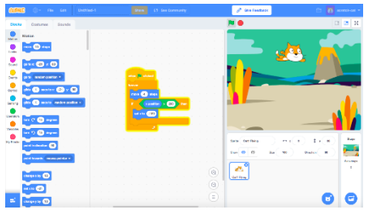
KNOWLEDGE ORGANISER

Overview



Sequencing in Scratch

- Programming is when we make a set of instructions for computers to follow.

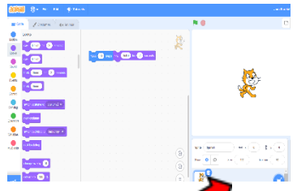
-Scratch is a program that we can use in order to code our own stories and animations.

-We use algorithms (a set of instructions to perform a task) to sequence movements, actions and sounds in order to program effective animations.

The Basics of Scratch

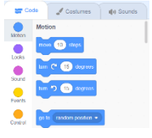
-What is Scratch? Scratch is a website/ app that lets us code our own stories, games and animations.

-Scratch helps us to learn how to use programming language, whilst also being creative and using problem-solving skills.



There are three main areas in Scratch:

-The Blocks Palette (on the left) contain all of the different blocks: puzzle piece commands which control the animation.



-Code Area (in the middle) is where the blocks are placed to create a program.

-Stage with Sprite (right) is where the output of the program is presented. The sprite is the character.

Adding/Removing Sprites: This can be done here, at the bottom of the stage. There are many sprites to choose from.

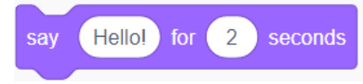
Attributes: There are three attributes of the sprite which we can change to make our animation: Code, Costumes, Sounds.

-Backdrops: Backdrops can be added by clicking on this icon (bottom right of the screen, below the stage).

Programming Using Blocks

-Basic Programming: Make sure that the feature of the stage that you want to program (e.g. sprite, background) is selected by clicking on it. Drag the block command that you want onto the code area. Blocks can be deleted by right-clicking on the block and selecting 'delete block.'

-Block Editing: White areas on blocks can be edited. Click on them and type in the preferred value.



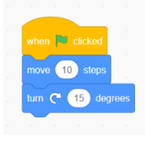
-Running the Code: You can run your animation by performing the action stated in the event block (e.g. clicking the event block). If this does not work, you may need to debug your animation (find errors and fix them).

Sequencing and Algorithms

-A sequence is a pattern or process in which one thing follows another.

-In Scratch, blocks can stack vertically on top of one another to create sequences.

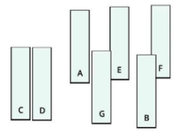
-Event blocks are used to start sequences. They are orange and have a curved shape at the top.



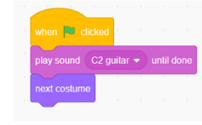
-Designing an algorithm (set of instructions for performing a task) will help you to program the sequence that you require.

Making Music

-Several sprites, each following connected sound sequences, can create music!



-In order to do this, you will need to carefully plan your algorithm.



-If your animation does not work correctly the first time, remember to debug it.

Important Vocabulary

Programming Scratch Blocks Code Sprite Costume Stage Backdrop Motion Point in direction Go to Event Task Run the code Order Note Chord Bug

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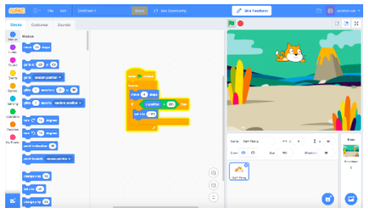
Overview



Events and Actions in Scratch

- Programming is when we make a set of instructions for computers to follow.

-Scratch is a program that we can use in order to code our own stories and animations. We can use event and action command blocks in order to make sprites carry out acts when certain prompts take place.

-We use algorithms (a set of instructions to perform a task) to sequence movements, actions and sounds in order to program effective animations.

The Basics of Scratch

-What is Scratch? Scratch is a website/ app that lets us code our own stories, games and animations.

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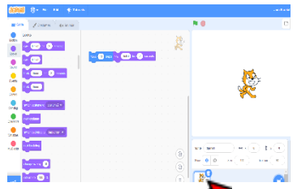

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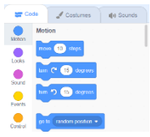

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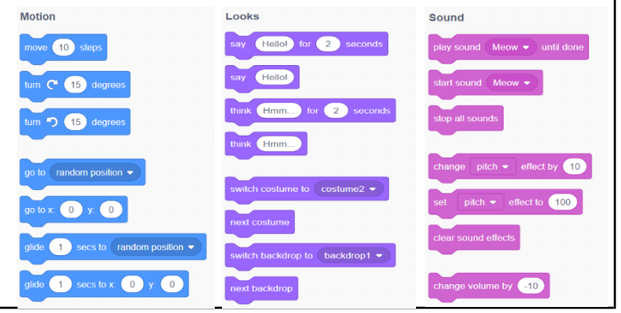
-Backdrops: Backdrops can be added by clicking on this icon (bottom right of the screen, below the stage).

Event and Action Blocks

-Event Blocks: Event blocks are coloured yellow and are used to sense different events that happen, e.g. the green flag being clicked, when a key is pressed, or when a sprite is pressed. They are needed for every project.

when clicked	Putting this at the beginning of your sprites programming will mean the program will only start when the green flag is clicked.
when space key pressed	This will begin a sprites actions when the selected key from the drop down bar is pressed. The drop down bar allows you to select any key on the computer keyboard. Meaning you can control your sprites movements by setting up movements in connection with different keys.
when this sprite clicked	A sprites actions will start when you click on it. For example: If that picture was the correct answer to a question you could get it to move.
when backdrop switches to backdrop1	This will start a sprites action when the back drop changes. Using the drop down bar you can select any backdrop you have in the selected backdrop library for your program. For more info on backdrops see page on creating and selecting backdrops.

-Action Blocks: Action blocks include 'Motion' blocks (coloured blue), 'Sound' blocks (pink) and 'Looks' blocks (purple). They make the sprite move, make sounds and change appearance when the event is triggered.



Sequencing and Algorithms

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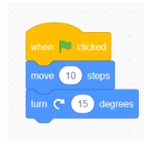
-Designing an algorithm (set of instructions for performing a task) will help you to program the sequence that you require.



-Programming is when we move the blocks into the position (based on our algorithm design). Programming uses a code that the computer can understand.

Trialling and Debugging

-Programmers do not put their computer programs straight to work. They trial them first to find any errors:

-Sequence errors: An instruction in the sequence is wrong or in the wrong place.

-Keying errors: Typing in the wrong code.

-Logical errors: Mistakes in plan/thinking.

-If your algorithm does not work correctly the first time, remember to debug it.

Important Vocabulary

Motion Event Logic Move Resize Extension block Pen Action Errors Test

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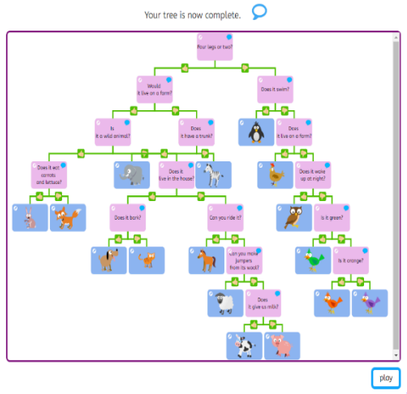
Overview



Branching Databases

-Data is raw numbers and figures. Information is what we can understand from looking at data.

-Objects can be organised into groups, based on what they are or their different attributes.

-Branching databases can help us to identify objects within sets of data. They are useful when we want to classify objects (consider objects within a certain group).

Grouping and Separating

-Grouping: Objects can be put into different groups. These groups can be made up of objects that are the same, or objects that have the same attributes (features). Computers can help us by allowing us to put different objects into groups.

-Yes or No Questions: Questions that require yes and no answers can be useful for helping us to find out the attributes of different objects. For example:

-Is it big? (size)

-Is it red? (colour)

-Is it made of plastic? (material)

-Is it heavy? (weight)

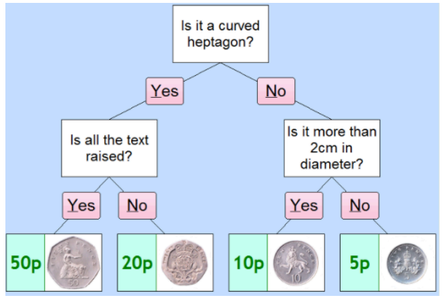
- **Open Ended Questions:**

An open-ended question has many different answers. For example, what is your favourite food? It is not possible to make a branching database using open-ended questions.

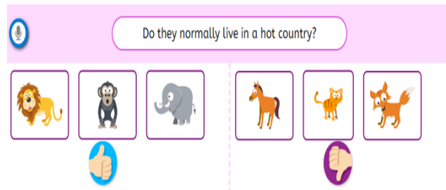
-Multiple Groups: Sometimes, we need to split objects into more than two groups, and so one yes or no question alone is not enough. For example, we may wish to classify animals into the different animal types (mammals, birds, reptiles, amphibians, fish, etc.). We may ask multiple yes or no questions, such as 'does it lay eggs?' 'does it have hair or fur?' etc.

