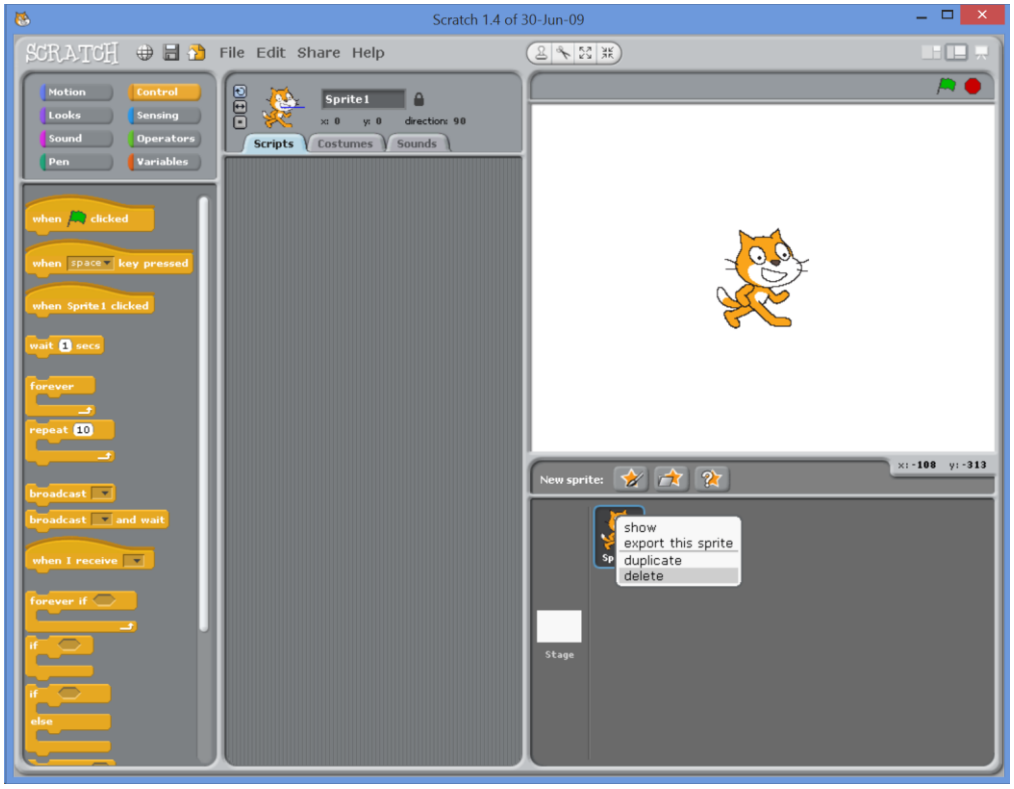
Scratch Top-Down Racing Game

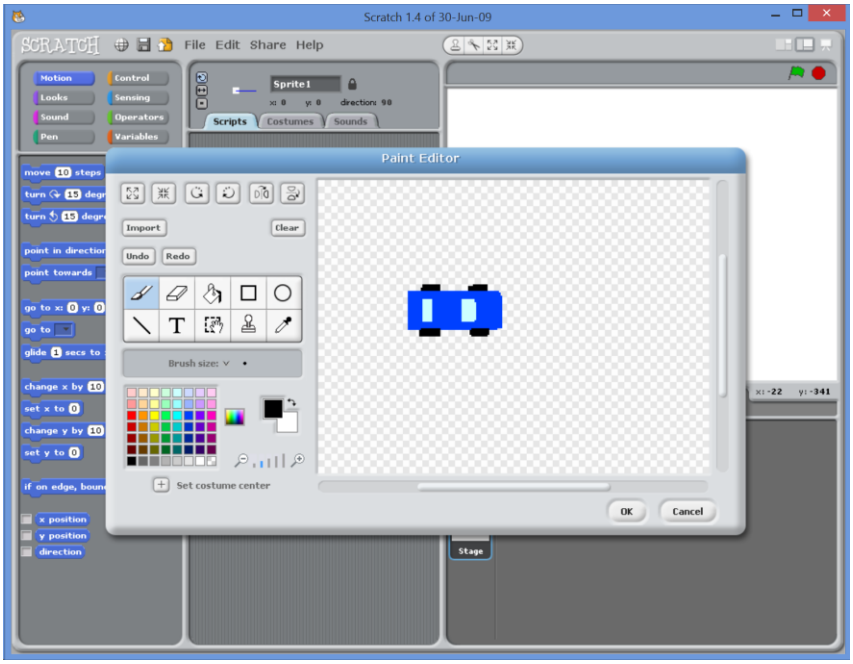
Getting Started

The first thing you need to do is open up Scratch and remove Scratch The Cat from your sprites – right click on Scratch and choose ‘Delete’:



Once you’ve deleted Scratch, you need to create a new sprite:

Clicking the ‘New Sprite’ button will open up the sprite editor window for you to draw a new sprite. You need to draw a car from a bird’s eye view and it **must be facing towards the right:**



