YOUR STEP BY STEP GUIDE
TO GETTING STARTED WITH SCRATCH CODING

If you haven't played around with Scratch you don't know what you are missing.

But don't worry. This guide is your jumping off point into the world of coding.

When you've finished you will have created several programs and be ready to move on to lots of other coding projects and become a super coder!

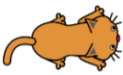Time needed to complete: approximately 30 minutes.
But allow more time for exploring and trying out your own ideas. Exploring and trying out ideas is always a good thing!

Coding with Scratch - First Steps

What is Scratch Coding?

- Scratch is a great way for you to learn how to code.

- It's fun and easy to use … but also very powerful!

- It uses coloured coding blocks that you snap together to create games, cartoons, storybooks, digital art and a whole load more.

- It lets you be creative and explore the world of coding without getting bogged down in writing lines of complex code.

- It's designed for young people aged from 7 to 14 – but anyone can use it!

- It's the programming language used in most schools around the world.

- It's completely free to use and runs on most computers including laptops and tablets.
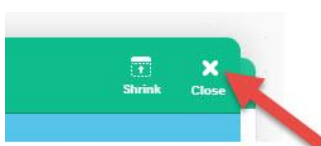
Opening Scratch

To start using Scratch go to the web page at **scratch.mit.edu**

When the page loads click on **Start Creating**.
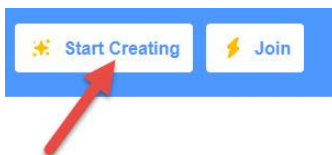
If the Tutorials block is showing in the middle of the screen click on 'close' to clear it.

The Interface

When Scratch loads you will see the Interface. Don't worry about learning what everything does before you start coding because we will be discovering things as we go along. The picture below shows the main areas of the Interface just to help you find your way around.

BLOCKS PALETTE
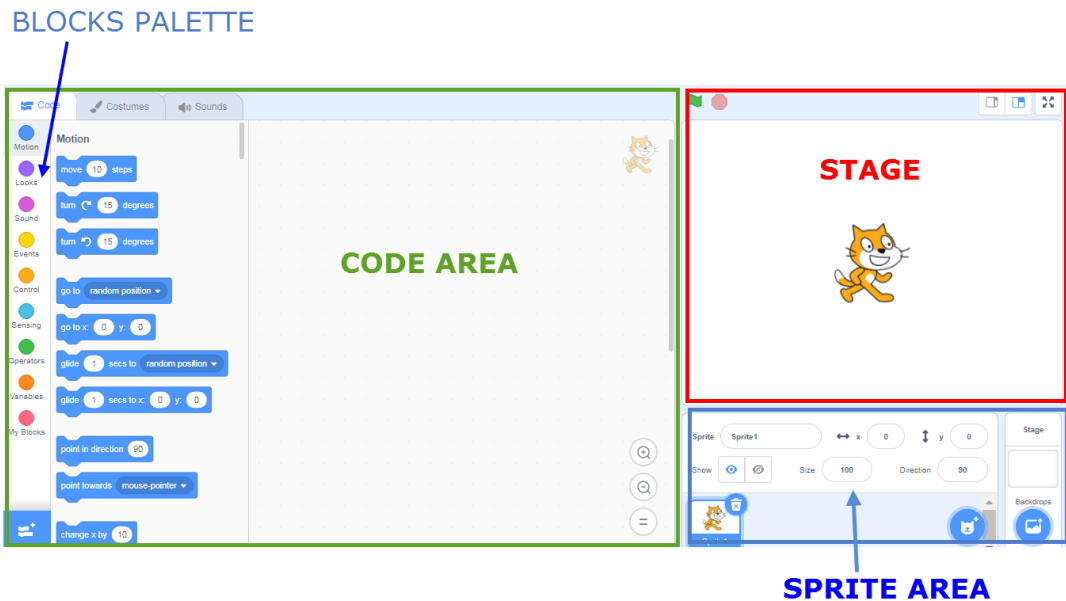
SPRITE AREA

The **Stage** is where your programs run, where you will see your game or story or other project come to life.

The **Sprite Area** shows all the Sprites in your program.

