IT user fundamentals

Level 1
Notes
for
City & Guilds
7574 ITQ Unit 102

Written for Office 2007®
for Windows™ XP

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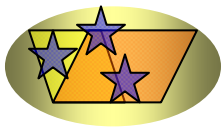

About the author: *Jackie Tench MSc, ACIB, Cert Ed*

Jackie started her working career in branch banking with the Midland Bank (now HSBC) and was transferred to their Computing Department after achieving 100% in their ability test for programmers. She then worked for more than a decade in this department and was one of the first women to achieve a junior management grade at the age of 21. She attended a significant number of IBM programming training courses during her time there.

Jackie was the first woman to pass the ACIB (Associate Chartered Institute of Bankers) examinations in the Midland Bank (HSBC) and the youngest person at 21 years of age.

Jackie then left to raise a family but still found time to teach part-time at a college in Sheffield and to obtain a MSc in Computing and a Cert Ed in teaching.

When her children were old enough Jackie returned to work full-time and was a Senior Lecturer in Software Engineering and Computer Studies at a college in Brighton for nearly 10 years teaching all levels up to and including HND.

Therefore, Jackie has considerable business knowledge and qualifications plus wide experience in practical computing and training – covering areas such as structured design, analysis, coding, testing and implementing software applications plus training students to fulfil an important role in the computer industry.

Jackie has worked as a consultant for several blue chip companies and examination boards using her software engineering and educational training skills and is now one of the foremost experts in computing with an extensive knowledge of programming languages and applications.

Contents Page

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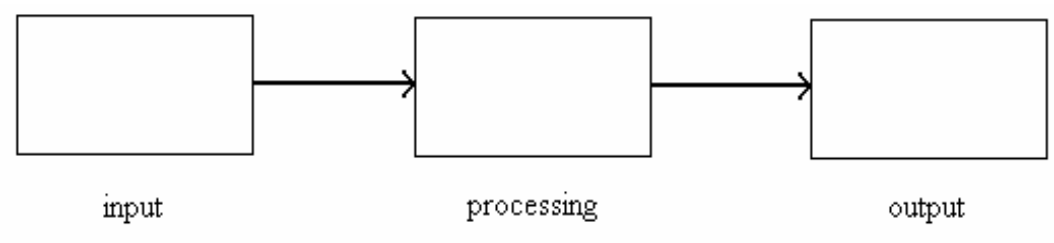
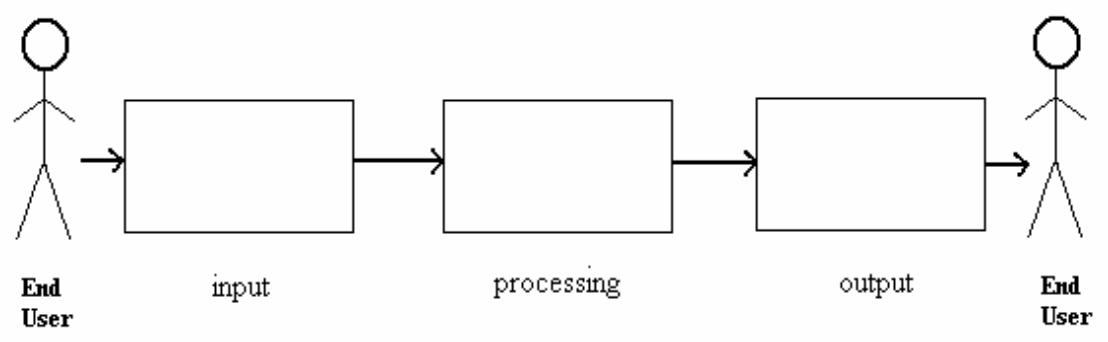
Computer systems

In any information system data has to be input then processed and there will be some output or result.