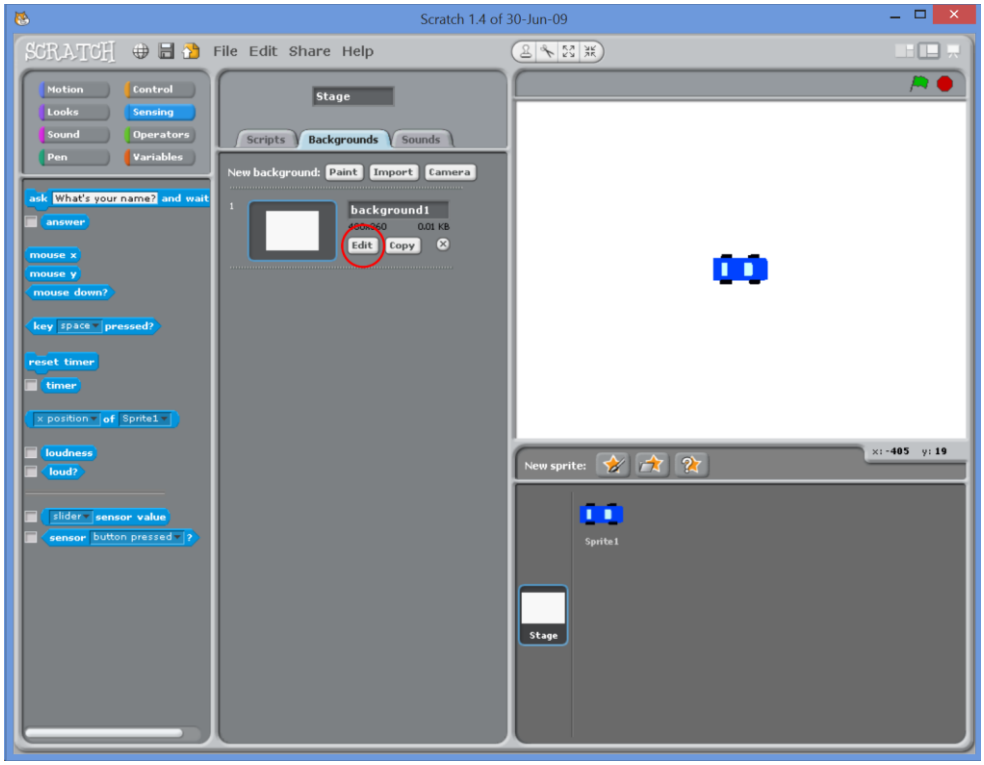
Try to make your car as original as you can

Think about what features you can see from above and how they might look. Remember, not all racing cars look the same!

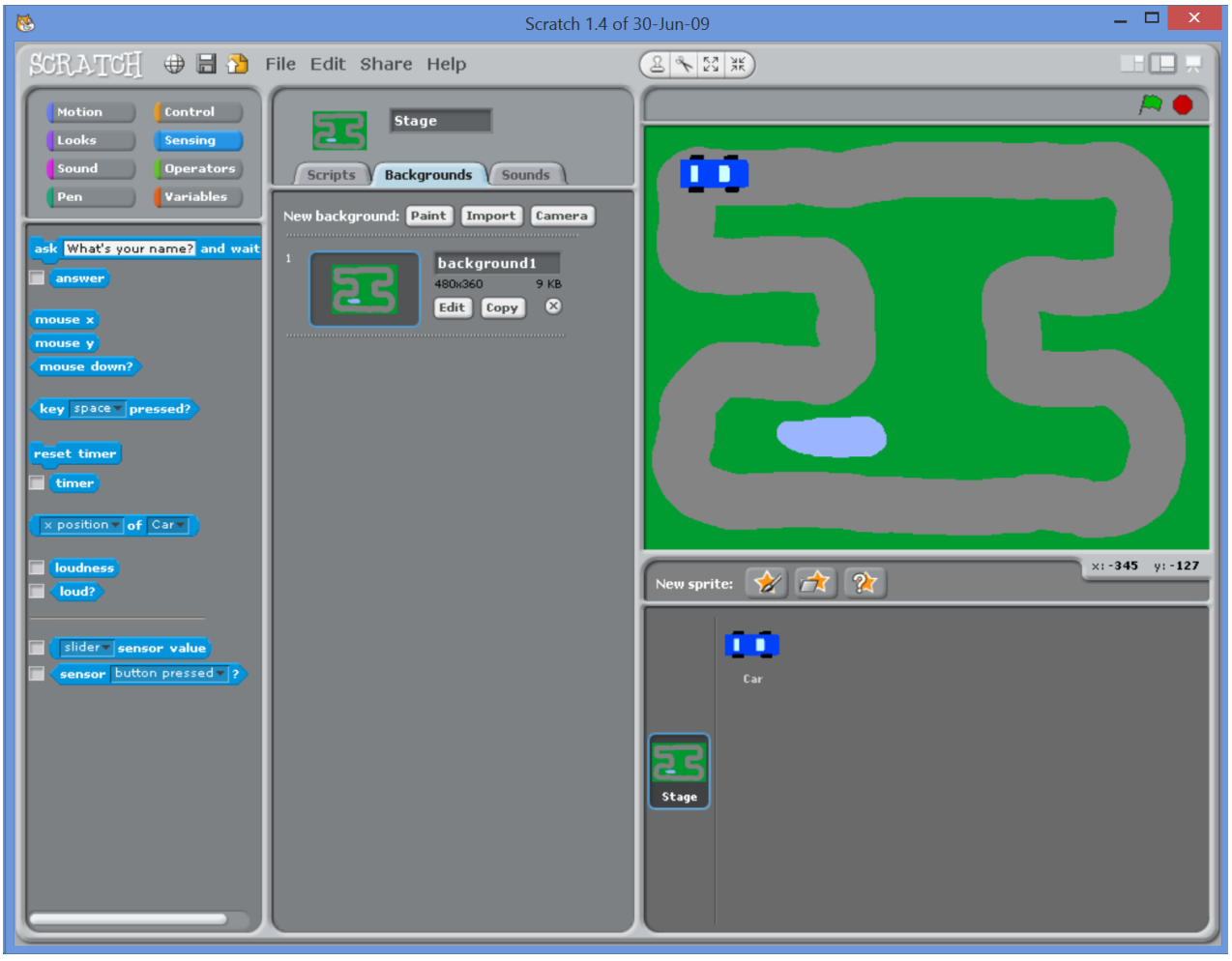
Try not to make it too big (the example on the left here is probably a little bit too big, but you can always use the ‘Shrink’ button later:

Make sure it faces right!

