



CHELtenham
COURSEWARE

ECDL Module 1

Concepts of Information & Communication Technology (ICT)
PC Edition
ECDL Syllabus Five



SAMPLE



ECDL Foundation
Approved Courseware

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Hardware

Concepts

Hardware

- The term hardware refers to the physical components of your computer such as the system unit, mouse, keyboard, monitor etc.



What is a personal computer?

- IBM invented the PC (Personal Computer) way back in 1981. All PCs released since then are in some ways compatible with the original design, though many extensions have been made. Most PCs will be running a version of Microsoft Windows such as Windows XP or Windows Vista.

Capacity: Large hard disks combined with a large working memory (RAM)

Speed: Fast. Normally measured in GHz.

Costs: Getting cheaper by the day.

Typical Users: Home users, large and small office users. Just about everyone needs to know how to operate a PC these days.



Apple computers

- The Apple Mac is a computer, but not a PC. It uses a different operating system, and may require special versions of application programs (such as word-processors or spreadsheets). Even the hardware add-ons may have to be customised to some extent to be able to be connected to a Mac. In the early days the thing that really distinguished the Mac over the PC was the GUI (Graphical User Interface), or in plain English the way you could use the mouse to drive the computer. In the early days of the PC, you really had to be a bit of an expert to use and maintain your PC. Recently the differences between the PC and the Mac have blurred, with Microsoft buying a stake in Apple.



Laptop & palmtop computers

- Laptop computers, as the name implies, are small portable computers that can run on batteries as well as mains power. They use special screens, rather than the traditional bulky VDUs (Visual Display Units), that allows for longer battery life as well as portability. A newer term, “Notebooks”, simply indicates a very small laptop. These are especially popular with salespersons on the move or people giving presentations. While they tend to still be more expensive than an equivalent desktop computer, they can now match the power of a desktop computer. Palmtops are even smaller computers that can literally fit into the palm of your hand.

Capacity: Large hard disks combined with a large working memory (RAM) – Often less powerful than for a PC of equivalent price.

Speed: Fast. Normally measured in GHz. Often speed specifications are less than for a PC of equivalent price.

Costs: Components need to be much more compact, so there is a price overhead when compared to a PC of equivalent power.

Typical Users: Business users, people on the move, educational users.



Tablet PCs

- A tablet PC refers to a small laptop or slate-shaped computer that uses a touch screen or graphics tablet screen to accept instructions and data using a stylus or digital pen rather than the usual mouse or keyboard. The original Tablet PC was introduced by Microsoft in 2001 and used a special edition of Windows called 'Windows XP Tablet PC Edition'.
- **Capacity:** Because of its small size the capacity of a tablet PC is much less than the traditional PC.

Speed: Again because of its small size tablet PCs tend to be slower than a traditional PC.

Costs: The cost of a tablet PC tends to be much higher than a traditional PC of equivalent power.

Typical Users: Includes users where a traditional PC would be too bulky or cumbersome to use.



Features of handheld portable digital devices

- A range of small portable digital devices are now available including:
 - Personal digital assistants (PDAs).
 - Mobile (Cell) phones.
 - Smartphones.
 - Multimedia players.

Personal Digital Assistants (PDA)

- These devices use a special pen, rather than a keyboard and can be used for storing and retrieving information. Like most computer devices, many can connect to the Internet. They are extremely compact.
- PDAs have many built-in features such as a calculator, a clock and a calendar.
- PDAs can also be used for accessing the Internet, sending and receiving e-mails, video recording, typewriting and word processing, use as an address book, making and writing on spreadsheets, scanning bar codes, playing computer games, recording survey responses, and Global Positioning System (GPS).

Newer PDAs also have both colour screens and audio capabilities, enabling them to be used as mobile phones (smartphones), web browsers, or portable media players. Many PDAs can access the Internet, intranets or extranets via Wi-Fi, or Wireless Wide-Area Networks (WWANs). Many PDAs employ touch screen technology.



Capacity: Much smaller storage capacity compared to a PC.

Speed: Much less than a PC unless you pay a lot extra.

Costs: In relative terms expensive, when compared to a PC.

Typical Users: Mostly business users.

Mobile phones (cell phones)

- A mobile phone, or cell phone, is used for mobile communication. As well as speech they may be used for text messaging, emailing or accessing the Web. Many also allow you to send and receive pictures and video. Most mobile phones use a signal from a local transmission tower and will not work when you are out of range, or if the signal is blocked by mountains, or even buildings.

Satellite phones use a signal coming from a satellite. They tend to be much more expensive to purchase and use. While you should never be out of range, the satellite signal may be blocked by tall buildings.



Media players

- Media players allow you to store digital music and video. A famous example is the ipod from Apple that lets you store your digital music that you can then listen to at your leisure. Thousands of songs can be stored on these devices.
- You can also get media players with a built-in screen that will allow you to watch films and video clips that you download to these devices.

WARNING: Remember that most music and films are covered by copyright and should only be downloaded from legitimate sources.

Smartphones

- A smartphone is a mobile phone (cell phone) offering advanced computer like features. Capabilities and standards vary from one manufacturer to another. Most smartphones have some sort of operating system, allowing you to connect to other devices and also to install applications. Most smartphones allow you to send and receive emails, and may even allow you to browse the Web. Some have a personal organizer built into them and some sort of contact management organiser. Some even have a miniature computer-type keyboard built into them, while others have a touch screen. Some have GPS positioning systems. Some smartphones allow you to read documents in Microsoft Word or Adobe Acrobat PDF format. Other features can include a built-in camera, the ability to play music, display photos and video clips, media software for playing music, browsing photos and viewing video clips.



Parts of a computer

- You should understand some of the basic elements that make up a computer including:
 - Central processing unit (CPU).
 - Types of memory.
 - The hard disk.
 - Input and output devices.

