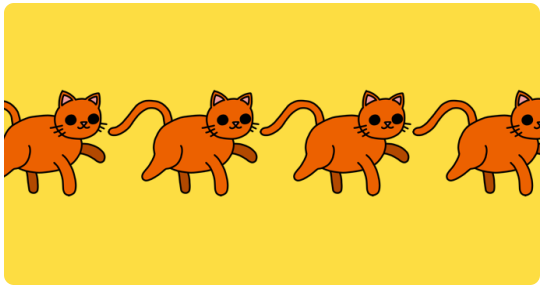
Projects

CATS!

Create a game in which you guide cats to safety and stop them from falling into holes

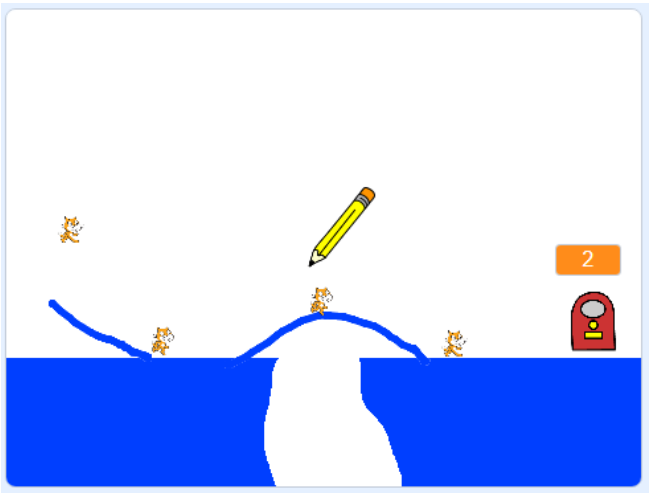
Scratch



Step 1 Introduction

In this project, you will create a game in which you need to guide cats to safety and not let any of them fall through the gaps!

What you will make



What you will learn

- How to use a `forever` loop to constantly generate moving cats
- How to use a `repeat until` loop to ensure your cats follow a line

What you will need

Hardware

- A computer capable of running Scratch 3

Software

- Scratch 3 (either **online** (http://rpf.io/scratchon) or **offline** (http://rpf.io/scratchoff))

Downloads

- **Offline starter project** (http://rpf.io/p/en/cats-go)

Additional notes for educators

You can **find the solution for this project here** (http://rpf.io/p/en/cats-get).

Step 2 Draw lines

Open the 'CATS!' Scratch starter project.

Online: open the starter project at **rpf.io/cats-on** (http://rpf.io/cats-on).

If you have a Scratch account you can make a copy by clicking **Remix**.

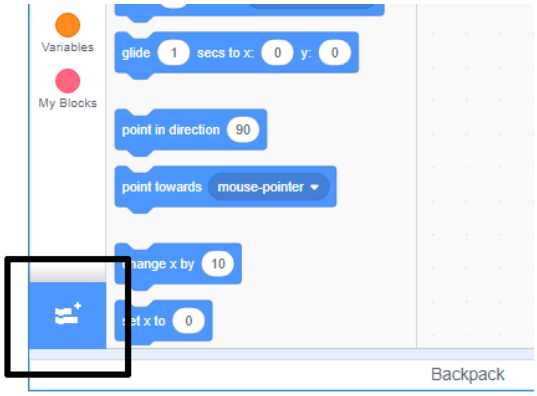
Offline: open the **starter project** (http://rpf.io/p/en/cats-go) in the offline editor. If you need to download and install the Scratch offline editor, you can find it at **rpf.io/scratchoff** (http://rpf.io/scratchoff).

Add the Pen extension to your project.

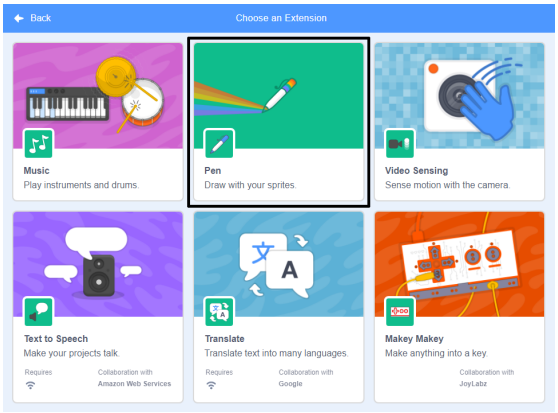
How to add the Pen extension

To use the Pen blocks in Scratch, you need add the **Pen extension**.

