technoteach

technocamps

Llywodraeth Cymru
Welsh Government

Prifysgol Abertawe
Swansea University

Cardiff University
Prifysgol Caerdydd

Prifysgol Bangor University

Cardiff Metropolitan University
Prifysgol Metropolitan Caerdydd

University of South Wales
Prifysgol De Cymru

Cyngor Cyllido Addysg Uwch Cymru
Higher Education Funding Council for Wales
hefcw

Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Prifysgol Aberystwyth University

Prifysgol Glyndŵr Wrecsam
Wrexham Glyndŵr University

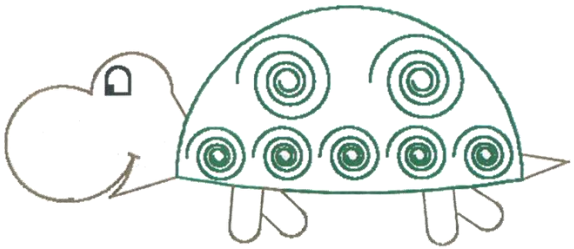
institute of CODING in wales
technocamps

technoteach
technocamps

LOGO & Scratch Pen

technoteach
technocamps

LOGO



techno

What Is LOGO?

Procedural programming language – it carries out steps in the order they appear

Allows the user to program a turtle-like cursor around the screen which draws a line everywhere it goes

1. Getting Started with LOGO

There are many free online interpreters though they may slightly differ in terms of the commands used to control the turtle

We will be using:

www.calormen.com/jslogo/

Drawing with LOGO

To begin draw a straight line. You can use the command 'forward 100' - the cursor will move forward 100 steps

As it moves over each step it will leave behind a line

2. Drawing a Straight Line

Move 150 steps forward

Tip: You can use the shorter "fd" command too. Try it out!

3. Combining Instructions

As we said at the start LOGO is a procedural language. This means it carries out the steps in the order they are written

For example if I wanted (for some reason) the turtle to move forward 20 steps **and then** again move forward an additional 50 steps. I would write:

forward 20
forward 50

Or: fd 20
fd 50

Forward and Backward Movement

Instruct the Cursor to Move 400 Steps Forward and Then 100 Steps Backward

Remember, the order of instructions is important!

Can you guess what the shorthand notation is for back?

Great so now we know two commands, forward and backwards, but not very useful on their own

If we can turn the turtle then we have a full range of motion available

Turning Commands

To make the turtle rotate to the right we use the command "**right**" followed by the number of degrees we want the turtle to rotate

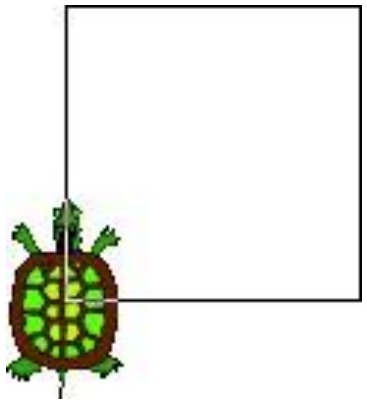
For example:

right 90

will make the turtle turn 90 degrees clockwise

4. Creating a Program

Create a program which creates a **square** where its **sides are 100 steps** long. You can do this with a minimum of **8 commands** (Including returning the cursor to its original position)



Repeating Commands

To repeat commands in LOGO we simply use

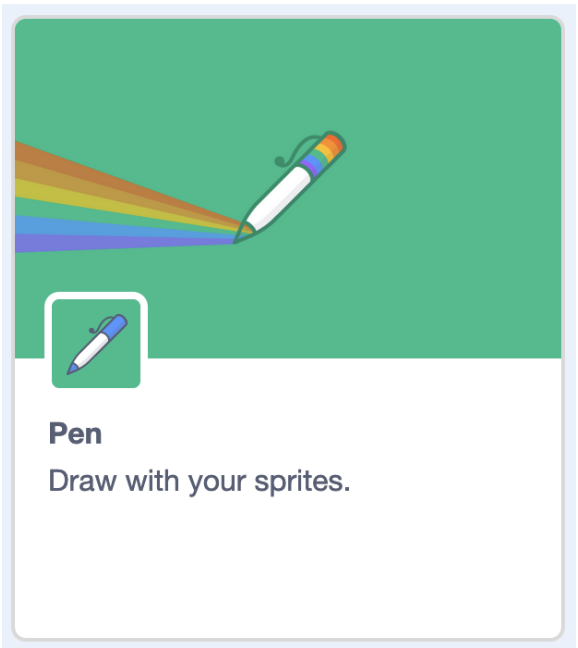
" repeat *number of times* [what we want to repeat] "

So if we wanted to make the same square, a more efficient way would be:

repeat 4 [fd 100 rt 90]

Try it out!