Next you need to create a racetrack as a background. Select the ‘Stage’ and choose the ‘Costumes’ tab from the centre section and ‘Edit’ the background:

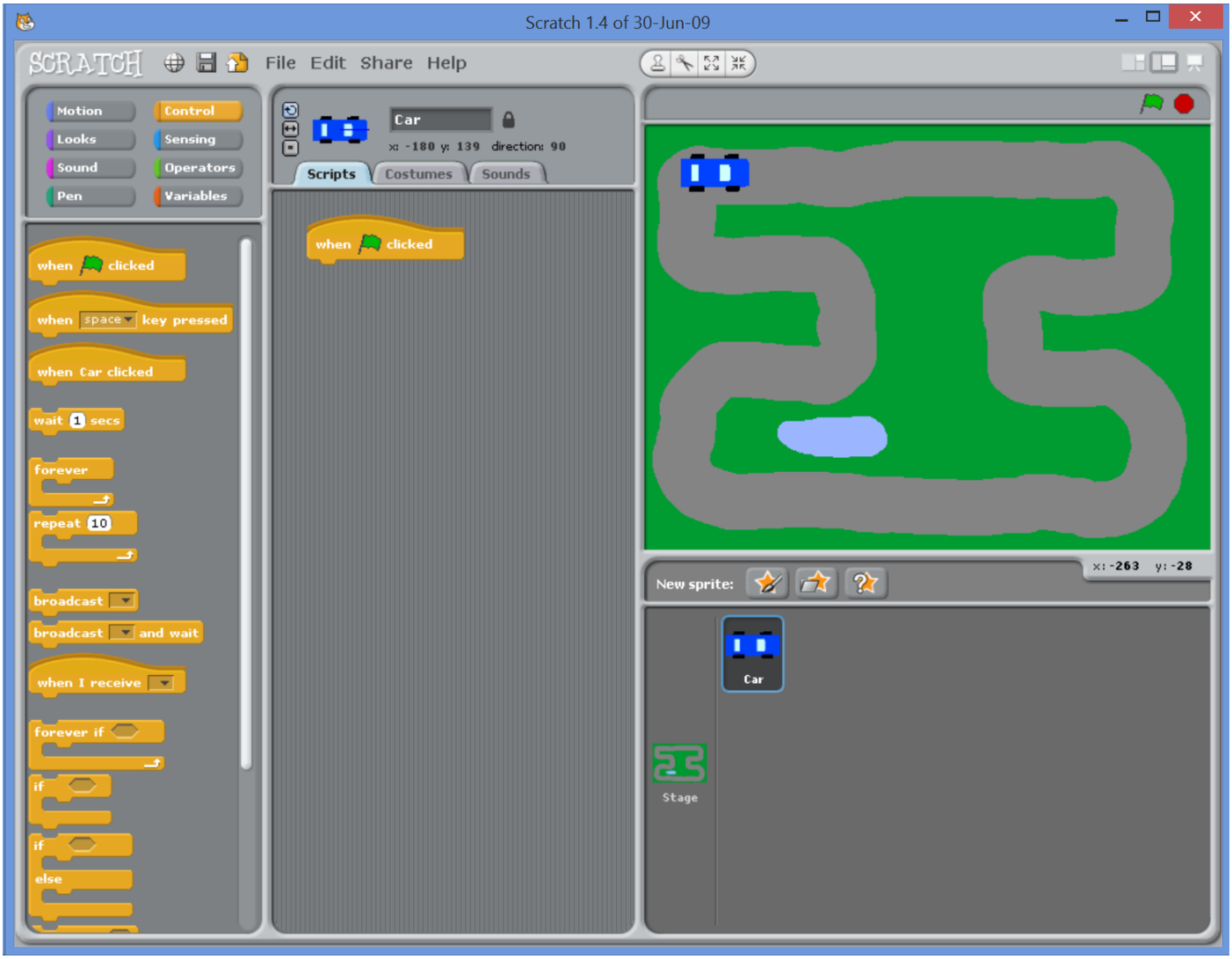


Use the edit tools to create a racetrack that fills the whole stage:



Add details like start/finish lines, pit lanes & buildings, curbs & chicanes and anything else you can think of. Be as imaginative as you can be with your race track.

