

# Using AI

## Making Googly Eyes

You are going to use an online program called Scratch to learn how to code googly eyes. To do this you need a computer with internet access and a camera.

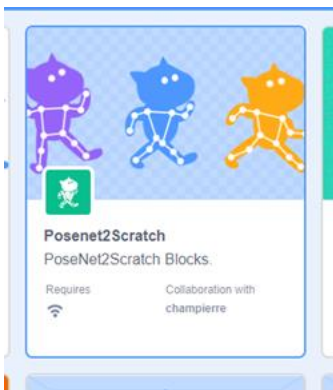
### Instructions:

Open a web browser and in the address bar type **stretch3.github.io**

A  page should open.

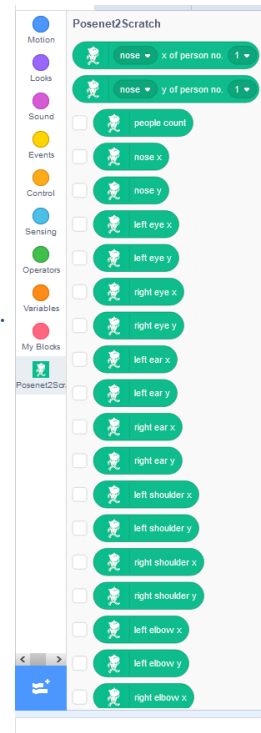
At the bottom left of the screen you will see the add extension button 

Click on this and a page of extensions will open. Select Posenet2Scratch.



This will take you back to the main screen and you will have a huge selection of new blocks.

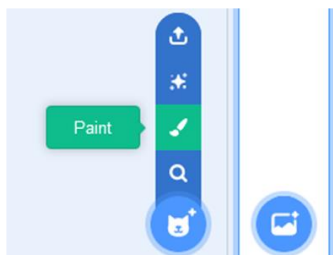
You should also be able to see your camera feed on the screen.




Delete the cat sprite (a sprite is the object you create to animate in Scratch).

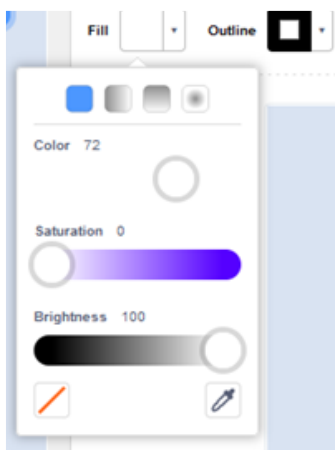


The next step is to draw your googly eyes.  
On the bottom right hover your mouse over the cat icon (new sprite) and select the paint option.

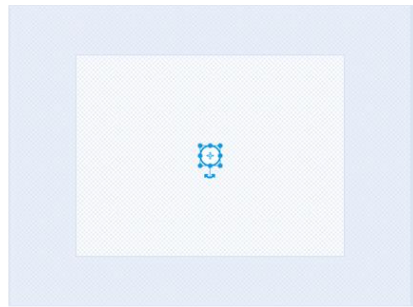


To draw an eye, use the circle tool  to draw a circle. Holding the shift key while you are drawing the circle will make it look round. If you want a more free form shape you can.

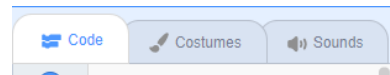
You can use the fill and outline tools to change the colours.



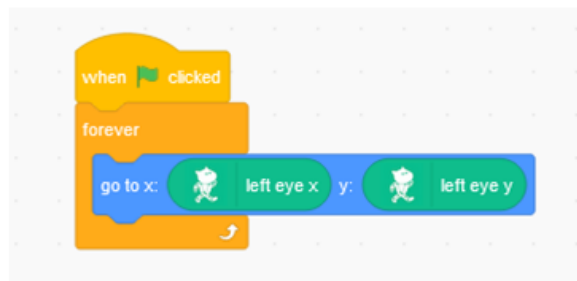
Make sure you put your image in the centre of the screen.



Click on the code tab on the left hand side.

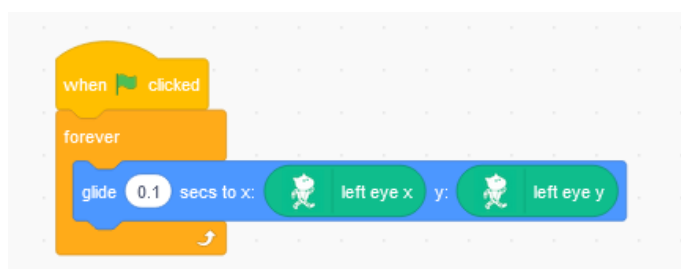


Drag the blocks from the menu to set the following code. To help you find the blocks they are colour coded to the sections of the menu. Make sure when you select the eye positions you use left eye x and left eye y.



Once you have done this click on the green flag above the camera panel. This will run the code and you should see the white circle follow your eye when you move your head. Click the red hexagon to stop the code.

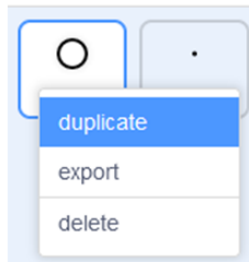
Next you need to add a pupil to your eye. Just like you created your first circle, use the new sprite button to create a small black dot. Again, it should be centred on the screen. Go to the code tab and add the following code. It uses the glide motion so the pupil takes a little longer to move.