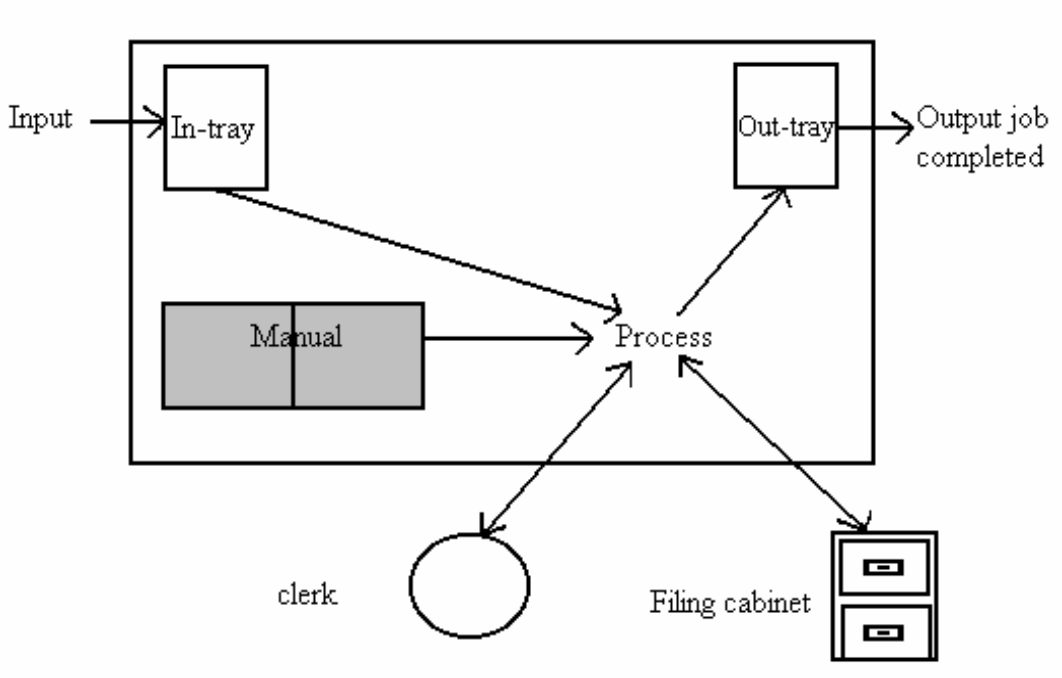


In a manual system humans do all of the work including the processing. In a computer system we are called the end users. We must supply some or all of the input and we make use of the output supplied by the computer's processing stage.



Manual system

In the following diagram the input is supplied in the in-tray and when the job is completed the output is placed in the out-tray. While the job is being processed it may be necessary to look up, in a manual, the instructions needed to process the job, if these are not already known. Also it may be necessary to look up further details from a file in the filing cabinet e.g. a customer's account number or address or to make changes to details held in the filing cabinet.