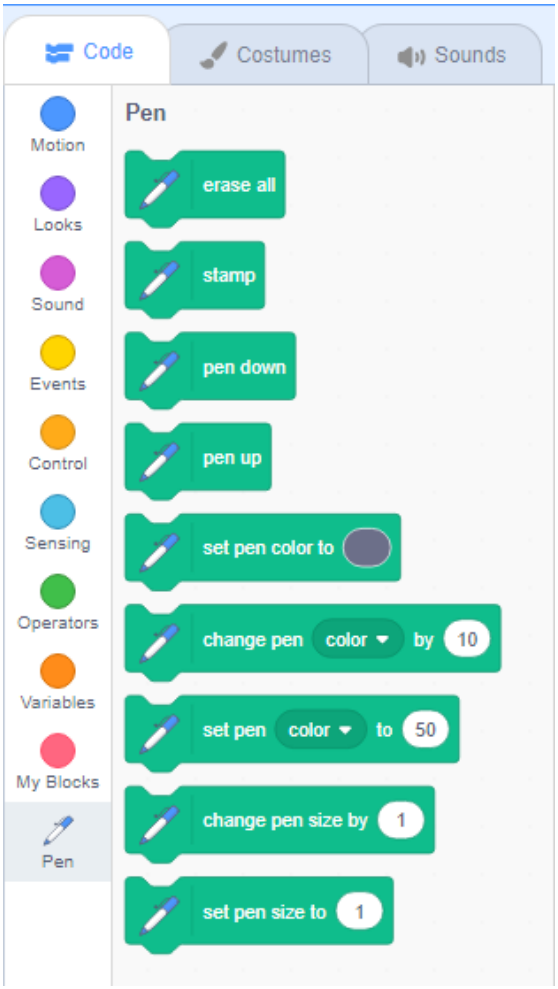
- Click on the **Add extension** button in the bottom left-hand corner.



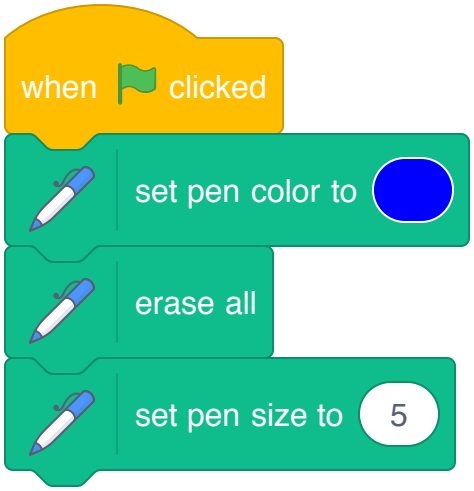
- Click on the **Pen** extension to add it.



- The Pen section then appears at the bottom of the blocks menu.



Click on the sprite called ‘Pen’, and add code to set the pen colour to the same blue as the obstacles on the Stage.

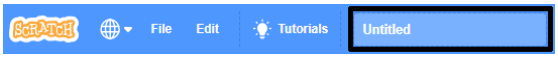


To select a colour, click on the colour square in the `set pen color` block to make your mouse cursor turn into a pipette, and then click on the correct colour on the Stage.

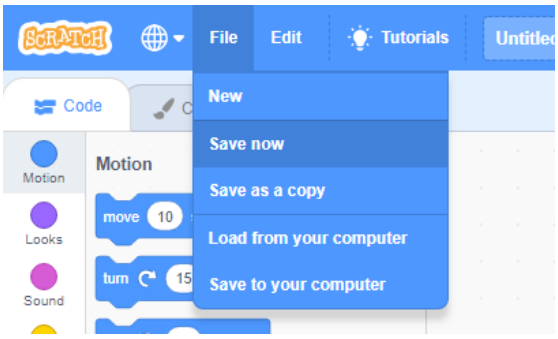
Add some more code to make the sprite follow the mouse pointer. Test your program to check that the code works.

Saving a Scratch project

- Give your program a name by typing into the text box at the top.