Sprites like Scratch are the characters or objects in your projects and they follow the instructions you create with the coding blocks. Sprites can move, play sounds, change costume, talk, disappear, bounce off walls and lots more. Projects can have several sprites and there are lots of sprites for you to choose from.

The **Blocks Palette** is where you find all the coding blocks. There are over a hundred blocks you can use. Here are a few examples:
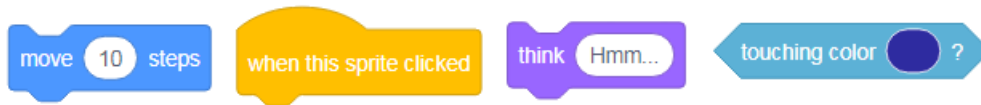
- The blocks can be joined together and control your sprites and create all the action.

- The blocks are colour coded depending on what they do. For example all the blue blocks deal with motion or movement.

- There is a helpsheet at the end of this guide which tells you more about the blocks. You can print this off to help you find the blocks you need when coding.

And finally the **Code Area** is where you create your code by dragging and joining coding blocks.
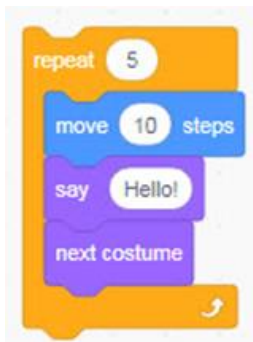
Information!

Scratch 3.0

We will be using the latest version of Scratch which is called Scratch 3.0

You may have already used an earlier version called Scratch 2.0 and the screen will look different but don't worry things haven't changed much - except Scratch 3.0 is much better!
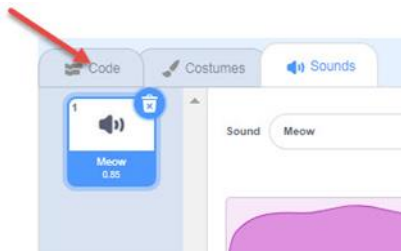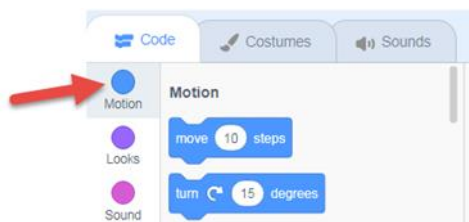
Let's start coding!

Moving the cat

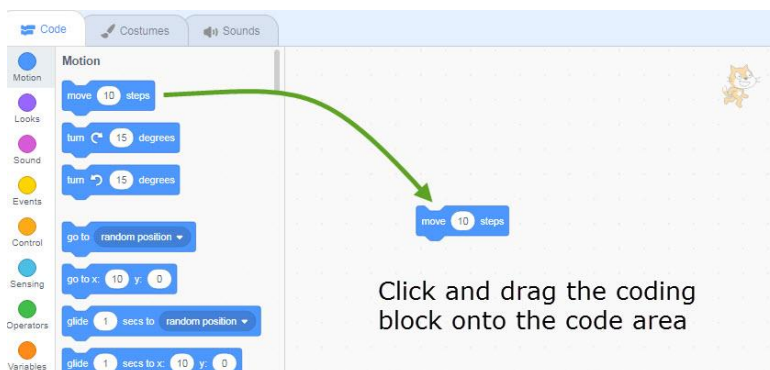Our first task is to create a simple program to make the cat sprite move across the stage.

First just check you can see the Blocks Palette on your screen. If not click on the Code tab to select it.

And then if you can't see the blue Motion blocks, click the Motion button at the top of the Blocks Palette.

Now you are ready to start coding. Click on the block and drag it on the Code Area.

Click and drag the coding block onto the code area

Now each time you click on the move 10 steps block in the code area the cat will move forwards across the Stage. The number of steps shown in the white cut out is the number of steps the cat moves.

Try changing the number of steps the cat moves to, say, 100.

1. move 10 steps — Click on the number 10

2. move 10 steps — The number is highlighted

3. move 100 steps — Type in the new number

Click on the block again and now the cat moves a greater distance.

How about making the cat go backwards? Try changing the number of steps to a minus number like -100.

move -100 steps

You will find that lots of the coding blocks have these white 'holes' where you can click and type in new numbers or words.

