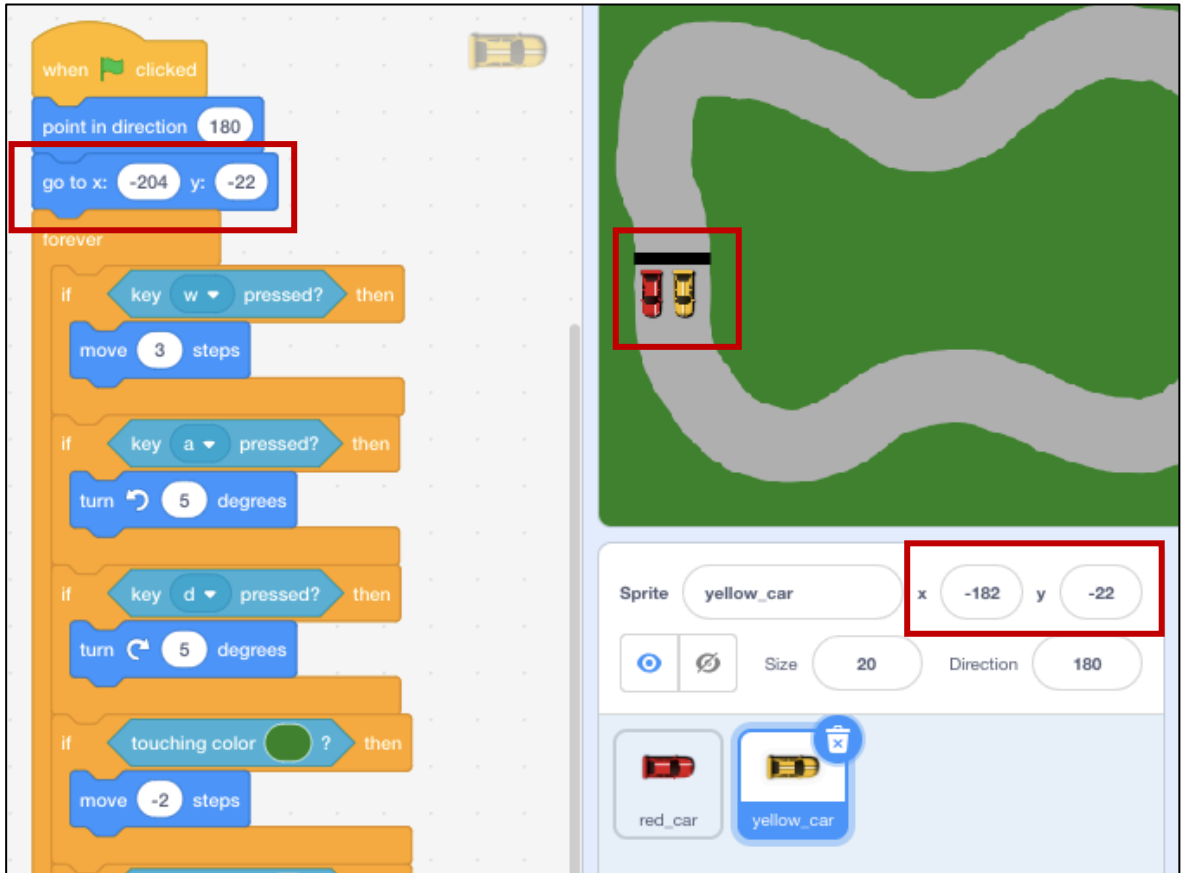
This copied the code to the yellow car sprite!



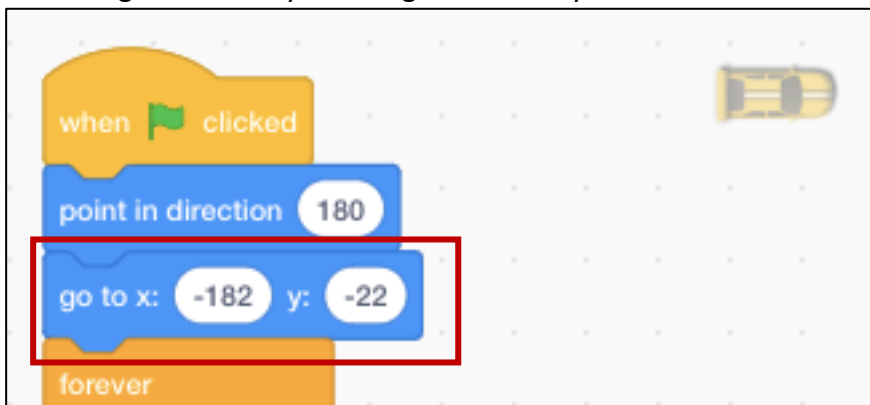
```
when green flag clicked
  point in direction 180
  go to x: -204 y: -22
  forever loop
    if key w pressed? then
      move 3 steps
    if key a pressed? then
      turn 5 degrees
    if key d pressed? then
      turn 5 degrees
    if touching color green? then
      move -2 steps
    if touching color black? then
      say Red car wins!
      wait 5 seconds
      stop all
```

But now we have to make some changes to the yellow car sprite code.

