

## UNIT 1

# Computer Users

### INTRODUCTION

A **computer** is a device that processes **data** according to a set of instructions known as a **program**. The equipment is known as the **hardware** and the programs and data are the **software**. A special set of programs, called an **operating system**, provides an interface for the user and allows applications programs to communicate with the hardware. Common **applications programs** include **wordprocessors** for creating and editing texts, **spreadsheets** for calculating mathematical formulae and **databases** for storing data in a way that allows the data to be sorted and searched. **Anti-virus programs** are used to detect and remove **viruses** (harmful programs that can reproduce themselves and attach themselves to other programs). Some operating systems have **graphical (user) interfaces** that allow the computer user to select items from **menus** (lists of choices) and to start programs using an input device called a **mouse**. This is done by pressing a button on the mouse i.e. **clicking** the mouse. The main device for inputting the data is a typewriter-style **keyboard** and the output is commonly displayed on a **monitor** screen that looks like a small television screen.

There is a range of sizes and types of computer. Those designed for use by one person at a time are known as **personal computers (PCs)** although the term PC is usually only applied to personal computers that are compatible with the standards laid down by the company known as **IBM** (International Business Machines). Personal computers include **desktop** computers (for use on an office desk) and **handheld** computers that can be carried around by the user. Electronics can be added to desktop computers by plugging in **expansion cards** (electronic circuit boards that can be plugged into special sockets called **expansion slots**).

It is also possible to build all the main parts of a computer into one electronic integrated circuit packaged as a single electronic **chip** (the common name for a microchip; an electronic integrated circuit in a small package) i.e. the '**computer on a chip**'. This enables computers to be built into other devices including household devices such as washing machines and fridges and to be incorporated into plastic cards i.e. **smart cards**, which are able to store information such as health records, drivers' licences, bank balances, etc. Devices that include a computer circuit are commonly referred to as **smart devices**. A **multimedia computer** can process different forms of data including text, graphics, **audio** (sound), animation and video. This enables computer systems to be used for a combination of education and entertainment, sometimes referred to as **edutainment**.

Unlike most machines, computers do not have a fixed purpose. They are multi-purpose tools. They can be used in a very wide variety of situations and are found in a wide range of systems including security systems, cars and phones. Advanced systems, known as **expert systems**, enable computers to 'think' like experts. Medical expert systems, for example, can help doctors diagnose an illness and decide on the best treatment. As computer systems are developed, they are becoming more common and are gradually being used for more and more purposes. How they are developed, and for what purposes they are actually used in the future, can be influenced by computer users. A variety of devices known as **peripherals** can be added externally to a computer. One of the most common peripherals is a **printer** used for printing the computer **output** (the processed data or signals that come out of a computer system)

on paper. A **digital camera** allows photographs to be input to a computer for editing.

Not all computer systems are **compatible** i.e. they cannot use the same programs and data. Connecting computers together to form a **network** can provide the 'connectivity' required to enable computers and software to communicate and to share resources. Networks connected together form an **internet**. The connection of networks throughout the world is known as **the Internet** (note that a capital I is used) or, more simply, **the Net**. Various communication services are available on the Internet, including **email** (electronic mail) for sending and receiving text messages and **IRC** (Internet Relay Chat) which allows users to communicate using text messages in **real-time** i.e. without any delay, while the users are **logged on** (connected to a network system account, normally using a password) to the system. An Internet service called **FTP** (File Transfer Protocol) is used for transferring data or program files between the powerful **server** computers that provide the network services and the **client** computers that use these services e.g. downloading music files. Note that copying data from a larger server system to a client is referred to as **downloading** and copying from the client to the server is known as **uploading**.

One of the newest and most popular services available on the Internet is **the World Wide Web (WWW)** which is often simply referred to as **the Web** (note the use of the capital W). The Web contains interlinked documents called **webpages**. A set of related webpages stored together on a server computer is called a **website**. Websites, such as Dogpile and AskJeeves, give the user

access to special programs called **search engines** that are designed to allow the user to find relevant webpages on the Web. An Internet system designed to provide free, interactive access to vast resources for people all over the world is sometimes referred to as an **information superhighway**.

Services such as these allow people to **telecommute** (use their computers to stay in touch with the office while they are working at home). Computer uses mentioned in this unit include producing greetings cards; learning, using three-dimensional graphics programs called 'Splat the Cat' and 'Pets 3'; using the Microsoft Word wordprocessing program including features such as **clipart** (ready-drawn graphic images that can be inserted into documents); communicating on the Internet using email and chat programs including the use of **email attachments** (other types of files e.g. video files attached to simple email text messages); distance learning and **videoconferencing** (a form of communication over a network that uses video cameras so that the people taking part can see and hear each other); electronic classrooms or boardrooms; **browsing** the Web (moving from webpage to webpage using a Web browser program); selling, using a website; painting; scanning pictures; downloading music and creating **CD-ROMs** (compact disk read only memory, commonly referred to as **CDs**). CD-ROMs are storage devices that use laser light for reading and writing data. The most common storage device is a **hard disk** (a set of aluminium disks coated in a magnetic material and enclosed in a vacuum-sealed case) used for storing the operating system and applications programs as well as the user's data.

## UNIT 2

# Computer Architecture

### INTRODUCTION

There are different types of computer of varying size and power, including the following:

**Supercomputer** (the most powerful type of mainframe)

**Mainframe** (large, very powerful, **multi-user** i.e. can be used by many people at the same time, **multi-tasking** i.e. can run many programs and process different sets of data at the same time)

**Minicomputer** (smaller than a mainframe, powerful, multi-user, multi-tasking)

**Personal computer (PC)** (single user)

**Desktop computer** (suitable size for sitting on an office desk)

**Workstation** (most powerful type of desktop, used for graphic design, etc.)

**Portable** (can be carried around, can operate with batteries)

**Laptop** (large portable, can be rested on user's lap)

**Notebook** (size of a sheet of notebook paper)

**Handheld** (can be held in one hand)

**Pen-based** (main input device is an electronic pen)

**PDA** (personal digital assistant, has functions such as task lists, diary, address book)

Note that the term **PC** usually refers to an IBM compatible personal computer i.e. an Apple Mac personal computer is not referred to as a PC. A computer that provides a service on a network e.g. storing files, sharing a printer, is known as a **server** computer. Server computers usually have a **UPS** (uninterruptible power supply) attached to them. This is a battery that automatically provides an electricity supply to allow the server to shut itself down properly if the main supply fails.

The **processor** e.g. Pentium, is the most important part of the computer. It processes the data and controls the computer. Powerful computers used as servers often have more than one processor. There are two main types of **memory**:

- a **RAM** (random access memory) holds the program instructions and the data that is being used by the processor.
- b **ROM** (read only memory) holds the program instructions and settings required to start up the computer.

The combination of the processor and memory is sometimes referred to as the **CPU** (central processing unit), although sometimes the processor itself is referred to as the CPU. The other parts connected to the CPU are known as **peripherals**. These can include input devices, output devices, storage devices and communications devices. **Input devices** include: keyboards, scanners, barcode readers, digital cameras, microphones and video cameras e.g. webcams (small digital video cameras used on the Web). **Output devices** include: **monitors** (VDU display screens), printers, plotters, loudspeakers, headphones. **Storage devices** include: magnetic tape, **floppy disks** (diskettes), hard disks, CD-ROMs, CD-R disks, CD-RW disks, DVDs and MO disks. A common **communications device** is a **modem** (a modulator/demodulator used for converting digital signals to analogue signals and vice versa to allow a computer to be connected to the ordinary telephone system).

A set of connectors used for carrying signals between the different parts of a computer is known as a **bus**. Data is transferred constantly between the processor and memory along the **system bus**. Each part of memory has its own **memory address** and

the processor determines where processed data is stored by sending an address signal along an **address bus** and data along a **data bus**. This is synchronised by an electronic **clock** in the CPU that determines the operating speed of the processor. Transferring data between the processor and RAM can slow up the computer; therefore, some very expensive, extremely fast memory is usually used as a **cache** to hold the most frequently used data.

In a desktop computer, the **CPU** (central processing unit) and **storage devices** (pieces of equipment used for reading from and writing to a storage medium) are normal built inside a **system unit** which consists of a metal chassis enclosed in a flat desktop or a tower shaped case. Other peripherals are attached to the system unit by cables. Each peripheral uses its own **driver card** or **controller** (an expansion card that is plugged into special **expansion slots** in the system unit). **Expansion cards** contain the electronics required to communicate with and control the device e.g. **video** or **graphics cards** are used for monitors, **soundcards** are used for audio input/output and **NICs** (network interface cards) are used for connecting to other computers in a **network** (computing devices connected together). Extra memory can also be added to the computer using special **memory expansion slots** inside the computer. A portable computer that does not have enough space inside to fit expansion cards may use an external device called a **port replicator** to provide connections for peripherals.

**Storage devices** in the form of a **disk** or **tape** are used to store the programs and data that are not being used. Note that the American spelling of *disk* is commonly used, although the British spelling, *disc*, is sometimes used. Before a program or data can be used, it must be transferred from the

storage device to the main RAM memory. **Hard disks** consist of a set of magnetic coated metal disks that are vacuum-sealed inside a case to keep out the dust. The magnetic surfaces of the disks are **formatted** using a **read/write head** to provide magnetic storage areas. These storage areas form concentric circles called **tracks** and each track is subdivided into sections called **sectors**. The disks are rotated at high speed and read from or written to by the read/write head that moves across the surface of the disks. In server computers, hard disks can be connected together and made to operate as one unit using **RAID** (a redundant array of inexpensive disks – see Unit 17). This can speed up the system and provide a way of recovering data if the system **crashes** (fails suddenly and completely, usually referring to the failure of a hard disk). There is a variety of optical storage devices that use laser light to read or write to a disk, including: **CD-ROMs** (compact disk read only memory), **CD-R** (recordable compact disk), **CD-RW** (re-writable compact disk), **DVD** (digital versatile disk – previously known as digital video disk).

An input device called a **barcode reader** is a special type of **scanner** for reading **barcodes** (a set of printed bars of varying thickness that are used to identify a product e.g. used to price items in supermarkets).

When comparing computers, the **power** of the computer is important. This is mainly determined by the **speed** and **capacity** (size) of each part of the computer.

Speed is measured in **hertz (Hz)** i.e. cycles per second.

Capacity is measured in **bytes (B)** where 1 byte = 8 **bits** (binary digits) = 1 character.

When specifying a computer the following are normally quoted:

- a the speed of the processor (MHz – megahertz, GHz – gigahertz)

- b the capacity (size) of the memory (MB – megabytes)
- c the capacity (size) of the **magnetic storage devices** e.g. hard disk, floppy disk (MB – megabytes, GB – gigabytes)
- d the speed of the **optical storage devices** e.g. CD-ROM, DVD (given as a multiple of the speed of the first devices produced e.g. 24× = 24 times, 12× = 12 times)
- e the display monitor size (measured in inches diagonally across the screen surface)
- f the monitor image quality (**resolution**) given by the number of **pixels** (picture elements) that are used across and down the screen e.g. 800 × 600, or by the graphics standard used e.g. **VGA** (video graphics array), **SVGA** (super video graphics array)
- g the graphics card memory size (MB – megabytes)
- h the speed of the modem (measured in **kbps** – kilobits per second)

Two different number systems are used in computer specifications:

- a The **decimal system**, which consists of ten digits from 0 to 9, is used for measuring speed.

- b The **binary system**, which only has two digits (1 and 0), is used for measuring capacity.

The following prefixes are also used in measurements:

	Decimal system	Binary system
<b>kilo</b>	$10^3 = 1 \text{ thousand}$	$2^{10} = 1,024$
<b>mega</b>	$10^6 = 1 \text{ million}$	$2^{20} = 1,048,576$
<b>giga</b>	$10^9 = 1 \text{ thousand million}$	$2^{30} = 1,073,741,824$

- e.g. 1.7 GHz = one point seven thousand million cycles per second  
 $256 \text{ MB} = 256 \times 2^{20} \text{ bytes} =$   
 approximately two hundred and fifty six million bytes

Communication is provided between **applications programs** (wordprocessors, drawing programs, etc.) and the computer **hardware** (the physical components of a computer system) by a set of programs collectively known as the **operating system** e.g. Microsoft Windows, MacOS.

## OBJECTIVES

By the end of this unit, Ss should be better at:

- reading for specific information
- understanding computer advertisements.

They should understand and be able to use:

- structures for expressing function
- prepositions of place.

They should know and be able to use names of types of computers, computer features, sequence words.

## STARTER

- 1 This provides an opportunity to revise the names of types of computer: *supercomputer, mainframe, workstation, desktop, portable, pen-based computer, PDA (Personal Digital Assistant)*. Have Ss do the task individually and then compare answers in small groups. Where there is disagreement, Ss should justify their answers. You can then compare answers in plenary.

## UNIT 3

# Computer Applications

### INTRODUCTION

As computer systems become more intelligent, they are used in a wider variety of work situations where previously it was necessary to employ people. Hospitals can increasingly use computers where highly trained people were required to deal with life-threatening situations. Computers can also be used in airports where highly trained experts were previously required to ensure safety and the police can make more use of computers to detect and investigate increasingly sophisticated crimes.

