



COMPUTING SYSTEMS AND NETWORKS KNOWLEDGE ORGANISER

Y3



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)

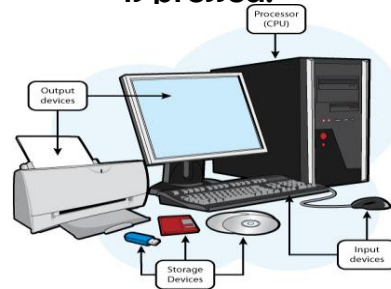
- A device is something that has been made for a particular purpose (it has a special use).
 - Digital devices use processing (have a process) There is more than just an on-off function.
- Digital devices have an input, process, output (IPO)

Input: 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

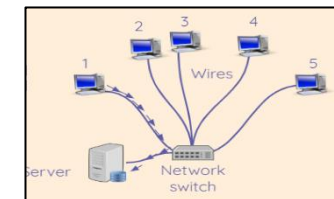
Connections and Networks

- 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.



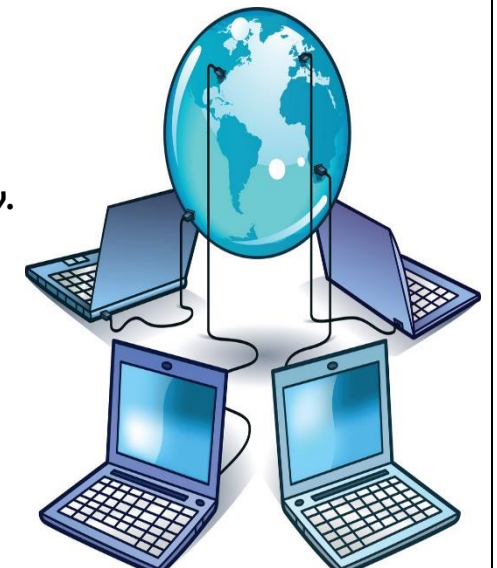
Network Devices

- 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

Process

Output

Connection

Network

Network Switch

Server

WAP

E-Safety



COMPUTING: CREATING MEDIA

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Overview

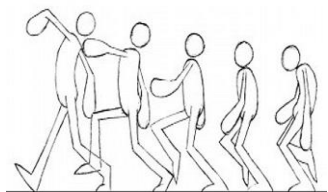
Animation



- Animation is a technique used to make objects and drawings 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 Clayframes.

Introduction to Animation

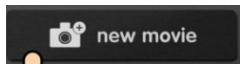
Animation is a technique used to make objects and drawings appear to move.



- 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

iMotion is one of many apps that you can use to create animation. You can create a new animation by selecting the 'new movie' option.



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).



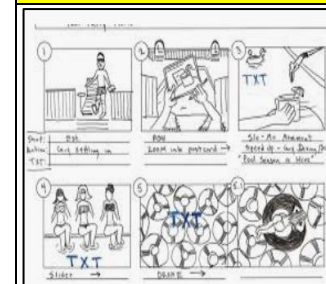
Creating the Animation

- Take a picture of your object/ drawing (press 'capture').
- Change the object/drawing very slightly. If drawing, keep a faint 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.

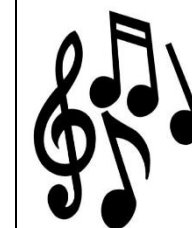
More Complex Animations



Storyboards can be used to plan animations. They help you to plan your different frames.



-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

Frame

Illusion

Sequence

Onion Skinning

Playback

Storyboard

Audio

Consistency

Text



COMPUTING: CREATING MEDIA

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Overview



Desktop Publishing

- Desktop publishing is when we create documents using page layout software.
- We can use desktop publishing to make things like newsletters, brochures, magazines and newspapers.
 - Some examples of software that we can use for desktop publishing are Microsoft Publisher, Adobe Spark and Canva.
- When using desktop publishers, we consider how images and text are laid out the page in an eye-catching and appropriate format.

Layout of A Page

When desktop publishing, we consider how we can lay out a page in the most interesting, eye-catching, and appropriate ways, to suit our purpose and audience.

The title should be large, bold and clear. It is normally the largest text on the page.

Consider which font you will use – different fonts create different ideas and feelings.

What is the main story of the magazine? How can you sum the story up in a few words?



Think about how different colours make us think and feel.

Think about where you will put the date and price of the magazine – this is important information!

Magazines are normally in portrait orientation. Think about how you lay out text and images.

Text Tools

The toolbar is the set of icons and buttons that are at the top of the page in a desktop publisher. You should already know some of these from your earlier study:

These tools can change the text.



The B makes the text **Bold**.

The I writes the text in *Italics*.

The U underlines the text.



Clicking on this icon allows you to change the size of the text. After pressing the icon, you will see a list of numbers. The larger the number selected, the bigger your text will be.



Clicking on this icon allows you to change the font (style) of the text. Most desktop publishers have many styles to choose from.

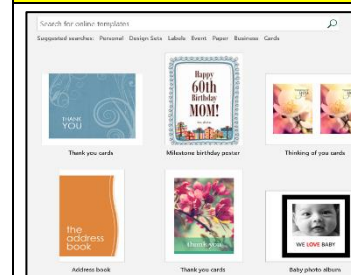


Clicking on this icon opens the text colour tool. It allows you to change the colour of the text. There are often many colours to choose from.

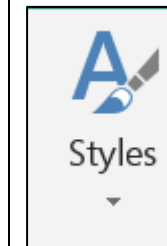


The undo tool reverses the last thing that you did. If you make a mistake, the undo tool can help you to get it back to how it was.

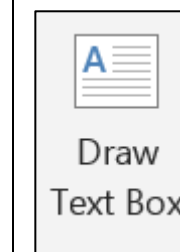
Image and Layout Tools



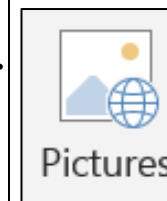
Templates have a pre-arranged layout, colour scheme and style that you can adapt for your needs!



