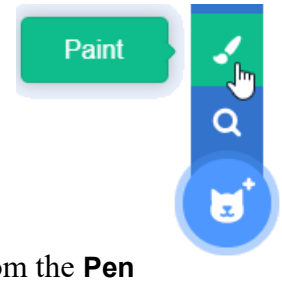
Introducing Scratch

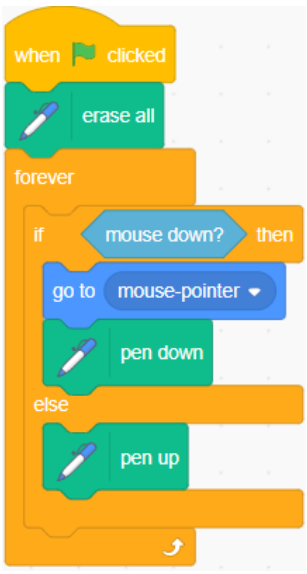
4 – Drawing

Exercise 1. Drawing Program

In this lesson we're going to create a drawing program similar to Windows Paint.



1. Start with a new project and **remove the default cat** sprite.
2. Create a new sprite.
3. All this sprite needs to do is mark the position of the mouse pointer so we will leave it blank since it doesn't have to have any visible picture.
4. Call the new sprite **Pointer**.
5. Add the following code blocks. Note that the dark green blocks are from the **Pen** category.
6. To view the pen category, click the **Add Extension** button at the bottom of the category list and then select **Pen**.

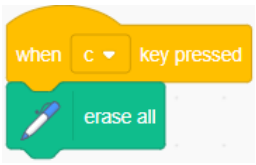


This will start by clearing all drawing from the stage when the  button is clicked. It will then use the forever loop to continually check to see if the mouse button is being pressed. If the mouse button is being pressed, the sprite will move to the mouse pointer and put the pen down (start drawing). If the mouse button is not down, the pen will be up (stop drawing).

7. Test the program so far by drawing something on the stage.

Next, we will add a keyboard control to the program.

8. Add the following code block.

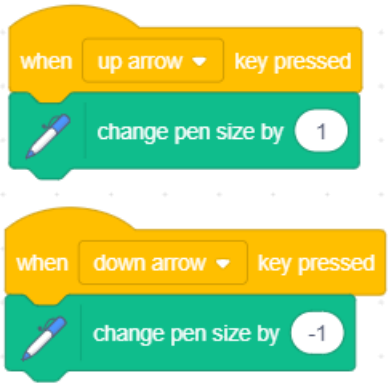


This will clear the stage whenever the **C** key is pressed.

9. Save the program as *Drawing*.

Exercise 2. Brush Changes

1. Add the following code blocks



These blocks will allow the user to change the brush size by pressing the up and down arrows (you can even do it while you are drawing).

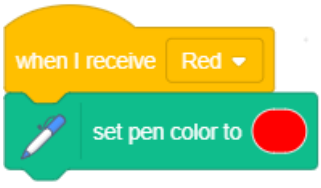
We will add some **icons** that the user can click on to change brush size and brush colours.

2. Create a **new sprite** that looks like a small red square (the size of a convenient icon the user can click to change colour). Rename the sprite as **Red**.

3. Position the sprite/icon in the top corner of the stage.
4. Add the following code blocks to the new sprite.

This will send out a message that the red icon has been clicked.

5. Select the Pointer sprite and add the following code blocks.

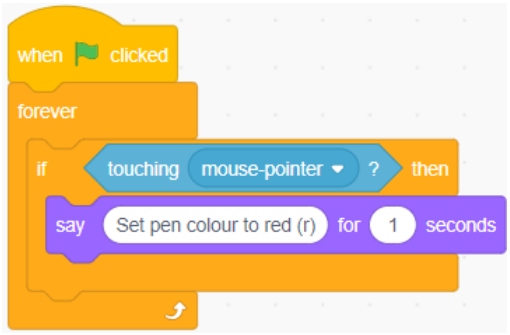


This will change the pointer/pen colour to red when it receives the message that the red icon has been clicked.

