Stage 1: What are those things called Algorithms? (Age 4+)

Project 1: Introduction

Hello! Let's meet Computers

For children of any age, we begin with a look at computers in society: what are they, where are they found, how do they work, how do they change and improve our lives, what is the future? A nice starter Quiz uses basic questions about computers and terminology.

Project 2: Daily Routines

We start off by looking at simple daily routines for children and putting the steps in order.

What do we do in the morning?

So just how do we get ready in the morning? Here we start to explain the idea of an Algorithm, by putting simple steps, like 'Packing books' in a logical order. It's just like following the steps in a recipe!

Let's go to the Park

We reinforce the idea of a sequence of instructions, by putting everyday routines like 'Put on my shoes' and 'Walk to the Park' in the right order. Children then create the steps to make a tasty jam sandwich.

Jumbled steps from bedtime to the morning.

This time, the challenge is to sort out a list of jumbled steps into the right order.

Project 3: Let's get cooking!

Using everyday food items, we reinforce the idea that the order of steps in an algorithm is important for its success.

A Juicy Pizza

Children put ingredients in the right order to create a tasty pizza.

A nice Salad Sandwich

After creating a simple program we start to use simple editing techniques, for example, to delete an item.

Project 4: Dressing up

Here, children can have fun getting clothing or facial features in the right place.

How shall we dress Manny?

Children can enjoy 'dressing' Manny the Mannequin, but they have to be careful because some clothes cannot go on top of others. We also introduce the next editing concept of 'inserting' an item.

Mr Watermelon & Mrs Pineapple

Children have to get facial items in the correct place to match the numbers on the images of Mr Watermelon Head or Mrs Pineapple Head. This is another opportProjecty to practice their editing skills.

Project 5: Animal Magic and Tall Towers

In the context of movement, children have to think about how far to move forward and whether to turn Left or Right. For a bit of fun we do some Origami and build tall towers.

Turpin creeps around the classroom.
We introduce Turpin, one of the 'Scare-D' kittens, but don't worry – they are actually very sweet and friendly. We look at directions for moving 'forward' and the idea of turning 90° using 'left' or 'right'.
Making Origami animals.
So who can do Origami? We have fun creating the steps to make an Origami Kitten and other animals.
Let's build The Shard!
Children will have fun matching pieces and numbers to "build" tall landmarks like the 'Shard' and the 'Burj-Khalifa'. But watch out: the pieces have to be in the correct order!
Project 6: Let's Review
The Eiffel Tower and Mrs Pineapple Head
After a reminder of the Shard Builder, children can have fun building the Eiffel Tower and 'dressing' Mrs Pineapple Head.

Stage 2: Safety, Directions and Scratch (Age 5+)

Parent Video: An Introduction to Scratch

The aim is to help Parents and Home Educators feel confident in using Scratch. We ask: 'What is Scratch, what can you do with it, how do you use it?' and give some useful hints.

Project 1 – Staying Safe Online

Children learn how to enjoy being online whilst avoiding some of the dangers.

'Stranger danger' – Who is Anna?

A light-hearted video turns out to have a serious message. Jacob thinks he is messaging Anna, but she turns out to be a big, scary monster! We suggest 5 key rules for safe use of the Internet.

Digital Footprints; Barrington Bear gets upset

Using Ernie the Elephant, Sammy the Squirrel and Barrington Bear the Businessman, we use child-friendly situations to show that when you post something on Social Media it stays forever.

Project 2: Fun Starters

Here are two themes that seem quite different but they both involve getting things in the right order – just like an Algorithm!

Who's the tallest? Princess and the seven animals.

Say hello to Monkey the Medic, Mr Muscles the Lion, Spikey the Moose, Mrs Humpy the Hippo, Captain Tiger, Bear the Businessman and Podge the Penguin. How could we put them in height order? For the first time, we meet the idea of repeating a group of steps.

The Jumbled Image

This is based on the popular game of sliding pieces into the empty slot on a 3x3 board to edit a Jumbled Image. We explain compass directions – North for up, South for down, West and East for left and right.