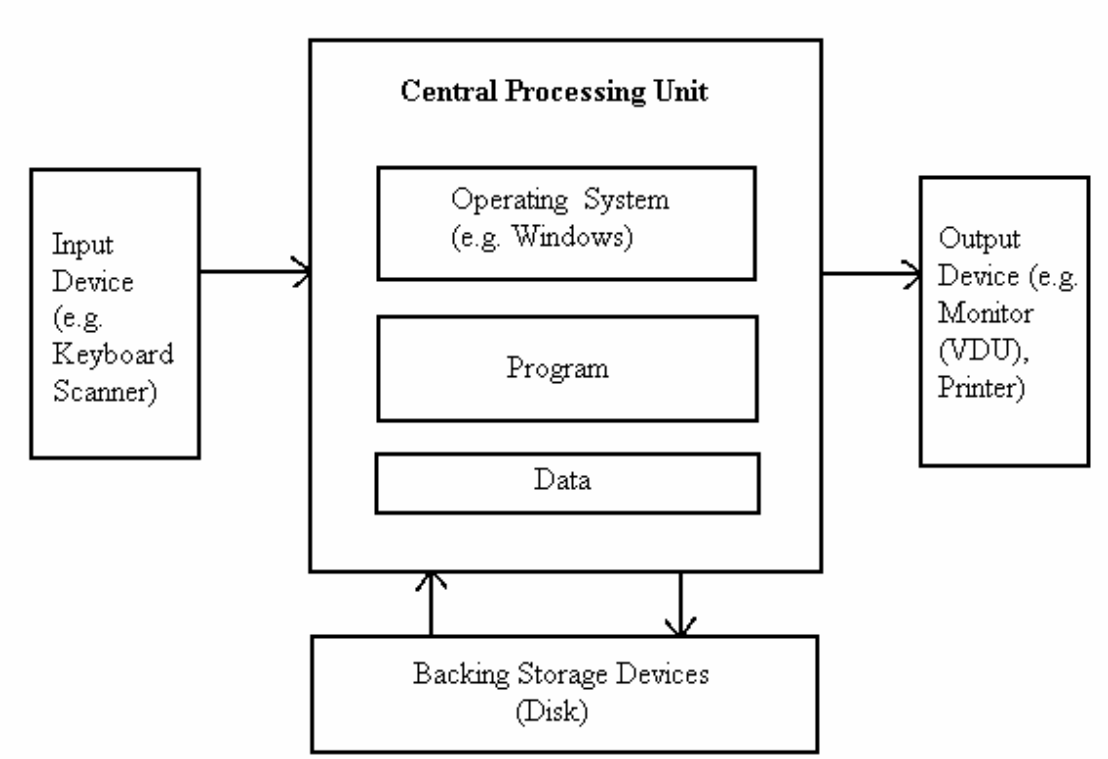
Computer system

In a computer system we also have to input data. This has to be done using input devices. Two of the main input devices used are the keyboard and the disk drives.

The computer needs to be given the instructions to perform the processing. A computer program (software) is a list of instructions that tell the computer what to do. The program (e.g. Word) is loaded into the computer's memory, which is within the Central Processing Unit (CPU), by using an input device. The Central Processing Unit is the main component in the computer and controls the running of the program and also controls the input from and the output to the devices that are attached to the computer.

A basic standalone computer system typically consists of a Visual Display Unit (VDU), keyboard, mouse, hard disk drives and a printer. The VDU is an output device used to display the application data.

The mouse is used as a pointer device to indicate a position on the screen and also as a clicking device to perform various operations in the application.



Components of a Computer System

The operating system manages and controls the operation of the input, output, backing storage devices and Central Processing Unit (CPU) and also loads the program.

Windows is a multi-tasking operating system which appears to be running several tasks at one time but is in fact only executing one task at a time.

A multi-user operating system (e.g. Windows NT) is used on a network where computers are connected together and share resources (e.g. disk drives, printers).

Backing storage devices

Backing storage devices are used to hold the programs and any data, which will be required at a later date. The backing storage devices are used in a similar way to a filing cabinet. Data can be written to records in a file on the backing storage and it can also be read from records in a file. In other words backing storage devices can be used for input or output.

Disk drives are used as backing storage devices to store the programs and the data files.

Output devices are used to output the results of processing. The printer is used to give printed output, known as hardcopy.

Types of computer

Mainframe

This is a very large powerful computer used by large corporations. This type of computer has numerous other computers linked to it via data transmission lines which can access and update its data. It can also have devices such as Automatic Teller Machines (ATMs) connected via data transmission lines. The computer processes data at a very high speed so that when a person uses an ATM the response is almost immediate. At one time a mainframe was the only type of computer available.

Supercomputer

A supercomputer is a mainframe computer that is the most powerful computer available at a given time. It is used for applications which consume a large amount of resources e.g. weather forecasting, animated graphics.

Mini

This is a mid range computer smaller and less powerful than a mainframe. Because of the pace of technology a microcomputer now has more power and larger storage capabilities then the older type of mini computer. The mini computer was sometimes used as the communication interface for a mainframe and dealt with all the communication traffic between a mainframe and its connected networked computers. The mini computer was developed originally for companies who required a computer but did not need and could not afford a mainframe.

Micro

This is the same as a Personal Computer (PC). It was originally called a microcomputer because it has a microprocessor chip based processing unit. This type of computer when it was first developed had a memory size of 32 Kilobytes, a slow tape cassette for data storage and no disk drive. With the changes in technology it now has a much larger memory and disk drives, CD drives and DVD drives with a high capacity. Companies that at one time would have purchased a mini computer can now process their data using multiple microcomputers linked over a network.