-The styles tool is a real time saver. You get to choose a number of different features, e.g. fonts and colours, and it will apply the rules to the whole document.



-Text boxes allow you to type text anywhere on the document. The box itself can be coloured. You can make the text box as large or small as you want, and rotate it using this symbol.



-This tool lets you insert pictures into your document. You can select pictures already on your computer, or search the internet for pictures. Pixabay contains lots of pictures that you can legally use in publications.

Important Vocabulary

Publishing

Text

Images

Font

Templates

Orientation

Placeholders

Software

Purpose

Audience



COMPUTING: DATA AND INFORMATION KNOWLEDGE ORGANISER

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Overview

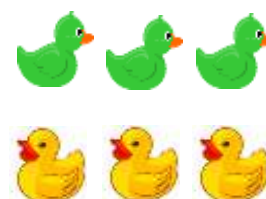
Branching Databases



- 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:

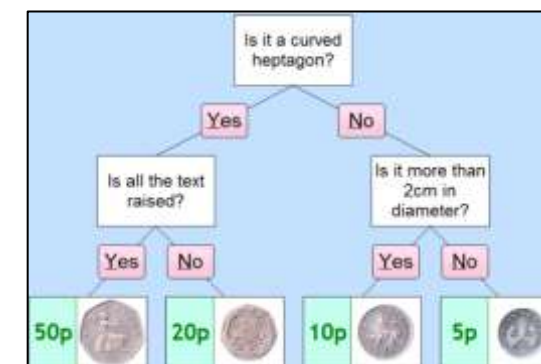
- Is it big? (size)
- Is it red? (colour)
- Is it made of plastic? (material)
- Is it heavy? (weight)



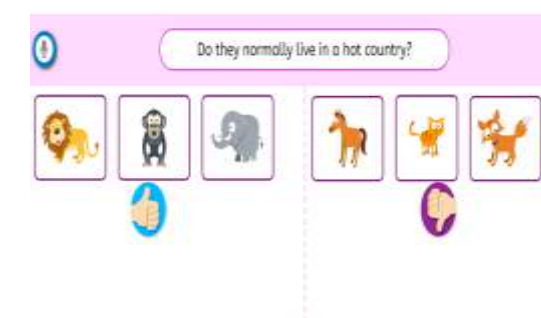
-Multiple Groups: Sometimes, we need to split objects into more than two groups, and so one yes or no question alone is not enough. For example, we may wish to classify animals into the different animal types (mammals, birds, reptiles, amphibians, fish, etc.). We may ask multiple yes or no questions,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



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

Information

Data

Attributes

Group

Branching

Database

Multiple

Classify

Structure

Present



COMPUTING: PROGRAMMING

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Overview

Events and Actions in Scratch

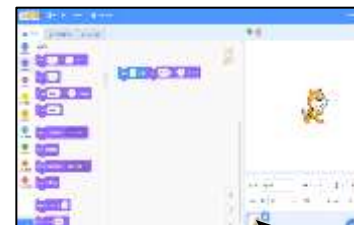


- **Programming** is when we make a set of instructions for computers to follow.
- **Scratch** is a program that we can use in order to code our own stories and animations. We can use **event and action command blocks** in order to make sprites carry out acts when certain prompts take place.
- We use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

- 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.

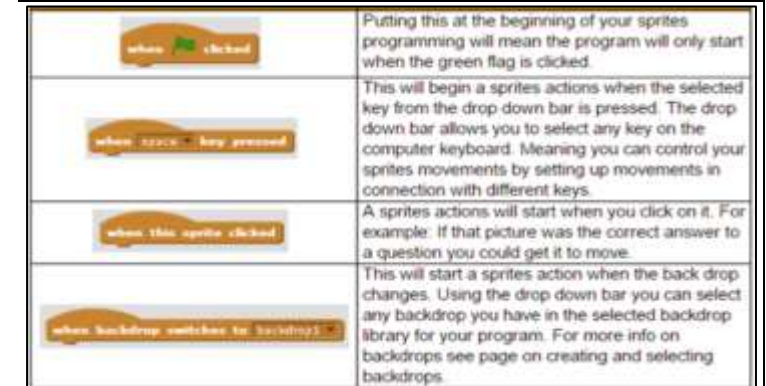
Attributes: There are three attributes of the sprite which we can change to make our animation: Code, Costumes, Sounds.

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

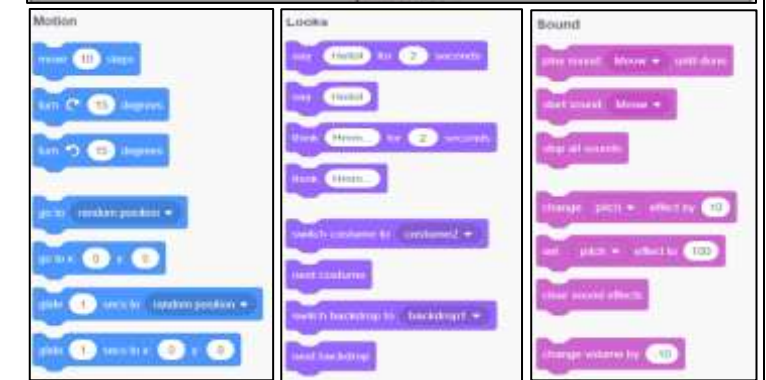


Event and Action Blocks

- **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.



- **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

- 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.

- 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

Programming

Scratch

Blocks

Commands

Code

Events

Motion

Sequence

Trialling

Debugging



COMPUTING: PROGRAMMING

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Overview



Sequencing in Scratch

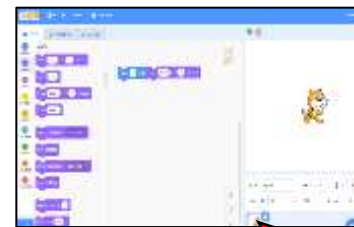
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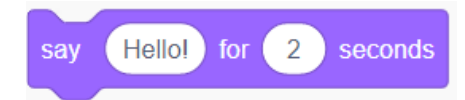


Programming Using Blocks

- **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.