Project 3 – Conker the Cat

Conker is a friendly Cat who travels around town scenes. This is all about moving Forwards and Back, or turning to the Left or Right.

Conker on the cross-roads

Say hello to Conker the Cat. Using a simple crossroads, we begin to make simple journeys, moving and turning. Children have to be careful not to take Conker off the road!

Conker Explores!

We explain that steps relate to the direction in which Conker is facing. Children create their own code to move Conker around a simple town scene.

Conker about town

This is a bigger town scene, with journeys that involve longer sequences of moves and turns. Watch out for the different starting points which create added challenge.

Project 4 – All Aboard!

This project will help children to get used to directions on maps like the underground, where lines have different colours. They should enjoy the puffs and whistles of the train!

Let's travel the Underground

We begin with simple journeys where the train stays on a single line/colour.

Changing train lines

Children can pick up useful real-life skills. This time they are allowed to use two different lines and can try to find the best route to shorten a journey.

Debugging a Program

For the first time, we introduce the important idea of 'de-bugging'. Children work through a simple code sequence to try to locate an error or a missing step. They then use their editing skills to put this right.

Project 5 – Ally the Antdroid

Ally is a friendly Antdroid who has to find her way around a Moonscape and then a Seaside scene. The focus is on directions again.

Ally explores the Moonscape

We introduce Ally the 'Antdroid' and move her around a Moonscape to improve understanding of direction and turning. To begin with, children work out the destinations of given algorithms.

Writing our own Algorithms

This time, children create their own algorithms for given start and end points, remembering that Ally has to be careful to avoid hazards like the Fiery Volcano and the Deep Dark Crater!

Improving Moonscape journeys

Here, we introduce the idea of making an algorithm better. This mainly involves the use of the 'Back' command to shorten the number of steps in a journey.

Ally's day at the Seaside

Using a colourful backdrop of the Seaside, children have to work out where given algorithms take Ally to. Will she end up on the beach, in the Arcade or in the sea?

Writing Seaside Algorithms

Children now create their own algorithms to take Ally from the start to the end points.

Debugging mistakes in a program

We reinforce the concept of 'de-bugging' again. Using pre-written code, children work through programs to try to locate errors or missing steps. They then use their editing skills to correct these.

Project 6 – Kitten Boxes and numbers

Here, we provide a really good explanation of what makes a rectangle or a square. We then use them to make boxes around our friendly Scare-D kittens.

Let's make a square

Captain Tiger visits his favourite places to explain what a square is.

Boxing the Scare-D Kittens

The idea of a rectangle is explained so that children can draw 'boxes' around Duke and Trinny, two of the Scare-D Kittens.

And now, some Numbers

Children learn how digitised numbers, such as those seen on a computer or calculator, are created. Be careful to get to the correct starting point and pen direction!

Project 7 – Detective Work and other Skills

We carefully explain some important features of the world of computing: using Search Engines, organising information and using Word Processors.

Detective work with Search Engines

Children learn how to use Search Engines to find out about things.

Let's be organised: Folders and Files

Here, we explain how computers store things in Files and organise them into Folders. We look at File names and types, and see how a 'Tree Structure' can be useful.

Word Processors

With the help of four of our animal friends, children learn some basic features of Word-processors, such as: changing the font, capitals, italics, bold, underline, bullets and using spell-checkers.

Project 8 – Let's Review

The Town Scene, Underground and Moonscape

We consolidate ideas of direction, turning and debugging by plotting journeys between 2 locations.

Stage 3: Flight, Funny Faces and Scratch (Age 6+)

Project 1 – Woof Woof!

This is the first time that children really start to use Scratch coding blocks. They should enjoy exploring costumes and getting the dog to bark!

Finding our way around

Children will start to use Scratch to write code for the first time. We begin with the basics: starting a new project; the various screen areas; getting a new sprite; costumes; blocks; deleting a sprite.

