Code a Car Racing Game

MYO Spring 2022

Volunteer Introductions

- Name
- Preferred pronouns
- Year
- Major
- Why I chose STEM?
- Post-graduation plans

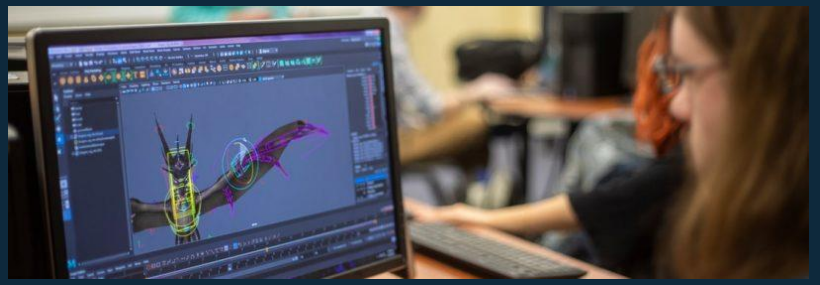
New To Coding?

- Have you ever seen a code?
- Programmed something yourself?
- Never seen a code before?
- We all start somewhere!

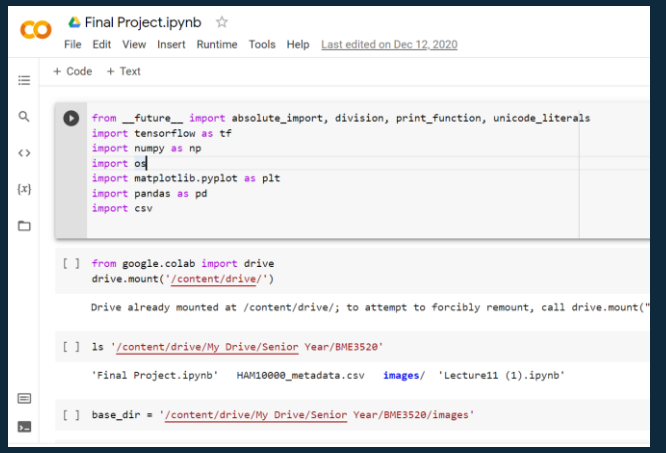
Computer Science Is Everywhere!

Related Majors:

- Computer Science
- Computer Science and Engineering
- Computer Engineering



Most majors and professions use computer science or coding in some way!



Can you name any examples?

Today we are making a car racing game

We will be using a website called Scratch.

Scratch is a coding language with a visual interface

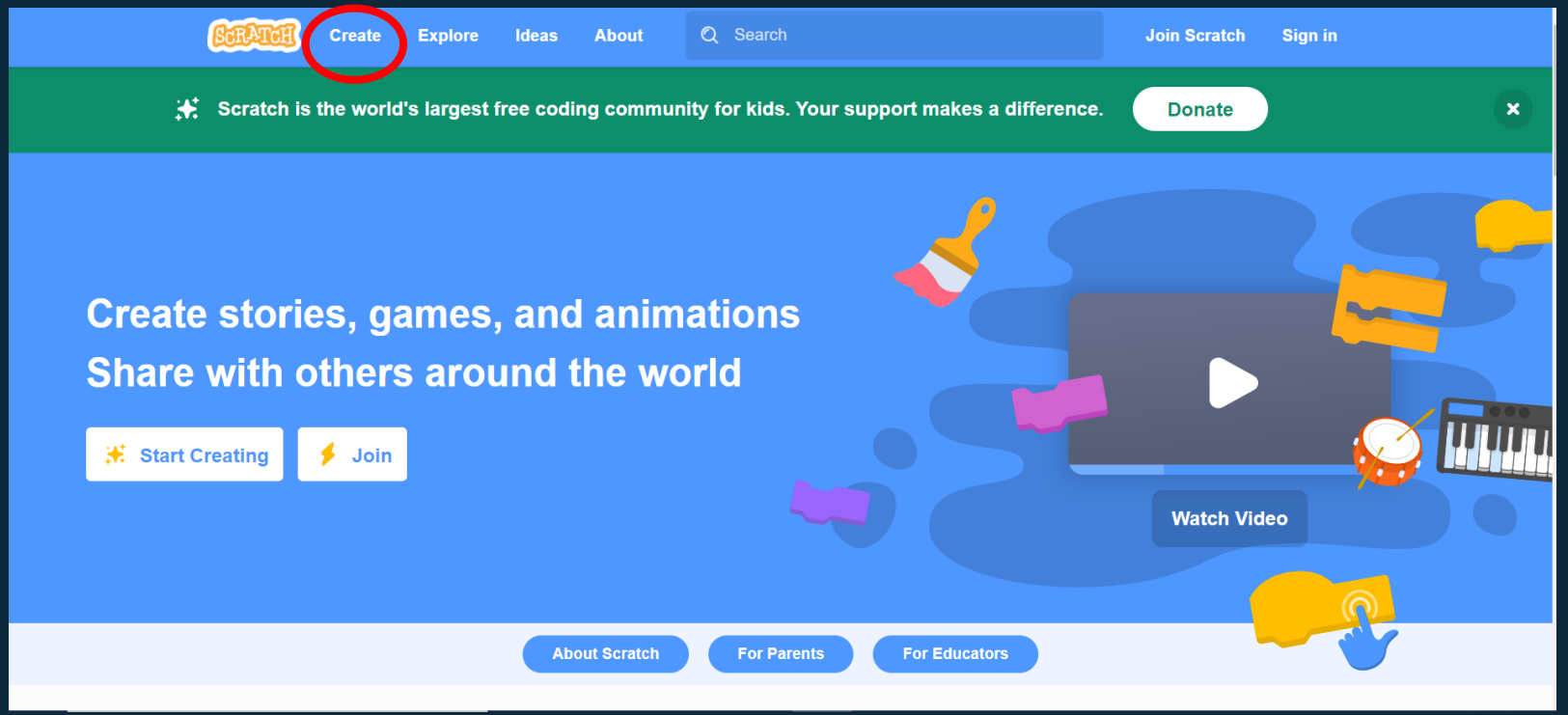
*Interface: where interactions between humans and machine occur

Let’s see what our game will look like!

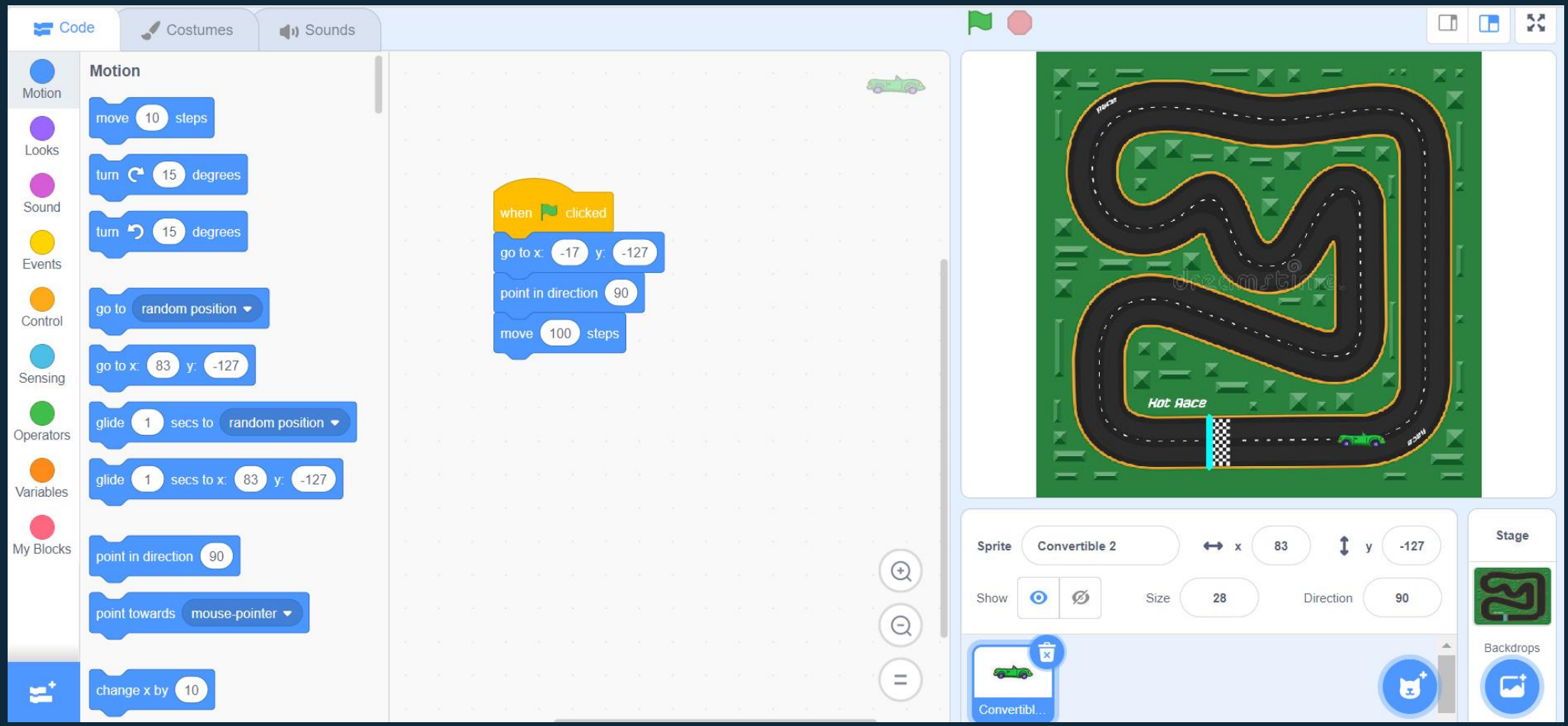
Let’s Get Started!

Go to scratch.mit.edu

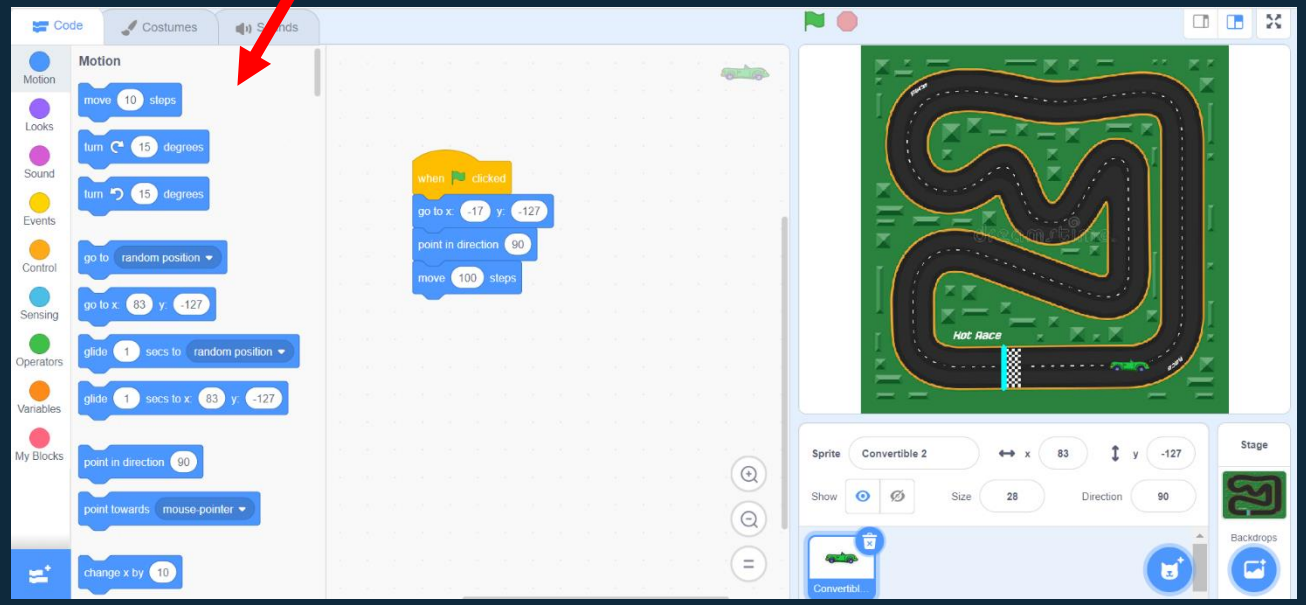
Click “Create” at the top

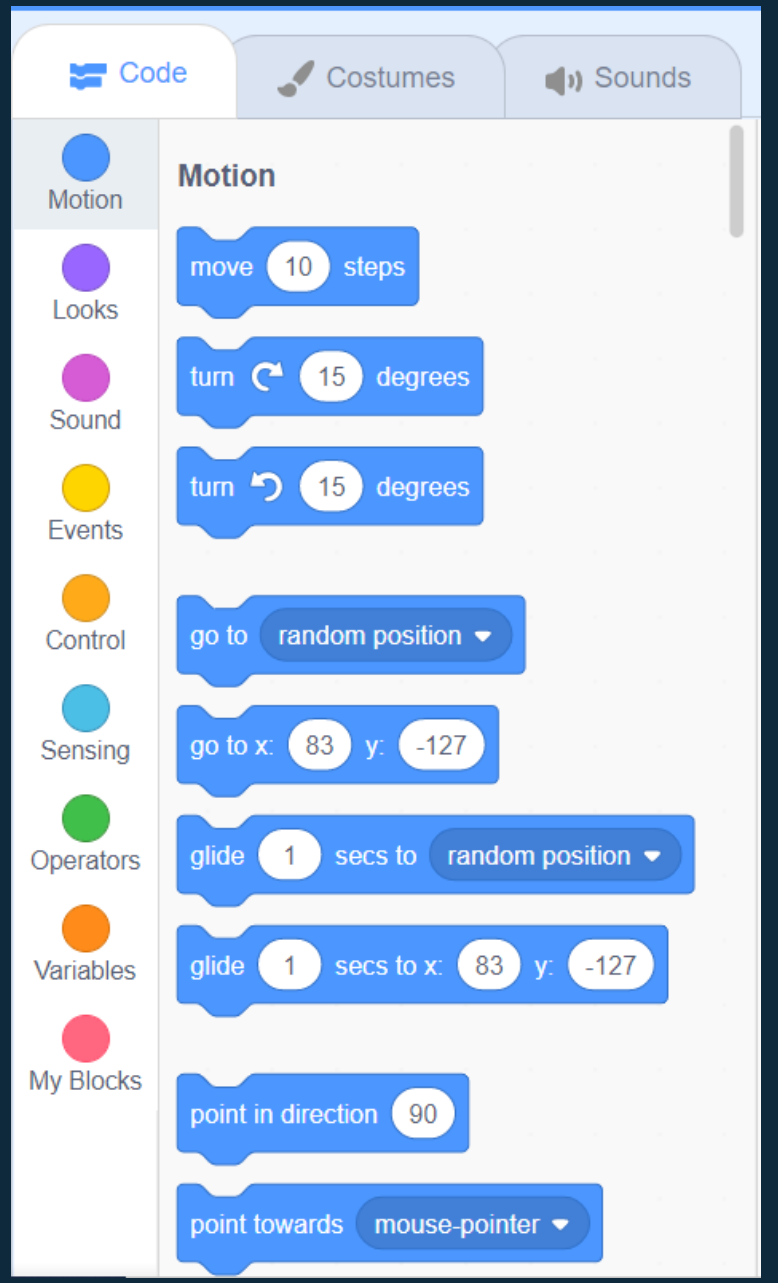


Home Page


Code
Costumes
Sounds
Motion
Looks
Sound
Events
Control
Sensing
Operators
Variables
My Blocks
move 10 steps
turn 15 degrees
turn 15 degrees
go to random position
go to x: 83 y: -127
glide 1 secs to random position
glide 1 secs to x: 83 y: -127
point in direction 90
point towards mouse-pointer
change x by 10
when clicked
go to x: -17 y: -127
point in direction 90
move 100 steps
Hot Race
Sprite
Convertible 2
x
83
y
-127
Show
Size
28
Direction
90
Stage
Backdrops
Convertibl...

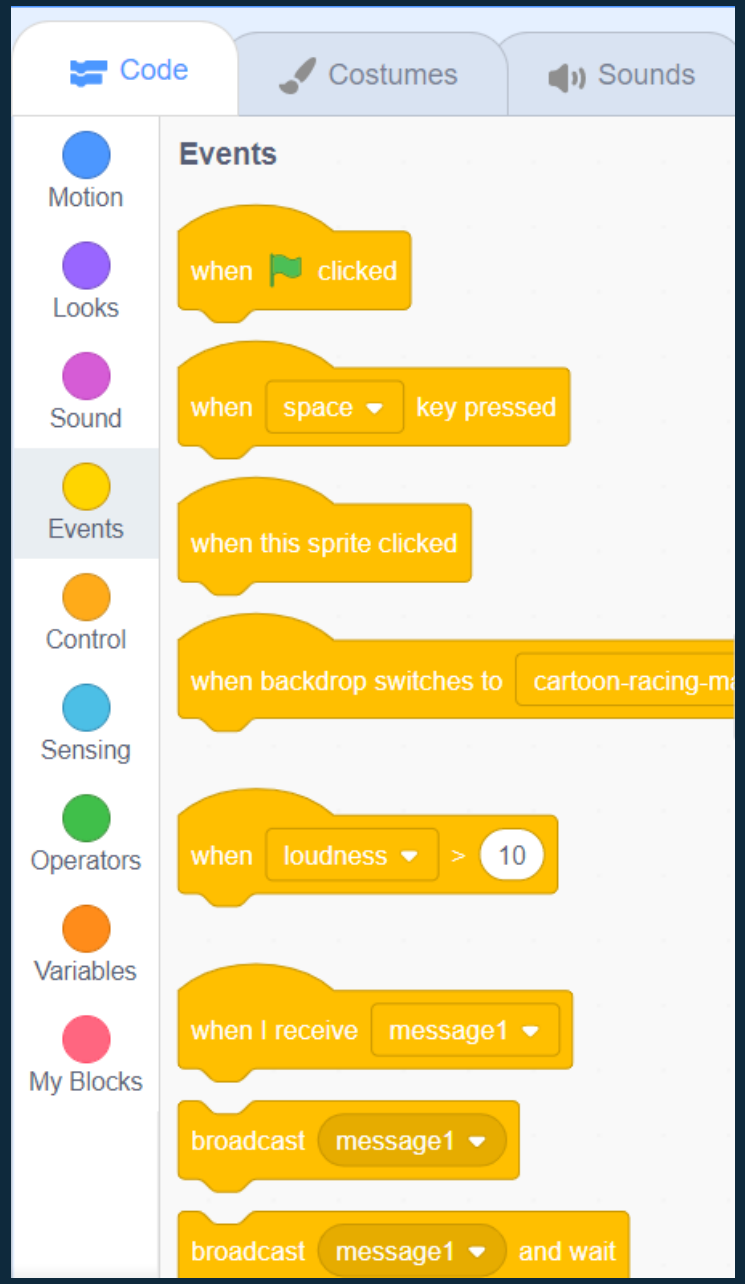
Command Center: Motion





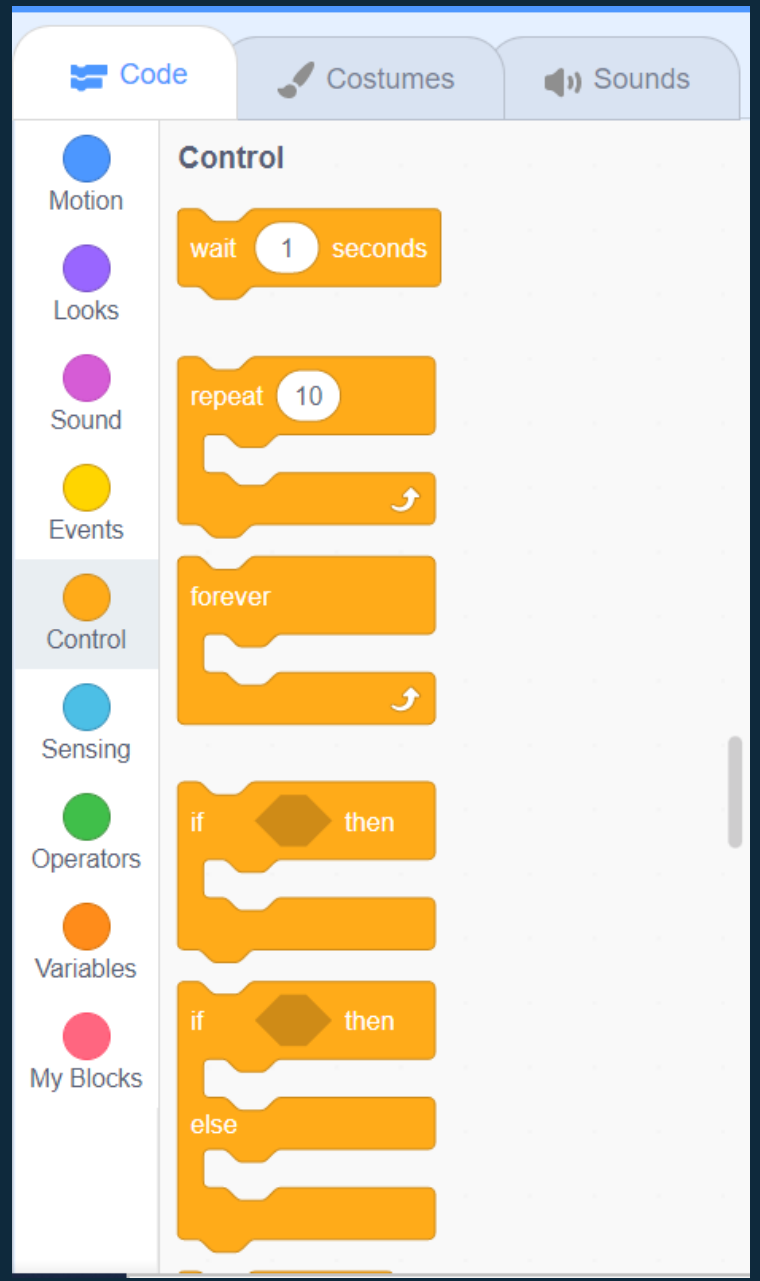
Command Center: Events

- Events go at the beginning of any code in Scratch
- You can have multiple events in one script
- The green flag at the top is used to start any code written



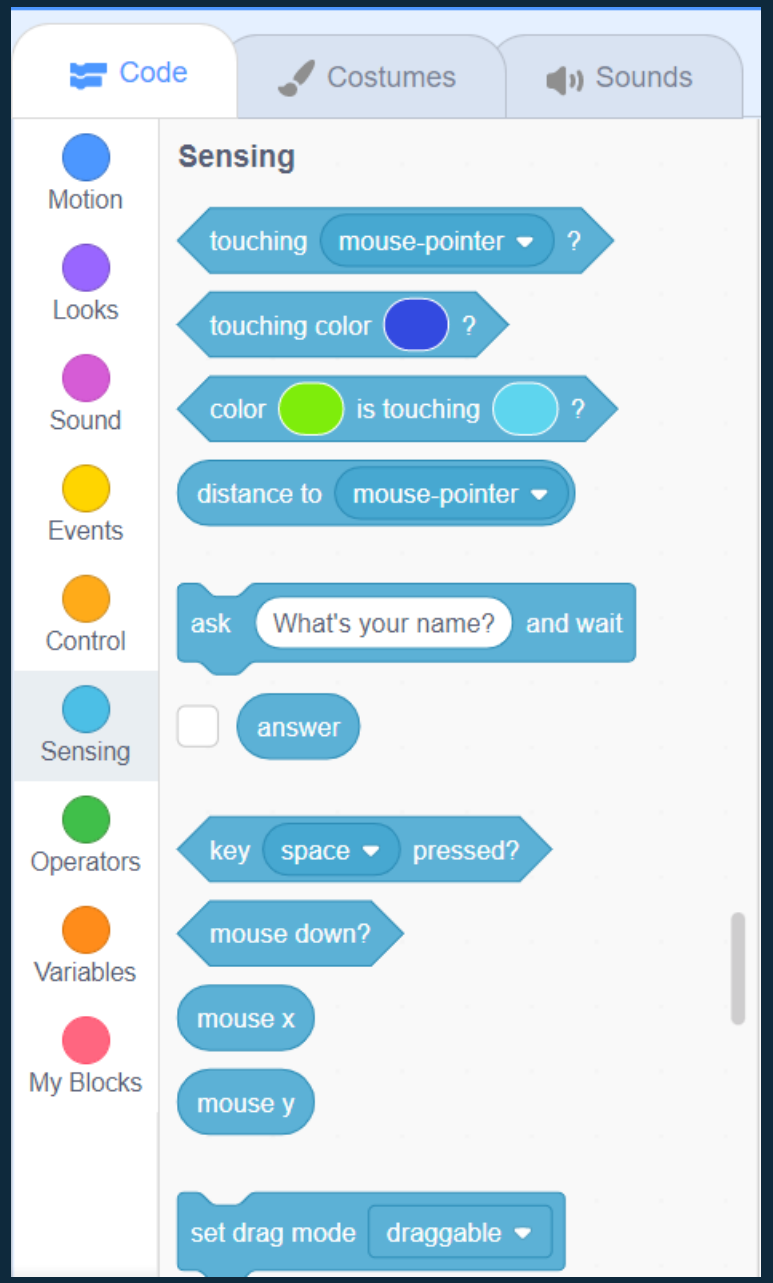
Command Center: Control

- Controls specify when and how long a command is run
- You will learn about some of these control commands later