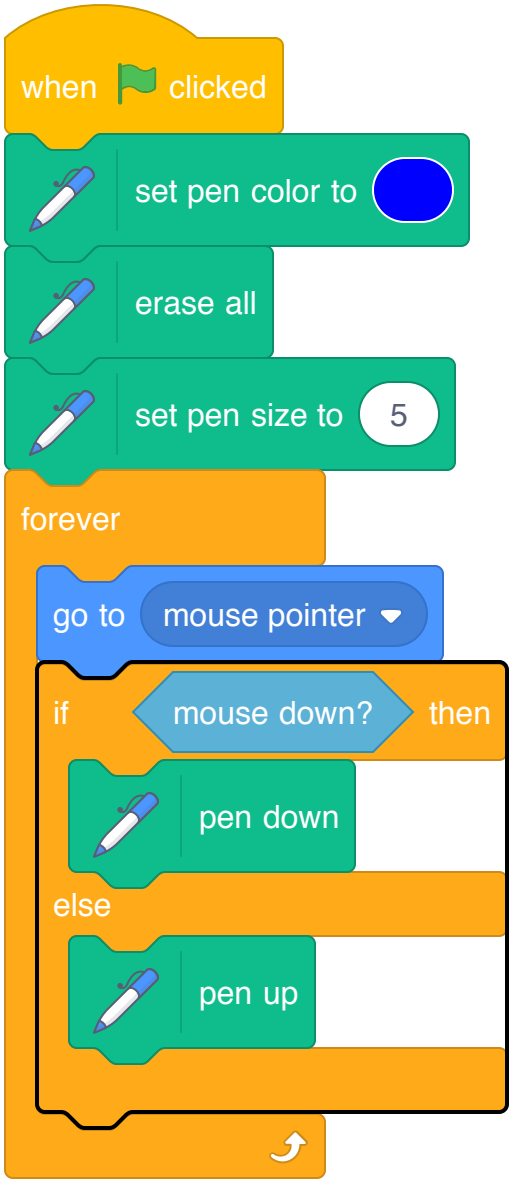
- You can click **File** and then **Save now** to save your project.



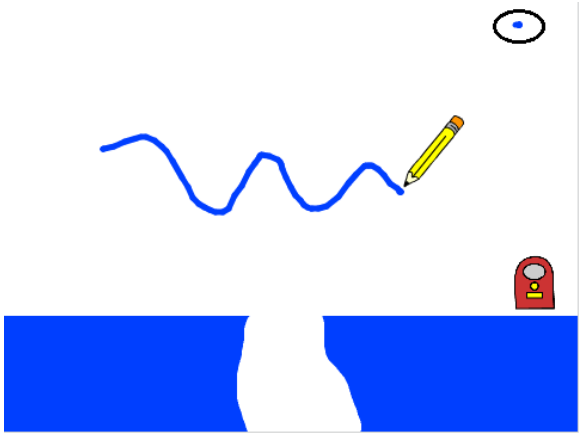
Note: if you are not online or don't have a Scratch account, you can save a copy of your project by clicking on **Save to your computer** instead.

Add some code to tell the sprite to draw a line on the Stage if the mouse button is pressed down.

This is what your code should look like:

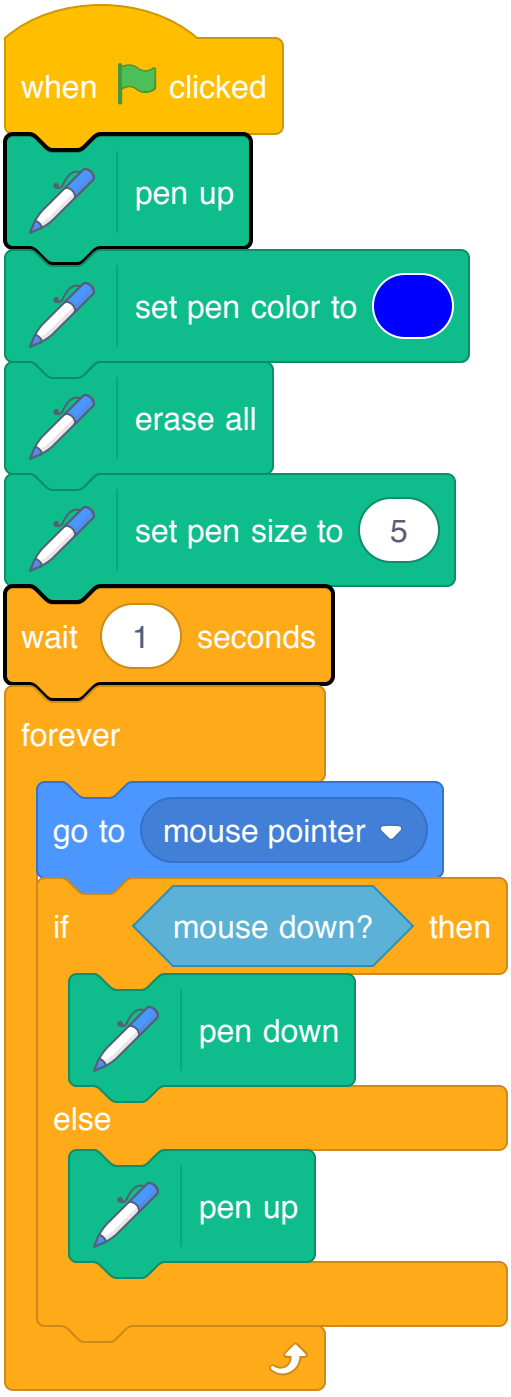


Test your code. You should be able to click and drag with the mouse to draw a blue line on the Stage.