Branching Databases

-Branching Databases: A branching database (sometimes known as a binary tree) is a way of classifying a group of objects. If it has been designed correctly, a branching database can be used to help someone identify one of the objects.



-Creating Branching Databases: Programs such as *j2data* can help you to create branching databases. Firstly, you need to select which objects you would like to use in your database. You can then type in 'yes' or 'no' questions to sort your objects. Add as many questions as needed until all of the objects are sorted individually. It is a good idea to have a similar number of objects in each group.



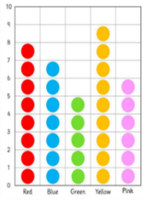
Structuring Branching Databases

-Remember that for your branching database to be effective, the strength of the questions that you ask is hugely important. Your questions need to separate different objects based on their attributes. E.g. the question 'does it have stripes?' would separate the animals below. You should also carefully consider the order that you ask questions.

Presenting Information

-Both pictograms and branching databases can be used in order to answer questions and solve problems.

-You should know which is best to use in different situations. E.g. a pictogram is best to show the favourite colours of children in the class, whilst branching diagrams are best to identify different types of minibeasts.



Important Vocabulary

Attribute Value Questions Table Objects Branching database Equal Even Separate Structure Compare Order Organise Selecting Information Decision tree

KNOWLEDGE ORGANISER

Overview

Animation

-Animation is a technique used to make objects and drawings/images appear as if they are moving.

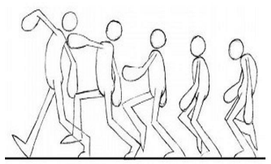
-Stop-frame animation is a technique in which many photographs are taken of objects, with small movements in between.

-When the images are quickly shown together, the objects appear to move! (They are animated).

-There are many stop-frame animation apps and programs, for example iMotion, Stop Motion Studio and Canva.

Introduction to Animation

Animation is a technique used to make objects and drawings appear to move.



Animations have been around for many years – even before computers! Stop-frame animations work in the following way:

-A number of pictures are drawn or taken of an object or picture.

-In each drawing or picture, the object has been moved slightly. Each picture is called a frame.

-When the frames are shown in a sequence, an illusion is created where it looks as though the object is moving!

Lots of movies and TV programmes are animated. These include cartoons, and films like *Wallace and Grommit* and *Chicken Run*.

-In recent years, lots of stop-frame apps and programs have been released, which can be used to make homemade animations!

Creating a Basic Animation

Canva & iMovie are one of many apps that you can use to create animation.

Setting Up

-Select 'manual.' Type in the movie title.

-Tap 'Start'. Turn on 'onion skinning'

-Make sure that your object/ drawing is in the frame (can be seen by the camera).

Creating the Animation

-Take a picture of your object/ drawing (press 'capture').

-Change the object/drawing very slightly. If drawing, keep a feint line of the original drawing to show you where to go next (onion skinning). Capture again.

-Repeat the process lots of times.

Playback and Saving: When you are finished, press 'stop' and then 'stop' again. Your animation will begin playing. You can change the speed (frames per second). Press 'export' to save your animation.

More Complex Animations

Storyboards

-Consistency is important. In each frame, we need to think about which things stay the same (e.g. background), and which things change.

-Add music by tapping 'audio.' You can add in soundtracks, your own music, or sound effects. Tap + to select the track that you want. Carefully choose when the audio starts/ stops.

-You can also add text into your animation. Tap on the frame that you want to enter text into. Tap T for text. You can choose different fonts, and select where you want the text to appear.

Important Vocabulary

Animation Flip book Stop-frame animation Frame Sequence Image Photograph Setting Character Events Onion skinning Media Import Transition

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Overview

Digital Devices

-You should already know that Technology is something that has been made by people to help us.

-You should also know that Information technology (I.T.) includes computers and things that work with computers.

- Digital devices are things made for a particular purpose, that use processing.

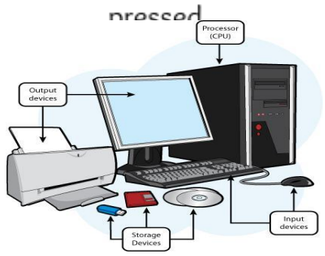
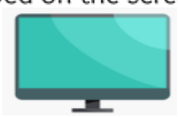
Digital devices have an input, process, and output (IPO).

-Information and data can be shared across networks. Many devices are used to create networks.

Digital Devices – Input, Process Output (IPO)

-A device is something that has been made for a particular purpose (it has a special use). Interactive Whiteboards and CleverTouch screens are a good tool for teaching and learning, iPads and other tablets are a good tool for researching, creating, storing and taking images. There are many devices suitable for different purposes.
-Digital devices use processing (have a process) There is more than just an on-off function.

Digital devices have an input, process, output (IPO)

Input	Process	Output
Input: Something that sends a message to the device. E.g. You press a button on the keyboard.  Input Devices: Keyboard, joystick, mouse, web cam, microphone, touch screen, track ball, digital camera.	Process: The device acts on the message. E.g. The computer follows a program that tells it what to do when the keyboard is pressed. 	Output: Something that is sent out by the device. E.g. The letter that you have typed on the screen.  Output Devices: Screen/monitor, printer, headphones, projector, speaker, smartboard.

Networks and Network Devices

Connections and Networks

-In Computing, a connection describes a link between the computer and something else.

-For example, a computer may be connected to the internet through wires, a mobile data system, or WiFi.

-A computer network is a set of connections that joins computers together.

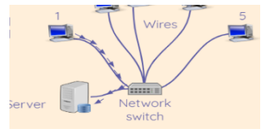
-The computers in the network can send and receive information to one another.

Network Devices

-Network switch: a device that helps different devices on a network to be connected with each other.

-Server: a computer that manages the network and stores files

Wireless access point (WAP): a device, connected to a wired network, that sends and receives wireless signals to and from devices.



Why Networks Are Useful

-Computer networks allow us to send and receive information between computers that are in different places.

-Networks can help us to communicate quickly and easily.

-Networks can also join computers to shared devices, like scanners and printers.

-The internet is a global network of computers. Imagine how different life would be without the internet!

-If information is shared on a network, it helps to reduce the risk of data being lost, e.g. if one computer breaks.

Important Vocabulary

Digital Device Input Output Process Program Connection Network

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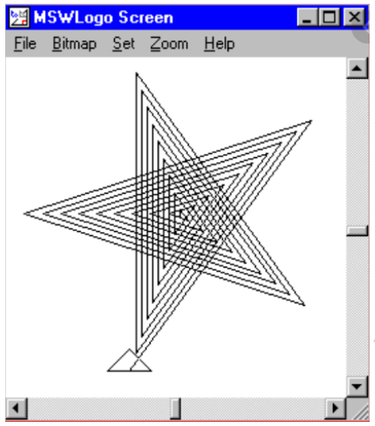
Overview



Repetition in Shapes

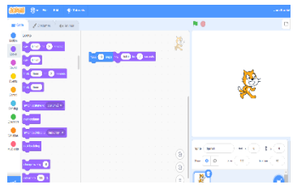
- Programming is when we make a set of instructions for computers to follow.

-Logo is a text-based program that we can use in order to create shapes and patterns.

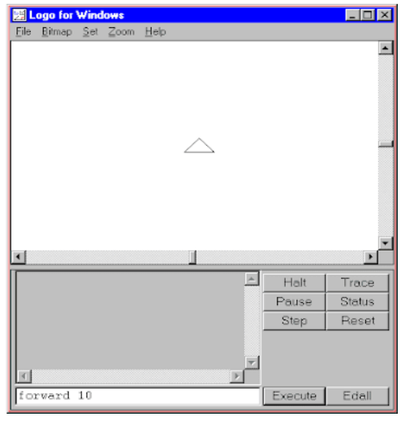
-We use algorithms (a set of instructions to perform a task) which we can plan, model and test, in order to create accurate and imaginative shapes and patterns.

The Basics of FMS Logo

-What is FMS Logo? Logo is a text-based programming language, where we can type commands which are then drawn on the screen.
-Logo helps us to learn how to use programming language, whilst also being creative and using problem-solving skills.



The Display:



The Turtle

Command History and Error Messages

Next Command

Basic Commands:

-FD: Forwards. Always followed by a space and the number of steps, e.g. FD 50
-BK: Backwards. As above, e.g. BK 50
-LT: Left turn. Always followed by a space and then the degrees to turn, e.g. LT 90
-RT: Right turn. As above, e.g. RT 90
-CS: Clears any pen marks on your screen and gets the turtle back to the centre.
-PU: Stops turtle from leaving a pen trail.
-PD: Makes turtle leave a pen trail again.

Programming Patterns

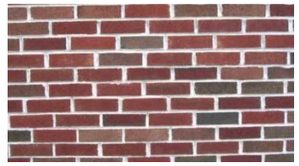
-Patterns: Patterns are things that repeat in a logical way. In everyday life, patterns are everywhere!