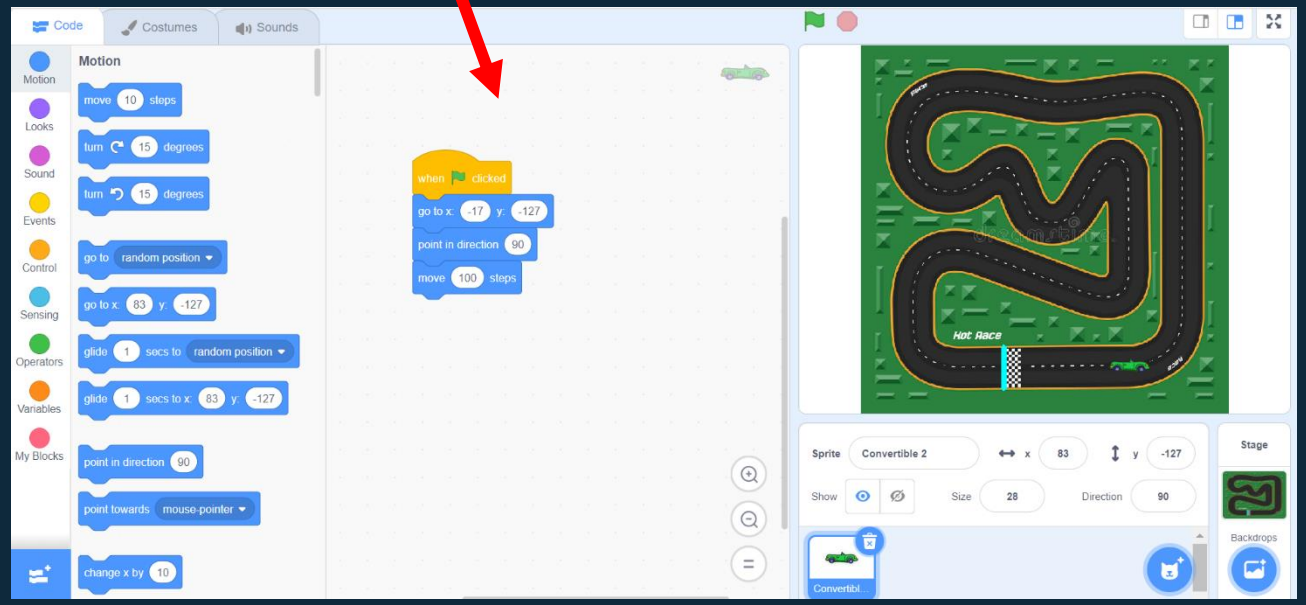


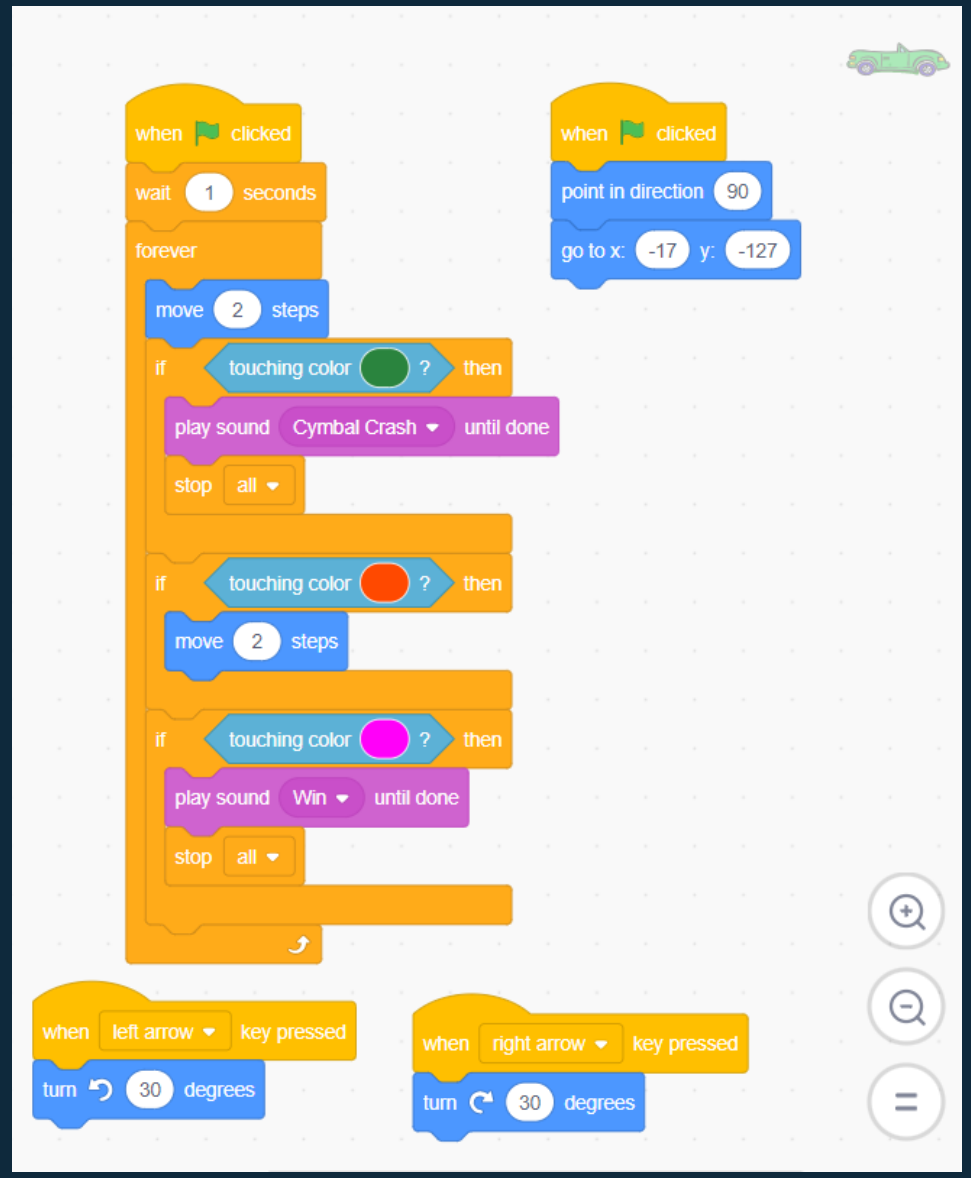
Command Center: Sensing

- Sensing commands pick up when something changes in your code
- Example: if object 1 moved closer to object 2, sensing commands would detect the movement and change how your code runs

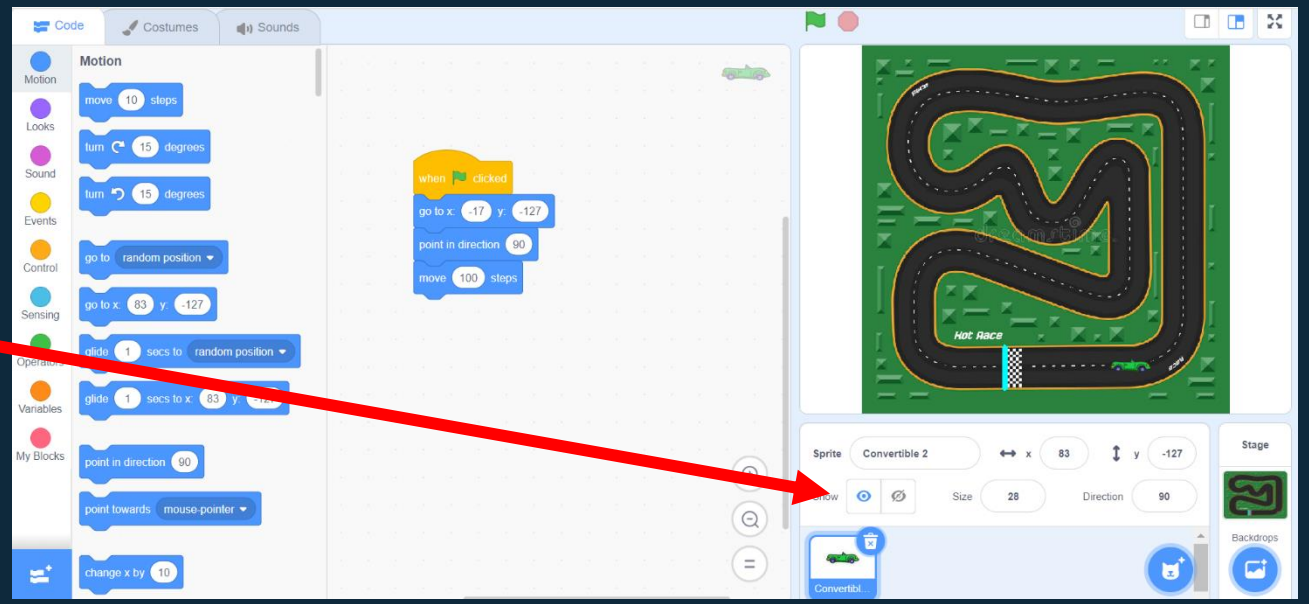


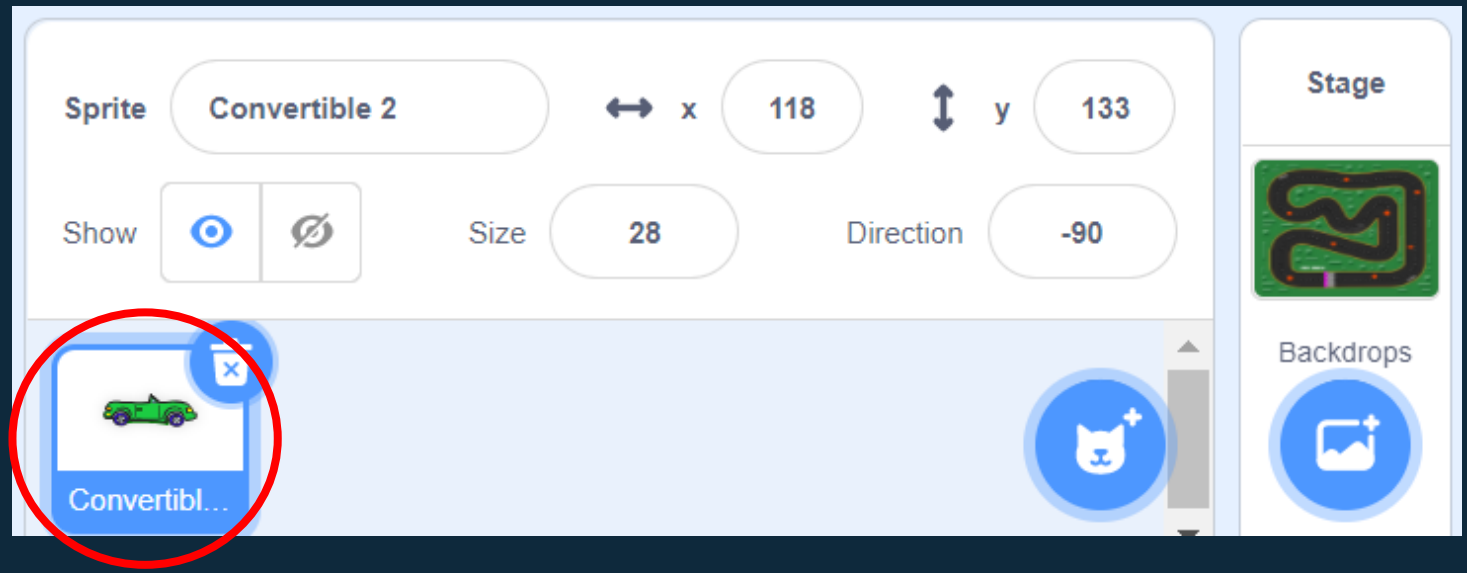
Programming Area





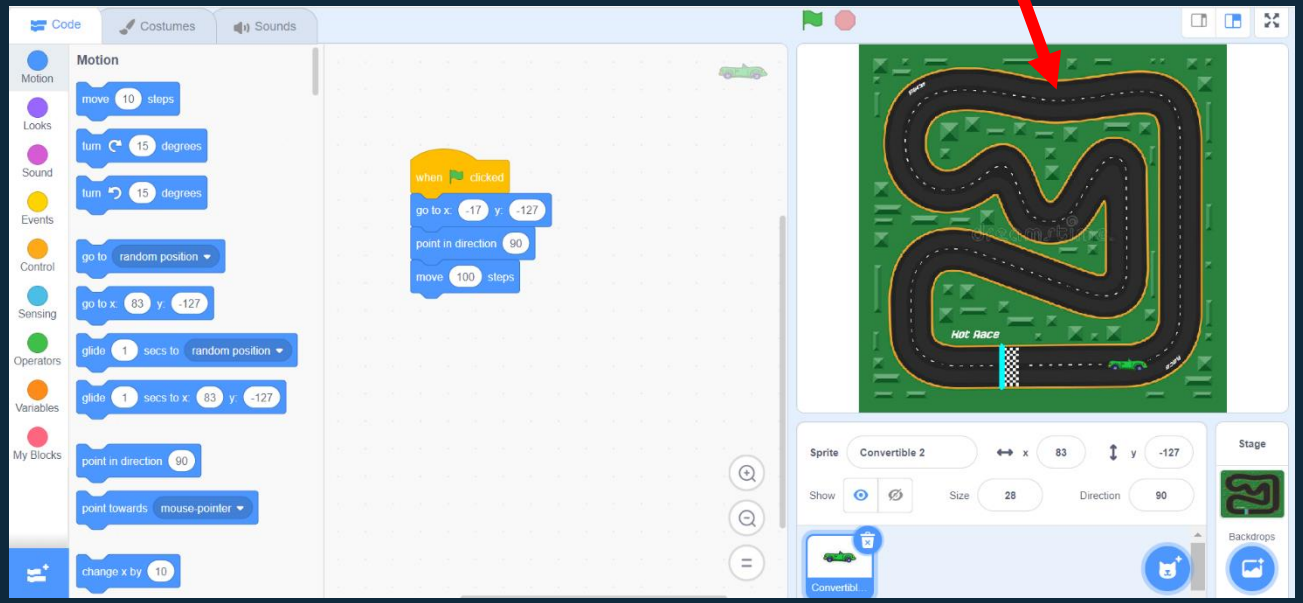
Costume Design Shop

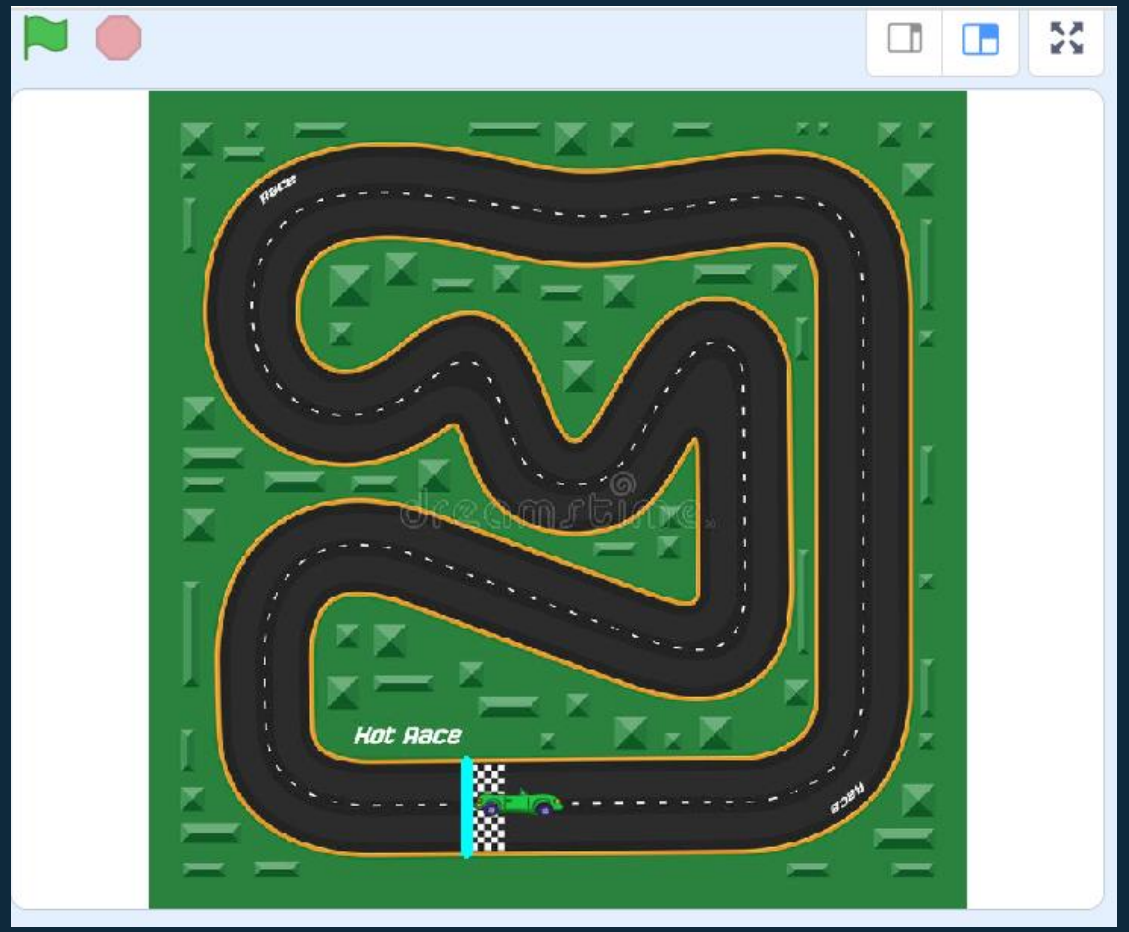




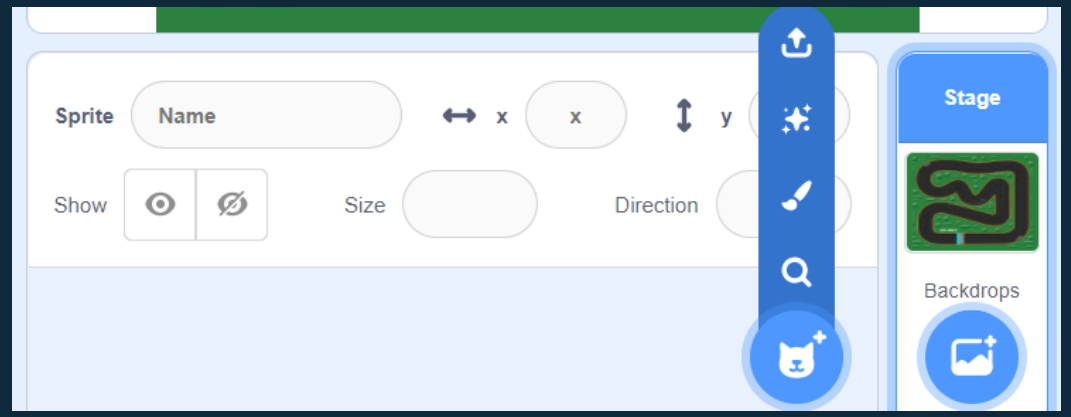
This is a Sprite

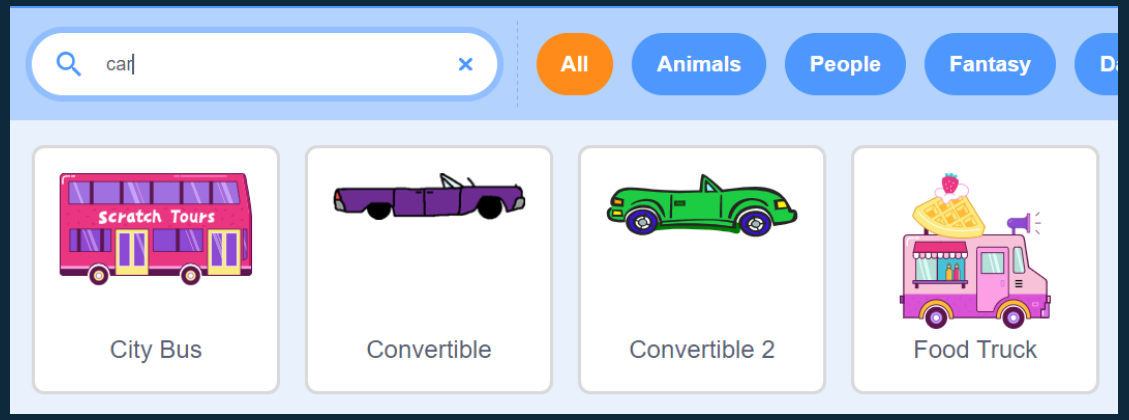
Display Window





Add Your Sprite





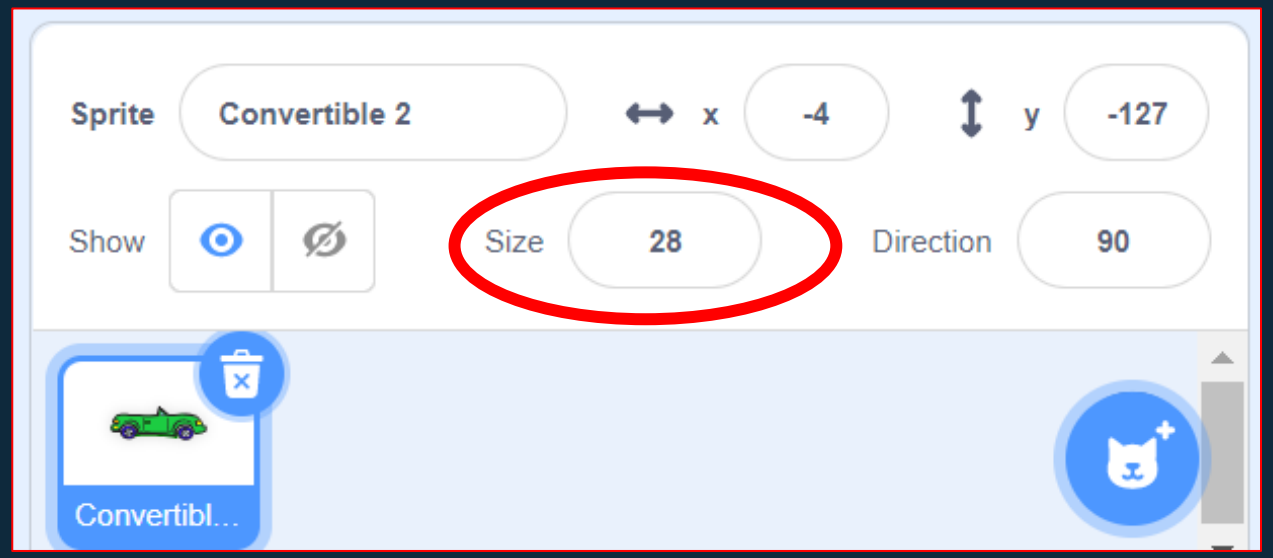
What issue do you see?