Information!

It takes the Cat a total of 480 steps to move from one side of the stage to the other.

If a sprite reaches the edge of the Stage you can simply click on it and drag it back to the centre of the Stage - or indeed any other position on the stage.
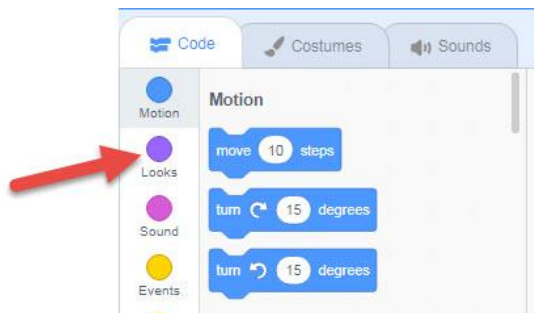
Joining blocks

The blocks in Scratch are designed to lock together like pieces in a jigsaw so as to create a stack of blocks which is known as a program or script. When the program runs Scratch carries out the instructions block by block starting from the top.

Blocks are joined by bringing them close together until they automatically 'snap' into place. Let's join two blocks to make the cat to do two things – move and then 'say' Hello!

First switch to the purple Looks Blocks by clicking the Looks button in the Blocks Palette.

Click on the [say Hello! for 2 seconds] block and drag it onto the code area.

Now drag the purple block so it lines up under the blue "move 10 steps" block. As the two blocks get closer together the space between them turns grey. Let go of the purple block and it will snap into place. This is how we build the code in Scratch.
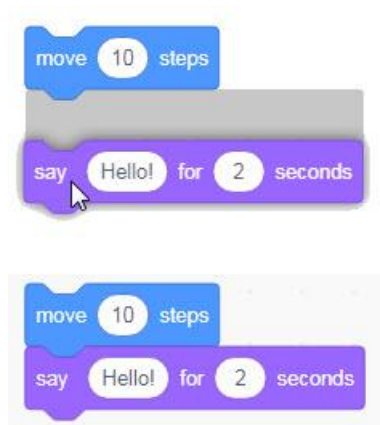

When you click on the pair of blocks the code runs and the cat moves and then says 'Hello!'

Try changing the cat's message by clicking in the white space and changing the words. You could change it to *Hello My name is Scratch*

The cat can also make sounds. First switch to the Sound Blocks by clicking the Sound button in the Blocks Palette and then drag out a 'Play sound' block

Add this
sound block
to your code
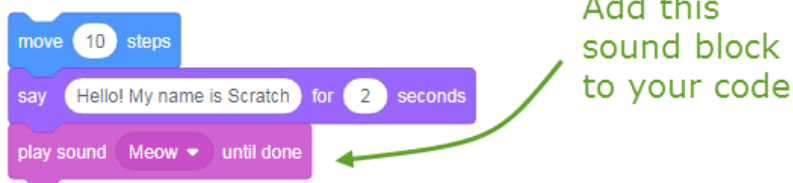
Click the blocks to run the code and you should hear the cat Meow. Make sure you have your computer speakers or headphones switched on.

Scratch has lots of musical instruments and sound effects that you will be able to use in your projects.

Information!

Click and Drag

- You can 'click and drag' a block when it is in the Code area and move it around to position it where you want.
- You can 'click and drag' a block back into the Blocks Palette and it will be deleted
- When blocks are joined together you can 'click and drag' all of them together if you click on the top block
- Whenever you have a stack of blocks you can only separate them by dragging blocks away downwards.

Have a go at playing around with joining different blocks and dragging them around just to see how things work. And don't worry you can't break anything!

The Disappearing Cat

We are going to make the Cat disappear and then re-appear in a different place. Like magic!

You will need to use these blocks:

Put the blocks together as shown in the picture below and change the numbers and words in the white circles. (You will need to drag out two 'Say' blocks).

Click on the code and the cat will disappear and two seconds later re-appear in a different place!

Chase the mouse

Next we are going to create a game where the Cat chases the mouse pointer (the cursor or track pad) on your computer.

First of all clear away all the blocks from the last project by dragging the top block of the stack onto the Block Palette on the left side (this will bring the entire stack with it, deleting all the blocks in one go).