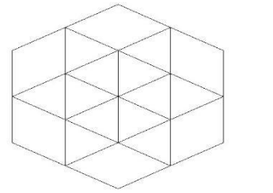
-Patterns in Logo: Instead of typing in the code to create each individual shape, we can save time by repeating a sequence of instructions. We use the 'repeat' function.

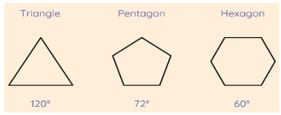
-Repeat: Type the command 'repeat' — this repeats commands a set number of times. The number following repeat is the number of times to repeat the code, and the code to be repeated is in square brackets, e.g. repeat 4 [FD 100 LT 90]

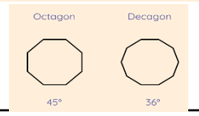
The above code will repeat FD 100 LT 90 four times.

-Creating Shapes and Loops: To make shapes, we need to know the angles of corners of different shapes (see right). Using the repeat function with shapes can help us to make spirals.





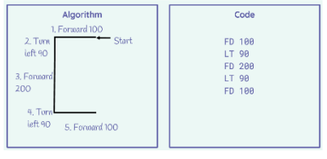




Sequencing and Algorithms

-A sequence is a pattern or process in which one thing follows another.

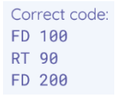
-We design algorithms (sets of instructions for performing a task) to help us program the sequence that we require to achieve our desired outcomes.



-Programming is the process of keying in the code recognized by the computer (using your algorithm).

Trialling and Debugging

-Programmers do not put their computer programs straight to work. They trial them first to find any errors:



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-Keying errors: Typing in the wrong code.
-Logical errors: Mistakes in plan/thinking.

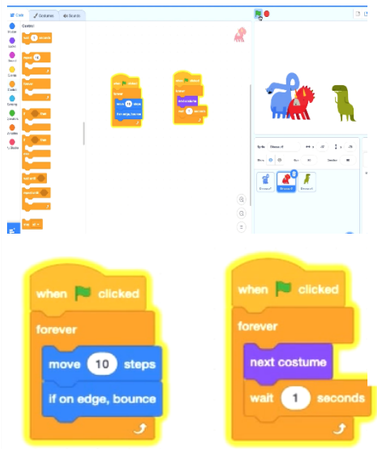
-If your algorithm does not work correctly the first time, remember to debug it.

Important Vocabulary

commands code snippet pattern repetition repeat value trace decompose procedure

KNOWLEDGE ORGANISER

Overview



Repetition in Scratch

- Programming is when we make a set of instructions for computers to follow.

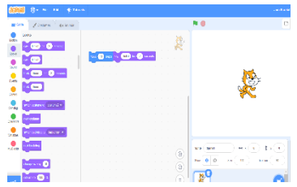
-Scratch is a program that we can use in order to code our own stories, animations and games. We can use repeat and loop operator blocks in order to make our programs more logical and efficient. These help to run code continuously or for a set number of times.

-We use algorithms (a set of instructions to perform a task) to sequence movements, actions and sounds in order to program effective animations.

- In day-to-day life, we use many patterns of repetition. This may include things like; brushing your teeth, performing a dance routine, creating a piece of music, finding a clapping rhythm.

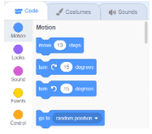
The Basics of Scratch

-What is Scratch? Scratch is a website/ app that lets us code our own stories, games and animations.



-Scratch helps us to learn how to use programming language, whilst also being creative and using problem-solving skills.

There are three main areas in Scratch:

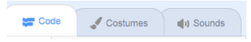


-The Blocks Palette (on the left) contain all of the different blocks: puzzle piece commands which control the animation.

-Code Area (in the middle) is where the blocks are placed to create a program.

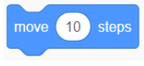
-Stage with Sprite (right) is where the output of the program is presented. The sprite is the character.

Attributes: There are three attributes of the sprite which we can change to make our animation: Code, Costumes, Sounds.



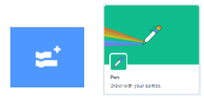
-Event Blocks: Event blocks are coloured yellow and are used to sense different events that happen e.g., the green flag being clicked.

-Action Blocks: Action blocks include 'Motion' blocks, 'Sound' blocks and 'Looks' blocks. They make the sprite move, make sounds and change appearance.



Loops and Repetition

-Pen Drawing in Scratch: Select the 'add extension' icon in the bottom left corner. Then select 'pen.' This allows you to draw with your sprites.



-The Repeat Block: Select 'code' and then the 'control' blocks (orange). Here you will find the repeat block. It should be placed around the command blocks that you want to repeat. The number of times something is repeated can be typed into the white area.

-Creating Shapes: Selecting 'pen down' (in the 'operators' blocks) can be followed by use of the motion blocks to determine the line that will be drawn (e.g. 'move 10 steps'). Turning a number of degrees changes the direction of the pen. Placing the repeat block around this motion code can allow more complex shapes to be drawn.

-Count-Controlled/Infinite Loops: We can control the number of 'loops' of a command with the number typed into the 'repeat' block. The 'forever' block makes a command continue infinitely (forever).

Event Managing and Efficiency

-We should ensure that programs are coded and labelled in easy-to-understand, user-friendly ways.

-Using the 'events' blocks logically can help to make your programming easy to use. E.g. when 's' key pressed a square is drawn, when 'h' key is pressed a hexagon is drawn.

-Efficiency is about getting the right result in the easiest way possible, wasting little time or effort. Our use of the repeat and loop tools should help to create efficient programs.

Algorithms, Trialling, Debugging

-Designing an algorithm (set of instructions for performing a task) will help you to program the sequence that you require.

-Programmers do not put their computer programs straight to work. They trial them first to find any errors:

-Sequence errors: An instruction in the sequence is wrong or in the wrong place.

-Keying errors: Typing in the wrong code.

-Logical errors: Mistakes in plan/thinking.

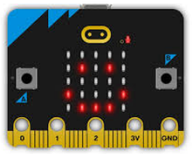
-If your algorithm does not work correctly the first time, remember to debug it.

Important Vocabulary

Loop Repeat Value Forever Count-controlled loop Animate Event block Duplicate Modify Refine

KNOWLEDGE ORGANISER

Overview



Data Logging

-Data is raw numbers and figures. Information is what we can understand from analysing data.

-There are lots of different ways that we can collect, log and interpret data, including by using data loggers.

-Data loggers and logging software can be used to automatically capture data. We can then draw conclusions in answer to our research questions.

Data Collection

Asking Questions: Data gathered over time can be used to answer important questions.

For example, the class register can be used to answer questions about children's attendance. Before collecting data, we need to carefully consider which questions we are trying to answer.

	23/02/16	01/03/16	08/03/16
Seb	NB	NB	
Anusha		NB	
Belle			
Patrick	NB	NB	
Reece		NB	
Ollie H		NB	
Ollie		NB	
Oliver D			

-Sensors: Our senses (sight, hearing, smell, taste, touch) detect things in our environment. Computers have input device sensors which help them to sense things.

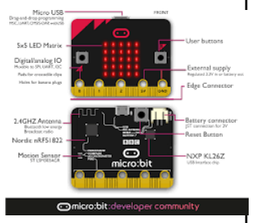
Some examples are:

-Microphones (sound)

-Camera (light)

-Touchscreen (touch)

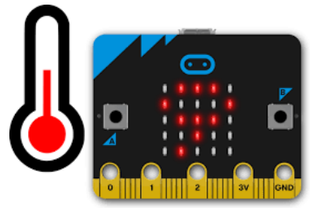
- Micro:Bits: have sensors built into them. They can be used to detect and record data.



Data loggers often contain:
-A heat sensor (to record the temperature)
-A light sensor (to record brightness)
-A sound sensor (to record the noise).

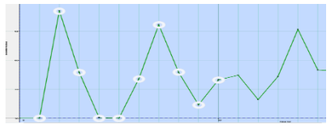
Data Recording

-One way for us to record data is by writing it down. Some data loggers can also record data themselves, which we can download later. Computers can also help us to record data, e.g. by connecting our data loggers to computers and opening data logging software.



-An advantage of this is that computers can record data automatically, meaning that someone does not need to sit waiting for a long period of time. Data loggers can be set to measure at different intervals (points in time).

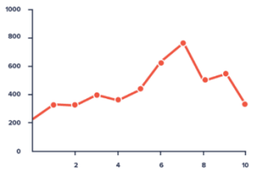
-Data logger software can also be used to show different charts and graphs. This can save the user a lot of time!



Analysing Data

-When scientists collect data, they usually store it so that it can be analysed at any time. The data can also be shared so that other scientists can use it.

-Tables and graphs can be used to present the data in a useful way for reading and understanding it. It is important to be able to see trends as clearly as possible.



Answering Questions

-Remember that data should be collected for a reason: to answer questions.

-It is very important to ensure that the testing that you do is fair and reliable, otherwise the data that you get back may not give you the accurate answers that you need.

-It is important to interpret your data carefully. You can then write a report detailing what your conclusions are.