The CPU

- The CPU (Central Processing Unit) is normally an Intel chip (or equivalent) and it is one of the most important components within your computer. It determines how fast your computer will run and the CPU speed is measured by its GHz speed. Thus, a 4 GHz CPU is much faster than say a 1 GHz CPU. It is the CPU that performs all the calculations within the computer, when running programs such as word-processors, spreadsheets and databases.

The CPU contains the following elements:

Control Unit:

The control unit is responsible for controlling the sequencing and timing of the other elements making up the CPU.

Arithmetic Logic Unit (ALU):

The ALU performs the mathematical calculations using data stored within the CPU registers.

Registers:

The registers are memory storage areas within the CPU that hold the data that is worked on by the ALU.

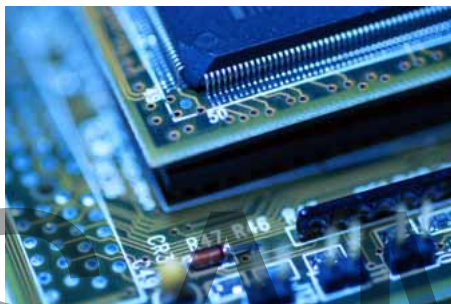
BUS:

The computer bus transports data between the memory and registers.

More information:

Intel: <http://www.intel.com>

AMD: <http://www.amd.com>



Memory (RAM)

- The RAM (Random Access Memory) within your computer is where the operating system is loaded to, when you switch on your computer, and also where your applications are copied to when you start an application, such as a word processor or database program. When you create data, such as letters and pictures, these are initially created and held in RAM and then copied to disk when you save the data. As a rule of thumb, the more RAM you have installed in your computer the better. These days you will commonly find over 2 GBytes of RAM installed.



ROM-BIOS

- The ROM-BIOS (Read Only Memory - Basic Input Output System) chip is a special chip held on your computer's system (mother) board. It contains software that is required to make your computer work with your operating system; for instance, it is responsible for copying your operating system into RAM when you switch on your computer.

Disks

- You use disks to store any data that you create. This can range from a memo created within a word processor to a video file created using a video camera. There are many different types of disk. Software is also supplied on disk, normally a CD or DVD disk.

The Hard (Fixed) Disk

- Hard disks are the main, large data storage areas within your computer. Hard disks are used to store your operating system, your application programs (i.e. your word processor, games etc) and your data. They are much faster than CD or DVD disks and can also hold much more data. Hard disks are installed within the system unit of your computer.

Input/output ports

- The Input and Output ports are normally located at the back or on the side of your computer. These include ports such as USB, serial, parallel, network and FireWire ports. You plug cables into these ports to connect your computer to other devices, such as printers, scanners and cameras.

Universal Serial Bus (USB) Port

- The Universal Serial Bus is a relatively new item within the PC. You will see one or more USB sockets at the back of the system unit, allowing you to plug in devices designed for the USB. These devices include printers, scanners and digital cameras. Memory sticks can also be plugged into a USB port allowing you to copy data to, or from, your hard disk.



Serial Port

- The serial port is a socket located at the back of your computer that enables you to connect items to the computer, such as a modem. They are commonly labelled as COM1 or COM2.



Parallel Port

- The parallel port is a socket located at the back of your computer that enables you to connect items to the computer, such as a printer. Commonly labelled as LPT1 or LPT2.



NOTE: The parallel port used to be the main way the computer connected to a printer. These days you are more likely to use a USB cable to connect the computer to a printer.

Network Port

- The network port allows you to plug a 'network cable' into your computer, which then lets you communicate with other computers connected to your local network or to other computers via the Internet.



FireWire Port

- FireWire is an interface from Apple Inc. that allows high speed data transfer between your computer and a compatible device such as a digital camera. FireWire has largely replaced earlier ways of transferring data. There are numerous versions of FireWire including fibre optic, coaxial and wireless versions. Most multimedia computers will have FireWire ports built into them. Firewire connectors usually look like this:



Computer Performance Issues

Factors affecting computer performance

- There are a wide range of factors that can affect the performance of your computer. These include CPU speed, RAM size, type of graphics card, plus the number of applications running. It is important to realise that it is not just the speed of the CPU that affect the overall performance of your computer. There is no point in having a very fast CPU if the other parts of a computer may slow down the real world performance.

CPU Clock speed

- The computer clock speed governs how fast the CPU will run. The higher the clock speed, the faster the computer will work for you. The clock speed is given in Gigahertz (GHz). The higher the GHz speed the faster the computer.

RAM size

- As a rule the more memory you have the faster the PC will appear to operate. Windows also uses the hard disk a lot, so logically the faster the hard disk can operate, the faster the PC will appear to run.

Hard disk speed and storage

- Hard disks are also measured by their speed, defined by the disk access time, which is measured in milliseconds. The smaller this access time, the faster the hard disk will store, or retrieve data. The data storage capacity of hard disks continues to increase as new products are released. The disk storage capacity is measured in Gigabytes (GBytes). 1 GByte is equivalent to 1024 Mbytes.

Free hard disk space

- To get the most out of your Windows based PC, you not only need a fast hard disk, but also a large hard disk, with plenty of "spare space". This is due to the fact that Windows is constantly moving data between the hard disk and RAM (Random Access Memory). Microsoft Windows will create many so-called "temporary files" that it uses for managing your programs. In fact, if you have very little free hard disk space, you may find that Microsoft Windows will not be able to run your programs at all.

De-fragmenting files

- If you are running Windows you may find that if you click on the **Start** menu, select **Programs**, and then select the **Accessories / System tools** group, there is a de-fragmentation program. Running this periodically may noticeably speed up the operation of your PC. When you use a PC, over a period of time the files get broken up into separate pieces that are spread all over the hard disk. De-fragmentation means taking all the broken up pieces and joining them back together again.