One of the uses considered in this unit is police **speed traps** used to catch drivers that are breaking the official speed limit. In earlier systems, **radar** equipment was used to bounce radio waves off the moving car. A small processor, known as a **microprocessor**, calculated the speed of the car from the changes in the radio waves and triggered an ordinary camera with a flashgun to take a photograph of the car if it was speeding. The details were stored on a **smart card** (a plastic card with a built-in computer system that can store large amounts of data). When the smart card was taken back to the police station, the driver's details were obtained from the **DVLC** (Driver and Vehicle Licensing Centre) **database** i.e. the central computerised records of all licensed drivers and vehicles.

Newer systems prevent '**surfing**' i.e. where the driver only slows down as they pass through the speed trap, by using two computerised units with digital cameras placed at a fixed distance apart. Each unit records the time that a vehicle passes it, as well as photographing and identifying the car licence number using **OCR software** (optical character recognition software that changes picture images of letters and numbers into digital form for use by a computer system).

The computer then uses the difference in recorded times to calculate the speed of the vehicle. The registration numbers of vehicles exceeding the speed limit are immediately **downloaded** (copied from the computer to a server computer) to the computer at police headquarters where each vehicle is matched with the DVLC database. Standard letters are then printed off addressed to the vehicle owners using **mailmerge** (a wordprocessing feature that produces a separate standard letter containing details obtained from each record in a database).

There are many ways in which computer systems can be used in large supermarkets, particularly for financial calculations and in stock control using **EPOS tills** (electronic point of sale cash tills). Each item on a supermarket shelf has a **barcode label** with a **barcode** (a standard set of vertical bars of varying thickness used to identify products) printed on it. The barcode number system giving standard price and item code numbers used throughout Europe is known as **EAN** (European Article Number). The barcodes are read by scanner devices called **barcode readers** that are attached to the EPOS tills. When a checkout operator moves the barcode label across the scanner, the label is scanned and the barcode number for that item is read. The scanner signals are converted to a **digital** form (where the changing signal is either off or on) and sent to the supermarket branch computer. The branch computer checks the digital EAN code against a computer **database** (a type of applications program used for storing information so that it can be easily searched and sorted) that holds a record of each type of item. In this way the item and the price of the item can be identified and the sale of the product can be recorded by the computer. The item and the price are shown

on the EPOS till display and printed on a paper receipt.

Computers are also used to provide cash to users and to process bank cards such as

Visa cards using an **ATM** (automatic teller machine – the type of machine used by banks for enabling customers to withdraw money from their bank accounts).

## UNIT 4

# Peripherals

### INTRODUCTION

**EPOS** (electronic point of sale) **tills** used in supermarkets form part of a computer system with various input and output **peripheral devices** attached to the till, including: **electronic scales** for weighing produce, **barcode reader** for looking up prices using **barcodes**, **swipe card reader** for reading bank cards, **numeric keypad** for inputting prices manually, **LCD** (liquid crystal display) screen for outputting purchase details.

**Digital cameras** are gradually being developed that are as good as conventional cameras. They have various electronic devices inside, including:

- a **LCD** (Liquid Crystal Display) screen used as a view-finder and for viewing the pictures after they have been taken.
- b **CCD** (Charge-Coupled Device) consisting of thousands of **photo-transistors** (light-sensitive transistors – a transistor is an electronic switch). It creates the pictures as a set of dots or **pixels** (picture elements).
- c Memory cards e.g. **flash cards** – **solid state memory** (electronic integrated circuits, i.e. chips, used for storing the pictures).

There is no delay in getting pictures from digital cameras because there is no film requiring chemical processing. They can be attached to a computer to directly transfer pictures for editing using special software and unwanted pictures can be deleted. However, they cost more than conventional cameras and the quality is not quite as good. You also need to buy rechargeable batteries and a photo-quality colour printer with high printing costs for paper, ink, etc. Two important features when buying a digital camera are:

- a picture quality or **resolution**. The resolution of a camera is measured in pixels and given as two numbers, indicating how many pixels there are across the image and how many going down the image e.g. 1280 by 960 (or  $1280 \times 960$ ).
- b the number of pictures the camera can store. The higher the resolution, i.e. the more pixels, the more memory is required to store the pictures. Data can be compressed to allow more pictures to be stored.

**Storage devices** are used to store data and programs that are not being used by the processor. They usually consist of:

- a **storage media** in the form of a circular disk or a tape where the data is stored
- b a **disk or tape drive** that moves the media past a **read/write head** that reads the data from and writes data to the storage media.

Types of storage devices include:

<b>magnetic devices</b> (that use magnetism)	<b>floppy disks</b> (diskettes) and <b>magnetic tape</b> made of a magnetic coated flexible plastic; <b>hard disks</b> made of magnetic coated aluminium disks.
<b>optical devices</b> (that use laser light)	<b>CD-ROM</b> – compact disk read only memory <b>CD-R</b> – recordable compact disk <b>CD-RW</b> – re-writable compact disk <b>DVD-ROM</b> – digital versatile disk read only memory <b>DVD-RAM</b> – digital versatile disk random access memory

<b>magneto-optical devices</b> (that use a combination of magnetism and laser light)	<b>CD-MO</b> – magneto optical compact disk
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**Read only media** enable the user to both read data from and write data to the media. **Read and write media** can only be used for reading data i.e. the stored data cannot be changed in any way.

**Removable storage** enables the user to change the media and transfer it to another computer.

**Fixed storage** does not allow the media to be changed or transferred to another computer.

Other factors that vary between storage devices include:

- the speed at which the drive moves the media past the read/write head and reads or writes data to the storage media
- the capacity of the media i.e. how much data can be stored on each disk or tape
- the cost of the drive and the media.

There are various types of **printers** for outputting text and graphics to paper.

Some types of printers are **mono** (print in black and white only) and others can print in colour. The speed, quality and cost of printing varies between different types of printer. Some are designed for printing text and are not really suited to printing graphics.

Data can take many forms and there is a wide variety of input, output, storage and communication **peripherals**.

**Units of measurement** used in data storage include:

<b>bit</b>	a binary digit i.e. a 1 or a 0
<b>byte</b>	8 bits = 1 character i.e. a letter, numerical digit or a punctuation mark
<b>megabyte (MB)</b>	1,048,576 bytes (approximately one million bytes)
<b>gigabyte (GB)</b>	1,073,741,824 bytes (approximately one thousand million bytes)
<b>terabit</b>	1,099,511,627,776 bits (approximately one thousand gigabits)
<b>micron</b>	one millionth of a metre
<b>angstrom</b>	the approximate radius of an atom

## OBJECTIVES

By the end of this unit, Ss should be better at:

- listening for specific information.

They should understand and be able to use:

- ways to express comparison and contrast.

They should know and be able to use terms for common peripheral devices.

## STARTER

**1** EPOS tills and how they work should be familiar from Unit 3. *Swipe cards* may be a new

term. Ss should do the task individually and then compare answers in pairs or small groups.

### Key 1

#### Input devices

Electronic scales  
Barcode reader  
Swipe card reader  
Numeric keypad

#### Output devices

Liquid Crystal Display

**2** Ss should make the links individually. They can work in pairs or small groups to name the peripherals. Continue this task by asking them



## INTRODUCTION

A job in **Computing Support** involves setting up and maintaining computing systems and providing help and training to computer users.

Qualifications in computing available in the United Kingdom include:

**Higher National Certificate (HNC)** – this is a qualification available in a wide variety of subjects that is studied in a college after leaving school. It can be studied as a full-time course but is often studied part-time. It normally takes a year to complete.

**Higher National Diploma (HND)** – this is a higher qualification than an HNC, also available in a wide range of subjects and studied at college, often after completing an HNC. It is, however, at a lower level than a degree which is studied at a university. It is usually a full-time course and can take one or two years to complete.

Course subjects and topics discussed in this unit include:

<b>Computer Architecture</b>	the way that the components of a computer are connected together
<b>HW Installation &amp; Maintenance</b>	installing and maintaining <b>hardware</b> (computer equipment)
<b>Info Tech Applications</b>	ways of using Information Technology (IT)
<b>Multi-user Operating System</b>	a set of programs used for controlling a computer such as a mainframe that can be used by many users at the same time

<b>Network Technology</b>	systems involved in connecting computers together
<b>Software Development Life Cycle</b>	the stages in developing a new computer program and training users how to use it
<b>Standalone Computer System Support</b>	setting up and maintaining computers that are not connected together in a network
<b>Software Development Procedural Language</b>	writing computer programs using a computer language that operates using modules called procedures
<b>Data Communications, Telecommunications</b>	transmitting and receiving data across a network system that uses the telephone network e.g. the Internet
<b>Information Systems &amp; Services, IT and Information Systems, Systems Building</b>	creating systems for providing business information using combinations of computer applications programs
<b>Systems Development</b>	stages involved in developing a computer system
<b>Project Management</b>	organising a computer development project
<b>Applications</b>	using <b>applications programs</b> such as wordprocessors, spreadsheets and databases

<b>Communication, Making Presentations</b>	language skills; how to get your point over; how to make a <b>presentation</b> i.e. giving a talk about a subject	<b>Memory Management</b>	the way that a computer uses electronic memory to store programs and data
<b>Creating a database, Learning Access</b>	designing a system for storing related data so that it can be easily searched and sorted using the Microsoft <b>Access</b> database program	<b>LAN Topologies</b>	ways of connecting computers together to form a <b>LAN</b> (local area network – a network over a small area)
<b>Systems Analysis</b>	analysing systems and designing programs for computerising the system. Also training users to use the computerised system.	<b>PC Bus Architectures</b>	how different types of buses work in <b>PCs</b> (IBM compatible personal computers). <b>Buses</b> are sets of connectors that carry signals between different parts of a computer.
<b>Programming, Writing a program</b>	carried out by a person called a <b>programmer</b> . It involves writing a <b>program</b> (a set of instructions written in a computer language for controlling a computer).	<b>How to connect printers</b>	connecting printers to a computer to act as output devices
<b>Computer Use and Applications</b>	ways of using computers and computer programs	<b>Unix Operating System</b>	the <b>operating system</b> commonly used on mainframes and multi-user systems. An operating system is a set of computer instructions that allow computer applications to communicate with the hardware.
<b>Network Commands</b>	computer instructions used to control computers connected together	<b>Pascal</b>	a computer language used for teaching programming. Other computer languages mentioned include <b>COBOL</b> and <b>C++</b> (pronounced as C plus plus).
<b>Compilers vs Interpreters</b>	using systems programs that convert <b>high-level languages</b> that humans use for writing programs into <b>machine code</b> that the computer processor can use. <b>Compilers</b> convert the whole program before the program is executed, whereas <b>interpreters</b> convert the program, one line at a time as the program is running.	<b>Maintenance of desktops</b>	looking after personal computers designed for use on an office desk
		<b>Wordprocessing and other office applications</b>	computer programs used in an office environment
		<b>Binary system</b>	a number system with only two digits (1 and 0) used in computing

## UNIT 6

# Operating Systems

### INTRODUCTION

The **OS (operating system)** is the set of computer programs that allow the user to perform basic tasks like copying, moving, saving and printing files. It also provides an **interface** between (i.e. provides communication between) **applications programs** (e.g. wordprocessors or spreadsheets) and the computer hardware. As a user interacts with an applications program on the screen, the applications program communicates with the operating system and the operating system communicates with the computer hardware. The work of the operating system takes place in the background and is not always obvious to the user.

The most important program in an OS is the **supervisor program**. It remains in memory all the time that the computer is operating, and manages the OS. It loads other parts of the OS into memory when they are needed. Programs that remain in memory while the computer is in use are known as **resident programs**. Programs that only stay in memory while they are being used are known as **non-resident programs**.

Some operating systems are **command driven** (i.e. the user runs a program by typing

a command). The screen is usually blank except for a symbol (e.g. \$) which acts as a **command prompt**. When the command is typed at the prompt and the Enter key is pressed, the command is processed and the output is displayed on the screen. OS commands are usually short words or abbreviations (e.g., date, logout, passwd, ls).

**Unix** is a command driven operating system used on all sizes of computers, but mostly large multi-user, multi-tasking mainframe computers. It is available in many versions, such as Linux, Minix, HP-UX, Xenix, Venix, Ultrix, A/UX, AIX, Solaris, and PowerOpen. Other command driven operating systems mentioned in this unit include: VAX/VMS, MVS VM OS/390, NetWare, MS-DOS and PC-DOS.

Some operating systems have a **GUI** (pronounced like 'goo-ey' – **graphical user interface**) that allows the user to use a mouse to click on icons on the screen or choose commands from a list of choices known as a **menu**. Operating systems with graphical interfaces mentioned in this unit include: MacOS, OS/2, Penpoint, Windows NT, Windows 3.x, Windows 9X and Windows 2000.

### OBJECTIVES

By the end of this unit, Ss should be better at:

- predicting text contents from figures and title
- making a summary
- exchanging information and defending decisions orally.

They should understand and be able to use:

- the *-ing* form in subject position and after prepositions.

