1 Types and components of computer systems

Why this unit matters

ICT influences what we do, how we travel, what we listen to, how we shop and how we communicate. In offices and classrooms people are using computers. While on the move, people use small hand-held devices. You may notice goods being scanned at the supermarket, or a car attached to a machine that monitors the performance of it's engine.

All Computers Inc. is a large computer supply company. They supply everything from small hand-held computers right up to big computer systems for banks and insurance companies. Many customers find it difficult to make a choice when it comes to buying a computer. This is what some of their customers have said:

There are so many types of computers here. They all seem to do the same thing but some are faster than others, some have keyboards, some don't. I can't tell the difference between a computer costing $100 and one costing $2,000.

If I buy a computer, what else will I need to get? I've heard that I need to buy hardware and software. What does that mean, and how will I know the difference?

I've been looking at the labels that describe the computers. They're a bit complicated. I don't understand what CPU, RAM or ROM are. I need to know about operating systems. I don't know which one I should choose.

Your practical task

All Computers Inc. has decided that it would be helpful if the company had some simple information sheets to describe:

- the advantages and disadvantages of different operating systems
- the different types of computers that are available to buy
- the different types of computers they sell, to help customers decide which is the best computer for them
- the different components of a computer: CPU, screen, keyboard, printer, and external hard drive

They have asked you to produce this information by creating and editing the contents, appearance and layout of documents.

What this unit covers

Sessions		
Theory	1.1	Types of computers
	1.2	Hardware and software
	1.3	The main components of a computer
	1.4	Operating systems
	1.5	The impact of emerging technologies
	1.6	Using a computer system to communicate
		Theory review
Practical	1.7	Document production: Entering and editing data from different sources
	1.8	Internet research
	1.9	Creating a newsletter
	1.10	Communication
		Practical review

By the end of the theory sessions you will be able to:

- identify the different types of computers
- describe a range of emerging technologies
- define what is meant by hardware and software and give examples
- identify the main components of a general purpose computer
- identify operating systems, including those which contain a graphical user interface or a command line interface
- show an understanding of a range of documents that communicate knowledge and ideas

In your practical work you will develop and apply skills in:

- creating, formatting and opening documents using information from different sources
- combining text, images and numeric data in your work
- formatting texts in lists and tables
- saving and printing your work
- communicating using email
- using the internet as a source of information
- performing a mail merge

Types of computers

○ Background

There are many different kinds of computer systems. Some computer systems are very big because they are used to carry out large and complex tasks. Others are small and portable – small enough to put in your pocket – even to wear around your wrist or as a pair of glasses. This session will look at the ways in which various types of computer are used, as well as their characteristics.

Personal/desktop computers

Personal computers, or general purpose computers, are used by individuals for many reasons. Personal computers have various standard components such as a tower, monitor, keyboard, mouse (see Session 1.2 for more detail). Some users create and store documents, some play games, others create music, video and photographic content; the applications are endless. When these computers are being used by only one person at a time, a person who is in control of the **application software** being used, providing any required data and using the processed results with no connection to any other resource, the computer and its use is referred to as being **standalone**. The computer and any related resources, such as a printer, are being used as an isolated workstation.

Often these computers will be connected together in order to share data, programs and other resources such as a printer, application programs or an internet connection. In these cases the computers are considered to be **networked** together. Just think of the computers in your school ICT suite and how resources can be shared. It would be crazy for each computer to have its own printer, or that you always had to work on the same computer because your files were on that computer's hard drive. The sharing of any information resource and devices means that any user is able to provide information to many other users as well as being able to access a wealth of information from someone in the next room, a nearby town or a different country.

In Unit 4 you will discover the advantages and various ways in which computers can be networked.

Laptop computers/netbooks

Laptop computers or notebooks are many people's preferred choice of computer because they offer the same processing capabilities as a desktop computer but are portable. Many families choose to buy a laptop instead of a desktop computer because they take up so little space, can be moved around the house depending on who is using it, and can be packed tidily away. A laptop computer has an inbuilt screen, keyboard and mouse pad, making it completely self-contained. Some people may choose to connect an external keyboard or mouse but leave them at home when using their laptop when they are out. Because a laptop is carefully designed to minimise necessary (physical) space, one problem is the ability to upgrade or add extra components.

Tens of thousands of people carry laptops around every city, every day; business people and students. Like personal/desktop computers, laptops can be used as standalone computers or as networked computers. If you take your laptop to school with you, the Wi-Fi system there connects you to all the school resources and its internet connection. The same is true if you are in a cafe or similar public space with Wi-Fi you have access to their Wi-Fi, and as a result the internet.

Tablet computers

Tablet computers are portable computers with slightly smaller screens than an average laptop. Their defining characteristic is that user interaction is all through touch. There is no mouse or keyboard. Users can swipe, pinch, drag and rotate icons on the screen to activate tasks, control the cursor and input data. The use of solid state flash memory (see Unit 3) means that these devices switch on and are ready for use very quickly.
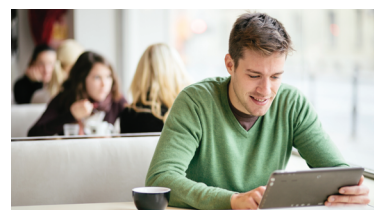
Tablets really exploit Wi-Fi technology because they are devices that many people will use for entertainment while on the move: reading newspapers and magazines; internet browsing; playing games; and watching TV programmes or films. This means that tablets need the fast internet connection that downloading/ streaming video/TV content demand.

Tablets can run the same applications as laptops, so it would be possible to work on a word processed document or a spreadsheet for example. However, the virtual keyboard can be difficult to use for these tasks.

Types of computers

Type of computer	Description	Advantages	Disadvantages
Mainframe computer	These are extremely large computers used in organisations (such as banks and government departments) where very large amounts of data are processed.	• Capable of **processing** very big jobs, which make use of their large memories and fast processor speeds. • Capable of complex problem-solving that would take smaller computers much longer to do.	• Mainframes are so large that they take up almost a whole room. • Complex to set up. • Expensive to operate and maintain and they require specialist staff to operate them.
Desktop or Personal computer (PC)	This is a general purpose computer made up of separate components: • monitor • keyboard • mouse • processor and **storage**.	• Spare parts are often cheap because they are standardised. • They often have faster processors than laptop computers for the same price. • There are fewer problems with overheating than laptops because of their larger size.	• Lack of portability – heavy and separate components are connected by wires. • **Files** have to be copied and stored on portable **disks**, especially if you need to take them with you.
Laptop or notebook	This is a computer where all the components are together in a single unit. This means that they are portable; unlike desktop computers, they can be moved from one work area to another.	• Portability. • Users can work anywhere, especially if they can access **Wi-Fi** (see Unit 4) and link to other media.	• Loss and theft are key disadvantages. • Battery life is limited. • Keyboards and **pointing devices** are not as flexible as those on a desktop. • Laptops are more compact, so overheating can be a problem.
Tablet	Like a laptop this is a small portable computer but the biggest difference is that its user interface is all through touch.	• Portable and easy to use. • Quick to switch on. • Thousands of downloadable applications available.	• Not all have 3G/4G access. • Touch-screen typing can be difficult. • Cannot make phone calls.

Type of computer	Description	Advantages	Disadvantages
Personal Digital Assistants (PDAs)	Small handheld computers with a **touch screen**. Some have traditional keyboards behind or underneath the screen. Others display a keyboard on the screen. Some use handwriting recognition software to enter text. These machines have developed quickly from sophisticated diaries into small and powerful computers that include satellite navigation facilities (**GPS**), mobile phone capability and versions of application software that have a limited range of functions.	• Extremely portable – they fit into pockets and bags. • Usually have bigger screens than mobile phones. • Web and email connectivity. • Often have a **QWERTY** keyboard. • Designed for organising information: diary, calendar, alarm, clock, address book, etc.	• The keyboards are very small, so it makes it difficult to enter text and numbers quickly. • Screen sizes make it difficult to read long documents. • Versions of software (see Session 1.2) that have a limited range of functions may make it difficult to complete tasks effectively.
Smartphones	This is an advanced mobile phone that is combined with the functions of a PDA, with, among other features: **web browsers**, high-resolution touch screens, GPS navigation and Wi-Fi access. Smartphones are often used as media players and cameras.	• Online access to data. • Better web browsing capability than a more simple mobile phone. • Just one device can accomplish many tasks at work or at home. • Contacts' details and phone numbers can be integrated.	• Similar disadvantages to PDAs due to their size. • Costs can be high as most providers want the user to commit to a long-term contract with internet access. • Some webpages may not display or function entirely as the web designer expected.

Activity 1

Look through the list of computer types and think about where you have seen them being used. Discuss with a partner and decide on three reasons why a student might choose a laptop computer rather than a general purpose desktop computer.

You can see in the table above that the devices described become physically smaller. However, many PDAs and smartphones have similar processing capabilities to much larger general purpose computers. Advances in technology mean that smaller devices are increasingly capable of better performance.

Activity 2

We all know that you can make phone calls with a smartphone, but it can do so much more. It adds in features that not too long ago you would have found only on a personal digital assistant or a computer; such as the ability to send and receive email, edit documents and play games. Do some research and determine:
• how a smartphone is different from a conventional mobile phone
• a clear definition of a smartphone
• from a computing perspective, what can a smartphone be used for?
• what is it that makes it smart?

Review and revise

You should now be able to:
• identify different types of computers including the personal or desktop computer, mainframe, laptops, tablets, smartphone and Personal Digital Assistant.

Hardware and software

◉ Background

Computer systems are made up of **hardware** and **software**. Computer hardware is made up of the parts of the computer that you can touch: its physical components. Software is the programs, instructions and data that controls the operation of a computer and enables the computer to carry out a task.

Hardware

When you look at a computer and all the **peripheral devices** that are attached to it, you can see examples of hardware such as:

- monitor
- keyboard
- mouse
- printer
- speakers
- scanner

Some peripheral devices have more than one function. Many people now choose to have their scanner, photocopier and printer together in one device, which are widely known as All-In-One printers. Touch-sensitive screens allow us to use them as input devices as well as output devices (see Session 2.1, page 62).

Having an external hard drive is an excellent way of giving yourself extra portable storage space as well as providing a backup facility.

> **Activity 1**
>
> Can you identify each of the seven examples of hardware listed in this picture?
>
>
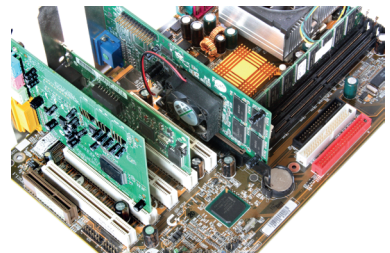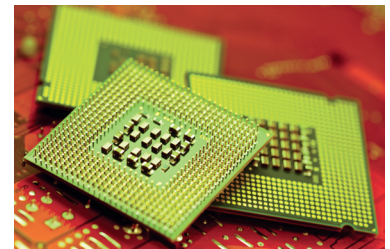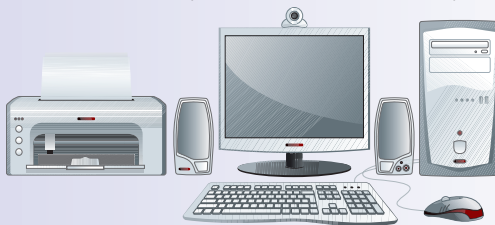
Of course, there are other examples besides the hardware that can actually be seen. There is other hardware that is built into, or inside the computer case (or tower) including:

- **Memory chips** (RAM and ROM – see Session 1.3)
- Processing chips (see Session 1.3)
- A **motherboard** (see Session 1.3)
- Video cards (note the connection sockets such as VGA, HDMI, DVI)
- Sound cards (note the sockets for such hardware as headphone and microphone)
- Internal hard disk drive

There is also computer hardware in devices like mobile phones, **satellite navigation** systems, automatic washing machines and even in car engines.

Real world

VGA connects a PC/laptop to a monitor or data projector.

DVI and HDMIs, although they are slightly different to each other, connect a PC/laptop to a TV, Blu-ray/DVD device, data projectors and satellite TV boxes.

Software

There are two types of software that are used to operate a computer.

System software	These are **programs** and files that make up the computer's **operating system**.
	Examples of **system software** include the software to connect with the printer, that controls the way the screen appears, the software that deletes a file or a folder. These run invisibly in the background so that you can do your work effectively.
Applications software	Also known as **applications programs**. These programs allow users to write letters, solve problems, perhaps using spreadsheet and database software, or to play games.

Examples of applications software

If you look at your computer screen, you should see that there are many different kinds of applications software. You might see examples of the following software (you are likely to have many more):

- word processing
- presentation software
- modelling software – spreadsheets
- data-handling software – databases
- desktop publishing
- video editing software
- apps

Activity 2

Complete the following table by deciding whether the listed software is either applications or system software and then give a description of what it does. You might need to search for some answers on the internet.

Software for…	Applications/System	What does it do?
Word processing	Application	Creation of reports/letters/posters/flyers
Anti-virus software		
Spreadsheet		
Operating system		
Internet browser		
Photo-editing software		
File manager		
The programming language 'Scratch'		
Printer driver		

Review and revise

You should now be able to:
- identify a variety of hardware components
- describe the key elements of hardware and the difference between hardware and software
- describe the difference between system and applications software
- give examples of applications software.

Tip

See Session 1.8 for information and advice about internet research.

Tip

When referring to applications software, it is better if you can describe what the software does rather than just knowing the name of the software. No marks will be awarded for using brand names of software packages or hardware.

The main components of a computer

Background

Computer systems also include a processor and memory. Computer systems are made up of many devices. In the last session reference was made to peripheral devices such as keyboards and printers. Some devices, such as keyboards and scanners, are used to input data to a computer. Other devices, such as a printer or speakers, are needed so that we can understand the output from a computer. A range of input and output devices are explored in detail in Unit 2.

Peripheral devices such as these provide data for the **processor** or **central processing unit (CPU)** to work with and then to communicate the results of that processing. Without a processor there would be no computer system, the data you entered would have nothing done with it – no processing would have taken place. This session looks at the processor itself – the 'brain' of a computer system.
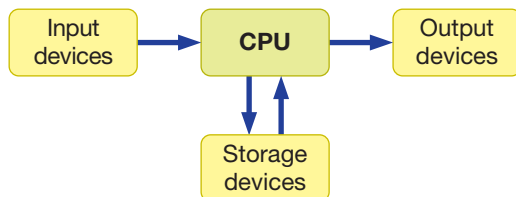
Motherboard

A **motherboard** (sometimes known as the mainboard or system board) is the main circuit board found in a computer. It holds the crucial electronic components of the system, such as the processor (CPU) and main memory. It also provides connectors for other peripherals such as video and sound cards, and USB devices such as a mouse. The non-volatile memory that holds the system BIOS will also be directly attached to the motherboard. This is true not just for your desktop computer but also laptop/tablet and even your mobile phone. If the processor is the 'brain' of the system, then the motherboard is certainly the 'spine' onto which all other devices are connected.
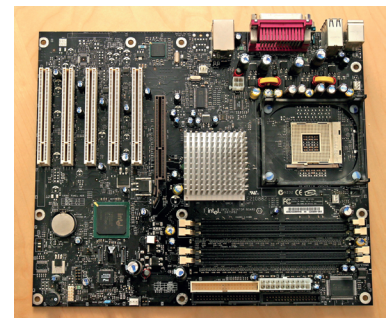
Processor – Central Processing Unit (CPU)

The processor is at the centre of a system, between input, output and storage devices, and is known as the Central Processing Unit (CPU). Storage devices are explained in Unit 3.

```
Input          ┌─────┐          Output
devices  ────► │ CPU │  ────►    devices
               └─────┘
                 │ ▲
                 ▼ │
               Storage
               devices
```
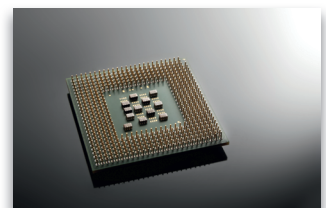
The processor:
- interprets and executes commands from the computer's hardware and software
- is a single **integrated circuit**, also found in many devices that involve control and monitoring (like an engine management system in a car, or the automatic stopping systems in trains).