Workstation

A workstation can be defined as a PC computer that is connected to a network. But, it can also be defined as a computer that is more powerful than a PC that is dedicated to a particular task, for instance graphics.

Laptop

This is a small portable computer which has a battery so that it can be used away from mains electricity. It has as a minimum a flat screen, keyboard, disk drive and an inbuilt device which can be used instead of a mouse.

Pocket

A pocket computer is a handheld, calculator-sized computer that runs on batteries. It can be plugged into a desktop or laptop computer for data transfer.

Mobile phone

Some mobile phones now have some of the capabilities of a computer. They can send and receive e-mail, store data, take pictures, connect to the Internet.

Volatile memory (RAM)

When the program (e.g. Word, Excel) is being run the data that is input can be held in the computer's memory while it is being processed. When the computer is turned off the program and the data, which is held in the memory, will be lost. This type of computer memory is called volatile memory because it does not hold data permanently; it only retains the data while the computer is turned on. Its name in computer terms is Random Access Memory (RAM).

Non-volatile memory (ROM)

Non-volatile computer memory is memory that holds data permanently. Read Only Memory (ROM) is non-volatile and cannot be written to. At one time the operating system of a computer was held in ROM, which meant if you wanted to upgrade the operating system you had to buy a new computer. Now the operating system is loaded in from disk so the ROM only needs to hold the information needed to be able to load the operating system. This means that you can upgrade the existing operating system on a computer.

Computer memory storage

Data storage in a computer memory is defined in terms of bytes. One byte is made up of 8 BInary digiTS (bits). A binary digit can be a 0 or a 1. One byte can hold one character so 10,000 bytes of computer memory can hold 10,000 characters.

Computer memory used to be defined in kilobytes where one kilobyte is 1,024 bytes. Nowadays memory is defined in terms of megabytes where one megabyte is 1,048,576 bytes.

Disk storage

Disk storage can be defined in megabytes for floppy disks but for hard disk can now be defined in gigabytes where one gigabyte is 1,073,741,824 bytes.

Storage measurements	
Bit	Contains 0 or 1
Byte	8 bits
Kilobyte	1024 bytes
Megabyte	1,048,576 bytes
Gigabyte	1,073,741,824 bytes
Terabyte	1,099,511,627,776 bytes

Hardware

Hardware is the term used for all the physical parts of the computer such as the VDU, keyboard, mouse, printer, scanner and disk drives. All devices attached externally to the computer are called peripherals. Peripherals can be either input or output devices or both input and output devices. Peripherals are connected (plugged in) to a computer via a port.

Software

Software is the term used for a computer program (set of instructions) used to tell a computer how to perform an operation. Every computer must be given instructions on how to perform an operation. Software is classified as either system software e.g. operating system or applications software e.g. word processor.

Input devices

Keyboard

On a computer keyboard hitting a key sends an electrical signal to the microprocessor. The electrical signal is translated into an ASCII code that is readable when displayed on the screen. Internally the computer stores the characters as binary digits. The ASCII character set is used on PCs to represent the characters on the keyboard.

The keyboard contains standard character keys and also function keys, such as Esc (Escape), tab and cursor movement keys, F1, F2, etc., shift and control keys and sometimes special manufacturer customized keys.

Scanner

A scanner scans paper copy and digitises the text and/or images to a format that can be interpreted by a computer.

A scanner can perform optical character recognition (OCR) using special software to convert printed documents to digital text files, which saves having to key in the data. These files can then be edited. The text created by the OCR software may not be 100% correct and therefore needs to be checked.

A scanner can also be used like a photocopier where a document is scanned in and printed or saved and transmitted as a fax document or attached to and sent with an e-mail message.

There are several types of scanner: flatbed scanner, sheet-fed scanner and hand-held scanner.

Barcode scanners are used in shops to convert barcodes into digital information.

Disk drives

Disk drives are both input and output devices. Application software and data can be written to disk and also read from disk.

There are two types of disk drives; floppy and hard.

Hard disk drives are normally held internally inside the computer casing but can be external.