You probably see that a blue dot always appears in the top right-hand corner of the Stage (it's circled in the image above). This is because, when you click the green flag to start the game, you press the mouse down, and so the pen immediately starts drawing.

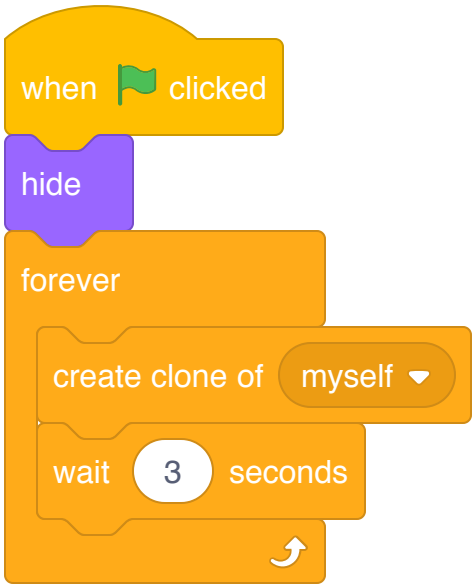
To stop this from happening, add a `pen up` block at the start of the script, and a `wait one second` block above the `forever` block.



Step 3 Clone cats

You want a never-ending stream of cats that the player has to guide along the path to the exit.

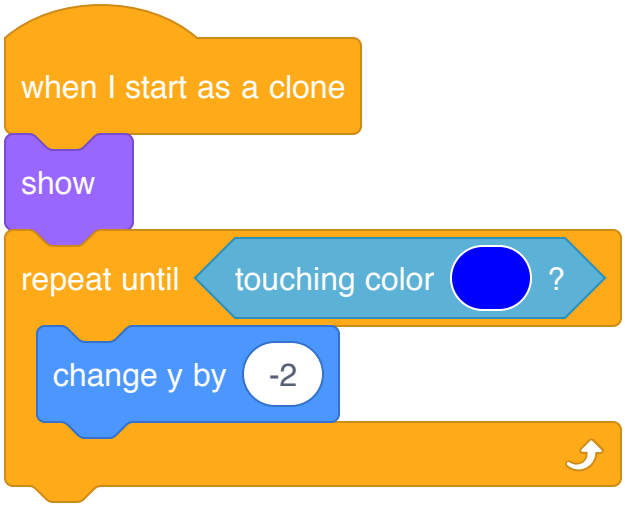
Click on the sprite called 'Cat', and add some code to `hide` the sprite, and also to `clone` it every three seconds.



If you run the program now, nothing happens on the Stage. To check that a new Cat sprite clone is created every three seconds, make each clone appear and fall out of the sky.

Add code to tell the sprite that `when it starts as a clone`, it should `show` itself and fall until it `touches` the blue floor that is drawn on the Stage.

This is what your code should look like:



When you click the green flag, you should see a new cat fall from the top of the Stage every three seconds. Every cat should land in a big pile of overlapping cats on the blue floor at the bottom.

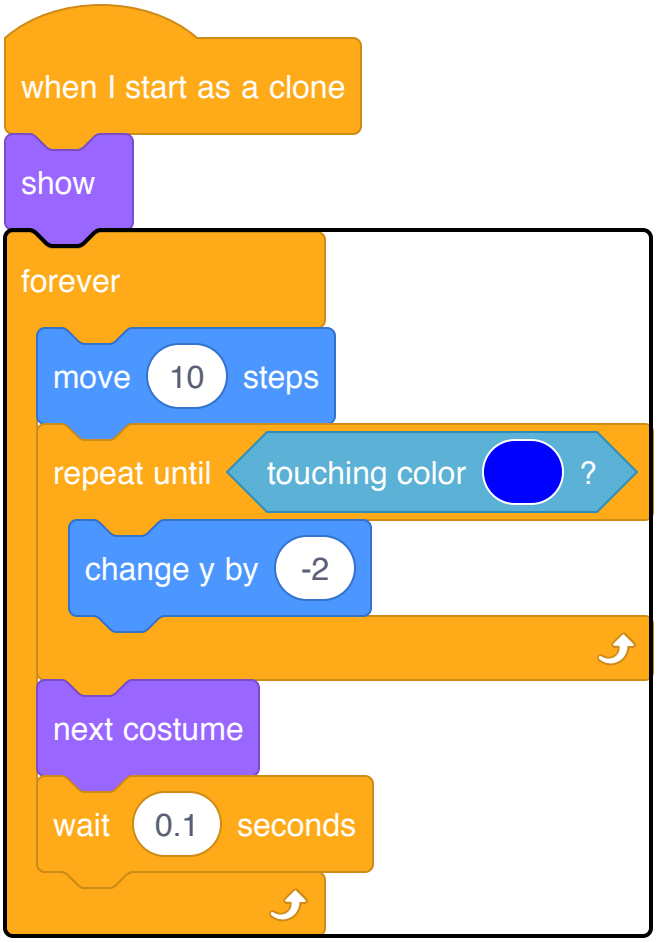
Step 4 Make the cats move

Once a cat reaches the floor, it should step slowly to the right.