Next we need to make the car driveable. Select the car sprite from the sprite pane at the bottom and click the 'Scripts' tab in the middle pane. **Make sure you are definitely adding scripts to the car, not the stage!**

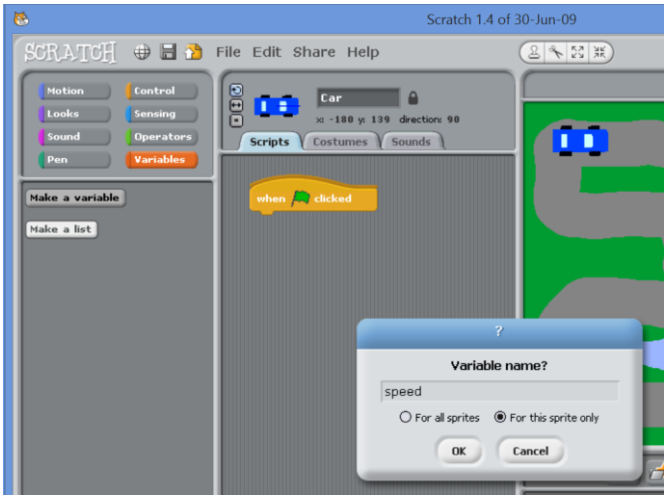


Add a 

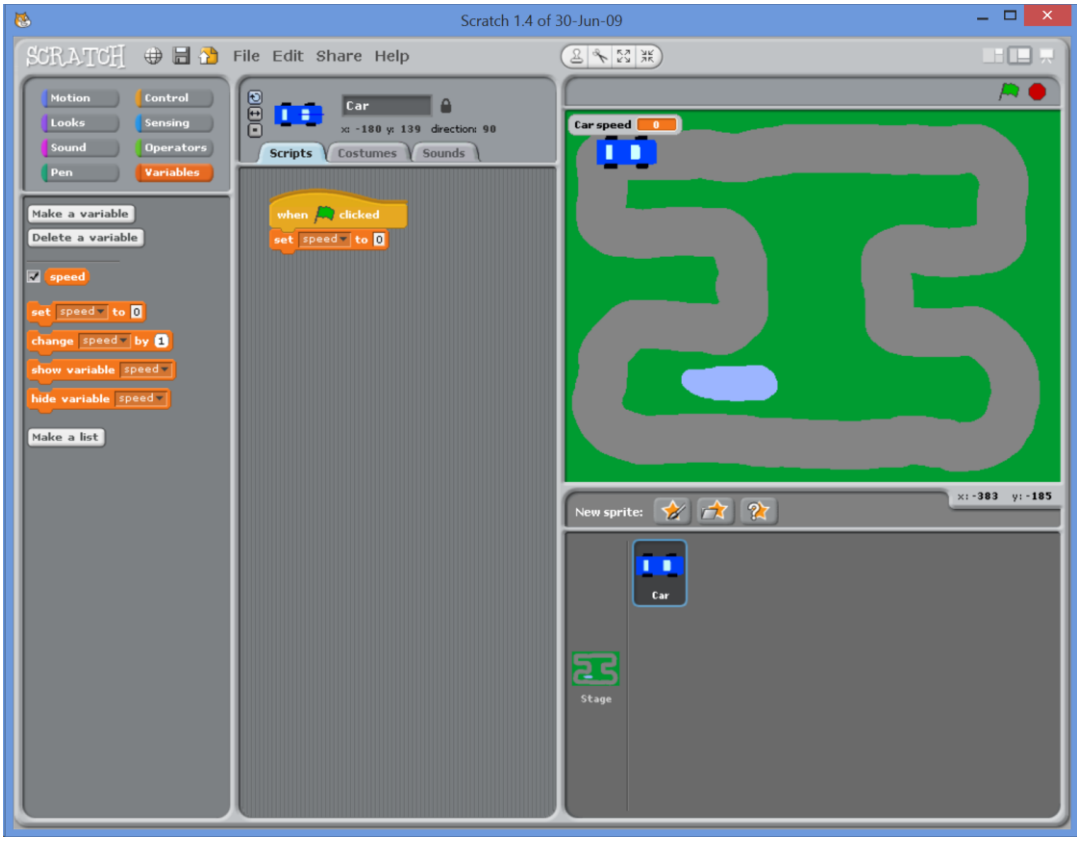
block from the yellow 'Control' section.

We want our car to behave a little bit like a real car – accelerating up to speed when we press the 'up' arrow key. To do this, we need to create a variable to hold the speed that the car is going at.

From the orange 'Variables' section, click the 'Make a variable' button. Give it the name *speed* and choose the 'For this sprite only' option, because we want the speed to only be associated with our car sprite:

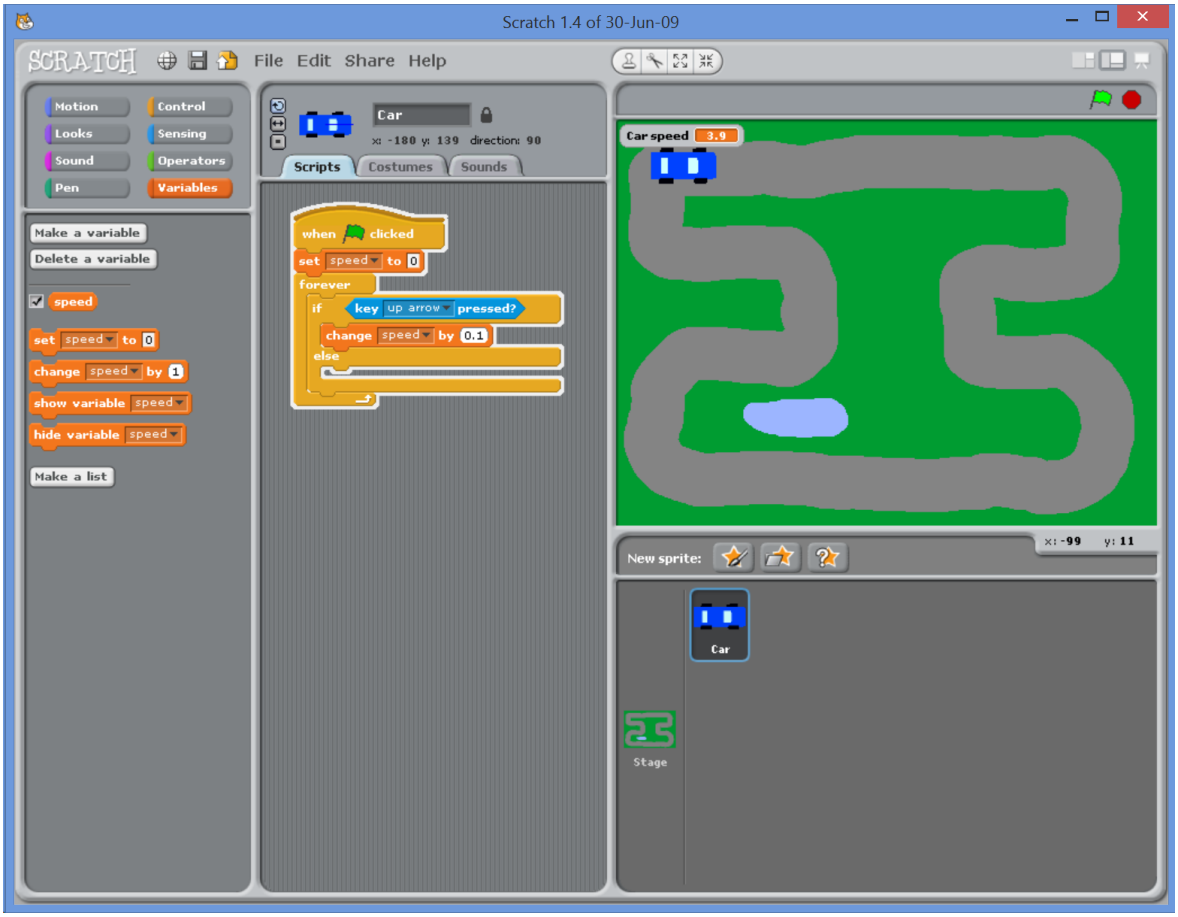


Now that we have a variable, we should initialise it whenever our game starts. Add a new block from the orange ‘Variables’ section just underneath the green flag block:



Now every time we start our game by clicking the green flag button, the speed of the car will always start at 0.

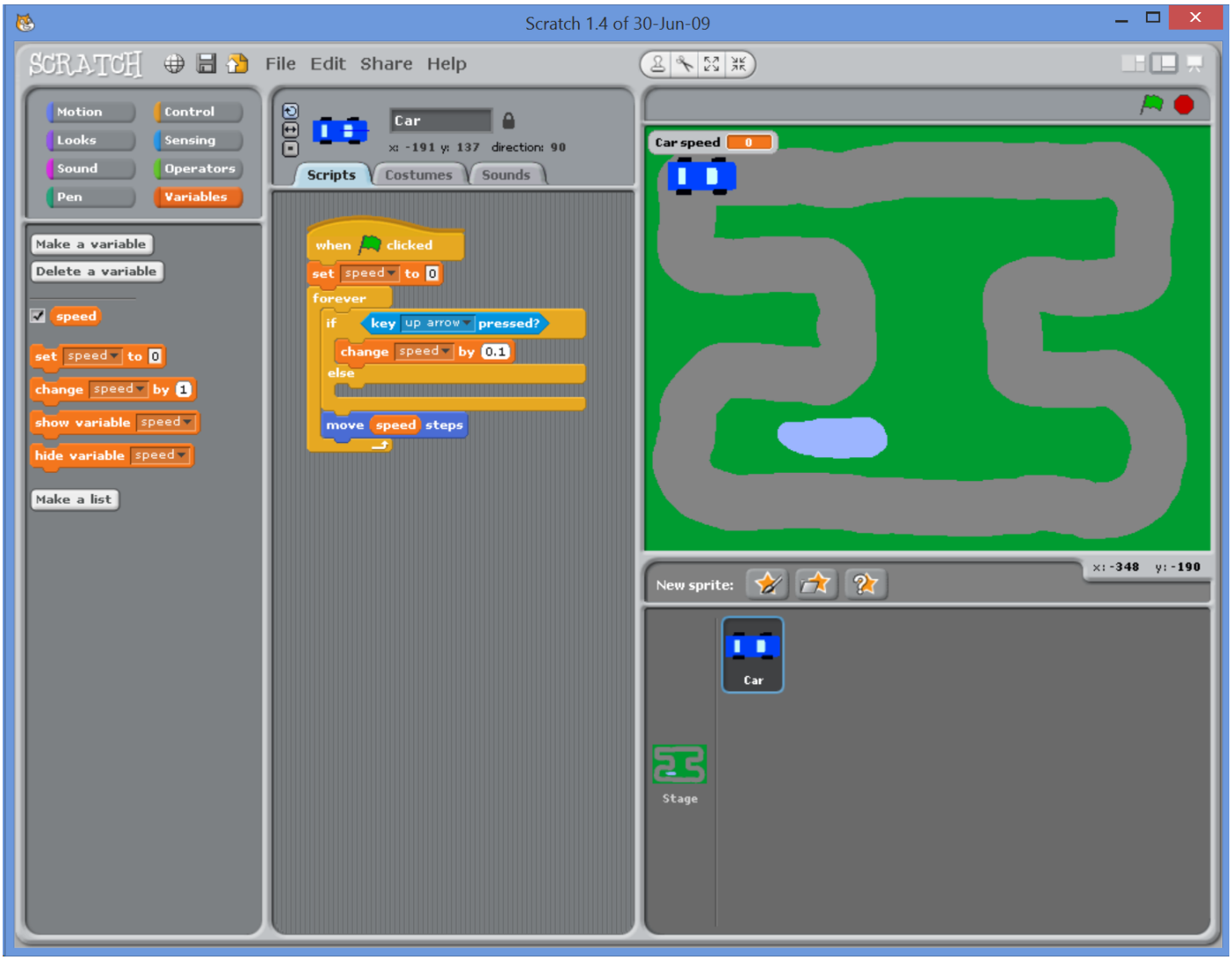
Next, we need to create a game loop that checks to see if the ‘up arrow’ key is being pressed. If it is, we increase the speed by a little bit:



Notice that we need a ‘forever’ loop and an if/else block from the yellow ‘Control’ section, a ‘key <up arrow> pressed?’ block from the blue ‘Sensing’ section and a ‘change <variable> by x’ block from the orange ‘Variables’ section.

If you click the green flag at this stage and press the up-arrow on the keyboard – nothing happens, although you might notice that the value in the speed variable displayed in the game window goes up. Make sure your speed is only going up a little bit at a time.

Next we need to actually move the car forwards based on its speed. Add a dark-blue ‘Motion’ block just before the end of the ‘forever’ loop:

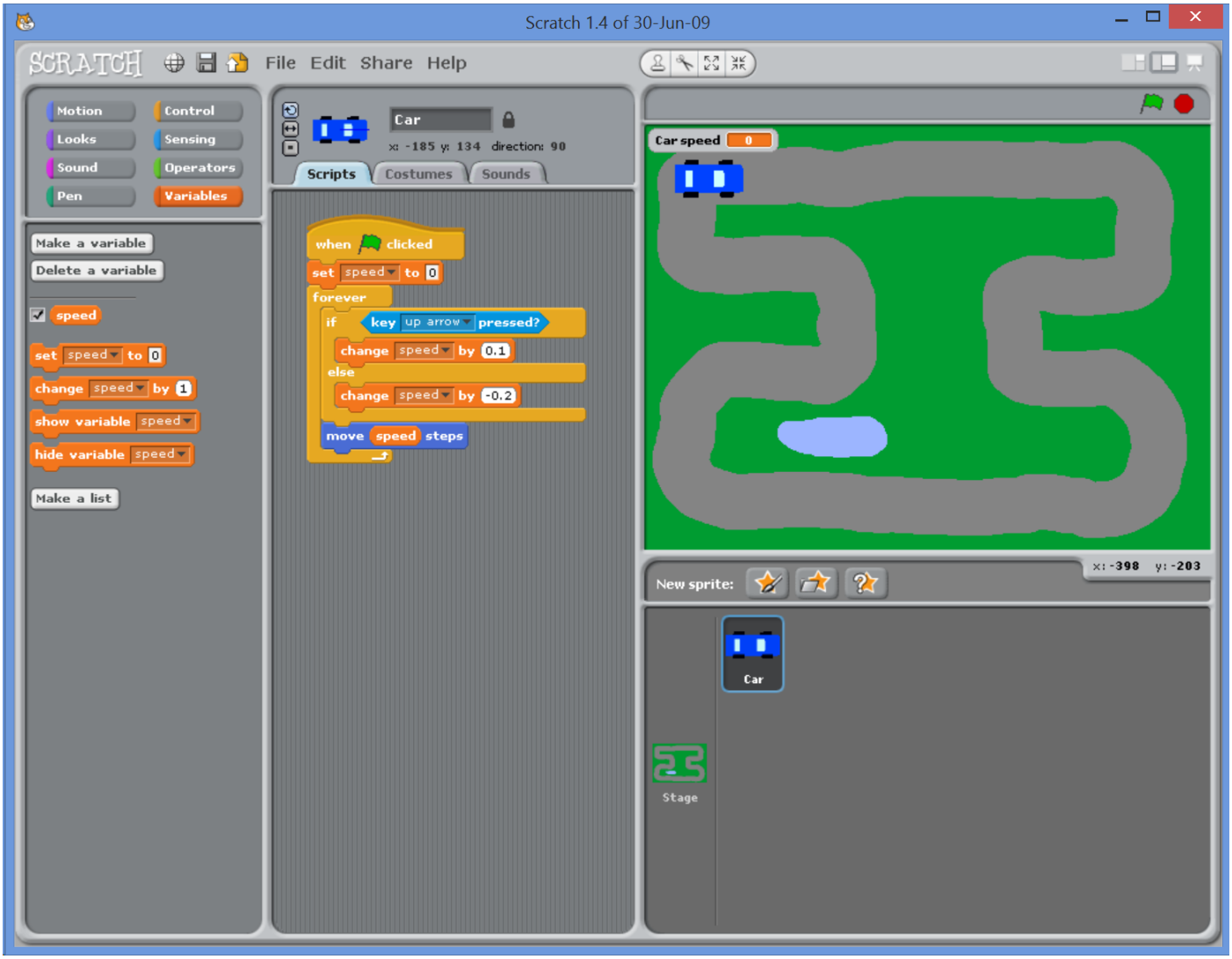


Notice that instead of typing a number in the ‘move <number> steps’ block, we’ve dragged the speed variable from the orange ‘Variables’ section and dropped it into the number slot. This means our car will move the number of steps stored in our speed variable each time the loop goes around.

