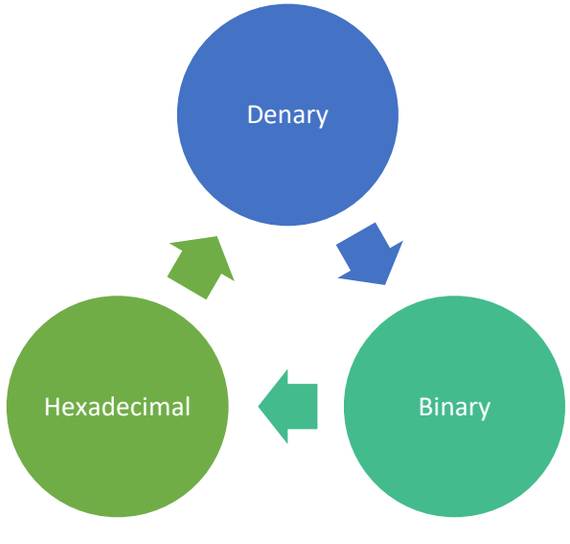
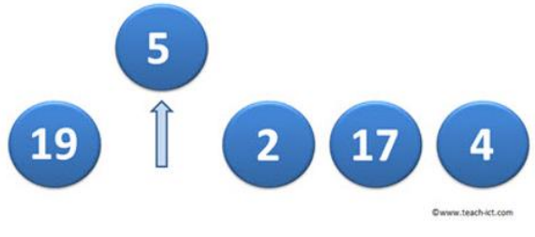
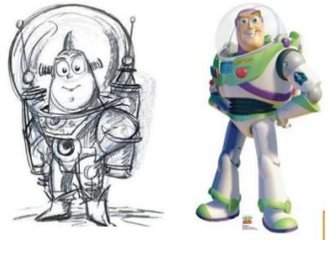
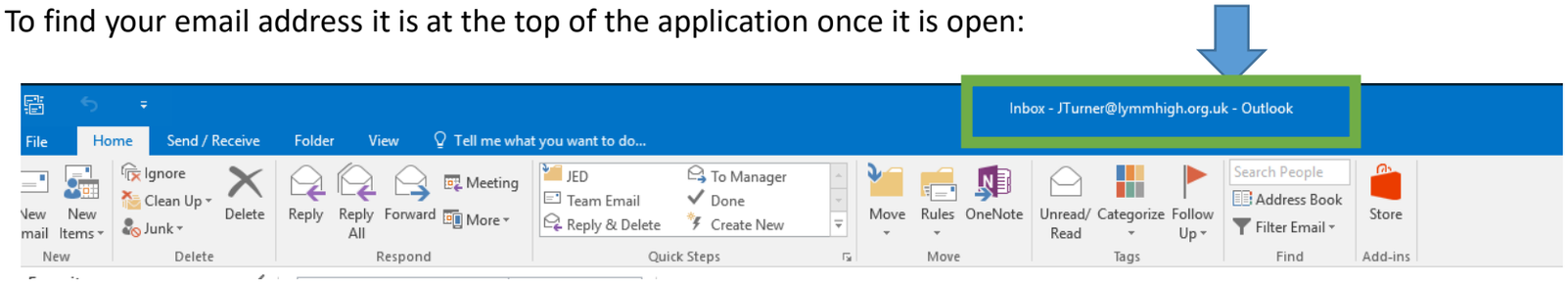
Year 9 IT/Computer Science Knowledge Organiser



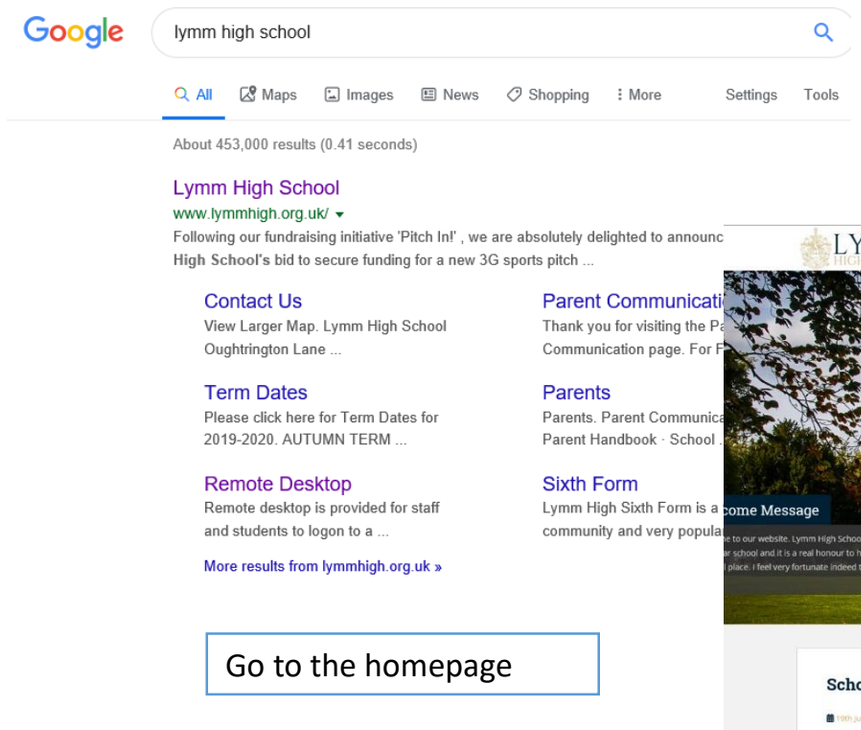




To find your email address it is at the top of the application once it is open:

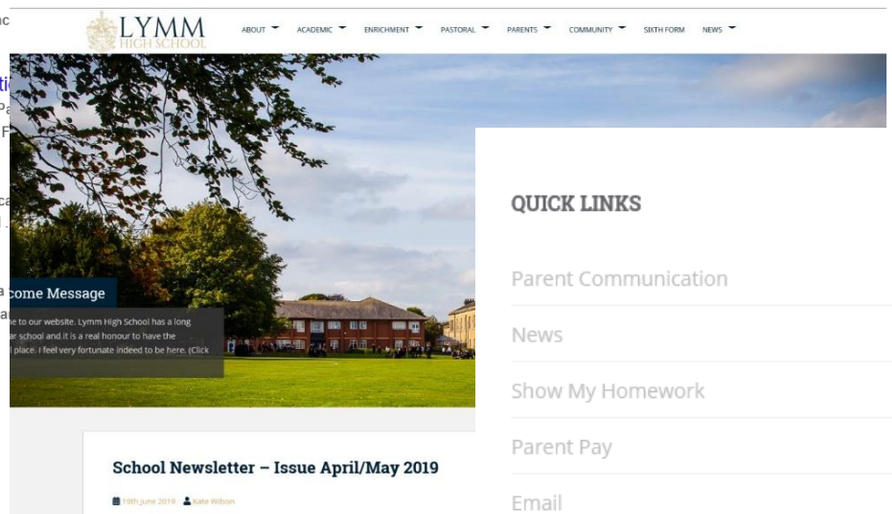


To access your email from home:



Go to the homepage

To access remote desktop from Lymm high home page go to the quick links and select remote desktop:



On the right find the quick links and select email :

Accessing Microsoft Office for free

If you don’t have access to Microsoft Office on your computer, laptop, tablet, phone, or any digital device then don’t worry! You have **a free account** which is connected to your **school email address** and this guide tells you how to do it. Select the device that you have and follow hose instructions:

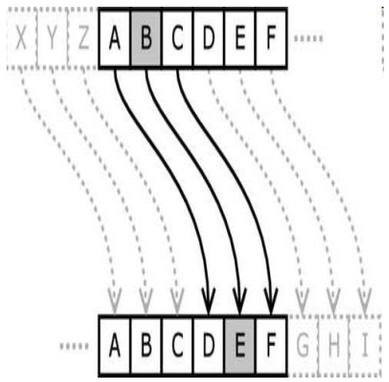
Go to www.office.com and if you're not already signed in, select **Sign in**.
Sign in with the your school email and password.
After signing in, follow the steps that match the type of account you signed in with.
Install it onto your computer.
Once done it will ask you to activate it, select activate and there you have it – Office installed.

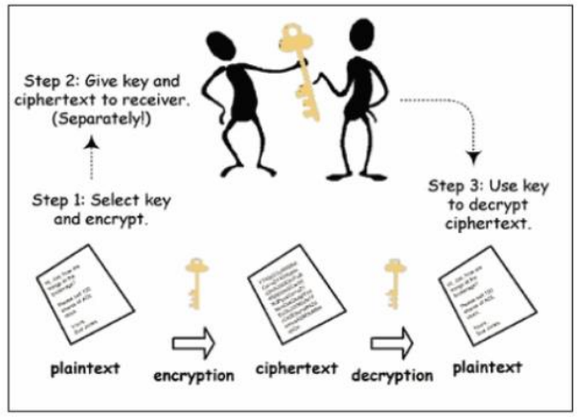
You can use office 365 online without actually installing it onto your computer or laptop, all you need is your school email address and password, go to: https://www.office.com/apps
Click sign in, located top right.
Then you should see all you have access to
This actually saves it to the one drive rather than on your computer.
Therefore, you could access the document in school as well as home.

You will need access to the **app store** for this -
You can install the new Office app that combines Word, Excel, and PowerPoint into a single app, and introduces new mobile-centric features to view, edit and share files without the need to switch between multiple apps. Note that Office mobile app is currently available for **Android** and **iPhone only.**
Or you can install the Office apps individually on your **iPhone or iPad**:

Component 2 computer science

Key terms	Definition
Encryption	Files that are encrypted have been altered using a secret code and are unreadable to unauthorised parties.
Caesar cipher	The **Caesar cipher**, also known as a shift cipher, is one of the oldest and simplest forms of encrypting a message.
Cryptography	The art of writing or solving codes.
Cipher	Put (a message) into secret writing; encode.
Plain text	Text that is not written in code.
Denary/decimal	Numbering system that uses base 10 (0-9) our normal numbers that we use every day.
Binary	Numbering system that uses base 2 (0s & 1s) this is the only language a computer understands.
Hexadecimal	Numbering system which uses base 16 (0-9 and A-F) these are used to represent colours and code.
Binary logic	Processing based on the binary numbering system.