They should know and be able to use logical connectives such as:

*although/because/but /in addition/such as/therefore.*

### STARTER

**1** Ss should work in pairs or small groups to make a list of any operating systems they know. Make a board list from their answers. Your task is to record and, where appropriate,

## UNIT 7

# Graphical User Interfaces

### INTRODUCTION

A **user interface** allows a user to interact with a computer. In particular, a **GUI** (graphical user interface) allows the user to use a **mouse** to interact with the computer. **Microsoft Windows** (commonly referred to as Windows) is a common GUI used on **PCs** (IBM compatible personal computers). The main Windows background screen is called the **desktop**. Programs, files and folders are represented on the desktop by small images called **icons**. Using a mouse, the user can move a pointer (**cursor**) across the screen. An icon can be **selected** by **clicking** the left mouse button (i.e. quickly pressing and releasing the button). By holding the pointer over an icon (**hovering**), a text box can be made to appear that explains what the icon represents. This text box is known as a **tooltip**. **Double-clicking** the mouse (pressing and releasing the button twice in quick succession) causes the program, file or folder represented by the icon to open in a rectangular box on the screen called a **window**. More than one window can be open at a time but the one with the focus is known as the **active window**. Windows can have a vertical **scroll bar** and a horizontal scroll bar to allow the user to move a document up and down or across the screen respectively. A user can **drag** a selected item from one part of the screen to another by holding down the left mouse button while moving the pointer. The user can then **drop** the item at the new location by releasing the mouse button.

Commands are displayed in a **menu bar** along the top of the window. Clicking on a command opens a list of choices known as a **menu**. Clicking on a menu item sometimes opens another related menu called a **submenu**. Common commands include:

<b>Find</b>	searches for a word, filename, or folder name
<b>Undo</b>	reverses the last action of the user
<b>Cut</b>	deletes the selected text, file or folder and copies it to a special area of memory called the <b>clipboard</b>
<b>Paste</b>	inserts the text, file or folder stored in the clipboard, at the location of the cursor

A bar, known as a **taskbar**, is displayed along the bottom of the desktop showing what programs, files and folders are currently open. At the far right of the taskbar is a special area called the **system tray** where icons are displayed showing what resident programs are continuously running in the background e.g. the system clock or a sound volume control. There is a **Start button** at the far left of the taskbar. When the Start button is clicked, the **Start menu** opens on the screen. The user can close down the operating system by choosing the **Shut Down** option on the Start Menu. A **touchscreen** allows the user to select icons and commands by touching the display screen with their finger instead of using a mouse. Graphical user interfaces were first introduced with the Apple Mac OS. Other GUIs with desktops, icons, pointers, windows, menus and submenus are also available.

**Common icons** on the Microsoft Windows desktop include:

<b>Microsoft Outlook</b>	a messaging program
<b>My Briefcase</b>	a program that allows the user to exchange files with a portable computer and to synchronise the files on each computer

<b>Network Neighbourhood or My Network Places</b>	a feature that displays the names of other computers networked with yours
<b>My Computer</b>	a feature that lets you see the resources on your computer
<b>Internet Explorer</b>	a browser program that allows the user to view webpages on the Internet
<b>Recycle Bin</b>	a feature that stores deleted files and allows the user to restore them to their original location i.e. the equivalent to the <b>trashcan</b> on an Apple Mac system.

  

A + sign used between the names of keyboard keys means that the user should press both keys simultaneously e.g. ALT + TAB. Keyboard keys and combination of keys mentioned in the text include:	
<b>Shift key</b>	allows you to type in upper case (capital letters)
<b>MouseKeys feature</b>	enables you to use the numeric keypad to move the mouse pointer
<b>ALT + TAB</b>	allows you to switch between open programs
<b>StickyKeys feature</b>	helps disabled people to operate two keys simultaneously
<b>PRINT SCREEN key</b>	lets you copy an image of the whole screen to the Clipboard
<b>ALT + PRINT SCREEN</b>	lets you copy an image of the active window to the Clipboard

### OBJECTIVES

By the end of this unit, Ss should be better at:

- reading for specific detail quickly.

They should understand and be able to use:

- *allow, enable, help, let, permit* correctly to describe developments in computing.

They should know and be able to use terms associated with GUIs such as: *button, desktop, icon, menu, pointer, submenu, system tray, taskbar, window*.

### STARTER

- 1 Do this in small groups to encourage discussion.

### Key 1

1d 2c 3a 4f 5g 6h 7e 8b

- 2 Ss should spot the differences individually at first, then compare in pairs.

### Key 2

- 1 menu choices, toolbar terms, icons, no system tray, no task bar
- 2 windows, icons, menus, pointer

### READING

- 3 This provides further practice in reading for detail, in this case the boxed texts which accompany the diagram. Ss should do this task individually. Write the time at one-minute intervals on the board so that Ss can note how quickly they can find the information.

## UNIT 8

# Applications Programs

### INTRODUCTION

**Software** is the word used to refer to **programs** (sets of computer instructions written in a computer language) and **data** that is input, processed and output by a computer system. **Applications programs** are programs that allow the user to do various types of work on a computer e.g. wordprocessors, databases. A set of related applications programs is referred to as a **package** (or **suite**). Common applications programs include:

<b>wordprocessors</b>	for creating and editing texts
<b>spreadsheets</b>	for performing calculations using formulas
<b>databases</b>	for storing data so that it can be easily searched and sorted
<b>graphics</b>	for drawing
<b>games</b>	for playing fast action games
<b>accounts</b>	for keeping business accounts
<b>payroll</b>	for calculating salaries
<b>presentation program</b>	for creating multimedia slide shows
<b>email</b>	for sending electronic mail messages
<b>PIM</b> (personal information manager)	for keeping track of appointments, address book, task list, etc.
<b>DTP</b> (desktop publishing program)	for creating publications to be printed by a professional printer
<b>small business tools</b>	for performing various business tasks
<b>website editor</b>	for creating and editing webpages
<b>image editor</b>	for editing graphic images
<b>developer tools</b>	for writing programs to add features to existing applications and creating integrated program systems

Some **applications programs**, such as wordprocessors, spreadsheets and databases, are commonly referred to as **office programs** because they are commonly used in a typical office. **Office packages** (or **suites**) such as **Microsoft Office** are sets of inter-related office programs. Different versions of office suites are usually available containing different combinations of programs.

**Mailmerging** is a useful feature found in most office suites that combines a database with a wordprocessor document to automatically produce a copy of a standard letter for each record in the database.

A variety of **computer hardware** is used in the doctors' practice in this unit including:

<b>PC</b>	common name for an IBM compatible personal computer
<b>network</b>	computers connected together
<b>file server</b>	a powerful computer that stores and allows users access to data files on a network
<b>laser printer</b>	a very high quality text and graphics printer that has a photosensitive drum that deposits toner powder on the paper
<b>dot-matrix printer</b>	a low quality printer that prints by hammering pins on the paper to print an image made up of dots. The hammering action means that it can print on special multipart paper where a number of copies are produced at the same time.
<b>CD-ROM</b>	a compact disk read only memory storage device that is cheap to produce and suitable for storing large amounts of data

The **Patient Browser program (GPASS)** discussed in this unit is a type of **database** for sorting and searching patient records. To

search, you select different option screens by clicking on a **tab** with a mouse and inputting the **search criteria** (details of what you are looking for) in text boxes known as **criteria boxes**. Different **button icons** can be clicked to perform different operations e.g. the Find button. The **default button** is the option that is selected automatically.

**Tomb Raider** is a popular adventure game that has appeared in various versions. The main character is represented by a female animated image, known as **Lara Croft**. The user follows a storyline in which they have to solve puzzles and control the movements of the main character, sometimes having to react quickly to avoid dangerous obstacles. It is available on well known **games consoles** (specialised games computers) called **PlayStation** and **Dreamcast** manufactured by a company called Sega.

**SimCity** is a **simulation program** (a program that simulates real life) in which the user has to develop a city by building roads and **3D** (three-dimensional) buildings, setting taxes, etc. They also have to control objects such as simulated cars and people. The user can **download** (copy from a server computer) additional objects and swap items with other users using a special website. The game is run on a computer called a **Commodore 64** (an early British type of personal computer particularly suited to games because of its excellent graphics facilities).

An **ASP (application service provider)** rents applications to users i.e. instead of buying software, the user pays for using applications as and when they need them.

The ASP provides the software, manages the hardware and provides storage space, security controls and the physical links to customers. The ASP normally leases storage space for programs and data from **data centres** (facilities for storing large amounts of information) owned by data storage specialists.

The user is provided with **remote access** (access across a communications network) to a wide variety of programs including: generic applications such as **email** (electronic mail) and office suites, **high-end** (advanced) packages including large, complex business applications such as enterprise resource planning tools (e.g. **SAP**), business services, such as payroll and accounting systems, expensive specialist tools and **e-commerce** resources (electronic commerce – buying and selling on the Internet).

This gives the user more flexibility and saves them having to install and maintain programs, **upgrade** (install newer versions of programs), deal with **viruses** (programs that can reproduce themselves and are written with the purpose of causing damage or causing a computer to behave in an unusual way) and manage **email systems** (electronic mail systems).

Disadvantages of this system include: the need for a **broadband** (high bandwidth i.e. a connection with a high signal capacity) network connection or a **leased line** (a cable connection that is rented for use in a communications system) and dependence on the ASP to provide a secure, reliable, readily available service.

## OBJECTIVES

By the end of this unit, Ss should be better at:

- reading and note-taking
- exchanging information orally
- defending their choice.

They should understand and be able to use:

- simple and complex instructions.

They should know and be able to use terms for common applications packages.

## INTRODUCTION

**Multimedia** is the term used to refer to a combination of text, graphics, animation, sound and video.

**MP3** (MPEG Audio Layer 3) is a standard way of storing compressed, digital audio files (usually music). **Digital audio** is created by sampling sound 44,000 times a second and storing a code number to represent each sound sample. The files are compressed by removing any sounds that are inaudible to the human ear, making them much smaller than files created using other digital audio storage standards, such as **WAV**. The size of an audio file is commonly measured in **megabytes (MB)** (millions of bytes). The frequency of a sound is measured in **kilohertz (kHz)** (thousands of cycles per second). MP3 files have extra code added, called **tags**, that give the user information about the file e.g. the performer's name, a **URL** (uniform resource locator i.e. a web address) or a graphic such as an album cover.

Because of their small size, **MP3** files are more suitable for transferring across the **Internet** (the connection of computer networks across the world). Some **Internet websites** (sets of related pages stored on a Web server on the World Wide Web) are devoted to providing **MP3** files for **downloading** (copying from a server computer to a client computer). The user can create their own music **compilations** (combinations of files) by listening to each file using a computer program, such as **Windows Media Player**, and choosing what files to download. They can then use a computer program called an **MP3 player** to listen to the files and control the sound. **MP3** players let the user group songs into play lists and randomise the selections. They also have sound control features such as spectrum analysers, graphic equalisers, and frequency displays. A **track**

**info button** allows the user to see the information stored in the **MP3** file tag. The appearance of **MP3** players can be changed using programs called **skins** (or **themes**). **MP3** players often include a program, called a **ripper**, that lets the user **rip** (extract) a song from a **CD** (compact disk) and convert it to a standard **WAV** file. Another program called an **encoder** is used to convert **WAV** files into **MP3** files or vice versa. **Recorder** programs are also available that enable the user to create audio **CDs** using a writable **CD-ROM** drive. Special **MP3 player devices** are also available that enable the user to listen to **MP3** files without a computer.

**MIDI** (Musical Instrument Digital Interface) is a standard way of connecting musical instruments, music synthesisers, and computers. A piece of electronics called a **MIDI interface board** is installed on each device to enable the device to communicate using **MIDI** standards. As music is being played, it can be displayed on a monitor screen as a musical score, then edited using a computer program that uses all the features of a **mixing desk** (an electronic device for mixing sounds together), stored and printed. **MIDI** systems do not store the actual sound. Instead the sound is **encoded** (stored as **MIDI messages**) in the form of **8-bit bytes** (units of capacity equal to eight binary digits i.e. 1s and 0s) of digital information. A **bit** is a binary digit i.e. a 1 or a 0, and a **byte** is a group of 8 bits. The **MIDI** messages commonly consist of instructions that tell the receiving instrument what note to play, how long and how loud it should be played, including a number that indicates which instrument to play. Each instrument is represented by a different number e.g. 67 is a saxophone.

A **DVD-ROM**, commonly referred to as a **DVD** (digital versatile disk – previously known

as digital video disk), is a development of **CD-ROM** (compact disk read only memory). It is an **optical storage media** (a storage media that uses laser light to store data) that provides large amounts of storage space for multimedia files. A **DVD-ROM drive** (a storage device for reading **DVD** disks) uses blue laser light (rather than the red laser light used by **CD-ROM** drives) to read information from the disk. Both sides of the disk can be used for storing files and each side can have two

separate storage layers. The **data transfer rate** of a **DVD** (the speed that data can be read from a **DVD**) is also faster than that of a **CD-ROM**. The capacity of a **DVD** is commonly measured in **gigabytes (GB)** (thousands of millions of bytes).

**MPEG** (pronounced em-peg) is a method of compressing and decompressing video signals. **MPEG** stands for Motion Picture Experts Group, an organisation that develops standards for audio and video compression.



# Computing Support Officer

## INTRODUCTION

**Computing Support** involves setting up and maintaining computing systems, troubleshooting hardware and software problems and training computer users.

A **hard disk drive** is used for storing programs and data as separate **files**.