Changing Costumes

We look at the sprite library and how different costumes can give the illusion of movement. Children will use the 'scripts' tab, the 'Events' and 'Looks' menus to create their first real program with blocks of code.

Let's make the dog bark!

Children have fun with the sound tab, but also learn how to trigger an action using the Space-bar or an arrow key. They are now taking their first steps towards understanding the idea of an Input.

Project 2 – Letters and Directions

For children who may have missed previous Stages, we recap on the key concepts of Algorithms and Directions.

Around the Classroom

For those who have missed previous Stages, we begin with a review of basic concepts, looking at motion, direction, sizing, repeating, backdrops, start triggers.

Conker's Day Out

Conker the Cat revisits various buildings in the town scene. To help children, we cover coordinates, variables, sending and receiving messages. Will Conker successfully reach the Shopping Mall?

Let's make some Letters

Bip the Beetle draws a beautiful letter 'P', but first she has to get to the right starting place, and then do some careful thinking about steps and angles.

Debugging Numbers

Children locate errors or missing steps in code, and then use their editing skills to correct them.

Debugging Letters

This time, the same concept is applied to digitised letters.

Project 3 – Poppy Parrot Flies!

Using Scratch, children learn about backgrounds, getting a Sprite from the Library or Internet and using different costumes to give the impression of wings flapping.

Let's make a new Sprite

Here, we show how to find a new background and get a new image from the internet to use as a sprite.

Poppy Parrot flaps her wings!

For the first time, we introduce movement, making Poppy look as if she is flapping her wings.

Now Poppy can fly!

Finally, we get Poppy to move across the stage and 'bounce', or turn around, when she reaches the edge.

Project 4 – Guess Who!

Children create a nice game using Yes/No questions to guess the correct identity. It's a subtle first step towards Binary.

Let's do some Graphic Design

In this introductory lesson, children learn how to change the size and position of something like a nose, how to correct mistakes, and how to do cloning!

Detective work

Here, we get children to think of simple Yes/No questions, laying the foundations of Binary. Broadcasting a message, getting an input and storing the 'y' or 'n' answer in a variable are carefully explained.

Mrs Humpy explains 'if-then'

Mrs Humpy the Hippo explains how 'if-then-else' can test whether an input is 'y' or 'n'.

Let's send out a Message

Another child-friendly 'Explainer' video teaches the concepts of sending out and receiving messages.

Copying and Graphical effects

We show how speed up the coding process and explain how to create fun visual effects like pixilation.

Ready to play?

With some 'sizzles', 'beep' sounds, children complete their Identity Game, and can now enjoy playing it.

Project 5 – Fruit For Sale!

Using the colourful setting of a farmer's Fruit Stall, we help children to understand how to set up and change a list of items.

Meet the Farmer and his Fruit Stall

Let's say hello to the Farmer and look at his attractive Fruit Stall. Just how do we create a list? Let's start to think about changing the items on the list.

Adding to the Shopping List

Let's give each item in a list a number so that we can get them in the correct place. And how do we communicate with the User if we want to Insert an new item?

Updating the Shopping List

Here we look at making Update and Delete buttons, and use a neat trick to copy blocks of code.

Farmer is ready to sell!

Finally, using Loops and a little bit of clever code, we get our Farmer to look as if he is reading the list.

Project 6 – Funny Faces

For the creative child, this is a great opportunity to use their artistic talents to create imaginative, zany images!

A crazy Moustache

We learn how to use a painting program and have fun making some crazy changes to an image with a moustache and a goatee beard!

Green Hair

Can you imagine someone with bright green hair?! Well, here we learn how to use a 'magic wand' tool to colours different parts of an image.

Help from our Animal Friends

With the help of Foxy the Juggler, Dibble the Dog and Mr Piggy, we build up a picture in layers and see how to turn and move an object like a moustache.

Julian Opie Images

Children can have fun being really creative producing cartoon-style images of the 1990s.

Project 7 – Let's Review

Debugging Letters and Numbers

Firstly, children will review how to draw and debug letters and numbers

Underwater!