Add code to the `when I start as a clone` section to make the cat sprite `move ten steps`, and switch between the sprite's two costumes every 0.1 seconds to make the cat look like it's

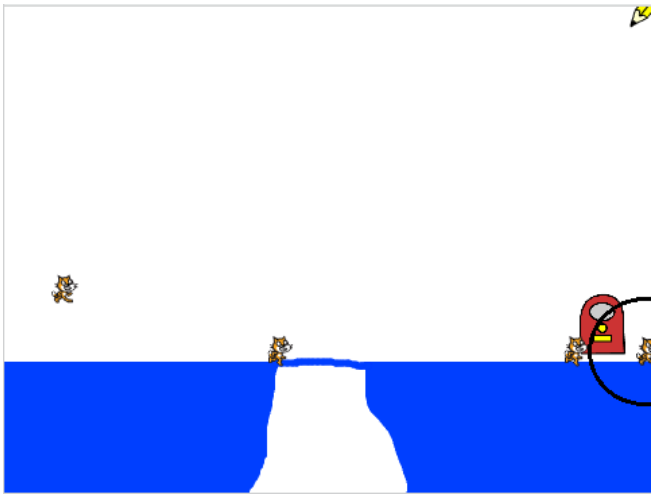
walking.

This is what your code should look like:

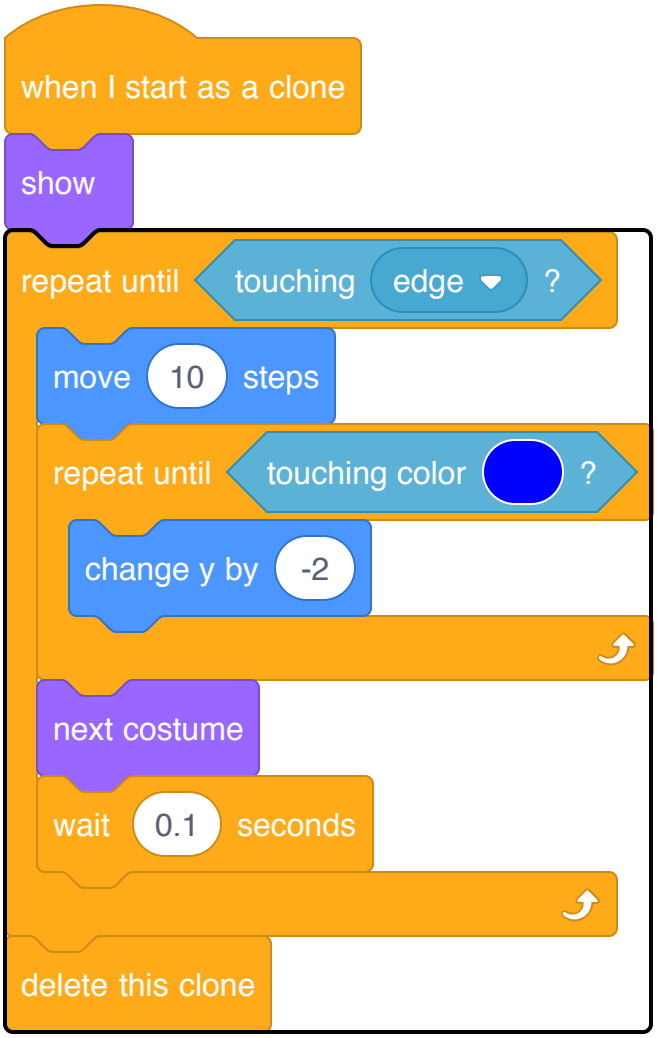


Press the green flag and check that the cats now move along the blue platform at the bottom.

If you draw a bridge across the gap so that the cats can get all the way to the right side of the Stage, you can see that they end up getting stuck walking into the right wall.



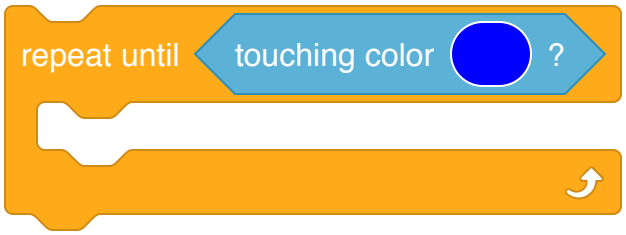
Remove the `forever` loop, and instead add a different loop to make the cats only walk until they reach an edge. When a cat reaches the edge of the Stage, it should disappear.