Start the new project by putting these two blue Motion blocks together

This block makes the cat sprite follow the mouse pointer on your computer
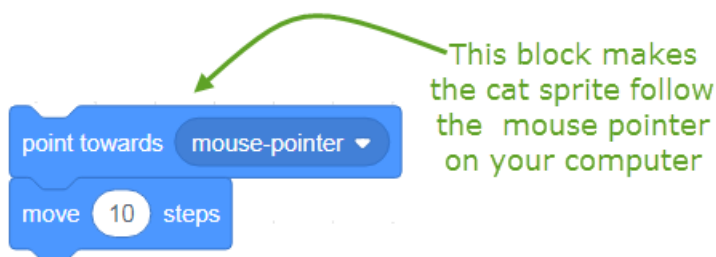
Click on the blocks and the cat will turn and move towards the mouse pointer on your computer. Keep clicking and the cat will keep moving.

But the cat only moves once each time you click. We want it to keep moving and chase the mouse pointer! We can do this by adding a Forever block. Click the **Control** button on the blocks palette and drag out a Forever block and move it over the two blue blocks.
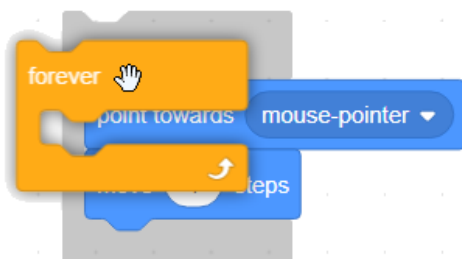
When you see the grey shape appear around the two blue blocks release the Forever block and it will snap into place.

Now click on the blocks to run the program. As you move the mouse of your computer around the screen the cat will chase it.

Try changing the number in the blue 'Move Steps' block. The higher the number the faster the cat moves.

The Forever block makes all the instructions inside it repeat in a loop until you stop the program. Loops are very important in coding and you will be using them a lot.

Notice that all the time your program is running the coding blocks have a yellow outline.
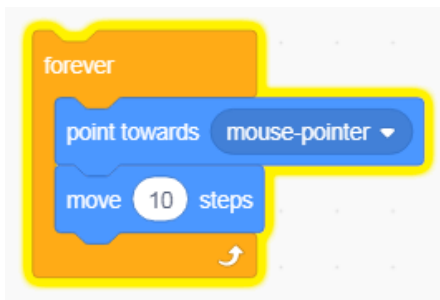
If you want to stop the program running just click on the red button at the top of the stage.

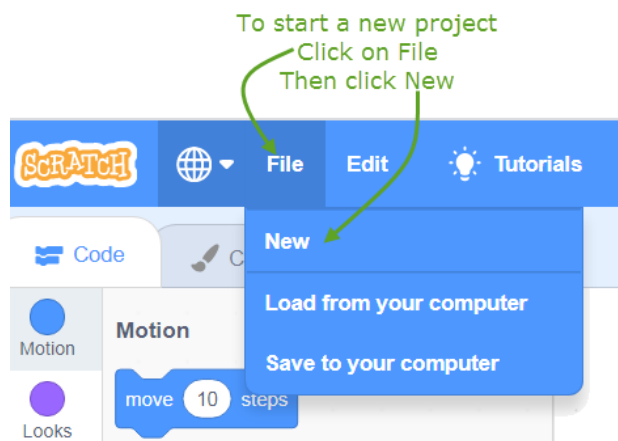Now we are going to move on to our final project

Lost in Space

❶ Start a new project

So far all the projects have involved the Scratch cat but there are lots of other characters we can have fun with.
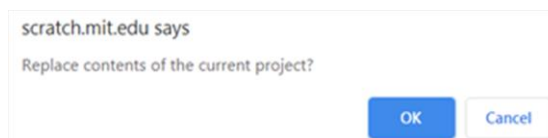
The first thing we need to do is the start a new project. This will clear away all the coding blocks any sprites we have added and give us a completely clean start.

Information!

Saving your work

If you see this warning

click OK because we don't really need to save the work we have done on these small projects.

But if you have been working on a larger project that you want to keep you need to save it before you start a new project. See the notes at the end of this guide to find out how to save your work.