Important Vocabulary

Input device Sensor Data logger Logging Data point Interval Analyse Data set Import Export Logged Collection Review Conclusion

KNOWLEDGE ORGANISER

Overview

Photo Editing

-You should already know that we can use digital devices to help us to take and edit photographs.

-There are many different apps and programs to edit and improve photos, for example Photoshop, Luminar and paint.net

-There are lots of different ways that we can edit photographs, for example cropping, rotating, flipping, and changing colours and styles.

-We should understand the not all photographs that we see are real – they may have been edited.

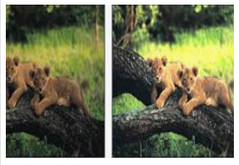
Editing Techniques

Below are a number of different ways that we can edit photographs.

When we only need a part of a photograph, we can crop the image. We can also enlarge and reduce the parts that we need.

We can make more than one of an image by copying it. We can also rotate and flip images to create different effects.

Photograph editing programs often have filters. These can change the colours in a photograph. Different colours can give us different feelings.



When the lighting of the photograph is not quite right, we can change the brightness of the photograph.

We can add and remove parts of a photograph by using cut, copy and paste tools.

We can change the contrast of photographs, making the subjects clearer.

Using Software

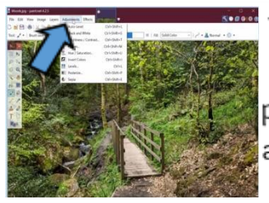
Paint.net is one example of photo editing tool, but many others are available. Below is how to select, copy and paste in new elements to edit your photograph.

1.Open the photo and use the 'lasso select' tool to select the area that you need.

2.Right click on the image and select 'copy.'

3.Open the image that you want your copied photo in. Select 'paste.'

4.Use the handles to resize the image, and drag into position.



The 'Adjustments' tab allows us to turn the photo black and white, and change contrast & brightness.

The 'clone stamp' copies pixels from one part to another. 'Recolor' is used to replace colours. 'Magic wand' allows areas with a similar colour to be selected.

When we want to save our edit, we should click on this icon or the 'save' button. We can reverse the last thing we have done with the undo tool.

Considerations of Edited Photos

-As photographers and editors become more skillful, and editing programs become more advanced, it can be hard to tell if images are real or edited.

-We therefore need to be alert, and not believe everything we see. We should also edit photos for positive, and not negative reasons (see right).

Positive Reasons for Editing Photos

-To make things clearer;

-To highlight the important things;

-To show things in a nice way;

-To avoid embarrassment.

Negative Reasons for Editing Photos

-To try to deceive people;

-To embarrass or put down others;

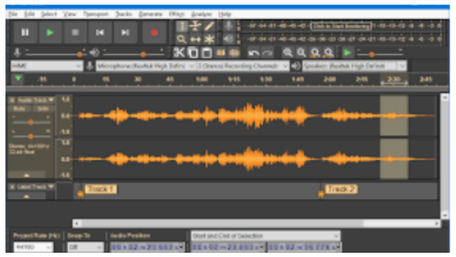
-To spread fake news or dishonest ideas.

Important Vocabulary

Arrange Digital Crop Undo Copyright Composition Pixels Rotate Flip Effects Hue/Saturation Sepia Illustrator Vignette Retouch Clone Recolour Sharpen Brighten Composite Cut Copy Paste Original Border Layer

KNOWLEDGE ORGANISER

Overview



Audio Editing

-You should already know that audio means sound, including music, sound effects, and podcasts.

-The process of recording and listening to sound requires input devices (e.g. a microphone) and output devices (e.g. a speaker).

-Podcasts are a type of spoken word audio file, that can be downloaded by listeners.

-People can have ownership over audio files, and can have the audio copyrighted, so that it can't be copied without permission.

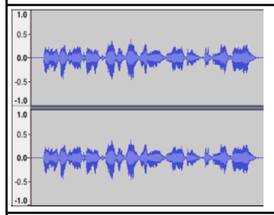
Input and Output Devices

We use input devices to send the audio to the device/ computer.
We use output devices to listen to the audio from the device/ computer.

Input Devices	Output Devices
 Microphones are input devices that change sound into electrical signals, which can then be recorded or transmitted.	 Digital speakers turn the electrical signal into an audio output that can be heard by the listener.
 With the help of special cables, musical instruments can be linked to computers, and become input devices.	 Headphones are worn over the ears of the listener, so that only they can hear the sound output.
  Some devices are capable of acting as both input and output devices. Examples include headsets, smartphones, and voice assistants (e.g. Google Home and Amazon Echo).	

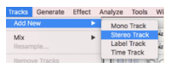
Using Software

Audacity is one example of an audio editing tool, but many others are available. For example, you can use the voice memo recorder on a tablet.

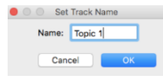


The sound is shown as a waveform. We should aim for it to peak at around 0.5/ -0.5

How to Record a New Track



1.Go to the tab 'Tracks' and then 'Add New.'

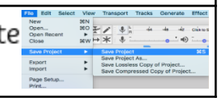


2.Name the new track

3.Click in the track's window to select it.

4.Press record to begin recording into the new track.

Got to the 'file' tab and 'Save Project' to save your work. You can also delete recordings, but you should only ever delete your own files!



Creating Podcasts

Podcasts are a type of spoken word file that can be downloaded by listeners. A user can often choose to download the whole series of podcasts.

Some examples of podcasts are 'Stories Podcast', 'Six Minutes' and 'Brains On! Kids Science Podcast.'

Features of podcasts include:

Sounds: Voices, jingles, background music, sound effects

Information: Presenters' names, name of podcast, introduction, main section, conclusion.

Top Tips for High-Quality Podcasts

-Speak clearly

-Avoid fillers ('um', 'like')

-Avoid coughing/ sneezing

-Take turns to speak

-Avoid background noise

-Don't touch the microphone

-Choose music carefully

Important Vocabulary

Audio Record Playback Input Output Sound Podcast Selection Mixing Time shift Export Sound file

KNOWLEDGE ORGANISER

Overview

The Internet

-You should also know that Information technology (I.T.) includes computers and things that work with computers.

-You should also know that information and data can be shared by devices across networks.

-The internet is a network of networks that is used around the world.

-The World Wide Web is a system on the internet that has websites and webpages.

-Some content is protected on the internet. It is important to know that not all information on the internet is accurate, honest, or legal. Websites and their content are created by people.

Networks and The Internet

-Networks connect different devices to one another, allowing for information sharing.
-Networks can also connect to other networks in different places, using a router.
-The internet is a network of networks that are all connected together.

Router: A router is something that finds a route between networks, connecting them.

The Internet: The internet is a network of networks, that is used around the world to share information and communicate.

Protection: Networks have security features that mean they can block or allow messages and requests. This means that information and data can be kept safe.

The World Wide Web

The World Wide Web

-The World Wide Web is the part of the internet where we can visit web pages and websites.

-Information can be shared in the form of things we can see or hear (e.g. things we can read, music, sounds, or videos, etc.).

-When we use the world wide web, routers help us to journey to different networks in different parts of the world.

-We can use traceroute tools to track the journey between routers.

-Web browsers, e.g. Google Chrome and Internet Explorer, let us look at different pages on the internet.

Website and Webpages

-Websites are a set of webpages.

-Webpages may contain different features, e.g. a title, links to other pages, images, videos, and text.

-Websites and webpages can be found using web addresses (domains), normally split into three parts:

1. www (world wide web).
2. Name of the organisation/ topic.
3. Type of organisation/ location.

- A web address may also be called a URL (Universe Resource Locator). This is the text you type into your internet browser when you want to visit a website.

Ownership and Reliability

-The content on the internet may belong to different people or companies, for example the person who wrote it or the company who published it.

-The content may be copyrighted, meaning that others cannot copy or use it without permission.

-Not all of the information that we see or hear on the internet is reliable. Some of it may be inaccurate due to people lying or misunderstanding things.

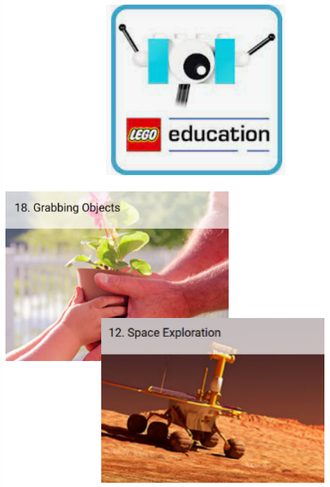
-Inaccurate information can quickly spread. This has become known as 'fake news.' We should check multiple sources that we can trust to verify information.

Important Vocabulary

Network Router Network Security Network switch Server Wireless access point (WAP) Browser World Wide Web Content Links Files Download Sharing Ownership Permission Information

KNOWLEDGE ORGANISER

Overview



Selection in Physical Computing

- Programming is when we make and input a set of instructions for computers to follow.

-Lego WeDo 2.0 is an App which enables Lego models to be programmed in order to create movements using robotics.

-We use algorithms (a set of instructions to perform a task) which we can plan, model and test, in order to create accurate and imaginative robotic actions.