Multitasking considerations

- Windows is a multitasking system, which means that it can run more than one program at a time. However the more programs that are running at the same time, the slower each one will run. To some extent this slowing effect depends on what each program is doing. Editing a large high definition video for instance can take up a lot of CPU time.

CPU speeds

- The speed (operating frequency) of the CPU is measured in gigahertz (GHz). The higher the value the faster the CPU will operate. The original IBM PC released way back in 1981 ran at 4.77 MHz whereas modern PCs can run at over 4000 MHz, which gives you an idea of how far things have progressed.
- 1 MHz means that the device will run at one million cycles per second.
- 1 GHz is a thousand times faster, so that 1 GHz = 1000 MHz.

Memory and Storage

What is computer memory?

- You can store data on your hard disk, while data that is being processed is stored in RAM (Random Access Memory). Data that is stored on a hard disk can be permanent, while data in RAM is only temporary. Normally when people talk about memory in relation to a PC, they are talking about RAM.

RAM

- Random Access Memory (RAM) is the main 'working' memory used by the computer. When the operating system loads from disk, when you first switch on the computer, it is copied into RAM. Commonly modern computers are supplied with over 2 GBytes of RAM. As a rough rule, a Microsoft Windows based computer will operate faster, if you install more RAM. When adverts refer to a computer having 2 GBytes of memory, it is this RAM which they are talking about. Data and programs stored in RAM are volatile (i.e. the information is lost when you switch off the computer).

ROM

- Read Only Memory (ROM) as the name suggests is a special type of memory chip that holds software that can be read but not written to. A good example is the ROM-BIOS chip that contains read-only software. Often network cards and video cards also contain ROM chips.

ROM-BIOS

- The 'Read Only Memory Basic Input Output System' chip is a chip located on the computer's system (mother) board that contains software. This software performs a variety of tasks. When you first switch on the computer the ROM-BIOS software performs a self-diagnostic to check that the computer is working OK. This software then loads your operating system from the disk into the RAM.

Video (graphics) memory

- The picture that you see on your screen is a form of data and this data has to be stored somewhere. The on-screen pictures are held in special memory chips called video memory chips; these chips are usually located on the video card. A modern computer will be supplied with large amounts of video memory.

Measurement of storage capacity

- It is important that you understand a little about the measurements used to define storage capacities:

Bit:

Computers are digital. This means they work by processing ones and zeros. The basic one or zero is called a bit of information.

Byte:

There are eight bits in a Byte.

KB - Kilobyte:

There are approximately a thousand bytes in a KB (also called a KByte)

MB - Megabyte:

There are approximately a million bytes in a MB (also called a MByte)

GB - Gigabyte:

There are approximately a thousand, million bytes in a GB (also called a GByte)

TB - Terabyte:

There are approximately a million, million bytes in a TB (also called a TByte).

Types of storage media

- There are a range of storage media to choose from including CDs, DVDs, USB flash drives, memory cards, internal hard disks, external hard disks, network drives and on-line file storage. Some are more suitable than others for a particular job, for instance a flash drive is great for quickly transferring relatively small amounts of data from one computer to another.

Internal hard disks

- All PCs are supplied with an internal hard disk. This is where the operating system (such as Windows) is stored. It is also where you store your data. When you install new applications, they are copied from CD or DVD to your internal hard disk.



External hard disks

- As the name suggests these are secondary hard disks that you can plug into your computer. They are normally connected via a USB cable. They are available in a range of speeds and storage capacities and are an ideal way to backup your data, such as photos or movies.



CDs

- Most computers are now supplied with a CD drive. CD data discs look exactly like music CDs but contain computer data instead of music. The advantage of a CD is that it can hold a vast amount of data. The other big advantage of CDs is that they are interchangeable. This means that you can own a range of different CDs and choose which one to insert into your CD drive.

DVDs

- Short for "Digital Versatile Disk". Similar to CD drives but allows you to use DVD disks, which contain vastly more information than a traditional CD disk. These also transfer the data from the disk to the computer far faster, allowing you to watch movies on your computer screen. A CD disk can store 650 MB of data, while a DVD disk can store over 4 GB of data.

Recordable CD & DVD drives

- CD-ROMs are read-only devices, but increasingly people are purchasing a special type of CD drive unit that allows you to record data, music or video to your own CDs. These devices require the purchase of special CDs to which you can write, called CD-R (Compact Disc – Recordable).



USB flash drives (memory sticks)

- Flash drives plug into the USB port and when viewed via the Windows Explorer, look just like any other drive. They are supplied in a range of sizes with the 1 GB devices being a very cheap way of transferring relatively small amounts of data between computers.



Memory cards

- A memory card (also called a flash memory card) is a card containing memory chips that is often used in devices such as digital cameras, telephones, music players, video game consoles, GPS system and similar devices where there is a need to store data in a compact form, often using a battery power source. There are a number of different types of memory cards with different storage capacities.

Many new PCs have built-in slots for different types of memory cards.



Network drives and on-line file storage

- Within an office it is normal that the computers are connected together via a network. This allows you to store your data centrally, on a network server. This network server should be backed-up by the IT support staff on a daily basis. This means that your data is safely backed up for you.
- Alternatively you may create and store your data on your own PC or laptop and periodically copy it across the network to be stored safely on a central network server. In many companies network software automatically backs up selected folders on each computer to the central server.

Floppy disks (diskettes)

- Floppy disks are also known as diskettes. They are very slow compared to hard disks, CD or DVD disks and hold relatively small amounts of data (1.44 Mbytes). Sometimes people will backup (i.e. copy) important data from their hard disk to floppy disks. However, as diskettes are notoriously unreliable this is not the best

way of backing up valuable data (but is better than nothing). Modern computers are not normally supplied with this type of drive. Floppy disks have almost entirely been replaced by CD or DVD disks.



Input Devices

What are input devices?

- Input devices allow you to input information to the computer and include things such as the keyboard and mouse.