Press the green flag and check that the cats disappear when they reach the edge of the Stage.

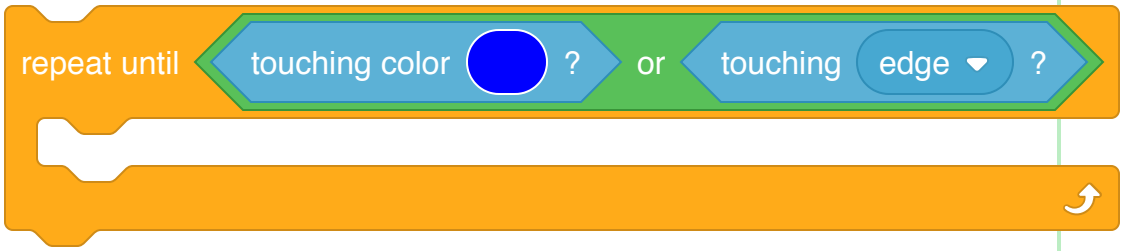
You may notice that, if the cats fall into the hole, they don't disappear but instead get stuck at the bottom. This is because they keep trying to fall downwards.

This is the part of the code that tells the cat to keep falling until it touches blue:



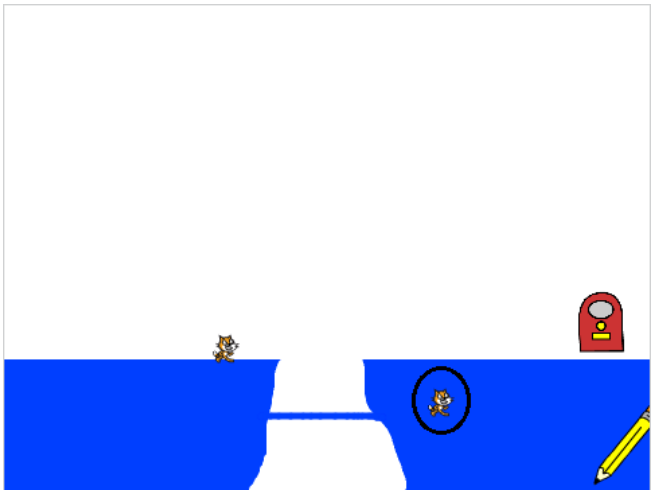
However, in the hole, the cat can never reach blue, so it is stuck forever.

Add more blocks to this loop so that it repeats until the cat sprite is touching blue `or` `touching the edge`. This way, the sprite stops trying to fall if it reaches the edge of the Stage.