Microprocessors

The processor of a device is designed for a general purpose and is able to run any sort of program. However, a **microprocessor** (see photo on the right) is a special form of CPU, used in microcomputers and small computerised devices. It is important to remember that when they are used in small computerised devices, they are designed to carry out a specific task and will only ever carry out that task, such as the control circuit of a burglar alarm.

All the computers introduced in Session 1.1 such as mainframes, laptops and smartphones can perform a wide variety of tasks; they can be programmed to a great extent. In comparison, a washing machine is just a washing machine and will have a limited number of functions for which it was designed – washing your clothes.

There are many devices in the home that are controlled or powered by a microprocessor, but are designed, programmed and built to fulfil only a specific task, for example, a refrigerator, microwave oven or DVD player.

Activity 1

Some devices in the home that are fitted with microprocessors are known as labour-saving devices – they perform functions that, without the technology, we would have to do ourselves. Can you identify which of the following household devices that use microprocessors are labour-saving?

Dishwasher　　Oven　　Television　　Burglar alarm　　Washing machine　　Toaster　　Central heating system

Main memory

The **main memory** of the computer stores all the data and instructions that enable the computer to function. There are other names for the main memory:

- internal memory
- central memory
- primary memory

There are two types of central memory

RAM (Random Access Memory)

- RAM is an internal memory chip where data is stored temporarily when applications are running. If your program is large, such as *Word* or *Photoshop*, you might notice that it takes a while to load. This is because it is being brought from your computer's hard drive (where it is stored) into RAM. From here the processor can rapidly respond to instructions, as the program is immediately accessible in RAM.
- RAM can be both read and written to.
- RAM is volatile (temporary), because its contents are lost when the power is turned off.

ROM (Read Only Memory)

- ROM stores data or instructions that need to be permanent.
- Permanent memory is used to store the processes that the computer needs to go through when it is switched on.
- ROM retains its contents when the power is switched off.
- It is also known as non-volatile or permanent memory.

An important use of ROM is to store the software that allows a machine to start up successfully. This software is known as **BIOS**, or **B**asic **I**nput and **O**utput **S**ystem, and it loads and runs the boot file (the start-up instructions).

When the computer is switched on, BIOS starts the boot file sequence, which:

- checks that all the hardware devices are attached and are working properly
- copies the operating system to the RAM
- stores the date, time and system configuration on a battery-powered non-volatile chip known as a **CMOS** (a **C**omplementary **M**etal **O**xide **S**emiconductor).

> **Real world**
>
> Main memory is referred to by a number of different names, but the important point to remember is that this memory, although not physically part of the CPU, is directly connected to it, and because of this it really is **central memory**.

> **Tip**
>
> Do not confuse ROM, which is a part of the computer's internal memory, with CD-ROMs and DVD-ROMs, which are optical storage devices with enormous capacity – see Unit 3.

> **Tip**
>
> Remember that RAM and ROM are referred to as central memory.

Activity 2

The RAM component of computers is gradually getting bigger and bigger – in 2005, RAM would typically have been about 500 MB, in 2011 around 4 GB (or 4000 MB) was normal and by 2014 8 GB (8000 MB) had become common. What is the reason for this? What advantages does having larger amounts of RAM offer the user?

Secondary or backing storage devices

Storage devices are used to store programs and data when the computer is switched off. It is important that you do not confuse memory with backing storage. Remember that internal (main) memory is **inside** the computer connected to the CPU. **Backing storage** (with the exception of the internal hard drive, inside the computer case) is **outside** the computer (external) and can be moved from one computer to another – it is a **peripheral**. For example, portable hard discs, CD- and DVD-ROMs, memory sticks and flash memory cards.

Storage devices are sometimes called:
- backing/backup storage or backing/backup store
- **secondary storage**
- external storage.

Why have internal *and* external storage?

It is important to realise that the computer works very fast when instructions and data are immediately accessible to the processor. If the processor continually had to transfer instructions and data to and from external devices, such as a hard drive, and RAM, it would slow down processing tremendously. That is why computers have RAM in increasingly large capacities.

External storage is still needed though. RAM is volatile storage and its contents are lost when the computer is switched off. We need to store that data or those programs somewhere safe. There are also many times when we need to take a file and use it on another computer – you may use a pen drive to work on files at school and then take them home to complete for homework. You could not do that if the files were stored in the computer at school – you would also always have to work at the same computer and the computer could never be turned off!

Input and output devices

You will learn more about input and output devices in Unit 2, but it is useful be able to identify the differences. The devices you have learnt about so far can be divided into two categories:
- Input devices are those that are used to put information into the computer.
- Output devices are those that take information from the computer for other uses.

Some examples of input and output devices are listed below:

Input devices: keyboard, mouse, webcam

Output devices: monitor, printer, speakers

Activity 3

Give a brief explanation of the type of inputs and outputs that each of the devices above are used for. For example: *A webcam inputs moving images of the person using the computer for video or video messaging.*

Review and revise

You should now be able to:
- describe the main components of a typical computer system: motherboard, central processing unit (CPU), main/internal memory (including ROM and RAM), input devices, output devices and secondary backing storage
- explain the difference between internal and backing storage.

Operating systems

● Background

Operating systems are made up of software that allows users to interact with the computer system. Operating systems have a number of key functions:

● controlling the input, output and backing storage devices
● loading, running and storing applications programs
● handling errors that occur in applications programs
● maintaining the security of the computer system
● keeping a log of computer usage
● managing the **user interface** so that the user can communicate with the computer system.

User interfaces

A user interface allows the user to interact effectively with the computer system. There are two main types of user interfaces:

● **Command Line Interface** – CLI
● **Graphical User Interface** – GUI.

Command Line Interfaces

CLIs are often seen in specialist systems, where users type instructions for activities like opening or saving a file. Users have to learn and remember commands that have to be typed in for even the simplest of actions. In a PC with the Windows 7 operating system, you can access the CLI by following the menu options: **All Programs > Accessories > Command Prompt**. In Windows 8 you will need to find the **cmd** app. On a MAC OS X you need to access the Applications folder and choose **Utilities > Terminal**.

```
Command Prompt                    –  □  ×

C:\Users\stobart>dir d:
 Volume in drive D is Audio CD
 Volume Serial Number is 0102-9CF0

 Directory of D:\

01/01/1995  01:00                 44 Track01.cda
01/01/1995  01:00                 44 Track02.cda
01/01/1995  01:00                 44 Track03.cda
01/01/1995  01:00                 44 Track04.cda
01/01/1995  01:00                 44 Track05.cda
01/01/1995  01:00                 44 Track06.cda
01/01/1995  01:00                 44 Track07.cda
01/01/1995  01:00                 44 Track08.cda
01/01/1995  01:00                 44 Track09.cda
               9 File(s)             396 bytes
               0 Dir(s)                0 bytes free

C:\Users\stobart>
```

Command line instruction **dir d:** which lists the contents of a CD in drive d:

Advantages of CLIs are that the user communicates directly with the computer and can make decisions about exactly what they want to see happen.

Disadvantages of CLIs are that typing in commands can be very slow and relies on the user remembering the way that commands have to be given to the computer. They can be difficult to edit or change.

Graphical User Interfaces

GUIs use pictures and symbols rather than having to type in a number of commands. All the commands that would have been typed in using a CLI are already programmed into the GUI. This means that users do not have to learn and remember a lot of commands – they just need to know what actions the **icons** represent.

You can see GUIs on your Mp3 players, gaming devices, digital cameras and mobile phones as well as on your computers. The type of GUI will depend on the device you are using.

One of the most common GUIs is the **WIMP** interface. WIMP stands for Windows, Icons, Menu and Pointing device. It uses a mouse (or similar device) to control a cursor, which can be used to select icons that open and run programs. Many programs can be selected to run at the same time.

To make it easy to find programs that are open and running, the operating system places each file in a separate **window**. Many windows can be displayed at the same time. This might make it difficult to work with, so it is possible to 'minimise' a window to the area at the bottom of the screen: the program stays open, but you can choose when to bring the window up on the screen again.

In this GUI, you can see that there are:

1 17 icons that will open programs or files
2 windows that have been minimised to the tray at the bottom.

A number of windows have been opened and then minimised. They are highlighted to show that they are open:

3 web browser
4 email program
5 word processing file
6 folder

There are other icons in the tray.
These can be clicked on to open:

7   start menu
8   another web browser
9   spreadsheet program
10 presentation program
11 text editing program

Touch screens

There are other GUIs that do not rely on a cursor to select an icon. You have probably seen, and used, a touch-screen device to select icons, open programs and change the layout. This operation is known as post-WIMP interaction, because it was developed after WIMP.

Touch-screen devices are newer, allowing users to scroll, pinch (choose and resize) and rotate images and documents using fingers and thumbs. This type of action would be difficult using a simple mouse. Touch screens are a common feature in small, portable devices. They are becoming popular on large desktop screens, on laptops and are the primary way of operating tablet computers.

Key differences between CLIs and GUIs

CLIs tend to be used by technicians and specialists who need access to all areas of the computer. Knowing the different commands enables technicians to look after the computer system, and to make changes.

Because GUIs use icons, users need only limited knowledge to carry out complex activities. GUIs have been developed in such a way so that young children can use them. However, users can only access programs or carry out activities that have icons allocated to them; without a visible icon in a GUI, users will not know how to access it.

Activity 1

There are many operating systems in use. *Windows*, *Linux* and *MAC OS X* may be familiar to you, but there are others that are in everyday use on mainframe computers and the latest smartphones.

Create a table like this:

Operating system	Computer type/size		
	Mainframe	Desktop	Smartphone
Windows			
OS X			
WindowsCE			
Linux			
Unisys OS 2000			
Android			
z/OS			
iOS			

Find out what type and size of computer the listed operating systems are designed for and place a tick in the appropriate column. Find one more operating system for each computer type/size.

Review and revise

You should now be able to:
- understand the function of an operating system
- describe the difference between CLIs and GUIs.

The impact of emerging technologies

Background

General developments, such as the way that storage capacity changes, drive the development of smarter devices because more can be squeezed into a smaller space, but the technology and how we interact with it remains largely the same. It takes a real innovation to shift the way technology is used. For example, in the late 2000s the introduction of touch technology (properly called capacitive touch) changed the way in which we interact with, and therefore control, technology.

The idea of being able to touch/swipe/pinch our way through a TV listing, an email, a webpage or a photograph album would have been an extraordinary idea before the iPhone hit the stores in 2007 (although touch-screen technology had been around for a number of years before that). Apple's iPad and the resulting rush of tablet computers have shifted our use of technology.

This session will explore some of the emerging technologies that are breaking into, and having an impact on, our everyday life.

> **Tip**
>
> Keep an eye out for new or emerging technologies and gadgets as they are launched. Examiners will award marks if you can demonstrate that you are aware of the latest developments.

Security

All students entering examination halls may soon find themselves submitting to technology applying the latest in **artificial intelligence biometrics**. A few examination boards already use fingerprint recognition devices to identify students in the examination room. If a student needs to leave the room, to use the bathroom for example, their fingerprint is recorded as they leave and then again as they re-enter – to make sure the person who left is the same as the one entering. Finger and palm print recognition door locks do exist not just in major organisations. Soon you may be able to open your house front door or the family garage simply by placing a finger over a special scanner built into the door handle. Many people quickly pass through airport controls because they have had the iris in their eye scanned. This could be used to manage access to restricted areas of buildings.

It is not difficult to see the use of these technologies becoming more common-place. Imagine never having to carry a front door key around in your bag, or your parents not needing car keys anymore, because there are small fingerprint scanners built into door handles, or eye scanners built into door frames or the steering wheel.
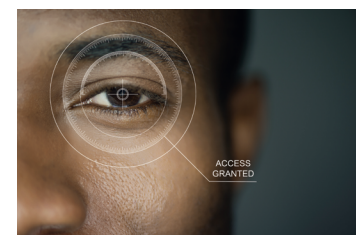
Activity 1

Research the development of *Facial Recognition Systems*. How do they work? Where typically might they be best used? Might there be an issue with people's privacy?

We are all used to checking that certain websites such as ones used for shopping are secure. We expect that all information transferred is safe. The process of 'scrambling' and 'descrambling' a message (encrypting and decrypting) is called **cryptography**. This process is based on mathematical **algorithms** which use a 'scrambling' **key**, with the sender and receiver of the message knowing what combination of keys to use. Without the proper key, it's virtually impossible to decipher an encoded message. For many years it has been recognised that, as computers become faster, the prospect of an eavesdropper being able to work out a key, and understand the message being transmitted, is increasing. To overcome this, and make messages completely unbreakable without knowing the key, **quantum cryptology** is being developed. This uses physics rather than mathematics to create a key based on the behaviour of photons – tiny, massless packets of light – it is a method that has little chance of being cracked using mathematics. Quantum cryptography also has the property of alerting the receiver to an eavesdropper because the act of eavesdropping affects the transmission.

In October 2007 votes cast in the Swiss canton of Geneva during their parliamentary elections were transmitted using quantum cryptology, so the votes cast by citizens in Geneva were more protected than ever before.

You should be familiar with images of robots working in industrial settings, but robots are being developed for use in many different settings: there is an experimental robot on the International Space Station; exoskeletons have been developed to help those working to clean up areas after natural and industrial disasters; Unmanned Aerial Vehicles seem to be given a new uses on a regular basis. Choose an area such as medicine, the home, space or commerce, and find out what you can about the most recent developments in robotics in that area.

Text translation

Computer-assisted translation is language translation in which a person translates with the aid of computer (application) software. The person carrying out the translation can use a variety of software including: monolingual and bilingual dictionaries, parallel texts, translation memory, and language search engines.

With translation memory, the text being translated is broken into small segments such as a sentence or clause. Each segment is compared with previously saved translated segments – if one exists, if not, the software allows the translator to enter a new translation for that segment which is saved. The text is worked through a segment at a time, gradually building up a translated text from saved fragments and new translation.

Language search engines are internet based systems that work in the same way as internet search engines. The difference is that instead of searching the internet, a language search engine searches a large selection of translation memories to find previously translated sentence fragments, phrases, whole sentences, even complete paragraphs that match the segment that the translator is working with.

Many companies are building websites that are multilingual, and brochures for products and services may be required in different languages. For example, if your school is bilingual or international, many of your publications will be in two or more languages, and the school website may also offer pages of translated text. With companies and markets developing and moving ever faster the need for accurate and consistent translation is paramount.

Vision enhancement

When illumination is inadequate for a person to see clearly, vision enhancement devices enable images to be formed by intensifying or enhancing the low level of light that exists. The image many of us have of this technology is of night-vision scopes, which exist either to be mounted on vehicles, weapons or worn by a person as a pair of goggles. Age-related night vision problems make it difficult for people who drive at night for a living, such as truck drivers, taxi drivers, police officers, ambulance drivers, firefighters, and other public safety officers. Not only must they regularly drive at night, but also must be able to see exceptionally well because their jobs may require them to drive quickly in emergency situations. Generally, goggles provide poor peripheral vision which means that although the wearer will see the central parts of the road much more clearly, they will still not have good vision of anything entering the road from the side. This is the current focus of research – being able to provide a more 'widescreen' or panoramic field of vision. Who knows, in the coming years, a pair of night time goggles may be as necessary as a seatbelt!

Activity 3

The use of 3D imaging in medicine to enhance CT, MRI and ultrasound scans is providing a wealth of extra, detailed information for medical procedures. What is holography? Is there a connection between 3D imaging and holographic imaging? Identify three possible uses for this technology.

A second way that an image can be enhanced is by capturing infrared light and producing on screen a thermal image. Infrared images are used for a wide variety of forensic and industrial purposes, because they can reveal chemical compositional differences not evident in visible light. We often see thermal imaging being used to reveal where homes are losing heat (for checking insulation) but border security agencies or police forces can use these devices when trying to discover or find people.