Scatch Pen



What is Scratch Pen

Scratch is a simple block-based programming language designed for education

It is procedural, so all of the blocks in a stack will be carried out in order

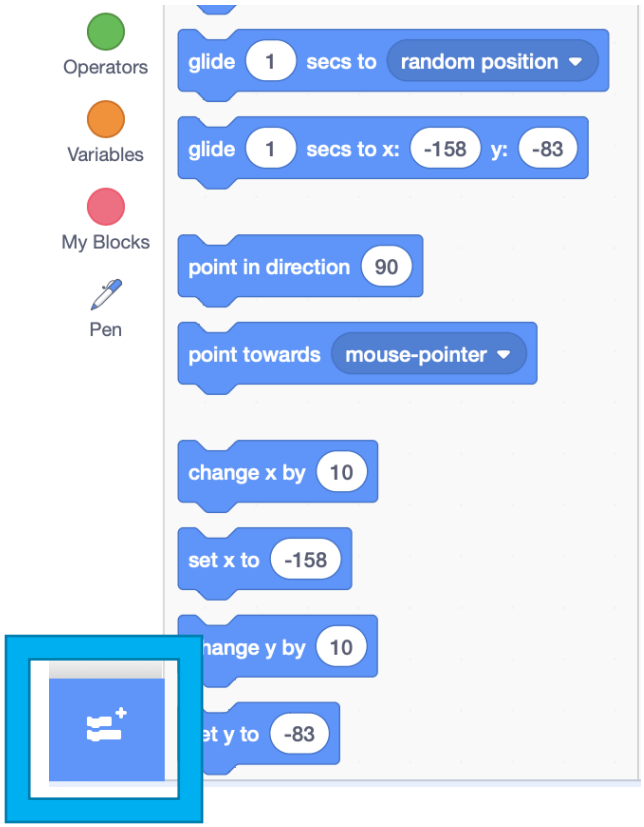
We can use the Pen Extension in Scratch to do the same things as LOGO

Pen Shapes - Resizing the Cat

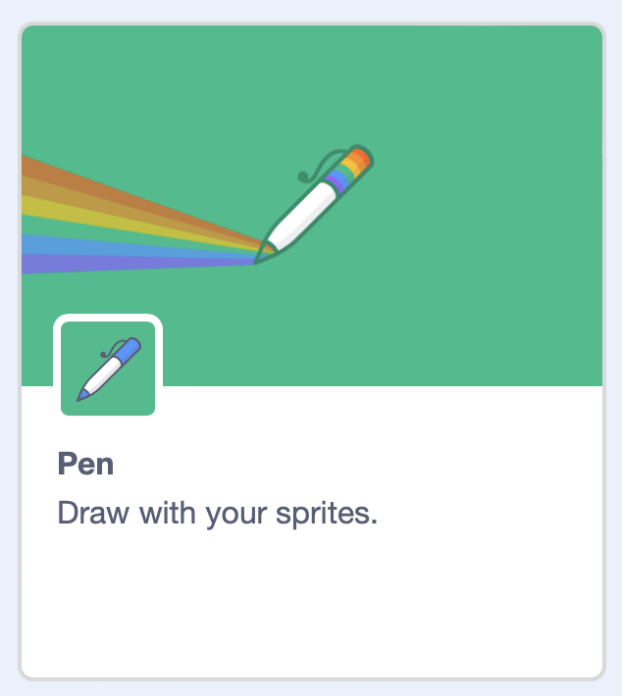
Start by setting the size of the cat sprite to 5