Tip You can easily set the red colour to be exactly the same as the colour you used for your sprite by clicking the square in the **set pen color to** block, and then clicking on the colour picker icon to select the colour you want.

Optional step – add a keyboard shortcut and tooltip. You can also repeat this step for other icons if you like

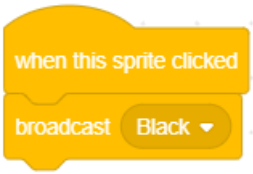
6. Add the following code blocks in the *Red* sprite



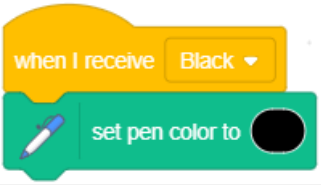
This will make a "tool tip" appear when the mouse goes over the icon.

7. Repeat steps 2 to 5 to create a black icon that will change the pen colour to black when it is clicked. **Tip** – you can duplicate the existing sprite and modify its costume to change the colour inside the square shape. If you do that then remember to rename the sprite and make appropriate changes to the code blocks.
8. Position it near the red icon (you can rearrange them in whatever order suits you). Try to make the new sprite the same size and shape as your first one.

In the *Black* sprite

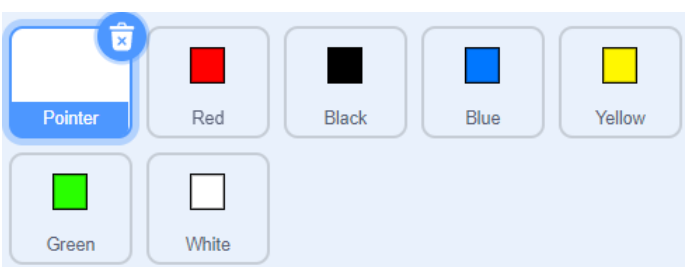


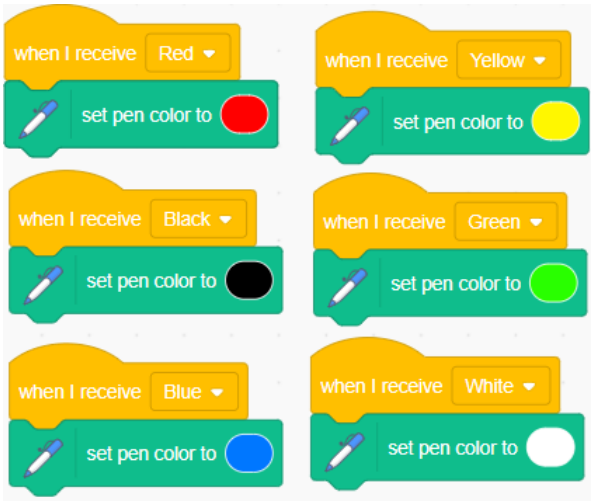
In the *Pointer* sprite



Tip When you are drawing a sprite, you can use the chequered grid to help you make it the right size. The zoom options can also help when drawing.

9. Test your black and red icons now and try drawing with both colours.
10. Create some additional colour change buttons.





Now we will create icons for 3 brush sizes. We'll start with an icon for a small brush size.

11. Create a new sprite in the shape of a white square with a small circle in the middle of it (for your small brush size).

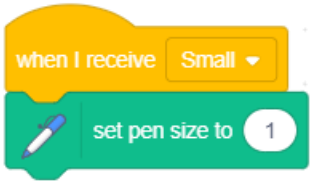
12. Name the new sprite **Small** and position it in the bottom corner of the.

Tip If you would like your sprite / icons to be lined up, one easy way to do it is to edit their coordinates in the sprite properties. E.g. if you want them all to be lined up vertically then make sure they all have exactly the same x coordinates.