Activity 4

Many of us still only associate virtual reality (VR) with gaming and experimental, fictional worlds, but VR products are now commonly used by many companies, often to test product designs and simulate user interaction. VR head-mounted displays are also used in flight simulators and custom-made VR devices are used for medical training and to help with patient recovery.

Research the current state of VR technology, including virtual immersion, and think about how this technology could be used, for example, in museums and archaeology.

New technology, new applications and new generations of users combine to push our use of ICT into many new areas of medicine, travel, shopping, warehousing/retailing, industry and entertainment. Unit 5 considers the effects of using ICT in many situations.

Review and revise

You should now be able to:
- describe how emerging technologies are having an impact on everyday life.

Using a computer system to communicate

Background

A range of ICT applications are used in our everyday lives and the way you communicate is influenced by computer systems and the software that is available. This session will look at some of the things you need to consider when using software applications for five of the most common forms of communication:

1   newsletters, flyers and posters
2   websites
3   multimedia presentations
4   music scores
5   cartoons.

Newsletters, flyers and posters

Newsletters are information sheets that are distributed within organisations or communities to keep them up-to-date with the latest news that affects or interests them directly. Your school may have its own newsletter. Newsletters can be produced using **desktop publishing** software, but in the practical sessions of this unit you will be learning how to produce them using **word processing** software.

Flyers and posters can also be produced quickly and easily using word processing or desktop publishing software. As with newsletters, they can include photographs and images. Flyers and posters are usually one-page documents that are designed to present information quickly. A poster is usually one-sided and is likely to have only a few key words on it. A poster advertising an event would need to include:

● the name of the event
● the time, date and place
● the names of key people you would see
● a brief indication of why you should attend.

A flyer might be two-sided and is likely to have more words. Flyers are usually used to advertise something.

> **Activity 1**
>
> What would a flyer advertising a new takeaway restaurant need to include?

Considering the needs of the audience

Each newsletter, flyer or poster should be produced with the intended audience in mind.

	Description and key features	How is the audience reached?	Audience
Newsletter	Newsletters are usually produced for a specific audience. Lots of words and images. They are likely to contain information about local news, events and activities.	Either handed out or collected by those who want them.	Often a group such as local residents or members of a club or society.
Flyer	Flyers are usually produced to advertise products and services. More colour than a newsletter, with fewer words. The font size may be larger. The focus is mainly on the service or products being advertised. Flyers are usually no more than one page and are designed so that they can be posted.	Often posted by hand through letterboxes, or inserted loosely inside magazines.	Flyers are sometimes produced to appeal to a particular audience. For example, a flyer about life insurance might only be sent to people over a certain age.
Poster	Often much larger than a flyer. Used to advertise an event or a single product or service, or persuade people to take notice who might not initially be interested. Few words and often only one large image.		

Producing documents using a computer

Producing a newsletter, flyer or poster on a computer has a number of advantages:

- They are cheap to produce.
- An organisation can print as many newsletters as they need.
- Previous newsletters and different versions can be stored electronically.
- They can be distributed as paper copies or electronically.
- Physical copies can be printed onto different types and sizes of paper and printed on one side or both to form a booklet or pamphlet.

Producing a newsletter, flyer or poster using word processing software has a number of advantages:

- Correcting errors is quick and easy – the inbuilt dictionary highlights spelling and grammatical errors, offering suggestions where potential errors are highlighted.
- Formatting the document to meet the needs of the audience is also straightforward. Writers of newsletters can include features such as:
  - columns to structure text
  - **white space** to draw the eye to key areas
  - pictures, diagrams and other images such as photographs
  - changing the Size and CASE of text to emphasise headings
  - suitable fonts, such as Calibri or Times New Roman or Comic Sans
  - adding emphasis by using *italics*, underlining, **bold** or other special effects
  - using bullet points and indentations – just like this list.

> ### Tip
> You will learn more about using word processing software in the practical sessions of Units 1, 3 and X.

Activity 2

Consider the audience for posters by providing answers for the remaining sections of the table above.

Desktop publishing (DTP) software

DTP shares many features of word processing – the way that images are inserted, the formatting of paragraphs and text, the use of columns, and so on. You can produce good flyers and posters using word processing software, so what advantages does using DTP software give you?

- The key is to do with professional looking pages. DTP software lets you be far more creative with your work than traditional word processor software does, which is why it is used to create newsletters, flyers and posters.
- They are frame-based – the information is placed on the page in blocks or frames. If the text you are placing does not fit into a frame then it will spill over into another, continuing frame, automatically. This is a really good feature because the frames can be anywhere on the page, or even on different pages. Frames can be of different sizes so that text can be broken up and appear in an attractive layout.

- DTP software also gives you a selection of publication layouts, which are automatically created for you. A flyer could be a sheet of A4 paper folded to create a small booklet. You do not need to worry about where the frames go in order to create the layout, and how they are orientated to achieve the correct effect when folded. The software takes care of all that. Text wrapping (explained in the practical sessions of this unit) of images or any other imported element (table, chart, clip art) works in the same way.

It is worth noting, however, that no matter how professional your document appears on screen, the quality of the finished publication depends on the quality of your printer.

You are probably aware of DTP software such as Microsoft Publisher or if you work with an Apple Mac maybe you have seen or used something like Swift Publisher.
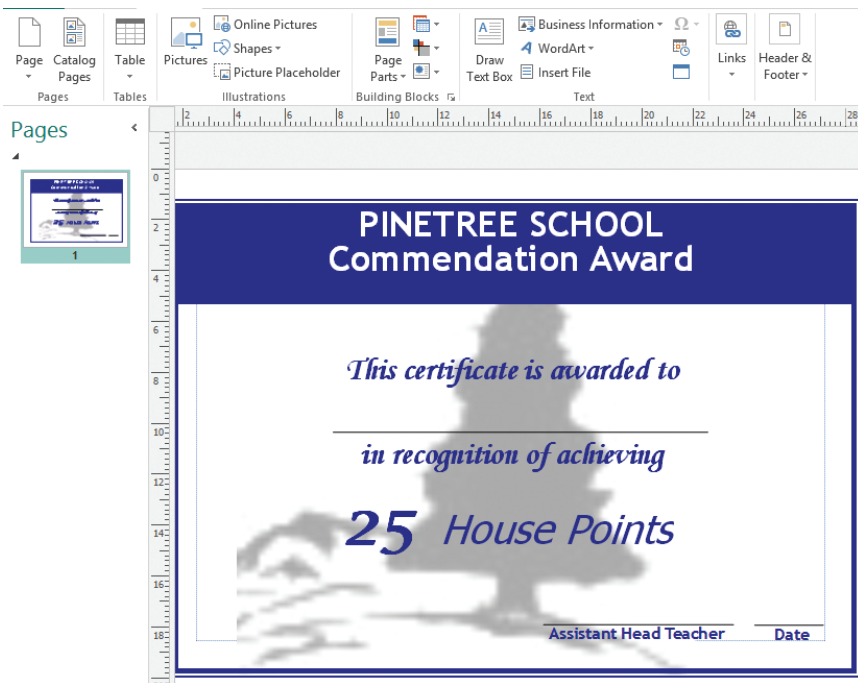
DTP for corporate image publications

In Session 1.8 you will find discussion about corporate image and the importance of image and styling, along with a practical exercise.

An important question is, "What software applications are available if more adventurous work than simple flyers and booklets of only a handful of pages are to be produced?" You may need to start investigating, industry standard software that allows good image manipulation as well as framing text.

There are a number of applications that are used to produce publicity material such as brochures and prospectuses as well as flyers and posters, of high quality. You may have come across QuarkXPress and Adobe's InDesign, Illustrator or Photoshop. There are some open software applications as well, Scribus, for example. What these products offer, by themselves or in combination, is the ability to produce material of a high, professional standard.

The resolution of images is important; you do not want a school brochure that has grainy or pixilated images! Colour in photographs might need to be manipulated, the images used may need to 'bleed', or run off the page without leaving a coloured border. Text might need to creatively wrap around part of an image. Colours will need to be matched exactly with the corporate style guide. A page template may have been created and will need to be followed throughout. The list of requirements that you have for an application package may be very long.

Creativity is the key. Can your software produce business cards? How might you go about creating them? In Session 6.11 you will see how a database program can be used to create business cards but this is not a sophisticated and graphically interesting solution. Ideally you would set up a template with a DTP program and work on individual details only. The template would adhere to company corporate style guidelines.

Any such software will save the document/file in an industry standard format and to a high resolution so that it can be sent to a printing house for loading into their presses with the minimum of adjustment. In many cases it makes sense to send files to printing houses as .pdf documents – although there is a variety and number of types of these and images may be required to be saved as .psd, .tiff or another format. It is important that you work with your printing house to establish exactly what file formats they need.

Activity 3

Look through this book and pick out the elements that make the template for the page. What elements are on every single page? What colour scheme is being followed? What are the styles of the main headings sub-headings and body text? Can you see columns on the pages? Now think about how/if possible you might organise this in your word processing software. Do you have a DTP program, if so how could you arrange these elements in that program?

Websites

In many respects, websites are electronic versions of newsletters, flyers and posters. There are many software packages for creating webpages and websites, known as **web authoring** software.

Websites offer the owners, producers and users of the websites a number of advantages:

- Rather than just having text and images, websites can have sound, video and animation.
- Buttons, images and highlighted text can encourage the reader to focus on specific aspects – and can be used to **link** directly to other webpages.
- The producer can add a **hit counter** to monitor the number of people visiting the website.
- Websites can be viewed all over the world.

Of course, there are also disadvantages:

- Websites can be illegally altered without the knowledge or authorisation of the producer. It is difficult for a user or reader to know if unauthorised changes have been made.
- You cannot usually see a website unless you have access to a computer system or the **internet**. Unless you have access to a portable device you are not able to carry the website content with you.
- A website needs to be updated regularly to keep it up-to-date. People expect the page they see to contain the latest information.

Tip

You won't need to know how to use desktop publishing software for the IGCSE course, but it is important to be aware of why you might choose either word processing or desktop publishing software when producing various documents.
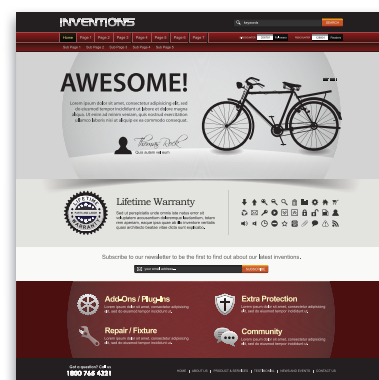
An example of a website

Activity 4

Connect to the internet:

1. View the BBC news website: http://news.bbc.co.uk. When was this site last updated? How often is it updated? How can you tell?

2. Visit the Cambridge home page at www.cie.org.uk. When was this page last updated? How do you know?

3. Visit the website of your favourite musician or sports team. When was this site last updated? How do you know? Are you happy with how up-to-date this information is?

4. Many websites do not give any indication of when they were last updated. Does this make you less sure of the reliability of the information that is presented? Why?

5. Why do you think there is a difference between the 'update cycles' of the BBC and Cambridge websites?

6. Can you think of (and find) any websites that are only updated once a year? Are there any websites that are never updated?

Tip

You'll learn more about web authoring software and how to create webpages in the practical sessions of Unit 4.

Multimedia presentations

Like websites, multimedia presentations engage the audience, often showing and explaining to them the content of a topic by using not just text, but images, charts and diagrams, sound, video and animation.

There are many software packages designed to produce simple and complex multimedia presentations. Presentations come in many forms and for different purposes.

Advantages of multimedia presentations:
- A good presentation (using sound, animation and video) helps to focus the audience's attention on the key points being made.
- Presentations can be interactive – links to different presentation slides, new information, even to websites, can be included.

Disadvantages of multimedia presentations:
- You cannot usually run a presentation for an audience without a computer system and a projector, which can be very expensive.
- If links to websites are included, the presentation will be limited to locations with an internet connection.
- A poorly produced presentation, perhaps with too much text on a slide, or too many animations, will lose its impact because the audience may not be able to recognise the key points.

Tip
You'll learn more about creating and producing multimedia presentations in the practical sessions of Unit 2.

Activity 5

The head teacher of your school has some important information about changes to IGCSE subjects to give to parents, and she is wondering how to communicate this. She has invited you (as Head of ICT) and the Head of English to a meeting. The Head of English thinks that the information should go out in a newsletter. You believe that there should be a parents' meeting where the head teacher explains the changes with the aid of a presentation. Write a list of advantages of using a presentation, and a list of disadvantages of using a newsletter.

An example of multimedia presentation slides

Music scores

Music software can be used on a computer system to compose music and then to print the music score. This has many advantages for the composer:
- The music can be played at different speeds and in a different key without having to rewrite it.
- Many changes can be made automatically.
- Scores for different instruments can be printed.
- The musician can also choose to hear how different instruments might play the music.
- Musicians can play a tune on the computer and the software will write the notes into the score. This means that a musician does not always have to understand how to write music.

Cartoons

Computers are often used to make cartoon animations. In the past, cartoons were made up of thousands of hand-drawn images. Even feature-length cartoon films were hand-drawn, which meant that it took a very long time to produce a cartoon film. Today, many films are animated using computer generated imagery, widely known as CGI. With CGI, images can be scanned, replicated and altered. One image can be used to create thousands of other, similar images. This makes the production of crowd and battle scenes in films much easier to produce. A great advantage for film companies is that they do not have to pay for human actors to fight in a battle scene if the computer can generate enough images!

Tip
You won't need to know how to use music software or create animations using CGI for the IGCSE course, but it is important to be aware of the impact of ICT in each of these areas.

Activity 6

For each of the scenarios below, decide which of A-E is the best way to communicate the information. Give reasons for your choices.

A a newsletter

B a flyer

C a poster

D a website

E a multimedia presentation.

	Scenario	A B C D E	Reason
1	Amika is in charge of preparing a document that is to be sent to all the parents of pupils in Excelsior School. The document will include news about recent events and activities. There will also be information about the parents' evening, prize-giving and sports events. The Parent Teacher Association wants to include a quiz.		
2	Douglas Cheung has been asked to share some sales information within his company, with a very large audience, at the same time and in the same place.		
3	The school theatre group is presenting their own version of *Romeo and Juliet*. They want to advertise their play to everyone in the school.		
4	The headteacher has decided that a school newsletter should be more widely available. She knows that there are former pupils in Egypt, the USA, Dubai and the West Indies. She would like them all to be able to see what is happening at the school today.		
5	Junaid of All Computers Inc. wants as many people in the local area as possible to see an advertisement for a half-price sale on laptops and netbooks.		

Review and revise

You should now be able to:

- describe a range of communication applications such as:
  - newsletters
  - flyers and posters
  - websites
  - multimedia presentations
  - music scores
  - cartoons.
- discuss the need for software that professional, corporate publications require.

What have you covered?

In these six theory sessions you have:
- discovered the range of computers in common use today
- been introduced to a variety of hardware and software components in a computer system
- been shown the difference between applications and system software
- compared memory types
- been shown the components, and relative advantages, of different user interfaces
- evaluated the different ways that a computer user might communicate with a target audience
- explored some of the emerging technologies which are beginning to have an impact on our everyday life.

Some practice questions

1 Connect each image on the left with a line which best describes it in the middle column, then another line from the middle column to the best example in the right column.

Mainframe	Small hand-held computer	Business executive needing a powerful electronic diary while travelling
Desktop	Computer having very fast processing capability and supporting massive storage facilities	Student needing to be able to work as she moves around campus
Personal Digital Assistants (PDAs)	Computer where all components are within a single unit, making it portable	Large organisation such as a government department
Laptop or notebook	General purpose computer having separate monitor, keyboard, etc.	A family needing a computer at home for a variety of uses

See Session 1.1

2 For each of these, indicate with a tick whether it is hardware or software.

	Hardware	Software
Operating system		
Mouse		
Monitor		
Word processing program		
CD-ROM		

See Session 1.2

3 For each of these, indicate with a tick whether it is applications or system software.

	Applications	System
Operating system		
Database program		
Printer driver		
Disc formatter		
Graphics software		

See Session 1.2

4 The memory of a computer can be volatile or non-volatile.
- **a** Describe what is meant by the terms volatile and non-volatile.
- **b** Which type of memory is volatile?
- **c** The instructions for starting up a computer will be held in which type of memory? Why?