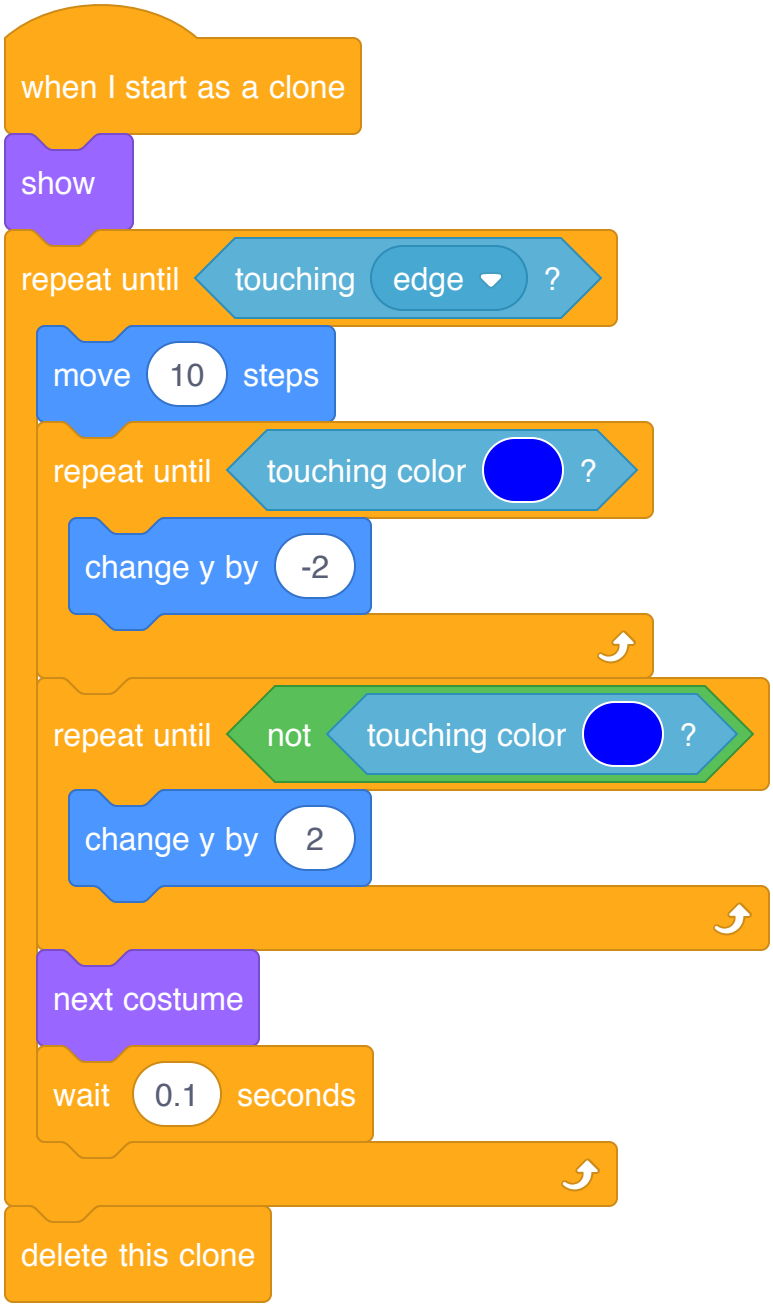
Step 5 Stick to the lines

You might notice that, if you draw a low bridge between the two platforms, or a line that slopes upwards, the cats end up walking through the platform rather than on top of it!



In the code for the cat sprite, add another loop before the `next costume` block. This time, the loop should tell the cat to move upwards by `2` until it is not touching blue.

This is what your code should look like:



Click the green flag and try drawing a line that slopes upwards. Check that your cat follows this line.

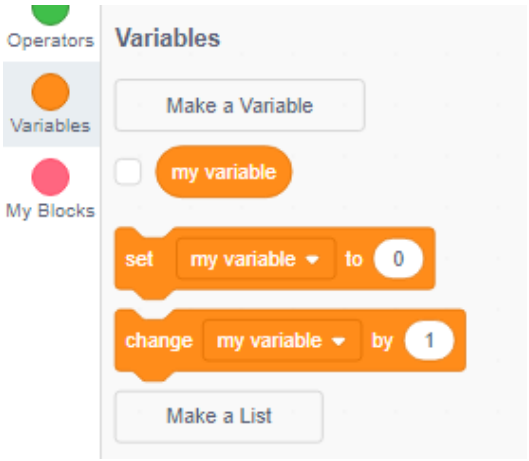
Step 6 Get to safety

The object of the game is to guide the cats to safety by creating a path so they can reach the door. Create a score variable to keep track of how many cats reach the door.

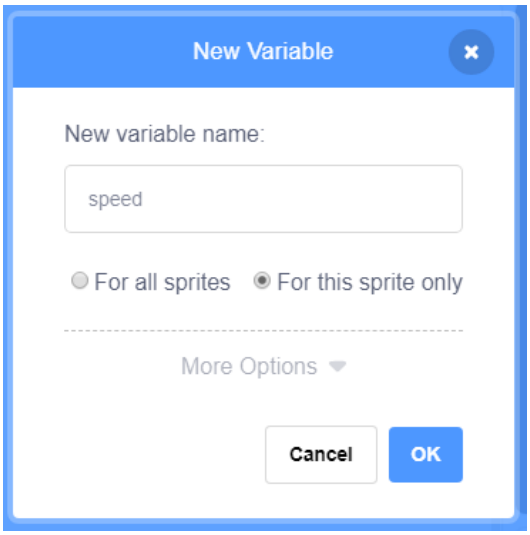
Create a variable called `score`.

Add a variable in Scratch

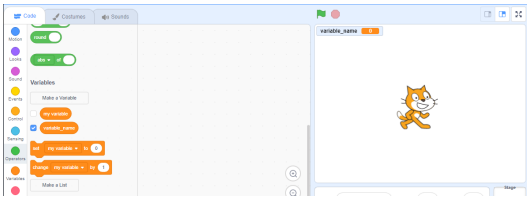
- Click on **Variables** in the Code tab, then click on **Make a Variable**.



- Type in the name of your variable. You can choose whether you would like your variable to be available to all sprites, or to only this sprite. Press **OK**.