Floppy disk drives use removable disks. These disks are inserted in the drive when data needs to be read from or written to the disk.

Optical drive

An optical drive is one where data is written and read by light. This includes CD and DVD drives.

CD-R drive

A CD-R drive is an input device. Software applications are usually sold on CD, as they are normally too large to be written to a floppy disk.

CD-RW drive

A CD-RW drive is both an input and an output device. Data can be read from a CD or written to a CD. Special software is required to write data to a CD.

DVD-R drive

A DVD-R drive is an input device that reads a DVD disk.

DVD-RW drive

A DVD-RW drive is both an input and an output device. Data can be read from a DVD or written to a DVD. Special software is required to write data to a DVD.

Network drive

A network drive is a drive that is attached to a network and is therefore accessible to multiple users.

Output devices

Visual Display Unit

Visual Display Unit or VDU is another name for a monitor. The VDU is an output device used to display the operations being performed and the data used.

When a software application is running the position of the mouse will be displayed on the screen. A symbol is shown at the current mouse position. This symbol changes according to where the mouse is positioned on the screen. For instance if the mouse is positioned over text it has the shape of an I-beam, if positioned over a toolbar it takes the shape of a pointer. When the computer is doing some operation such as saving a file the mouse pointer changes to an hourglass shape to indicate that it is busy and there will be a delay before it responds to any action by a user.

The screen only displays a portion of a document or file so a scrolling action must take place to move the screen display up or down a line or a screen page.

When a software application e.g. a word processor is running, if the mouse is clicked when the mouse is over part of a document a cursor is displayed at that point. A cursor is a symbol that takes the form of a blinking line. This indicates to a user the current position for an action such as insert text into a document.

Touch screen

A touch screen is a special type of monitor which has the ability to display and receive input on the same screen. Often this uses beams of infrared light that are projected across the screen surface. Interrupting the beams by touching the screen generates an electronic signal identifying the location on the screen. Software interprets the signal and performs the required operation.

Speakers

Speakers are attached to a computer to allow sound output. Music CDs can be placed in a CD drive and the music can be heard through the speakers if a sound card is present in the computer.

Printer

A printer is attached to a computer system so that printed output can be produced. This printed output is known as hardcopy. Different types of printer can be attached.

Printers

Modern printers can usually produce output in colour or in monochrome. A colour printer does not have to always produce colour output. An option can be set to change the output to greyscale. The colours will be shown in varying shades of grey.

The amount of time the consumables (toner, ribbon, ink) for a printer last depends on the average amount of print on each page produced. If print coverage on pages is 90% then fewer pages will be produced than print coverage of 50%.

Printers can be set to print draft quality (economy mode) or high quality. Printing in draft quality saves on the consumables e.g. ribbon, toner, ink. High quality is normally used for the final print for documents. Typically when printing in draft quality the output is produced faster.

Software applications allow multiple copies of documents to be produced and if a document consists of multiple pages the pages can be collated so that they are printed in order. That is if three copies of a four page document are required the pages are printed 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4 instead of pages 1, 1, 1, 2, 2, 2, 3, 3, 3, 4, 4, 4.

Dot-matrix printer

A dot matrix printer is an impact printer. It has a print head that consists of a number of small pins. To form a character the appropriate pins are fired into a ribbon making dots on the paper. Carbon copies can be made with a dot matrix printer because the impact will produce the image through the carbon.

Some dot matrix printers allow continuous sprocket fed stationery to be used otherwise individual sheets of paper can be used fed through a sheet feeder. If paper is fed through a sheet feeder it can be printed on both sides by turning the paper over and feeding it through again.

The output quality is not as good as for a laser or ink-jet printer.

Ribbons need to be replaced before they wear too thin and the quality of the printed output becomes very faint. Care must be taken when replacing the ribbon to ensure that it is fed through the holders and in front of the print head correctly otherwise it may jam and prevent the printer from operating.

Laser printer

Laser printers use a process similar to a photocopier, with toner (powdered ink) being transferred to the paper and then fused on to it by heat and pressure. The output produced is of very high quality.