Caesar Cipher

Named after Julius Caesar, it is one of the oldest types of ciphers. It is considered a weak method of cryptography, as it is easy to decode the message owing to its minimum security techniques.
Advantages of using a Caesar cipher include:

- Use of only a short key in the entire process
- Requires few computing resources

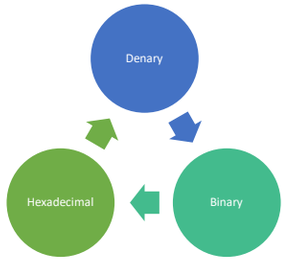
Disadvantages of using a Caesar cipher include:

- Simple structure
- Frequency of the letter pattern provides a big clue in deciphering the entire message

Common pseudocode notation

There is no strict set of standard notations for pseudocode, but some of the most widely recognised are:

- **INPUT** – indicates a user will be inputting something
- **OUTPUT** – indicates that an output will appear on the screen
- **WHILE** – a loop (iteration that has a condition at the beginning)
- **FOR** – a counting loop (iteration)
- **REPEAT – UNTIL** – a loop (iteration) that has a condition at the end
- **IF – THEN – ELSE** – a decision (selection) in which a choice is made
- any instructions that occur inside a selection or iteration are usually indented



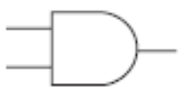
Decimal (Base 10)	Binary (Base 2)	Hexadecimal (Base 16)
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

Units of storage

Size	Equal to
4 bits	1 nibble
8 bits	1 byte
1024 bytes	1 kilobyte
1024 kilobytes	1 megabyte
1024 megabytes	1 gigabyte
1024 gigabytes	1 terabyte
1024 Terabytes	1 petabyte

Logic Gates

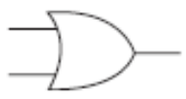
AND – Conjunction



Notation used
∧ e.g. A ∧ B

A	B	A ∧ B
T	T	T
T	F	F
F	T	F
F	F	F

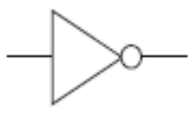
OR - Disjunction



Notation used:
∨ e.g. A∨B

A	B	A∨B
T	T	T
T	F	T
F	T	T
F	F	F

NOT - Negation



Notation used:
¬ e.g. ¬A

A	¬A
T	F
F	T

Binary conversions

Remember: to convert from binary to denary you only add the switches that are on (1)

128	64	32	16	8	4	2	1

Remember: to convert from denary to binary you would turn the switches on if the number fits into the column by placing a 1 if the numbers doesn't fit then it is a 0.

Converting from hex to denary

- Put the first number into a binary nibble and then put the second number into a nibble.
- Put the two nibbles together
- Convert to denary/decimal

What is the denary value of hex value 2D?

- Find the number into a nibble:
- 2 = 0010 and D = 1101
- Put the two nibbles together:
- 00101101
- Convert to denary/decimal:
- 32+8+4+1 = 45

Binary to Hexadecimal

- 45 in binary is 32 + 8 + 4 + 1

128	64	32	16	8	4	2	1
0	0	1	0	1	1	0	1

- Split this into two nibbles and treat each as a 4 bit binary number

8	4	2	1	8	4	2	1
0	0	1	0	1	1	0	1

2 denary = 2 hex | 13 denary = D hex

Hexadecimal to Binary

Convert A5 in hexadecimal to binary

A = 10 in denary

ten in binary is:

8	4	2	1
1	0	1	0

5 = 5 in denary

5 in binary is:

8	4	2	1
0	1	0	1

Joining them both together = **10100101**

Make sure you put them in the correct order!

Denary to Hexadecimal

- 235 denary number
- Step – convert to binary: 235 in binary is 128 + 64 +32 +8 +2 + 1