If we click the green flag now, and press the up-arrow on our keyboard, our car will start moving to the right, faster and faster until it hits the side of the screen!

Not quite what we want, but definitely a start! Let’s get the car to slow down when we aren’t pressing the up-arrow key.

To do this, we need to add some blocks into the ‘else’ part of the if/else block we added earlier. “If a key is pressed, increase the speed, else decrease the speed.”

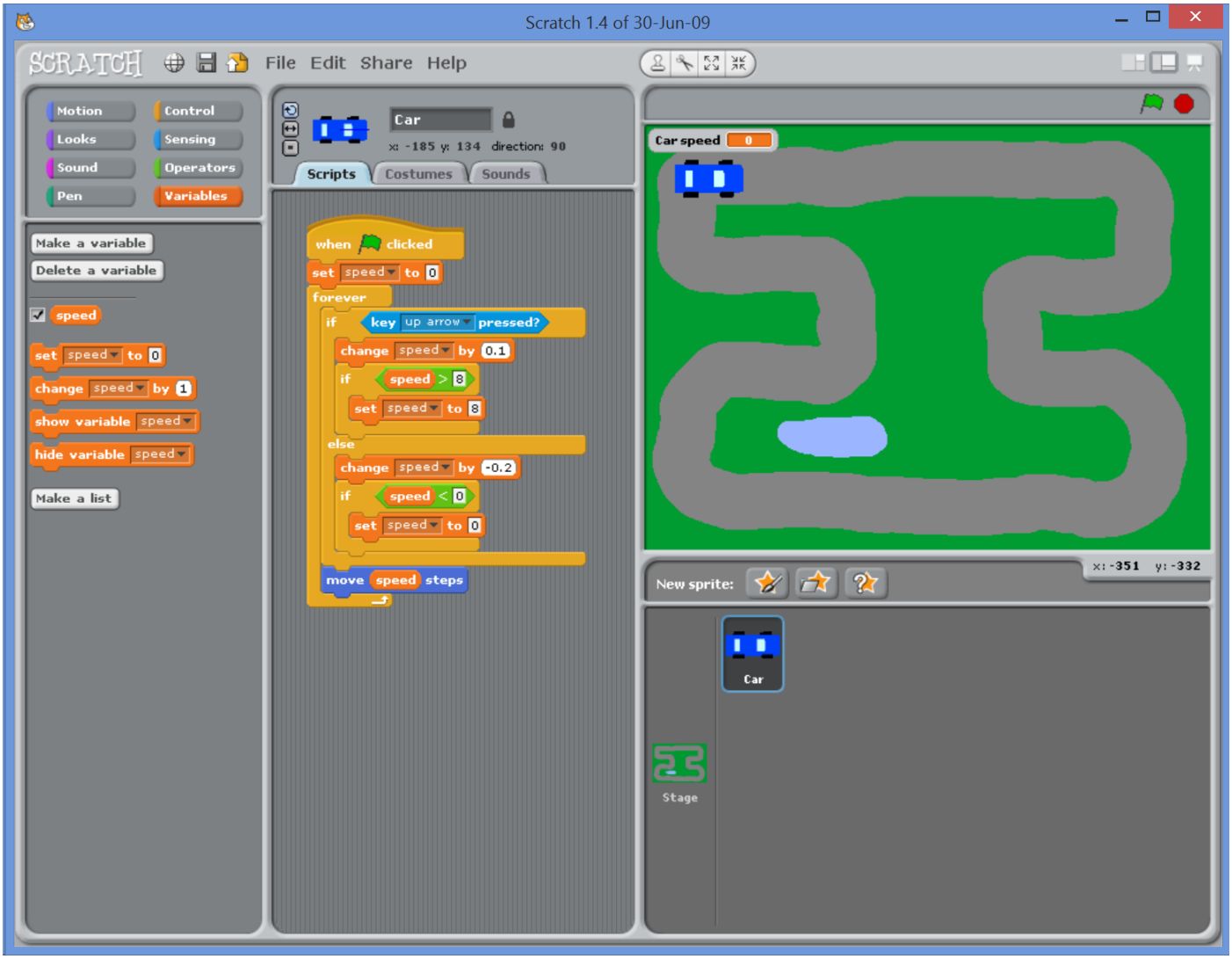


One block added to the ‘else’ part of the ‘if/else’ block that changes the speed variable by -0.2 if the up-arrow key isn’t being pressed.

Click the green flag button again – Oh no! If we don’t immediately press the up-arrow key, our car starts going backwards! Hold down the up-arrow key for a little while and eventually the car starts moving forward again!

We need to **limit** the speed variable, so that it never goes below zero. We should probably also limit it so it never goes higher than a maximum speed. Let’s say 8.0 is our maximum speed.

Add a simple ‘if’ block to both parts of the ‘if/else’ block we’ve been working on.