Click and drag the yellow car sprite on the game screen so that it's side-by-side with the red car sprite. Note the new location of the yellow car sprite. Mine is x: -182 y: -22.



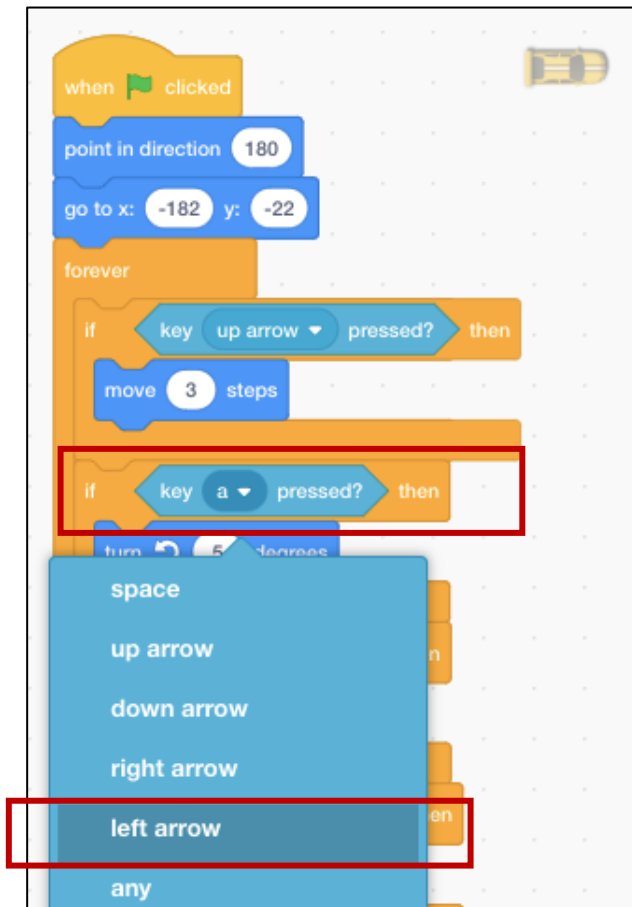
So I change the x and y in the "go to x: -204 y:-22" block to "x: -182 y: -22"



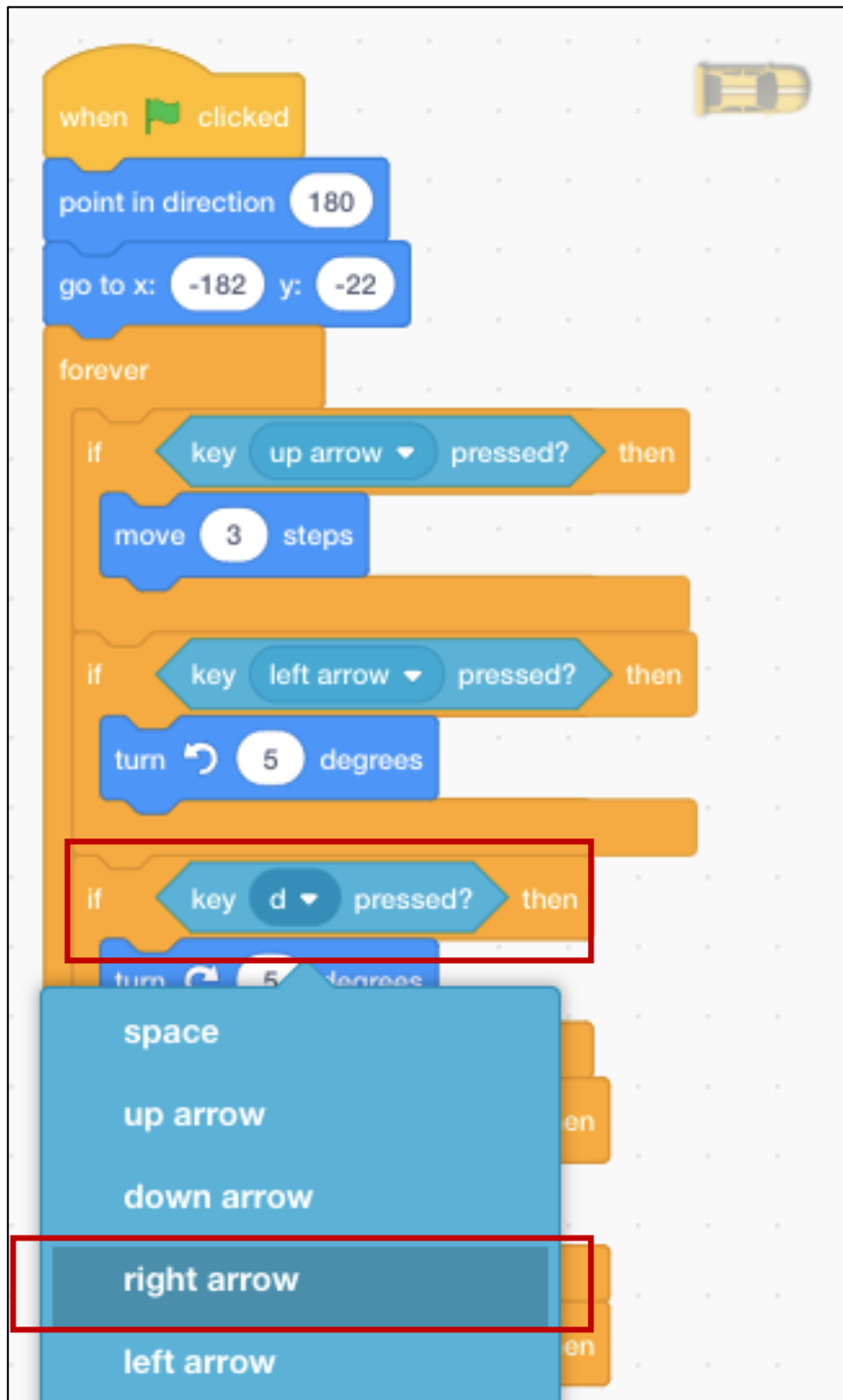
In the first “If ___ then” block, change w to the up arrow