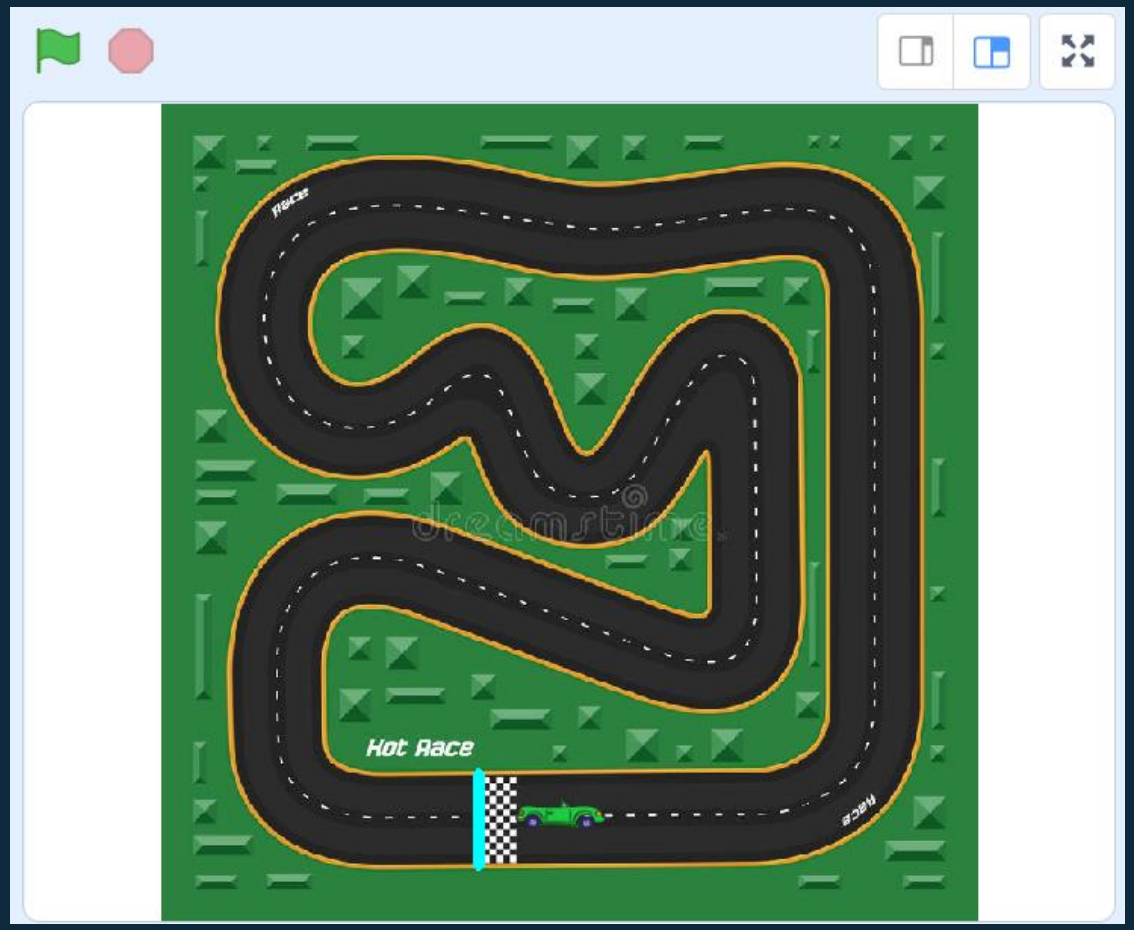
The car is too big!

How do you think we can fix it?

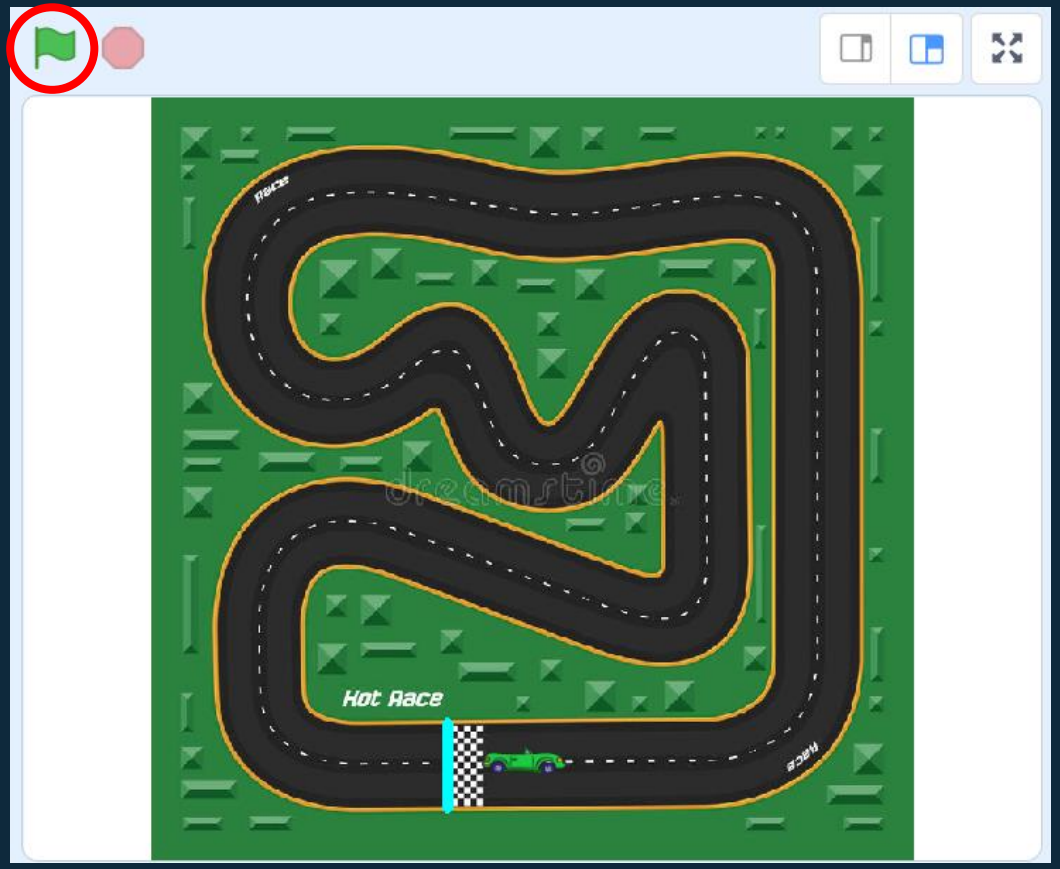
Change the size in the costume design shop!

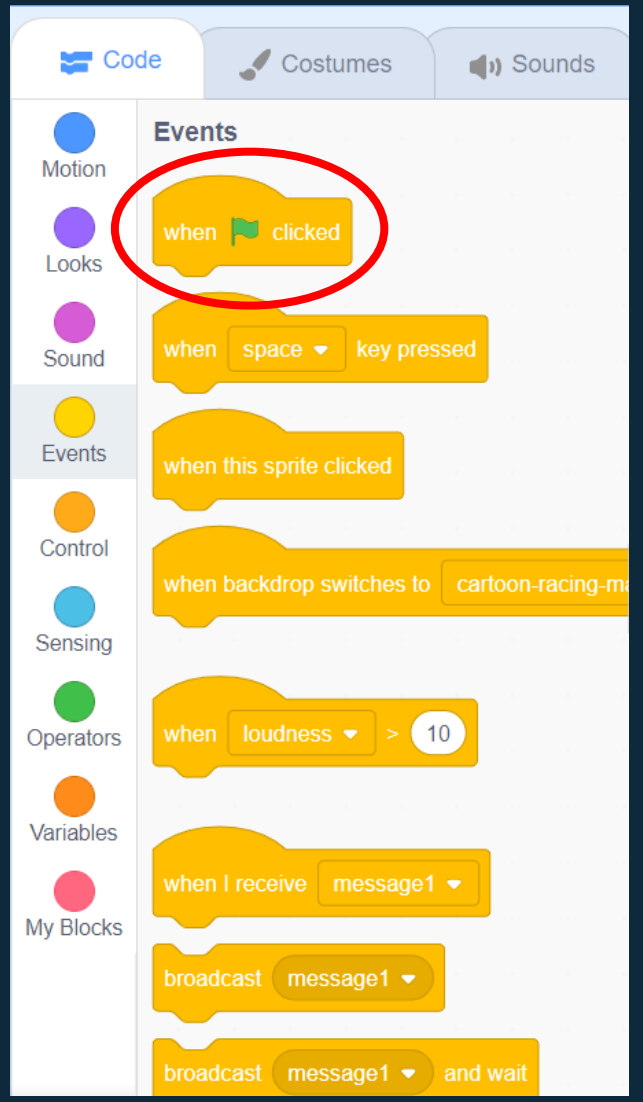
Set Up Your Sprite



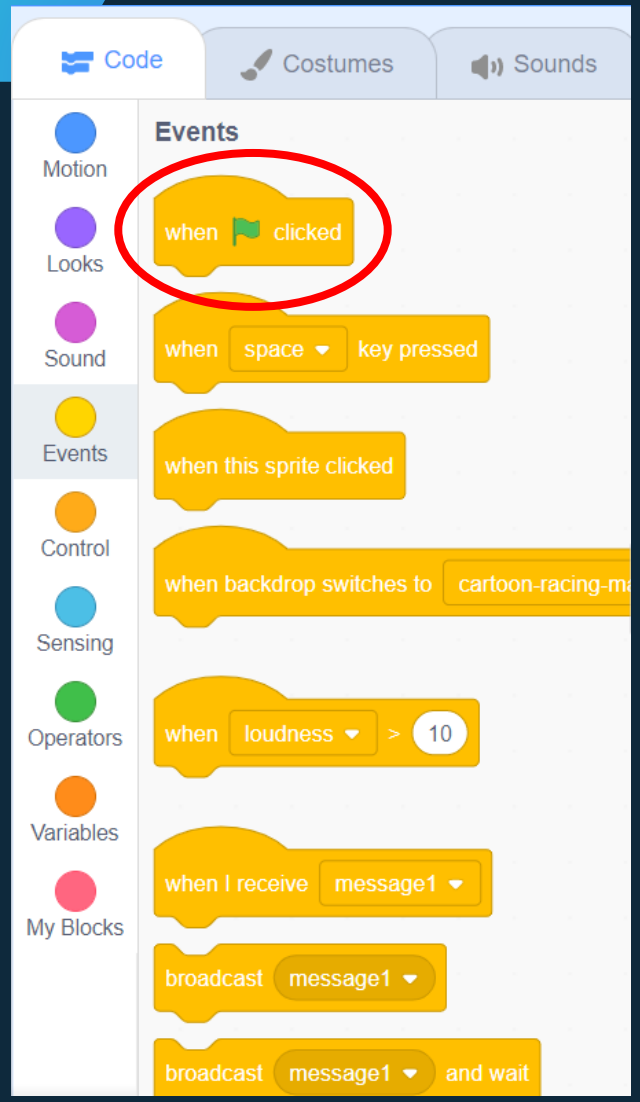


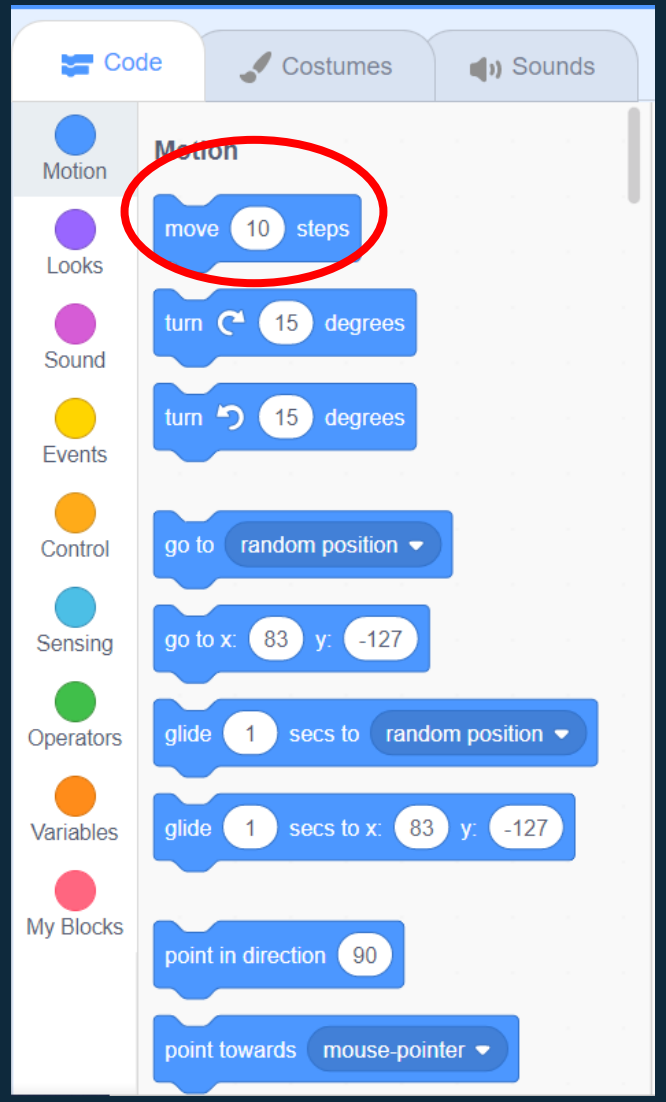
Starting Your Code

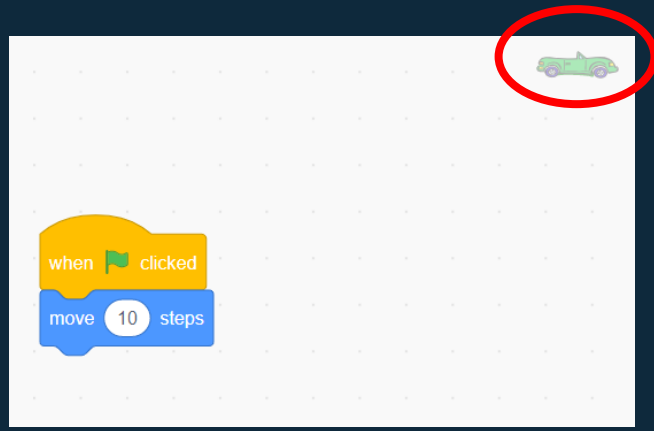




Programming Your Sprite







What happens when you click the green flag?

The car moves 10 steps and stops

How can we make it move continuously?

Use a loop!

What Are Loops?

Sometimes you want a section of your code to run multiple times without having to press start each time

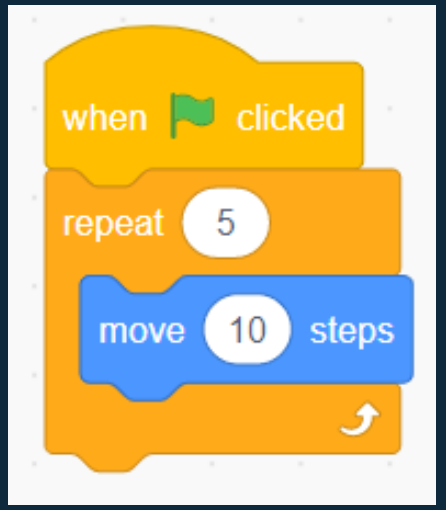
You can ***loop*** this section of the code to repeat on its own

Repeat X times:
    Move 10 steps

Loops In Scratch

Repeat # Loops:

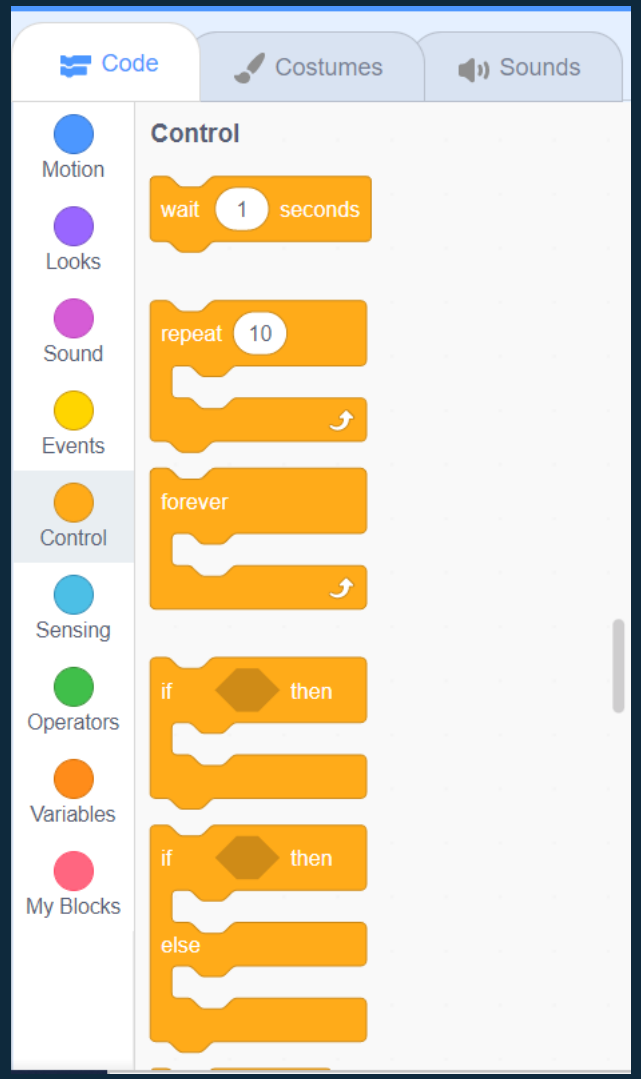
Will run the inside section of code X amount of times (5)



Forever Loops:

Will run the inside section of code forever **until the code is done**

Add a Forever Loop



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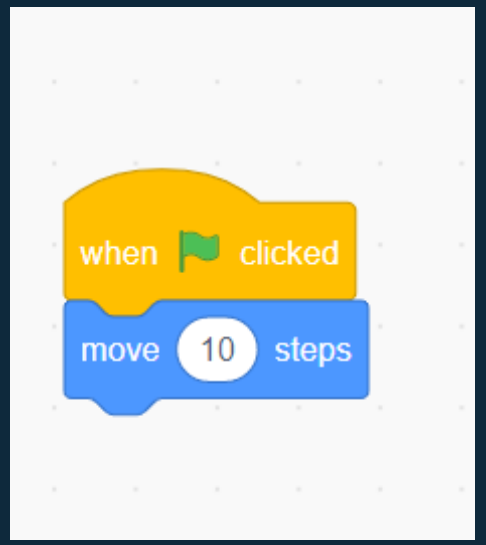

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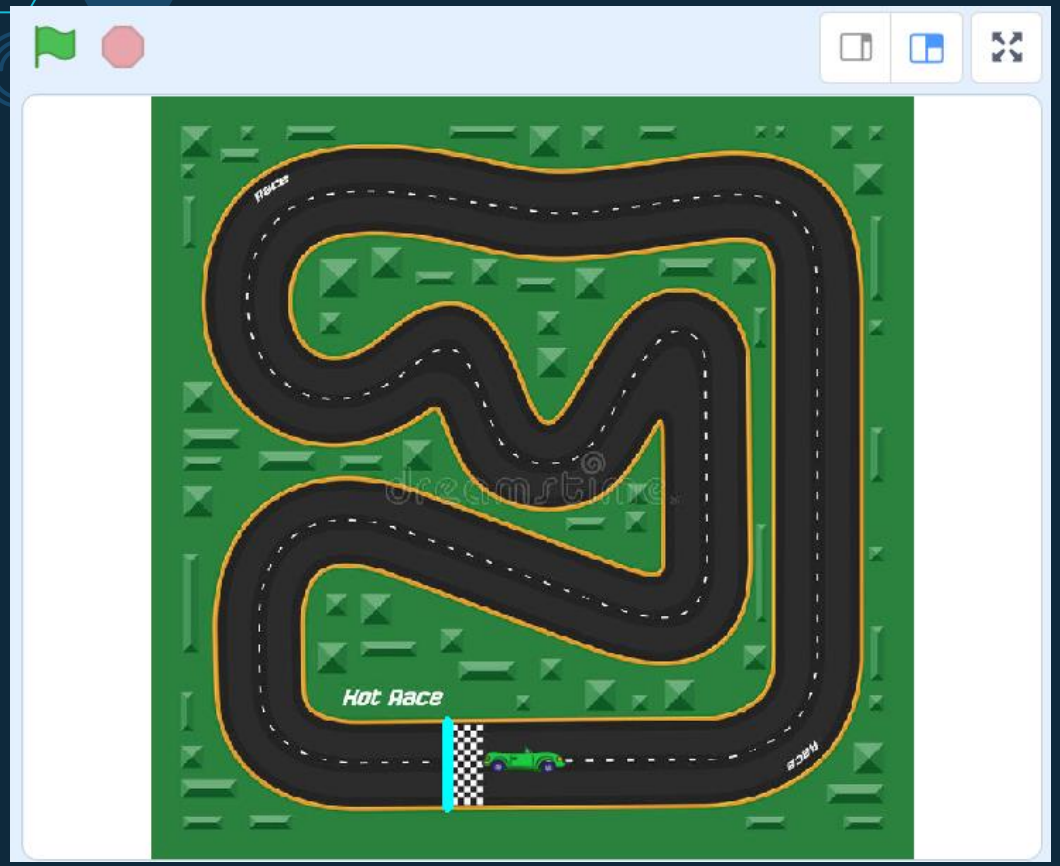
What happens when you click the green flag?

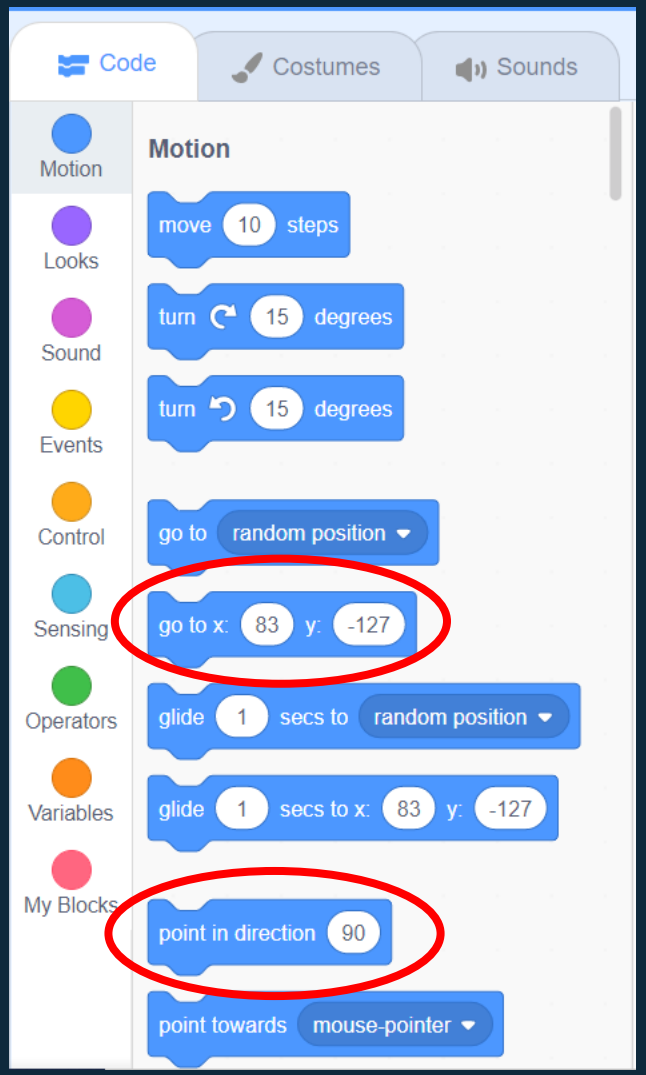
The car moves and doesn’t stop!

Try to run your code again. What happens?