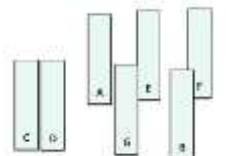
- **Event blocks** are used to start sequences. They are orange and have a curved shape at the top.



- 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

Commands

Code

Sprite

Stage

Costume

Backdrop

Debugging



COMPUTING SYSTEMS AND NETWORKS 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.

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.

 www.youtube.com

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

Internet

World Wide Web

Router

Security

Website

Webpage

Browser

Domain

Reliable



COMPUTING: CREATING MEDIA

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Overview

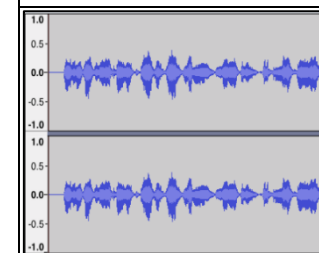
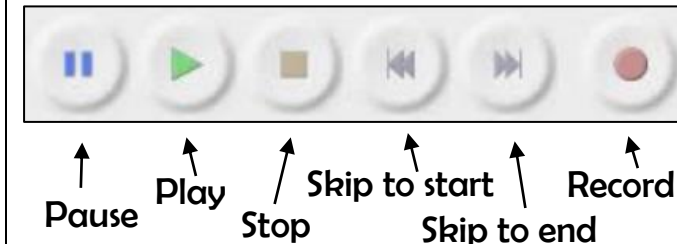


Audio Editing

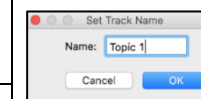
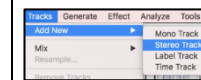
- You should already know that audio means sound, including music, sound effects, and podcasts.
- The process of recording and listening to sound requires input devices (e.g. a microphone) and output devices (e.g. a speaker).
- Podcasts are a type of spoken word audio file, that can be downloaded by listeners.
- People can have ownership over audio files, and can have the audio copyrighted, so that it can't be copied without permission.

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.



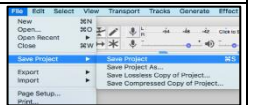
The sound is shown as a waveform. We should aim for it to peak at around 0.5/-0.5



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!



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



Microphones are input devices that change sound into electrical signals, which can then be recorded or transmitted.



With the help of special cables, musical instruments can be linked to computers, and become input devices.



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).

Output Devices



Digital speakers turn the electrical signal into an audio output that can be heard by the listener.



Headphones are worn over the ears of the listener, so that only they can hear the sound output.

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

Input

Output

Microphone

Speaker

Podcast

Waveform

Jingle

Track

Presenter



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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.

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.



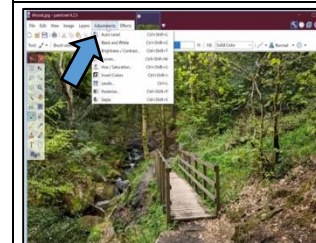
2.Right click on the image and select 'copy.'



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.



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.

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

Photography

Editing

Software

Crop

Rotate/Flip

Copy

Brightness

Contrast

Enlarge

Reduce



COMPUTING: DATA AND INFORMATION 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
Selb			
Anusha			
Belle			
Patrick			
Reece			
Dylan H			
Dylan			
Dylan 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)



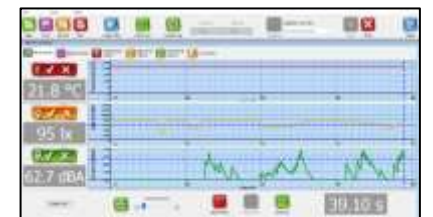
- Data Loggers: Data loggers have sensors built into them. They can be used to detect and record data. Data loggers often contain:

- A heat sensor (to record the temperature)
- A light sensor (to record brightness)
- A sound sensor (to record the noise).



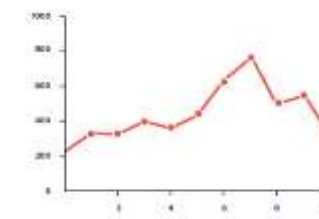
Data Recording

- 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

Information

Data

Collection

Sensor

Logging

Analysis

Data Logger

Software

Interpret

Conclusion



COMPUTING: PROGRAMMING

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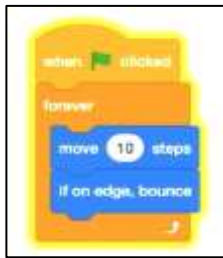


Overview

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.