128	64	32	16	8	4	2	1
1	1	1	0	1	0	1	1

- Step 2: Split this into two nibbles and treat each as a 4 bit binary number

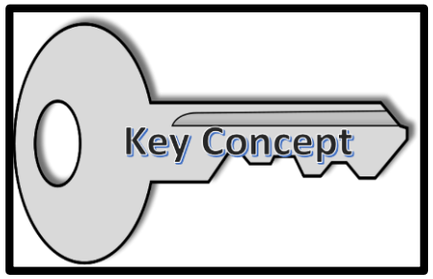
8	4	2	1	8	4	2	1
1	1	1	0	1	0	1	1

13 denary = E hex | 11 denary = B hex

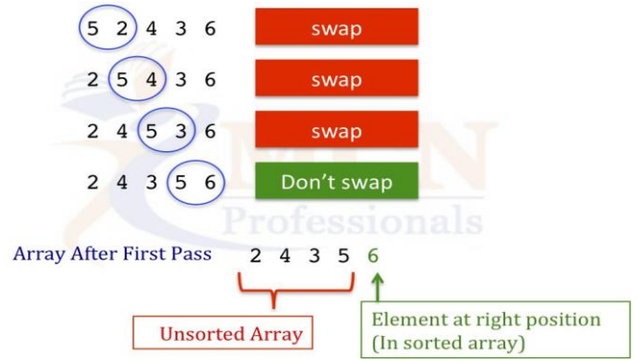
Year 9 Algorithms

Key Words

Algorithms
Sorting
Bubble Sort



Bubble Sort

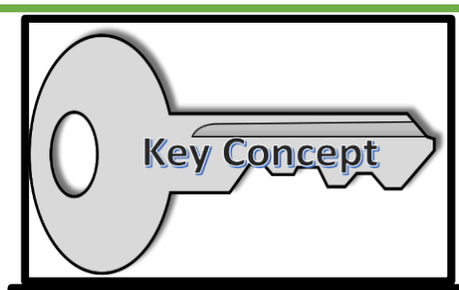


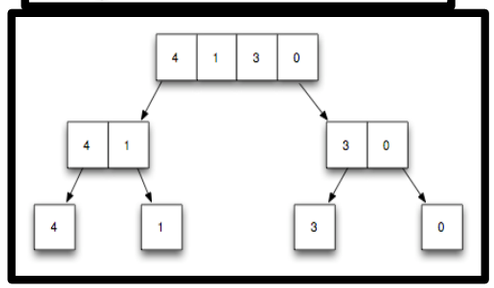
Advantages
Simple to write the code for.
Simple to understand.
The data is sorted in the same memory location that it is held, so you don't need much extra memory to run the algorithm.

Disadvantages
One of the slowest ways to sort a list. For example, if the list becomes ten times larger than before, it takes almost a hundred times longer to sort. So this method of sorting is very sensitive to the length of the list.

Key Words

Algorithms
Sorting
Merge Sort





Merge Sort

Merge sort – a list is split into individual lists, these are then combined (2 lists at a time).
To merge lists:
- Split all elements into individual lists.
- Compare the first element in both lists.
- Put the smallest into a new list.
- Compare the next element of 1 list with the second element of the 2nd list.
- Put the smallest into a new list.
- Repeat until merged.

To complete a merge sort:
- Split all elements into individual lists.
- Compare the first element in both lists.
- Put the smallest into a new list.
- Compare the next element of 1 list with the second element of the 2nd list.
- Put the smallest into a new list.
- Repeat until merged.

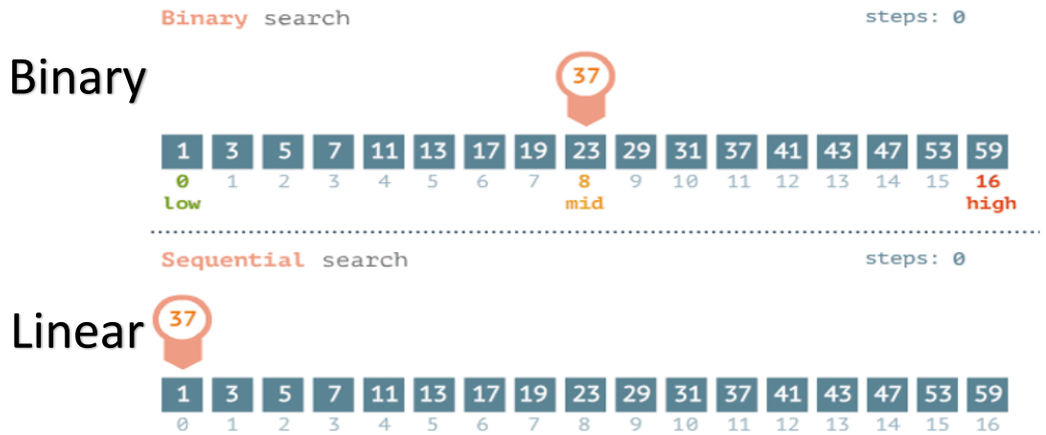
Advantages
It's the fastest of the three types of sort (bubble, insert, merge)
It is the best option to use for long lists of data (more than 1000 long)
Disadvantages
More complicated to code compared to bubble and insert
It may use twice the memory size of the list – depending on the way it's coded. This becomes important if the list is millions of items long.

Year 9 Algorithms

Key Words

Binary
Linear
Searching
Algorithms

Binary and Linear Searching



Linear search - Linear search looks for an item within a data set by starting with the first item in the set and comparing it to the search criteria. If no match is found, then the next one is compared. This continues until a match is found or the end of the set is reached.

Advantages

Performs well with small and medium-sized lists
The data set does not need to be in any particular order (some algorithms need an ordered list)
It doesn't break if new items are inserted into the list.

Disadvantages

May be too slow to process large lists or data sets
If the search criteria only matches the last item in the list, the search has to go through the entire list to find it.