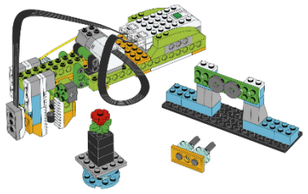
- Input- The data which is entered into a computer or device.

Output Device- The device which receives data from a computer or device.

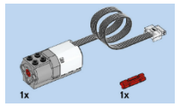
Connection and Lego Kit

-Bluetooth Connection: Bluetooth enables a secure way to connect and exchange information between devices such as mobile phones, telephones, laptops, personal computers, printers, digital cameras, tablets, voice controlled devices and video game consoles. This connection is needed to exchange information from the App to the Lego model. We can use USB cables for a more secure connection.

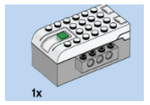
Grabbing Objects:



Motor



SmartHub



Space Exploration:

Select your own solution from these three:

Drive Grab Sweep

The motor connects to the SmartHub. The SmartHub connects the device to the computer or tablet using a Bluetooth signal.

Programming Blocks

-Flow Blocks:

Start Block

Must be used at the beginning of a program string. Press on it to make the program start.

Wait for

Use this to tell the program to wait for something to happen.

Repeat Block

Use this block to repeat actions. Blocks placed inside will be looped.

-Input Blocks:

Any Distance Change

Inputs the Motion Sensor mode "Any Distance Change" in a block.

Number Input

Inputs a numeric value to a block.

-Output: Motor Blocks:

Motor This Way Block

Sets the motor to turn the axle in the direction shown.

Motor That Way Block

Sets the motor to turn the axle in the direction shown.

Motor Power Block

Sets the motor power to the desired speed and starts the motor.

Motor On For Block

Starts the motor for a chosen amount of time.

Sequencing and Algorithms

-A sequence is a pattern or process in which one thing follows another.

-We design algorithms (sets of instructions for performing a task) to help us program the sequence that we require to achieve our desired outcomes.

-Programming is the process of keying in the code recognized by the computer (using your algorithm).

Trialing and Debugging

-Programmers do not put their computer programs straight to work. They trial them first to find any errors:

-Sequence errors: An instruction in the sequence is wrong or in the w

-Keying errors: Typing in the w
-Logical errors: Mistakes in plan/thinking.

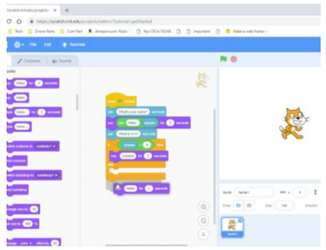
-If your algorithm does not work correctly the first time, remember to debug it.

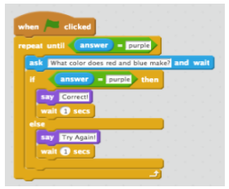
Important Vocabulary

Components | Connect | Infinite Loop | Output Devices | Selection | Motor | Condition | Input | Action

KNOWLEDGE ORGANISER

Overview





Quizzes in Scratch

- Programming is when we make a set of instructions for computers to follow.

-Scratch is a program that we can use in order to code our own quizzes, stories, animations and games. We can input questions using the 'ask' command blocks. We can use selections and conditions in order to ensure that there are different outcomes depending upon a user's response.

-We use algorithms (a set of instructions to perform a task) to sequence movements, actions and sounds in order to program effective animations.

The Basics of Scratch

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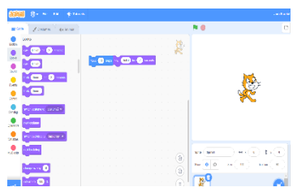

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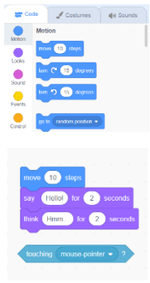

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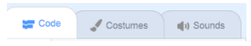

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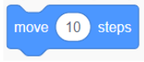
-Action Blocks: Action blocks include 'Motion' blocks, 'Sound' blocks and 'Looks' blocks. They make the sprite move, make sounds and change appearance.



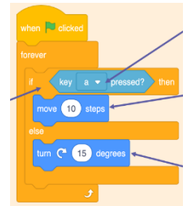
Selections and Conditions

-Creating Conditions: The 'If-then' command block helps us to create conditions. It is one of the darker orange control blocks. Other blocks are placed inside the 'If-then' blocks to create conditions.

The 'senses' blocks (light blue) create the 'trigger' (e.g. when a certain key is pressed). We can change the trigger by pressing the downward arrow and selecting from the range of keys/ actions. The 'actions' blocks (e.g. motions, sounds, etc). are then used to program what will happen when the 'senses' command is triggered.

-Different Outcomes: The 'If-then-else' command block helps us to write programs that have selections with two outcomes.

-Actions to be carried out if the condition is 'true' (if the conditions of the 'sense' command are met) are placed below 'then.' Actions to be carried out if the condition is 'false' (e.g. if any other key is pressed) go below 'else.'

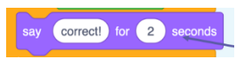


-The 'forever' block means that the command will happen continually.

Asking Questions

-Questions can be included by using the 'ask' command blocks.

-If specific answers are needed (e.g. yes or no), these can be typed in when using the 'answer' sensing block within the = 'Operators' block - drag it into the first white space. In the second white space, we can then type in the desired answer.



-The 'say' command block (in looks) is used to inform the user if the response was correct.

Algorithms, Trialling, Debugging

-Designing an algorithm (set of instructions for performing a task) will help you to program the sequence that you require.

-Programmers do not put their computer programs straight to work. They trial them first to find any errors:

-Sequence errors: An instruction in the sequence is wrong or in the wrong place.

-Keying errors: Typing in the wrong code.

-Logical errors: Mistakes in plan/thinking.

-If your algorithm does not work correctly the first time, remember to debug it.

Important Vocabulary

Selection Condition True False Count-Controlled Loop Outcomes Conditional Statement

KNOWLEDGE ORGANISER

Overview

Flat-File Databases

-Data is raw numbers and figures. Information is what we can understand from analysing data.

here are lots of different ways that we can collect, log and interpret data, including by using databases.

-Databases organise data so that it can be easily added to, amended, stored and accessed. Computer databases can allow large amounts of data to be sorted, filtered and edited more easily.

Types of Databases

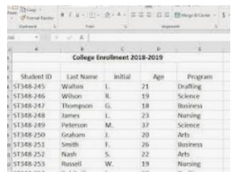
Database: A database is a collection of organised data that is easily stored and used.

Databases often structure data in logical ways (e.g. in columns, rows and tables) so that it can be accessed by those who need it easily. Databases are made up of individuals records, which contain information in different fields (categories).

-Paper Databases: Paper databases require the creator to manually write in individual records, and to sort the records in an appropriate order. Paper records can still be useful in small databases, particularly where information is not changing and does not need to be amended frequently. However, most large databases are now stored on computers.

-Computer Databases: Many computer programs allow us to create databases, e.g. *j2data* or *Microsoft Excel.*

Computer databases have become more popular than paper databases, as data can be easily and quickly added or removed, sorted, filtered, edited, or viewed at any time.



Using a Computer Database

-Computer databases often contain large amounts of data. We can find the data that we need by using the 'search', 'filter' and 'sort' functions. Search functions allow us to type in the exact word/s that we are looking for. This can be useful if we are looking for a particular record.

-If we are looking for records that share certain information we can filter out data by different fields. For example, we filer in the 'age' field for all students aged 23. The database will then present only the students aged 23.

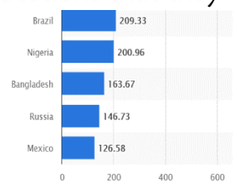
-We can also sort records by the data in particular fields. e.g. we may sort by the students' ages, from youngest to oldest. The youngest student will then appear at the top.

College Enrollment 2016 - 2017

Student ID	Last Name	Initial	Age
ST348-245	White	R.	21
ST348-246	Wilson	P.	19
ST348-247	Thompson	A.	18
ST348-248	Holt	R.	23
ST348-249	Armstrong	J.	37
ST348-250	Graham	S.	20
ST348-251	McFadden	H.	26
ST348-252	Jones	S.	22
ST348-253	Russell	W.	20
ST348-254	Smith	L.	19

Presenting Data

-Data can be shown visually, by using graphs and charts. This allows users to quickly and easily find answers to the questions that they need. It helps the user to easily see trends and to sequence information.

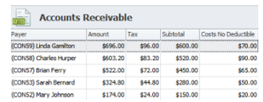


-Charts and graphs can be created by selecting the charts icon and selecting which fields to display in the x-axis and y-axis.

Using Databases

-Remember that databases are used in order to quickly and easily find information. Databases are only able to do this if the data is organised logically into clear records and fields.

-Databases are used in most institutions across the world. Think about: medical records, school student information, flight logs and business accounts.