**Windows Explorer** is the name of the program included with Microsoft Windows operating systems for managing stored files. The program opens in a window which is divided into two parts called **panes**. The line separating the panes is called a **divider** and can be moved, using a mouse to change the size of the panes. Using a program such as Windows Explorer, the user can divide the drive into virtual storage areas called **folders** (or **directories**) and give each folder a different name (or label). Each folder can contain other folders called **subfolders** (or **sub-directories**). The user can then copy or move files into different folders and subfolders. Windows Explorer displays drives and folders on the left-hand pane (called the **navigation pane**) in the form of a **tree diagram** with the folders indented below the drive they are stored in and the subfolders indented below the folder they are stored in. A small box called a **toggle box** with a + (plus) or - (minus) sign inside is displayed beside each drive and folder that contains folders or subfolders. When a + is displayed in the box, the folders and subfolders inside the drive or folder are hidden (in the text in this unit the Computing Officer refers to this as the drive being **compact**). When the user clicks on the box, the folders and subfolders stored in that drive or folder are displayed with lines known as **guidelines** indicating what folders belong inside what drives. The toggle box sign also changes to a minus. Therefore, by clicking on the box, the user can expand and

contract the display to show or hide folders and subfolders.

To **create a new folder**, the user uses the mouse to select the drive or folder that will contain the new folder. They then click on the File button on the menu bar at the top of the screen. This opens the File menu and they choose the New option on the File menu. They then choose a Folder from the submenu. This creates a folder called 'New Folder' inside the drive or a folder that was selected at the beginning and gives the user the option of renaming the new folder. When a particular drive or folder is selected, the folders, subfolders and files it contains are displayed in a similar tree diagram in the right-hand pane. The user can **drag** files from one folder to another on the screen using the mouse. To do this they select the file and hold down the left mouse button. As they move the cursor with the mouse, the file moves with it. They can **drop** a file into another folder by moving the cursor over the name of the folder and letting go of the left mouse button. The user can reverse a change they have made by using the **Undo command** on the Edit menu on the menu bar at the top of the screen.

The main operating system's background screen is called the **desktop**. In Microsoft Windows operating systems, the desktop has a bar along the bottom of the desktop called the **status bar**. This is used to indicate what programs are currently open. By changing the status bar property settings, it can be made to only appear on the display screen when the cursor is moved down to the bottom of the screen. It disappears again when the cursor is moved away from the status bar. At the far left of the status bar is a button icon called the **Start button**. Clicking on the start button causes the **Start menu** to open up. By

selecting the Programs option on the start menu, users can normally select the Windows Explorer option on the submenu to start the Windows Explorer program. Another way of starting programs is to choose the **Run command** option on the Start menu. This

opens up a **dialog box** (a message window with different options for the user to choose) with a text box and some command buttons inside it. The user can then start a program by typing the name of the program file in the text box and clicking on the OK command button.

## INTRODUCTION

Computers and **peripherals** (pieces of equipment that are connected to the central processing unit of a computer system) connected together form a **network**. Networks allow communication between computers and the sharing of **hardware** (such as printers) and **software** (programs and data). A network that covers a small area e.g. an office or building is known as a **LAN** (local area network). The main computers that provide services on the network are called **servers** e.g. a **file server** provides a central storage area for data files. The computers that use the services are known as **clients**. The computers can be connected using various types of cabling, including the ordinary telephone system wiring. A main data communications cable connecting LANs together is referred to as a **backbone**. Various electronic devices are also used to amplify, filter and determine the best path for the signals. These include **bridges** for dividing a LAN into separate parts or connecting similar networks together, **gateways** for connecting different types of networks and **routers** for connecting different networks together and determining the best path (or **route**) for the signals. Routers are used to connect networks to form the Internet. A **modem** (modulator/demodulator) is used to convert signals from **analogue** (having a variety of levels) to **digital** (having only two levels, representing on and off) for connection to the ordinary telephone system. Alternatively, an **ISDN** (integrated services digital network) **adapter** or a **DSL** (digital subscriber line) **modem** can be used to allow digital signals to be used without being converted to analogue signals.

There are different standard methods of connecting computers in a LAN. One of the most common is known as **Ethernet**. Each computer must have a network adapter

(special electronics to control the network connection). This is usually in the form of an expansion card known as a **network interface card** (NIC). All the computers are connected through another electronic device known as a **hub**. The electronics in the hub are used to amplify the signals to prevent them from becoming too weak before they reach the desired computer. The cable normally used to connect the computers to the hub is known as **twisted-pair cabling**. It contains two cables twisted together to eliminate interference from external signals. In a home network, the mains power cables built into the house can be used instead if electronic devices called **isolation adapters** are used to isolate the computer from the mains electricity running through the cable. In future, **wireless networks** will use a radio transmitter and receiver tuned to use the same radio frequency, instead of cabling.

In a **client/server network**, the main server computer provides the **services** (sharing of printers, programs or data, etc.) and the attached **client** computers can be normal computers or simple **terminals**. Terminals require the server to do most or all of the processing. A **thin client** (or thin terminal), such as a **NetPC**, has a processor that does some of the processing but a **dumb terminal** does not have a processor and all the processing must be done by the server computer.

One character of data is referred to in computing as a **byte**. In the **binary system** (a number system that only uses two digits i.e. 1 and 0) used in computers, a byte is made up of 8 **bits** where a bit is a 1 or a 0. When data is transmitted through a network system, it can be transmitted in different ways.

**Asynchronous transmission** (or stop-start transmission) sends the data one byte (or

character) at a time. A **start bit** (called a **control bit**) is added to indicate the beginning of each byte and another control bit called a **stop bit** is added to indicate the end of each byte. **Synchronous transmission** sends the data in blocks. Extra bytes of data called **synch bytes** are added at the beginning and end of each block. They are used to synchronise the sending and receiving devices.

When a message is transmitted through a network, it is processed in various ways by

the software and the hardware. It is first processed by the applications program e.g. an email program, and then it is processed by the operating system. It is then processed by the hardware such as the network interface card and finally by the network electronics e.g. a router, as it passes through the network system. When it arrives at its destination, it is similarly processed in reverse order to display the message on the display screen of the receiving computer.

## INTRODUCTION

The Internet (commonly called the Net) is the connection of networks across the world. Different services are made available on the Internet including :

<b>email</b> (electronic mail)	sending and receiving text messages.
<b>Usenet</b> (user network)	accessing <b>newsgroups</b> (groups of users who send and read messages on a particular topic).
<b>IRC</b> (Internet relay chat)	chatting to other users using text messages in <b>real-time</b> (immediately, while users are logged on to the system).
<b>FTP</b> (file transfer protocol)	copying files e.g. program files, between computers on a network. Copying files from a server computer to a client computer is known as <b>downloading</b> and copying from a client to a server is <b>uploading</b> .
<b>Telnet</b> (telephone network)	<b>logging on</b> (connecting to a network system account, normally using a password) to your local server from across a network communications system at a distance e.g. from another country.
<b>MOOs</b> (Multi-user domain that is object-oriented)	taking part in simulations in a shared environment. Each person assumes a persona and communicates using text messages.
<b>WWW</b> (the World Wide Web, commonly referred to as <b>the Web</b> )	<b>browsing</b> (moving from webpage to webpage) linked documents known as <b>webpages</b> .

**Computer-Mediated Communication (CMC)** is a term used to describe systems that allow users to communicate using a computer network.

## 1 Basics

Networked computers allow users to communicate with each other. At present most of this communication is written although video- and audio-conferencing permit speech. Most computer-mediated communication (CMC) is **asynchronous** i.e. the participants are not on line at the same time and there are delays between messages. Examples of asynchronous communication include: mobile phone text messages, chat rooms, email, bulletin boards and newsgroups/discussion lists. **Synchronous** CMC depends on participants being on line at the same time. There may be a few seconds' delay – like a satellite phone call – but the communication is closer to face-to-face interaction. Examples of synchronous communication include: Internet Relay Chat, MOOs, audio and videoconferencing.

With the exception of **videoconferencing** (a form of communication over a network that uses video cameras so that the people taking part can see and hear each other), there is no opportunity for paralinguistic features such as gesture. To compensate, users have developed a number of strategies which account for the linguistic features of text-based CMC including: abbreviations and acronyms, e.g. LOL, simplified syntax – subject and modal deletion (C U L8R), tolerance of surface errors – typographical/spelling errors, symbols and exclamation marks, etc. to express emotional meaning e.g. Yeees!!, symbols indicating

emotions called emoticons e.g. :-), formulaic phrases, **emotes**, to display action in a chat room, e.g. *looks round nervously*. Discourse features vary from mode to mode but for emails include omitting salutations and quoting previous messages in whole or part.

Most users connect to the Internet, using a **modem** (modulator/demodulator – an electronic device that converts signals to enable a computer to be connected to an ordinary telephone line), through a server and router owned by an **ISP** (Internet service provider). Often they have to pay the ISP a fee to make a connection but some ISPs provide a free connection, usually depending on advertising on the webpages to pay for the service or charging premium rate telephone line charges for helplines that provide help and support services. With free ISPs, the user only pays for the telephone call connection which is usually a local connection.

To attract users to connect through their system, ISPs offer various options including:

an unlimited number of email addresses (unique address codes used to contact someone using electronic mail) with filtering of email to remove **junk email** (unwanted and unsolicited email normally advertising or trying to sell something), unlimited **Web space** (file storage space for storing webpage files) for setting up your own **website** (a set of related pages stored on a server on the World Wide Web) and **virus checking facilities** (for checking your computer files to detect programs written with the purpose of causing damage or causing a computer to behave in an unusual way). **Web-based mail** allows users to access their email from any computer with Internet access. **POP3 email** however requires a special email program but is faster and more efficient. Users **register** (open an official account) with the ISP, using a program provided on a CD-ROM or by filling out details on a webpage while **online** (connected to the Internet).

## OBJECTIVES

By the end of this unit, Ss should be better at:

- reading and note-taking
- exchanging information orally
- justifying their decisions.

They should understand and be able to use:

- simple and complex warnings.

They should know and be able to use terms associated with the Internet such as: *CMC, email, FTP, IRC, ISP, MOOs, telnet, Usenet, WWW*.

## STARTER

**1** Do this in small groups. When they have completed, ask them to explain each of the abbreviations.

## Key 1

1d 2g 3b 4c 5f 6a 7e

## READING

### Computer Mediated Communication (CMC)

**2** This is a jigsaw reading activity. Ask Ss about the kinds of CMC they use themselves. They will probably have experience of email, newsgroups and IRC. Divide them into groups of 3 with each student reading and taking notes on a different text. Note the use of pseudonyms in Text A, the abbreviation LOL = lots of laughs in Text B.

## UNIT 13

# The World Wide Web

### INTRODUCTION

The **World Wide Web** (commonly referred to as **WWW** or **the Web**) is a service on the Internet. It consists of a sets of linked documents known as **webpages** which can be viewed using a program called a **browser**. The links on a webpage (called **hyperlinks**) contain the Web address of the webpage that will be displayed if the user clicks on the link.

The **Web address** of a webpage is also known as a **URL** (Uniform Resource Locator) e.g. `http://www.hw.ac.uk/libWWW/irn/irn.html`. The URL consists of a number of separate parts divided by forward slashes (/). This example indicates the following:

`http://` is known as the **protocol prefix** and indicates that the **hypertext transfer protocol** (an agreed communications standard for webpages) should be used to transfer the webpage across the Internet.

`www` indicates that this is a World Wide Web document i.e. a webpage.

`hw.ac.uk` is the **domain name** and indicates the network domain in which the webpage is stored.

`ac` is the **domain name extension** and indicates the type of domain e.g. `ac` or `edu` is an educational domain, `co` or `com` is a company.

`uk` is the **country code** indicating that this webpage is stored on a computer in the United Kingdom.

`libWWW/irn` gives the **path** of the directory (or folder) where the webpage is stored on the server.

`irn.html` is the name of the **webpage file**. The **extension** used in webpage filenames is either `htm` or `html` to indicate that the file is written using **HTML** (hypertext markup language).

When a user clicks on a hyperlink on a webpage, the browser program contacts a server computer known as a **DNS** (Domain Name System) **server** to look up the **IP** (Internet Protocol) **address** (the unique 32-bit binary number) of the remote **Web server computer** (the computer storing the webpages) given in the URL of the linked webpage. The DNS has a stored table of names and addresses of **nodes** (a network terminal or point where a computer is connected to a network) on the Internet. The request for the linked webpage is then sent to a computer or electronic device known as a **router** that uses the Internet address obtained from the DNS server to **route** the request (decide on the best Internet path to send the request).

The message requesting the webpage is divided up into small sections called **packets** and each separate data packet is passed from router to router until they all reach the remote Web server where they are put back together again. The remote Web server sends the requested webpage back to the **browser computer** that made the request in a similar way using the IP address of the browser computer to determine the best available route for each packet. When the packets arrive at the browser computer, they are combined and the requested webpage is displayed in the browser.

Special websites (e.g. AltaVista) provide a facility known as a **search engine** that can be used to search for other websites. A search engine uses special programs to collect information about websites on the World Wide Web and stores the information in a **database** (a type of applications program used for storing information so that it can be easily searched and sorted). The user can then search the database to obtain a list of

links to relevant websites. To search using a search engine, the user types words (known as **keywords**) into a text box (called a **search box**). The search engine then displays a list of website links that are relevant to the given keywords. Keywords can be used to form **search phrases** by putting quotation marks around the keywords and they can be combined in different ways using special logical **operators** such as the words OR, AND or NEAR which can be grouped by enclosing them in brackets. Sometimes, symbols such as + or – can be used to represent the operators. Special symbols known as **wildcards** can also be used with keywords. These symbols represent certain characters or combinations of characters. For example, an asterisk (\*) is often used to represent any combination of characters. A search for 'col\*' would look for any word beginning with 'col'.