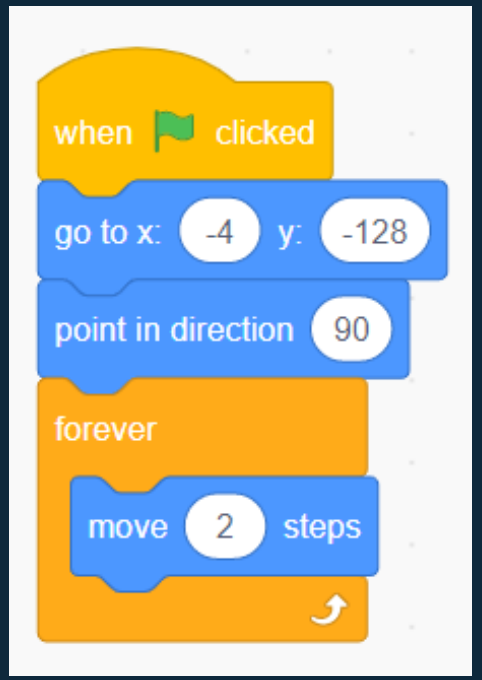
The car starts from the ending position of the previous run.

Restart Your Sprites Position





Inside or outside the forever loop?



Outside!

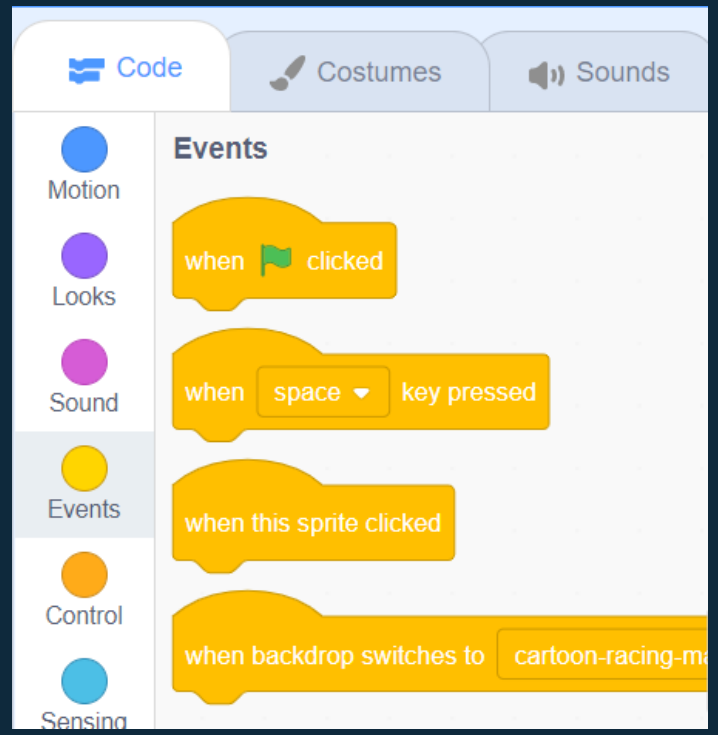
Test your code!

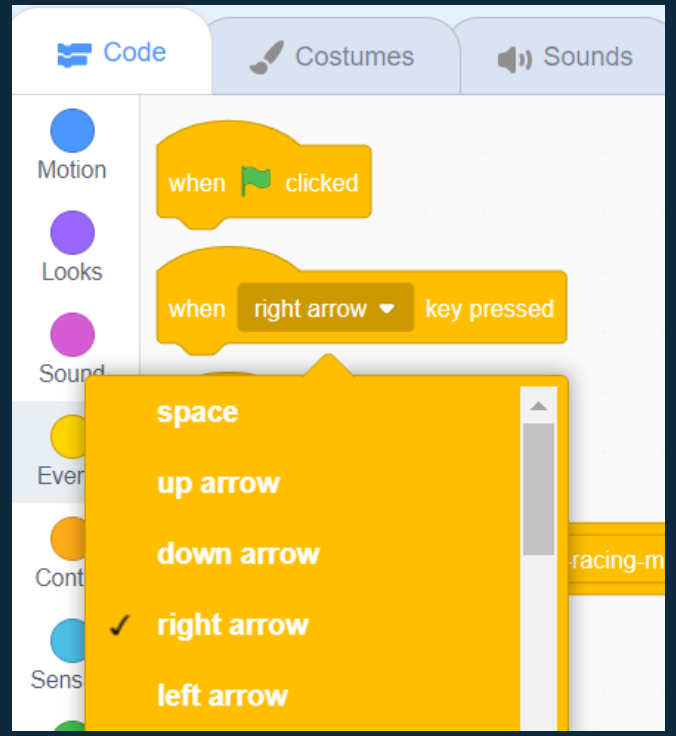
Coding is always trial and error! Testing it after each step can help you find any issues.

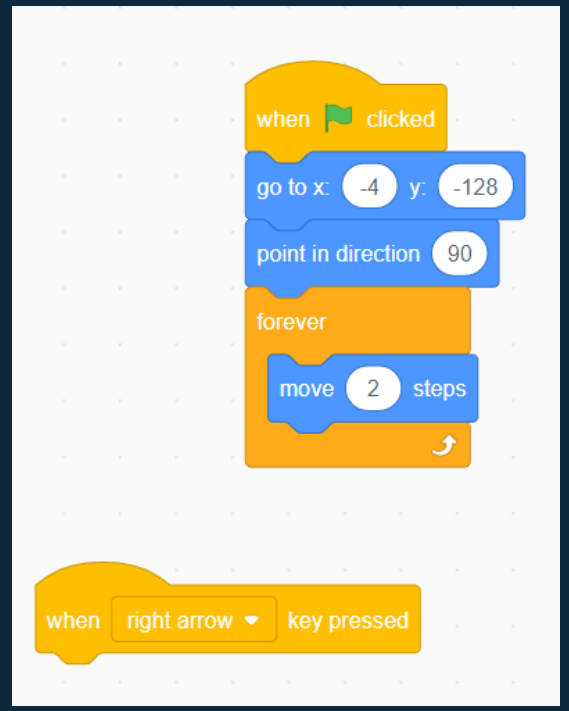
Let’s make the car turn!

Set Up Buttons To Turn Your Sprite

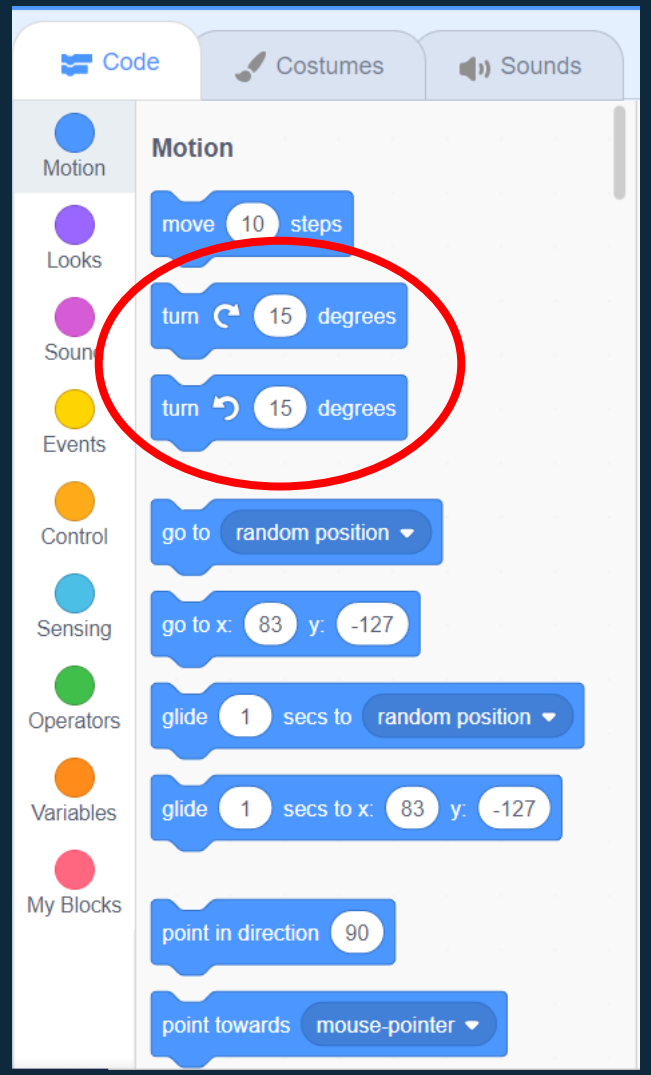
Repeat this twice, once for turning LEFT and once for turning RIGHT.

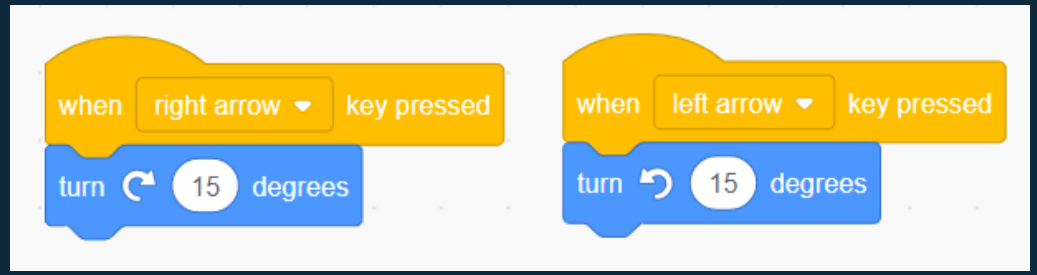






Choose Number of Degrees To Turn





Test out different numbers and find the one you like best!

Test your code!

Does it work as expected?

How can we make the game stop?

Either the car goes off the road or it crosses the finish line!

Conditional Statements: If

When an instruction in your code depends on a certain ***condition*** being true, it can be written out using “if ___, then ___” statements.

Everyday example:

If it is raining outside,

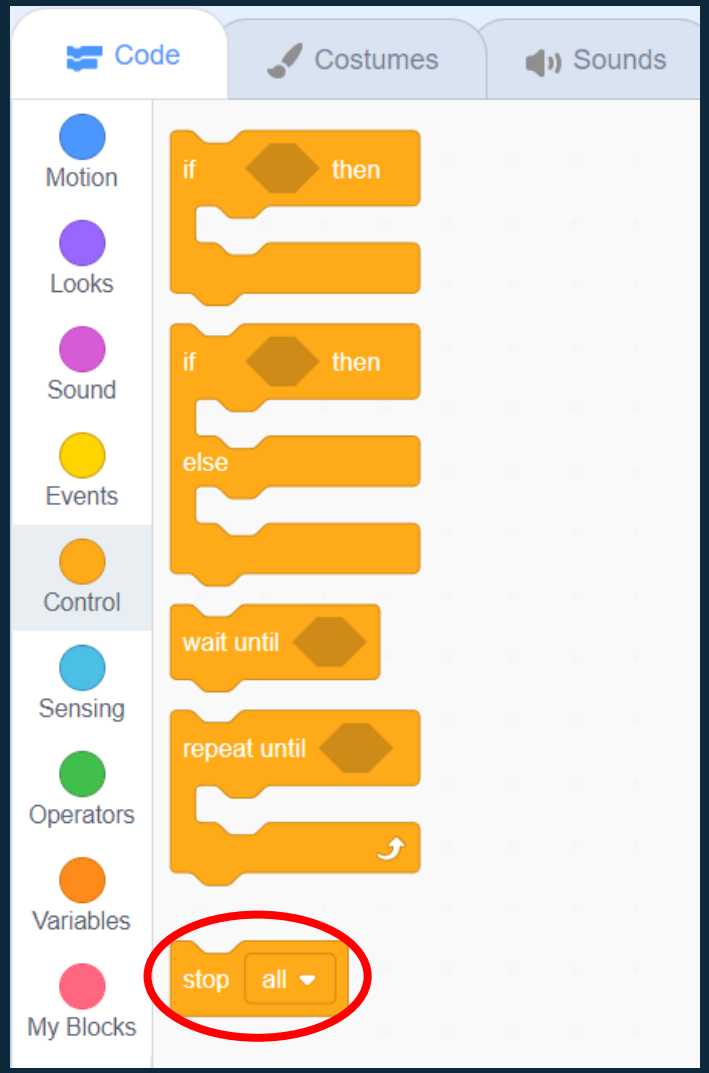
Then I will wear rain boots.

Coding example:

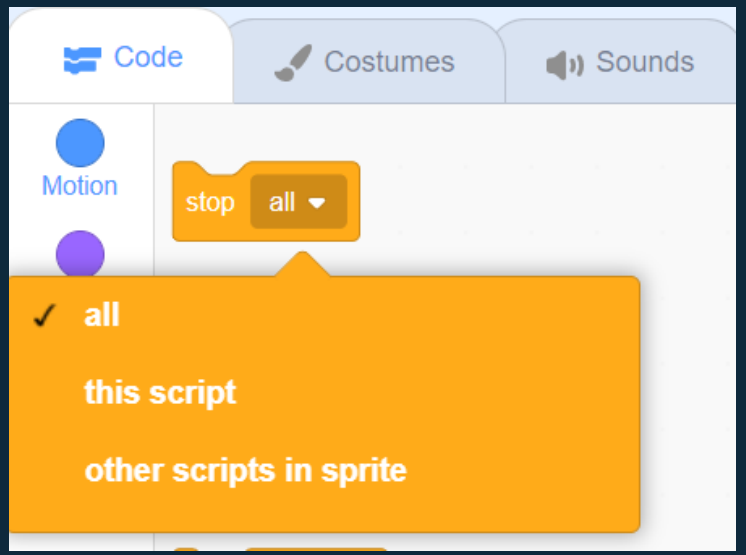
If my Sprite crosses the finish line,

Then end my game.

How To End Your Game



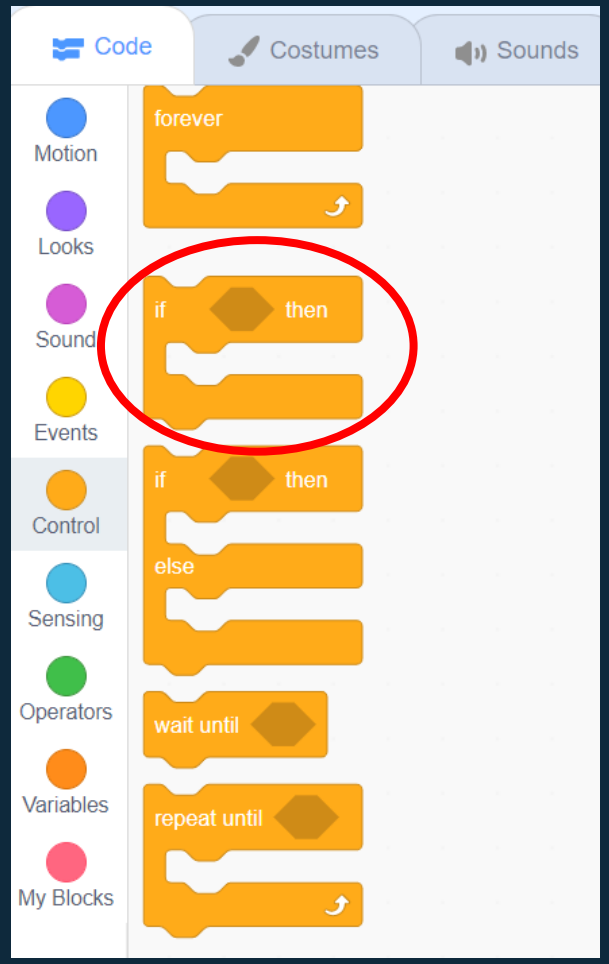
The “stop all” call will go inside an if statement.



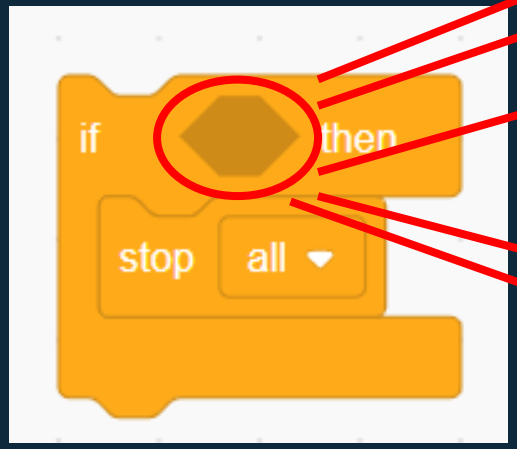
For this game, leave it marked as “all”.

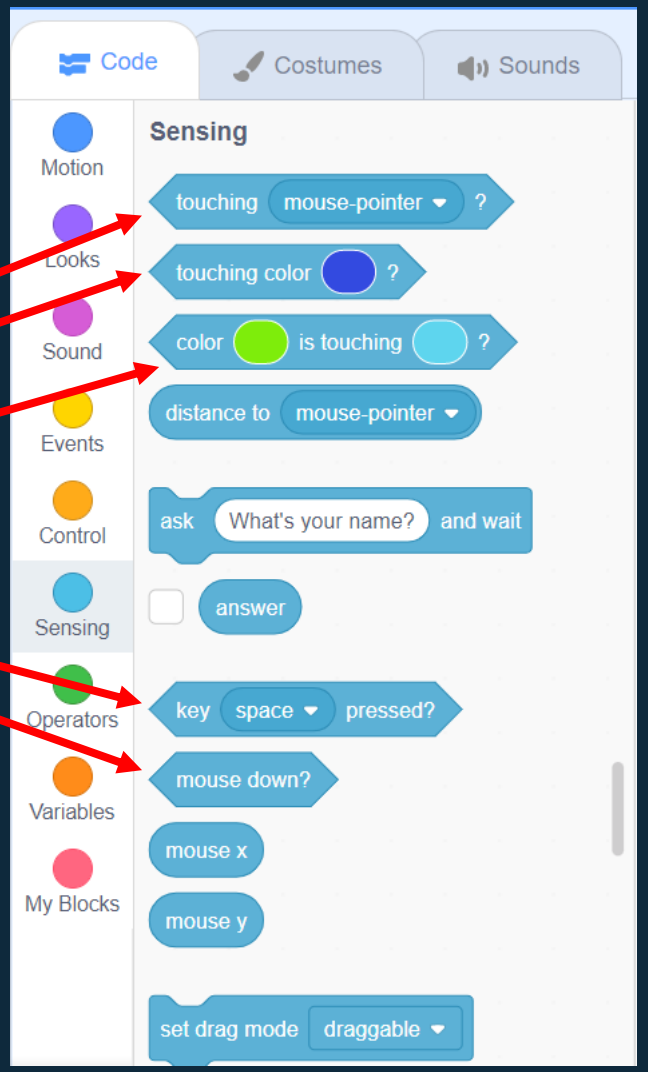
If Your Sprite Crosses the Finish Line…

Then stop the game!



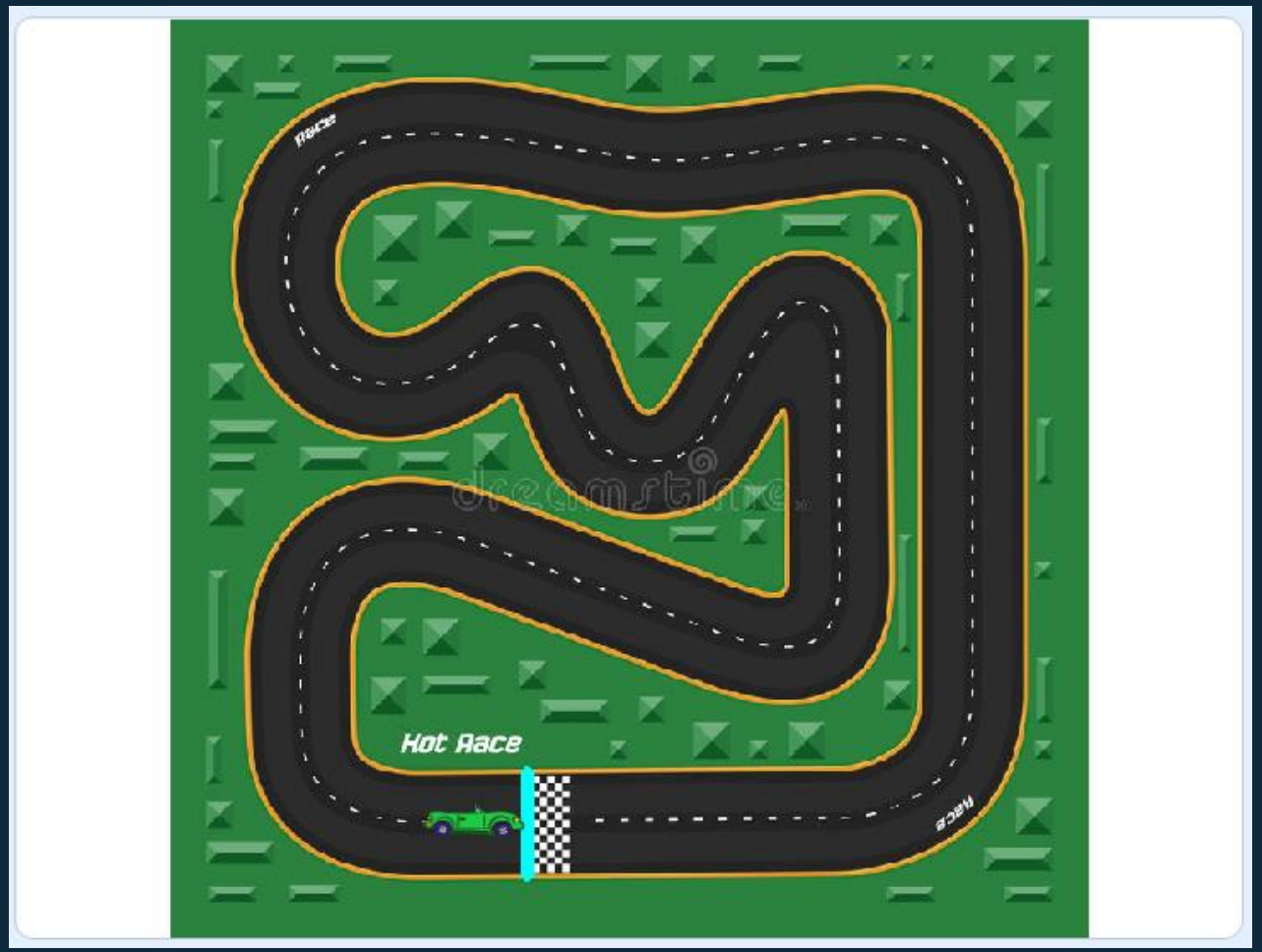
Shapes Must Match In Scratch

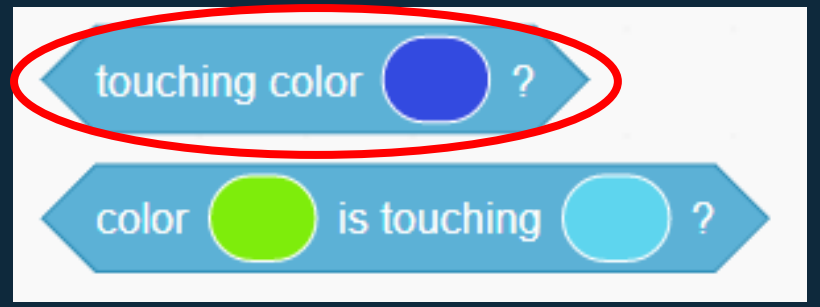




Which condition should we use?

Touching The Teal Line = Game Finished





Because there is only one moving object (the car) only the top option is needed!

Where should the if statement go in your code?

In the forever loop under the move action!

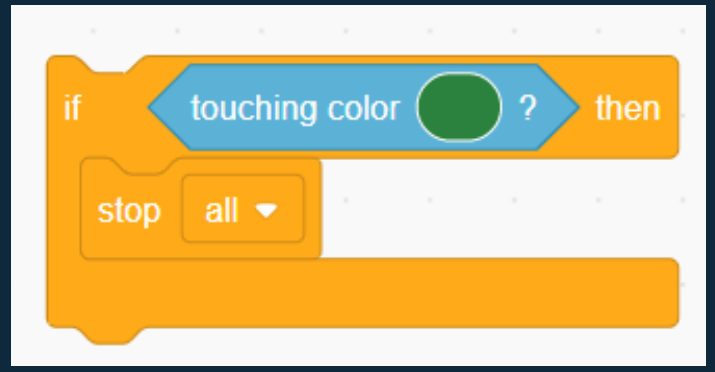
How should test if the car drives off the road?