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

Programming

Scratch

Blocks

Commands

Code

Events

Motion

Sequence

Trialling

Debugging



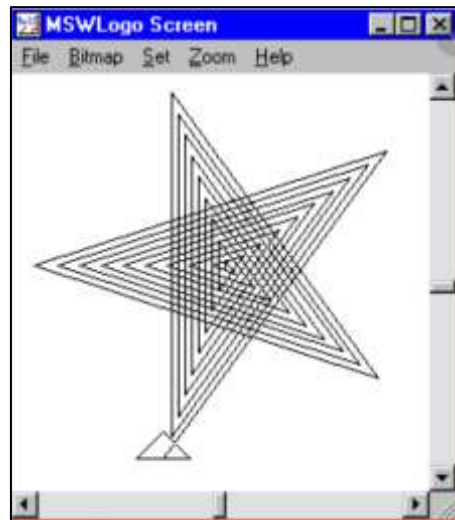
COMPUTING: PROGRAMMING

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Overview

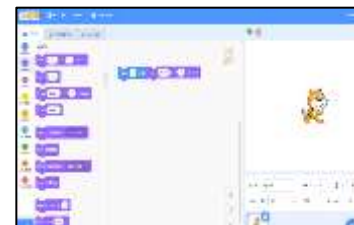


Repetition in Shapes

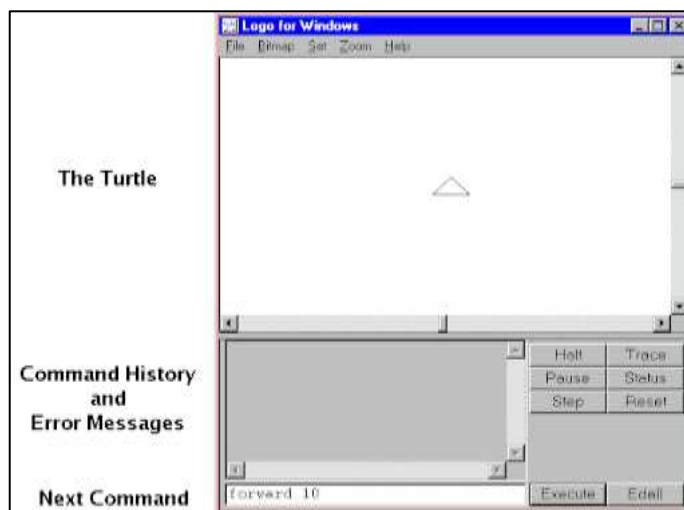
- Programming is when we make a set of instructions for computers to follow.
- Logo is a text-based program that we can use in order to create shapes and patterns.
- We use algorithms (a set of instructions to perform a task) which we can plan, model and test, in order to create accurate and imaginative 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:



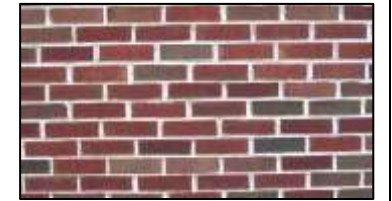
Basic Commands:



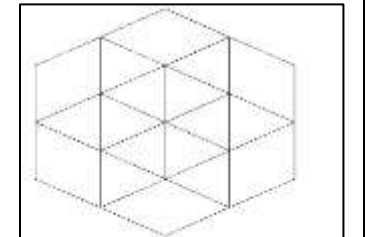
- FD: Forwards. Always followed by a space and the number of steps, e.g. FD 50
- BK: Backwards. As above, e.g. BK 50
- LT: Left turn. Always followed by a space and then the degrees to turn, e.g. LT 90
- RT: Right turn. As above, e.g. RT 90
- CS: Clears any pen marks on your screen and gets the turtle 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!



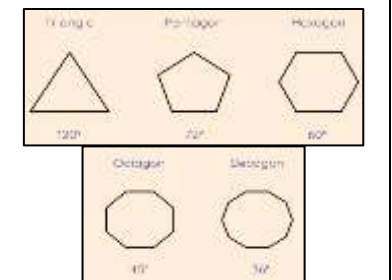
- **Patterns in Logo:** Instead of typing in the code to create each individual shape, we can save time by repeating a sequence of instructions. We use the 'repeat' function.



- **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:

- **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

Programming

Logo

Turtle

Commands

Code

Cursor

Algorithm

Pattern

Sequence

Debugging



COMPUTING SYSTEMS AND NETWORKS 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:

- Input: Dials and buttons.
- Process: The computer inside follows a program.
- Output: The clothes are washed and the display shows the remaining time.



DVD Player:

- Input: The disc is inserted and play is pressed on the remote.
- Process: The system reads the information on the disc.
- Output: The screen displays the movie/ show.



Smart Locker:

- Input: The customer scans in a barcode.
- Process: The code is recognised by the system.
- 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.'



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

My IP Address
63.255.173.183



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

Input

Process

Output

Protocol

IP Address

Packet

Reuse

Explore

Collaboration



COMPUTING: CREATING MEDIA

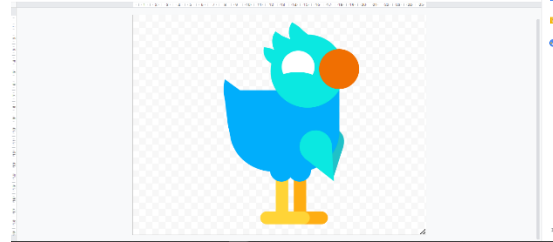
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Overview

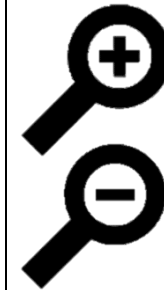
Vector Drawing



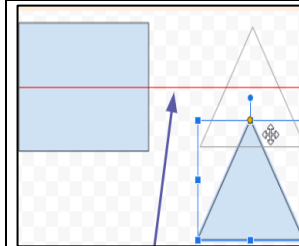
- Vector drawings are computer graphic images that are made using 2-D shapes.
- The drawings are connected by lines and curves to form polygons and other shapes, forming a complete picture.
- There are lots of different apps and programs that can help us to complete vector drawings, including Google Drawings and Adobe Illustrator.
- Many techniques, e.g. zooming, rotating, resizing & duplicating, can help to create accurate images.

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.

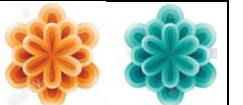


Coloured lines can be drawn, and colours can be used to fill shapes.



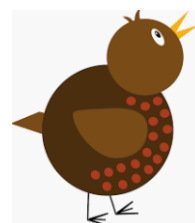
Gradient colours can be used to colour the same object in different colours.

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



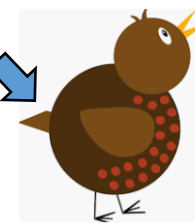
Creating Simple Vector Drawings

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

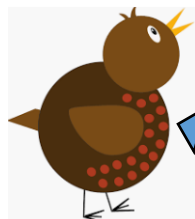


Plan your drawing by thinking about what shapes it is made up of. Each shape is called an object.

The tail is furthest away so is drawn first.