Now they can be imaginative to create an underwater scene with colours, fish and movement.

Stage 4: Games, Binary, Patterns (Age 7+)

Project 1 – Drawing Patterns

It's amazing what attractive patterns children can create with a few simple shapes and some easy coding tricks!

A perfect Triangle!

We think about patterns all around us and learn how to create a beautiful Equilateral Triangle.

And a Square

Children see how simple changes and repeat loops can extend their triangle code to make a square.

What about more than 4 sides?

Now we build polygons with more than 4 sides, making sure they don't become too large for the screen.

Colourful, whizzy Patterns

Here we see how the magic of simple changes to the code can create colourful, whizzy patterns.

Patterns with Circles

Enjoying creating fantastic patterns with a focus on colours and circles.

Project 2 - Monkey Drop

You create the code for Muggins the Monkey to fall through the jungle and then try to catch him. See if you can get the highest score!

Dippy the Dot explains Coordinates

Dippy the Dot gives a friendly explanation of the x and y axes, negative and positive coordinates and the origin, focusing on what is special about points in a vertical line.

Meet Muggins the Monkey!

Say hello to Muggins and learn how to make him fall through the jungle. Every step is carefully explained so that the youngest child can get the idea. How can we tell when Muggins gets to the bottom?

Let's organise our Code

Children learn how to define blocks of code for particular actions. We also create a lush tropical rain-forest that's just right for Muggins.

Understanding Percentages and Variables

We gently explain these two important ideas, showing how to resize Muggins. A beautiful 'Explainer' video puts across the concept of a variable, which we use to keep the score.

Muggings loses his 'lives': Game Over!

Muggins starts with 3 'lives' but loses one every time he hits the ground! Children learn how to display a 'Game over' message and how to keep their score.

Random Numbers and Zizzy Sound Effects

The idea of random numbers is simply explained so that we can change Muggins' size and position. Children learn how to add some fun sound effects...and the project is complete!

Project 3 – The World of Binary

After a look at Inputs and Outputs, our animal friends help to explain the idea of Binary.

Inputs, Steps and Outputs

Simple ideas are used like mixing 2 colours to make a different one, or inputting 2 numbers to add them.

Letters and Words

Words like 'string' and 'character' are explained. Children learn simple operations like: counting the number of characters; changing from lower case to capitals.

True and False

Here, we look at outputs which are 'true' or 'false', and inputs which are neither Strings nor Numbers, such as ingredients to make a Pizza or notes to make music.

The Animals explain Binary

Catkin the Cat, Dibble the Dog, Bear the Businessman and Mrs Humpy the Hippo help to represent 1, 2, 4 and 8, as we start to develop an understanding of Binary.

Addition with our Four Friends

Our four friends help with simple Binary addition and give three simple rules to deal with 'carry' digits.

The World of Os and 1s

We take the big step of moving from animals and silhouettes to '1's and 'O's. As always, everything is explained in a child-friendly way.

Project 4 – Ping Pong

We show you how to create the code for this compelling Ping Pong game. Can anyone beat the top score of 25? Watch out – it gets faster!

Let's make the Bat

Children make their own Bat and learn how to make it move following the mouse.

Angles and Moving the Ball

We show how to get the ball moving across the stage and bouncing back. A very important 'Explainer' video looks at simple Angles, ready for moving the ball around at 45˚.

Contact with the Ball

Children learn how to write code to sense when the ball touches the Right edge of the stage.

Which way does that Ball bounce?

This is the exciting bit – how to make the ball bounce at 45˚. Although a little challenging, the explanations are beautifully clear and children will gain a real sense of accomplishment.

Keeping the Score

Another 'Explainer' video re-explains the idea of a variable to keep track of the score and increase it by 1 each time the bat hits the ball.

Who can get the Highest Score?

After introducing some sounds to spice up the action, we explain a useful trick to gradually increase the speed of the ball...and the project is complete! Kids will have great fun playing this game, which is as good as many commercial apps.