As well as **keyword searches**, search engines can be used for **field searches**. This allows the user to search webpage fields such as the title field of a webpage or its Web address. The **Web address** is sometimes referred to as its **URL** (uniform resource locator).

The user can store the links to useful websites using a **bookmark** facility in the browser program used to view the webpages. The webpage that is set to be displayed when

the browser program is first started is referred to as the user's **homepage**. The user can return to the homepage by clicking a button known as the **Home button** in the **toolbar** at the top of the browser program.

Because a video signal contains so much data, it is difficult to **download** it from an Internet server (copy it to a client computer from a server computer), in **real-time** i.e. so that it can be viewed immediately without any delays or gaps. The connection would need to have a huge **bandwidth** (signal capacity). One way of doing this with a normal Internet connection involves using a section of memory as a **storage buffer** (a storage area for temporarily storing data from a fast source so that it can be fed at a steady rate to a slower system). This allows part of the video signal to be downloaded and stored so that the user can begin to view the video before it is completely downloaded. Feeding the video signal from the storage buffer to the display makes space in the storage buffer for more of the video to be downloaded. Therefore, as the user is watching the first part of the video, the next part is being downloaded into the storage buffer. The video can therefore be shown to the user at a steady rate. This method of downloading video signals using a storage buffer to obtain a steady display is known as **streaming**.

### OBJECTIVES

By the end of this unit, Ss should be better at:

- listening and note-taking
- defending a choice.

They should understand and be able to use:

- time clauses with *when, once, until, as, before*
- reduced time clauses with *after and before*.

They should know and be able to use terms associated with the World Wide Web such as:

*browser, country code, directory path, domain name, domain name extension, DNS, hyperlink, IP, protocol prefix, search engine, URL, WWW.*

### STARTER

1 Do this matching exercise in small groups. Write the address on the board and ask selected Ss to label each part as a check the task has been completed correctly. The address is that of the Internet Resources newsletter of

## UNIT 14

# Websites

### INTRODUCTION

A set of related **webpages** (hyperlinked documents in a web network system) stored on a **Web server** (a server computer that stores and provides access to webpages) is known as a **website**. A **Webmaster** is a person who sets up and maintains a website. The design of websites varies greatly and some are more successful than others. Features of a good website include:

- 1 Good webpage design.
- 2 A good **navigation** system (a way of allowing visitors to move from webpage to webpage and find their way around your website). Navigation features should include:
  - a Using text hyperlinks, rather than graphical buttons or **image maps** (graphical images that provide links to different webpages depending on where on the image the user clicks).
  - b Providing descriptive text captions for any graphics. These alternative text captions are known as **ALT text captions**.
  - c Providing a webpage that gives an overview to the website with links to various related pages grouped together. This is known as a **site map**. (**FAQs** are the common name for frequently asked questions about the website).
  - d Avoiding **frames** which are a way of dividing the browser screen into separate windows, each with its own **scrollbar** for moving up or down through the text. Frames allow webpages to be displayed inside other webpages.
  - e Keeping the website consistent by not changing the location of the navigation elements and not using links and buttons that appear and disappear.
  - f Making it easy to reach any particular content on the website.

- g Providing multiple paths through a website by using logical, clearly placed links rather than using a **search engine function** (a program designed to find information according to data entered by the user) where the user has to type in **keywords** (words used to categorise documents or records in a file) to find data.
  - h Not giving website visitors an overwhelming number of links to follow.
- 3 Website ease of use.
- 4 Accurate and up to date data provided on the website.
- 5 Good use of graphics on the webpages.
- 6 Website compatibility with different types of Web browser programs i.e. using webpage features that are standard and can be displayed on a variety of common browser programs.

Access to the Internet is normally made through an **ISP** (Internet Service Provider). ISPs are organisations that normally charge a fee to provide the server computers, Internet services and Internet connections for users. Some ISPs get their money from advertising and provide the Internet connection free, the user only paying for the telephone call. However a number of factors should be taken into consideration when deciding which ISP to use. These include:

- 1 **Sign up software on CD-ROM**. The ISP provides software on a CD-ROM disk that makes it easy for the users to set up their computers to connect to the Internet.
- 2 **Local call rates and national call rates for online time**. The user pays for a telephone call while they are **online** (connected to

<p>the Internet). If the ISP is local, the user need only pay local telephone call rates. If the ISP is not local the user will have to pay national telephone call rates to connect to the ISP.</p> <p>3 <b>Initial set-up fee.</b> Although the ISP may not normally charge for providing the Internet connection, they sometimes make a small charge for first setting up the connection.</p> <p>4 <b>Web-based and POP3 email.</b> ISPs often provide free email facilities. This may be in the form of <b>Web-based email</b> that uses a <b>browser program</b> to access the email or <b>POP3 email</b> that uses special <b>POP3 email client programs</b> for copying email messages onto the user's computer and allows the user to read and send messages through an <b>email server computer</b>.</p> <p>5 <b>Free Web space.</b> Most ISPs provide storage space for users on a Web server computer where the users can set up their own websites.</p> <p>6 <b>Access to newsgroups.</b> Most ISPs provide access to the Internet <b>Usenet service</b> that</p>	<p>allows users to subscribe to discussion groups, known as <b>newsgroups</b>, that discuss particular topics, using text messages that can be accessed by all members of the group.</p> <p>7 <b>Customer support.</b> Most ISPs provide a help service that enables customers to obtain help for common computing problems. The ISP often charges for this type of support.</p> <p>8 <b>Reliable service.</b> The users rely entirely on the ISP to provide their Internet connection. Some ISPs are better than others at maintaining their systems and providing a connection that is fast enough.</p> <p>9 <b>Multiple ISP accounts.</b> A <b>username</b> and <b>password</b> (a secret code used to control access to a network system) is required to access a user's own storage areas and services on the ISP's server computer. Some ISPs provide more than one such <b>account</b> to a user enabling the same system to be used by different members of the family or for one user to keep business and personal data completely separate.</p>
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### OBJECTIVES

By the end of this unit, Ss should be better at:

- understanding a writer's purpose
- exchanging information orally.

They should understand and be able to use:

- ways of giving advice.

They should know and be able to use terms associated with websites such as: *frames, graphical buttons, navigation, search function, site maps, text links.*

### STARTER

1 Give the class time to make individual lists. Then group them to compare their answers and try to reach agreement on the most important features. You can limit these to five to force discussion. Ask selected Ss to read out their lists.

2 This is a fairly demanding task. They can expand each of the seven points into a statement, for example: 3 *The pages should be easy to use.* Or, as in the suggested key, a question or set of questions. Give the class



## INTRODUCTION

**Webpages** are documents designed for use on the **World Wide Web** which is an Internet service that allows users to view linked webpages stored on **Web server** computers. A set of related documents stored on a Web server is known as a **website** and the starting webpage of a website is referred to as the **homepage**. Webpages are viewed using a program called a **browser**.

Many websites deal with a particular area of interest or topic and almost every topic imaginable is dealt with by some website. Special websites known as **search engines** allow users to find websites related to a particular topic by searching a **database** (a type of applications program used for storing information so that it can be easily searched and sorted) of links to other websites. Some websites allow users to **download** files (copy files from a server computer to a client computer). Files available for downloading include **applications programs** that allow the user to perform specific tasks such as wordprocessing, **upgrades** to programs that add features or fix **bugs** (faults in the program), software **drivers** (programs that are used to control **peripheral devices** such as printers), **development tools** (software that can be used for writing programs or creating material such as webpages). Downloadable programs that are free to download and use are known as **freeware**. Programs that are free to download and try but should be paid for if the user wishes to continue to use them, are known as **shareware**.

Websites can be created by anyone who has the necessary programs and equipment. When the website creator creates their website, they **publish** it (copy it to a Web server computer). This is referred to in the text as '**putting up a site**'. Every website has a **Web address** that takes the user to the first

page of the website i.e the **homepage**. The Web address usually starts with 'www' and ends with 'com' if it is a company (co.uk is used for a company in the United Kingdom). The parts of the Web address are separated by dots (.) e.g. www.themovieshrine.com but there is no dot at the end of the address. The **domain name** is the part of the Web address that indicates what network the website is stored on. Sometimes the Web address used is not the actual address of the website. When the address is typed into a browser program, the browser is automatically re-directed to the actual web address. This is usually done by an **ISP** (Internet service provider – an organisation that provides Internet connections for a fee) to make the Web address look as if it is owned by a private company.

Webpages are created by adding **HTML** (hypertext markup language) **tags** to plain text to determine the way that the webpage will be displayed in a browser program and to create **hyperlinks** (dynamic links that the user clicks on to display other webpages). Webpages can be created using a very basic wordprocessor program known as a **text editor**, but special programs are available that allow the user to create webpages without knowing about HTML e.g. **Netscape Composer**. This program is part of a package of programs for managing websites called **Netscape Communicator**. A website owner can **register** their website on a search engine. This means that they submit their Web address and details of their website to be included in the search engine database i.e. to be **listed** on the search engine. One of the best known search engine websites is called **Yahoo**. As well as providing a search engine, websites such as Yahoo provide a variety of facilities including enabling users to form newsgroup

clubs that discuss various topics using email. After a website has been created and published, it is important that the creator **updates** the webpages frequently to vary and improve the website, keep the information up to date and make sure that the hyperlinks still connect to existing websites. A **static site** is a website that does not change its content. It is common for an email address to be provided on the website to allow users to contact the website creator to provide feedback about the website. Creating a professional website

involves more than just publishing webpages. The website needs to be planned carefully if it is to be a success. This involves a number of stages including analysing the demand and other related websites, designing the webpages and the overall structure of the website, publishing and advertising the website including registering it on search engines and getting other websites to create links to it, and evaluating the website after it has been published by using user feedback and statistics on the use of the website.

## UNIT 16

# Communications Systems

### INTRODUCTION

**Mobile phones** have become a common way of communicating. They are small computing devices in the form of a telephone handset that can connect to local radio networks, allowing users to make normal telephone calls. They often have extra hardware and software features including: keyboards; earphones; a **phone book** in the form of a database for storing telephone numbers; **text messaging** that allows short text messages to be transmitted and received (the text messages are displayed on a small screen built into the handset); a **calls register** that stores details of any telephone calls that are sent or received; computer games programs that can be **downloaded** (copied from a server computer) and played on the handset; a program that allows the handset to be used as a mathematical calculator; and an **alarm call facility** that automatically causes the handset to ring or a message to appear on the screen at a time chosen by the user. When sending text messages, abbreviations consisting of letters and numbers are used to save typing and to make it easier to display the messages on the small screen e.g. CU L8R is commonly used to represent 'see you later'.

The messages are transmitted in a way that conforms to a special communications **protocol** i.e. according to an agreed standard. A common protocol used with mobile phones is called **Wap** (wireless application protocol). In a Wap system, messages are divided into small units called **packets**. The packets are transmitted separately over the radio network system and are put together to form the original message when they arrive at their destination. By sending packets belonging to a number of different users along the same connection, the system can be used by many people at the same time. Wap allows mobile phone users to use Internet **online services**

such as **email** (electronic mail) and browsing webpages on the **World Wide Web**. Normal webpages written in **HTML** (hypertext markup language) cannot be used with Wap phones. Wap webpages are specially prepared using **WML** (wireless markup language) so that they can be used on handset screens. A newer language called **XML** (extensible markup language) will be used in the future, enabling webpages to be created that can be used in normal computer browser programs and on mobile phone screens. The high **bandwidth** (signal capacity) available using Wap also enables video transmissions to be received by mobile phones. More sophisticated communications systems providing higher bandwidths, such as **GPRS** (General Packet Radio Service) and **UMTS** (Universal Mobile Telecommunications System), are likely to replace Wap in the future.

In the future, computers will become more **powerful** (faster and with bigger storage and processing capacity). They will also become cheaper to produce. This will make them more commonly available and allow them to be integrated with other devices such as **videorecorders** (a device for recording video signals onto magnetic tape cassettes), TVs and telephone systems. They may not even be called computers in the future, but computing devices will be designed for particular purposes and thrown away when they become faulty. Cheaper and more compact, flat **digital panels** are likely to be used for monitor screens in the future and security will be provided by **biometric devices** rather than passwords i.e. devices that measures some aspect of a living being e.g. eye scanning devices or fingerprint recognition devices. It will also become cheaper and more common to print photographs from a camera using a colour laser printer. Flexible **motherboards**

(the electronic circuit boards that hold and connect the main parts of a computer) will allow the design of computers to be more varied in the future. **Voice control** will allow the user to input data and control the computer by speaking. In the future, software will be rented and run across the Internet rather than being bought and installed on individual computers. They will be built into clothing and worn by the user. Domestic appliances such as fridges and cookers will be computer controlled. In the longer term, computers may be operated using laser light or quantum physics rather than electronics and may even be implanted into the user's body, even into the human brain. This may help people with disabilities.