This will make it easier to see the shapes being drawn

Pen Shapes – Pen Extension

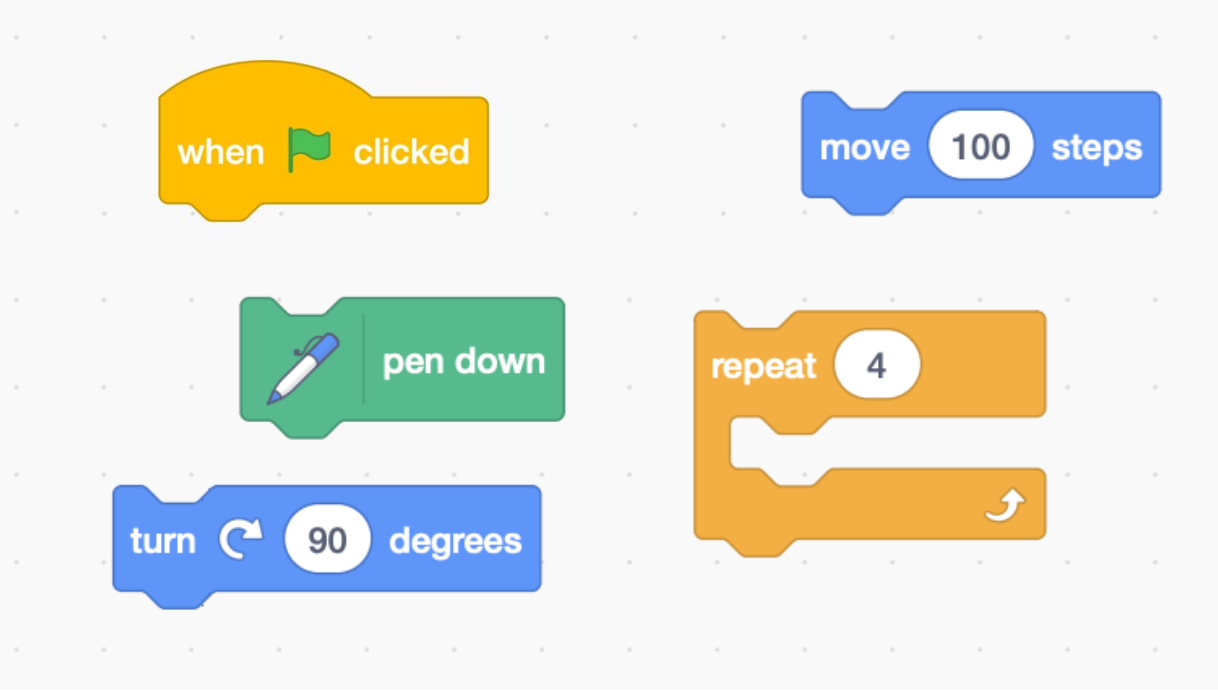


Click the Extensions button on the bottom left of the screen and find the pen extension



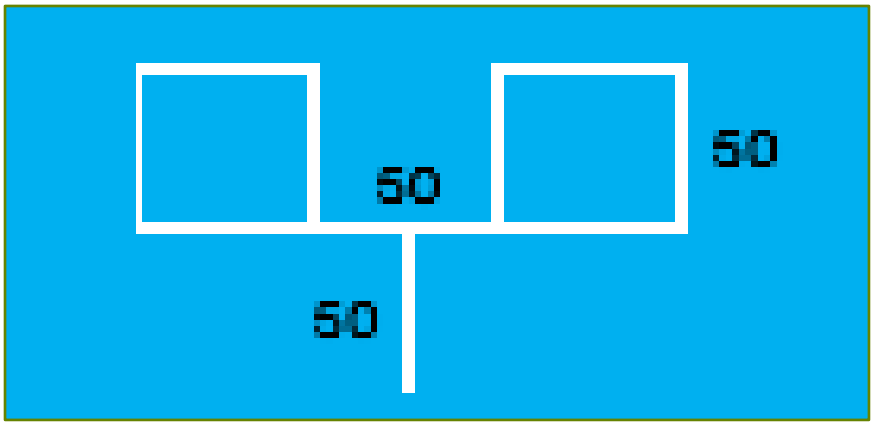
Pen Shapes – Drawing a Square

Using the following blocks, try to assemble an algorithm that will draw a square on the screen



5. Program

Create a program which creates the following image:

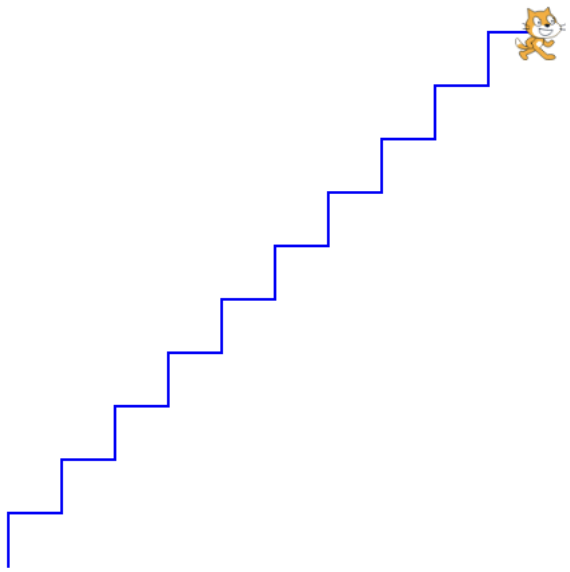


6. Stairs

Create a Program which creates a staircase consisting of 10 steps of size 20

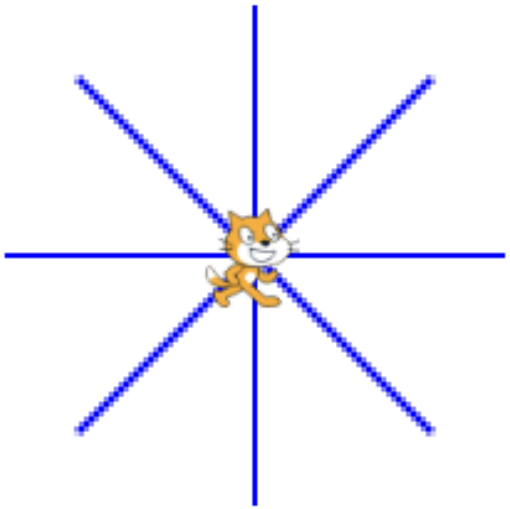
First find the repetitive pattern

Think about how to move the cursor in the correct direction



7. Stars

Draw an 8 point star (Asterisk shaped) with the angle between each point at 45° and the length of the points being 250 steps



Penup and Pendown

By default the sprite will create a line over every step it takes. You can stop this by using the "**pen up**" block

For example:

- Moves forward 60 steps
- Lifts the "pen" off the "paper"
- Moves forward 30 steps
- Puts the "pen" back on the "paper"
- Moves forward 60 steps

Writing and Reusing Programs

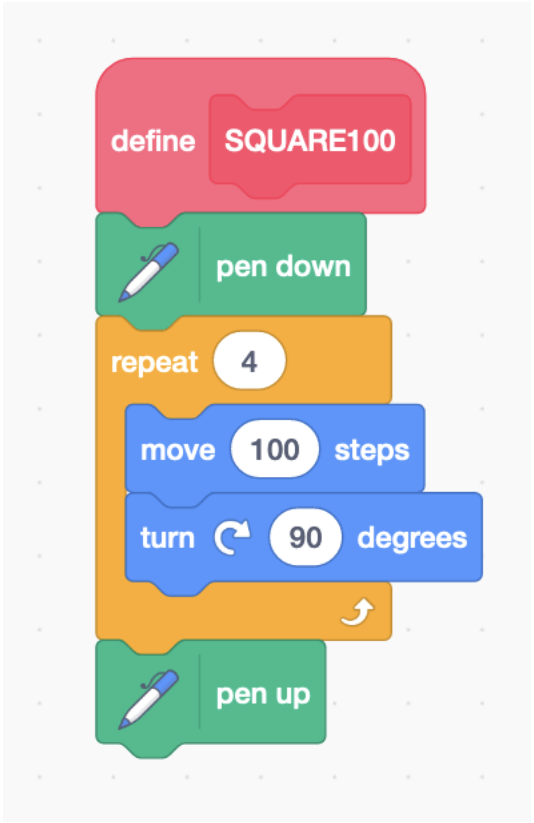
Once we've written a program (a set of commands) we may want to reuse it. We could write it all out again, or copy and paste, but this is inefficient

Instead, we name the program and then just write it's name to call it (use it) again

We call this process of naming and reusing code, "creating functions"

Creating a Function in Scratch

Here is how we create a function in Scratch:



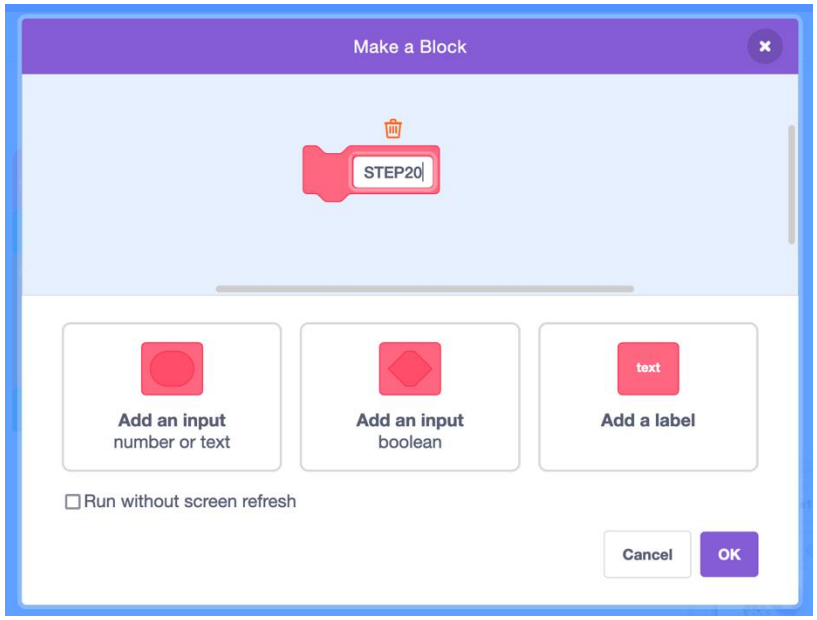
This code names a function "**SQUARE100**" and **defines** it. We can now use this name instead of writing out the entire function

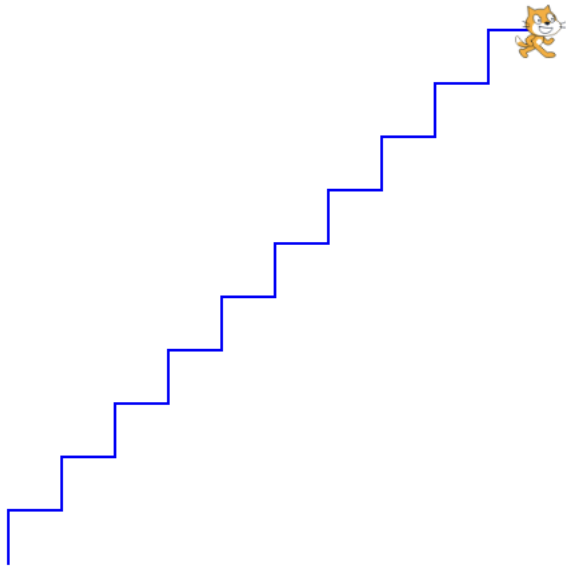
What does this function do?

8. STEP20

Create a function called STEP20 which creates one step from the stair in task 5

Use this function to create the stairs from Task 6





9. Street

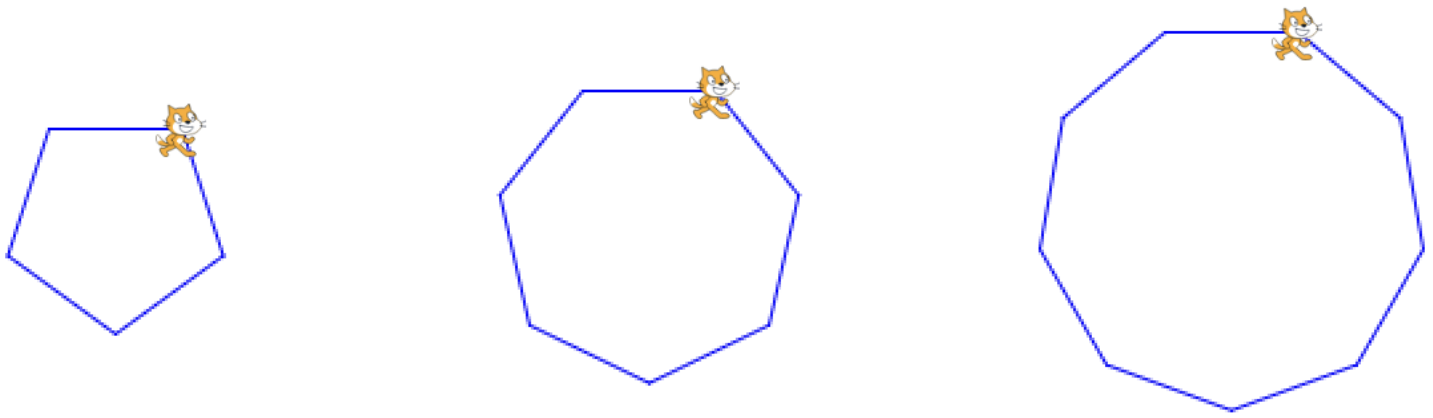
Create a program which draws a row of houses

- First create a program which creates a house
- Use this program and the repeat command to create the row of houses
- Remember to make a gap between each house!