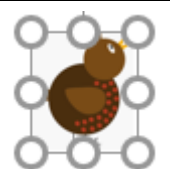


When vector drawing, the shapes overlap, so start with the objects that are the furthest away.

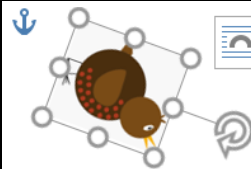


Copy and paste has been used to make the red spots the same size.

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.

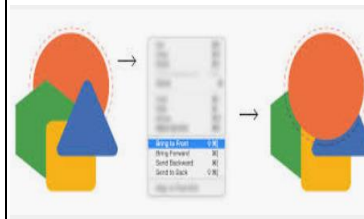


You can rotate an object by dragging the circular handle at the top.

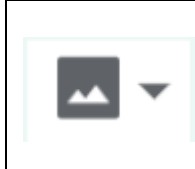
Advanced Tips



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

Object

Handles

Rotate

Enlarge/ Reduce

Layering

Gradient

Zoom

Alignment

Grouping



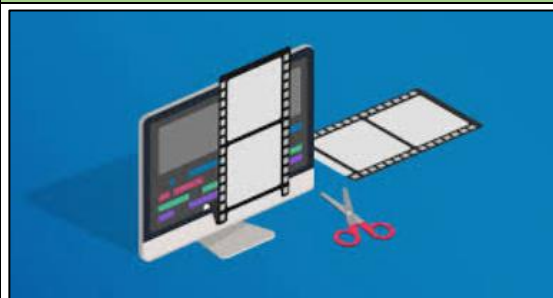
COMPUTING: CREATING MEDIA

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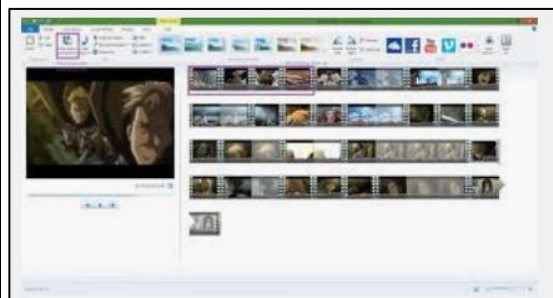


Overview



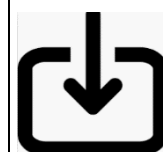
Video Editing

- 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.



Editing Videos

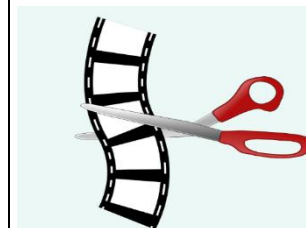
Windows Movie Maker is one example of a video editing tool, but many others are available. Examples include WeVideo, Nero Video, and Apple iMovie.



In order to edit your video, you first need to import it from your device to the computer. You then need to import it into Movie Maker by clicking 'Add videos and photos.'



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



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



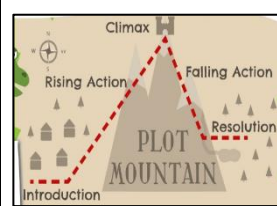
A number of special effects are available, including using animations and transitions between shots. You can also add text in captions.

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



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.



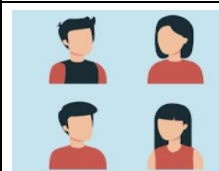
Most videos, even very short videos, try to give the audience a message. This may be obvious or hidden.



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.

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.

Important Vocabulary

Video

Audio

Themes

Message

Dialogue

Plot

Props

Zoom

Angle

Pan/Tilt



COMPUTING: DATA AND INFORMATION KNOWLEDGE ORGANISER



Overview

Flat-File Databases



- 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 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 individual 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. *2data* 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.

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

Using a Computer Database

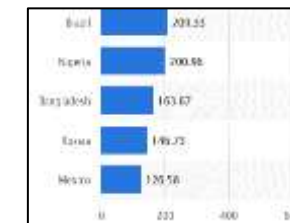
- Computer databases often contain large amounts of data. We can find the data that we need by using the 'search', 'filter' and 'sort' functions. Search functions allow us to type in the exact word/s that we are looking for. This can be useful if we are looking for a particular record.
- If we are looking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

Account	Balance	Interest	Current Balance
Account 1	1000.00	10.00	1010.00
Account 2	2000.00	20.00	2020.00
Account 3	3000.00	30.00	3030.00
Account 4	4000.00	40.00	4040.00
Account 5	5000.00	50.00	5050.00

Important Vocabulary

Information

Data

Collection

Database

Search

Sort

Filter

Software

Fields

Records



COMPUTING: PROGRAMMING

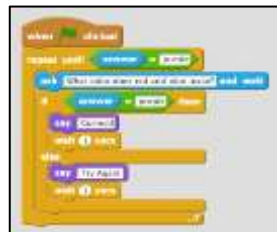
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Overview

Quizzes in Scratch

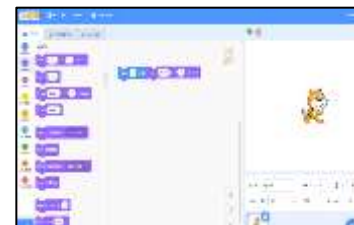


- **Programming** is when we make a set of instructions for computers to follow.
- **Scratch** is a program that we can use in order to code our own quizzes, stories, animations and games. We can input questions using the 'ask' command blocks. We can use **selections and conditions** in order to ensure 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

- **What is Scratch?** Scratch is a website/ app that lets us code our own quizzes, 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.

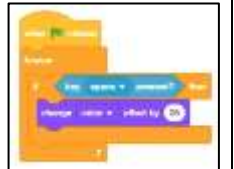


-Action Blocks: Action blocks include 'Motion' blocks, 'Sound' blocks and 'Looks' blocks. They make the sprite move, make sounds and change appearance.



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.