Binary Search

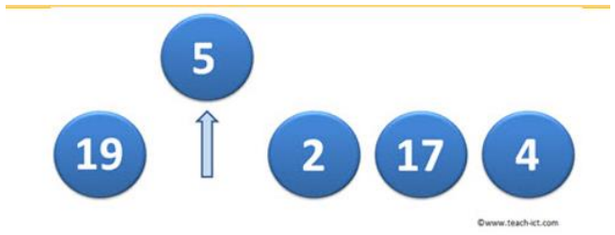
Step 1 – count how many are in the list
Step 2 – add one and divide by 2 (always round up)
Step 3 – The algorithm checks that the value at that places matches the value we are looking for, if not it checks whether it is larger or smaller that the value – it discards the half that doesn't contain what it's looking for

Advantages

Very good performance over large ordered lists.

Disadvantages

Binary search can only work on an ordered list.
If it is a constantly updated list with items added or removed, the list will need re-ordering every time.



Insertion Sort

Look	Compare	Repeat
Look as the 2nd item in a list.	Compare all the items before it (in this case the 1st item) and insert the number into the right place.	Repeat step 2 for the third, fourth, fifth, etc. items until the last number in the list has been inserted to the correct place.

Advantages

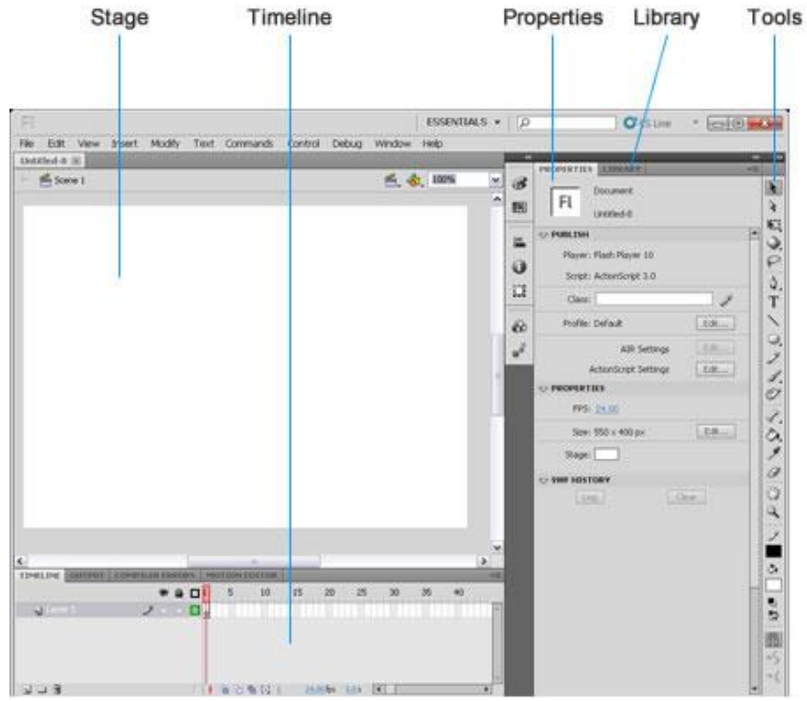
Simpler to code than a merge sort
Useful for small lists that only take a very short time to sort
Faster to process a small list than using a bubble sort