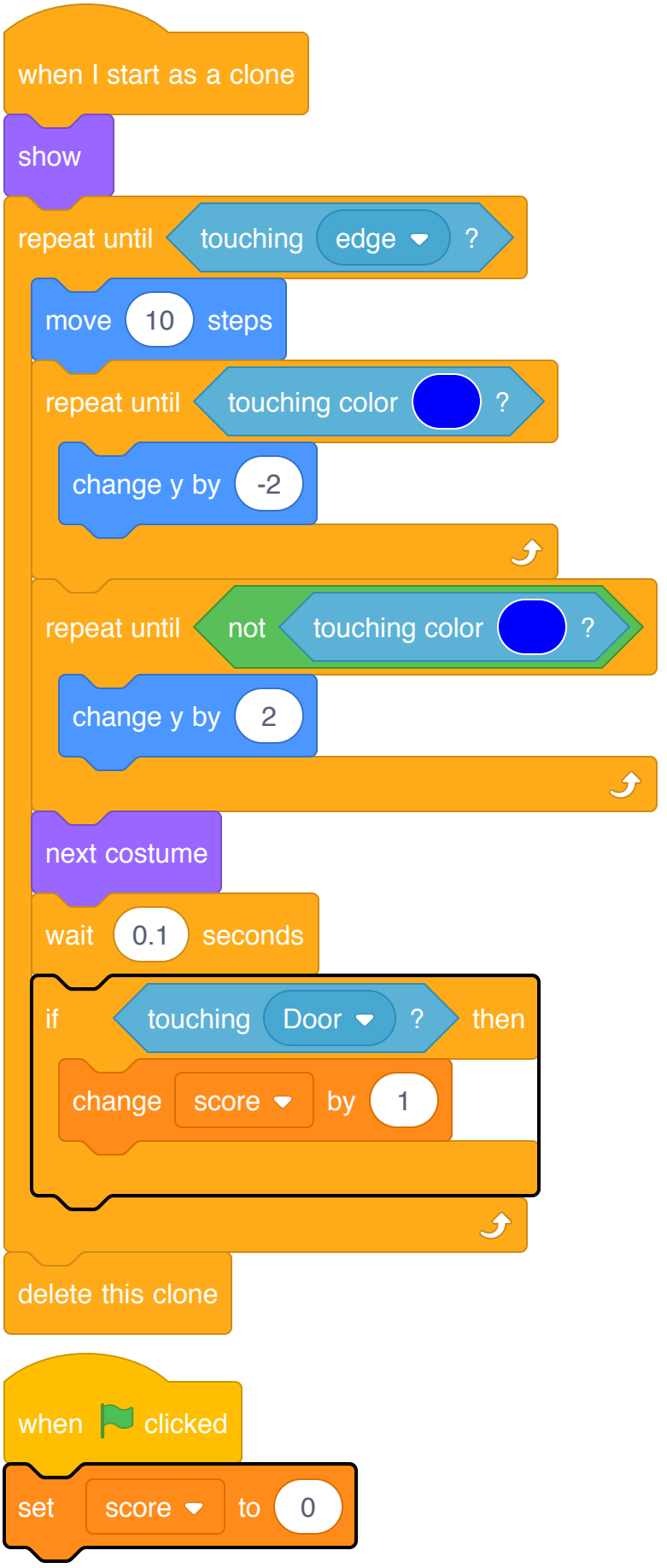


- Once you have created the variable, it will be displayed on the Stage, or you can untick the variable in the Scripts tab to hide it.

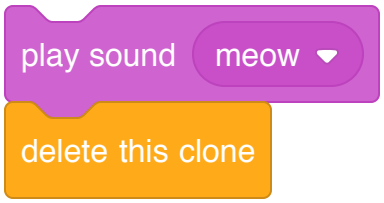


Add code to your cat sprite to add `1` to the `score` each time a cat reaches the door. Also set `score` to `0` `when the flag is clicked` at the start of the game.

This is what your code should look like:


when I start as a clone
show
repeat until touching edge ?
move 10 steps
repeat until touching color ?
change y by -2
repeat until not touching color ?
change y by 2
next costume
wait 0.1 seconds
if touching Door ? then
change score by 1
delete this clone
when clicked
set score to 0

Add some more code so that, when a cat sprite reaches the door, the cat makes a 'meow' sound and then disappears.



Challenge!

Challenge: more obstacles

At the moment, the game is rather easy to win. Can you think of ideas to you make your game harder?

- Add more backgrounds with different platform designs.
- Move the location of the door depending on which background is displayed.
- Add more sprites as moving obstacles. Perhaps you could have roaming dogs or rotating spikes the cats need to avoid?
- Only allow the player to use a limited amount of "ink" to draw lines in the game. You can keep track of how much "ink" is used by creating a timer variable that records how long the mouse is held down.
- Create a sprite to show the player how much ink is left.

Step 7 What next?

Try the **Flower generator** (https://projects.raspberrypi.org/en/projects/flower-generator?utm_source=pathway&utm_medium=whatnext&utm_campaign=projects) project, where you will use custom blocks to create flower patterns.