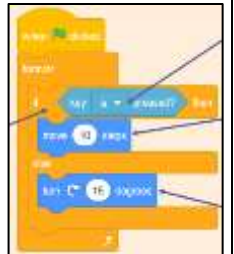


The 'senses' blocks (light blue) create the 'trigger' (e.g. when a certain key is pressed). We can change the trigger by pressing the downward arrow and selecting from the range of keys/ actions. The 'actions' blocks (e.g. motions, sounds, etc). are then used to program what will happen when the 'senses'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



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

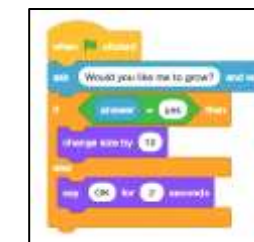
-Actions to be carried out if the condition is 'true' (if the conditions of the 'sense' command are met) are placed below 'then.' Actions to be carried out if the condition is 'false' (e.g. if any other key is pressed) go below 'else.'



-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

Programming

Scratch

Logical

Commands

Algorithm

Condition

Selection

Sequence

Trialling

Debugging



COMPUTING: PROGRAMMING

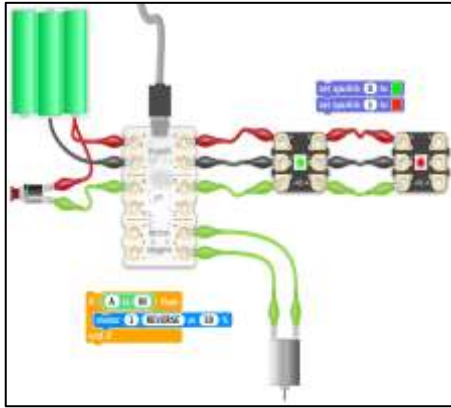
KNOWLEDGE ORGANISER

Y5



Overview

Selection in Physical Computing



- Programming is when we make and input a set of instructions for computers to follow.
- Microcontrollers are devices that can be programmed to control output devices that are connected to them.
- We use algorithms which we can plan, model, trial and debug, in order to create accurate command sequences, involving multiple output devices (e.g. LEDs and motors).

Microcontrollers, LEDs and Motors

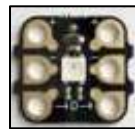
- **Microcontrollers:** A microcontroller is a small device that can be programmed to control devices that are connected to it.

- One brand of widely used microcontroller is called a Crumble controller, which can be used to control many things, e.g. LEDs and motors.



LEDs:

- LEDs are output devices that emit light. When electricity is passed through an LED it produces light. One type of LED light, controlled by a Crumble controller, is called a Sparkle.

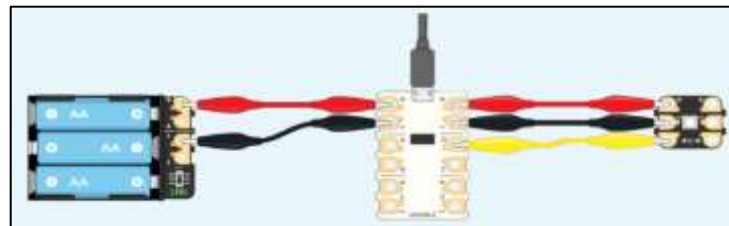


Motors:

- Motors are another output device. A motor can start, stop, spin forwards, spin backwards, and go at different speeds.



Creating Circuits:



- The USB port connects the microcontroller to a computer. Crocodile clips pass electricity and data through to the LED/motor.
- The + and - power pads on the Crumble should be connected with the + and - power pads on the Sparkle and battery box. The D pads on the Crumble and Sparkle should also be connected.

Programming Commands

- For programming, we should use the microcontroller software.

- Crumble uses command blocks (like Scratch).

- **Adding/Removing Commands:** To add a command block, drag it from the menu towards the program. When the grey arrow appears, the command will snap into the program. To remove a command block, drag it away from the program and back to the menu.



- **Modifying Commands:** Clicking on the colour square in the command block allows us to change the Sparkle's colour. To change the time of commands, click on the value. Delete the current value and type in the new value. Press enter after completed.



- **Count Controlled Loops:** These allow us to put programs on a loop. Count Controlled Loops are found in the 'Control' options. Drag the desired program into the Count Controlled Loop command block. 'Do until' loops allow commands to happen until a condition is met.



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

Programming

Circuit

Electricity

Microcontroller

Code

LED

Algorithm

Motor

Modify

Debugging



COMPUTING SYSTEMS AND NETWORKS KNOWLEDGE ORGANISER

Y6



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.

Selecting and Ranking Search Results

Selecting Search Results

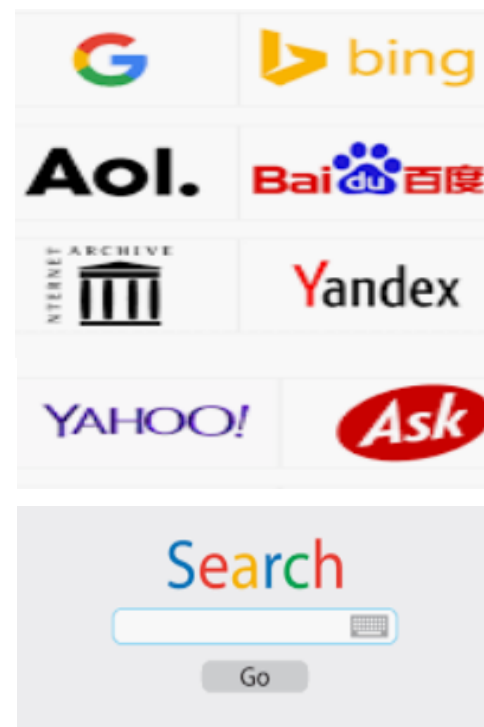
- Search engines use programs known as crawlers to index the World Wide Web.
- They 'crawl' websites for searchable information – they then store where it is found in a huge index.
- Search engines select information from this index when we type in key words.
- Searching for some search terms can bring 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.

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).