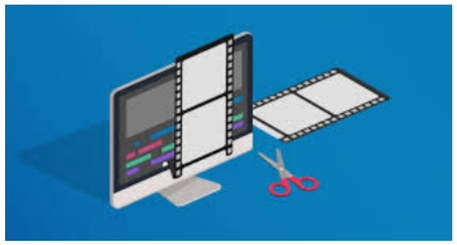


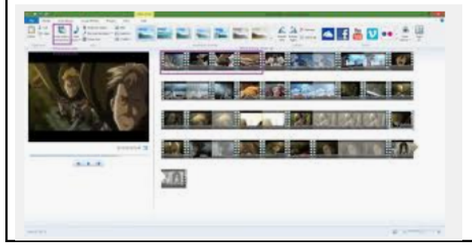
Important Vocabulary

Database Record Field Sort Order Group Value Criteria Graph Chart Axis Compare Filter

KNOWLEDGE ORGANISER

Overview





Video Editing

-You should already know that video means the recording, reproducing and broadcasting of visual images (often accompanied by audio).

-Video is made up of a sequence of images shown in quick succession, giving the impression of movement.

-Many different devices can be used to record, edit and playback video and sound.

-Theme, setting, characters, colour, sound, and dialogue are all important features of video.

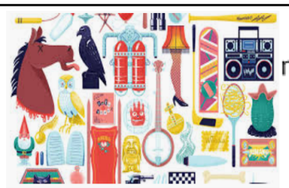
Features of Videos

Videos present moving images, often accompanied by sound. The following features are commonly found in videos.

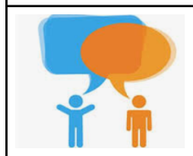
Plot means the main events in the video, shown in a sequence. Plot features are caused by and affect one another.

Themes are the main ideas that run through the video, e.g. love, friendship, magic, violence.

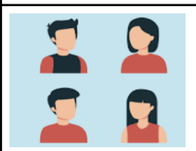
Most videos, even very short videos, try to give the audience a message. This may be obvious or hidden.



Props are the moveable objects that are used by the actors/ actresses in videos texts.



Dialogue is the name given for the conversations between people in video texts.



Characters are the different people and animals in a story, including in a video.

Editing Videos

Canva is one example of a video editing tool, but many others are available.
Examples include Apple iMovie, CapCut and Adobe Express.

In order to edit your video, you first need to import it from your device to the computer.

The trim tool allows you to move excess video from the beginning or the end.

By right-clicking on the video thumbnail, you can choose to 'split' the video into pieces. The different pieces can be moved or deleted.

A number of special effects are available, including using animations and transitions between shots. You can also add text in captions.

Remember to save your project regularly. You need to save your project as a *.wmv file so that you can continue to edit it.

Recording Videos

Static Camera: The camera is in a fixed position, sometimes using a stand or tripod. Examples of this in use are during news-reading and weather forecasts.

Zooming: Zooming in means to give a closer view of the subject. Zooming out gives us a further, broader view of the subject. Zooming too close can make the subject appear blurry.

Pan: The camera position is fixed, but moves from side to side.

Tilt: The camera position is fixed, but moves up and down.

Top Tips for Recording High-Quality Videos

-Use considered lighting.

-Think carefully about the sounds that you will use, e.g. music and sound effects.

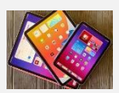
-Think about the use of colour.

-Consider the use of a green screen for settings.

Devices for recording video:

iPads/tablets/smartphones

Camcorders or Cameras

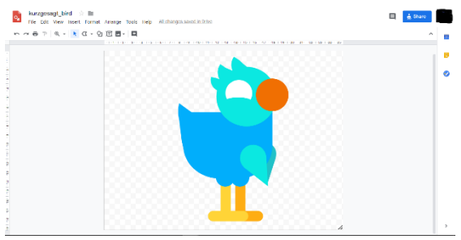


Important Vocabulary

Video Audio Recording Storyboard Script Soundtrack Dialogue Capture Zoom AV (Audio Visual) Videographer Zoom Pan Tilt Angle Lighting Setting Export Split Trim/Clip Titles Timeline Transitions Content Retake Special Effects Title Screen End Credits

KNOWLEDGE ORGANISER

Overview



Vector Drawing

-Vector drawings are computer graphic images that are made using 2-D shapes.

-The drawings are connected by lines and curves to form polygons and other shapes, forming a complete picture.

-There are lots of different apps and programs that can help us to complete vector drawings, including Google Drawings and Adobe Illustrator.

-Many techniques, e.g. zooming, rotating, resizing & duplicating, can help to create accurate images.

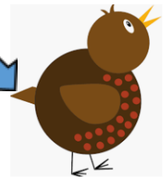
Creating Simple Vector Drawings

Vector drawings use lines and shapes to create bigger and more detailed images.

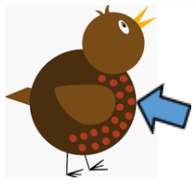
Circles

Plan your drawing by thinking about what shapes it is made up of. Each shape is called an object.

The tail is furthest away so is drawn first.



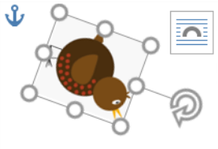
When vector drawing, the shapes overlap, so start with the objects that are the furthest away.



Copy and paste has been used to make the red spots the same size.

You can save a lot of time and effort doing the same thing over and over by duplicating shapes. This is done most easily by copying the object that you want to duplicate (hold ctrl + c) and pasting (hold ctrl + v) a new one.

You can enlarge/reduce an object by clicking on it and dragging the handles to the desired size.

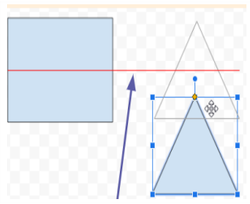


You can rotate an object by dragging the circular handle at the top.

More Complex Vector Drawings

Google Drawings has been used in these examples, but lots of other vector drawing software uses the same tools and functions.

When dealing with small and intricate objects, it is important to use the zoom tool. Zooming in allows you to work with more precision. Zooming out allows a wider view.



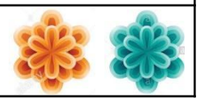
The Alignment guides pop up as you move objects around, and help you to align and size objects.

The line tools can be used to help you change the colour and weight (thickness) of the line, and to make dotted lines.

Coloured lines can be drawn, and colours can be used to fill shapes.

Gradient colours can be used to colour the same object in different colours.

Remember to that vector drawing is all about layering. By gradually adding layers of basic shapes, you build up something far more complex.



Advanced Tips

Grouping: 1. Select all images. 2. Right-click 3. Choose 'group.' All of the objects can now be moved and changed at the same time.

Advanced Layering: Right-click on objects and use the 'send to back' and 'bring to front' tools (in 'order') to ensure that your layering is in the correct order.

Backgrounds: You can create backgrounds by uploading images (using this icon). Remember to 'send to back' after it has been inserted.

Selecting Multiple Objects

This allows you to perform tasks with the whole drawing, rather than individual objects:

-Click, drag and drop a box around all of the objects in an image. This allows you to select all of the objects.

-When you perform an action (e.g. copy and paste) it will now apply to all.

Important Vocabulary

Vector Drawing Tools Icons Toolbar Vector Drawing Move Resize Rotate Duplicate/Copy Organise Zoom Select Alignment Grid Handles Consistency Modify Layers Object Paste Group Ungroup Reuse Improvement Alternatives

KNOWLEDGE ORGANISER

Overview

Systems

-You should also know that Information technology (I.T.) includes computers and things that work with computers.

-You should also know that computers have Input, Process and Output (IPO) components.

-Computer systems are built using a number of parts.

-Computer systems can communicate with other devices.

-There are many, many different kinds of computer systems all around the world, ranging from small-scale to large scale.

Systems

-Systems are a set of things working together as parts of a whole.
-Computer systems are made up of inputs (something that sends a message to the device), processes (the way the device acts on the message) and outputs (something that is sent out by the device). Below are some examples.

Washing Machine:	DVD Player:	Smart Locker:
Input: Dials and buttons.	Input: The disc is inserted and play is pressed on the remote.	Input: The customer scans in a barcode.
Process: The computer inside follows a program.	Process: The system reads the information on the disc	Process: The code is recognised by the system.
Output: The clothes are washed and the display shows the remaining time.	Output: The screen displays the movie/ show.	Output: The correct locker is opened.
		

Transferring Information

Protocols and Packets

-Protocols are an agreed way of doing something. When we communicate, we use an agreed set of protocols (greeting, speaking, listening, etc.).

-In computing, agreed protocols are the way that computers communicate with one another.

-The digital information they send is called a 'packet.'

- Media, files and information can be shared on the internet either privately via email/cloud space or publicly on websites.

IP Addresses

-Computers and their users are not always in the same place as one another.

With billions of computers around the world, computers need to send the information to the correct place.

-To do this, computers use special addresses called IP addresses. They may look like this:

From: 216. 58. 1. 214

To: 216. 64. 1. 20

Working Together

-Collaborating is another word for working together on something, to reach a shared goal.

-The internet can be used to help people collaborate online, even when they are a long distance apart!

-'Chat' functions can be used keep each other updated with new information.

-Shared 'cloud' spaces and online drives can allow one or more person to have access to/ edit documents.

-When building upon someone else's work, you need to be aware of copyright and intellectual property rules.