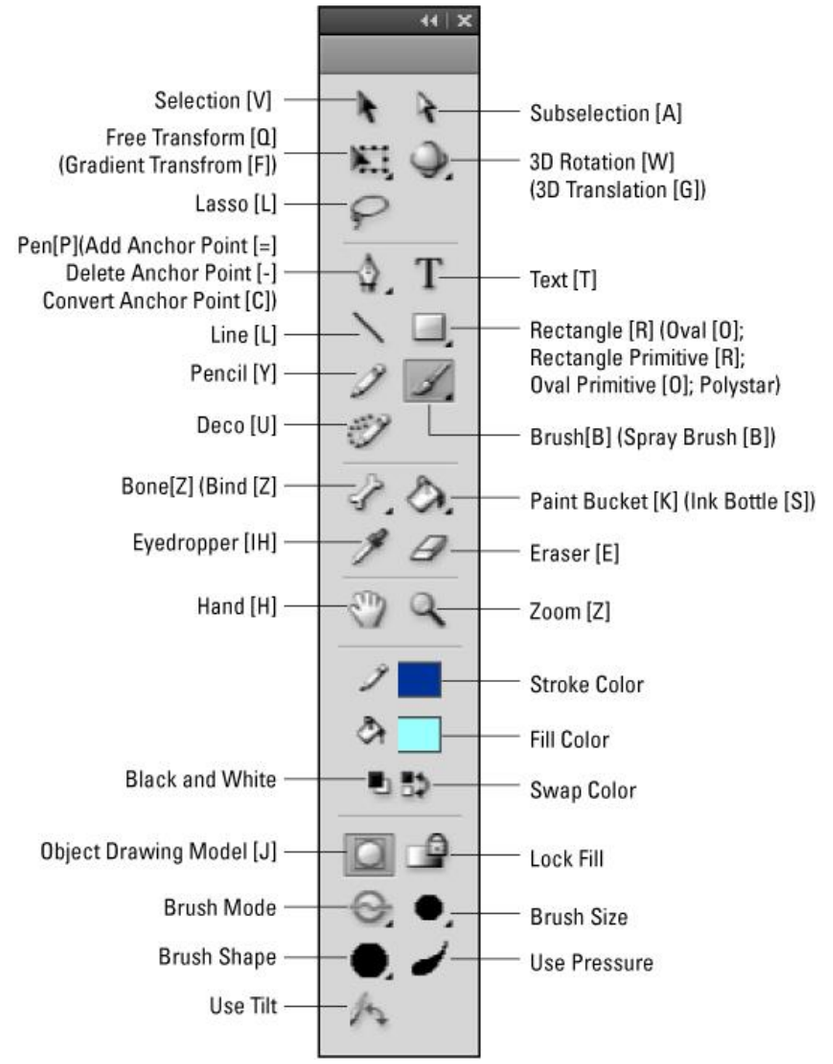
Disadvantages

Not efficient with large lists - merge sort would be a better choice

Year 9 Animations in Flash

Key term	Definition
Free transform	Use the Free Transform tool to scale, rotate, or skew an image or selected piece.
Timeline	The Timeline is similar to a strip of film for a movie. It is broken into individual frames that show events and actions. Just as you could lay one strip of film on an other, you can have layers in the timeline, such that both are seen in the movie.
Animation	The technique of photographing successive drawings or positions of puppets or models to create an illusion of movement when the film is shown as a sequence.
Keyframe	A keyframe is a frame in Adobe Animate CC where a new symbol/image appears in the Timeline.
Stage	The area in Flash used to create or edit designs.
Layers	Layers help you organize the artwork in your Adobe Animate CC document. You can draw and edit objects on one layer without affecting objects on another layer. In areas of the Stage with nothing on a layer, you can see through it to the layers below
FPS	The frame rate (the speed at which the animation in Adobe Animate CC is played) is measured by the number of frames per second (FPS). A frame rate that is too slow makes the animation appear to stutter (stop and start), while a frame rate that is too fast blurs the details of the animation.
Onion Skin	Use Onion skinning to compare the previous and next frames and adjust the objects in the current frame
Vector	Vector graphics is the creation of digital images through a sequence of commands or mathematical statements that place lines and shapes in a given two-dimensional or three-dimensional space.
Anchor Point	Use the anchor points of the connecting segments in the asset to display direction handles, which consist of direction lines that end in direction points. The angle and length of the direction lines determine the shape and size of the curved segments. Move the direction points to reshape the curves.
Stop Motion	Create the illusion of motion by playing frame by frame designs at a high rate of speed
Frame	A Frame is a single time-slice of the Flash movie. It is a similar concept to a frame of a motion picture. Frames are seen in the timeline.
GIF	A lossless format for image files that supports both animated and static images.
Tweening	Well, a tween in Adobe Flash is basically an animation command. It allows the animator to animate an object without drawing all of the individual frames of a traditional animation. There are three types of tweens in Adobe Flash CS4- classic tween, shape tween, and motion tween. Each tween creates a different effect.
Shape Tweenings	A reshape, resize, recolour and relocate tool built into Flash which changes shapes into different ones.
Assets	An item of property owned by a person or company – in regards to animations an asset might be an image or text.
Motion Tweening	Motion tweens are used to create animation movements within Animate. Motion tween animation is created by specifying different values for an object property between the first and the last frames. The object properties vary from position, size, colour, effects, filters, and rotation.
Motion Paths	When you position a tween instance across the Stage, you see a motion path for that animation to appear on the Stage. Motion path is a line that represents the spatial movement of the tweened instance. Its dots (sometimes called "tween dots" or "frame dots") represent the position of the target object along the path on the timeline.





python™

Key term	Definition
Python	A programming language which is quite close to English!
Programming	The process of writing computer programs.
Code	The instructions that a program uses.
Sequence	Parts of the code that run in order.
Selection	Selects a pathways through the code based on whether a condition is true
Iteration	Code is repeated (looped), either while something is true or for a number of times
Algorithm	A set of rules/instructions to be followed by a computer system
Variable	A value that will change whilst the program is executed. (e.g.. temperature, speed)
Function	A collection of code that works outside the main program. These are created to speed up programming. They can be called from a single line of code at any time.
Comparative/ relational Operator	When comparing data, an operator is used to solve the equality such as <>, != or ==
Syntax	The punctuation/way that code has to be written so that the computer can understand it. Each programming language has its own syntax.
Data Type	This indicates how the data will be stored.

Data types and Maths	
Data type	**What they mean**
String	This means any combination of keyboard characters (letters, numbers symbols)
Integer	This means any whole number. If the computer knows the data is an integer it can do maths with the data
Real/Float	This means any decimal (fractional) number
Character	This means any single character that you might find on a keyboard.
Boolean	This data type has just two values: True & False.