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 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

Internet

World Wide Web

Search Engine

Browser

Keyword

Google

Tim Berners-Lee

Ranking

Crawlers

Algorithm



COMPUTING: CREATING MEDIA

KNOWLEDGE ORGANISER

Y6



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.'

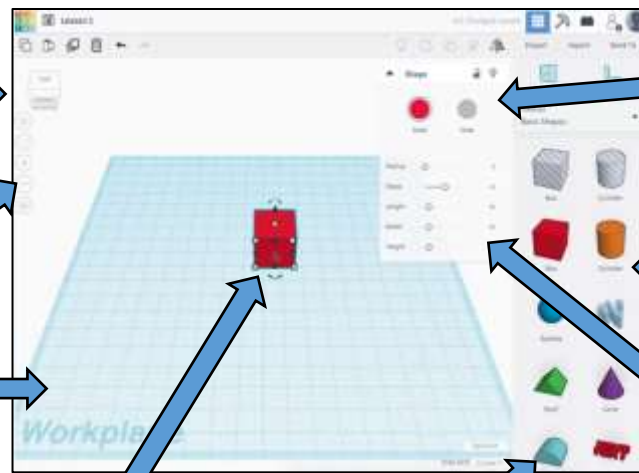
-The ViewCube Allows us to switch the view of the model e.g. from the front angle, top angle, or spin around to show the sides.

-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.



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

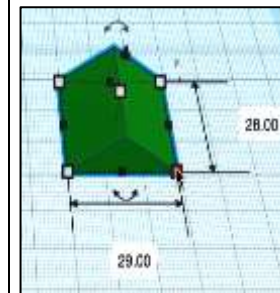
-3D objects that can be dragged into the workspace and remodelled.

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

More Advanced Techniques

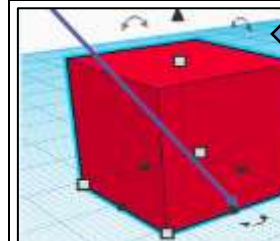
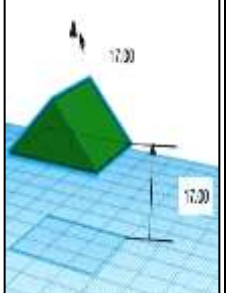


Duplicating: Click and drag around an object to ensure that it is selected. Then, click on the duplicate icon (see left) to create a copy.



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

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.



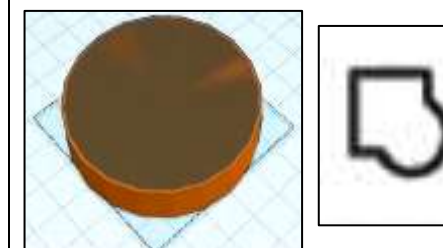
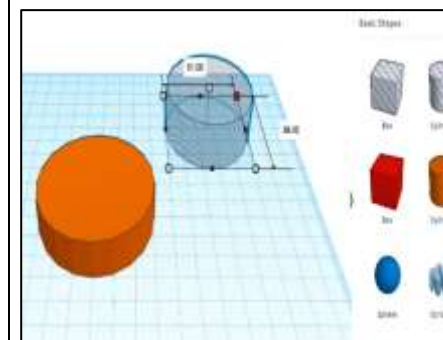
Rotating: Selecting these handles allows us to rotate shapes. Drag the object to rotate it in different ways.

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

Duplicate

Holes



COMPUTING: CREATING MEDIA

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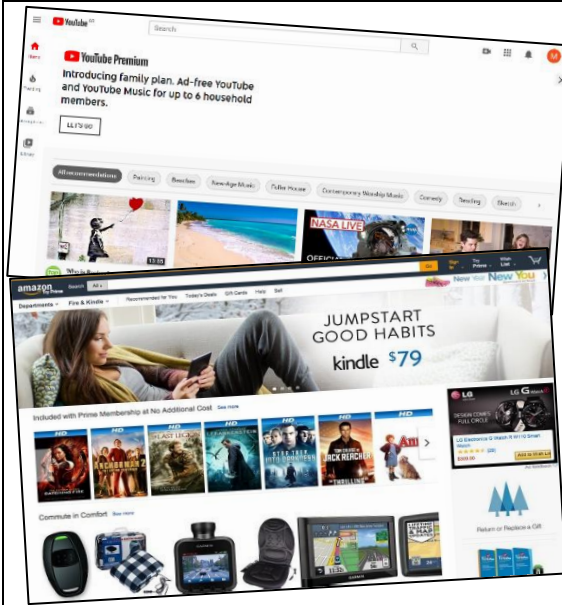
Y6



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.



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.

Text Box: Lets you add different sections of text.

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

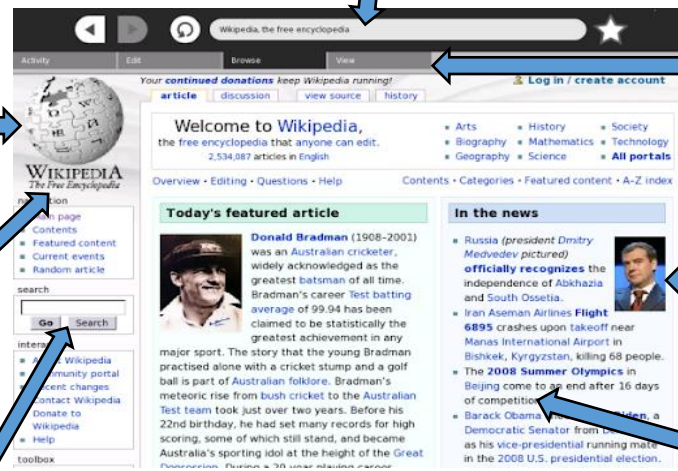
Header: You can add images used in the header, and the type of header, by clicking on these options.

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

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).



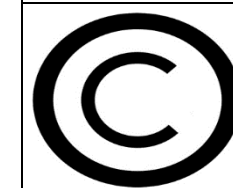
Making Effective Web Pages



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

Domain

Hypertext

Purpose/ Audience

Browser

Copyright

Homepage

Navigation Pathways



COMPUTING: DATA AND INFORMATION 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).