See Session 1.3

5 Rana is not a confident computer user and has just bought her first computer, a laptop. The operating system provides her with a GUI.

Give three reasons why the GUI is an advantage to her.

6 Pete is a vet who runs a parrot sanctuary for pet parrots that have been abandoned by their owners. He is going to organise an open day at the sanctuary in the hope that some of the abandoned parrots will be adopted. He needs some publicity material to be produced.

He tells you that he thinks it might be a good idea to build a new page into his website for this.

You do not think that is a good idea and want to suggest creating a simple flyer instead.

Before you talk to Pete, you decide to write down the advantages and disadvantages of both options – the webpage and the flyer – paying particular attention to the event that Pete is organising and the people he hopes to attract to it. Discuss the advantages and disadvantages, to Pete, of using webpages and flyers.

7 You are applying for the post of Innovations Director at a car manufacturer and are asked to provide three sample ideas of how emerging technology could be built into future cars. Identify and explain the desirability of three ideas.

Progress check

Aiming for good progress

- You are able to distinguish between hardware and software.
- You can distinguish between system and applications software.
- You can name the different types of memory and state a use for each type.
- You can use the terminology relating to user interfaces.
- You are able to choose an appropriate method of communication for a target audience.
- You are able to identify emerging technologies and link them to everyday situations.

Aiming for excellent progress

- You can distinguish between hardware and software.
- You can describe, and distinguish between, the use of a variety of software types.
- You can identify appropriate uses for, and justify the selection of, different memory types.
- You are able to describe the features of user interfaces.
- You can choose, and justify a choice, between different methods of communicating with a target audience.
- You are able to identify and explain how emerging technologies may be utilised in everyday situations.

Document production: Entering and editing data from different sources

Background

Every day you are likely to come into contact with documents, posters, letters, leaflets, books and other printed materials that were prepared using software that enables users to develop and edit text-based documents. In this session, you will be looking at how to create and open documents using information from different sources. The examples here are from *Microsoft Word*, but you can use any word processing software to complete the tasks and activities.

Locating and recognising file types

As part of your practical work, you will need to be able to open and edit work that has been prepared for you. People do not always work using the same types of text editing software, so there are various 'generic' file types that all computer systems will recognise.

> **Language**
>
> Generic file types means that you will be able to work with them regardless of the software packages that you are using.

Activity 1

Open the folder titled Session 1.7 within the Unit 1 source files on the course CD and look at the file types that are there.

You should see that there are three types of generic files. You can recognise them by their extensions (the letters that come after the dot). These are listed in the table below.

> **On the CD**

Format	Meaning	Description
.csv	comma separated values	This data contains data items that are separated by commas. When imported into text editing software (a word processing program, for example) the data can be formatted as a table. Often, .csv files are used as source data for spreadsheets and databases as the data can be read by any appropriate software.
.rtf	rich text format	Text files, which keep some of the formatting that was in the original file.
.txt	text file	.txt files contain text. All the formatting is removed. .txt files can be opened in any text editing or word processing program.

Opening documents and importing data from existing files

When you create the documents for your practical work, you can use many different types of document formats as part of your work. As well as the generic file types you could include:

.doc	A document file created in *Microsoft Word 2003* or earlier
.docx	A document created in *Microsoft Word 2007* or *2010*
.odt	A document created in *Open Office Writer*

Follow the steps below to:
- create a new document
- open a document
- import text
- save as a *Word* document.

Open your word processing software, for example, *Microsoft Word*. You need to open the document called **ComputerTypes.rtf**, that you found in the Session 1.7 folder on the course CD. You need to select **File > Open**. This will open a new window. You need to browse the course CD for the document. You might not be able to see the file you need to open, because *Word* will automatically

> **Real world**
>
> Portable document format (.pdf) files are another 'generic' file type, a universal document file format. Although specific to the Adobe Acrobat system, the Adobe Reader is widely and freely available. When you convert documents, forms, graphics, and web pages to PDF, they look just like they would if printed. pdf files are especially useful for documents such as magazine articles, product brochures, or flyers. Portable document format files have become the standard for transferring documents between different computer platforms when you want to preserve the original graphic appearance and can be opened on any computer platform as long as you have downloaded Adobe Reader.

look for other *Word* documents. So you need to go to the drop-down menu at the bottom right of the screen and select **All Files**. You will then see all the files in the folder.

All Files (*.*)

All Files (*.*)
All Word Documents (*.docx;*.docm;*.dotx;*.dotm;*.doc;*.dot;*.htm;*.html;*.rtf;*.mht;*.mhtml;*.xml;*.odt;*.pdf)
Word Documents (*.docx)
Word Macro-Enabled Documents (*.docm)
XML Files (*.xml)
Word 97-2003 Documents (*.doc)
All Web Pages (*.htm;*.html;*.mht;*.mhtml)
All Word Templates (*.dotx;*.dotm;*.dot)
Word Templates (*.dotx)
Word Macro-Enabled Templates (*.dotm)
Word 97-2003 Templates (*.dot)
Rich Text Format (*.rtf)
Text Files (*.txt)

ComputerTypes is an .rtf file. Double click on **ComputerTypes.rtf** to open it. This will open the file in *Word* and you can now begin to improve the way the document looks, and to format and edit the text.

Before you do anything with the text the file needs to be saved in a new format, as a word processed file. Click on, or select the option to **Save As…** Save the file as: **ComputerTypes** with the file type .doc, .docx, odt or whatever your software uses.

Page layout

The layout of the pages in your document needs to be considered very carefully. Each time you import text, or open a document that someone else has created, you may be dealing with the page settings that were set when the document was created. This can have an impact on the layout of your document, and can lead to poor quality printing.

Look carefully at the length of ComputerTypes. It should be three or four pages long in your word processor.

In your word processing program select **Page Layout** and open the **Page Setup** dialogue box by clicking the icon at the bottom right.

From here you can change:
- the orientation of the page (landscape or wide, portrait or tall)
- the size of the paper
- the layout of the page
- the size of the margins.
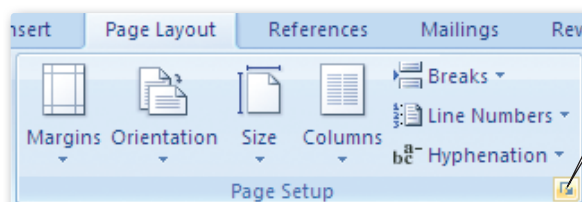
Click here to open up the **Page Setup** dialogue box
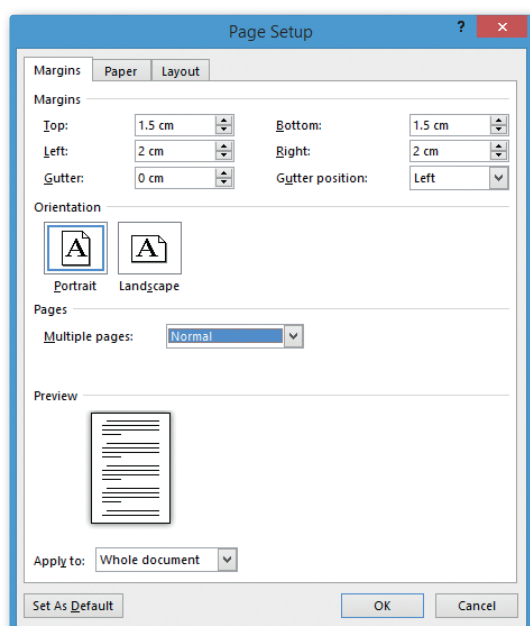
Real world

The **gutter** that you can see in the **margins** menu refers to part of the page outside the margins. This is important if the pages are to be bound. The gutter leaves space for staples or binding, and means that the text on the page is printed with enough space around it to make reading easier. Most of the time, the gutter is set to 0 cm. The gutter position can be set to: Top (top of the page) or, more usually, to: Left.

Activity 2

How is **ComputerTypes** laid out? Using the **Page Setup** dialogue box that you have just opened, use the tabs that are available to find out the answers to these questions:

1 What is the orientation of the page?

2 How big are each of the margins: left, right, top, bottom?

3 What is the paper size?

Activity 3

These settings are not convenient. You need the orientation to be portrait and hopefully fit everything onto a single page. Open up the **Page Setup** dialogue box again. Using the tabs change the page settings so that the document has:

1 a page size of A4

2 a page orientation of portrait

3 all 4 margins set to 2 cm

Save the document.

The document should fit onto one page and the top of it should look like this:

Header

Computer types

Mainframe computer
These are extremely large computers used in organisations (such as banks and government departments) where very large amounts of data are processed. They are capable of processing very big jobs which make use of their large memories and fast processor speeds. They are also capable of complex problem-solving
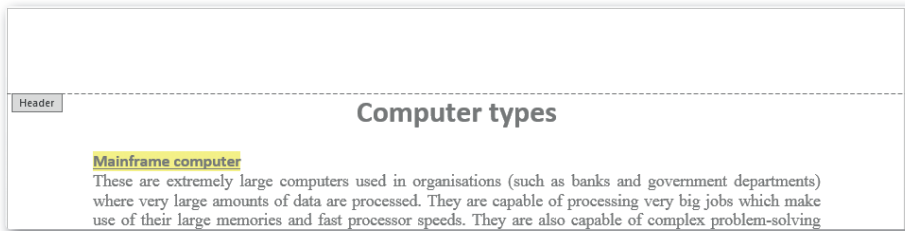
Look through the text that is now on your one page. It looks quite messy. The words are different sizes in different paragraphs, some paragraphs are over to the right, some centred and the style of type is different. You need to tidy it up.

Font style

The style of a font (sometimes called the *font face*) can be described as being either **serif** or **sans-serif**.

The difference is very easy to see:

This little mark is called a *serif*.

h

This is an example of a serif font because it has the little marks added.

h

This is an example of a sans-serif font because it does not have the little marks added.

Times New Roman — 12 —

Font

Size

Text colour

Text highlight

B *I* U abc x₂ x² Aa
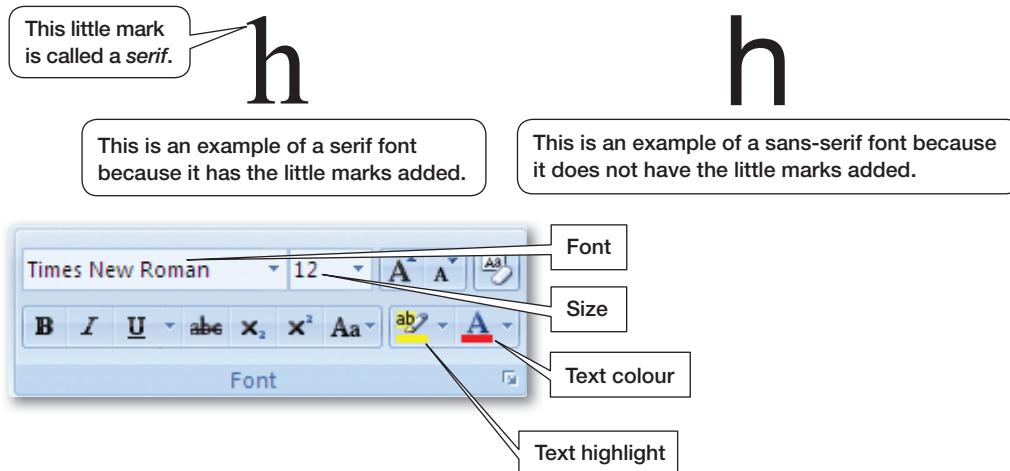
Font

Changing the font, size and colour is very easy. You have a panel that allows you to work with fonts. Can you work out what the **B**, *I* and U icons will do?

Activity 4

1 Complete this table by deciding whether each of these fonts is serif or sans-serif. The first has been done for you.

2 Is the majority of the text in this book serif or sans-serif?

3 Change the whole of the text in **ComputerTypes** to a serif font of size 11.

Save the document.

Times New Roman	Serif
Arial	
Calibri	
Perpetua	
Harrington	

Paragraph alignment

The next layout problem concerns the paragraphs. Some are over to the left, some centred and some to the right. This is known as paragraph **alignment**, and you may hear this referred to as *justified*. Some paragraphs are left aligned (or left justified), some centred and some right aligned (or right justified). Changing the alignment is very easy. There is a panel that allows you to change the alignment with just a click of the mouse.

Click anywhere in the first paragraph and the left alignment button should be highlighted. Click anywhere in the third paragraph and see that the right alignment button is highlighted, and the fourth and fifth paragraphs are centred.

With the left mouse button, click at the very start of the first word of the second paragraph (not the heading), hold down the mouse button and drag the cursor to the very end of the second paragraph. Let go of the mouse button and the text of the paragraph will be highlighted. Click on the fully justified button to see what effect this has – both left and right margins are straight, like you see in a newspaper or magazine.

Click and highlight the very first heading, Now click on the **bold** and <u>underline</u> icons in the font panel (**B** and <u>U</u>). The first paragraph should look like this:

Left   Centre   Right   Fully justified
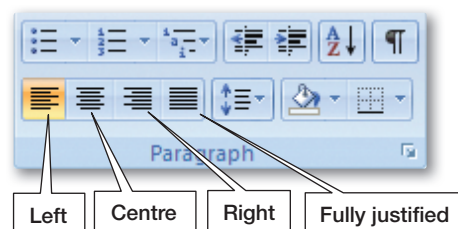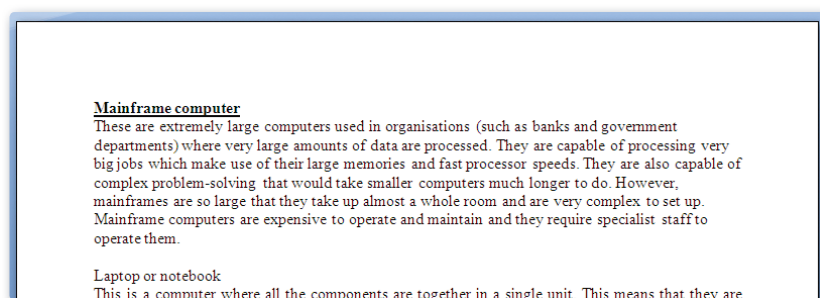
> ### Tip
>
> Some useful keyboard shortcuts:
>
> | Ctrl | + | B | Bold |
> | Ctrl | + | U | Underline |
> | Ctrl | + | I | Italics |
> | Ctrl | + | C | Copy |
> | Ctrl | + | V | Paste |
> | Ctrl | + | X | Cut |
> | Ctrl | + | S | Save |

Mainframe computer
These are extremely large computers used in organisations (such as banks and government departments) where very large amounts of data are processed. They are capable of processing very big jobs which make use of their large memories and fast processor speeds. They are also capable of complex problem-solving that would take smaller computers much longer to do. However, mainframes are so large that they take up almost a whole room and are very complex to set up. Mainframe computers are expensive to operate and maintain and they require specialist staff to operate them.

Laptop or notebook
This is a computer where all the components are together in a single unit. This means that they are

Copying and pasting text from another document

The document is missing any text to do with Desktop or Personal Computers. A friend has prepared some for you. It is saved as **DesktopComputer.txt** on the course CD. Locate and open the file in your word processor.

Click on the first letter of the text and highlight all the text. Find an icon or menu item that allows you to copy text. The icon might look like this:
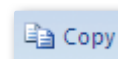
Click on this item and then return to **ComputerTypes**. Move down the document and click in the space between the first and second paragraphs. Now find the paste icon (right), or menu item, which will be in the same place that you found copy.