Symbol	Explanation
	Start or stop
	Decision
	Process
	Input or output

Relational Operators	How They Compare
= (or ==)	Is equal to
<> (or !=)	Is not equal to
<	Is less than
>	Is greater than
<=	Is less than or equal to
>=	Is greater than or equal to

Pseudocode command words

INPUT – indicates a user will be inputting something
PRINT – indicates that an output will appear on the screen
WHILE – a loop (iteration that has a condition at the beginning)
FOR – a counting loop (iteration)
REPEAT – UNTIL – a loop (iteration) that has a condition at the end
IF – THEN – ELSE – a decision (selection) in which a choice is made
Use of **KEYBOARD** and **DISPLAY** are suitable for input and output.
SEND - Sends output to the screen.
RECEIVE - Reads input of specified type.

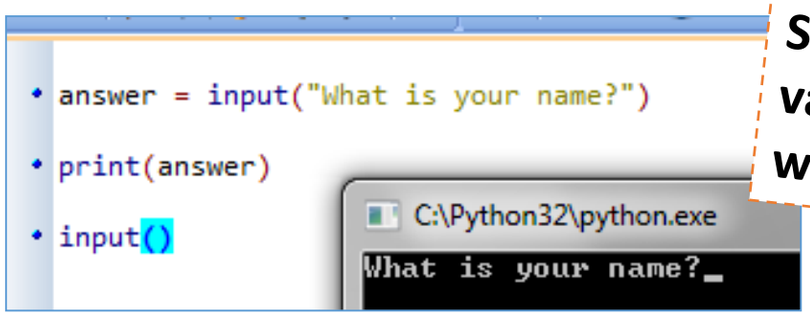
Any instructions that occur inside a selection or iteration are usually indented

Outputs

Inputs and variables

```
input("What is your name?")
```

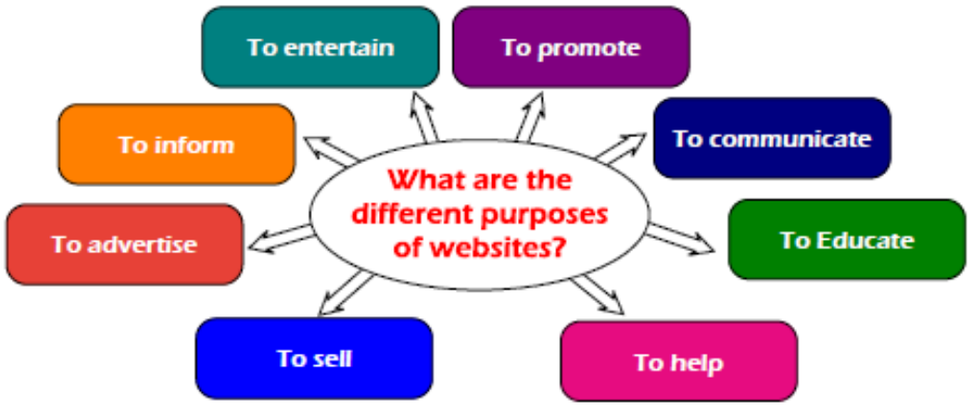
INPUT Displays a message and waits for a user input!

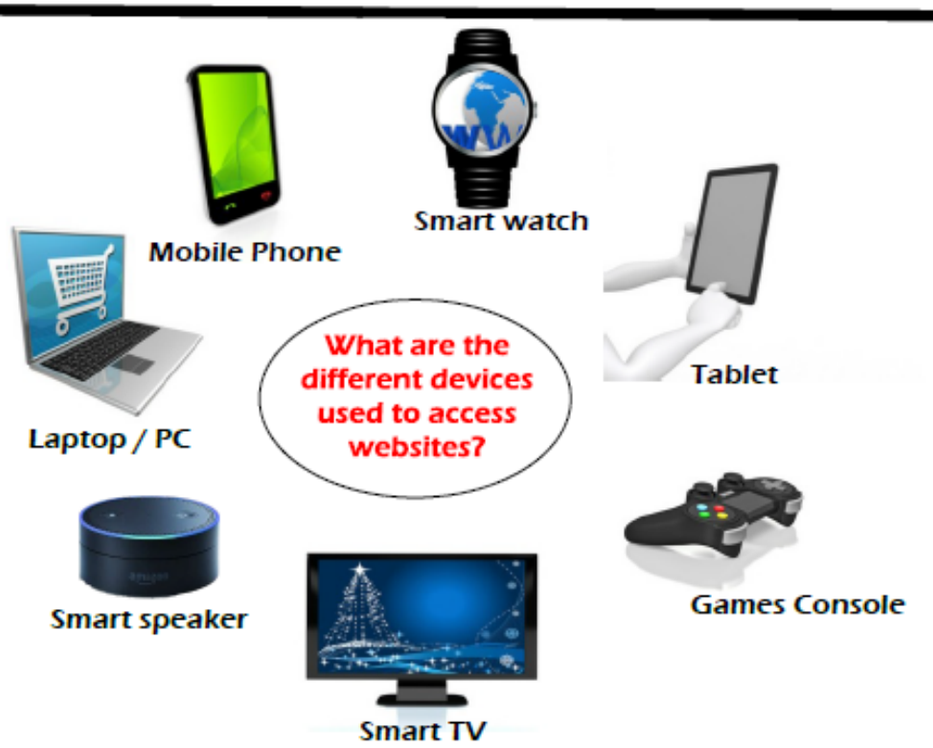


So, it needs to equal a variable if we want to store what the user types in…

Year 9 Web design

Unit R085 Designing a multi-page website - Knowledge Organiser





How does the appearance of websites change on different devices?