Keyboard

- The keyboard allows you to type information into the computer. It has evolved over the years. The keyboard is built into laptop computers but is a separate item if used with a Desktop computer. They can be connected via cables or may be wireless.



Mouse

- When using an operating system, such as Microsoft Windows, you use the mouse to select drop down menus, to point and click on items, to select items and to drag and drop items from one place to another.



Scanners

- A scanner allows you to scan printed material and convert it into a file format that may be used within the PC. You can scan pictures and then manipulate these inside the PC using a graphics application of your choice. In addition, you can scan printed text and convert this not just to a picture of the text but also to, actual text that can be manipulated and edited as text within your word-processor. There are a number of specialist programs, generically called OCR (Optical Character Recognition) programs that are specifically designed for converting printed text into editable text within your applications.



Tracker balls

- A tracker ball is an alternative to the traditional mouse and favoured by graphic designers. Tracker balls often give much finer control over the movement of the items on the screen. They may take a while to get used to if you are used to the traditional mouse, but offer a lot in terms of added flexibility.



Touch pads

- A touch pad is a desktop device and responds to pressure. Used in conjunction with a special pen they can be used by graphic artists wishing to create original, digital artwork.

Joysticks

- Many games require a joystick for the proper playing of the game. There are many different types, the more sophisticated respond to movement in 3 axis directions, as well as having a number of configurable buttons. Like most things in life you get what you pay for with joysticks and it is worth investing in a good, strongly constructed model, especially bearing in mind that children will hammer these devices whilst playing games.



Web cams

- Ever since it was invented, the Web has become increasingly interactive. You can now use a small digital movie camera (a Web cam) mounted on the PC monitor to allow two-way communication involving not just text communication but sound and video communication as well. While not yet considered a standard piece of PC kit, it is only a matter of time ...



Digital cameras

- A digital camera can be used in the same way a traditional camera can, but instead of storing images on rolls of film that require developing, the images are stored digitally in memory housed within the camera. These pictures can easily be transferred to your computer and then manipulated within any graphics programs that you have installed on your computer. Currently they are limited by the quality of the image recorded and the number of pictures that you may store within the camera.



Microphones

- Early voice recognition systems offered very poor results, due to the limitations of the software combined with hardware limitations. It takes an awful lot of CPU processing power to convert the spoken word into text that appears on the screen. Things are changing rapidly however and recent systems allow you to

talk to a PC and see text appear on the screen. Most of these systems require an initial training period, where you train the software to respond to your particular voice. Whilst still not perfect this is a key technology of the future.



Output Devices

What are output devices?

- Includes items such as screens (monitors), printers, speakers and headphones.

Traditional computer monitor

- An output device. The original computer monitors were TV type screens on which you viewed your programs. They were supplied in different sizes, common sizes range from 15" to 21" screens. You should be aware that poor quality or badly maintained monitors could harm your eyesight.



Flat screen computer screens

- Traditional computer monitors are based on the same sort of technology that is used within a television screen.

More recently, flat screen computer screens have become available. These take up a lot less room on a desk and use less energy than the traditional, more bulky monitors.



- You should be aware that often if you specify a screen of a certain size, say a 17-inch screen, this is the size measured diagonally, not horizontally across the screen. If you are upgrading you should also ask for the "visible viewing area" of the screen.

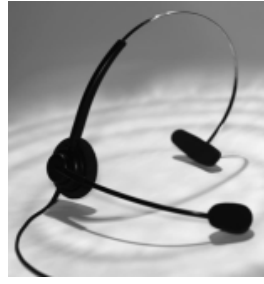
Projection devices

- These are projection devices that can be attached to your computer and are useful for displaying presentations to a group of people. They are best used in combination with presentation programs, such as Microsoft PowerPoint. They are used within education and are also very popular for sales presentations. The price of these devices has dropped dramatically recently. When purchasing one of these devices the two things to look out for are the resolution (go for a minimum of XGA) and the brightness of the lamp (the brighter the better). Other factors to be aware of are the quietness (or otherwise) of the device, as well as the cost of replacement bulbs.



Speakers and headphones

- Most computers are sold with the capability to add a pair of speakers to your system unit. In fact, in some cases, the computer screen may have speakers built directly into the unit. This enhances the value of educational and presentation products and can now be considered a standard PC component.
- Most computers allow you to plug headphones into one of the computer sockets. This is useful as the sound will then not annoy others in the room.



Speech synthesizers

- A recent development is the ability not only to display text on a monitor but also to read the text to you. Thus, you could receive a text email from a colleague and the system could read that email to you. This is of enormous benefit to the visually impaired when using a computer. On the flip side, it is now possible to use a microphone to talk to the computer and for the computer to directly convert the spoken word into text that will be displayed within say your word-processor. Whilst these systems are far from foolproof they are getting better as more advanced software is being made available.

Printers

- Most data is printed once you have created it and there are a vast number of different printers available to accomplish this. Most common are ink jet and laser printers both of which can now produce coloured output (at a cost).



Different types of printer

- There are many different types of printers. In large organisations, laser printers are most commonly used because they can print very fast and give a very high quality output. In most organisations, the printers are connected to the computers via a network. This means that each person with a computer does not require his or her own printer. Each computer connected to the network can print using a particular shared printer.

- When you buy a printer, one of the things the salesperson will not necessarily stress is how much it will cost to keep that printer running. Laser printers do not use ink; they use something called toner that is normally supplied in a sealed unit called a toner cartridge. Each toner cartridge will allow you to print a certain amount of pages and when the toner is used up it needs to be replaced. In some cases the costs of these toner cartridges is very high. Ink jet printers can work out even more expensive to run.

Laser printers

- Laser printers produce high print quality at high speed. They are called "laser printers" due to the fact that they contain a small laser within them. There is a wide range of laser printer manufacturers and one buzzword to be aware of is Postscript, a type of printer that is designed to give very high quality reproduction of pictures.