➋ Delete the cat sprite

For this project we don't need the Cat Sprite so let's delete it.

Click on the dustbin to delete a sprite

➌ Add a new sprite

For this project we are going to use Dot – the space dog.

To add a sprite click on the [button] button in the **Sprite area** at the bottom right of the screen. And you will see all the available sprites. Look through the sprites until you find Dot and then click on it to add it to the project.
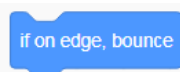
➍ Move Dot around the stage

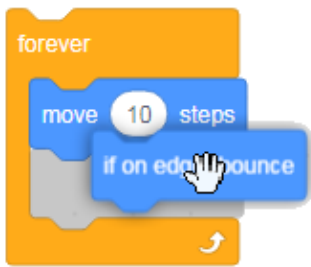Drag out a Forever block from the **Control** blocks.

Then drag out a blue 'Move 10 steps' **Motion** block and drop it inside the Forever block
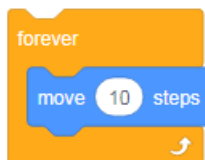
When you click on these two blocks Dot will move across the Stage but she soon disappears off the edge!
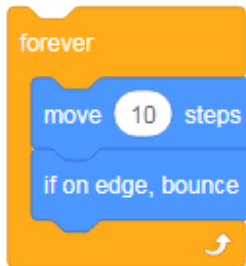
We can stop this happening by adding an [if on edge, bounce] blue Motion block to our code.

Drag the new blue block into the jaws of the forever block.

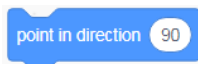When you see the grey area appear drop the new block into place.

When you click these three blocks and you should find Dot bounces when she reaches the edge of the Stage.

The only problem now is that Dot just bounces backwards and forwards in a straight line which is pretty boring. We can make her bounce all over the stage by adding a new block that makes her turn at an angle when she bounces at the edge.
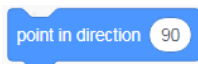
Drag out a blue **point in direction 90** from the Motion blocks and add it to the top of our code (not inside the forever block) and change the number in the block to 45 degrees like this:
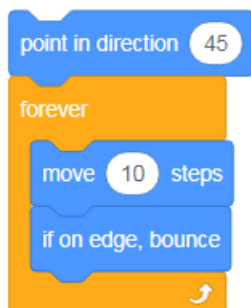
Now when you click the code blocks Dot bounces all over the stage!

Remember if you want to stop the program running just click on the red button Stop button.

Stop

5 Add a backdrop

So far all our projects have just used a simple white backdrop. But Scratch has lots of different backdrops and you can even create your own ones. (Scratch calls them backdrops but this means the same as backgrounds.)

Firstly click on the 'Select Backdrop' button   which is at the bottom right of your screen.

Look though the backdrops until you find the one called 'Nebula' which is a scene of Outer Space – just right for a Space dog! Click it and it will be added to your stage.

Nebula

So now when you run the code Dot is floating around in Space which looks much better. But if she was really *Lost in Space* she would probably be floating around more slowly and she would look smaller. So let's change the code!
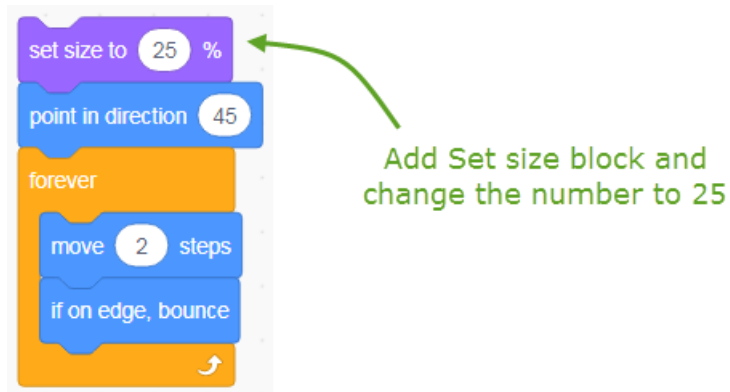
5 Make Dot move slowly
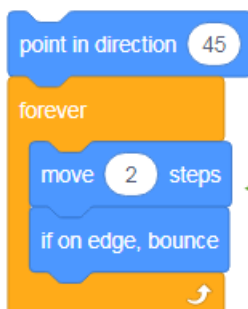
To make Dot move more slowly change the number of steps to something smaller. Try 2.