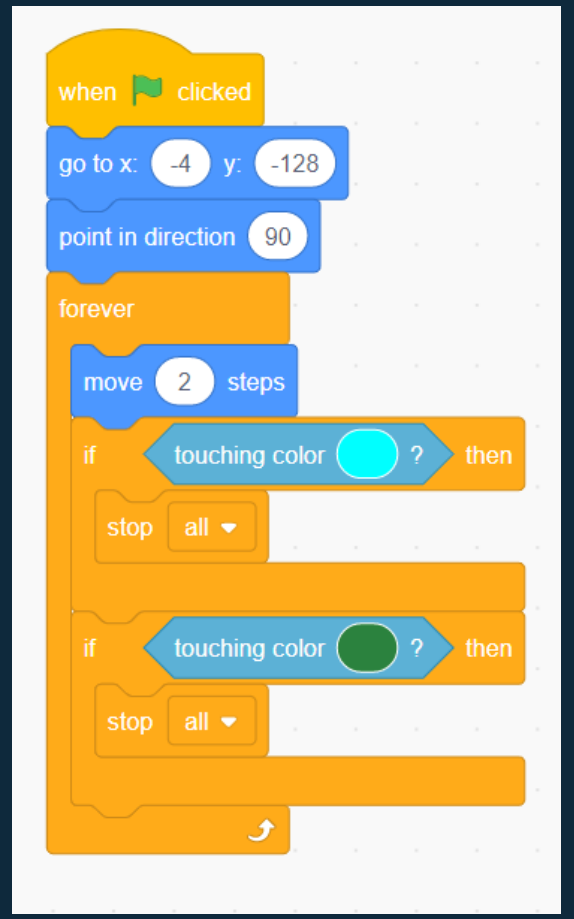
A second if statement!

If the car goes off the road, **Then** end the game.

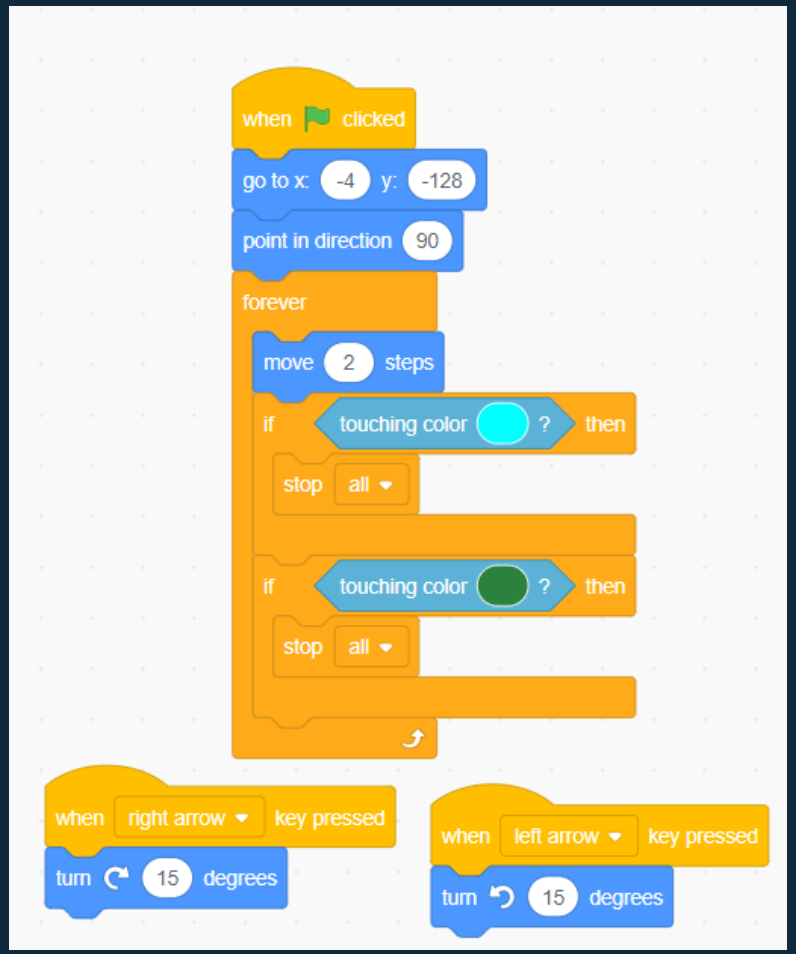
What should go inside the if condition?

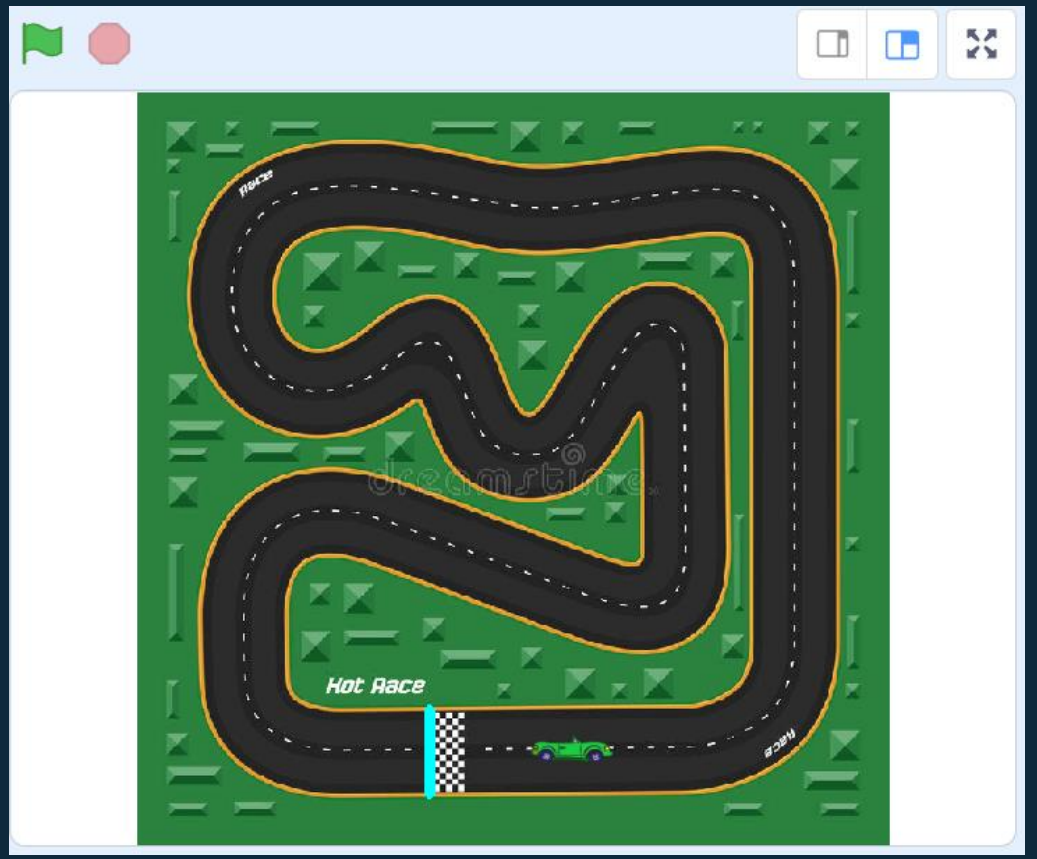
If it touches the grass color!





Your Finished Code Should Look Like This





Congratulations, you completed the game!

If there is time left, let's add some special feature to make your game unique!

Special Feature Options:

1. Add power ups to your racetrack
2. Add sounds after you win or lose
3. Add a costume to your Sprite after you win or lose

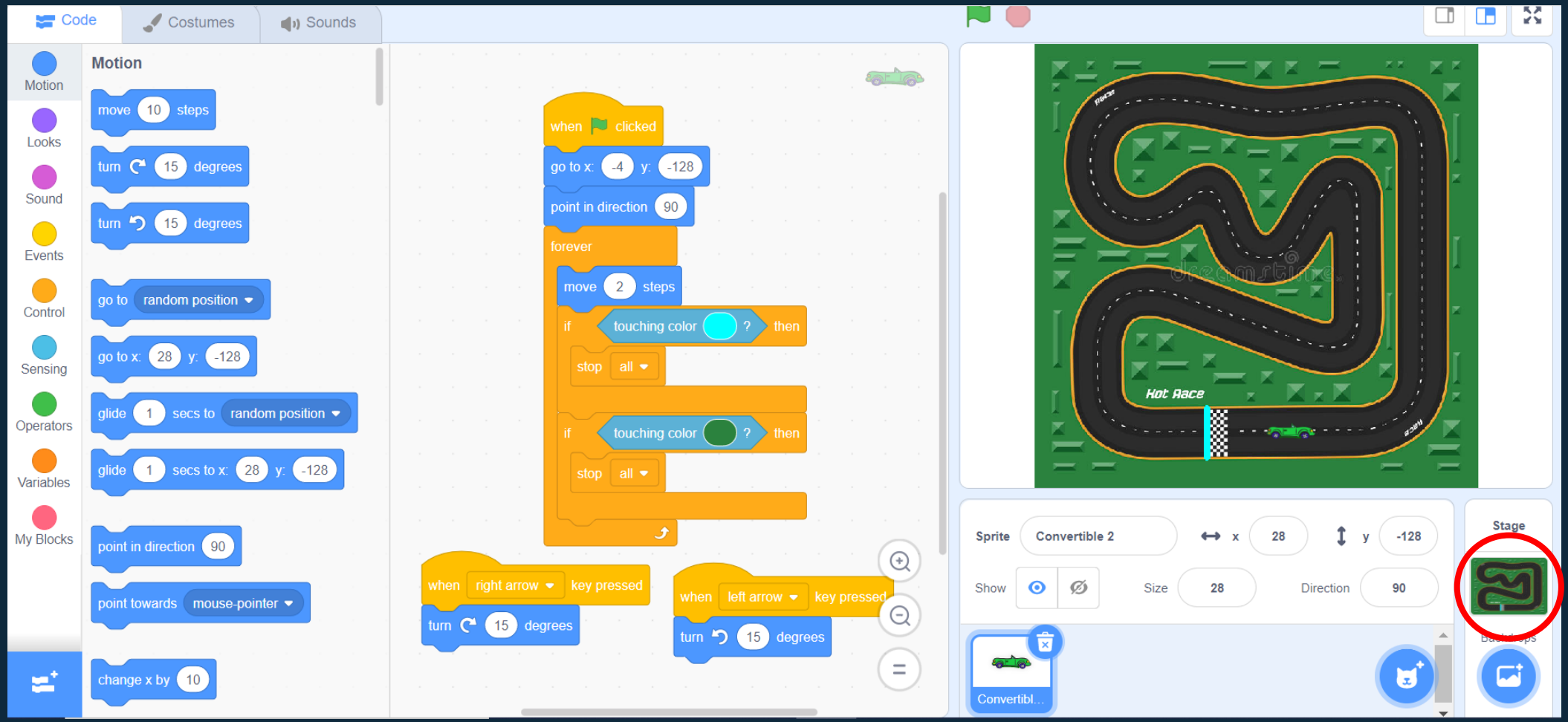
If you're out of time, head over to the closing questions.

1. Adding Power Ups

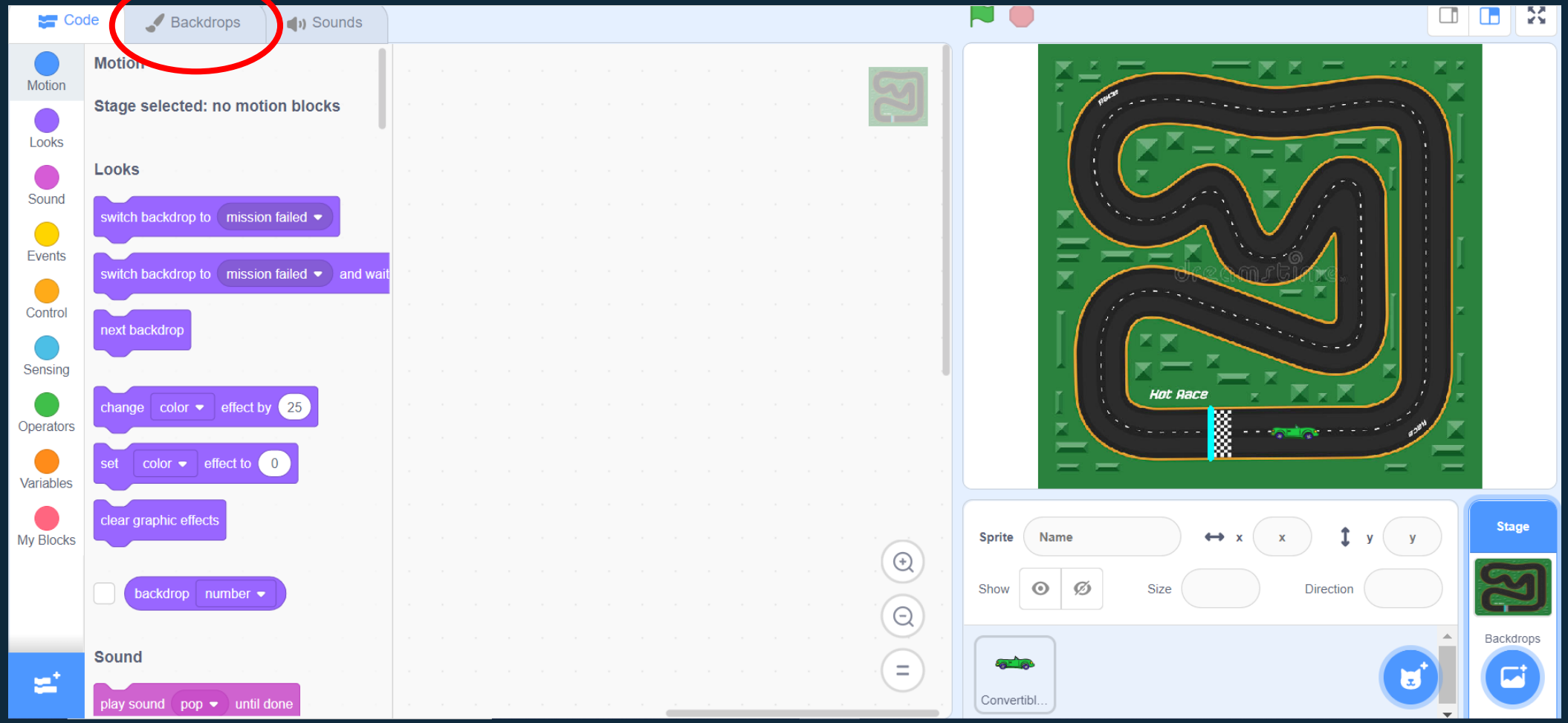
First, we are going to edit the backdrop to add in our power ups.

Then we will write the code that will make your car speed up.