Colour laser printers

- Originally, most laser printers would only print in black and white (mono). More recently colour laser printers have dropped in price and are entering wide spread use. While many of these produce excellent results, you should be aware of the fact that the "price per page", especially if you are using a lot of colour on a page can be very high compared to the cost of printing in black and white.



Inkjet printers

- Inkjet printers work by using tiny jets to spray ink onto the paper. Inkjet printers are very quiet in operation and produce print quality comparable to that of laser printers, though laser printers still have the edge in terms of speed. Inkjet printers are ideal for low volume printing where high quality print is required and speed is not a high priority, e.g. printing letters in a small office or in the home.



Dot Matrix printers

- Dot matrix printers work by firing a row of pins through an ink ribbon onto the paper. The more pins the print head has the higher the quality of the print, most modern dot matrix printers have 24 pins. Unfortunately, dot matrix printers can generate a lot of noise and do not produce a very high quality of print, especially when printing graphics. As a result, the inkjet printer has now largely replaced the dot matrix printer. Dot matrix printers are used for high volume / low quality printing, e.g. printing company pay slips.



Input and output devices

Some devices are both input and output devices.

- A modem can be used for downloading information from web sites and receiving emails. It can also be used for uploading and sending emails. A touch screen can display a menu system (output device), and accept input when people touch the menus displayed on the screen.

Software

Concepts

What is software?

- The software is the collection of instructions that makes the computer work. For instance, when you type in words via the keyboard, the software is responsible for displaying the correct letters, in the correct place on the screen. Software is held either on your computer's hard disk, CD, DVD or on a diskette (floppy disk) and is loaded (i.e. copied) from the disk into the computers RAM (Random Access Memory), as and when required.



What is an operating system?

- The operating system is a special type of program that loads automatically when you start your computer. The operating system allows you to use the advanced features of a modern computer without having to learn all the details of how the hardware works. There are a number of different types of operating system in common use. The IBM PC (Personal Computer) was introduced way back in 1981 and was originally supplied with an operating system called DOS (Disk Operating System). This operating system was very basic, and you had to be a bit of a computer expert just to understand how to use it. It was NOT user-friendly. Later on, Microsoft introduced Windows and this is the operating system which is most widely used on PCs today. To complicate matters further, there are a number of different types of Windows. Most people are today running either Windows XP or Windows Vista.



- IBM produced an operating system called OS/2 but this was largely ignored and is only used by a few companies.
- UNIX and Linux are other examples of operating systems that may be run on PCs.
- Other types of computers, such as those manufactured by Apple have a completely different operating system.

Microsoft Windows: Microsoft: <http://www.microsoft.com>

IBM OS/2: <http://www.ibm.com/software/os/warp>

Mac OS X: <http://www.apple.com>

Linux: <http://www.linux.org>

UNIX: <http://www.unix.org>

Examples of software applications

- An application program is the type of program that you use once the operating system has been loaded. Examples include word-processing programs (for producing letters, memos etc), spreadsheets (for doing accounts and working with numbers), databases (for organising large amounts of information), games programs and graphics programs (for producing pictures, advertisements, manuals etc).
- It is important that you recognise examples of application programs covering the following areas:
 - Word processing
 - Spreadsheets
 - Databases
 - Presentations
 - E-mailing
 - Web browsing
 - Photo editing
 - Computer games

Word processing applications

- A word processing program (such as Microsoft Word) allows you to produce letters, memos, etc., easily. You can easily mail merge a list of names and addresses to produce mass mailers, individually addressed to customers or subscribers.

Spreadsheets applications

- A spreadsheet program (such as Microsoft Excel) allows you to work out a company's income, expenditure and then calculate the balance. It enables you to

make 'what if' type projections of how the company will fair in the future and to forecast how changes in prices will affect profits.

Database applications

- A database program (such as Microsoft Access) allows you to compile information and then to search this information to extract just the information you require. For instance, if you have a database of all the equipment housed within an office you can very simply produce a report listing only the equipment above a certain value.

Presentation applications

- A presentation program (such as Microsoft PowerPoint) allows you to produce professional looking presentations that can be printed out directly onto slides for use with an overhead projector. Alternatively, you can display your presentations directly on a computer screen or via a computerised projector.

E-mailing applications

- There are many emailing programs available. As the name suggests you use these to send and receive emails. Microsoft Outlook is supplied within Microsoft Office. Another well know example is the Thunderbird email program.

Web browsing applications

- Applications used to view and interact with the World Wide Web (WWW).

MS Internet Explorer: <http://www.microsoft.com/ie>

Google Chrome: <http://www.google.com/chrome>

Firefox: <http://www.mozilla.org/products/firefox>

Photo editing applications

- These programs allow you to edit digital photos. You can adjust items such as the picture brightness, contrast and colour balance. You can remove defects such the red eye effect often caused when using a flash. You can apply interesting special effects and filters to visually enhance your photographs. Examples include Photoshop from Adobe and Paint Shop Pro from Corel.

Computer games

- Computer games started off as simple bat and ball games and today have evolved into an enormous worldwide business. There are many different types of games ranging from the educational, to the 'shoot them up' variety. The level of graphical detail on the screen gets better each year.

There are many different formats available for games. Some games can be played on a standard computer, while others require a dedicated console such as a Sony Playstation.

Famous examples include Doom (a shoot them up game) and Simms (a game where you build your own little world within the computer).

Difference between the operating system and application programs

- The operating system works closely with the hardware that you have installed within your computer. It interprets the input via the mouse or keyboard and outputs data to the screen.
- The application programs sit above the operating system, and make use of the functionality built into the operating system. They are specific to a particular task. For instance Microsoft Word is designed as a word processing program, while Microsoft Excel is a spreadsheet program.