**Computer-mediated communication (CMC)** can be either **synchronous**, where the users can communicate with each other at the same time in **real-time** i.e. immediately, enabling interactive communication; or it can be **asynchronous**, where messages are sent to a user who receives them and replies at a different time. Some messages are text only, some are audio only and others are **multimedia** (include text, graphics, audio, animation and video data).

A **pager** is a small radio receiver which beeps to alert the wearer of messages or telephone calls. It displays the telephone number of the caller so the wearer can call back. Some pagers can display very short messages.

A **bulletin board** is an electronic noticeboard system that enables users to display messages for other users to read.

A **MOO** (multi-user object oriented) system is an Internet **virtual environment**, developed from multi-user adventure games, that allows many users to interact in real time.

A **GPS** (Global Positioning System) receiver uses a microprocessor (the main electronic chip in a computer that does the main processing and controls the other parts of the computer) to compare coded **digital signals** (an electronic signal that has only two states i.e. off or on) from special satellites orbiting the earth to calculate latitude, longitude and altitude, and enable the user to determine their exact location. Extremely accurate atomic clocks are used in the satellites. GPS systems, although originally developed for the US military, can be used for a variety of purposes including orienting hikers, navigating ships, tracking trucks and buses, and locating stolen cars.

## OBJECTIVES

By the end of this unit, Ss should be better at:

- reading for detail
- listening for detail
- exchanging information orally.

They should understand and be able to use:

- certainty expressions.

They should know and be able to use terms associated with Communication Systems such as: *GPRS, GPS, HTML, mobile phones, pagers, SMS, Wap, WML*.

## STARTER

- 1 Make sure Ss can use the direct question forms they will need for this task. For example,
  - 1 Do you have a mobile phone?
  - 2 What do you use it for?
  - 3 What make is it?
  - 4 How often do you use it per day?
  - 5 What additional features does it have?
  - 6 Does it have a calculator?, etc.

Do the survey in groups. Appoint a spokesperson for each group to report back in

## INTRODUCTION

**Computing support** involves setting up and maintaining computing systems and solving **hardware** (the physical components of a computer system) and **software** (programs and data) problems. Common problems include: dealing with **viruses** (programs that can reproduce themselves and are written with the purpose of causing damage or causing a computer to behave in an unusual way); fixing faulty **peripherals** such as monitors, mice or printers; dealing with computers **hanging** (suddenly and unexpectedly stopping processing during the execution of a program); or computers **crashing** (failing suddenly and completely). It is usually the failure of the hard disk inside a computer that is referred to as a crash.

New computers commonly have a one-year **warranty** agreement that allows the purchaser to obtain help with computing problems by telephoning computing support staff at a **help centre**. Each computer has its own unique **serial number** that identifies the equipment. It also usually has a **service tag number** that identifies its warranty agreement to the support staff. A **job number** is usually issued by the support staff to uniquely identify the particular fault report. Special fault report forms are often used by the support staff to record the details of the problem. To solve the problem the support staff usually need to know the type of computer, type of processor, amount of **RAM** (random access memory – the memory that stores the user's program and data while they are being used by the computer), the operating system and what type of **LAN** (local area network – a network connected over a small area) it is connected to, if any.

The problem reported to the help centre in this unit involves **MIDI** (musical instrument digital interface) sound files. MIDI files are

created by connecting a musical instrument to a computer system. This type of music file is commonly found on the Internet and is used in **Microsoft Encarta**, a multimedia encyclopaedia program produced by the Microsoft Corporation. The faulty computer has 128 **megabytes** of RAM (approximately 128 million bytes – a **byte** is the amount of memory required to store one character e.g. a letter, a number or a punctuation mark). The fault is caused by a faulty **sound driver** (an operating system program that controls the sound system in the computer). The help centre will usually try to solve the problem over the phone but if that is not possible, the computer may have to be returned for repair or they may send out a **repair technician** to the user's location. Many simple computer problems can be fixed by simply **rebooting** the computer (restarting the computer operating system). Some computers have programs for testing and diagnosing hardware faults stored in **ROM** (read only memory) on the **motherboard** (the main electronic circuit board inside a computer that holds and connects together all the main electronic components). These stored programs are known as **on-board diagnostic and repair tools**. To save users having to telephone the help centre to solve well known common problems, the company selling the computer may have a website with a **FAQs** (frequently asked questions) section that describes common problems and their solutions.

The Microsoft Corporation has a website with a section known as the **Microsoft Knowledge Base** that allows Microsoft software users to find out about known problems with using Microsoft software with certain combinations of hardware. It provides a description of the problem and any known

solutions to the problem. The Microsoft software problems used in this unit include a problem using a free Microsoft email program called **Outlook Express** and the **Dial-Up Networking** feature in a Microsoft operating system. Dial-Up Networking allows the user to connect their computer to a network using a modem. The problem occurs with a particular make of **video adapter** (the expansion card that provides the electronics for controlling the monitor screen). The other Microsoft software problem is with **Internet**

**Explorer** (a free **browser** program used for viewing webpages) causing the computer to **hang** (to suddenly and unexpectedly stop processing during the execution of a program). The solution is to change the settings in the program that determine whether the program should **hang up** (disconnect the telephone line when it has finished sending, receiving or **downloading** i.e. copying data from a server computer to the user's computer).

## UNIT 18

# Data Security 1

### INTRODUCTION

There are a variety of different crimes that can be committed in computing, including:

Computer Crime	Description
<b>Spreading viruses</b>	distributing programs that can reproduce themselves and are written with the purpose of causing damage or causing a computer to behave in an unusual way
<b>Hacking</b>	gaining unauthorised access to a network system
<b>Salami shaving</b>	manipulating programs or data so that small amounts of money are deducted from a large number of transactions or accounts and accumulated elsewhere. The victims are often unaware of the crime because the amount taken from any individual is so small.
<b>Denial of service attack</b>	swamping a server with large numbers of requests
<b>Trojan horse</b>	a technique that involves adding concealed instructions to a computer program so that it will still work but will also perform prohibited duties. In other words, it appears to do something useful but actually does something destructive in the background.
<b>Trapdoors</b>	a technique that involves leaving, within a completed program, an illicit program that allows unauthorised – and unknown – entry
<b>Mail bombing</b>	inundating an email address with thousands of messages, slowing or even crashing the server

<b>Software piracy</b>	unauthorised copying of a program for sale or distributing to other users
<b>Piggybacking</b>	using another person's identification code or using that person's files before he or she has <b>logged off</b> (disconnected from a network account)
<b>Spoofing</b>	tricking a user into revealing confidential information such as an access code or a credit-card number
<b>Defacing</b>	changing the information shown on another person's website
<b>Hijacking</b>	redirecting anyone trying to visit a certain site elsewhere

A **computer virus** is a program that can reproduce itself and is written with the purpose of causing damage or causing a computer to behave in an unusual way. It **infects** other programs i.e. it attaches itself to other programs, known as **host programs**, and therefore reproduces itself. It operates by replacing the first instruction in the host program with a **JUMP command**. This is a command that changes the normal instruction sequence in a program, causing the virus instructions to be **executed** (processed by the processor) before the host program instructions. When the virus has been executed, the host program is executed in the normal way.

When it attaches to operating system programs to integrate itself with the operating system (the set of programs that control the basic functions of a computer and provide communication between the applications programs and the hardware), it is said to have

**patched** the operating system. Viruses normally attach themselves to programs that have a COM extension (e.g. command.com) that are known as command files or **COM files**, or to programs that have an EXE extension (e.g. explorer.exe) that are known as executable files or **EXE files**. A virus is **loaded** into memory (copied from the storage media into memory) when a program it has attached itself to is **run** or **executed** (processed by the processor). It then becomes **memory resident** i.e. it stays in the memory until the computer is switched off. When the virus is **triggered** by a predetermined event, it operates the **payload** (the part of the virus that causes the damage). Although a virus is the term used to describe any program that can reproduce itself, viruses usually have four main parts:

- a a **misdirection routine** that enables it to hide itself
- b a **reproduction routine** that allows it to copy itself to other programs

- c a **trigger** that causes the payload to be activated at a particular time or when a particular event takes place
- d a **payload** that may be a fairly harmless joke or may be very destructive.

A program that has a payload but does not have a reproduction routine is known as a **Trojan**. Each virus is given a name e.g. Love Bug and can be classified as a particular type of virus. Virus types include: **logic bombs** that destroy data when triggered; **boot sector viruses** that store themselves in the **boot sector** of a disk (the part of a disk containing the programs used to start up a computer); **file viruses** that attach themselves to COM files; **macro viruses** that are small macro programs that attach themselves to wordprocessor files and use the macro programming facilities provided in some wordprocessor programs.

### OBJECTIVES

By the end of this unit, Ss should be better at:

- scanning a text, ignoring irrelevant information
- inferring information from a reading text
- exchanging information orally
- writing a description of a computer crime.

They should understand and be able to use:

- ways to link cause and effect relationships
- *en-/ -en* verbs.

They should know and be able to use terms associated with Data Security such as:

*defacing, denial of service attack, hijacking, mail bombing, piggybacking, salami shaving, software piracy, spoofing, trapdoors, trojan horse, viruses.*

### STARTER

**1 and 2** Do these in small groups. If you have access to English language newspapers, look out for other headlines like these to use with your students. *Scam* here means a plan to cheat people of money.

#### Key 1

- 1 Damaging effects of the love bug virus.
- 2 Illegal hacking into Microsoft's software codes.
- 3 Scheme to make money illegally using Web phones.

#### Key 2

Refer back to these lists when doing Task 8. In addition note *data diddling*, feeding false data into a computer.

## INTRODUCTION

There are a variety of security measures that can be used to protect hardware (the physical components of a computer system) and software (programs and data) including:

- 1 **Controlling physical access** to hardware and software.
- 2 **Backing up** data and programs (storing a copy of files on a storage device to keep them safe).
- 3 **Implementing network controls** such as:
  - a using **passwords** (a secret code used to control access to a network system)
  - b installing a **firewall** (a combination of hardware and software used to control the data going into and out of a network. It is used to prevent unauthorised access to the network by hackers).
  - c **encrypting data** (protecting data by putting it in a form only authorised users can understand)
  - d installing a **callback system** (a system that automatically disconnects a telephone line after receiving a call and then dials the telephone number of the system that made the call, to reconnect the line. It is used in remote access systems to make sure that connections can only be made from permitted telephone numbers).
  - e using **signature verification** or **biometric security devices** (security devices that measure some aspect of a living being e.g. a fingerprint reader or an eye scanner).
- 4 **Separating and rotating the computing functions** carried out by employees and carrying out periodic **audits** of the system i.e. observing and recording events on the network systematically.
- 5 **Protecting against natural disasters** by installing **uninterruptible power supplies** (battery backup systems that automatically provide power to a computer when the normal electricity source fails) and **surge protectors** (electronic devices that protect equipment from damage due to a sudden surge in a power supply).
- 6 **Protecting against viruses** by using **antivirus programs** (computer programs or sets of programs used to detect, identify and remove viruses from a computer system) and ensuring that all software is free of viruses before it is installed. Particular care must be taken when using **public domain software** (free software) and **shareware** (software that is free to try out but must be paid for if it is used after the trial period).

A **smart card** is a plastic card containing a processor and memory chip. It can be used to store large amounts of confidential data including coded data that can be used as **digital cash** (electronic currency that is used for making electronic purchases over the Internet). It can also be used as a security device to prevent or allow access to a system and allow a user to withdraw cash from a bank **ATM** (automatic teller machine – a type of machine used by banks for enabling customers to withdraw money from their bank accounts). A **smart card reader** is a device used for reading smart cards by detecting radio signals emitted from a radio **antenna** (aerial) in the form of a small coil inside the smart card.

An **anti-virus program** is a program that checks files for virus coding instructions inside another program and can be used for removing any virus coding instructions detected.

A **backup program** is a program that stores a copy of data on a storage device to keep it safe. There are different kinds of backup, including:

- a **Incremental backup** which copies all the selected files that have been created or changed since the last full, differential or incremental backup. These files are identified by the fact that their **archive bit** would be on. The archive bit is a digital bit stored with a file indicating if the file has been backed up since it was last edited. The archive bit is switched off when the

file is backed up using a full or incremental backup.

- b **Differential backup** which copies all the files created or modified since the last **full** backup. The archive bit is not set to 'off' by a differential backup.
- c **Full backup** which copies all the selected files on a system, whether or not they have been edited or backed up before.

A series of incremental backups and a full backup, or the most recent differential backup and a full backup, is known as a **backup set**.

## INTRODUCTION

A **hacker** is a person who attempts to gain unauthorised access to a network system. They are often young teenagers although they are usually fairly skilled **programmers** (people who write computer programs). Sometimes, the type of person who becomes a hacker is referred to as a '**geek**' (an expert lacking in social skills), or as an '**anorak**' (a slang term for an eccentric, socially inept person with little or no fashion sense and having an obsessive interest in a hobby or subject). Although '**geek**' was originally a derogatory term it is now used in computing to mean a dedicated expert. Although it is illegal, people become hackers for different reasons including: making money, criminal purposes, or to expose political information. But often people **hack** (break into a computer system) just because it is an exciting challenge. Parents are often unaware that their children are hacking into computer systems although they usually receive very large telephone bills. Young hackers are often caught by boasting about their successes to their friends.