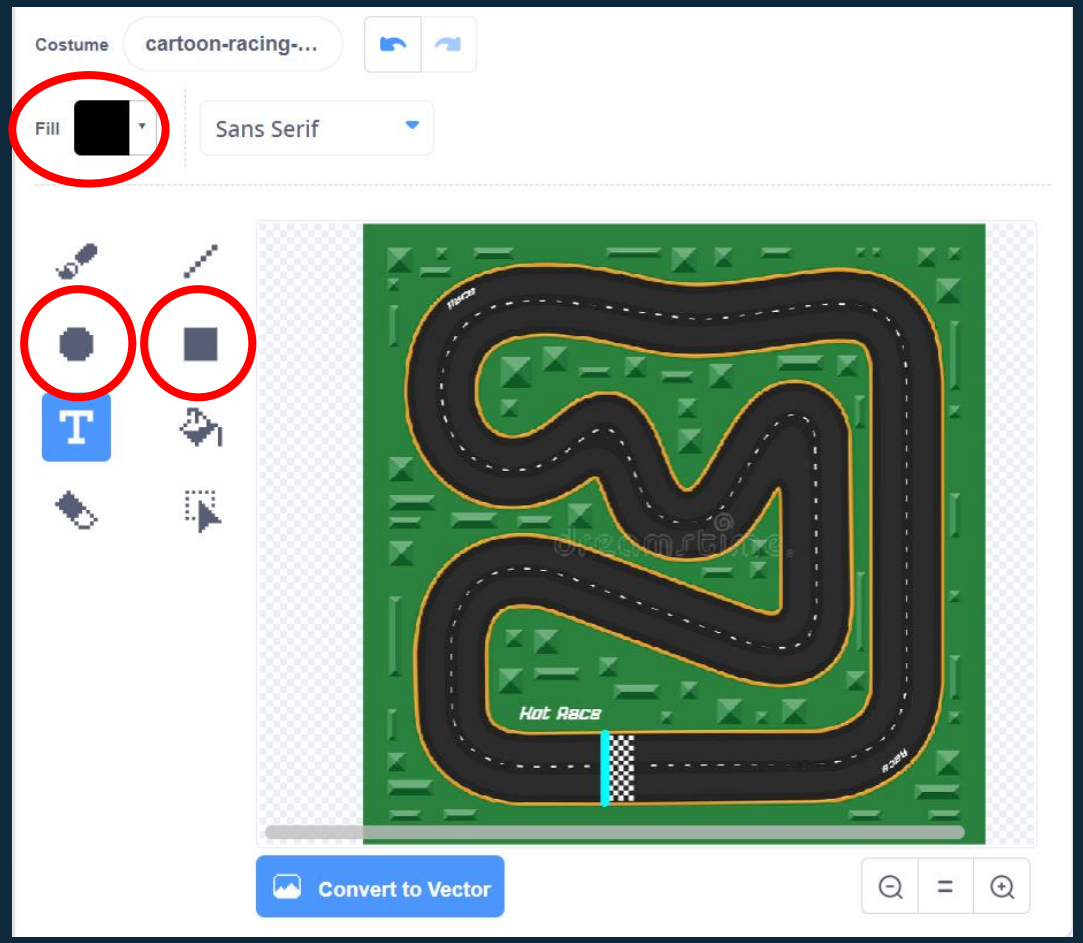
Choosing the Backdrop

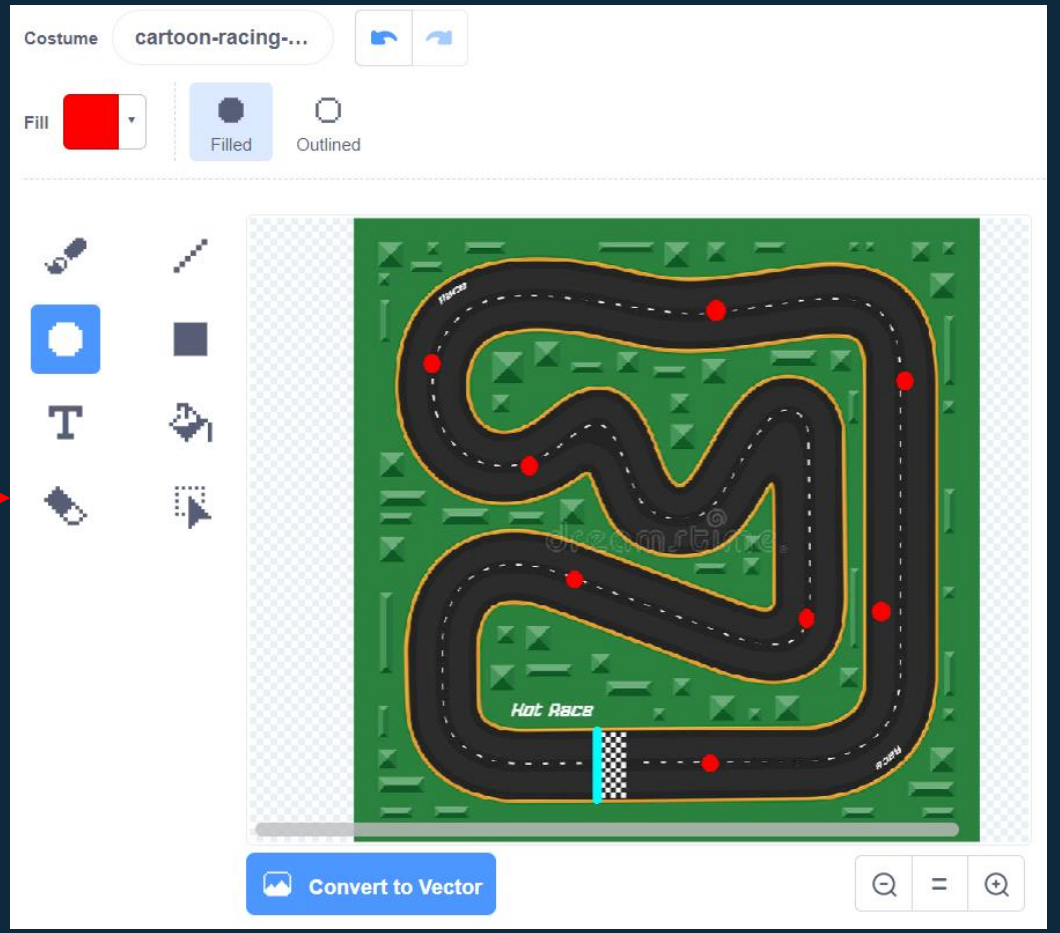


Editing the Backdrop

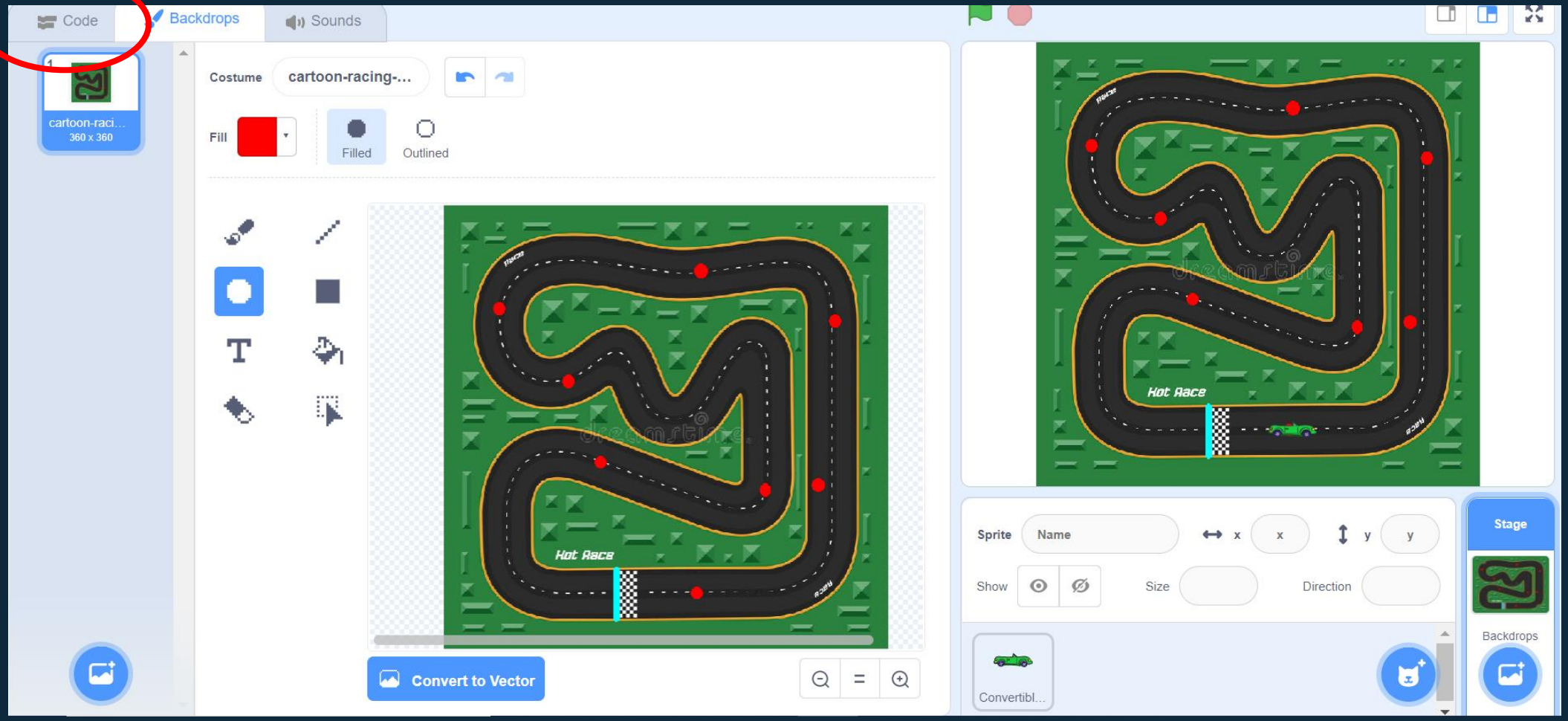


Placing Power Ups

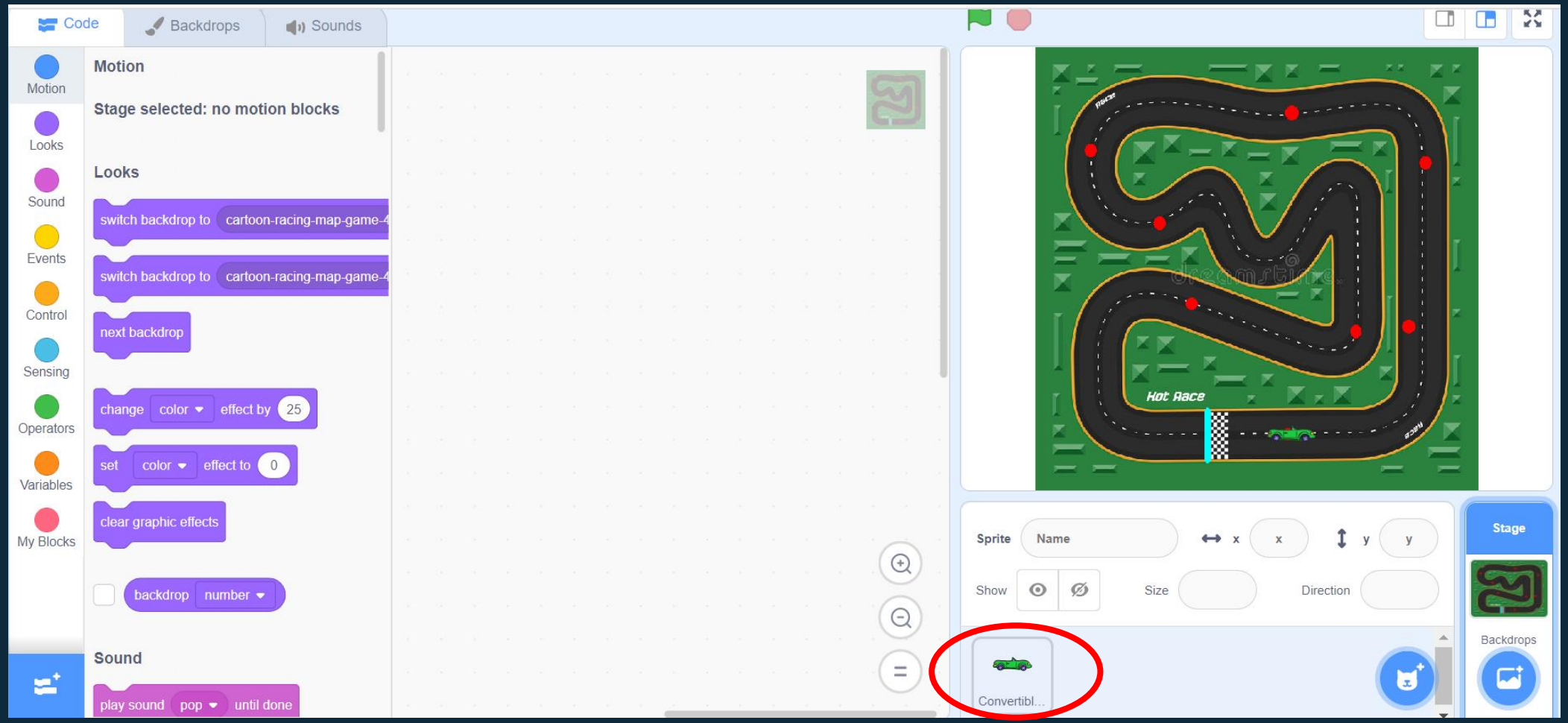




Go Back To Code

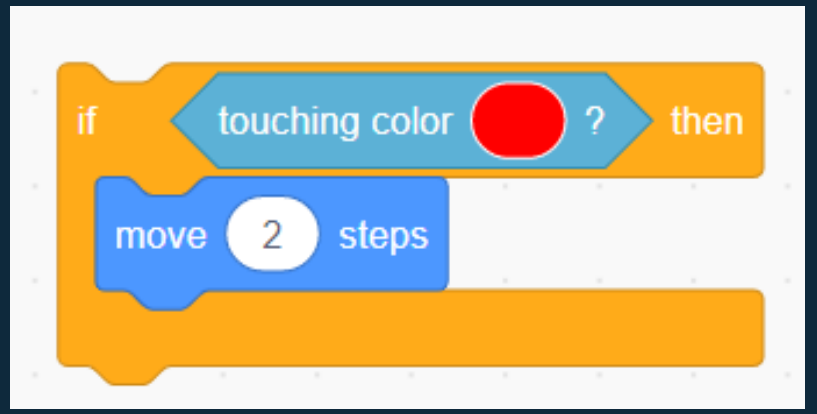


Go Back to Sprite



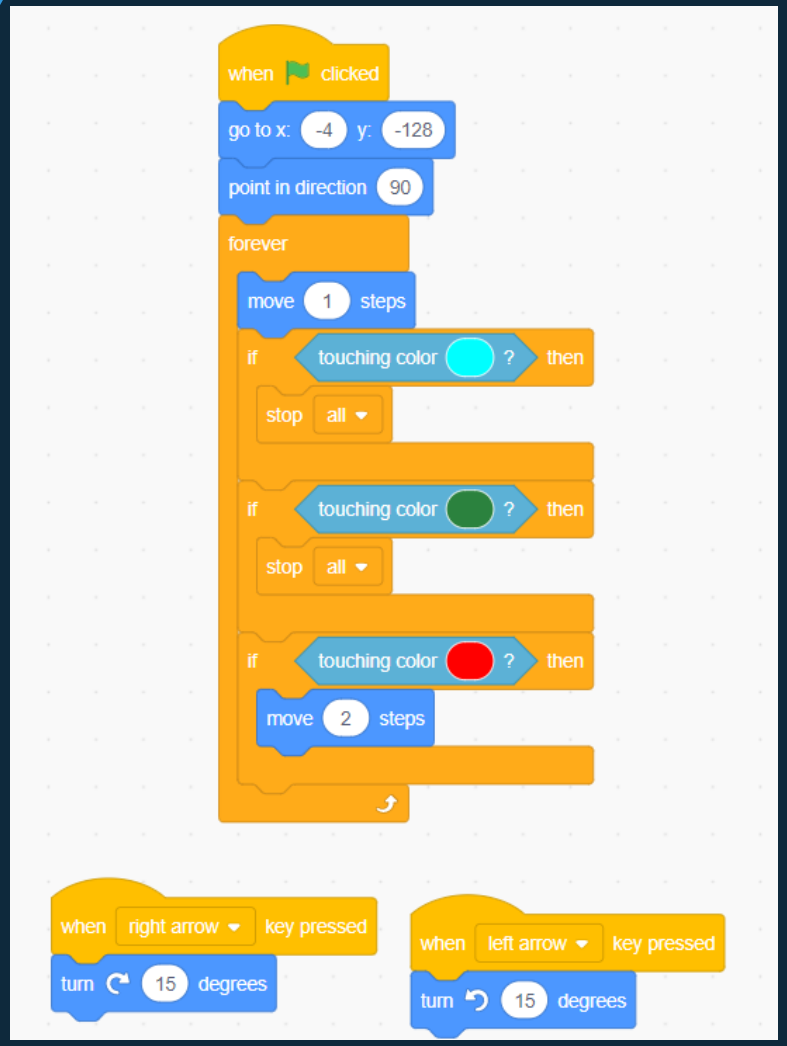
Use An If Statement With Color Sensing

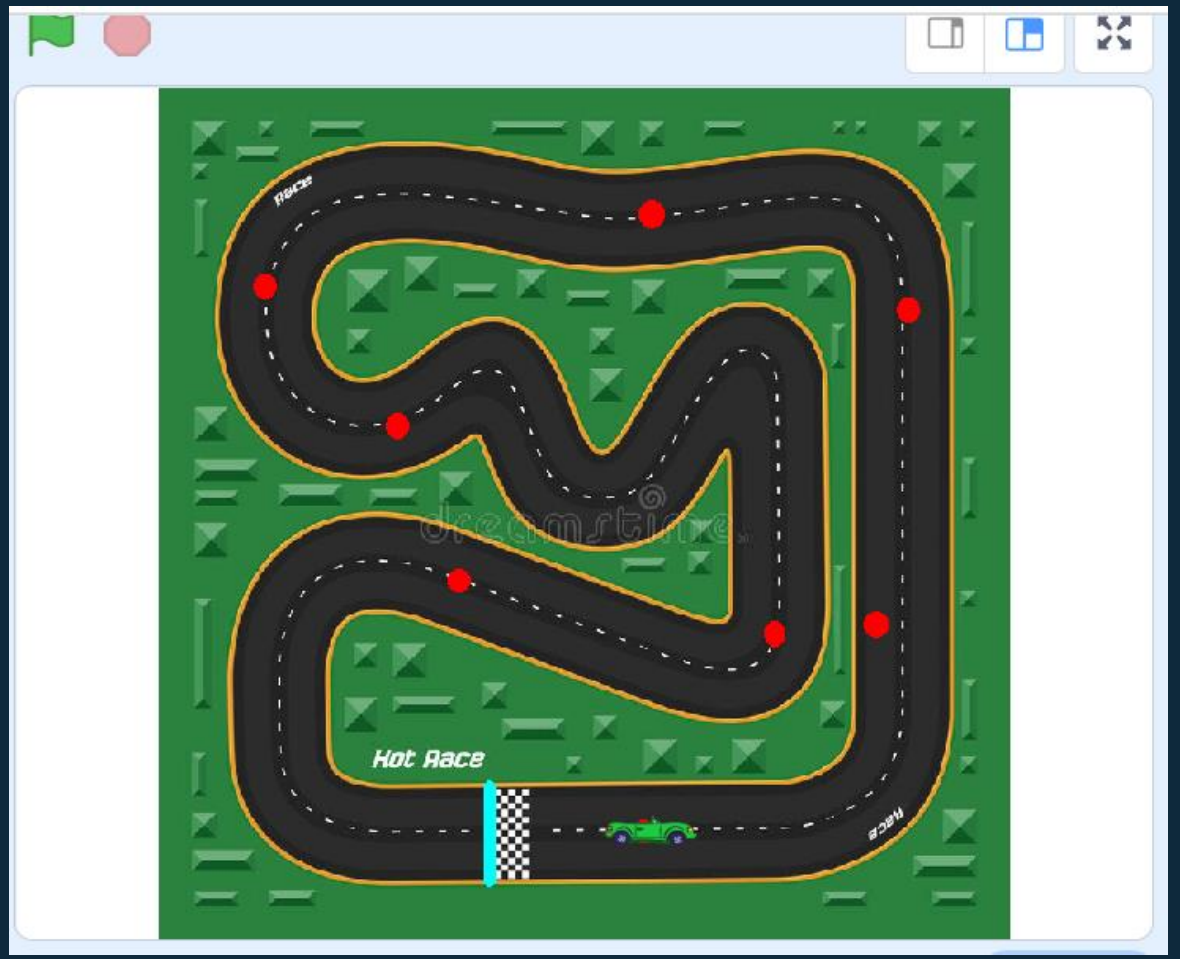
What should go inside?



"Move __ steps"!
It should be larger than your regular movement to be a true "power up". Try different numbers!

Add To Your Forever Loop





You added power ups!

Try to play your friends' games!

If you have more time:

1. Add power ups to your racetrack
2. Add sounds after you win or lose
3. Add a costume to your Sprite after you win or lose

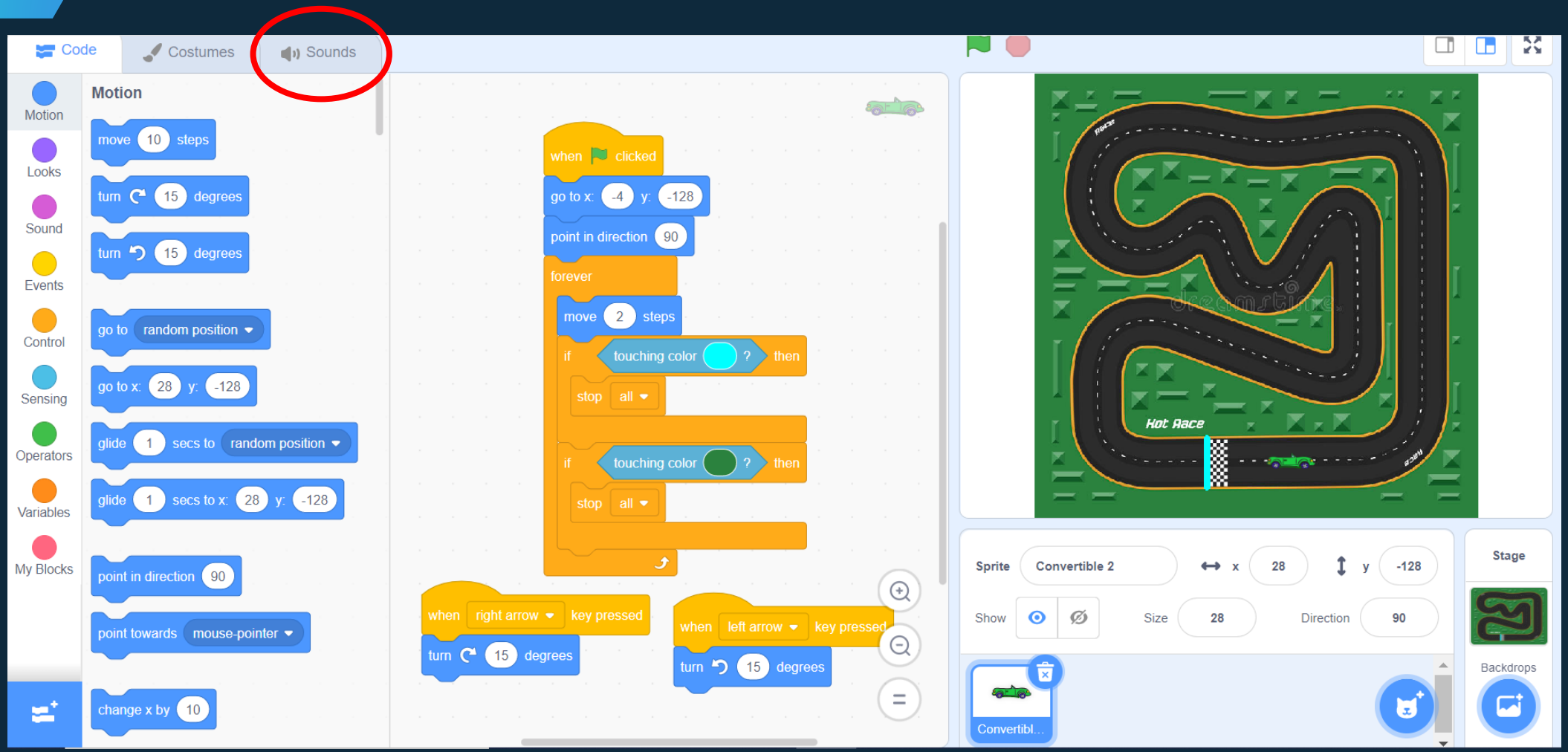
If you're out of time, head over to the closing questions.

2. Adding Sounds

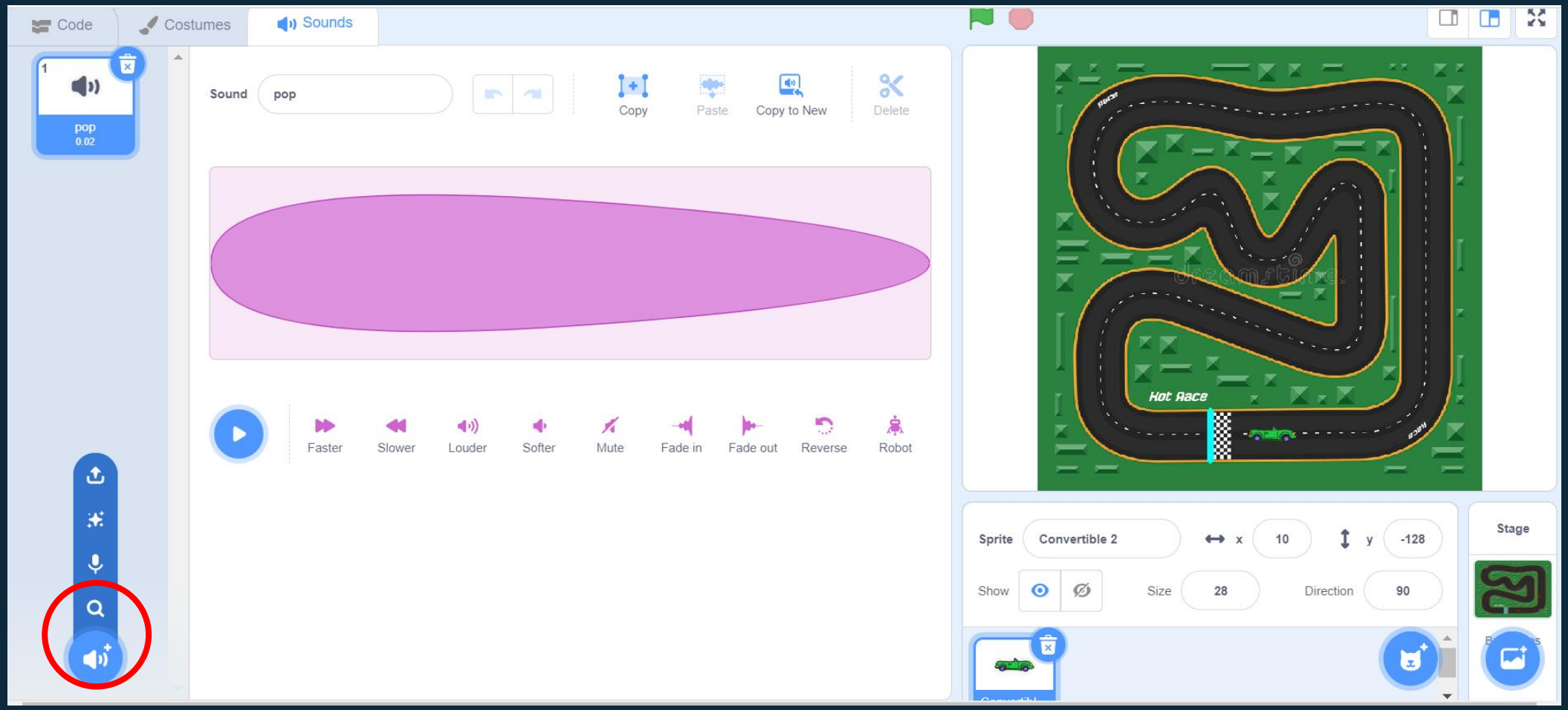
First, we are going to add the sounds we want to our Sprite.

Then we will write the code that will make your game play music after you win or lose.