Accessibility options

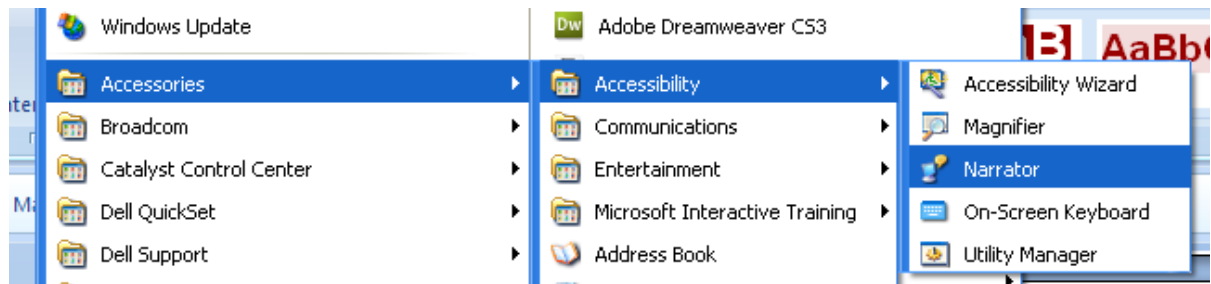
- There are a range of options to improve computer accessibility. These cover:
 - Voice recognition software
 - Screen reader software
 - Screen magnifier software
 - On-screen keyboard.
- In addition many web sites are now written to be compatible with software designed to increase accessibility.

Voice recognition software

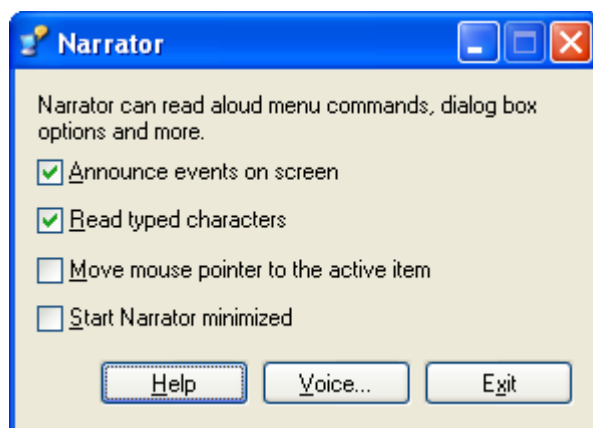
- Voice recognition software lets you talk to a computer and use simple commands or sentences. These systems are easily confused by regional accents and background noise, but are getting better each year as the software improves.
- This type of software is commonly used when phoning large organisations, typically banks. You may be requested to read your credit card number. The software at the other end of the phone will recognise the numbers that you tell it, and put your call through to the correct person.
- Voice recognition software has obvious benefits as far as improving accessibility option is concerned. If you are unable to use a keyboard then the ability to talk to a computer offers tremendous opportunities, however we are a long way from the talking computers found on Star Trek.

Screen reader software

- Screen reader software is designed for the visually impaired and tries to interpret the contents of the computer screen and then communicate that information in different formats, such as speech output, sound icons or as Braille output.
- Recent versions of Microsoft Windows are supplied with basic screen reader options.



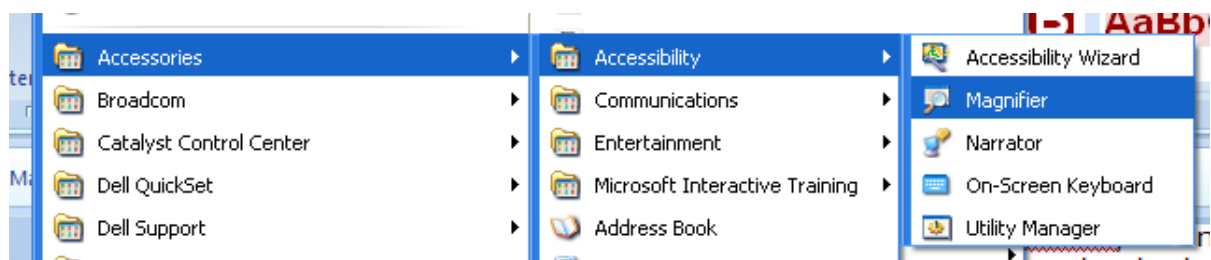
The Windows XP Narrator options look like this:



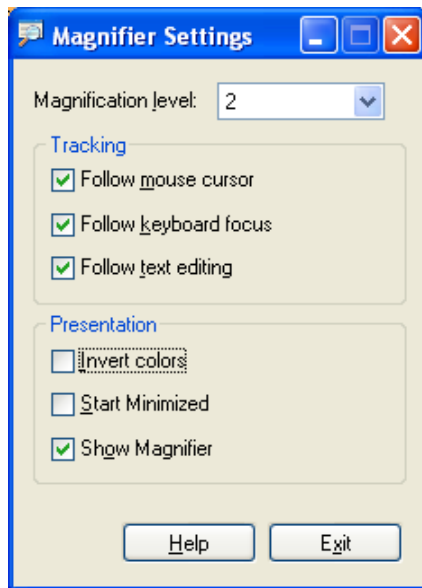
- There are many rival commercial options available. Try searching the web for 'screen reader software' for an idea of what is available.

Screen magnifier software

- This type of software magnifies the screen contents, making it easier to read for the visually impaired. Microsoft Windows has basic screen magnifier software included.