Stage 5: More Exciting Games (Age 7/8+)

Project 1 – Cat and Mouse

You can make this exciting and colourful project where Mango the Mouse has to avoid being caught by Clipper and Snipper the Cats.

How shall we control Mango?

We say hello to Mango the Mouse and learn how to make him move in response to keys on the keyboard.

Keeping Mango on the Paths

Mango is not allowed to go on the Garden. So we use some crafty colours and sensing blocks to detect when he bumps into a wall and make him bounce back.

Meet the Cats: Clipper and Snipper

Here are Clipper and Snipper the cats whose job is to try to catch Mango! We learn how to use Repeat loops to move them on different routes around the garden.

Can Mango escape?

We need code to sense when Clipper or Snipper touch Mango and then display a Game Over message. But if Mango finds his way through the garden then we need to show Game Won! Have fun playing!

Project 2 – Yum-Yum Escape

Yum-Yum, a friendly Bug-Droid, sneaks around a maze, trying to eat batteries for energy. But watch out: if he gets caught by one of the Alien Ant-mobiles, the game is over!

How shall we move Yum-Yum?

It's easy! We just code the keyboard keys, as we have done before, to control Yum-Yum's movement.

Keeping Sprites on the paths

We set up another 'no-go' area to stop Yum-Yum going through the walls. Then children learn how to use 'glide' blocks to move the Ant-mobiles around the Maze.

Watch out Yum-Yum!

So what happens if Yum-Yum gets caught by an Ant-mobile? We use 'sensing' to check if Yum-Yum makes contact with an alien and do a bit of 'painting' to create a 'Game Over' sprite.

Food Energy for Yum-Yum

Each time Yum-Yum eats a battery, we learn how to hide it and then increase the score by 1.

How shall we end the game?

We need to test if Yum-Yum has gained the maximum score of 5 and if he has reached the blue 'home' dot. Then we can display the 'Game Won' sprite.

Let's add some sounds!

To complete the project, children add some scary sounds for alien contact, a 'zoop' sound when Yum-Yum gobbles up a battery and a hearty cheer if he wins the game. Now it's time to play!

Project 3 – An Introduction to LOGO

For the first time, we look at another coding language called LOGO.

LOGO and Scratch

Let's find out about LOGO and look at the differences between LOGO and Scratch – the turtle, coordinates, how and where commands are written.

Let's make a Square

Here, we introduce children to more LOGO commands, such as how to modify colours and use the REPEAT command.

And now, some Circles

Next, we introduce the Ellipse command and explain how it can be used to draw circles. We then make a beautiful 4-sided pattern using the REPEAT command again.

The Olympic Rings

Children create an impressive image of the Olympic Rings whilst also learning a useful way of copying to speed up the coding process.

Teddy Bear

Today we learn how to draw a friendly looking Bear using LOGO

A beautiful Flower

Using simple shapes in LOGO, children create a beautiful flower image

Project 4 – Spreadsheets and Improving Letters

Two interesting lessons look at an introduction to Spreadsheets and how to create some impressive looking letters.

Sammy Squirrel's Spreadsheet

Sammy Squirrel explains about rows and columns, putting items into cells, and how to add and subtract.

Can we improve our letters?

Here, the pupils will create double width letters that will look really impressive! The algorithms are correspondingly longer and, therefore, the level of challenge is somewhat increased. Pupils will need to utilise all the skills of analysis and editing that they have learned previously.

Project 5 – Media, Binary and Coding Review

Time to Practise

Now is the time to practise those Coordinates, Percentages, Variables, using axes, negative and positive numbers.

Chatting, searching and organising

This all about Social Media, Internet safety, Digital Footprints, Search Engines, Folder structures, storing information, Word Processors and Spreadsheets.

Inputs, Outputs and Binary

Children can consolidate ideas from Project 2 using Inputs and Outputs, binary operators and addition.

Now we can really code!

As a conclusion to the first 4 Stages this is the time to recap on all those coding features, including: Blocks, Motion, Looks, Sound, Events, Control, Sensing and Operators.