Since **hacking** (attempting to gain unauthorised access to a network system) is illegal, hackers want to keep their true identity secret but they often like to call themselves by special names such as 'the Analyser'. The Internet has made hacking more common and hackers are found throughout the world. They sometimes form **hacking groups** or teams that work together and exchange ideas. These groups also like to be known by names such as 'Hackers Unite'.

Hackers like to attack and penetrate computer systems belonging to large, important organisations such as the Pentagon's computer systems, computer systems belonging to US military bases and **Hotmail**, the free email service provided by

the Microsoft Corporation. In fact, hackers compete with each other to be the first to hack into really powerful systems. Often, breaking into a system is done gradually, with the hacker gaining entry to a system then planting passwords in the system, allowing them to gain access to the system more easily in the future.

When a hacker gains access to a system they don't usually break into the system using the Internet and steal all the data on the system, as is often portrayed in the cinema. In fact, most **hacks** (break-ins) are done by company staff misusing the company network system. Hackers have been known to do a variety of things to computer systems, including:

- a **Downloading** files (copying files from a server computer) and leaking confidential information. **Posting** information is the term used for making information available to a large number of users in a **newsgroup** (an Internet discussion group that uses a restricted area on a server computer to display messages about a common interest) or on a **bulletin board** (an electronic noticeboard system that enables users to display messages for other users to read).
- b Exposing **email** (electronic mail) correspondence managed by well known email services, causing the service to be shut down while the exposed weakness in the system is repaired.
- c Programming email server computers to reroute email (send to a different email address than the one it was originally sent to).
- d **Hijacking** websites by redirecting the **Web address** (URL) to point to another website.
- e **Defacing** websites by changing the text and graphics on the webpages, sometimes



<p>leaving very rude messages on the system.</p> <p>f <b>Blackmailing</b> the owners of websites by threatening to damage their systems by doing something like releasing a <b>virus</b> (a program that can reproduce itself and is written with the purpose of causing damage or causing a computer to behave in an unusual way) onto their system, although such a threat often turns out to be nothing more than a hoax.</p> <p>Sometimes, young hackers put their experience and knowledge to good use when they become older. Many former hackers have been hired by large companies as <b>security experts</b>. They are employed to test out the company systems by trying to hack into them to find any weaknesses in the systems. <b>Cyberspace</b> is the combination of all the data on all the computer networks throughout the world, accessed using the Internet. A person who uses their skills to make cyberspace safer is referred to as a '<b>white hat</b>' hacker.</p> <p>A computer system can be <b>hacked</b> (broken into) in various ways including:</p> <ul style="list-style-type: none"> <li>a guessing somebody's <b>password</b> (secret code used to control access to a network system)</li> <li>b finding a <b>bug</b> (a fault in a system) that allows certain passwords to access information they are not supposed to access</li> <li>c phoning a company, pretending to be a company employee and asking for a password. People tend to be too trusting.</li> </ul> <p>Connecting to a computer network involves <b>logging in</b> (sometimes referred to as <b>logging on</b>) by typing a username or <b>ID</b> (identification username) and a password. Usernames that are often used on networks systems include 'guest', 'demo' and 'help'.</p>	<p>To avoid a computer system being hacked into, the people managing the system must work hard to keep ahead of the hackers. There are different ways of avoiding being hacked into including:</p> <ul style="list-style-type: none"> <li>a installing a <b>firewall</b> (a combination of hardware and software used to control the data going into and out of a network)</li> <li>b using a <b>callback system</b> (a system that automatically disconnects a telephone line after receiving a call and then dials the telephone number of the system that made the call, to reconnect the line. It is used in remote access systems to make sure that connections can only be made from permitted telephone numbers.)</li> <li>c having really secure <b>passwords</b> (secret codes used to control access to a network system) – don't use common names or dictionary words</li> <li>d <b>auditing</b> the system regularly (checking the system regularly using event logs to find failed access attempts).</li> </ul> <p>Some people do not like to give out their credit card numbers on the Internet. Hackers have been known to get <b>databases</b> (applications programs used for storing information so that it can be easily searched and sorted) of credit card numbers by hacking computer systems. However, in the opinion of the ex-hacker in this unit, using your credit card on the Internet is no more dangerous than giving your credit card number on the telephone or throwing away a credit card receipt. There are various things you can do to avoid credit card theft on the Internet including:</p> <ul style="list-style-type: none"> <li>a using a separate credit card for Internet purchases</li> <li>b having a small credit limit on the credit card you use</li> </ul>
<ul style="list-style-type: none"> <li>c buying a pre-paid charge card for small purchases.</li> </ul> <p>In the future, <b>smart cards</b> (plastic cards containing a processor and memory chip that</p>	<p>can be used to store large amounts of confidential data) will be used instead of credit cards. This will require <b>smart card readers</b> (devices used for reading smart cards) to be attached to computers.</p>

## UNIT 21

# Software Engineering

### INTRODUCTION

**Software engineering** is the discipline of designing high quality software solutions. **Software** consists of programs (sets of instructions for controlling a computer) and **data** (the material that has to be processed). Programs are written in computer languages by people called **programmers**. A **systems analyst** is a person who designs or modifies information systems to meet users' requirements. This includes investigating feasibility and cost, producing documentation, and testing prototypes of the system. Producing a program, therefore, involves a number of stages including:

- a **clarifying** the problem by considering the requirements of the potential users
- b **designing** the solution to the problem by first deciding on the overall structure of the solution
- c **coding** the program by first choosing an appropriate programming language and inputting the program code
- d **testing** and **debugging** the program (identifying and fixing any problems or faults in the program code)
- e **documenting** and **maintaining** the program including writing instructions for using the program.

Systems analysts first need to talk to the people involved in the computing problem, including the people managing the system and the users or potential users of the system. They need to establish factors such as:

- a the nature of the problem
- b what systems already exist
- c to what extent any existing systems are **computerised** (changed so that they can be operated or controlled using a computer)

- d what **output** (the processed data or signals that come out of a computer system) will be required from the system
- e who will be using the system and what parts of the system they need to be able to use
- f the computing experience of the staff and what training would be required
- g what **hardware** (the physical components of a computer system) already exists and what would need to be added, including the specification of the hardware and whether a **network system** is required (a system where a number of computers and peripheral devices are connected together).

They then have to plan the structure of the solution and check it through with the people involved to make sure it meets their requirements. Next, they have to choose a suitable programming language and write the **program** (a set of instructions, written in a computer language, that control the behaviour of a computer), continually testing and adapting it until it works to the satisfaction of the customer and users. The system then has to be put into service and the users have to be trained. This involves documenting the program specifications and writing instructions for using the system.

Programming languages commonly use different structures for sequencing program instructions, including:

- a **conditional instructions** i.e. if a certain condition is true, then process this instruction (*if X then Y*). **Decision tables** are used to indicate how a conditional structure will process data. They show all the different inputs that might arise for each condition and the resulting outputs that would be produced by the conditional instruction.

- b **iterations or loop instructions** i.e. process these instructions repeatedly until or while a particular condition is true, or false (*do ... until ...* or *do ... while ...*). **Program flowcharts** can be used to show the sequence of instructions in a program and are sometimes used for designing parts of programs such as iterations. **Pseudocode** is a method of writing a description of a computer program using a mixture of natural language and computer language code.

There are a large number of computer languages available for use by programmers. Each language is designed for use in solving particular types of problem and therefore has particular strengths and weaknesses. A systems analyst has to decide which language is most appropriate in each situation. Languages such as **C++** are particularly suitable for writing **systems programs** (programs that are used to control the basic functions of a computer system e.g. operating system programs). Languages such as **Visual Basic** and **Pascal** are easy to use and are particularly suitable for learning how to program. **FORTRAN** is designed for solving engineering problems, **COBOL** for writing business programs, **Ada** for military purposes, **Prolog** and **LISP** for working in **artificial intelligence** (an area of computing concerned with developing computer programs that perform tasks that can normally only be done

using human intelligence). **Logo** is particularly suited for use by young children. Some languages such as **HTML** and **XML** are **markup languages** rather than programming languages i.e. they use **tag codes** (labels) for marking text for use in programs such as Web browsers. Languages such as **Java** and **Perl** have a number of specialised uses including adding features to Internet connections and webpages (hyperlinked documents).

Converting to new computer systems can be done in different ways. Each strategy has its advantages and disadvantages. These include:

- a **direct implementation** where the old system is simply removed and the new system installed. In this strategy only one system is used at any one time but there is **no fall back** (alternative system that can be used if problems occur in the main system) if the new system does not operate properly.
- b **parallel implementation** where the old and the new systems are both used at the same time until the users are satisfied that the new system is working properly
- c **phased implementation** where the old system is gradually replaced by the new system, one part at a time
- d **pilot implementation** where the new system is tried out in one section of the company to make sure that it works as required.

## OBJECTIVES

By the end of this unit, Ss should be better at:

- listening for specific information.

They should understand and be able to use structures used in programming:

- If X, then Y. Do X until/while Y.

They should have a better understanding of terms used in Software Engineering such as: *decision table*, *flowchart*, *pseudocode* and the names of current programming languages.

## UNIT 22

# People in Computing

### INTRODUCTION

There is a wide range of jobs in computing and different titles are sometimes given to the same type of job. Jobs mentioned in this unit include:

- A **Webmaster** – a person who administers a Web server.
- A **help-desk troubleshooter** – a person who works as part of a telephone service that helps users solve problems that occur on computer systems.
- An **applications programmer** – a person who writes **applications programs** (computer programs designed to be used for a particular purpose e.g. wordprocessors, spreadsheets or database programs).
- A **security specialist** – a person who tests the security of networks systems and advises customers how to introduce and maintain security policies including:
  - a setting up secure **password** systems (secret codes used to control access to a network system)
  - b installing **firewalls** (a combination of hardware and software used to control the data going into and out of a network)
  - c keeping out **hackers** (skilled programmers who attempt to gain unauthorised access to network systems)
  - d dealing with **viruses** (programs written with the purpose of causing damage or causing a computer to behave in an unusual way).
- A **systems programmer** – a person who specialises in writing **systems software** (a program or set of programs that are used to control the basic functions of a computer system e.g. operating system programs).

Being employed in any of these jobs requires the person to have particular formal

qualifications, personal qualities and technical skills. Qualifications mentioned in this unit include:

- a **Standard grades in Maths**. This is a basic level school qualification in mathematics.
- b **HNC in Computing**. This is a Higher National Certificate in computing including the study of **hardware** (the physical components of a computer system) and **software** (programs and data). This is a college qualification that can usually be obtained by a period of part-time study.
- c **HND in Computing Support**. This is a Higher National Diploma in installing, maintaining and **troubleshooting** (to find and fix faults in a system) computing systems and training users. This is a higher college qualification than an HNC but not as high as a University degree. It usually requires a period of full-time study.

An IT (Information Technology) **support engineer** is a professional who provides help for computer users by designing, building and maintaining **information technology systems** (systems and equipment such as computers for dealing with information). A support engineer might start out in their career by working on a **help-desk** (a telephone service for helping users solve problems that occur on computer systems).

An IT **manager** manages projects, technology and people. An IT **systems manager** is responsible for developing and implementing computer software that supports the operations of the business. **Off-the-shelf systems** are ready-made systems that are purchased from systems suppliers. **In-house systems** are developed by the employees of the company. A university degree is usually required but not necessarily

in **computing science** (the study of computers and their use). The best qualification for becoming a manager is experience.

A **systems analyst** studies systems in an organisation and decides how to **computerise** them (change the system into one controlled by computers). They analyse requirements and report on options for using **information technology** (the study and practice of techniques or use of equipment for dealing with information).

A **software engineer/designer** produces the programs which control the internal operations of computers. They use **program libraries** (sets of programmed functions that are made available for use by any program) to produce programs. They also design, test and improve programs for a variety of purposes including **computer-aided design and manufacture** (the production of technical designs and the production of goods using machines controlled by computers).

A **computer services engineering technician** is responsible for installation, maintenance and repair of computers and **peripherals** (associated equipment). They install, test, troubleshoot, **upgrade** (add components to improve the features or performance of a system) and carry out routine maintenance on hardware, ranging from **personal computers** (a computer designed to be used by one person at a time) to **mainframes** (the largest and most powerful type of computer, usually operated by a team of professionals).

A **network support person** or **computer engineer** maintains the link between **PCs** (personal computers) and **workstations** (powerful desktop computers used by power users for work that requires a lot of processing e.g. graphic design) connected in a **network** (a number of computers and peripheral devices connected together). They use **telecommunications** (technology

concerned with communications over long distances), software, electronic skills and knowledge of networking software to troubleshoot systems. This may involve work with the controlling software, on the wiring, **printed circuit boards** (the electronic boards that hold the components of a circuit and connect them together), software or **microchips** (small integrated electronic circuits) on a **file server** (a powerful network computer that stores computer files and makes them available to users on a network), or on cables either within or outside the building.

An **applications programmer** writes **applications programs** (computer programs designed to be used for a particular purpose e.g. wordprocessors, spreadsheets or database programs).