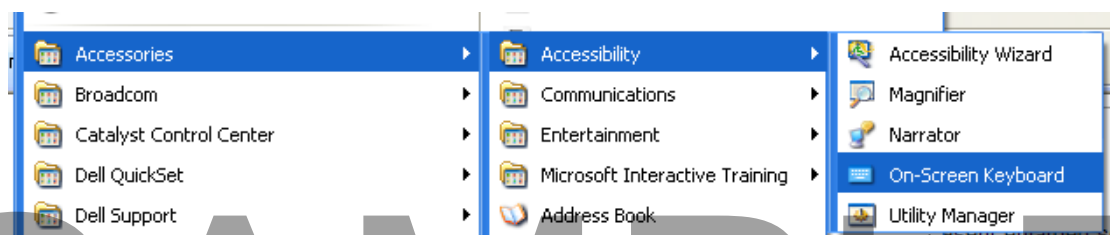


The options include the following:



On-screen keyboard

- An on-screen keyboard is a representation of the physical keyboard on the screen. It is designed for use by individuals who are not able to use a physical keyboard.
- Windows has a basic on-screen keyboard option located within the **Accessories** group.



It looks like this.

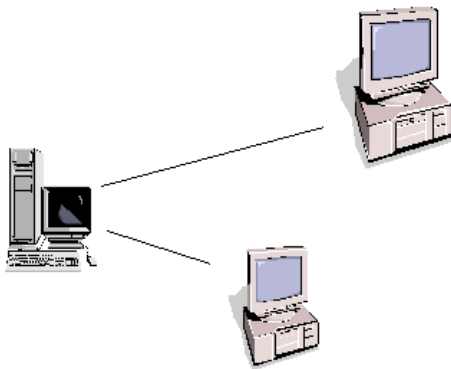


Networks

Network Types

LAN (Local Area Network)

- A LAN (Local Area Network) is a system whereby individual PCs are connected together within a company or organisation. For instance if ten people are working together within an office it makes sense for them all to be connected. In this way, the office can have a single printer and all ten people can print to it. In a similar way, other devices such as modems or scanners can be shared. Even more useful is the ability to share information when connected to a network.



WLAN (Wireless Local Area Network)

- A WLAN (Wireless Local Area Network) allows you to connect to other computers within your LAN using wireless technology.



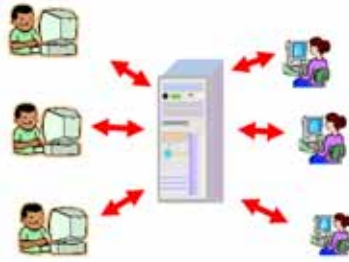
WAN (Wide Area Network)

- A WAN (Wide Area Network) as the name implies allows you to connect to other computers over a wider area (i.e. the whole world).

Client/server networks

- This term relates to the type of network where resources are kept centrally on the server and used locally by the client. The server tends to be a very powerful PC

(or group of PCs), while each client workstation, which the users have, is less powerful.



Internet

- A collection of networks started by and for the US military to enable them to 'survive' a nuclear war. Later adopted by the educational system, and now exploited by the commercial world.
- The Internet is a global network of interconnected networks. The unique thing about the Internet is the sheer amount of information that you can access from it. Whatever your interest, you can search for and find information on the most obscure topics. For research the Internet is an incredibly valuable tool. Whether you are gathering information about a rival company on the other side of the world, or are looking for information about your family tree, you will find there is plenty of information available. If you publish material on the Web, it can be accessed by everyone on the Web (providing they can find it.). As a marketing tool, this has interesting possibilities. It is possible for a small company to sell products and services worldwide, without the need for a single sales-person. These days the problem is often not finding information but rather dealing with the sheer amount of information that is available. Also, you have no idea how accurate or up to date a lot of the information you access really is.

World Wide Web (WWW) vs. the Internet

- The World Wide Web (WWW) is just a small part of the Internet as a whole. The Internet relates to all the hardware and software involved, as well as the WWW, it also includes FTP (File Transfer Protocol), email and newsgroups. The WWW is basically the text and pictures that you can view using your web browser, such as Microsoft Internet Explorer.

Intranets

- An Intranet is a smaller, closed version of the Internet that can only be accessed by authorised members of an organisation. Intranets are becoming an increasingly popular way to share information within a company or other organisation. An Intranet uses Internet technologies to allow users to access company documents, search databases, schedule meetings and of course send

emails. Once a company has installed a comprehensive Intranet many users need only one piece of software on their PC, a web browser.

Extranets

- An Extranet is an Intranet that is partially accessible to authorised outsiders. An Intranet is normally only accessible by members of the same company or organisation; an extranet also allows outsiders who have been issued with a password to gain limited access to information held on a company network. Extranets are being used as a way for business partners to share information.

Data Transfer

Downloading from & uploading to a network

- You can 'download' data from a network, for instance you can download a file from a web site. Another example of downloading would be copying a file from another computer on your Local Area Network to the hard disk on your computer.



- Uploading refers to copying data from your computer to another computer, either on your local area network or on your company web site.



Data transfer rate measurement

- When you download or upload data the speed of the data transfer is measured by the amount of data that is transferred per second. Common transfer rate units are:
 - Bits per second (bps). Very slow connections will be quoted in bits per second.
 - Kilobits per second (kbps).
 - Megabits per second (mbps). High speed data transfer is measured in megabits bits per second.

Broadband vs. dial-up Internet connection services

- In the early days of the Internet, you plugged a modem into your computer, which in turn was plugged into a phone line. Each time you wanted to connect to the Internet you had to dial up your Internet Service Provider (ISP), via your modem and you would be connected to the Internet. You were charged for every second that you connected to the Internet. As a result, most people, spent most of the time not actually connected to the Internet. This made emailing frustrating. It was like phoning someone who unplugged their phone for most of the time. When you reconnected to the Internet, you would check for email and read it then. Dial up Internet access is very slow. It is OK for browsing Web sites, but you would not be able to watch movies on a dial up connection.
- A broadband Internet connection means that you are permanently connected to the Internet. Your email program can receive and display mail as soon as someone sends you mail. Broadband Internet connection is not charged by the second, but by a monthly fee. The speed of your broadband connection depends on how much you wish to pay each month. A fast broadband connection allows you to view movies and listen to music.

Internet connection options

- Most people will connect to the Internet via a phone line or via a cable connection. There are however a range of Internet connection options including:

Phone line:

The most common type of Internet connection. Your computer is connected to a modem that connects to the phone line. You can use dialup or broadband via the phone line.

