

COMPUTING SYSTEMS AND NETWORKS- Connecting Computers

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).

Networks and Network Devices

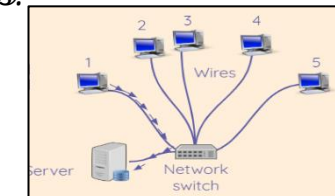
Connections and Networks

- 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.



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.

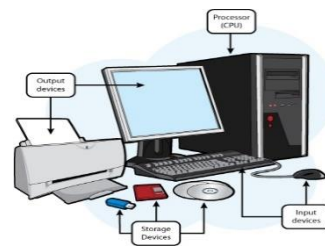
Digital devices have an input, process, output (IPO)

Input: 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.

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!



Important Vocabulary

Digital Device Input Output Process Program Connection Network

COMPUTING: CREATING MEDIA- Stop-Frame Animation

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).



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.

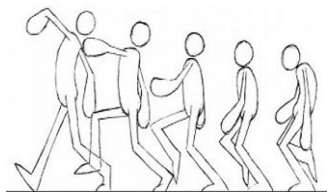
Introduction to Animation

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!

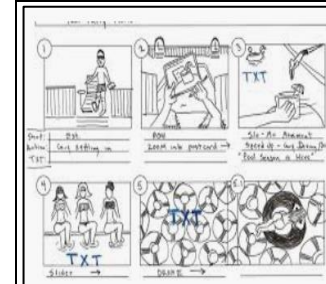


Lots of movies and TV programmes are animated. These include cartoons, and films like *Wallace and Gromit* and *Chicken Run*.

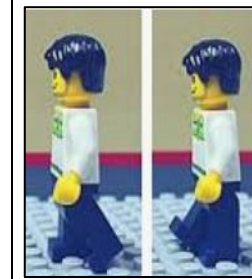
- In recent years, lots of stop-frame apps and programs have been released, which can be used to make homemade animations!



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

COMPUTING: CREATING MEDIA- Desktop Publishing

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.

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*.

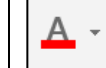
The U underlines the text.



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.

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?

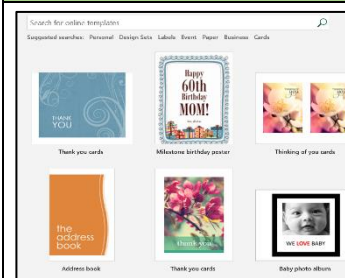


Think about how different colours make us think and feel.

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.

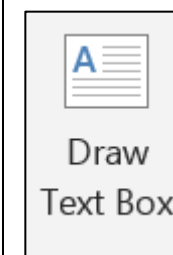
Image and Layout Tools



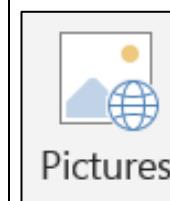
Templates have a pre-arranged layout, colour scheme and style that you can adapt for your needs!



-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.

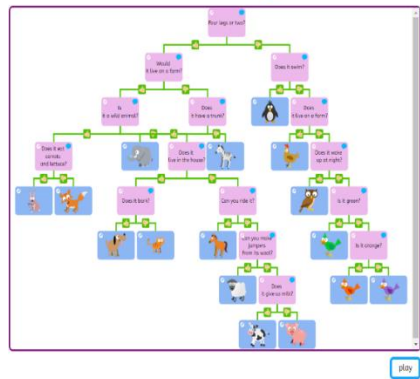
Important Vocabulary

Desktop publishing Text Images Font style Template Orientation Placeholder Copy Paste Layout Purpose

COMPUTING: DATA AND INFORMATION- Branching Databases

Overview

Branching Databases

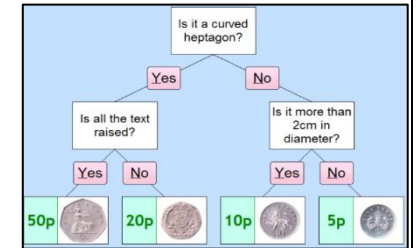


- Data is raw numbers and figures. Information is what we can understand from looking at data.
- Objects can be organised into groups, based on what they are or their different attributes.
- Branching databases can help us to identify objects within sets of data. They are useful when we want to classify objects (consider objects within a certain group).

Branching Databases

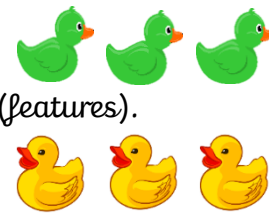
- Branching Databases: A branching database (sometimes known as a binary tree) is a way of classifying a group of objects. If it has been designed correctly, a branching database can be used to help someone identify one of the objects.

- 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.



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.

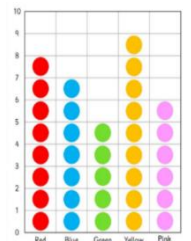
- Multiple Groups: Sometimes, we need to split objects into more than two groups, and so one yes or no question alone is not enough. For example, we may wish to classify animals into the different animal types (mammals, birds, reptiles, amphibians, fish, etc.). We may ask multiple yes or no questions,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

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.