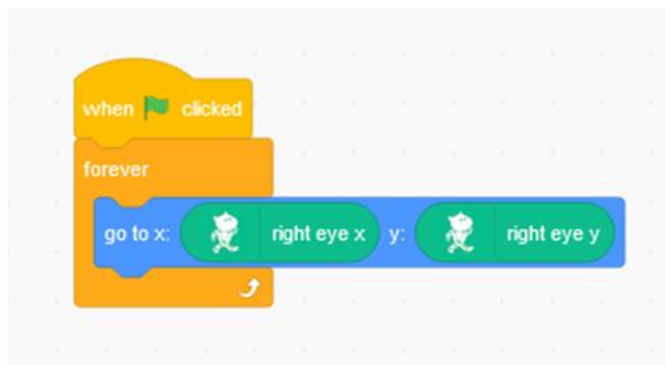
Click on the green flag to run your code. You should have one eye that follows your left eye.

Now you need to add a second eye!

Make a copy of the eye circle (in this example it is a white circle) by right clicking on the sprite tile (bottom right hand panel) and selecting duplicate.



Go to the code tab and change the left eye x and left eye y blocks to right eye x and right eye y blocks. (To remove blocks you no longer want, drag them back to the menu, then you can replace with the new blocks).



Make a copy of the black dot by right clicking on the sprite tile and selecting duplicate.

Go to the code tab and change the left eye x and left eye y blocks to right eye x and right eye y blocks.

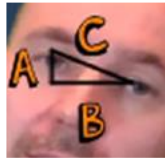


Click on the green flag to run your code - you should now have two googly eyes!

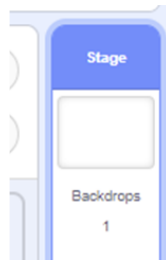
Have a play around with different shapes, different sizes, different glide times - which ones look the funniest?

## Scaling - challenge!

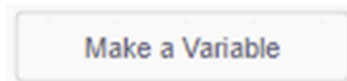
You can use scaling to make sure the eyes scale correctly. Pythagoras' theorem is used to work out the distance between the eyes.



The first thing to do is set up some code to run in the background for each of your sprites. Click on the stage panel in the bottom right of the screen.



In the code tab, click on the variables menu, and choose "Make a Variable".



Make four new variables, calling them:

- o length\_a
- o length\_b
- o length\_c
- o Scale

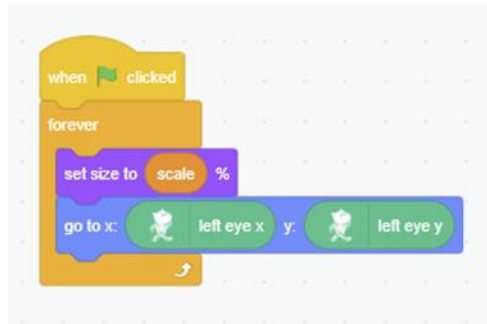
They will appear as orange variable blocks in your menu.

Add the following code to the script area.



If you find when you run your code that the googly eyes are too big or too small try changing the 50 to 40, or 60. Change the numbers until you find what works best for you.

In each of your sprites (left eye, left pupil, right eye, right pupil) change the code to add in a set size block.



Once you have done all four, hit the green flag to run your code – do your googly eyes track your face?

### Extras

You can try adding extra things, as well as trying out different googly eyes. You can add hats, beards, silly ears, whatever you want. In order to do that you need to work out the angle of the head by using trigonometry.

Trigonometry lets you work out the angles in a right angled triangle. There are three different equations for trigonometry, but the one we are interested in is:

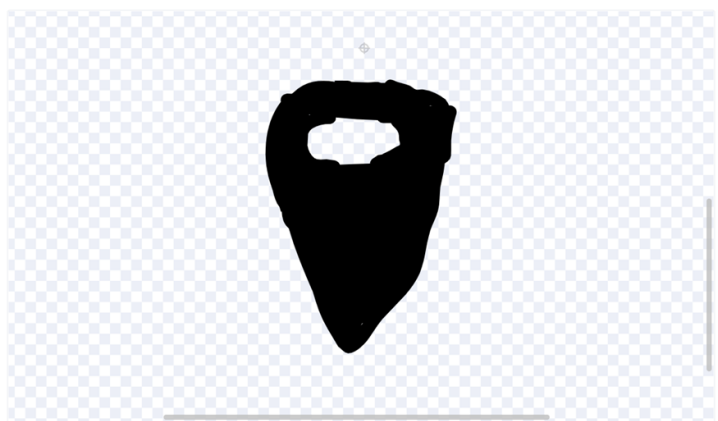
$$\tan(\text{angle}) = b / a$$

We then use the “atan” function to get the angle.

In the stage area change the background script to look like this:

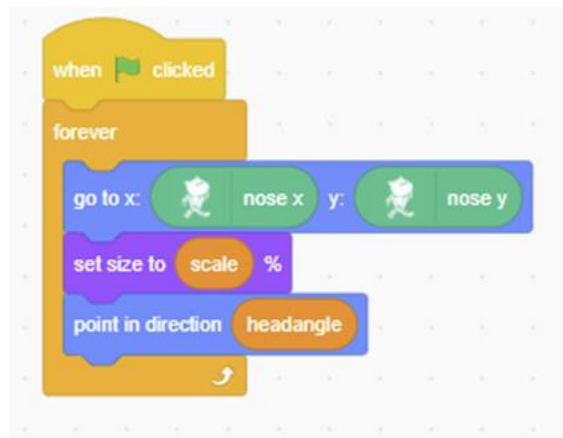


To add a beard, create a new sprite and draw your beard.



You should draw it just below the centre. If the position is not quite right after you have tried it you can change the position.

In the code tab for your beard sprite put the following code blocks together.



Hit the green flag to run your code and see how it looks. If the beard is too high or too low you can go back to the sprite drawing and move it up or down. The centre point of the drawing area will be on your nose when the sprite is drawn so make sure there is enough space.

Can you work out how to add a hat or silly ears?