Cable:

The same cable that supplied TV channels can also supply your Internet connections. Often cable gives you very high speed Internet access.

Mobile phone:

This is often very expensive and mainly appeals to the younger Internet users. The connection is established via special, Internet compatible phones. The screen on mobile phone is tiny, so you are limited in what information you can usefully view via a mobile phone.

Wireless Hot Spots:

Many public places, such as shopping malls, hotels, airports and restaurant chains now offer wireless access to the Internet. This is sometimes free but is normally charged via your credit card as a fixed rate per time period. Often you cannot download materials, you can just browser the Web or view your emails.

Satellite:

If you live in a very remote area, your only way to connect to the Internet may be

via a satellite link. This may require large satellite dishes and expensive specialised equipment. The cost of the Internet connection may also be high.

Features of a broadband Internet connection

- Broadband features include:

Always on:

Unlike a dialup connection a broadband connection is always connected to the Internet.

Flat fee payment:

Unlike a dialup connection where you often pay for every minute connected a broadband connection is paid for via a flat monthly fee.

High speed access:

With broadband the more you pay the higher the connection speed. There are technical limitations that cap the speed and you should be aware that the theoretical access speeds quoted by Internet Service Providers (ISPs), are seldom reached.

Risk of intruder attack:

Because a broadband connection is always connected there is more chance that hackers will try and invade your computer connection. This is often done via virus like programs and you should always have an up-to-date virus checking program installed on any computer that has a broadband connection. You will also need a firewall in place to protect you from some of the online threats.

SAMPLE

ICT in Everyday Life

Electronic World

What does 'Information and Communication Technology' (ICT) mean?

- ICT stands for Information and Communications Technology. In the Asia Pacific region the term IT & T is often used instead of ICT. This stands for Information Technology and Telecommunications.
- These terms cover a wide range of computer related fields including:
 - Installing and maintaining computer systems and applications
 - Designing, installing and maintaining computer networks
 - Data management
 - Computer hardware maintenance
 - Database and software design

and many other areas!

Internet services for consumers

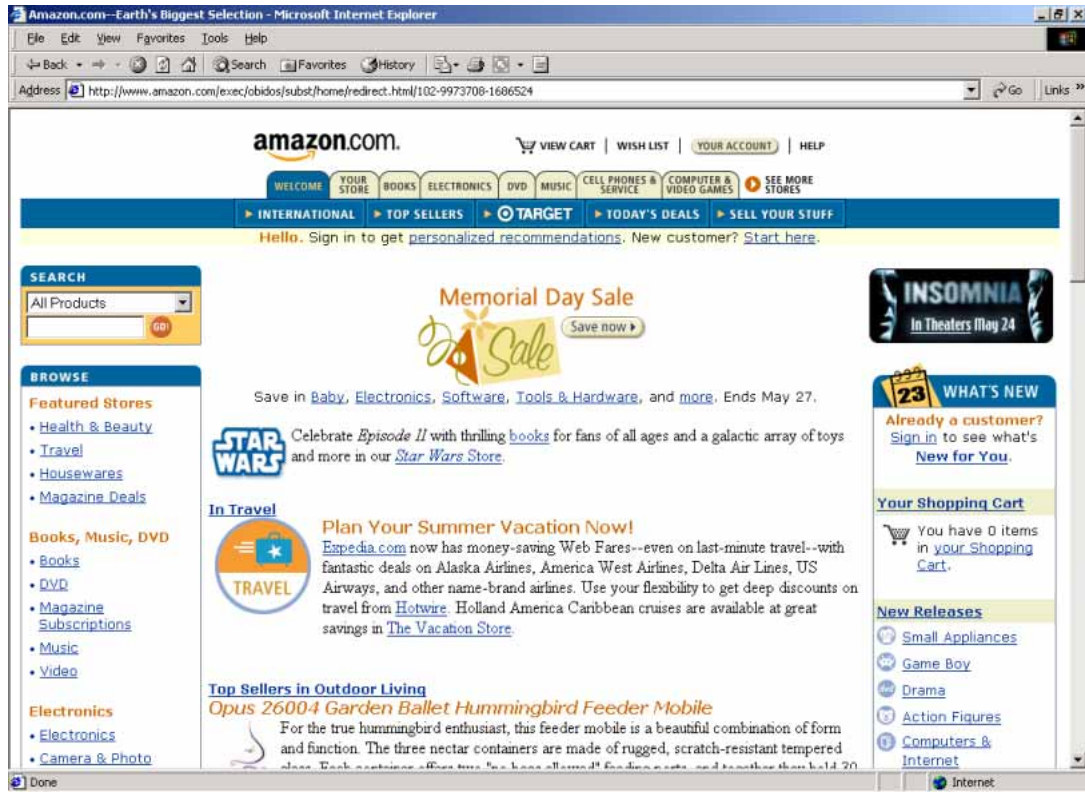
- The Internet offers a vast range of services for consumers including e-commerce, e-banking and e-government.

What is e-commerce?

- The phrase e-commerce is a buzzword that relates to buying or selling via the Internet. Increasingly you can purchase directly via a Web site by selecting the goods or services that you require and entering your credit card details. When you send your credit card details these SHOULD be encrypted by the site operators so that no one can intercept your details. Most sites that accept credit card payment are on secure services and your Internet browser program will normally inform you (via a pop-up) when you are entering or leaving a secure server.

Using e-commerce

- There are numerous web sites from where you can purchase online, a famous example being amazon.com. Most Internet based shopping sites use a "shopping cart" system. As you browse the site, you can add any products you want to purchase to your cart. Once you have placed items in the cart, you can then move to the checkout stage. At the checkout you enter your name & address, select the type of delivery you want, and enter your payment details.



SAMPLE

End of the preview sample



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