The paragraph from **DesktopComputer.txt** is now pasted into **ComputerTypes** to become the second paragraph. Save the document **CompterTypes** and close **DesktopComputer.txt**.

Activity 5

Check through **ComputerTypes** so that:
- all paragraphs are fully justified (both the left and right margins are aligned)
- each heading is left aligned
- each heading (there are six) is bold, underlined and highlighted yellow.
- each heading is a sans-serif font (use the same font for each heading).

Save the document.

Click to the left of the first heading and then press the Enter key to make a couple of blank lines and then click in the empty top line. You are going to give the document a title.

Activity 6

1. Type in: **Computer Types**.
2. Make this title a sans-serif font.
3. Change the size of the title to 20.
4. Make the heading bold and centre aligned.

Save the document.

Headers and footers

Sometimes, titles are put at the top of the page as you have done. Important information can also be put in the **header** and **footer** areas of a document. They can also be used to provide information about the document that will appear on every page.

The header is at the top of the page. It can be used to insert the title of the document. The footer is at the bottom of the page. It is often used to print the page number of the document. This is really important when you have documents that include lots of pages. Page numbers help readers to find their way around a document, and to check the order of printed pages.

You are going to put a header in the document – your name, and a footer – today's date. There is no need to enter page numbers in this document.

Double click in the space just above the heading **Computer Types** and the header space will open up:
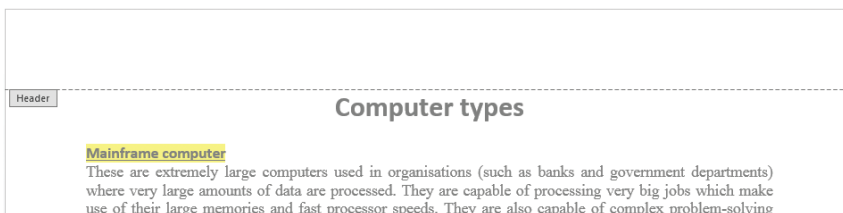
In the top of the window you will also be presented with a range of options such as adding date, time, or page numbers. All you are interested in is adding your name so click on the tab or menu to go back to the panels, which have the options for changing font, size and paragraph alignment.

Type in your name in a serif font size 10 and make it italic, left aligned. Double click back in the main body of the page. You have now created a header and it should be visible to you, but as a faint grey colour.

Activity 7

1. Double click in the space at the very bottom of the page to open up the footer area. Find the options panel for inserting automated objects. It may look like this:
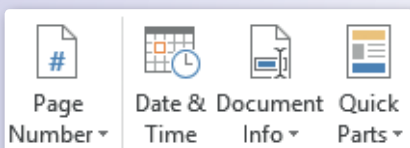
2. Place the date in the footer, as an automatically updated field, left aligned.
3. Place the full file path in the footer, as an automatically updated field, after the date, separated by a comma
4. Make the footer items: serif font, size 10, italic
5. Double click in the main body of the text and save the document.

Review and revise

You should now be able to:
- load data from an existing file
- copy and paste text from another document
- open documents of *.txt* and *.rtf* file types, saving each as a word processed format
- use headers and footers, with automated fields
- set font styles and sizes, knowing the difference between serif and sans-serif font faces
- emphasise text
- align text paragraphs
- adjust page orientation, page size and margins.

Internet research

Background

A good newsletter requires relevant information and images that are suitable for the intended audience and purpose. The internet provides access to millions of pages, documents, images and descriptions that can help when researching any project, but deciding where to start looking and what key words to use can be daunting.

All Computers Inc. requires a newsletter containing information about the peripherals that are needed to connect to a desktop computer. In order to create this newsletter you will need to search the internet for images and technical information. In this session you will look at the following:

- using basic searches
- using specific websites
- using advanced searches
- recording the URLs of useful websites
- downloading text and images.

> **Real world**
>
> The examples in this session use the browser Internet Explorer, but you can use any web browser, although each may work slightly differently.

Search engines

There are many search engines available, but they all perform a similar task – searching for content based on the words you enter.

Most search engines will help to target your results by allowing you to choose the type of information you require.

www.google.com

Targeted searches can be carried out without extra search terms.

Specific areas that can be searched range from images, news and shopping to videos and books.

www.yahoo.com

www.ask.com

Activity 1

The search engines Google, Yahoo and Ask are mentioned above, but there are many others. How many different search engines can you find? Make a list and then compare your list with others in your group. Does it seem like you all use the same ones? Are some search engines designed for specific tasks? Can you work out or find out which are the most popular and why?

Basic searches

Key words are essential for any basic search and they can often be used to find information quickly. A simple search will quickly produce information and images – not all of which, unfortunately, may be relevant to your school work. For the newsletter you need to find images and text that you can copy, edit and paste into your newsletter.

Advanced search techniques

More specific searches require more specific questions. There are many words that have two or more meanings or are so common that a simple search produces millions of results. Most search engines have an advanced search feature that allows more key words to be entered in order to refine the search and produce more relevant results.

Using **mouse** as an example, an advanced search could be created as follows:

The first result from the search is a Wikipedia article on the history and technical specifications of a standard computer mouse.
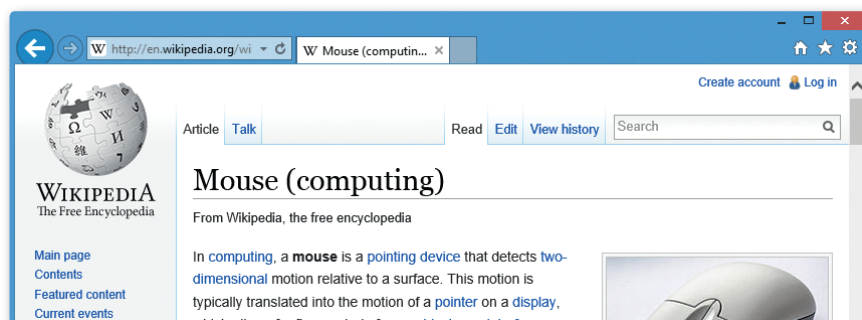
Advanced image searches are also possible. Searching for a large image of 3D printer could be created as follows:

This should result in images of 3D printers, in full colour and large enough to be used in a presentation.

Boolean operators

Take a look again at the advanced mouse search. The search window now has the following search terminology: the use of quotation marks and minus symbols. These last two are **Boolean operators**. Advanced search options generate these terms, but they can be entered manually.

Key word: printer

Key word: 3D

Unwanted key words: inkjet or laser

Size of image: Large

Full color only

Quotation marks mean that this must be included exactly as typed.

Either one of these could be in the results.

Neither of these terms must appear in the results.

Locating information from a specific website

Many large websites contain their own search functions that allow you to search within them. The following website **URL**s all have internal search facilities:

- **www.wikipedia.org**
- **www.bbc.co.uk**
- **www.ted.com**
- **www.nationalgeographic.com**
- **www.morguefile.com**

Downloading and saving information

Images or files relevant to any project can be **downloaded** onto a computer so that they become available as a local resource (this means that these files can be accessed again without the internet).

Before you download any information or images from the internet, it will be useful for you to create a folder within your work area, which you will use to collect together the resources that will be going into the newsletter.

Create a folder called NEWSLETTER.

The steps below show how to download an image from the internet.

Right clicking an internet image usually provides an option to save or download an image. The option here is **Save Picture As**.

A suitable location to save this file would be in the same folder that you created for the newsletter within your document area.
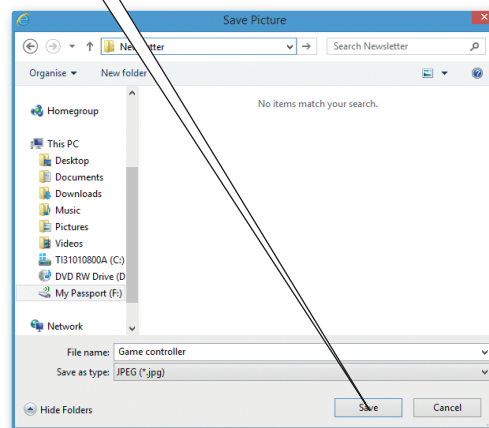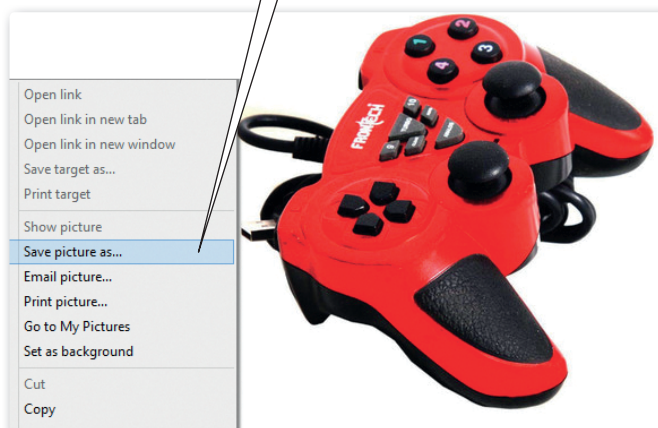
Recording research results

When carrying out research it is important to record the addresses of useful websites, especially the URL of specific pages that contain information that you have decided to use, or of images that you have downloaded. Creating a word processed document of URLs that can be referred back to again is a useful way of recording them and this document can then be shared with others to help them with a similar task.

In your word processor software open a new document. Save this document as **NewsletterURLs**. Switch back to your internet browser and the image of the joystick from the save image task above.

Copying and pasting URLs

Click once in the address bar and the URL will be highlighted. Now hold down the Ctrl (or Control) key on your keyboard and then press the C key once. This is an instruction to copy whatever has been highlighted.

Switch to the document **NewsletterURLs** and click in the top line of the page. Hold down the Ctrl key again but this time press the V key once. This is an instruction to paste whatever has been copied. The URL from the browser is pasted into the document. You might want to type in some headings to help you remember what the URL was pointing to.

Newsletter research

The newsletter you are going to produce will contain the following input and output devices.

Input devices: keyboard, mouse, scanner, joystick.

Output devices: TFT monitor, Inkjet printer.

Saving text from the internet

Of course the newsletter is not just going to be full of images, it will also need text alongside each image to explain what the device is needed for.

You can locate text about anything, just as easily as you can for images. It is tempting to copy lots of text and include it in your newsletter but you need to remember that material created by someone else might be copyright protected. Session 5.5 explains the issue of copyright fully for you. For now, you need to be aware that the people or organisations who post information on a website may not want anybody else to copy and use it. There is nothing wrong, of course, with saving text that you will refer to later on. You need to remember that any information that you copy and paste should only be used to *help* you put together the newsletter.

Real world

A URL (Uniform Resource Locator) is the long string that refers to a web address, usually starting with www. This indicates to your web browser on which server, and stored in which folder, the page or image can be located.

Activity 6

Using the search methods described so far, find and download images for each of the six devices on the previous page, saving them into your NEWSLETTER folder. Do not forget to copy and the paste the image URLs into the **NewsletterURLs** document. Remember that you are collecting images suitable for a professional-looking newsletter. Save **NewsletterURLs**.

Now, go back to your search engine and (making sure you are searching for websites and not images) type in **Joystick for PC**.

High on the list will be the Wikipedia website. Click on the link and you should see an image of a joystick illustrating the article about joysticks, which is similar to this:

Reading through the text you might decide that the second paragraph is the one with the better information for your needs.

Click at the start of the second paragraph and, without releasing the left mouse button, drag the cursor to the end of the paragraph. Release the left mouse button and the text of the second paragraph will be highlighted.

As you did with the URL, press Ctrl + C to copy the text.

Select the document **NewsletterURLs** and click in the next available line of the page and press Ctrl + V to paste the text from the website into your document.

Now copy and paste the Wikipedia page URL into the document as well so that you know where this text came from.

Activity 7

Using the method described for locating, copying and pasting text, find text that could be used as background information for each of the six devices and copy and paste it (and the URL) into the **NewsletterURLs** document. Save the document **NewsletterURLs**.

You now have a document that contains all the URLs of images that you want to use in the newsletter, along with suitable background text and their URLs. Additionally, in the folder NEWSLETTER you have six images that are going to be used.

These images and the text will be used in the next session to create the newsletter itself.

Downloading tables and charts

There will be times when researching information that you find either a table or a chart that you want to download. Downloading a table is a case of copying and pasting the information as you would some text, while a chart can be saved just as you saved images in Activity 6. It is important to credit the source of information in the table if you use it directly – tell the readers of your document where the data came from.

Open your web browser again and go to the website **www.xe.com**. This website is a source of information regarding currency exchange rates. On the opening page you will see a table that gives the rates for $US, €, and £ against one another.

If you want to copy this table to use in your own document then highlight the data in the table.

XE Live Exchange Rates

Add a currency ...

Auto-refresh 14x 0 : 52	USD	EUR	GBP	INR	AUD	CAD	ZAR	NZD	JPY
1 USD	1.00000	0.78484	0.61340	61.4109	1.13899	1.11056	11.2018	1.26299	108.763
Inverse:	1.00000	1.27414	1.63026	0.01628	0.87797	0.90045	0.08927	0.79177	0.00919
1 EUR	1.27414	1.00000	0.78156	78.2464	1.45124	1.41501	14.2727	1.60924	138.580
Inverse:	0.78484	1.00000	1.27950	0.01278	0.68907	0.70671	0.07006	0.62141	0.00722
1 GBP	1.63026	1.27950	1.00000	100.116	1.85685	1.81050	18.2618	2.05901	177.312
Inverse:	0.61340	0.78156	1.00000	0.00999	0.53855	0.55233	0.05476	0.48567	0.00564

Mid-market rates: 2014-09-25 16:49 UTC

Click on a rate to see a chart.

Press Ctrl + C to copy, and then move to your document and press Ctrl + V to paste. You will then get the table as it appeared in the website in your document. Remember to reference its origin. With constantly changing data such as this it is also a good idea to date it although in this case the date is within the copied data.

You might find a chart that is useful to you. Charts in a website will generally be an image and so you can save as you have already been doing. For example, use Google or some other search engine and type in (with quotation marks): "**UK CD versus digital downloads**"

In the results you may find towards the top of the listing a link to DiscWizards.com. Click on this link (or type in this URL directly: **www.discwizards. com/articles/Digital-Downloads-Versus-Physical-CD-DVD-Blu-ray-Sales-UK-2012.htm)**

On this page you should see something like this:

Right click with the cursor over the image and save it in your work area as CDchart.

Once saved in your work area it can be imported/inserted into your document as you have with other images.

Physical CD, DVD and Blu-ray sales dominate UK digital downloads 2012

Physical discs still continue to dominate market share over digital sales, bu[t] overall entertainment sales figures are down on 2011, but digital has broke[n] the £1bn threshold in 2012.

Recent UK entertainment sales figures for 2012 confirm that although physical sales are slowing, the market overwhelmingly still enjoys buying music, film and video games in the physical form of CD, DVD and Blu-ray compared to digital downloads, contributing to over 75% of market sales.
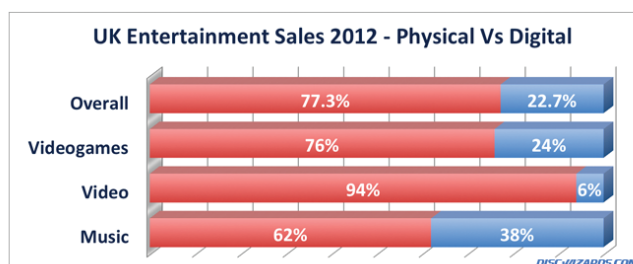
UK Entertainment Sales 2012 - Physical Vs Digital

	Physical	Digital
Overall	77.3%	22.7%
Videogames	76%	24%
Video	94%	6%
Music	62%	38%

DISCWIZARDS.COM

Fig 1: Entertainment market split of sales between physical CD, DVD, Blu-ray versus digital downloads, UK 2012.

Review and revise

You should now be able to:
- choose and use an internet search engine
- use basic and advanced searches to locate relevant text or images
- use the search facilities within specific websites
- record the URLs of useful websites
- download text and images from websites.