In the second “If ___ then” block, change a to the left arrow

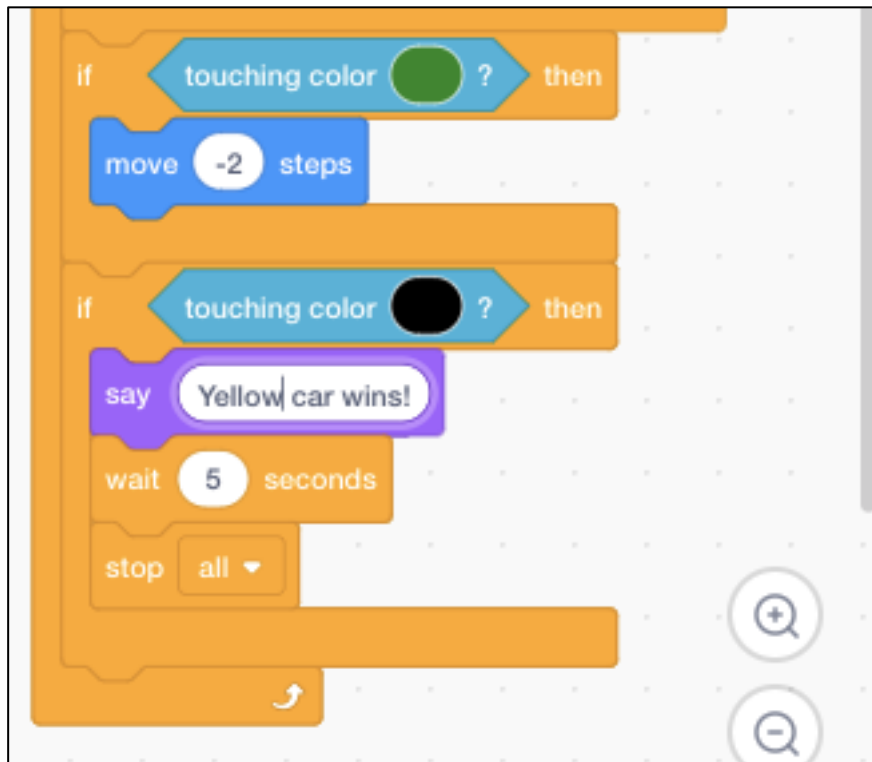


In the third “If ___ then” block, change d to the right arrow



The image shows a Scratch code editor with a script for a racing car game. The script starts with a yellow "when green flag clicked" block, followed by a blue "point in direction 180" block and a blue "go to x: -182 y: -22" block. Below these is an orange "forever" loop containing three "if key pressed?" blocks. The first block is for "up arrow" with a blue "move 3 steps" block. The second is for "left arrow" with a blue "turn 5 degrees" block. The third is for "d" with a blue "turn 5 degrees" block. A keyboard menu is open, showing "space", "up arrow", "down arrow", "right arrow", and "left arrow". The "right arrow" option is highlighted with a red box.

Finally, change the “say Red car wins!” block to “say Yellow car wins!”



And there you have it, a simple game of racing you can play with a friend!

Can you find ways to improve your game?

- How about adding sprites to make booster powerups that make your cars go faster?
- Or how about adding trees or a lake to the middle of the track to stop cars from crossing the grass?
- How will you code these? Try it out!