1. The screen resolution you are using can change the look of a site.
2. The operating system used can change the look of a site.
3. Fewer images may be used on mobile versions.
4. The web browser used may change things.
5. The orientation can change.

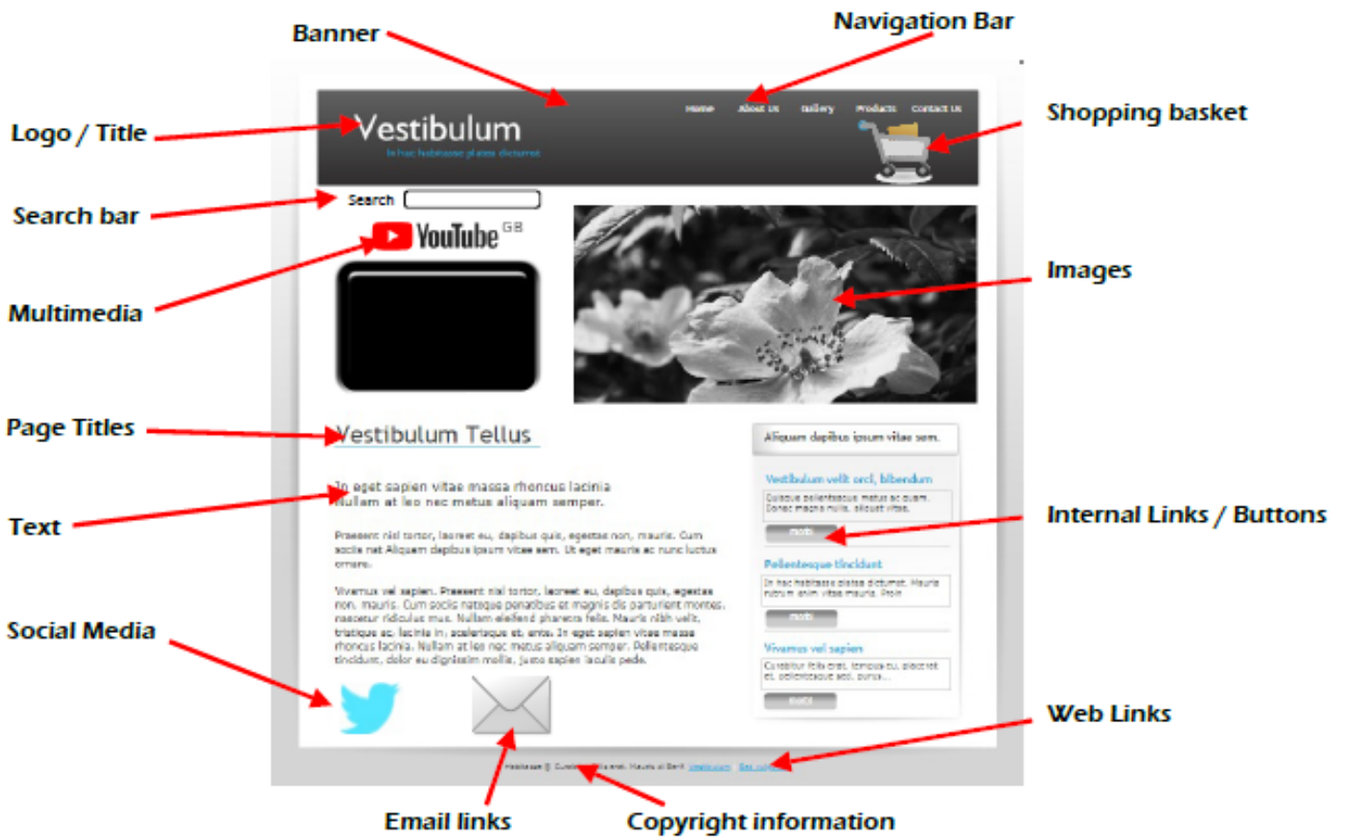
Advantages and disadvantages of using the Internet

Advantages	Disadvantages
1. Easy communication across the world	1. Viruses
2. 24/7 access to information	2. Cyber-bullying / Trolling
3. Entertainment	3. Viruses
4. Online Banking	4. Exposure to inappropriate material
5. Online Shopping	5. Identity theft
6. Learning Resources and information availability	6. Leakage of private information

Which different ways can be used to connect to the Internet?

1. ADSL Broadband over existing phone lines.
2. Cable Broadband -.through cables shared by the TV service
3. Fibre Broadband.- High speed fibre optic cables
4. Ethernet - a cable running from a router / network point
5. Wi-fi - wireless signal from a wireless router
6. Mobile Data 3G and 4G

What are the common features of websites?



Interactive elements: e.g. rollovers, animations, games, adverts, surveys, forums, quizzes, comment boxes, audio files