When the toner is running out the printed output appears patchy with parts missing or faint. A new toner cartridge should be inserted when this happens. Toner cartridges are quite expensive but normally last for thousands of pages.

Ink-jet printer

Different manufacturers use different processes to produce the printed output. The output produced is high quality.

Ink-jet printers use ink cartridges. The black and the colour cartridges are separate and can be replaced separately. Some printers use combined colour cartridges with all the colours in one cartridge. If one colour runs out the whole cartridge needs replacing. It is more economical to have a separate cartridge for each colour so that when one colour runs out only that cartridge needs replacing.

The quality of the printing can alter (e.g. lines appear breaking up the text or graphics) during the lifetime of an ink cartridge. Software is normally provided with the printer that allows the heads to be cleaned to improve the quality. This same software normally warns you when an ink cartridge is nearly out of ink. This warning is required because once an ink cartridge runs out the printer will not operate.

Paper is fed through a sheet feeder and can be printed on both sides (odd and even pages) by turning the paper over and feeding it through again.

Dye sublimation printer

A dye-sublimation printer has a printing process that uses heat to transfer dye to a medium such as a plastic card, printer paper or poster paper. The process is usually to lay one color at a time using a ribbon that has color panels. Most dye-sublimation printers use CMYO colors which differs from the more recognised CMYK colors in that the black dye is eliminated in favour of a clear overcoating. This overcoating is effectively a thin laminate which protects the print from discoloration from UV light and the air while also rendering the print water-resistant. Many consumer and professional dye-sublimation printers are designed and used for producing photographic prints. One of the main advantages that dye-sublimation printing has over inkjet printing is its ability to print a superior colour range.

Printer settings for different media

Different types of stationary such as labels, headed paper, envelopes, card, and transparencies and different size paper can be printed on most printers. The settings for some of these (labels, headed paper, envelopes, transparencies, paper size) can be set in the software applications. But if the stationery is a different thickness such as card or an envelope then there may be a lever on the printer that must be set to allow the thicker stationery to pass through the printer. This lever will be in a different place on each printer, you need to consult the printer manufacturer’s manual to find out where the lever is situated and how to operate it. The lever must be returned to the normal position after the special stationery has been printed.

Printer self test

A printer self test means that the printer will print out all the characters in its character set a certain number of times. This is done so that the operation of the printer can be checked to make sure that it is printing correctly. Each printer will have a different method for starting a self test so you need to check the manufacturer's manual to find out how to start a self test.

When a printer is shared on a network, printing on both sides of the paper is not always possible because print jobs are queued and printed in turn so that another person's printing may intervene and print on the back of your work. If a printer has a duplex mode then printing can be done automatically on both sides of each sheet as the job is printed.

Consumables

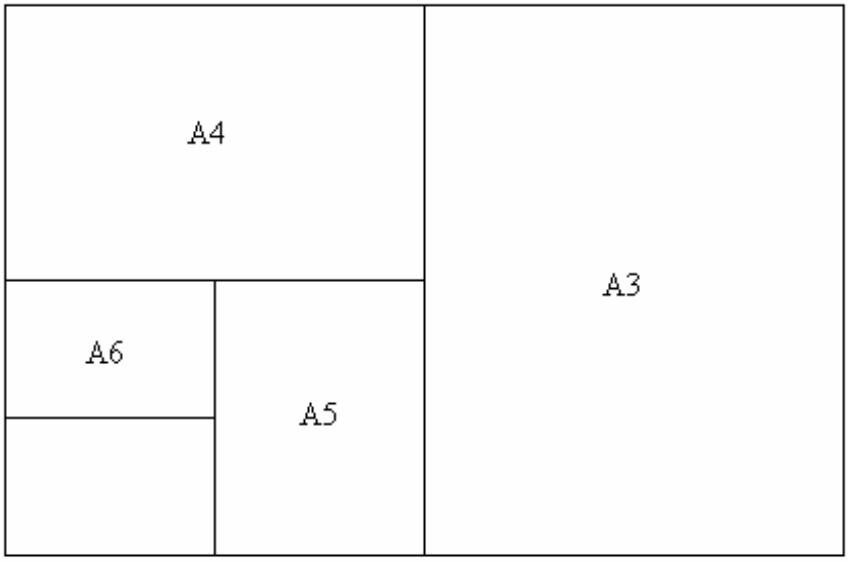
Consumables are the items that are used or consumed when creating output from the computer. These include the paper, labels, envelopes, printer toner cartridges, ink cartridges and ribbons.