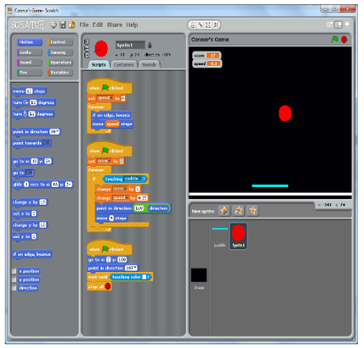
Important Vocabulary

System Connection Digital Input Process Output Protocol Address Chat Collaboration IP Address

KNOWLEDGE ORGANISER

Overview

Variables in Games



- Programming is when we make and input a set of instructions for computers to follow.

-Variables are changeable elements of a program. Scratch is one app in which we can explore variables.

-We use algorithms which we can plan, model, trial and debug, in order to create accurate command sequences, that enable variables to be enacted in games.

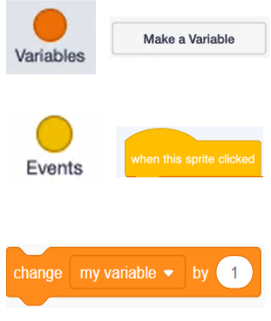
Basic Variables

-Variables: A variable is something that is changeable. A variable can be set and changed throughout the running of a program.

In computer programming we use variables to store information that might change and can be used later in our program. E.g. in a game a variable could be the current score of the player; we would add 1 to the variable whenever the player gained a point.

Making Variables in Scratch – The Basics

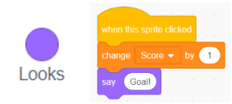
-Select 'Variables' (dark orange circle) from the menu on the left. Either choose from the available variables or 'Make A Variable.'
-Select 'Events' (light orange circle) from the menu on the left. Choose what needs to happen for the variable to change. E.g. 'When this sprite clicked' or 'when space key pressed.'
-Select 'Variables' again from the menu on the left. Choose what will happen when the event happens, e.g. 'change score by 1' (to add a point) or 'change score by -1' to remove a point.



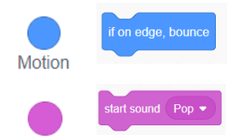
More Complex Variables

- Variables should always have a value and an appropriate name.

-Adding Callouts: Select 'Looks' from the menu on the left. Add it to the variable program. Edit the text to change the callout.

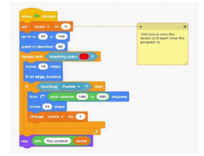


-Adding Motion: Many games require sprites to change position. This is achieved using the 'Motion' commands. Select 'Motion' from the menu on the left. Choose from the available motion commands.



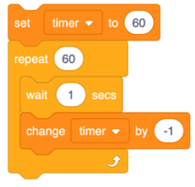
-Adding Motion: Many games require sprites to change position. This is achieved using the 'Motion' commands. Select 'Motion' from the menu on the left. Choose from the available motion commands

-Adding Comments: Comments are a good way of showing that you understand what your code is doing. Right click on the block that you want to comment on, and add in your comment.



Sequencing and Algorithms

-A sequence is a pattern or process in which one thing follows another.



-We design algorithms (sets of instructions for performing a task) to help us program sequences involving multiple output devices (e.g. LEDs and motors).

-Programming is the process of keying in the code recognized by the computer into the software (using your algorithm).

Trialling and Debugging

-Programmers do not put their computer programs straight to work. They trial them first to find any errors:

-Sequence errors: An instruction in the sequence is wrong or in the wrong place.
-Keying errors: Typing in the wrong code.
-Logical errors: Mistakes in plan/thinking.

-If your algorithm does not work correctly the first time, remember to debug it.

Important Vocabulary

Variable Change Name Value Set Design Event Code Task Test Motion Callout

KNOWLEDGE ORGANISER

Overview

Spreadsheets

-Data is raw numbers and figures. Information is what we can understand from analysing data.

-There are lots of different ways that we can collect, log and interpret data, including by using spreadsheets.

-Spreadsheets organise and store data in meaningful ways so that it can be easily accessed and analysed. Computer spreadsheets are particularly useful for powerful calculations, graphs and charts.

What are Spreadsheets?

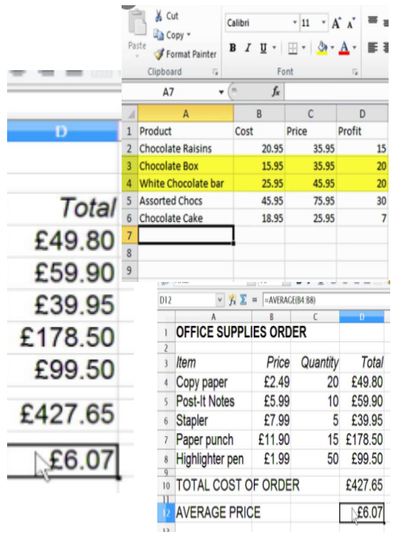
-A spreadsheet is a computer application that allows users to organise, analyse and store data in a table. Programs such as Microsoft Excel and Google Docs help users to make spreadsheets.

-A spreadsheet can be made up of multiple worksheets. They can be reordered and renamed. Each cell has a unique reference, made up of a number (the row) and letter (the column).

-Data headings allow data to be stored in a meaningful way.

-To select a cell, we click on it. To enter data, we double click on it. Data can be typed directly into a cell or into the formula bar.

-By clicking on a column or row, we can sort information in different ways (e.g. alphabetically, 0-9, etc).



Formulas, Calculating and Duplicating

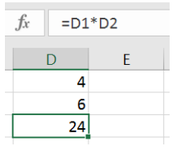
Formulas: A formula can tell a computer which mathematical operation to use for a calculation: add, multiply, divide, or subtract. It also tells the computer which data to use.

+ = add - = subtract * = multiply / = divide

Select your cell. Use cell references to create your formula.

All formulas must begin with the = sign.

E.g. In D3, you enter the formula =D1*D2. The answer will appear in D3.



-Calculations: Sometimes there are large amounts of data that require multiple or complex sums. The 'fx' or 'sigma' icons (see below, depending on the program you are using) can help you to find averages (AVERAGE) add many cells together (SUM) and many other calculations. Σ fx

-Duplicating: Duplicating allows you to create copies of the same data, without having to type it out multiple times. The copy and paste function (Ctrl+C and then Ctrl+V) can duplicate individual cells. You can duplicate whole worksheets by clicking on the worksheet name and selecting 'move or copy' then tick 'create a copy.'

Other Functions

-Formatting makes a spreadsheet easier to read. Hovering the mouse between two columns/ rows allows the user to drag them to the desired size. Right-clicking on a cell and selecting 'format cells' presents a number of options, including fonts, borders, fill etc.

-Charts and graphs can be created using the data in the spreadsheet. Select the charts icon (see below) and which fields to display in the x-axis and y-axis.

Using Spreadsheets

-Spreadsheets are commonly used by individuals and businesses across the world. They are most commonly used for organising and presenting finances, for example budgets and finance reports.

-Spreadsheets may be used by businesses to look back on past income and expenditure and to forecast future performance. They are also used for calculating taxes and deductions.

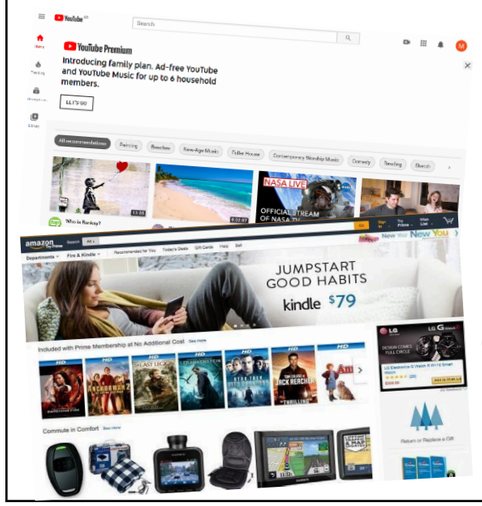
- Data is often presented in tables or graphs.

Important Vocabulary

Spreadsheet Data Heading Cells Data Columns and Rows Data Format Common Attribute Formula Calculation Cell Reference Operation Range Graph Chart Evaluate Results Comparison

KNOWLEDGE ORGANISER

Overview



Web Page Creation

-A webpage is a hypertext document that is a part of the World Wide Web.

-Websites are a collection of webpages about the same topic. They can be found using browsers.

-Examples of websites are Amazon and YouTube. Webpages are the different pages on the websites.

-Websites are created for a chosen purpose, and with a particular audience in mind.

-They include navigation paths, and must adhere to copyright and fair use of media rules.

Features of Good Websites

Websites can be found using browsers. Browsers allow us to find our way around the worldwide web, and show us what websites look like.

-The website name is usually visible in large font, particularly on the home page.

-There is often a slogan/ logo and short description of what the website is about.

-The search allows you to find different things on the website.

-Webpages are made up of a code called Hypertext Markup Language (HTML). You can find this by right-clicking on a page and selecting 'Inspect.'

-The menus at the top of the page allow you to look at different parts of the website.