Product	Cost	Price	Profit
Chocolate Raisins	28.95	35.95	15
Chocolate Box	15.95	35.95	20
White Chocolate bar	25.95	45.95	20
Assorted Chocs	45.95	75.95	30
Chocolate Cake	18.95	25.95	7

Item	Price	Quantity	Total
Copy paper	£2.49	20	£49.80
Post-It Notes	£5.99	10	£59.90
Stapler	£7.99	5	£39.95
Paper punch	£11.90	15	£178.50
Highlighter pen	£1.99	50	£99.50
TOTAL COST OF ORDER			£427.65
AVERAGE PRICE			£8.07

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.

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

D	E
4	
6	
24	

-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.



-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.



Important Vocabulary

Information

Data

Spreadsheet

Format

Formula

Accounting

Filter

Software

Tax

Business



COMPUTING: PROGRAMMING

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Y6



Overview

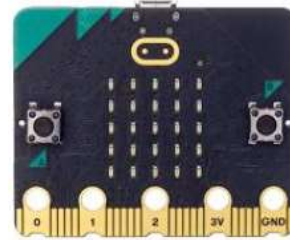


Using Micro:bits

- Programming is when we make a set of instructions for computers to follow.
- Micro:bits are small computers that perform different actions based on programs written on computer software. Programs are then downloaded to the micro:bit.
- Micro:bits have a range of input sensors that can be used as input triggers for different codes to run.
- Output devices on Micro:bits (e.g. LED displays) can be programmed to display words, pictures and numbers.

The Basics of Micro:bits

- **What is a Micro:bit?** A micro:bit is a pocket-sized computer. We can write programs on our computers which can then be transferred to micro:bits to run.
- Micro:bits have an LED light display, buttons, sensors and many input/output features that we can program.



The Parts of a Micro:bit - Front

1. A and B buttons: make things happen.
2. LED Display: shows words, pictures, numbers.
3. Light Sensor: Measures the light that falls onto the micro:bit.
4. Input and Output Pins: Connects the micro:bit to other devices.



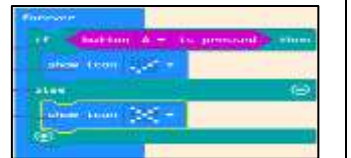
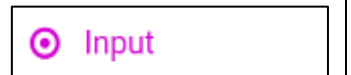
The Parts of a Micro:bit - Rear

5. Temperature Sensor
6. Compass
7. Accelerometer – Detects movement
8. Radio Communication – to communicate with other micro:bits and devices.
9. USB Port – Connects device to computer.
10. Reset Button
11. Battery Socket – to power away from the computer.
12. Processor – The 'brain' of the device.



Using Micro:bit Software

- **Software Interface:** Just like other programming software, the micro:bit interface has programming blocks and a programming area. The emulator gives a simulation for testing code.
- **Basic Blocks:** Can be used to do things like display images, text and pictures on the LED display. They should be placed into the 'on start' or 'forever' blocks.
- **Input Blocks:** Enables the user to create 'triggers' using different parts of the micro:bit device, e.g. 'on button ... pressed.'
- **Logic Blocks:** Allow conditions to be set. E.g. 'If, then, else' blocks allow us to set actions for when certain conditions are met (true), and alternative actions for when they are not met (false).
- **Math Blocks:** Includes numbers and sums in programs. The 'pick random' block can allow different codes to run dependent on the random number generated.



Transferring to Micro:bit

Micro:bit can be connected to the computer using a USB cable.



1. Select 'download'
2. Locate the file in the downloads folder.
3. Copy the file from the MICROBIT drive.
4. Run the program on the micro:bit.



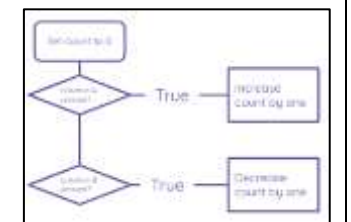
- Micro:bit will only run code that has been downloaded. If code is changed in the editor, it will need to be downloaded again in order to run on the micro:bit.

Sensing Inputs

- There are a number of input sensors on micro:bits, including the buttons, light sensor, accelerometer, compass, temperature sensor and GPIO pins.

- We can create algorithms that enable different codes to run depending upon what is detected by different sensors.

- Remember to trial your programs and to debug them if there are sequence, keying, or logical errors.



Important Vocabulary

Programming

Micro:bit

LED

Sensor

Random

Condition

Accelerometer

Sequence

Emulator

Motion



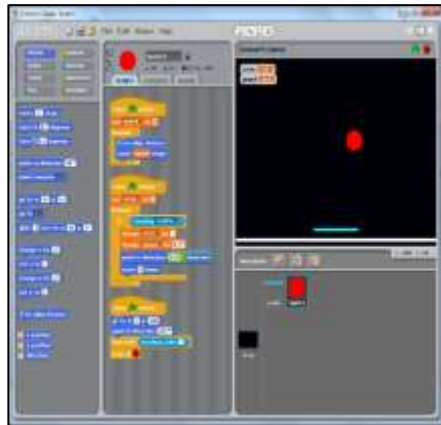
COMPUTING: PROGRAMMING

Y6 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

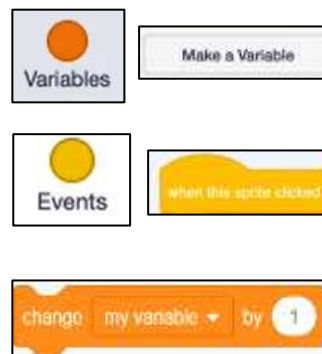
-**Variables:** A variable is something that is changeable. A variable can be set and changed throughout the running of a program.

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

Programming

Variable

Scratch

Events

Code

LED

Algorithm

Motor

Modify

Debugging