❻ Make Dot smaller

Make Dot smaller by using a Set Size block from the Looks palette.

Add Set size block and
change the number to 25

We have changed Dot's size to 25 but you can experiment with other numbers to see what happens.

❼ Starting and stopping the program

So far we have started our programs by clicking on the coding blocks. But Scratch has a special block called the Green Flag block to start programs.

Drag a [when clicked] block out from the Events Palette and add it right at the top of your code – like this.
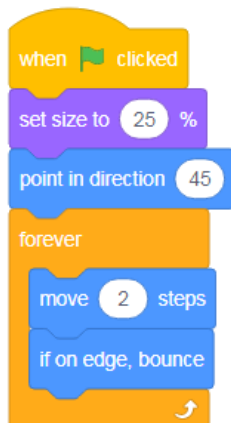
Now you can start the program running by clicking the Green Flag button at the top of the Stage. And you can stop the program by clicking the Red hexagon.

Start   Stop

What next?

Well done you're a coder!

Now that you know how to write code in Scratch you can try experimenting with the code blocks. You can't break anything so just try dragging some of the blocks out to see what they do. If you get into a mess you can simply start a new project.

Here's a few ideas.

- Go back to the programs you already written here and change the numbers in the white ovals to see what happens.

- Try adding different backgrounds to the Disappearing Cat

- Try adding an extra sprite to the Lost in Space game (don't delete Dot the Space Dog). Then add the same code as you made for Dot to your new sprite. You will then have two sprites floating about in space.

You can also try out other Scratch projects at our website stemforstarters.com

Happy Coding!

Scratch is developed by the Lifelong Kindergarten Group at the MIT Media Lab

Saving your work

Saving your work is important especially if you are working on a big or complicated project. You don't want to have to keep starting from the beginning again every time. Also if you save your work you can share with your friends.

There are two ways to save your work, either create a Scratch account or save the work onto your computer.

(1) Creating a Scratch account

Make sure you get permission from your parent or carer before you create an account.

To create an account visit scratch.mit.edu and click the Join Scratch link at the top of the page. You will need an email address and to choose a user name and a password.
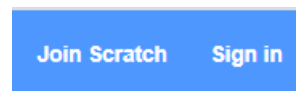
The next time you visit the Scratch site you can **Sign in** with your user name and password to see you projects.

(2) Save your work onto your computer

Check first with your parents or carer where is the best place to save work on your computer.
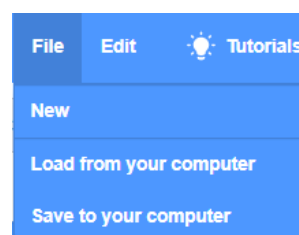
1 Click the 'File' menu at the top left of the screen.

2 Select **Save to your computer** and save the file somewhere where you will be able to find it later.

3 When you want to work on your project again, click 'File' and then **Load from your computer**.

The Blocks Palette

The Blocks Palette is where you find all the coding blocks. The blocks are colour coded depending on what they do.

Motion

Blue: The Motion blocks make your sprites move, turn, glide or point in a particular direction. They control how far, how fast and in what direction.

Looks

Purple: The Looks blocks control appearance. This includes changing costumes and adding speech bubbles. They also control the backdrop or background.

Sound

Magenta: Sound blocks control the different types of sounds that can be played such as music and sound effects and the volume of the sound.

Events

Yellow : Events blocks control when your code starts running. For example when a key is pressed. There is a special control block called the Green Flag which is often used to start code running.

Control

Gold: Control blocks are used to repeat code or to wait for a certain time or to check for certain conditions. They include Loops, Pauses and Clones.

Sensing

Light Blue: Sensing blocks are used to check what your sprites are doing. For example if a sprite is touching another sprite or a particular colour.

Operators

Green: Operators blocks are used to make comparisons, do maths calculations and handle text.

Variables

Orange: Variable blocks are used for creating and using variables. Variables are values that you can store and change.

My Blocks

Pink: My blocks allows you create your own new blocks which are called **functions**