13. Add the following code blocks.

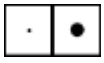
In the *Small* sprite

In the *Pointer* sprite



14. Create a new sprite similar to the previous one with a larger dot (this will be for your medium brush size).

15. Name the new sprite **Medium** and position it next to the Small icon.



16. Add the following code blocks.

In the *Medium* sprite

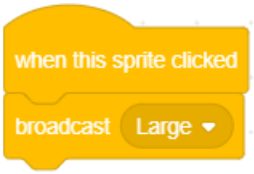
In the *Pointer* sprite

17. Create a new sprite with a larger circle than the previous two (this will be for your large brush size).

18. Name the new sprite **Large** and position it next to the Small and Medium icons.

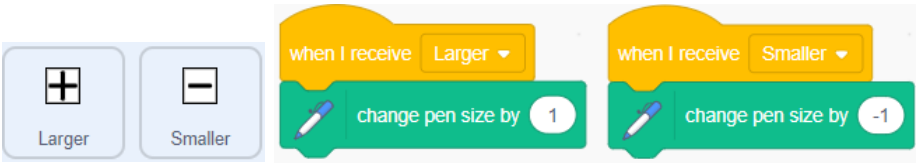
19. Add the following code blocks.

In the *Large* sprite



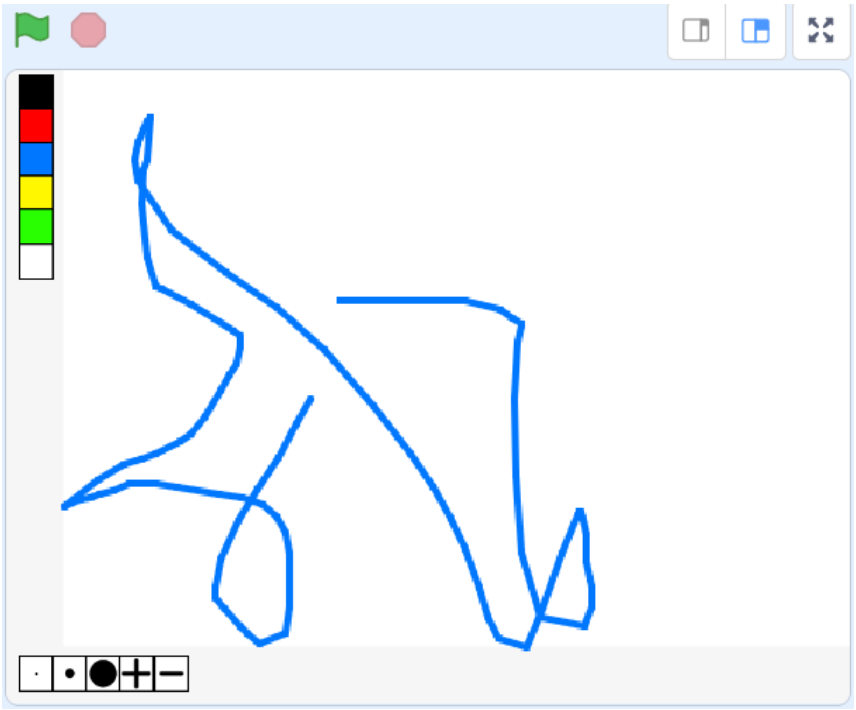
In the *Pointer* sprite

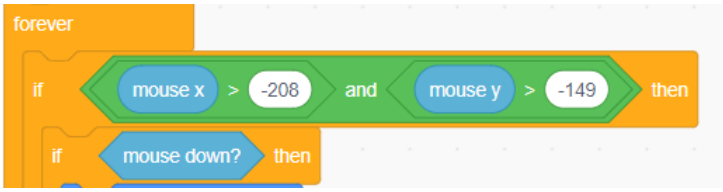
20. Add 2 more Icons that can be clicked to increase or decrease the brush size (just like the ↑ and ↓ keyboard shortcuts we set up earlier.



21. Test the program. Click on each icon to test drawing with the different brush sizes.

Extra At the moment, the pen keeps on drawing even when you are clicking on one of your icons. Can you find a way of limiting the pen so that it only draws in a certain area? You could even change your backdrop so that the "no draw" area is shaded.





Exercise 3. Code Reference

Pointer sprite