Creating a newsletter

Background

All Computers Inc. requires a newsletter containing information about the peripherals that are needed to connect to a desktop computer. You have already downloaded the images and text that you think will provide a professional and informative newsletter.

In this session you will be guided through the process of combining your images and text in order to create the newsletter. To achieve this you will:

- create a document where the information is presented in columns
- stretch and crop images
- arrange text around the images.

If you have not had access to images or text you can use **NewsletterText**.rtf and the images: **Keyboard.jpg**, **Mouse.jpg**, **Scanner.jpg**, **Joystick.jpg**, **TFTMonitor. jpg**, **InkjetPrinter.jpg** that are on the course CD.

On the CD

Importing text

The first task is to set up the text in the document in the style that you require. In your word processing software open either the **NewsletterURLs** document that is in your folder NEWSLETTER, or **NewsletterText. rtf** from the course CD.

If you are using your own text then carry out these steps:

1. Open a new document in your word processor.
2. In **NewsletterURLs** highlight and copy all your saved text that will be used in the newsletter.
3. Switch to your new document and paste the text onto the page.

No matter where your text has come from, save your document of text as a word processed document called **Newsletter**.

Activity 1

The page layout needs some work. Using **Page Setup**, change **Newsletter** so that:

- the page orientation is Landscape
- all four margins (top, right, bottom and left) are 2 cm
- the page size is A4
- you have a header with the text: **All Computers Inc.**
- the text of the header is a sans-serif font, size 16, bold and is centred
- has a footer of 2 lines. The first line has the text: **Date created:** followed by today's date. A second line has the text: **Date/time last printed:** followed by an automatically updated day/time field
- the text in the footer is a sans-serif font, size 8, italic and right aligned.

Save **Newsletter**.

Creating columns

The body of the text now needs to be arranged into two columns.

In the area of your word processor where you accessed the Page Layout panel you should also find an icon or menu item that allows you to select columns. To arrange text into columns only takes a few steps.

1. Highlight the whole of the first paragraph and click on the icon for columns.
2. You will be asked how many columns are needed – select two.

   Your text should now be looking like this:

All Computers Inc

Keyboards
Used to enter text into a computer. The advantages of using a keyboard are: they designed for long-term repetitive use and widely available; wireless versions are now available; function keys can be set to perform tasks or open specific programmes. The disadvantages of

using a keyboard are: data can only be input as fast as it can be typed; people with physical disabilities may struggle to use them; there is a danger of repetitive strain injury after long continuous use; wireless versions require an internal power supply.

Scanners
Allow hard copies of images (such as drawings or photographs) or text to be transferred to a computer. Images can be scanned at very high resolution and scanners are often built into printers to create multi-functional devices. However, high-resolution scanning produces large file sizes and this can be a very time-consuming process.

Activity 2

Make the following changes:

1. Arrange the second paragraph (about scanners) into three columns.

2. Arrange the third paragraph into two columns.

3. Highlight the fourth paragraph. Click on the columns icon but now select the option for **More Columns…** and you might see a panel like this:
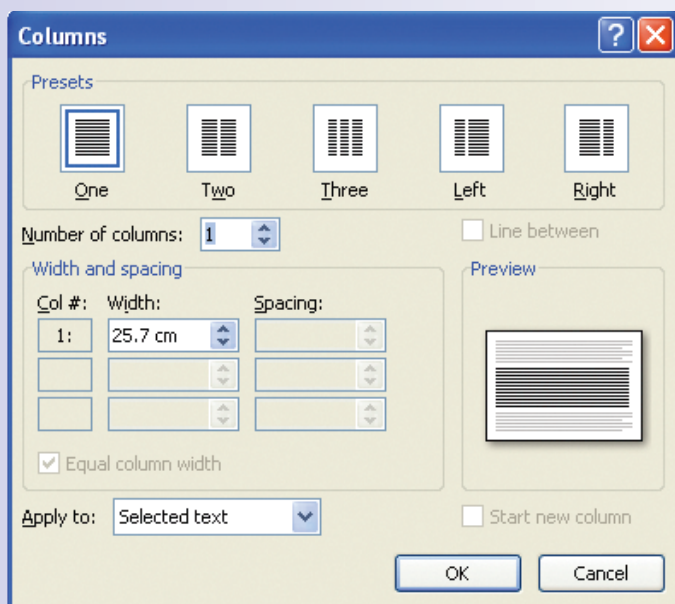
4. Enter **4** as the number of columns and **1** for the spacing between the columns, and click **OK**.

5. Save the document.

You should now have a document where the first four paragraphs look like this:

Now go through the entire document and change all six paragraphs back to a single column and save the document again.

Inserting images

Now the images need to be placed. Click before the first word in the first paragraph. Find the icon or menu item, which allows you to insert an image.

You are going to insert a picture so click on the Picture icon.

You will be asked where the picture is coming from. Navigate through your folders until you find your NEWSLETTER folder where you saved your six images. You want the keyboard picture first so select this to be inserted.

The picture is retrieved and inserted into the text where the cursor was and should look like this:

Notice the small points on each corner of the image and at the side half-way points. These are also known as 'resizing handles'. If you do not see these, click once on the image.
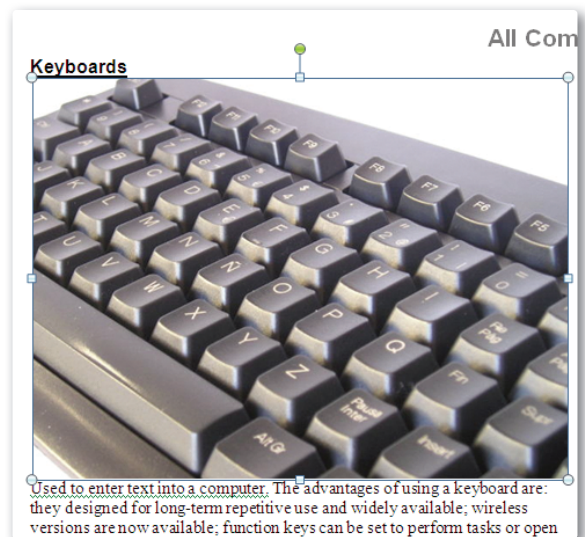
Resizing an image

You need to resize the image as it is far too big. Click and hold down the left button of the mouse when the cursor is over the top right point of the image. Drag the cursor toward the middle of the image. You should see either the outline or the image shrinking:

Click here and drag the point toward the centre of the image.
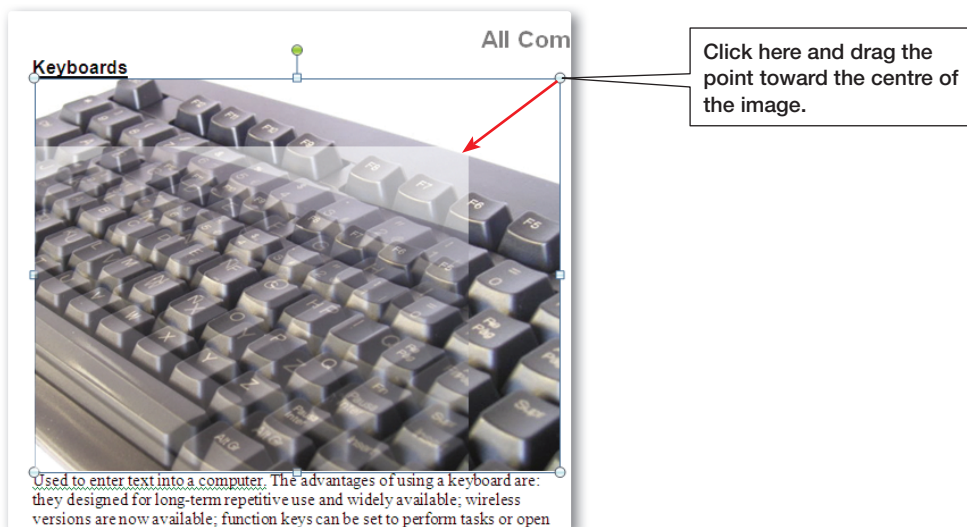
When you have shrunk the outline of the image to a size you think is suitable, let go of the left mouse button. The image is resized. It may look like this:
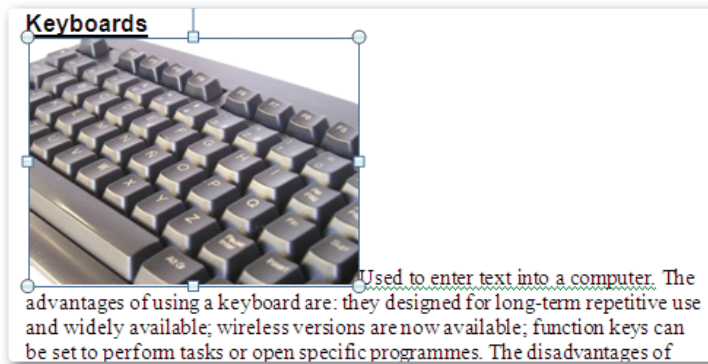
Save the document. The keyboard image is a little tall for the space you are using so you will shrink it down a little more.
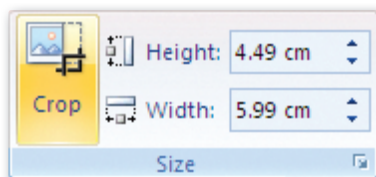
Cropping an image

Click and drag the point in the top edge of the image to flatten it. This does not look good. All you have done is squash the image. This is an important lesson to learn. When you resize an image you should always try and preserve the **aspect ratio**. This means that when resized you have kept all the dimensions in proportion. In word processing software, when you click and drag on any of the corner sizing points, the aspect ratio will be preserved, when you click and resize on any of the mid-side resizing point you will only succeed in squashing the image somehow.

To get the image back to its proper aspect ratio, you can either:
- reopen the document as it was before you squashed the keyboard
- click and drag the image back to its original size
- press Ctrl + Z to undo the last thing you changed.

What you really want to do is **crop** the image – cut away the part you do not want. Click on the image again and look for the icon that allows you to crop. It may look something like this:

> **Tip**
>
> Using Ctrl + Z can be very useful as it works with many different software programs, not just word processing.

Click on this icon and move back over the image. Now click on the top middle resizing point and drag down into the image. There is a line showing you where the new side will appear, but this time when you let go the area that you dragged over will be cut away.
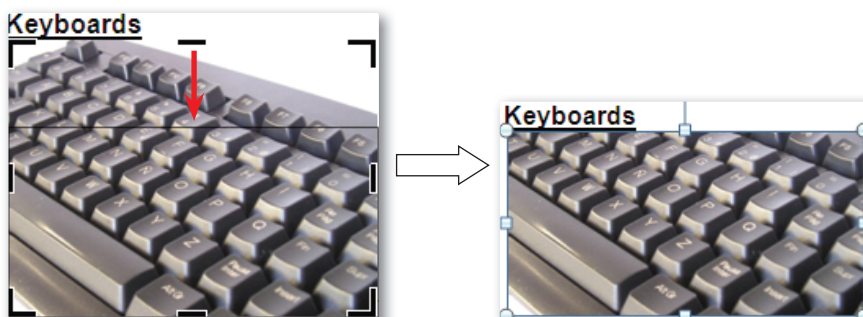
If you are unhappy with it then press Ctrl + Z to undo the cropping and try again. Resize and crop until you are happy with the resulting image size.
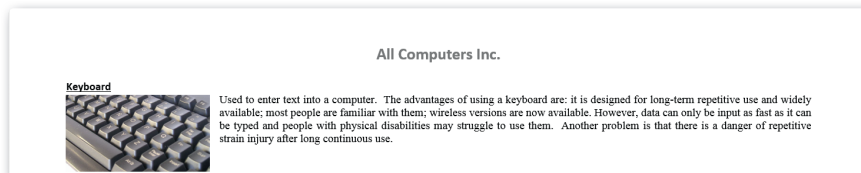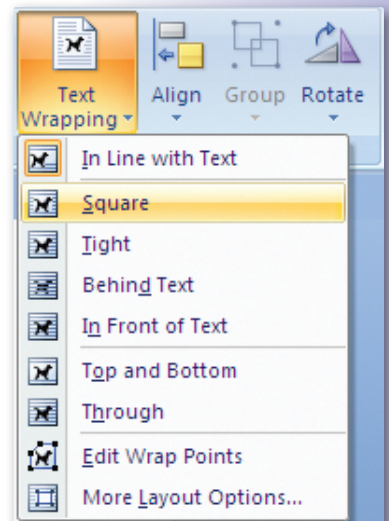
Text wrapping

The final adjustment to make now is with getting the text to flow around the image. This is called **text wrapping**. You may have already seen an icon for this, as shown below.

Click on the keyboard image and then click on the Text Wrapping icon and choose **Square** from the list. Immediately you will see a difference. The text is now wrapping around the image. This makes a great difference to the appearance of the newsletter.


Save the document.

Activity 4

Play around with the other wrapping options to see what they do. Be careful with the options **Behind Text** and **In Front of Text** as you may think that you have lost the image somewhere or that it is not going to be visible. Sometimes you will have to introduce blank lines to get the image where you want it. What happens if you position the image over the column?

Open the document you saved before Activity 4. Now you need to complete the newsletter. You have a number of tasks to do.

Activity 5

1 Change all the body text to be fully justified.
2 Insert the other five images into their correct places in the text.
3 Resize and crop each image so that it appears exactly as you want it to be.
4 Apply text wrapping to all the images.
5 Adjust either the image size or your cropping so that everything remains on one page.
6 Save the document.

The top of the completed document might look like this:
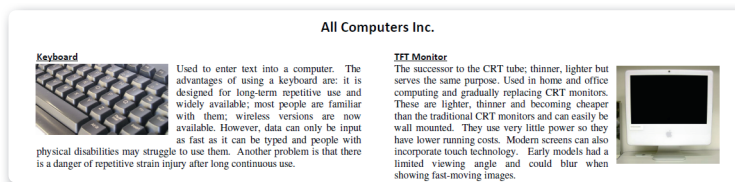
There is a document, **Newsletter.pdf**, on the course CD that shows a finished example.

Review and revise

You should now be able to:
● create a document where the information is presented in columns
● resize and crop images, maintaining their aspect ratio
● manage text wrapping around images.

Background

Individuals as well as companies need to send out information to individuals. The days of writing letters that have personal details inserted have long gone.

This session will show you how to perform a mail merge, and how to manage emails, especially to groups of people. This session also assumes that you are familiar with an email application such as Outlook or a web based service such as Hotmail, Gmail or MailXchange.

Mail merging

Mail merging (sometimes referred to as a *mailshot*) is a way of placing content from a spreadsheet, database, or table into a word processed document. A mail merge is ideal for creating personalised letters or labels. Instead of editing an original letter several times to input different personalised information, the mail merge process does just that: merging data items into specific parts of a document. Clearly, this saves a lot of time. It also means you do not have to worry about missing any information for the recipient of one of the letters.

In order to create a mail merge, two documents are needed: a word processed document (a template) and a file with the data for each letter. This file can take many forms, such as a spreadsheet, a database, or even another word processed document that has a table in it.

All Computers Inc. are advertising for a new Marketing Manager and have short-listed five candidates to attend a second interview. The details of these candidates are held in the file **InterviewCandidates.rtf** which is on the CD. It is these details that are going to be inserted into letters sent to each candidate.

The second part of the mail merge requires the letter that these candidate details are going to be inserted into. Your secretary has produced a standard letter but it is incomplete. On the CD look for **InterviewLetter.rtf** and open it in your word processor.

The personal details for each candidate need to be inserted in the places indicated.

Look for a panel or selection of buttons that allow you to work with mail merge documents and fields.

It may look like this:

The first step is to attach the file that contains the list of interview candidates – the document just saved: **MarketingCandidates**

Click on the button: **Select Recipients**, and then **Use an Existing list.**

You will need to navigate through your filing system to the folder with **MarketingCandidates** in it.