10. Shapes

Create a program which creates a 5-sided shape, a 7-sided shape and a 9-sided shape

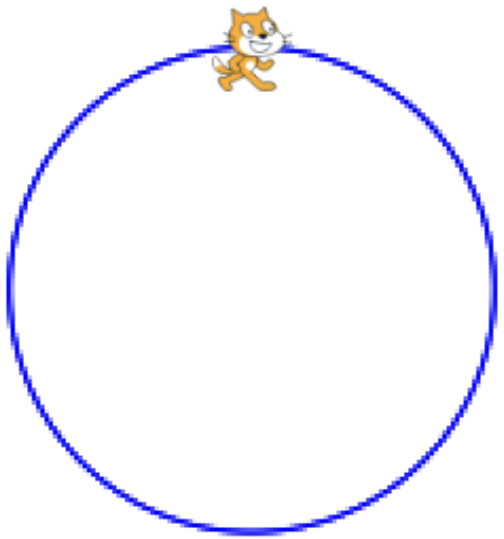
Create these as their own programs called SHAPE5, SHAPE7 etc



11. Shapes

Create a programme that creates a circle

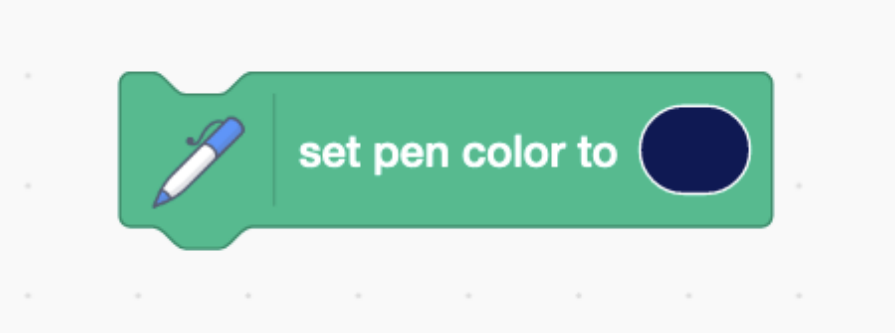
(It isn't possible to draw a perfect circle but get as close as you can!)



Changing Pen Colour

It's possible to change the colour of the line the pen draws.

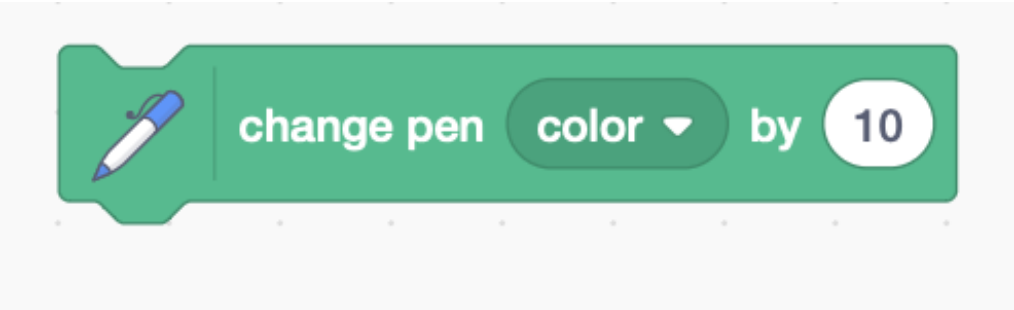
To do this, use the "set pen color" block and select the colour:



Code languages generally have American spelling. Annoying but something we have to live with.

Changing Pen Colour

Try adding the ‘change pen color’ block inside a loop to see how it affects the colour of the pen:



12. House

Create a program which creates a house (similar to that in task 9) which has size of the sides specified when the program is called.

13. Row of Houses

Using the program created in task 12, create a row of houses that has the number of houses specified and the size of the houses specified.