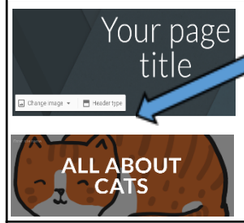
-Pictures are used to highlight what the text is about. Colours are used carefully.

-There are links to other areas of the website/ World Wide Web (in blue).

Creating a Webpage

Google Sites has been used in these examples, but lots of other web page creation software and apps are available, with similar tools and functions.

Setting Up: Click + to start a new website. Click on the top left to add a website name and the top centre to add a page title.

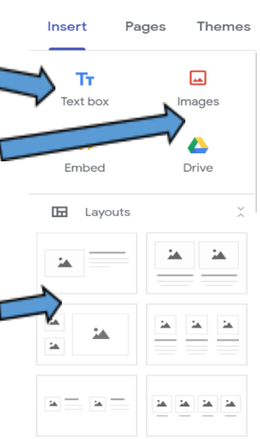


Header: You can add images used in the header, and the type of header, by clicking on these options.

Text Box: Lets you add different sections of text.

Images: Add in pictures from your computer or from the internet.

The layouts feature lets you set out your page in different ways. There are six for you to choose from.



Most websites contain a home page, which introduces the website. The other pages (sub-pages) on the website go into more detail about individual topics.

Making Effective Web Pages

Purpose: The purpose is the reason for your web page – what is it for? You should make sure that your web page meets its purpose.

Audience: The audience are the people who your web page is aimed at. You should make decisions with your target audience in mind.

Copyright: You should only use images that are copyright-free. Many images are owned by people/ companies and cannot just be reused.

Navigation Pathways

Navigation Pathways are also known as breadcrumb trails.

-Hyperlinks allow different pages to be linked together.

-These links help the audience to navigate the website easily.

-The user can also keep track of where they have been on the website.

Important Vocabulary

Web Page Website Browser Media Hypertext Markup Language (HTML) Logo Layout Header Purpose Copyright Home Page Preview Navigation Subpage Exerernal Link Embed

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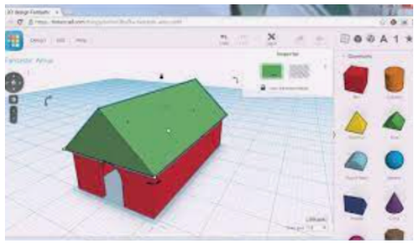
Overview



3D Modelling

-3D means three-dimensional, or having 3 dimensions. For example, a box is a 3D shape, whereas a square is a 2D shape.

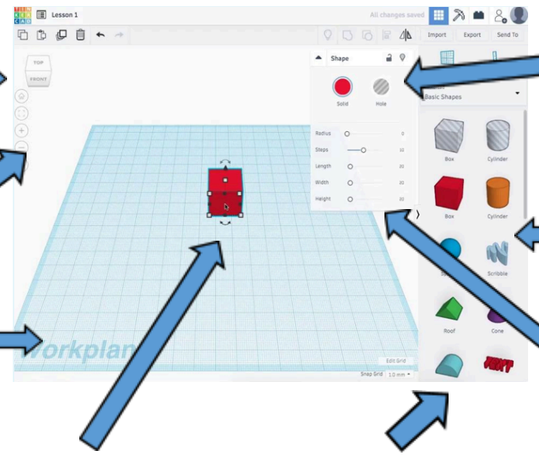
-3D modelling involves using computer software to create 3D shapes, in order to produce models of real-world objects.

-3D modelling allows us to view designs from different angles and experiment with various designs.

-3D modelling is used in many industries, e.g. in interior design, architecture and making video games.

The Basics of 3D Modelling

'Tinkercad' is one example of software that we can use to create 3D Models. Other examples include 'CAD for Kids' and 'Sketchup 3D.'



-The ViewCube Allows us to switch the view of the model e.g. from the front angle, top angle, or spin around to show the sides.

-Zoom in and zoom out.

-The workspace, where you can work on your model. The square panes help us to distances and dimensions accurately.

-Objects can be resized by dragging the handles (white squares).

-When you move multiple objects into the same space, they merge.

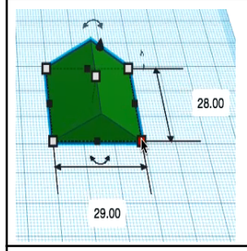
-Alter the dimensions of your model, for example the length, height, width and shape.

-3D objects that can be dragged into the workspace and remodelled.

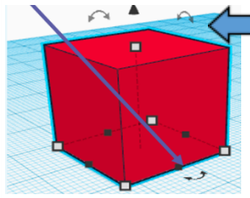
-Change the colour/ shading of your model, and make them solid or 'hole.'

More Advanced Techniques

Duplicating: Click and drag around an object to ensure that it is selected. Then, click on the duplicate icon (see left) to create a copy.

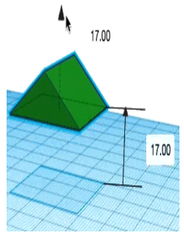


Resizing: Objects can be manually resized by clicking and dragging on the handles around them. The dimensions are labelled.

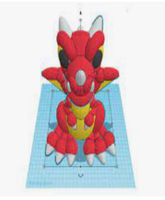


Rotating: Selecting these handles allows us to rotate shapes. Drag the object to rotate it in different ways.

Lifting: Use the ViewCube to change the viewing angle of the model to the front/ side. Then, use the cone handle in order to lift the object from the workspace.

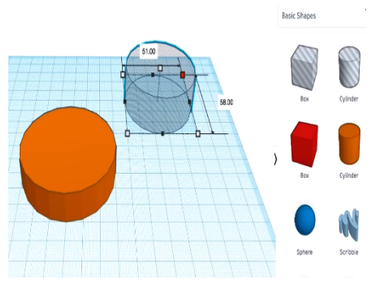


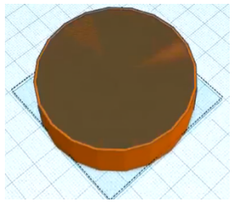
Combining Shapes Many complex shapes are made up of a number of 3D shapes – we can position and merge them together.



Text: You can add block text by selecting 'text' in the shapes. This can help you to enhance other shapes.

Making Holes





Holes: Sometimes we need to create objects that are not solid – they have space inside/ within them.

-To achieve this, begin by adding a 3D shape onto the workspace. Then drag one of the 'holes' shapes onto the workspace. Adjust dimensions accordingly.

-Drag the 'holes' shape over the 3D shape as desired.

-Click and drag a box around the shapes to select them.

-Click the 'group' button to combine the shapes and create the hole.

Important Vocabulary

Modelling | Three-Dimensional | Workspace | Faces | Vertices | Edges | Handles | Resize | Position | Hole | Design | Modify

KNOWLEDGE ORGANISER

Overview

Searching and Communicating

-You should already know that the internet is a network of networks.

-You should also know that the World Wide Web is the part of the internet where we can visit websites and webpages.

-The World Wide Web can be used to find information, using search engines.

-The internet is also a useful communication tool – with a number of different communication mediums for a range of different purposes.

Search Engines - Introduction

-We can find information on the World Wide Web by using search engines.

-A search engine is a program that finds websites & webpages based on key words entered by the user.

-When the World Wide Web was invented by Tim Berners-Lee in 1989, there was only 1 website. By 2018, there were 1,630, 322, 579! The World Wide Web is a big place, and we need search engines to be able to find what we need.

-Some examples of search engines are Bing, Google, Yahoo, DuckDuckGo and Kiddle.

-You can also type searches into the address bar of the browser (e.g. Google Chrome or Microsoft Internet Explorer).

-We may not get the results that we are looking for if our search is not refined (precise) enough.

Selecting and Ranking Search Results

Selecting Search Results

-Search engines use programs known as crawlers to index the World Wide Web.

-They 'crawl' websites for searchable information – they then store where it is found in a huge index.

-Search engines select information from this index when we type in key words.

-Searching for some search terms can bring many millions of results.

-We need to make sure that our search terms are as refined as possible, in order to allow the search engine to select the information that is most relevant.

Ranking Search Results

-Search engines 'rank' the web pages (the highest ranked page is at the top).

-Search engines use algorithms to do this – algorithms look at a number of different factors and give web pages a score for each.

-The web page with the highest score ranks the highest.

-Some factors include if the search term is in the title of the page (high points) or if it appears in the paragraphs of the text on the page (lower points).

-Web designers consider algorithms when making when pages.

Online Communication

-Communication is when we share information with one another. We can communicate in lots of different ways on the internet, e.g. messaging services, emails, social media, video calling, blogging/vlogging and gaming platforms.

-Public communication is visible to all, whilst private communication is restricted to only some people.

-Some communications are one-way (e.g. Youtube) whilst others are two-way (e.g. Skype).

-Some communications are to one person, whilst others are to many.

-We should consider which type of communication is most appropriate to our needs, safety and privacy.

Important Vocabulary

Search Engine, Refine, Index, Web Crawler, Ranking, Links, Searching, Selection, Communication, Public, Private, SMS, Blog, World Wide Web