When you have selected the file it may initially appear as if nothing has happened, but if you look at the Mailings panel you should notice that a couple of the other options such as 'Insert merge field' have now become available. This indicates that the table in **MarketingCandidates** been attached and the fields can be inserted.

Delete the couple of lines that tell you where to put the candidates name and address details.

Tip

As with all the other examples in this practical unit, the mail merge process here is described using Microsoft Word.

Activity 1

Open **InterviewCandidates.rtf** in your word processor. You should see the names of five candidates with their addresses and interview times.

Anton Kaslov has contacted you to indicate that he is unable to continue with his application, and so you have replaced him with Raphael Tomas who lives at: 243 The Maltings, Lillington, DT6 9TF.

Make this change to the table and save the document as a word processed document with the name **MarketingCandidates**.
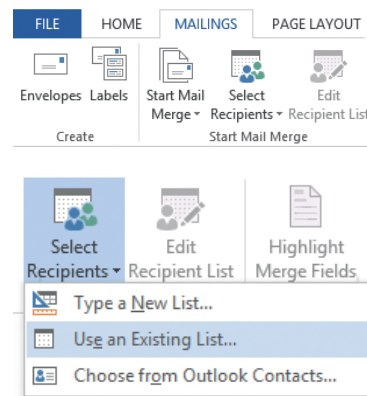
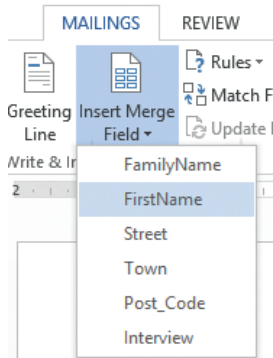Leaving the cursor in the line where you want the candidate name to be placed, click on the 'Insert merge field' button which may then display a list of available fields like this:

Click on *FirstName* and a marker will be placed in the letter where you had left the cursor.

Repeat this procedure for: *FamilyName, Street, Town, Post_Code*. Remember to leave a blank space between the *FirstName* and *FamilyName*, and then place the other three on separate lines.

Now replace the text *Candidate's first name and Candidate interview time* with the correct merge fields.

Save the letter as a word processed document with the name: **InterviewLetter**.

«FirstName» «FamilyName»

«Street»

«Town»

«Post_Code»

Everything is now ready for **InterviewLetter** and **InterviewCandidates** to be merged to produce five personalised letters.

Look for a button on the Mailings panel or elsewhere that allows you to complete the merge process. It may look like:

It is always best to choose to edit the individual letters rather than send them straight to the printer. A visual check is a good idea to see that the letters are exactly as you expect and that the insertion of some of the details hasn't messed with the layout.

You will be asked if you want to see all the records or just a selection, choose to see all of them.

A five page document should now be produced with the first page being the letter addressed to Nigel Mitchel, asking him to attend interview at 10 a.m. Scroll through the other pages to make sure that they are as required.

You could now save, edit or print this document as you could any other word processed document.

Usually these will not be saved once printed. Saving the letter with the merge fields is sufficient to reproduce the individual ones again if needed.

Corporate style

Having completed the mail merge you are reminded that All Computers Inc. has a corporate style guide. This is a very important policy document and will make clear a wide variety of things such as:
● the way standard letters should be laid out
● the size and font face to use for various elements of a document (headings and paragraphs for example)
● the format of dates
● where a company badge or image should be placed
● the specific colours that must be used (the hexadecimal numbers for a web page background, or text for example).

The reason these guides are produced is to ensure consistency across all the publications and documents that are produced.

The larger and more widely recognisable the company, the tighter the controls will be regarding colour, font face and size, image dimensions and so on.

Activity 2

The All Computer Inc. style guide states that:
- all text should be in font face Tahoma, and colour 'dark blue'
- any normal paragraph should be font size 9.5 with an 8 point space after the paragraph
- all line spacing should be 1.15 lines

In your word processor look for a button that allows you to create a new style. This may be in the same or connected to the panel dealing with paragraphs, or connected to formatting. Look for a button similar to this:
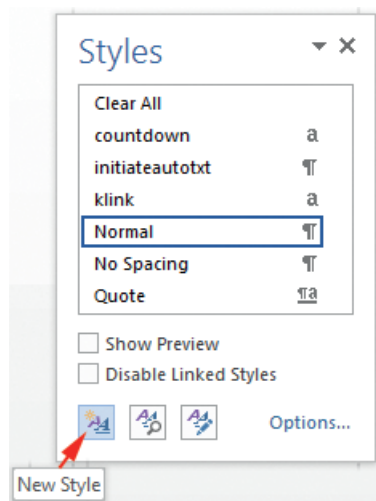
When you click this button a dialogue box appears where settings can be selected.

Choose the font 'Tahoma', size 9.5 and colour, dark blue.

Look within this dialogue for an option to format the paragraph.

Set the spacing before to be 0 point, after, 8 point and line spacing to be multiple at 1.15.

Before this definition is saved, name it **AllComputerParagraph**, with 'Style type' paragraph and make sure AllComputerParagraph also appears in 'Style for following paragraph'.

Finally, ensure that the option to add the style to any new document is chosen; otherwise this style will only be attached to this single document.

Click 'OK' or 'Save' for the style to be available as an option.

You should now see your new style, **AllComputerParagraph**, in the list of available styles.
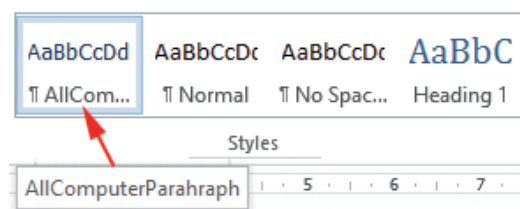
Now highlight all the text in InterviewLetter and click on the button AllComputerParagraph for the new style to be applied to the whole letter.

You will need to right justify the lines of the company address and the date.

Save the document.

Open a new document in your word processor to check that the new style is attached. Close without saving.

Which font for which audience?

There is a great deal of debate about what type of font face is best for a particular purpose, depending on the target audience and on the medium used, for example the printed page or the computer screen. Different fonts can also be used to give a particular impression of the type of organisation.

Suggestions vary, and there are few guidelines. It is claimed that on the printed page, serif fonts generally provide an invisible line that the eye can follow, allowing the eye to flow more easily over the text, improving reading speed and decreasing eye fatigue. Most books, newspapers, and magazines use a serif font, often because they give a more traditional feel, especially for established organisations with an older audience. However, there is very mixed evidence for this preference and many books and other resources printed for children are printed in sans-serif fonts (such as this book) because it is claimed that the simplicity of the letter shapes make them more recognizable. The cleaner, minimalist feel of a sans-serif font could be favoured by a younger, more modern organization.

So while a popular choice might be to send out a sales letter or brochure in the mail set in a serif font, you might want to consider other factors – who is going to read the document?

Headings are a little easier. The popular view is to have a sans-serif font because they often have more of a 'standout' value, even if the body text is in a serif font.

On screen, the convention seems to be to use a sans-serif font. There are a couple of easily accepted ideas behind this. Firstly, sans-serif fonts are cleaner or neater, given the small space that a pixilated letter is created within, and the serifs can make letters blur together. Secondly, with smartphones and other small devices having small screens but still accessing large volumes of text, the idea of clean and neat characters is important when screen resolution in these devices is not high. This is especially true with today's users rapidly zooming in and out when reading content and text has to be clear and easily read at any size.

Activity 3

Open the document **ComputerTypes** that you created in the last session.

Create a style for **AllComputerHeading** with the following definition:
- a sans-serif font, size 12, bold, dark green
- spacing before to be 0 point, after, 8 point
- left justified.

Apply this style to all six headings in the document.

Create a style for **AllComputerText** with the following definition:
- a serif font, 9.5 point size, dark blue
- spacing before to be 0 point, after, 8 point and line spacing to be multiple at 1.15
- fully justified.

Apply this style to all the body text of the document.

Create a style for **AllComputerTitle** with the following definition:
- a serif font, size 17, dark blue
- spacing before to be 0 point, after, 8 point
- centred.

The top of the document may look like this:

Computer Types

Mainframe computer

These are extremely large computers used in organisations (such as banks and government departments) where very large amounts of data are processed. They are capable of processing very big jobs which make use of their large memories and fast processor speeds. They are also capable of complex problem-solving that would take smaller computers much longer to do. However, mainframes are so large that they take up almost a whole room and are very complex to set up. Mainframe computers are expensive to operate and maintain and they require specialist staff to operate them.

Save this new document as: **ComputerTypesCorporate**.

Using emails to send attachments

Email is an electronic method of sending and receiving text messages from one computer to another over a network – either local – or wide – area. An attachment is an electronic copy of a file (which can be anything that converts into a digital copy, such as an image, a document, a video or sound clip) which is sent with the message.

You should be very familiar with sending and receiving emails. To be able to send a file as an attachment it must be available 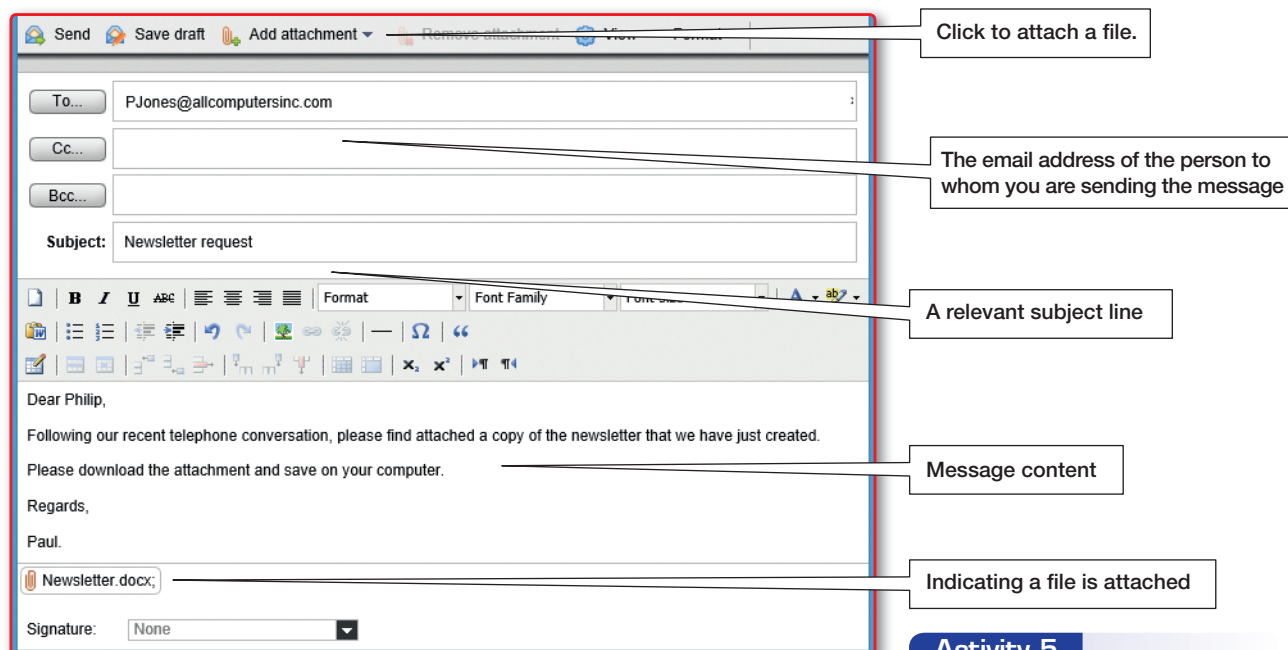to you, since you need at attach it to your email before you can send it. This means you have either created and saved it, or downloaded it, into a local folder.
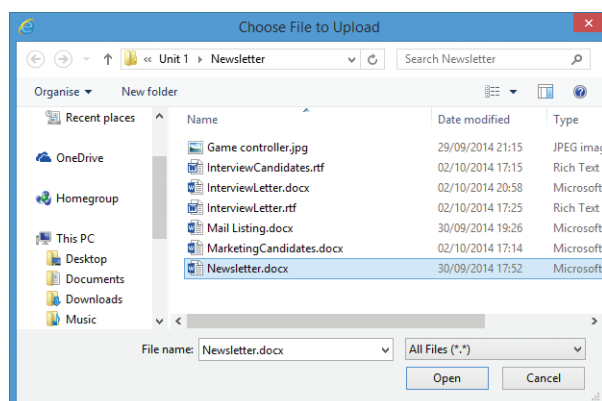
Here is a typical screen layout when composing a new email with an attached file:

Click to attach a file.

The email address of the person to whom you are sending the message

A relevant subject line

Message content

Indicating a file is attached

In this case clicking on the 'Send' button will send the message and the attached file (Newsetter.docx) to Philip Jones (PJones@allcomputersinc.com).

Close the email message without sending it.

If you had multiple files to attach, you would simply click on the paperclip icon, browse and attach each file in turn. Your email software may allow you to browse folders and make multiple selections in one browsing action.

In your email software click to open a new email message. Look around the window to find an option to add an attachment. A symbol often used is a paperclip, or there might simply be the words **Add attachment** or **Add file**. You will need to know where the file to be attached is saved, because when you click the button to add an attachment, you will be given a dialogue box to navigate through your folders in order to locate it. Search through your folders until you find the **Newsletter** you saved in Session 1.8. Select it for attachment by clicking on the file name, and then on **Open** (or maybe you have **Insert**).

Activity 5

The file **Newsletter** is one that needs to be emailed to one of your work colleagues at All Computers Inc. Ask a friend to act as the colleague at All Computers Inc. and send them an email with your newsletter as an attachment.

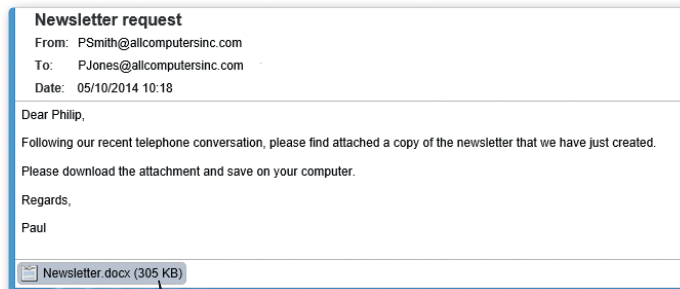## Receiving and downloading an email attachment

When you receive an email with an attachment, it will be displayed in the message and can then be downloaded and stored in a suitable location.

However, on receiving an email with an attachment do not automatically download and save it. You need, constantly, to be thinking about the dangers of downloading a file that contains malicious software (.zip and .exe files are potentially the most dangerous – although some email software will not allow these to be sent/downloaded). You need to ask yourself: Do I know the person who has sent this email? Am I expecting an attachment from them? What kind of file is the attachment? Do I trust the person who has sent this attachment? Be aware of potential dangers.

Real world

Once all the attachments are added, check that you have:
- the correct email address of the person to whom you are sending the message
- an informative subject line
- a clear and instructive message to the person.

Newsletter request
From: PSmith@allcomputersinc.com
To: PJones@allcomputersinc.com
Date: 05/10/2014 10:18

Dear Philip,

Following our recent telephone conversation, please find attached a copy of the newsletter that we have just created.

Please download the attachment and save on your computer.

Regards,

Paul

Newsletter.docx (305 KB)

Save As

Publication downloads

Organise ▼ New folder

Music
Pictures
Videos
TI31010800A (C:)
DVD RW Drive (D

Name | Date modified

File name: Newsletter.docx
Save as type: Microsoft Word Document (*.docx)

Hide Folders | Save

In order to choose the download location of a file attachment, right click the mouse on the link and select **Save File** or **Save File As**. You will be given a standard file window to choose the location of the download.
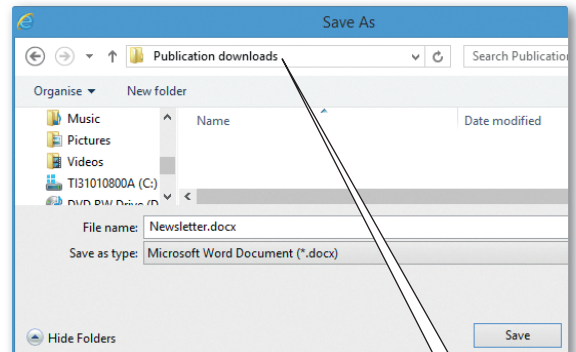
Clicking on the filename of the attachment or the download button will send the file to your default download area. The could be a folder name DOWNLOADS in the MY DOCUMENTS area, or the location where you last saved something

Activity 6

Reverse the previous activity and ask a friend to send you a copy of their presentation. Download it to a sensible location and open it.