A **systems support person** is an **analyst programmer** (a person whose job is a combination of systems analysis and computer programming) who is responsible for maintaining, **updating** (bring up to date i.e. change into the latest version) and modifying the software used by a company. Some specialise in **systems software** (software that handles the basic operation of the computers). This involves use of **machine code** (computer language that consists entirely of a combination of 1s and 0s) and specialised **low-level computer languages** (computer languages, such as machine code or assembly language, that is closer to the form that a computer understands than to that of a human language). They may sort out problems encountered by users including amending an area of **code** (text of a program or part of a program using a computer language) in the software, retrieving files and data lost when a system **crashes** (fails suddenly and completely, usually referring to the failure of a hard disk).

## UNIT 23

# Recent Developments in IT

### INTRODUCTION

An **electronic newspaper** is an electronic device that connects to the Internet and displays news items on a display screen.

A **channel** is a path for the transmission of data.

A **gigabit per second** is a communications speed of approximately one thousand million binary digits every second.

A **fibre** refers to a strand of glass fibre used in fibre optics cable which carries data using the reflection of laser light.

**Visual computer personalities** refers to digital images with human characteristics that are used as an interface between the user and a computer system.

A **hydraulic chair** is a chair that has moving parts that are operated using fluid pressure.

**VR games** are **virtual reality games** i.e. computer games that use a simulated three-dimensional environment that surrounds the user and is generated by a computer.

An **intranet** is an internal network webpage system that operates using the same **protocols** (agreed communication standards) as the Internet.

**The Internet** is the connection of computer networks across the world.

A **wearable health monitor** is a computerised medical device built into clothing so that it can be worn by the user to take measurements of certain aspects of the user's health.

A **robot** is a mechanical device controlled by a computer.

A **terabit** is a unit of storage capacity equal to approximately one million million binary digits.

**Optical fibre** is the glass fibre used in fibre cable that carries data using the reflection of laser light.

A **robotic pet** is a mechanical device in the

form of a pet animal, such as a dog, that is controlled by a computer.

**Robotic devices within blood vessels** refers to computer-controlled mechanical devices that are small enough to be inserted into human veins and arteries that carry the blood around the body.

**Artificial brain implants** refers to computerised devices that are designed to be inserted into the human brain.

**Avatars** are animated graphical icons used to represent real people in **cyberspace** (the combination of all the data on all the computer networks throughout the world, accessed using the Internet).

**Robotics** is the study of robot systems.

**Barcodes** are sequences of vertical parallel lines used to give items unique identification numbers.

**Radio-frequency tags** are badges attached to products that emit radio-frequency signals to provide information about the product.

**Computerised** (operated or controlled using a computer) versions of common household items, such as fridges and washing machines, are becoming available. These devices have touch-sensitive display screens and can be connected to the Internet to enable **email** (electronic mail) and **browsing** (moving from webpage to webpage using a Web browser program) using **Web protocols** (agreed standards for communicating using the Web) such as **WRAP** (web-ready appliance protocol). These devices can be operated by **remote control** (at a distance) and can communicate with each other through the house **ring main** (the common, main electrical supply circuit). **Computerised fridges** can use radio-frequency tags to keep track of the items in the fridge, suggest menus or provide a shopping list.

**Wireless network systems** (network

connections using radio signals without network cables) are becoming more common. They are used to connect devices such as **PCs** (personal computers), **mobile phones** (wireless telephones), printers, cameras, credit card devices, headphones and **MP3 devices** (music players that use MPEG Audio Layer 3 – a Motion Picture Experts Group standard for audio compression). They communicate using standard protocols such as Bluetooth or WirelessLAN.

**EVA**s (electronic virtual assistants) are also likely to become more common. These are **3D** (three-dimensional) animated images that provide a humanlike **interface** (connection that provides a means of communication) between a computer user and a computer system. They are used by **call centres** (organisations that promote and sell products using the telephone), advertisers, **ISPs** (organisations that provide Internet connections for a fee) and **e-commerce** (buying and selling goods and services on the Internet). They can be programmed to operate a **search engine** (a program designed to find information in a database according to data entered by the user). They search the **databases** (electronic filing systems that store data in records) using **artificial intelligence** (an area of computing concerned with developing computer programs that perform tasks that can normally only be done using human intelligence). EVA's are controlled by **Java applets** (small, self-contained programs written using the Java computer language).

**Ananova** is the world's first digital newsreader. It is a 3D computer-generated animated image that has been programmed to have human characteristics. It operates over the Internet to deliver the news and latest information to personal computers, mobile phones and televisions. Ananova converts the information to speech and uses

**real-time** (the immediate processing of computer data) animated graphics.

An **avatars creation system** automatically creates a 3D model of a person that can be used to represent them on mobile **videophones** (phones with video screens) and on Internet services, such as **email** (electronic mail), **Internet chat** (real-time, online discussions) and Internet games. Anyone can have a personal avatar created by emailing their photograph and personal details to the system. Electronic games played on a **games console** (an electronic device used for playing computer games) in which an image of the user appears in the form of an avatar, could become a **killer application** (an application program that is particularly useful and popular, making a computer system very successful). The increased availability of **broadband systems** (communications systems with a high signal capacity) such as **ADSL** (asymmetric digital subscriber line) are likely to allow avatars to be used to create a virtual world populated by virtual humans.

**Robotic pets**, such as robot dogs, and robotic creatures, such as robot lobsters and crickets, demonstrate that simple processes can result in complex behaviours. They use **neural nets** (an artificial intelligence system that is capable of developing rules from given input so that it learns how to deal with more complex input). Experiments in **cybernetics** (the study of control and communication in animals and machines) may lead to more humans being turned into **cyborgs** (a man-machine system or a person made superhuman by a machine or external system that changes the way the body functions) in the future by having **chips** (common name for microchips – electronic integrated circuits in small packages) implanted in their bodies to act as **transponders** (devices that respond to received coded radio signals by automatically transmitting a different coded signal).

Human brains depend on **parallel processing** (the processing of different data at the same time) whereas computers process an input **serially** (one item at a time). Experiments with neural nets that have the capacity to form new links in the same way as

the brain, are being used to simulate parallel processing. Robots controlled by computers with neural nets would be able to learn for themselves rather than depend on fixed programs.

## INTRODUCTION

In **IT** (Information Technology – the study and practice of techniques or use of equipment for dealing with information), the **hardware** such as computers, phones and consumer electronics, is converging. So are the applications of IT, with a convergence of information, entertainment, communications, shopping, commerce and education. We must, however, solve the **interface problem** (the problem of communication between us and machines). **Voice and language recognition** (computer programs changing speech into program commands and digital data) will provide an easy interface, avoiding the problem of **technophobic users** (users who have a fear or strong dislike of technology and technological devices). **Telecomms applications** (programs used for communications over long distances) will be more common. They will contain smart **databases** (electronic filing systems with records that can be easily sorted and searched) and **virtual environments** (environments that are computer simulated), with **ID** (identity) verification, **encryption** (the transformation of data into coded form to make it secure), translation and other services based on **voice processing** (changing speech into digital signals). They will include a natural voice interface to talk to the computer, all the **AI** (artificial intelligence – computer programs that perform tasks that can normally only be done using human intelligence) to carry out the request, **voice synthesis** (the generation of a human-sounding voice using electronic circuits) and **visualisation technology** (systems and devices used to create a virtual reality environment) to get the answer out. **E-cash** (electronic money) will be used on the **Net** (the Internet). Changes in work practices may lead to **teleworking** (working at home while communicating with your office by

computer, telephone and fax). **High bandwidth connections** (communications links with a high signal capacity) will be available in trains and planes. **Communicator badges** will be used to provide voice links to network computers, and earphones will have built-in **voice synthesisers** (electronic devices that generate a human-sounding voice).

**Homo Cyberneticus** is the name used in this unit for humans that have superhuman brainpower because their brains are directly linked to ultra-smart computers.

**Homo Optimus** is the name given to biologically optimised humans.

**Homo Hybridus** is a human with both the body of an Olympic athlete and a brain connected to **cyberspace** (the combination of all the data on all the computer networks throughout the world, accessed using the Internet).

**Reverse engineering** of the human brain (exploring the human brain from the inside and finding out how it works) will be required to recreate human intelligence. Eventually, tiny scanning **robots** (computer-controlled mechanical devices) will be sent along blood vessels to map the brain from the inside. At the moment, computers work in **serial** (processing one item of data at a time) and brains work in **parallel** (processing lots of different data at the same time). Parallel computers will be able to reproduce some of the higher functions of the human brain.

**Smart phones** are telephones that use artificial intelligence to translate speech into different languages in **real-time** (instantly). **Intelligent agents** (computer programs that can be trained to watch, learn and start communicating) will help users to deal with the deluge of information from the electronic revolution.

**Biotechnology** (the industrial application of biological science techniques) is another core focus of **R&D** (research and development). Putting people **online** (connecting them to the Internet) and allowing them to **upload** medical information

(copy from a client computer to a server computer) can reduce the pressure on hospitals.

**Futurologists** predict that humans will be eclipsed by a **supercomputer** more powerful than the human brain.



# Electronic Publishing

## INTRODUCTION

A **telecommunications engineer** is a person who works with systems concerned with communications over long distances.

An **e-publisher** is a book publisher that produces **ebooks** (electronic books – a book that is displayed using a computing device instead of being printed on paper).

An **ebook reader** is a computing device that displays the text and images of an electronic book. Users can **download** books (copy from a server computer) over the Internet. The display screens have a back light i.e. the screens are lit from the back.

Current **electronic storage media** (material used for storing programs and data) include **magnetic tape** (a thin plastic ribbon wound on a reel or a cassette and commonly used for backing up data) and **CDs** (compact disks – common name for compact disk read only memory; a read only storage media in the form of a disk that is read using laser light).

A **mouse** is a common cursor control input device used with a graphical user interface. It commonly has two or three button switches on top and a ball underneath that is rolled on a flat surface.

**Intel** is the name of the company that produces most **microprocessors** used in computers (the main electronic chip in a microcomputer that does the main processing and controls the other parts of the computer).

**Bill Gates** and **Paul Allen** were the founder members of the Microsoft Corporation, the most successful computer software company.

The **Sinclair ZX80** was the first commercially available microcomputer produced in the United Kingdom.

The **IBM Personal Computer** is the family of computers manufactured by the computer company called International Business Machines. It set the standard for future

personal computers, commonly referred to as **PCs**.

**MS-DOS** was the first **operating system** produced by the Microsoft Corporation (the set of programs that controls the basic functions of a computer and provides communication between the application programs and the hardware).

**Acorn** was the name of the company that designed and manufactured the **BBC Micro** (one of the first microcomputers produced in the United Kingdom and used in schools; its development was sponsored by the British Broadcasting Corporation).

The **Apple Macintosh** is the name of a family of personal computers produced by Apple Computer Incorporated. It was the first microcomputer to use a graphical user interface.

**Windows 3.0**, **Windows NT** (new technology) and **Windows XP** are members of the family of **Windows operating systems** produced by the Microsoft Corporation.

The **Intel Pentium** is the name of one of the family of microprocessors produced by the Intel Corporation.

**Apple** is the common name for Apple Computer Incorporated, a well-known producer of computers that introduced the **GUI** (graphical user interface) on computers such as the Apple Macintosh.

**OS X** is an operating system designed for Apple computers.

The **Archimedes** is the name of a family of computers designed and manufactured by the computer manufacture known as Acorn.

**Unix** is a popular multi-user (can be used by many people at the same time), multi-tasking (can run more than one program at a time) operating system originally designed for **mainframe computers** (the largest and most powerful type of computer, operated by a

team of professionals) although a wide variety of versions now exist.

Various **prefixes** such as *mega* and *giga* are used in computing. Because the **binary number system** is commonly used in computing (a number system that only uses two digits i.e. 1 and 0), the value of the prefixes is not exactly the same as in the **decimal number system** (a number system that uses ten digits i.e. 0,1,2,3,4,5,6,7,8,9). For example:

*mega* in the decimal system  
=  $10^6$  = 1 000 000 (one million)

*mega* in the binary system  
=  $2^{20}$  = 1 048 576 (approximately one million).

**teleworking** is working at a distance

**binary** is a system of numbers with 2 as its base

**interface** is a way of communicating between two systems or between a user and a computer

**megabyte** is approximately one million bytes of information

**synchronous** describes a program which allows two-way communication between users and computers

a **module** is a set of computer instructions operating as one unit

**multi-tasking** means performing many tasks at the same time

a **supercomputer** is a computer higher in scale than any other

**ATM** (Automatic Teller Machine) is a machine which provides cash to bank customers without requiring a human operator

a **microprocessor** is a very small but powerful processor

a **multi-user** system is a system used by many people at the same time

**autocorrect** is a wordprocessing feature which corrects by itself

**Backups** are copies of data on a storage device used to keep the data safe. A **full backup** is a type of backup that copies all the selected files on a system, whether or not they have been edited or backed up before.

A **differential backup** is a type of backup that copies all the selected files on a system that have been changed since the last time a full backup was carried out. A full backup plus the most recent differential backup is known as a **backup set**.

## OBJECTIVES

By the end of this unit, Ss should be better at:

- defending a decision
- listening and note-taking.

They should understand and be able to use:

- cleft sentences.

They should have a better understanding of prefixes used in IT terminology and *-ise* verbs.

## STARTER

**1** Give Ss a few minutes to make their decisions; then group for discussion. Ss should be prepared to defend their decisions and to challenge decisions they do not agree with. It is a good strategy for them to think of arguments for both sides so they can anticipate the points which may be made against their decision.