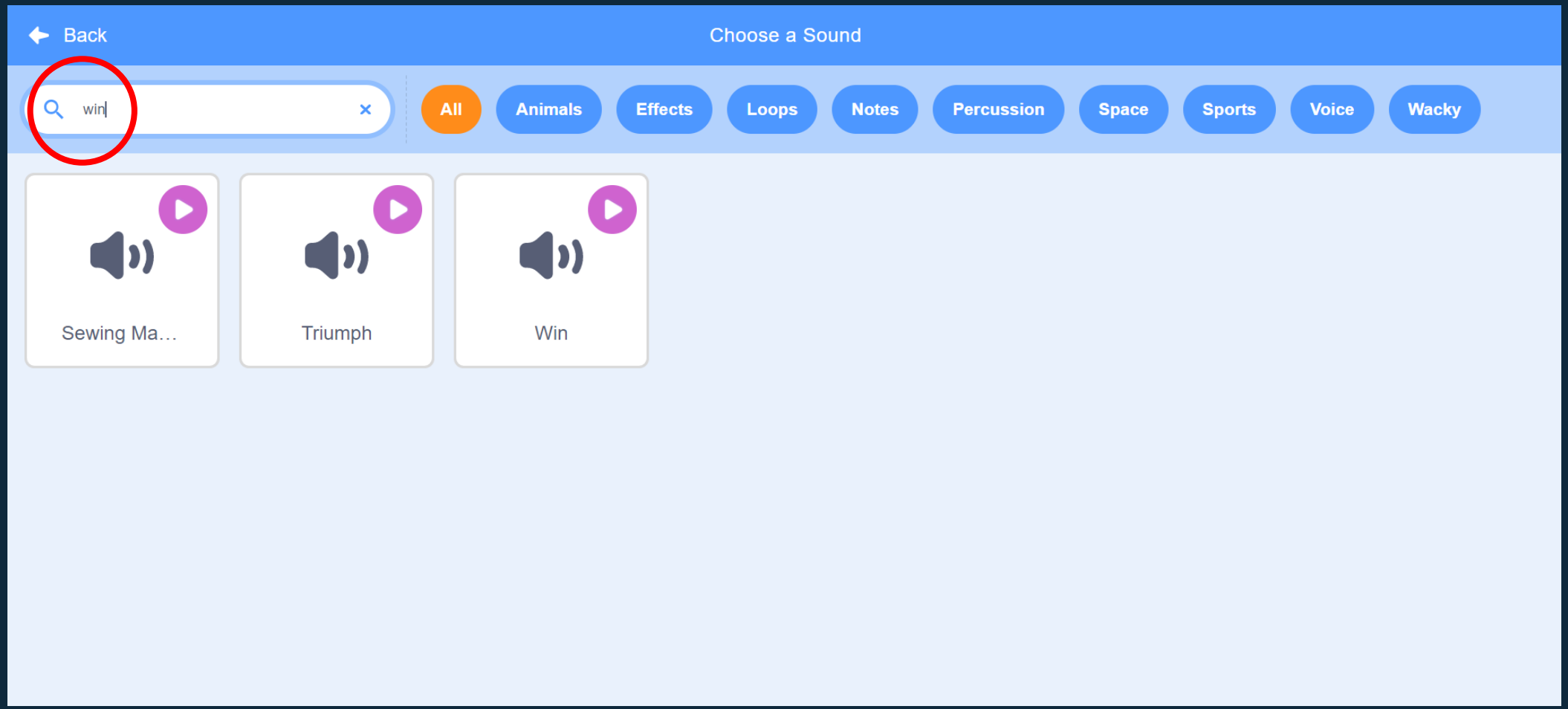
Finding Sounds



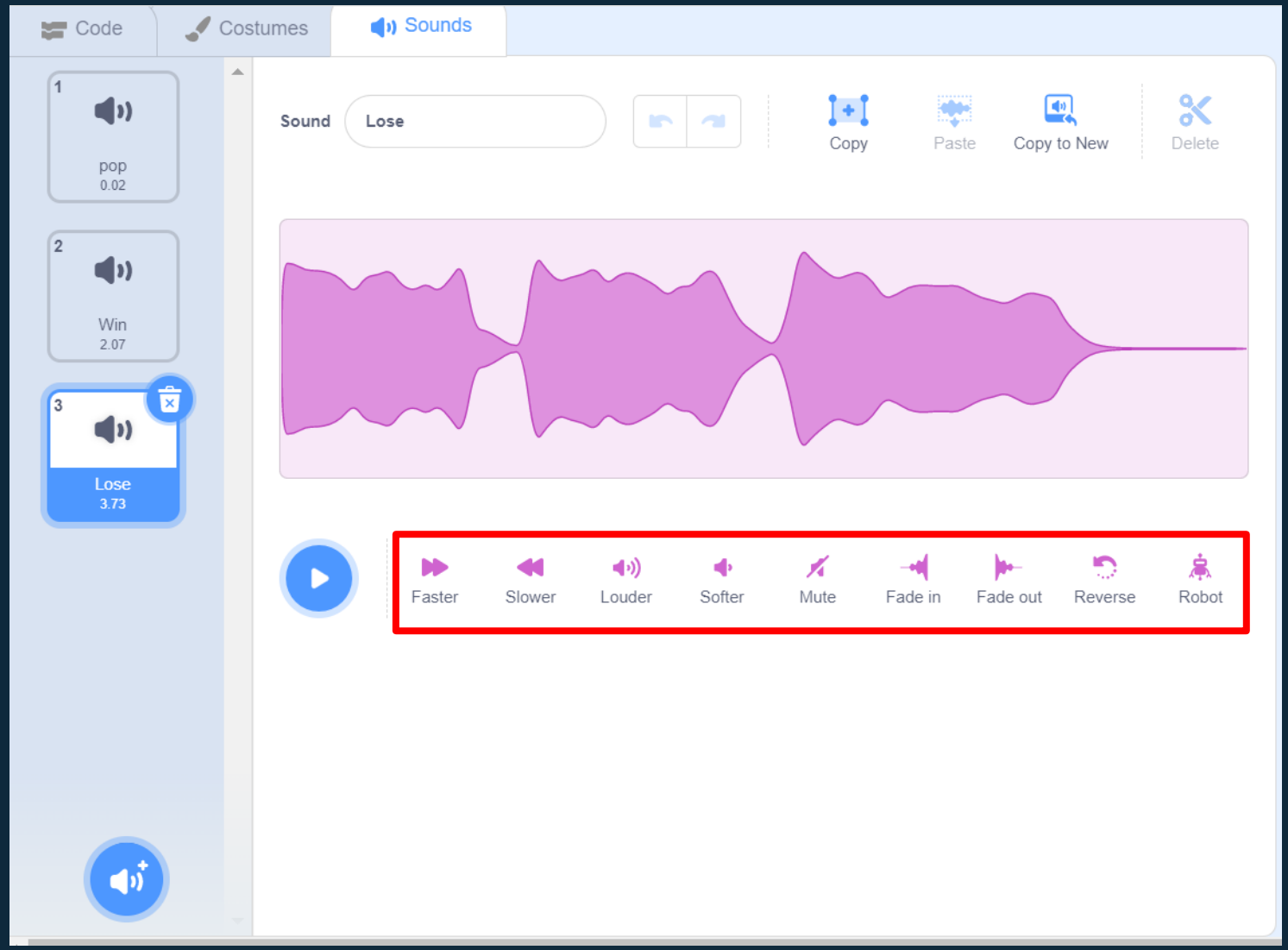
Search For Sounds



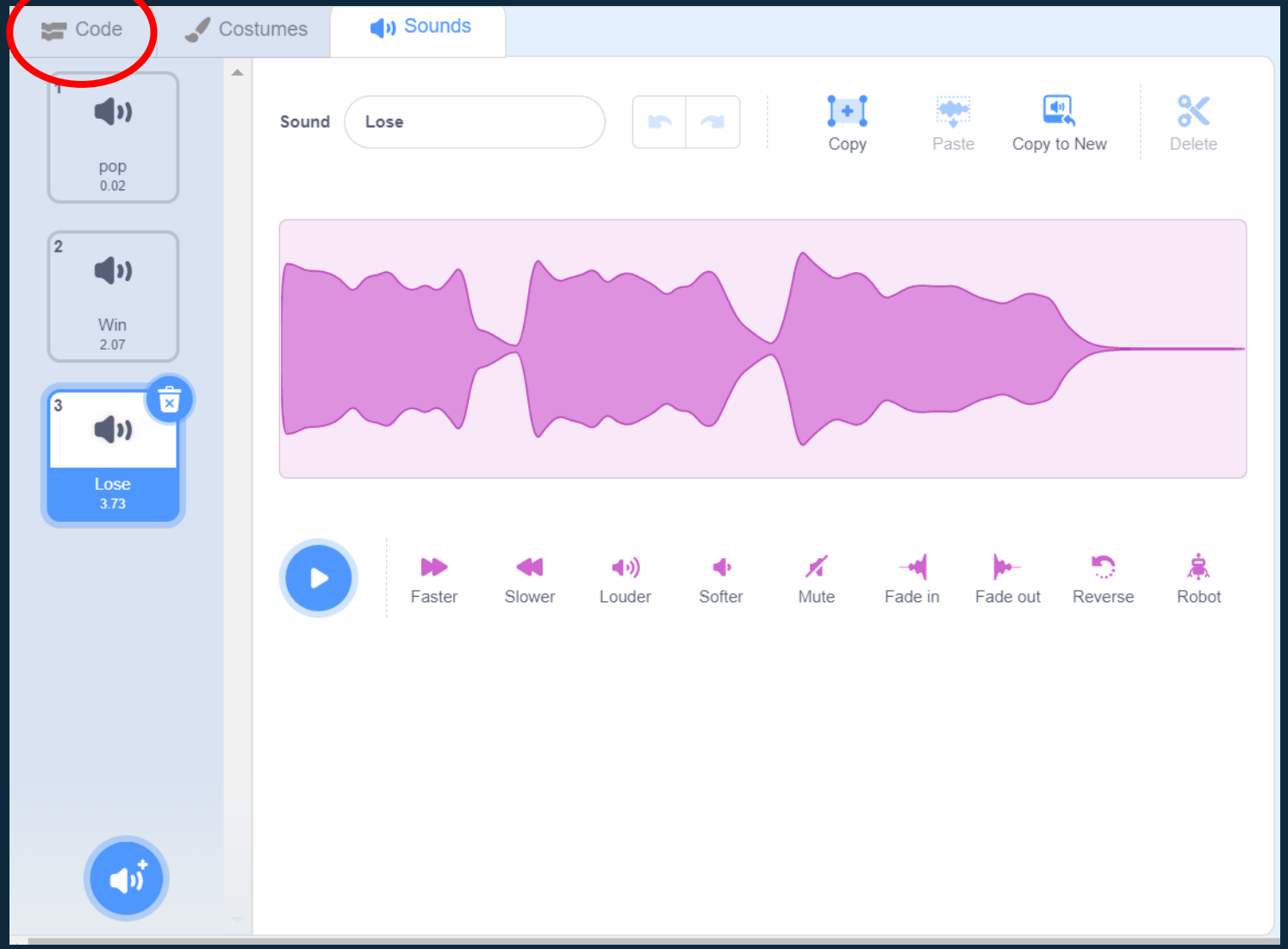
Choose Sounds For Win and Lose



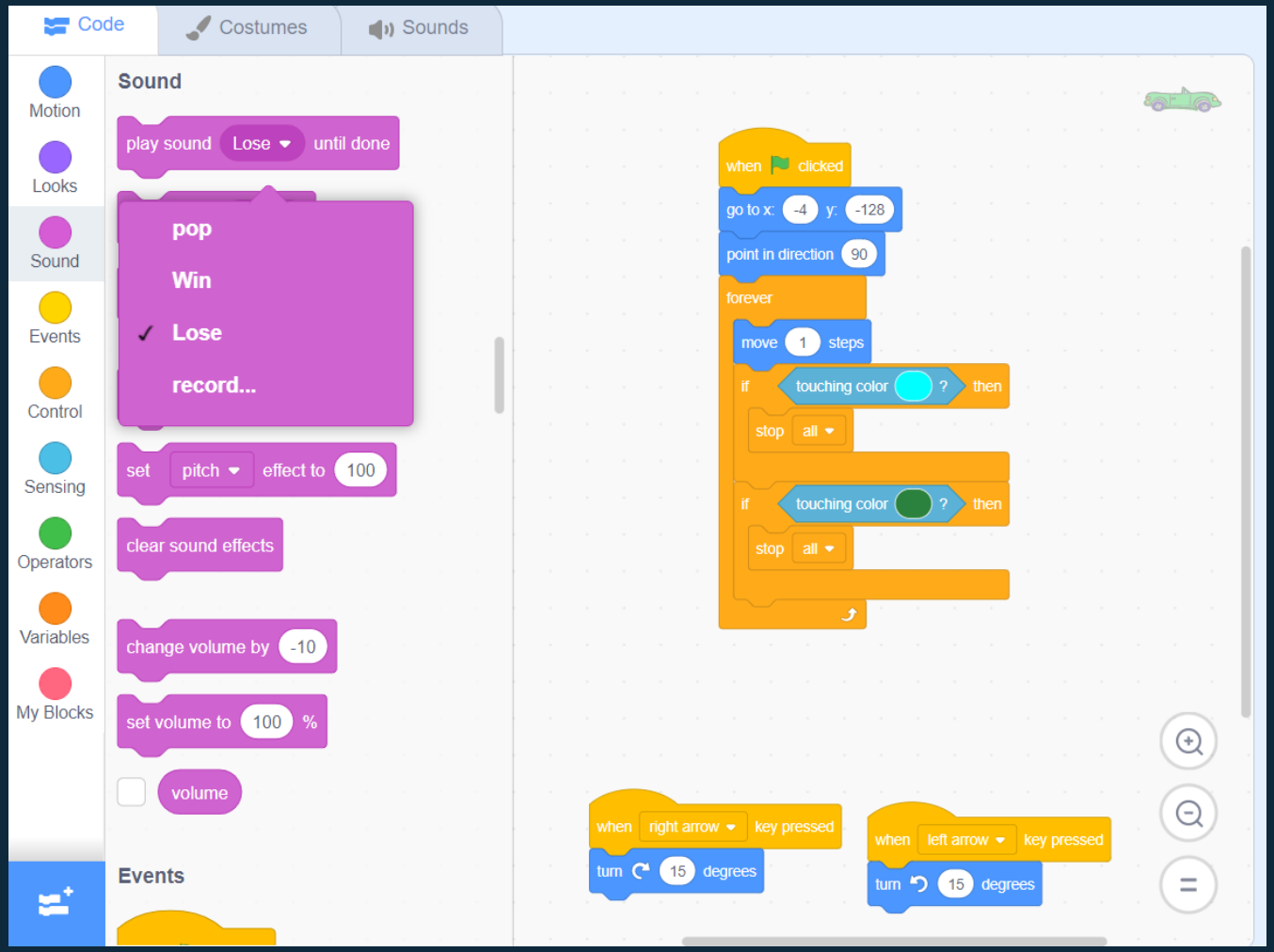
Edit Sounds


Code
Costumes
Sounds
1
pop
0.02
2
Win
2.07
3
Lose
3.73
Sound
Lose
Copy
Paste
Copy to New
Delete
Faster
Slower
Louder
Softer
Mute
Fade in
Fade out
Reverse
Robot

Go Back To Code



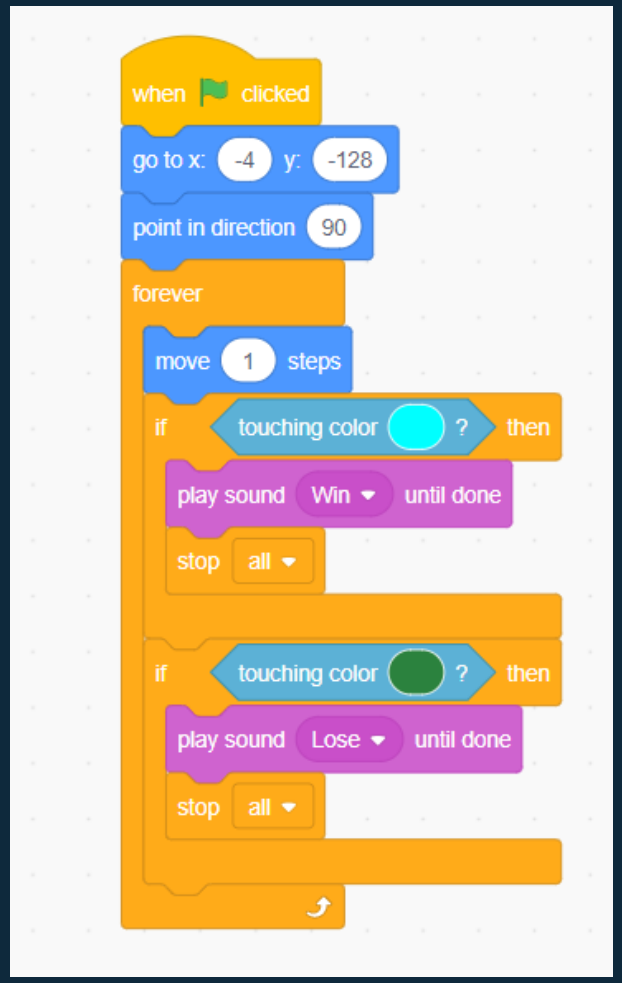
Find Sound Commands

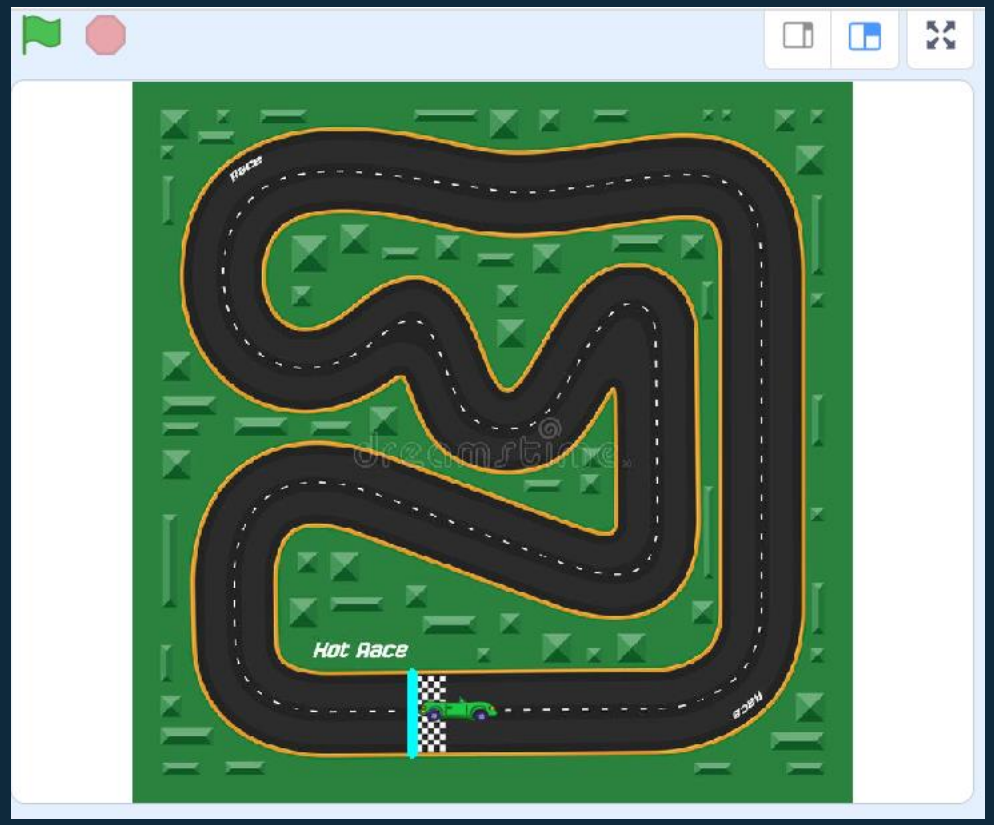


Where should we add in the sound commands?

Adding Sounds To Your Code

Add in the appropriate if statement **above** the “stop all” call!





You added sounds!

Try to play your friends' games!

If you have more time:

1. Add power ups to your racetrack
2. Add sounds after you win or lose
3. Add a costume to your Sprite after you win or lose

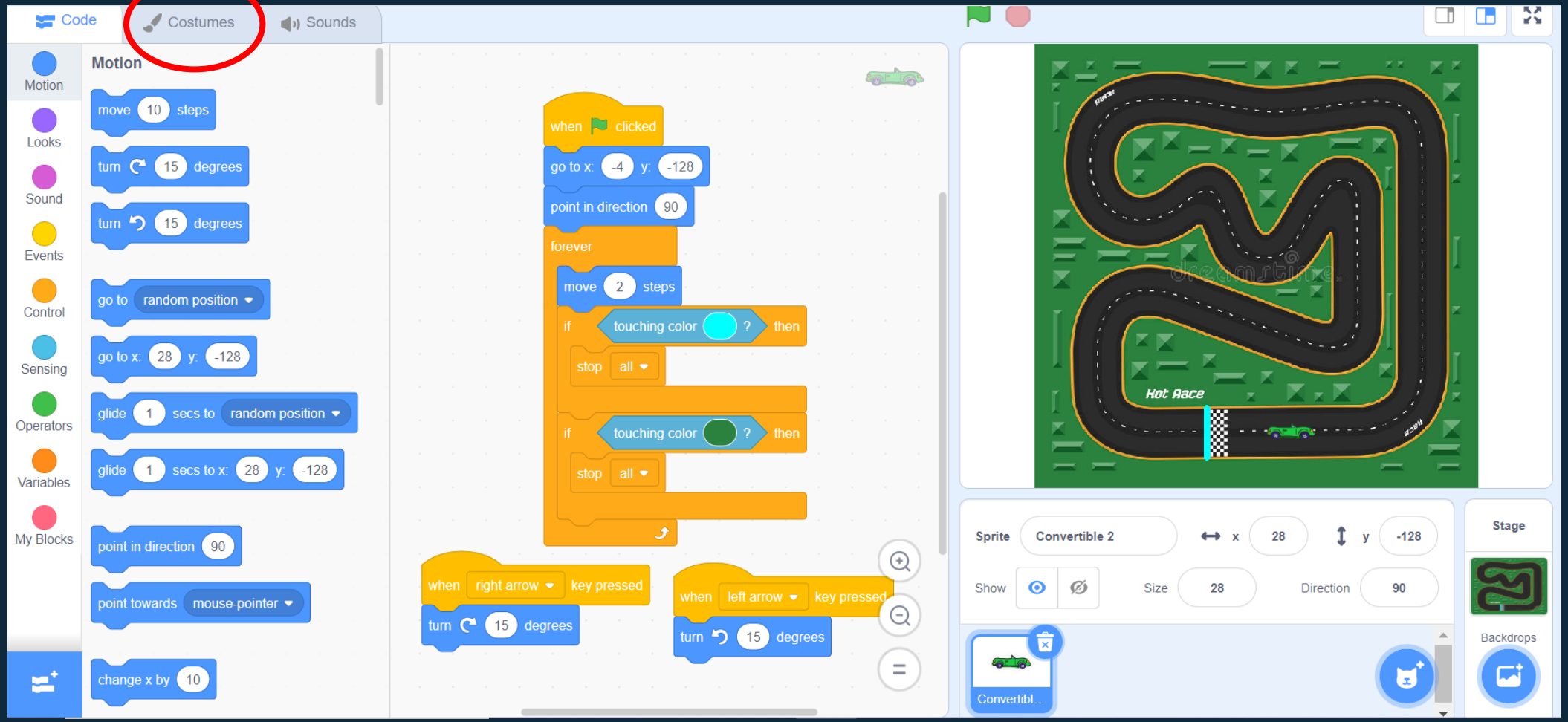
If you're out of time, head over to the closing questions.

3. Adding Costumes

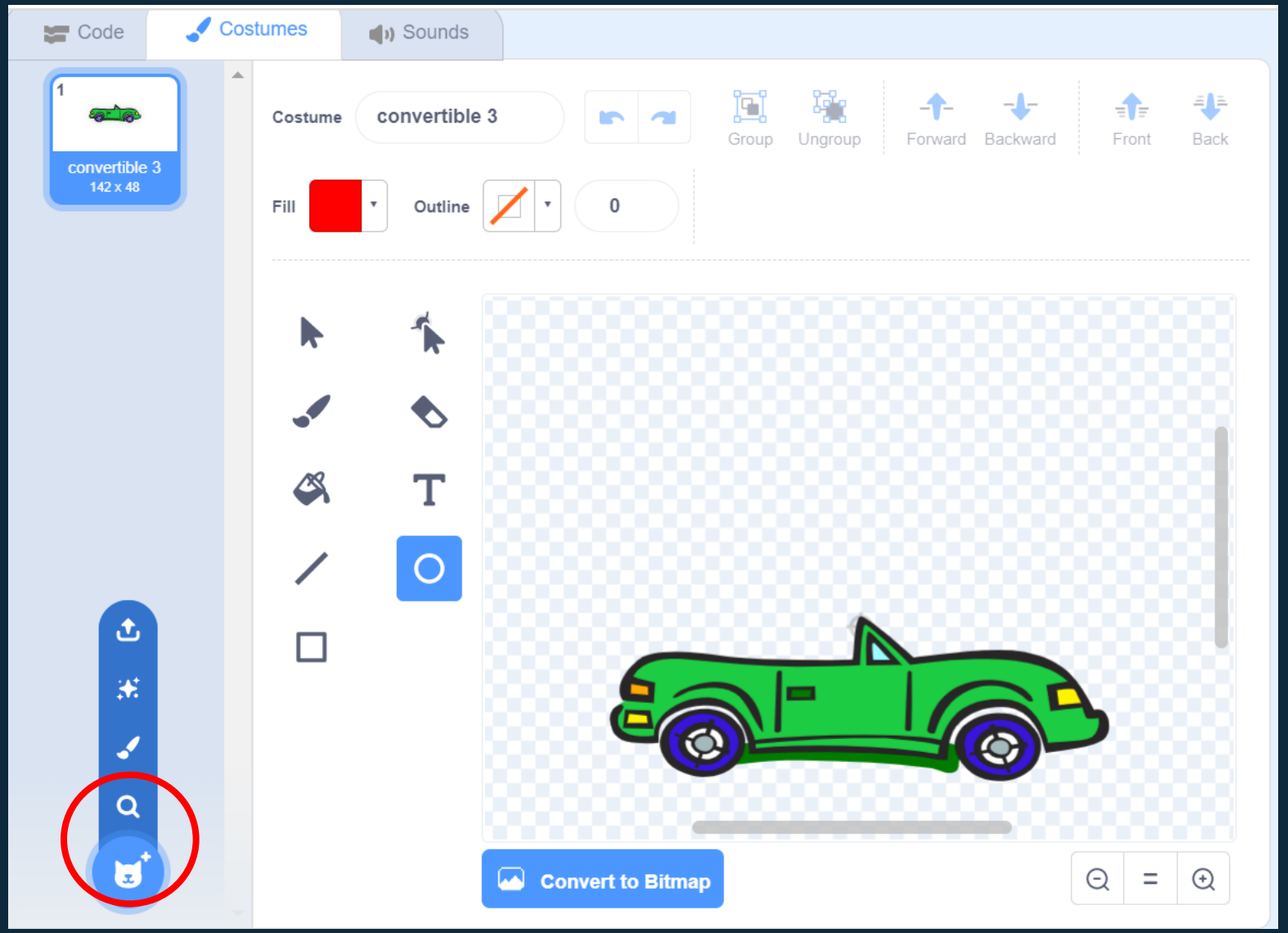
First, we are going to create new costumes for our Sprite.

Then we will write the code that will make your current Sprite switch when you win or lose.