Using Cc and Bcc

The standard way to add an address to an email is using the **To** option. However, there are occasions when the **Cc** (carbon copy) and **Bcc** (blind carbon copy) options can be used. Adding an address or addresses to the Cc window, in addition to the **To** window, will result in that person also receiving a copy of the message sent. All those involved will be able to see all addressees.
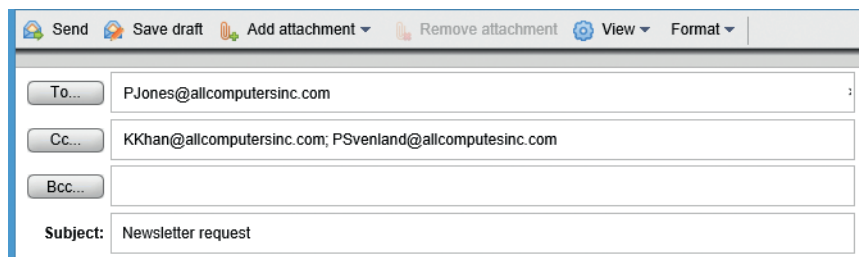
Real world

Cc and Bcc are normally positioned under the **To** option. However some email programs have the Bcc option disabled by default, as it often associated with spam and junk mail, so you may need to re-enable it before it can be used.

Send | Save draft | Add attachment ▼ | Remove attachment | View ▼ | Format ▼

To... | PJones@allcomputersinc.com
Cc... | KKhan@allcomputersinc.com; PSvenland@allcomputesinc.com
Bcc... |
Subject: | Newsletter request

For example, Khaled Khan also requires a copy of the newsletter for filing purposes. It's not directly for him to work with; he just needs to be kept up-to-date with what is happening with various publications. Petra Svenland of the printing department also needs a copy so that she knows what printing is about to be requested. In this case you would Cc Khaled and Petra. Philip Jones would be aware that Khaled and Petra had also received the email and attachment.

There are occasions when it is polite not to let everyone who receives an email, know the email addresses of everyone else who has received the email. This would not necessarily happen when sending emails within an organisation – many organisations actively encourage an openness about communication and require everyone's email address to be visible on a message.

To...	writer@megapopsensation.org
Cc...	
Bcc...	billy@123megamail.com; cathy@booglemail.com; omar@gulfbox.com; helga@rhir
Subject:	MassiveSquid Summer Concert Dates

For example, you may have signed up to a fan website of your favourite music group. An email newsletter may be sent out to all the people on the group's email list. As a matter of privacy it would be essential that you did not see everyone else's email address and you would be upset if you knew that your email address had been given to many other people without your permission. The way that this would be achieved is by using Bcc.

In this case **writer@megapopsensation.org** has written the email. The email is sent to themselves as well as to Billy, Cathy, Omar and Helga – and anyone else in the list's continuation. When Billy receives the email he will see that it has come from **writer@megapopsensation.org** but will not see any other email addresses – it will seem as though he is the only recipient.

Using email contacts

As has been mentioned, when contacting friends or colleagues using email, their address must be exactly right; one single character error and the message will not be received. Being able to save email addresses as contacts is an essential feature of any email software program or web-based email provider.

Web-based and software email packages may appear to be different but each will have some way of storing contacts and each person (just like an entry in a database) can have a number of different pieces of information (or fields) linked to them.

| General | Private | Additional | Attachments(0) |

|	
Title	Mr
Last name	Smith
First name	Paul
Phone	
Fax	
Cell phone	
E-Mail	PSmith@allcomputersinc.com
Company	All Computers Inc
Department	Marketing
Position	Technical Editor

This example of an address book entry shows the sort of information that can be saved. This may include:

- name
- contact email(s)
- job title
- company
- telephone number
- addresses
- photo.

For the purpose of this activity, only the name and email addresses need to be accurate, the other details can be invented.

To add a contact to the address book click on an icon or a tab that indicates **Add New Contact**. You may have buttons such as these:
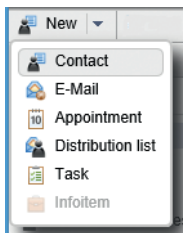
Clicking on Contact brings up the panels where you can add the details of the person to be added as a contact to your address book.

Once the details for a new contact have been entered they need to be saved.

Eventually you will have built up a contact list like this:
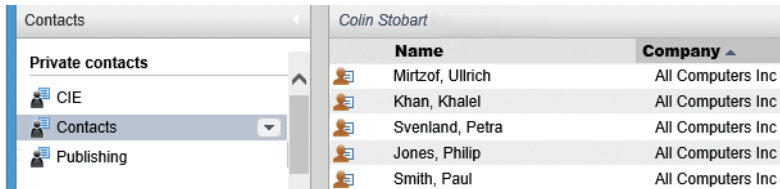
Contact groups/distribution lists

So far you have added the names and contact details of people who will eventually be a part of your complete address book. You need these specific contacts to be grouped so that you can refer to them all by a single name. This would enable us to send an email to a group instead of a list of individuals. Your email software might refer to Distribution Lists, as in the example below rather than Groups.

The first step to creating a group is by naming one. Click on the **New Group** (or **Distribution list**) button or icon in your software and name the group **AllComputersInc**.

Save the group.
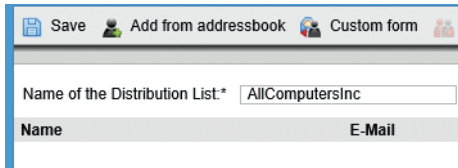
Here the steps would be:

- select the contact (Philip)
- choose to **Add** Philip to the group
- click and add the other four employees to the group
- click 'OK' to save these employees into the group.

Activity 7

Choose at least three friends in your class and make a note of the following information:

- full name
- email address
- mobile phone number
- business telephone number
- job title at All Computers Inc.

Activity 8

Using the Contact or Address book feature of your email package, add the details of classmates collected in Activity 7.

Activity 9

Add all of the members you entered in Activity 8 to the group **AllComputersInc** that you have just created so that they can all be referred to by the group name.

In some software, once a group is created, members can be added from your existing address book by selecting **Add Members** from a main menu. A **Remove Member** option will take that person out of the group but will not remove the person from the address book.

In the example above, selecting the person in the list and then clicking on 'Delete' will remove the person from the list.

Selecting just that group (All Computers Inc) will result in just those contacts who belong to that group being displayed:

Sending a message to a contact group

After choosing to create a new message all that is necessary is to click on 'Send To:' and then select the group from the list of available contacts:
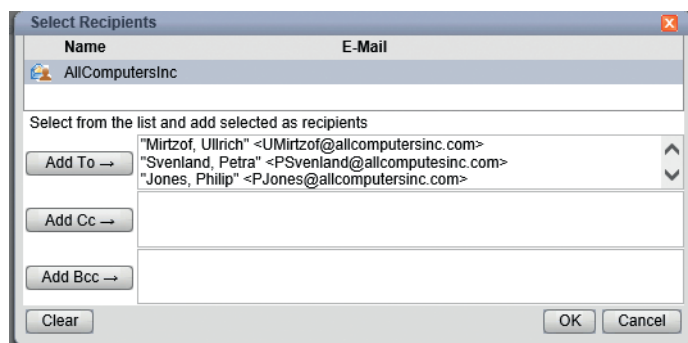
In this example, clicking on **AllComputersInc** in the group list and then 'OK', inserts all the emails connected to that group in the **To:** line.

Alternatively, your email software might show the group name like this:
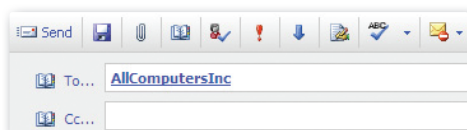
Activity 10

You need to send the Newsletter to all the people in the group **AllComputersInc**.

Create a new email message that:
- will be sent to the members of the group **AllComputersInc**
- has your own email address as a Bcc
- has the subject line: **Requested newsletter attached**
- has the message: **Hello everyone, Further to the recent request for the latest version of the newsletter, please find it as an attachment. Download and save to an appropriate folder. Kind regards.**

Send the email.
- Make sure that all your friends who are on the list received the email.
- Make sure that you (as a Bcc) also received the email.
- Save the attachment in your **Downloads** folder.

To send a fax or to send an email?

This example of sending out the newsletter to a number of different people illustrates the advantage of sending an email rather than sending a fax (short for 'facsimile').

When sending a fax, the fax machine scans the document converting it into a bitmap image. This image is then transmitted through the telephone system. The fax machine receiving the bitmap image converts the signal and prints out a copy of the original image. A computer can generate and send a 'fax' copy of a document to another fax machine which saves the sender having to print out the document first.

However, when a document is attached to an email the person receiving the attachment can download, edit, review, make comments on it, and then, after saving it on their computer, can email it back to you. This is a tremendous advantage over using fax. Another advantage would be that, as seen above, a single email can be sent to many people instantaneously – you would have had to fax everyone individually. Essentially, emailing is free whereas faxing will usually involve a cost per fax page. Of course everyone has to have an email address to receive an email, but then everyone would have to have a fax machine if you were sending faxes. However, the number of people you know who have access to a fax machine is probably very small, even zero – do you have one, if not you couldn't send one!

Emails can of course be hacked or face the threat of viruses.

Finally, do not forget that an attachment could be a document of many pages – such as the chapters of this book, which were exchanged a number of times during the writing, proofing and editing stages. Imagine having to fax all those pages – which could only be handwritten on and then sent back.

Emailing issues

Wherever you are using email, you need to be aware of issues surrounding your use of it.

The country that you are emailing from (or even into) may have strong filtering/censorship policies in place and so it is vital that in composing emails you avoid contentious or inflammatory vocabulary. This is because filtering systems will block, or treat as spam, emails that break the rules – meaning that your email does not get delivered.

It is general netiquette (internet etiquette) that you are polite and respect other people's views, keeping your language appropriate to the reader of the email. You never know who that email may get forwarded to – your permission might not be asked. DO NOT WRITE EVERYTHING IN CAPITALS, it appears that you are shouting or suggests that you are angry.

If you are emailing within a local area network such as at school or a small business, your school or organisation may have rules about the language and style of writing that you use.

Some organisations will have an encryption policy that applies to certain emails (in Session 1.5 advances in encryption was discussed). For example, personal or financial information sent by a company to outside agencies might be encrypted as a security measure. If you apply for a job you might decide to password protect your CV and application so that only the people you want to have see them can do so. You would need to let them know the password in a separate message.

Copyright is discussed in Session 5.5 but is also relevant here. If you had been one of the applicants for the Marketing Managers position in Session 1.10 and emailed your ideas for development, is that email copyrighted? If the ideas were just that – a few rough thoughts – then probably not, but if they were complete, detailed and operable then yes they probably are copyrighted because they could be seen as completed creative work.

Activity 11

Do you have a school email address? If so, find out what/if any rules are in place which govern your use of language, slang abbreviations, common text speak abbreviations, smileys or emoticons. Does your school email system have strong filtering based on vocabulary in the subject line/the text of the message?

Review and revise

You should now be able to:

- create documents and data source for carrying out a mail merge
- describe why corporate style guides are important
- to create and apply styles in a document
- create, send and receive an email message that has an attachment, and download the attachment
- use Cc, Bcc, Reply and Forward appropriately
- create and use an email group
- discuss the advantages of emailing rather than faxing
- discuss the issues surrounding the constraints affecting the use of email.

What have you covered?

In these four practical sessions you have:

- created new documents from external data and amended this text
- explored the use of footers and headers
- practised creating and applying styles, including font face, size, bold, underline, italic, alignment
- imported images, clip art and charts, resizing and cropping them
- practised adjusting the page layout: orientation, margins, columns
- practised sending a document as an attachment
- learned how to use advanced searching techniques to locate images and textual information on the internet
- practised copying/downloading images, text, charts and tables from websites
- practised working with templates and source data for a mail merge.

Some practice questions

You are going to edit a document, which is to be included as a review in a travel guide published by Compass Adventure Holidays. The relevant files are on the CD.

On the CD

1 Add the following contact for the Cycling Editor at the publishers, to your address book:

Cycling Editor   My.Name@abc.com

(*where* My.Name@abc.com *is **your** email address*)

2 Using a suitable software package, load the file **IndochinaByBicycle.rtf**.

3 Save the text as a word processing document with the name: **IndochinaArticle**.

4 Set the page size to A4.

5 Set the page orientation to landscape.

6 Set the top, bottom, left and right margins to 1.5 cm.

7 In the footer of the document place:
- an automated date, centre aligned.

8 In the header of the document place:
- an automated page number, right aligned.

Make sure that the header and footer are displayed on every page and that the alignments match the page orientation and margins.

9 Insert this heading at the start of the document: **Across Indochina by Bicycle**

10 Create a style **IndochinaHeading** with these settings:
- centre aligned
- a sans-serif font
- bold
- size 28 point

Apply this style to the heading.

11 Format the body text into two equally spaced columns, with a 1 cm gap between the columns.

12 Create a style **IndochinaText** with these settings:
- be a sans-serif font
- be fully justified
- have one and a half line spacing
- have a font size of 11 points.

Apply this style to the text in the body of the document.

13 Identify the three subheadings and make them ***bold italic***.

14 The main image for the article is to be a picture of the Victory Gate at Angkor Thom, in Cambodia, as shown here.

Use a search engine to find an image of this gate. If you are unable to, there is an image on the course CD.

Download and save this image into the same folder as you have saved **IndochinaArticle**.

15 Insert this image into **IndochinaArticle** so that it is centred, spanning the two columns on the first page. Use the text wrapping options to help with this.

Crop and resize the image so that it is the height of the column on the page (about 15 cm) and maintain the aspect ratio.

The first page should look like this:

Heading		
Text	Image	Text
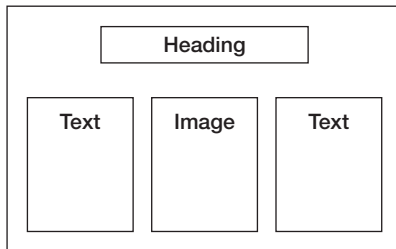
16 Save the document with a new name.

17 Prepare an email message:
- to be sent to the **Cycling Editor** (from your contacts list)
- with the subject **Indochina part 1**.

The body of your message should have the text:

Attached is the first section of the Indochina article.

18 Attach the document you saved at step 16 to this email.

Send the email.

Progress check

Aiming for good progress

With your word processing software you:
- can import text from .rtf and .txt file types into your word processing application
- can import images, charts or clip art into a document, resizing and cropping as necessary
- can adjust page settings: orientation, size, margins, two columns and place data in footers and headers
- can create a mail merge template and create details mailing list.

You can also:
- search the internet for images, download and save them to your computer
- copy text from webpages to place in a document of your own.

Using your email software you can:
- compose a message with an attached file
- use the Cc, Reply and Forward options as appropriate
- add a person's email details to a contact list.

Aiming for excellent progress

With your word processing software you:
- can confidently import text from a variety of file types into your word processing application
- can import images, charts or clip art into a document, resizing and cropping as necessary
- are confident with page settings: orientation, size, margins, multiple columns and also using footer and headers
- can set up and perform a mail merge successfully.

You can also:
- search the internet for images, download and save them to your computer
- copy text and tables from webpages to place in a document of your own.

Using your email software you can:
- compose a message with an attached file
- use the Cc, Bcc, Reply and Forward options as appropriate
- set up and use contact lists and contact groups.