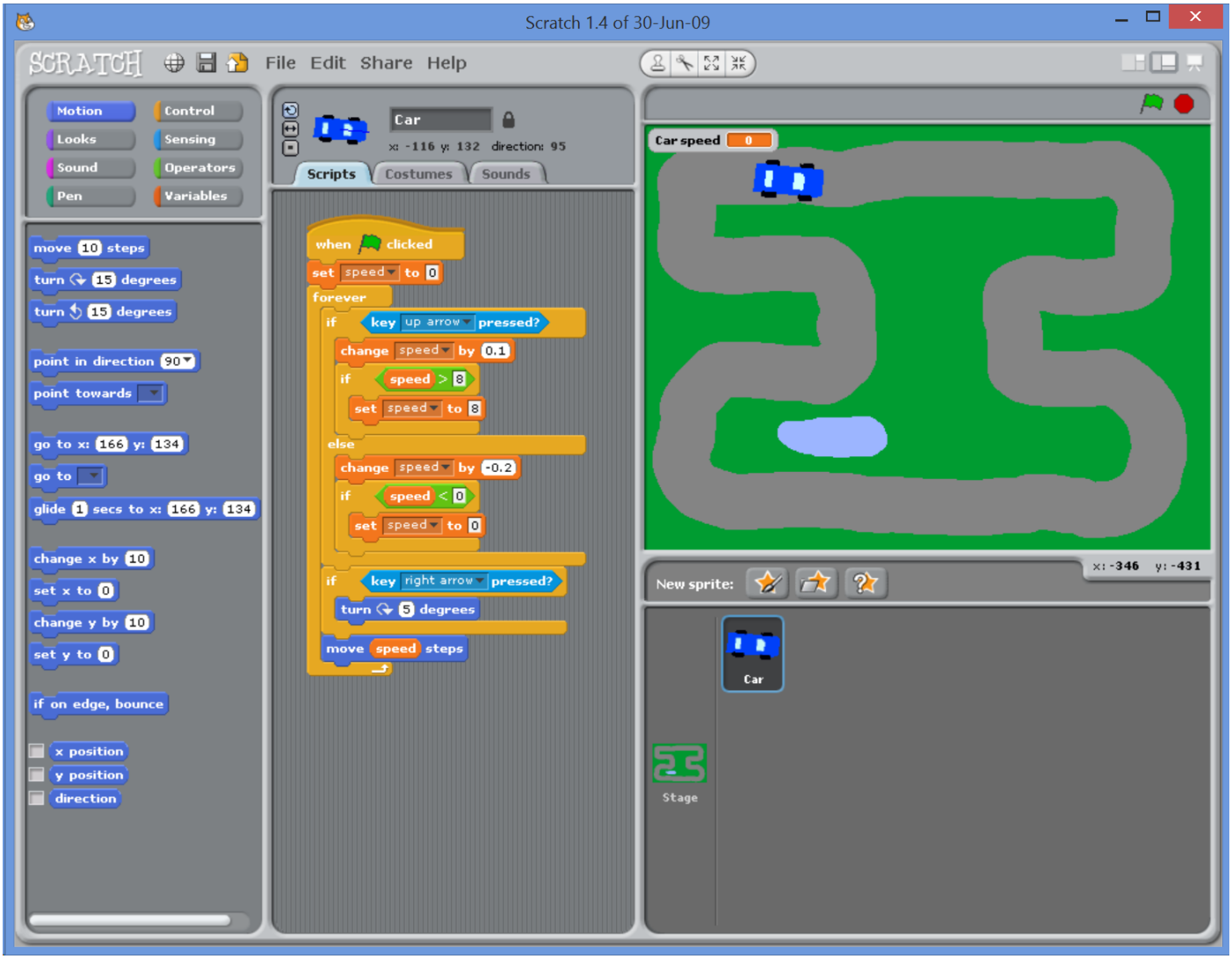


There's quite a lot going on in this part, notice that we've used blocks from the green 'Operators' section in the new 'if' blocks. "If the *speed* variable is **bigger than** 8, set *speed* to 8" and "if the *speed* variable is **smaller than <** 0, set *speed* to 0".

These two if statements ensure that the *speed* can never be too big, or too small.

Press the green flag button now and see what happens when you press the up-arrow!

Next we need to add some steering. Watch the placement of these next blocks, because it's really easy to put them in the wrong place!



New blocks have come from the yellow ‘Control’ section for the ‘if’, light-blue ‘Sensing’ for the ‘key <right arrow>’ and dark-blue ‘Motion’ for the ‘turn <right> 5 degrees’.

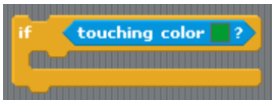
Make sure you put them in the right place – these blocks need to go just above the ‘move <speed> steps’ block, but *not* inside the ‘if/else’ block we’ve been working on previously.

Try the green flag button – we should now be able to turn the car to the right using the right-arrow key!

You’re on your own now! **Your first task is to get the car steering to the left as well!** (hint: use the right-turn we just did to help you!).

Once you have your racer working turning left & right, try some of these challenges, or come up with your own:

Challenges

- Add a reverse that lets the car go backwards when the down-arrow key is pressed
- Use the 

combo to slow the car down if you leave the track. You could even try and make the steering go all wobbly by using another variable.
- Can you add a second car controllable using the <WASD> keys on your keyboard – race against a friend!
- Can you use the 

block to detect when the car crosses the start/finish line and keep a count of the number of laps completed?
- In the light-blue ‘Sensing’ section there is a timer block with a built-in *timer* variable. Can you use this to somehow show a lap-time?
- How about create some new car costumes that show dents and other damage when you hit obstacles on the track?