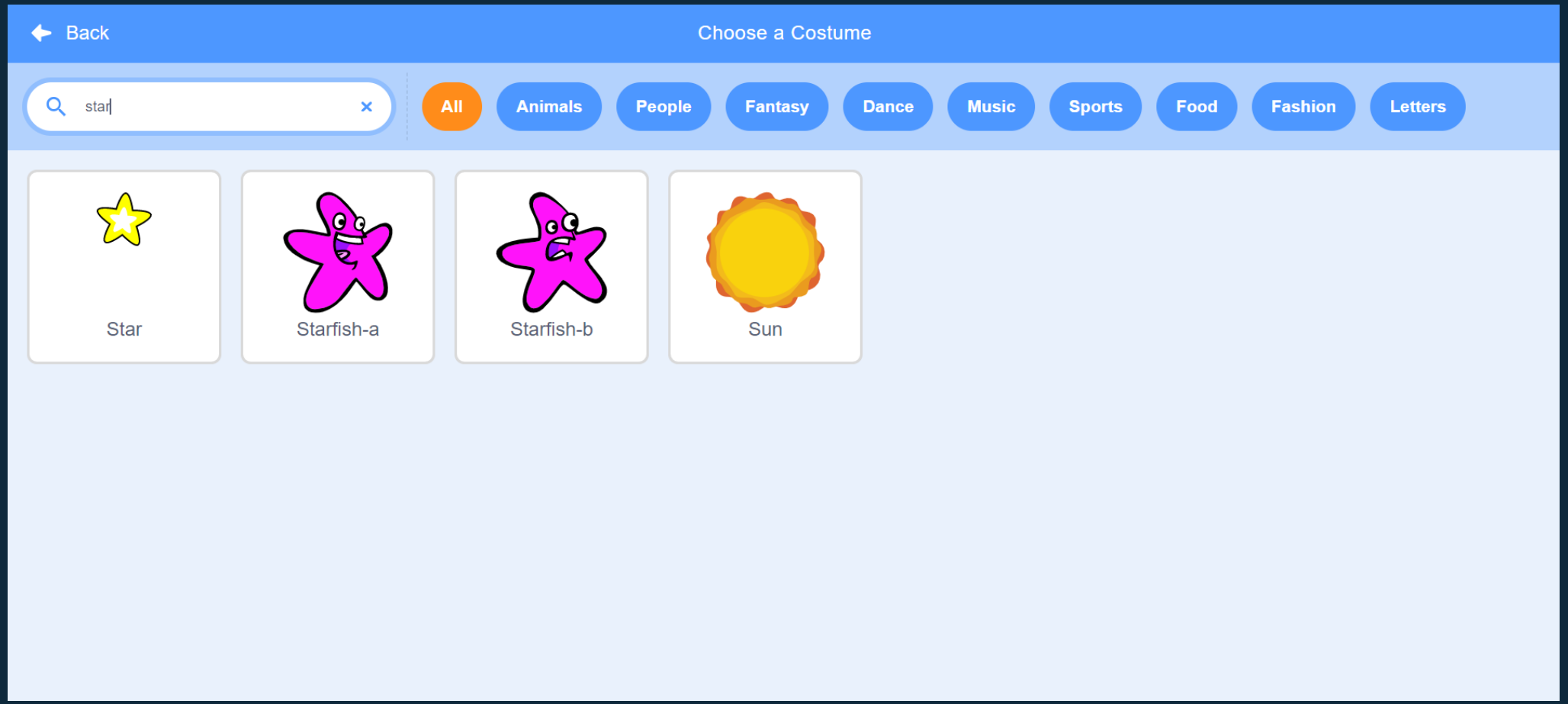
Finding Costumes



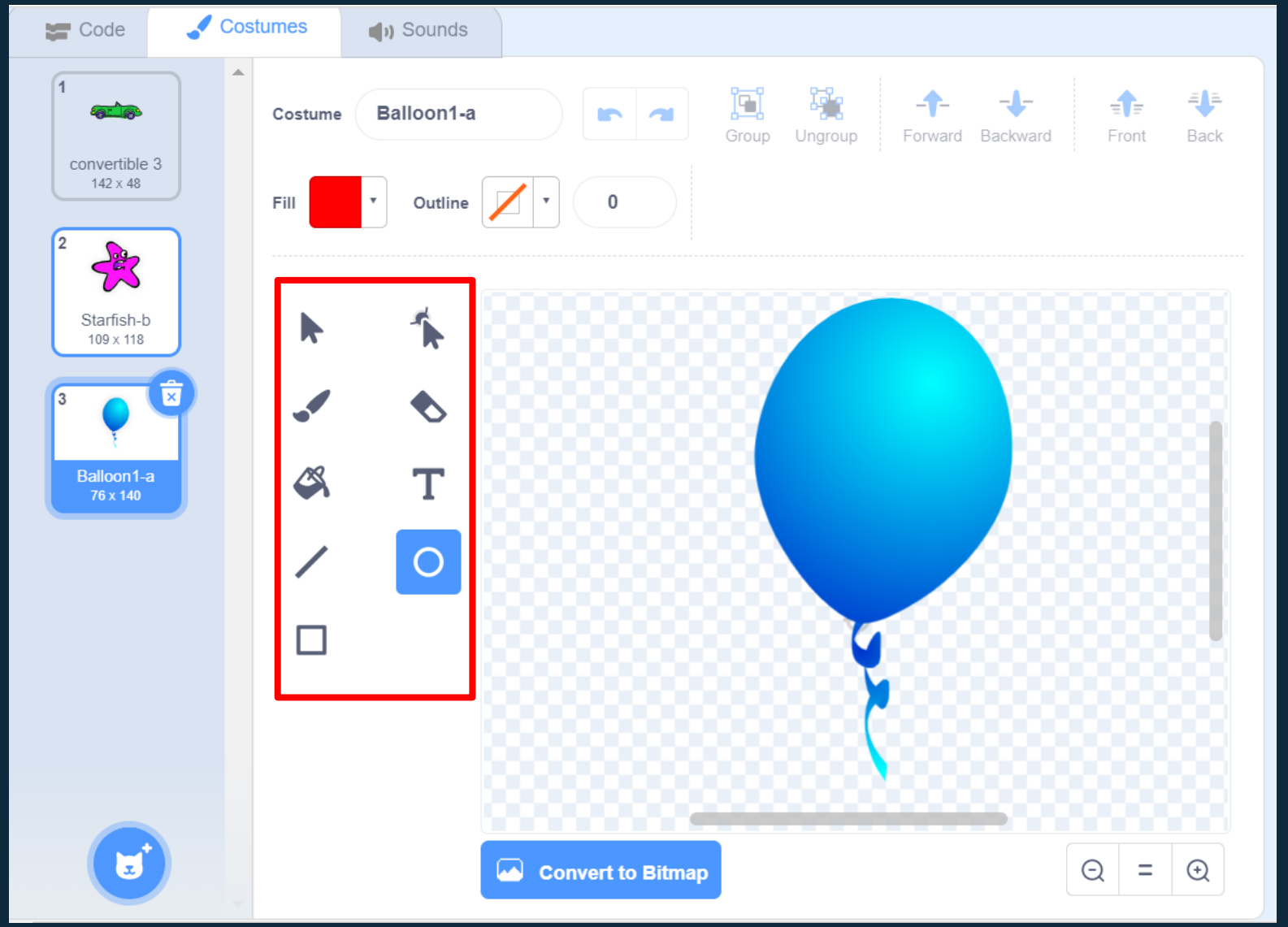
Search For New Costumes



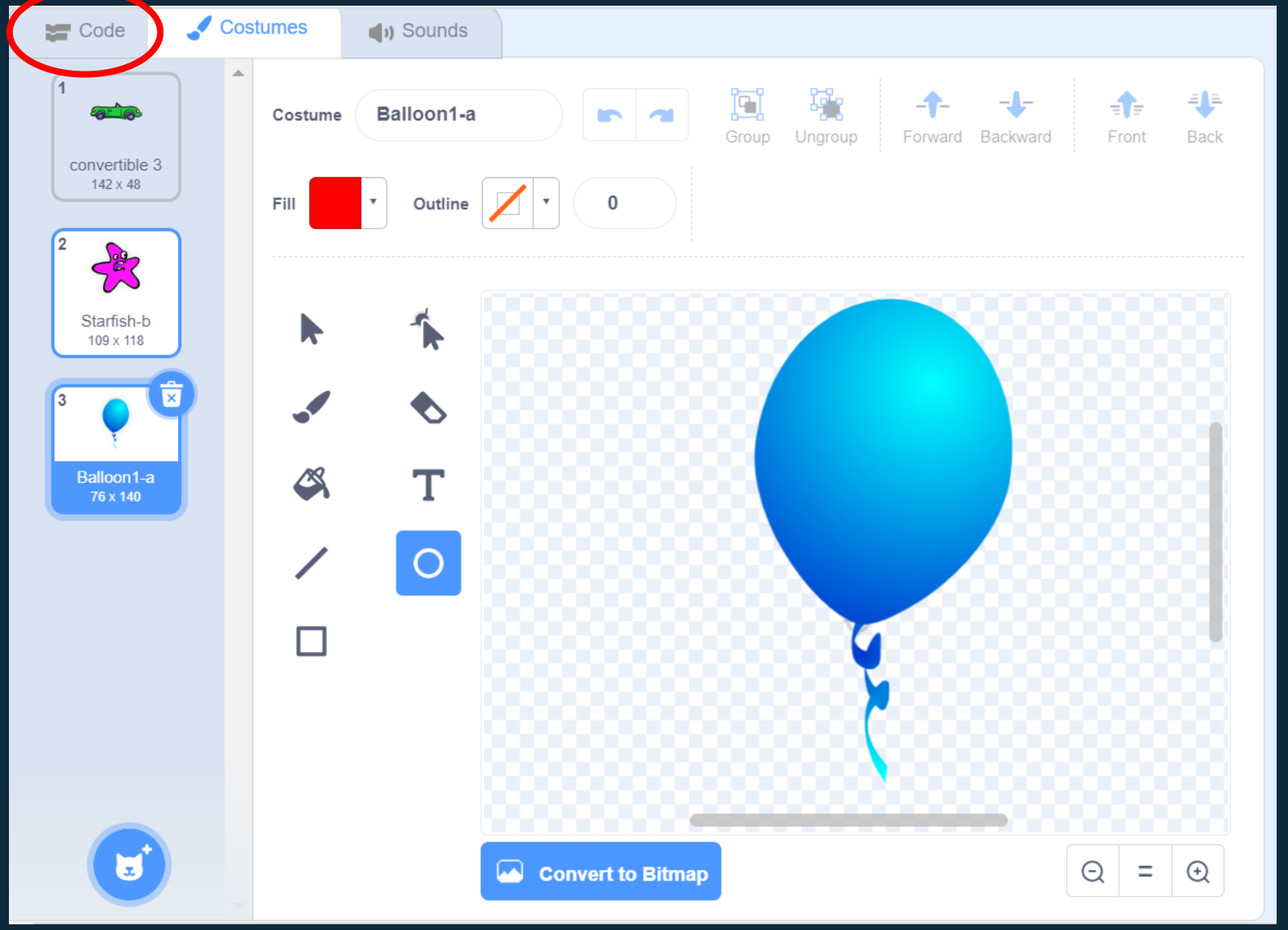
Choose a Costume For Winning and Losing



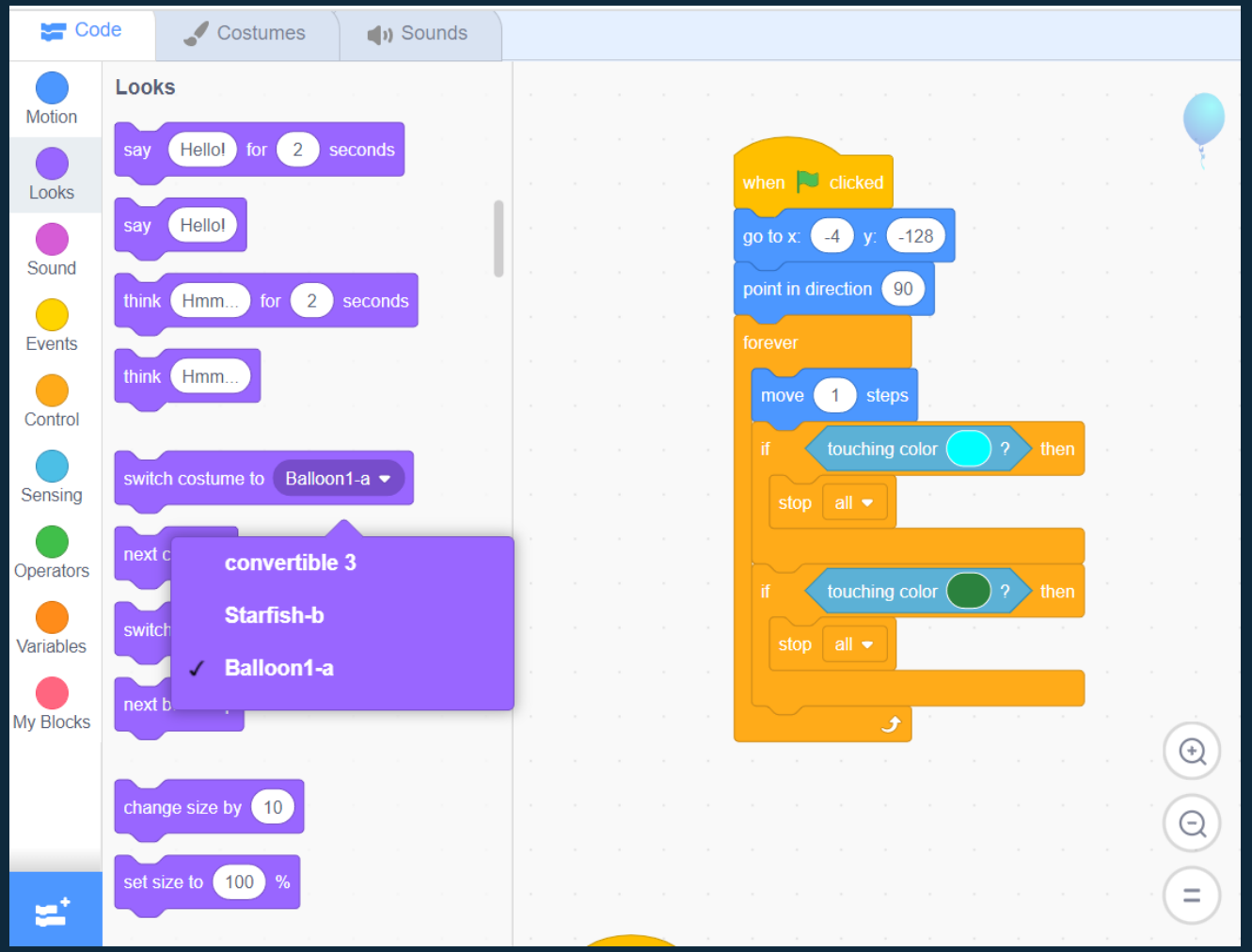
Edit New Costumes



Go Back To Code



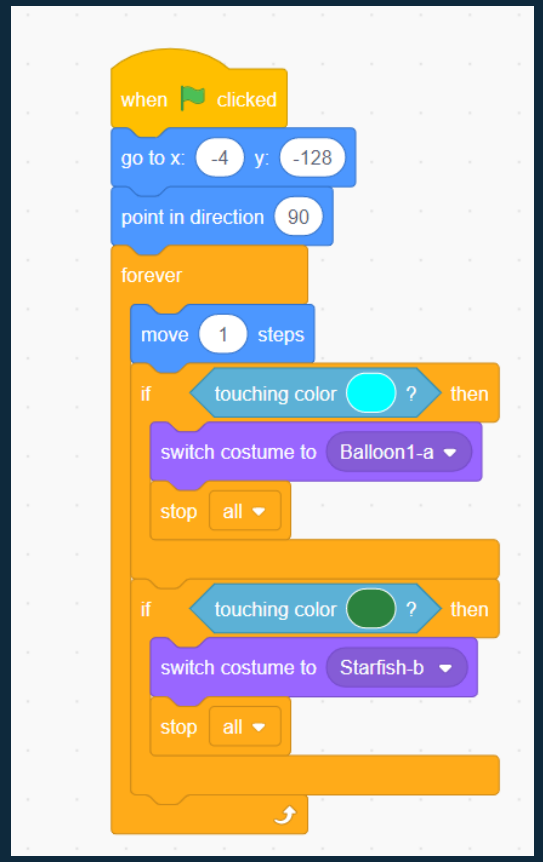
Find Looks Commands

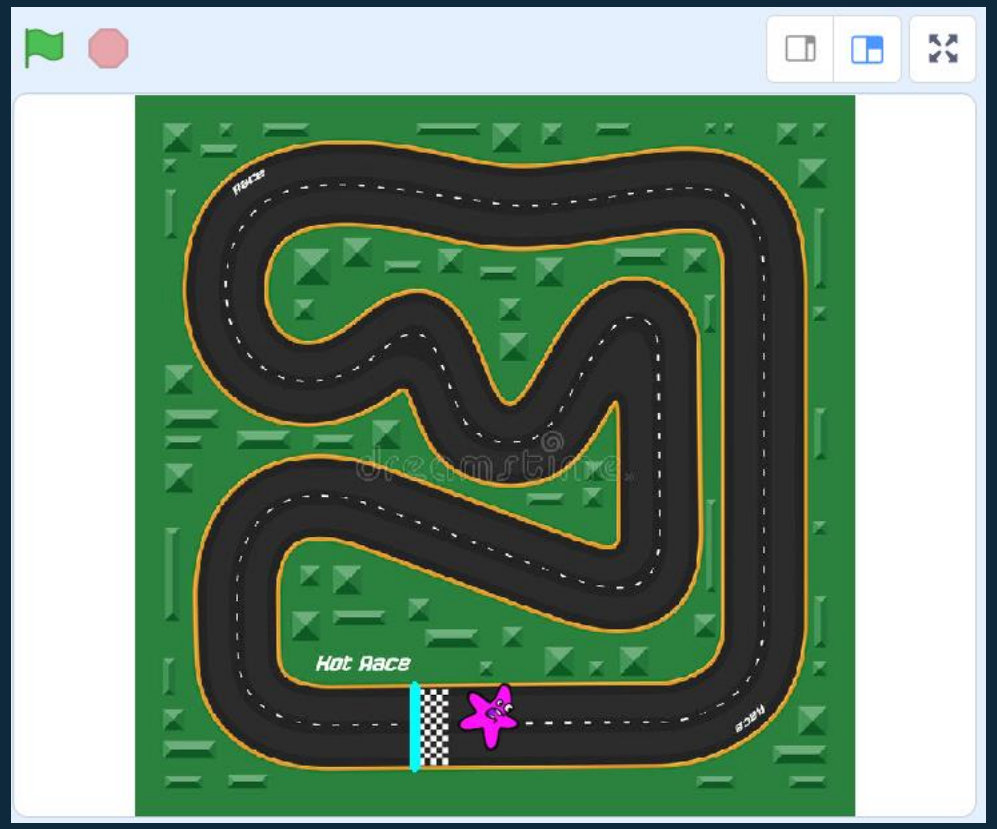


Where should we add in the sound commands?

Adding New Costumes To Your Code

Add in the appropriate if statement **above** the “stop all” call!

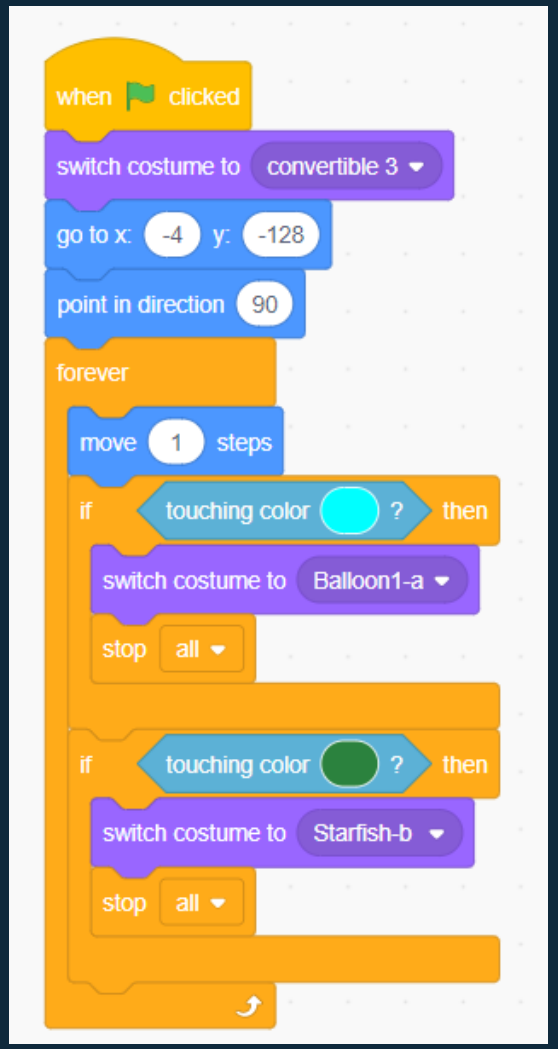


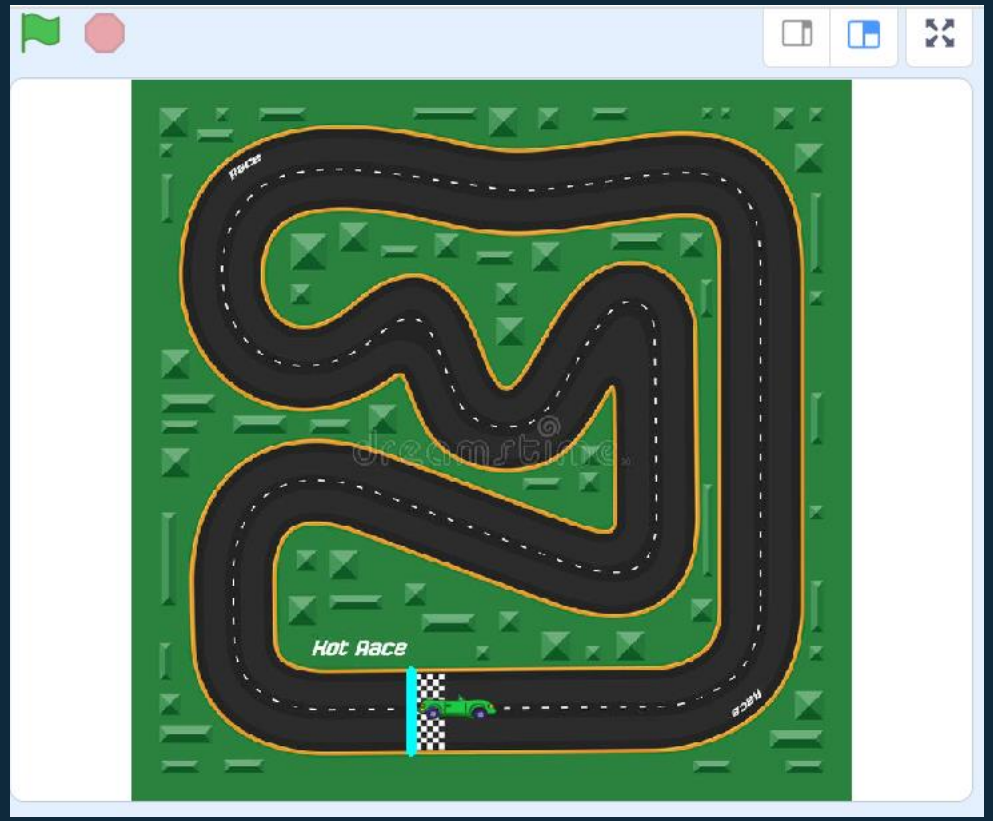


What problem does this create?

How should we fix it?

Switch Back To Car Costume When the Green Flag Is Clicked





You added new costumes!

Try to play your friends' games!

If you have more time:

1. Add power ups to your racetrack
2. Add sounds after you win or lose
3. Add a costume to your Sprite after you win or lose

If you're out of time, head over to the closing questions.

Congratulations, you finished your code!

What part of coding did you enjoy the most?

What part did you enjoy the least?

How can you change the design of your game?

Do you want to try Scratch again?

There are tons of tutorials on how to make your own Scratch video games, movies and more! You can also see and play with projects that others have made at Scratch.mit.edu!