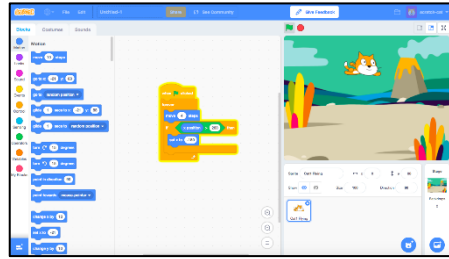
Important Vocabulary

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

COMPUTING: PROGRAMMING- Events and Actions

Overview

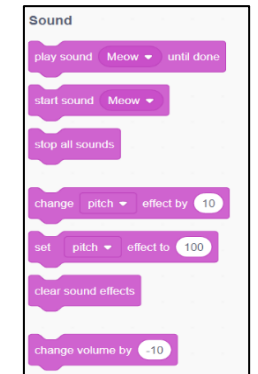
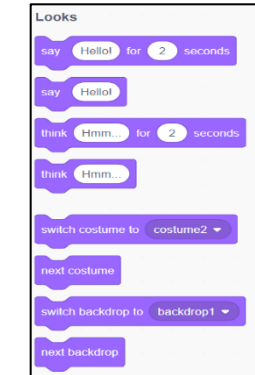
Events and Actions in Scratch



- 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.

Event and Action Blocks

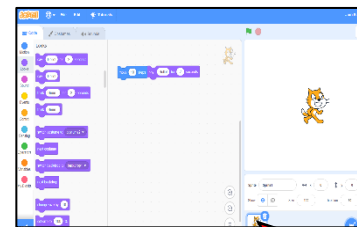
- Event Blocks: Event blocks are coloured yellow and are used to sense different events that happen, e.g. the green flag being clicked, when a key is pressed, or when a sprite is pressed. They are needed for every project.
- Action Blocks: Action blocks include 'Motion' blocks (coloured blue), 'Sound' blocks (pink) and 'Looks' blocks (purple). They make the sprite move, make sounds and change appearance when the event is triggered.



The Basics of Scratch

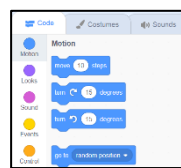
-What is Scratch? Scratch is a website/ app that lets us code our own stories, games and animations.

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

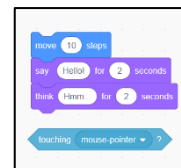


There are three main areas in Scratch:

-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.

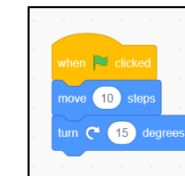
-Backdrops: Backdrops can be added by clicking on this icon (bottom right of the screen, below the stage).



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.

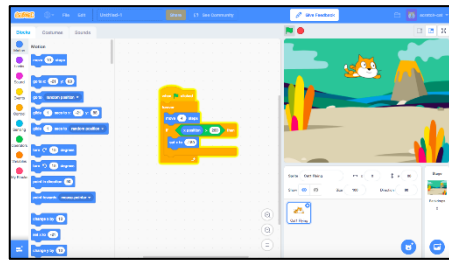
Important Vocabulary

Motion Event Logic Move Resize Extension block Pen Action Errors Test

COMPUTING: PROGRAMMING- Sequence in Music

Overview

Sequencing in Scratch



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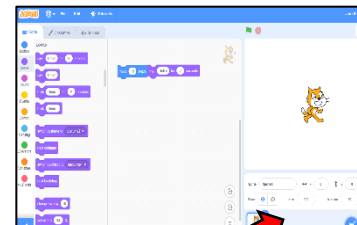


- We use algorithms (a set of instructions to perform a task) to sequence movements, actions and sounds in order to program effective animations.

The Basics of Scratch

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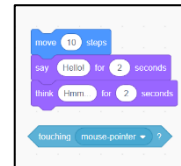


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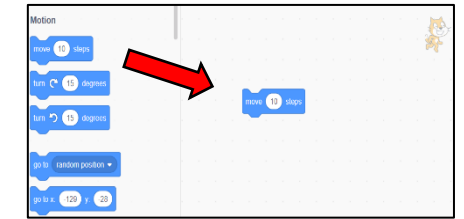
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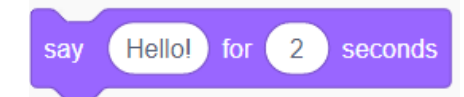


Programming Using Blocks

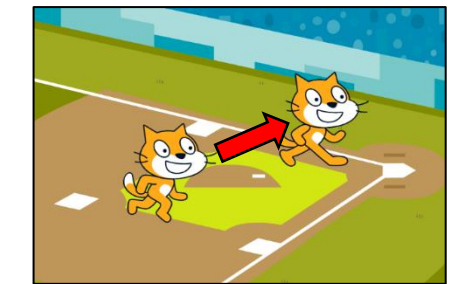
- Basic Programming: Make sure that the feature of the stage that you want to program (e.g. sprite, background) is selected by clicking on it. Drag the block command that you want onto the code area. Blocks can be deleted by right-clicking on the block and selecting 'delete block.'



- 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).

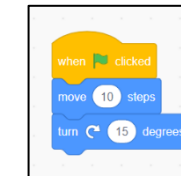


Sequencing and Algorithms

- 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.

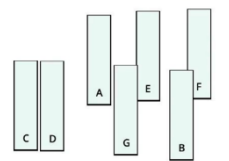
- Event blocks are used to start sequences. They are orange and have a curved shape at the top.



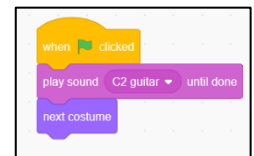
- Designing an algorithm (set of instructions for performing a task) will help you to program the sequence that you require.

Making Music

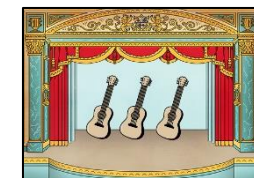
- Several sprites, each following connected sound sequences, can create music!



- 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