Removable/portable media

Removable/portable media refers to any media that is portable and removable such as floppy disk, CD, DVD and USB data/memory sticks.

Paper sizes

The ISO series of A sizes of paper is a standard set of sizes. Each size is half the size (in area) than the next size: the higher the number, the smaller the size. The most common size used in offices is A4 but the smaller size A5 and larger size A3 are also widely used in offices.



Foolscap paper is slightly larger than A4 paper. Foolscap is not normally used for computer printed output.

Paper types

The most common type of paper used for word processed documents is A4 bond paper of weight 60 to 80 g/m2. Letters are usually produced on headed paper.

Bond

Bond paper is the commercial standard that has qualities of strength and durability. It is available in a variety of sizes and weights.

Continuous

Continuous paper is used in traction feed printers and has perforations and sprocket holes.

The paper can be separated along the perforations to remove the side sections containing the holes that feed the paper through the printer and to divide the length of paper into individual sheets.

Headed

Headed paper is usually A4 bond and is used for business letters. It is pre-printed at the top and sometimes at the bottom of the sheet with company details.

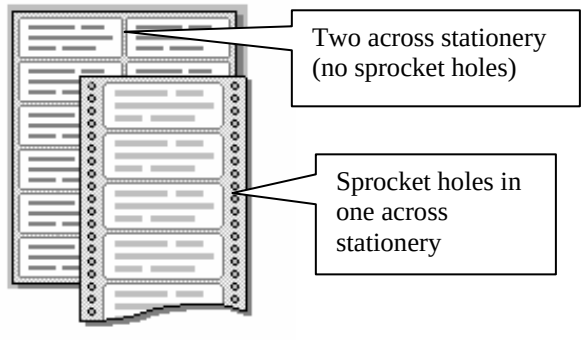
Weight

Weight is a measure of the thickness and density of paper. It is usually given in units of g/m2.

Replenish paper

Before replenishing paper in a printer it should be off-line. Some printers switch themselves off-line automatically as soon as they sense that the paper is out, otherwise you have to press a button on the printer to switch it off-line manually. The printer must be off-line so that it does not start printing before you have finished inserting the paper. If you switched the printer off manually, as soon as you have inserted the paper switch the printer back on-line so that it can start printing again. If the printer switched itself off-line automatically, you may still have to press a button to tell it to start printing again.

Labels



Labels are normally printed on special stationery that has adhesive labels on it; the labels can be removed and stuck on to envelopes after printing. Labels can be printed one across, two across, three across or four across the page depending on the size (width) of the printer used.

Labels special stationery is sold for use on laser, ink jet or dot matrix printers. If dot matrix printers are used the stationery can have sprocket holes on it so that the labels are fed through the printer in a continuous form.

You must be careful that labels stationery does not get damaged. If the adhesive labels are damaged they may come off while going through the printer and attach themselves to the drum or roller(s).

Labels stationery comes in different sizes and each supplier identifies their labels with a number. Software applications use the supplier's name and identifier so you select the stationery in the software by supplier name and identifier and the labels in the software will be set to the correct size to print on those particular labels.

Envelopes

Envelopes can be printed using a printer. The standard sizes for envelopes are normally selected in the software application and the printing will be adjusted to print on the size selected.

The two most commonly used envelope sizes for software applications are:

Code	Metric	Imperial
C6	114 x 162mm	4½ x 6⅜ inches
DL	110 x 220mm	4¼ x 8⅝ inches

Network interface card (NIC)

A network interface card must be installed on a computer if the computer is to be connected to a network. The card manages the sending and receiving of data to and from the network. The card can be connected to the network via a cable or it could be a wireless connection. Most NICs are designed for a particular type of network although some can serve multiple networks.

Router

A router is a network device that forwards messages (packets) from one network to another. Based on internal routing tables, routers access each incoming message and from the destination address contained in the message decide which route to forward the message on.

Modem

Modem stands for MOdulator/DEModulator.

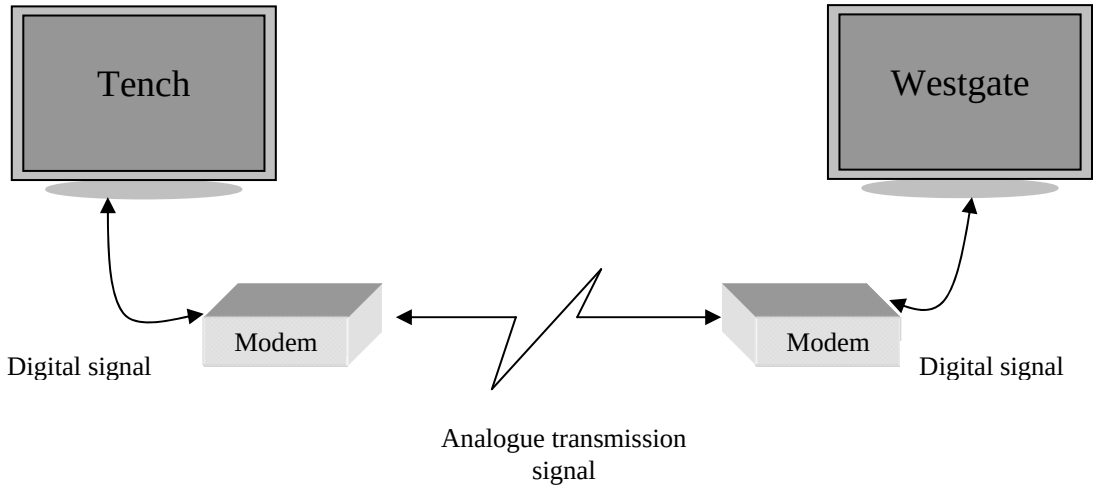
Telephone lines were originally designed for speech, which is transmitted in analogue or waveform. Computer data is digital. Modems are used to convert the computer digital data to analogue before sending and to convert it back from analogue to digital when receiving. Modems enable a computer system to communicate with other computer users around the world.

A modem is a device that is needed if you want to transmit messages (e-mail) across the telephone network or to connect to and use the Internet. When data is sent from a computer the modem converts the computer data into the format required for transmission over the telephone network. When a computer receives data, the modem converts it from the transmission format back to the computer format. The modem also controls the speed at which the data is transmitted.

A cable is used one end of which is plugged into the modem and the other end plugged into a telephone socket to connect the computer via the modem to the telephone network.

E-mail software is required to operate the modem and send and receive e-mail messages. Browser software is required to display web pages graphically and operate the modem and connect to the Internet.

The modem is normally inserted inside the computer casing but it can be connected externally.


Tench
Westgate
Modem
Modem
Digital signal
Digital signal
Analogue transmission signal

Recognising and reporting problems

Computer systems consist of many components and sometimes faults occur in one or more of the components. Errors can occur in software or hardware.

If you notice that your computer hardware or software is not functioning correctly you should report the problem to your line manager or to the help desk for technical support if your company operates one, so that appropriate action can be taken.

Examples of the sort of problems that can arise:

- The computer will not start up.
- The system starts up but keeps crashing.
- The screen display is not appearing correctly.
- The system crashes every time a document is sent to the printer.
- A software application is not responding.
- When entering data via the keyboard some of the characters do not appear on the screen.
- The mouse does not respond when moved and/or mouse pointer does not appear on screen.
- If the printer does not work, check that it has a paper supply and that it has not run out of toner or ink before reporting a fault.
- The printer is printing rubbish.
- If you suspect that there is an electrical fault, turn off the power before reporting the fault.
- The printer is reporting an error. The paper may be jammed in the printer. Before attempting to remove the blockage turn the printer off at the power supply.
- Disk full message appears – check the amount of storage available on the specified disk.
- An error message appears that cannot be resolved.

You should NEVER remove any casing from any of the computer hardware components.