

Using Computers

Word Processing Module

Adopt Good Working Practices

An overview of Computers Task

The aim of this task is to give you a basic understanding and knowledge of how a computers system works. We will distinguish between input and output devices and between hardware and software.

Read the document below and then either on your own or in pairs complete the quiz at the end of the document.

An overview of the computer system

A computer is a machine that processes data following a set of instructions. The computer system consists of hardware and software. Computer equipment that you can touch and handle is called hardware. It is the name given to all the physical devices that make up the computer system. These devices include the input devices (how we get the information into the computer), such as a keyboard or mouse. It also includes the central processing unit - the 'brain' of the system that carries out all the instructions received from the operator or the program - and the memory devices that store information. Finally, it includes the output devices (how we get the information out of the computer), such as monitors and printers. Input and output devices are known as peripherals.

Software is the name given to the programs, each made up of a series of instructions that tell the computer what to do, allowing the hardware to do a useful job. Without software, hardware is useless. Applications packages such as word processing, spreadsheet, database and drawing programs are all examples of software. Microsoft Office XP is software.

Hardware

Central Processing Unit (CPU)

The Central Processing Unit (CPU) or processor is the processing part of the computer. It carries out all arithmetical and logical operations. It is made up of the Arithmetic Logic Unit (ALU) that carries out high-speed data manipulation - calculating and comparing. It also contains the control unit that controls the passage of data to and from the ALU by locating, analysing and carrying out instructions and sending information to be temporarily stored in high speed memory. In a PC the CPU is a single microchip that looks like a thin wafer with legs. In a minicomputer, the CPU is usually contained on a printed circuit board. A mainframe CPU may take up several circuit boards. The speed of the CPU is called the clock speed or clock rate and is measured in megahertz (MHz). It is one of the crucial factors when determining a computer's overall performance. Currently, a typical clock speed for a PC is 500 MHz.

Input devices

There are many ways of feeding information into the computer and this is done using input devices. There are many different input devices including the following:

Keyboard	A keyboard consists of input keys. Computer keyboards are based on the standard typewriter layout QWERTY. They have additional keys, such as functions keys programmed to perform frequently used task, arrow keys, the Control (CTRL) key used in conjunction with othe keys to perform specific tasks, and often keys used for power saving.
Mouse	The mouse is a pointing device that enables you to interact with (eg select and move) items on the screen. The mouse's movements are tracked by a rotating ball and sensors in its base. When you move the mouse on your desk, the mouse pointer moves on the screen in the same direction.
Trackball	A trackball operates in a similar way to a mouse but is a stationery unit. Unlike a mouse, it has the rotating ball on top instead of underneath. Track balls are usually found in laptop computers and are operated by using fingers or the palm of the hand.
Touchpad	A touchpad is another alternative to a mouse in that it is a device for interacting with a comptuer screen. A touchpad is also common on laptop computers for the same reasons as the trackball. I t is a flat pad that works by sensing finger movements and downward pressure.
Scanner	A scanner can convert physical printed text or images into electrical signals that the computer can understand.
Light Pen	This is a light-sensitive detector in the shape of a pen. I t enables the user to draw, and change pictures by moving the pen across the screen. I t is normally only used in specialised applications.
Joystick	A joystick is able to interact with a computer program - for example, control the movement of a shape on the screen. I t has a stick that moves to effect corresponding movements on screen. Joysticks are usually used with games.

Output devices

There are many ways of getting information out of the computer. Some common output devices include the following:

Monitor	A monitor is the name given to any device that displays information on a screen (soft copy) and is normally separate from other parts of the computer. Laptop computers do not have separate monitors because the display is integrated in one unit. Monitors can be monochrome or colour. A Video Graphics Adapter (VGA) monitor can display up to 256 colours at one time and has a maximum definition of 640 x 480 pixels (pixel is an abbreviation for picture element - pixels are the tiny dots on screen that form an image). A Super VGA (SVGA) monitor has a higher definition with 800 x 600 pixels. Performance is improving at a rapid rate. Desktop monitors tend to have cathode ray tube (CRT - a vacuum tube used in televisions) technology. Laptops generally have LCD (Liquid Crystal Display) displays because they are lighter and use less power and less space. However LCD displays are more expensive.
Visual Display Unit (VDU)	This is another device that displays computer output on a screen. It is very similar to a monitor except that it is usually associated with a keyboard and is often used as a terminal to a mainframe computer.
Screen	A screen is the display area of a monitor.
Printers	<p>A printer provides printed (hard copy) output. There are three commonly used types of printer: dot matrix, inkjet and laser.</p> <p>The <u>dot matrix printer</u> is a low-cost printer but is being superseded by newer technologies. It is an impact printer and produces its characters from patterns of individual dots striking the paper via a ribbon (usually) a line at a time.</p> <p>Both <u>inkjets</u> and <u>lasers</u> are quiet in operation and print to a higher quality. They are both non-impact printers. The inkjet sprays ink on to the paper from an ink cartridge. Laser printers use laser beams reflected from a mirror to attract ink (called toner) to selected paper areas as the paper is fed over a drum. Laser printers are generally quicker and produce the highest quality output. Most printers have a built-in local memory in order to speed up the print process.</p>
Plotters	A plotter uses pens to produce drawings. The computer gives the instructions so that the plotter knows which pen to use and where to draw. Plotters are normally used in engineering applications.
Speakers	Speakers produce output in audio format. They are used in music, games and speech.
Speech Synthesizers	Speech synthesizers turn text into spoken words and vice versa. They can be used by the visually impaired.

Storage

Types of memory

Computer memory is the place where instructions and data are stored. A computer has two types of memory RAM (Random Access Memory) and ROM (Read Only Memory). RAM is the computer's fast short-term memory. It needs electricity to retain information and anything stored in RAM will be lost when the power is turned off. When the computer is running, the greater capacity it has to temporarily store instructions and data, the quicker larger programs will function. ROM permanently stores instructions and data. Its contents are stored when the computer is made and cannot be altered. RAM is faster than ROM and both are faster than disk. Access time to RAM is usually measured in nanoseconds (billionths of a second) whereas access time to a hard disk (see below) or CD-ROM is usually measured in milliseconds (thousandths of a second).

Measuring memory

The binary system is the principle behind digital computers. Binary means two and data is represented by the two digits 0 and 1 (0 is the off state and 1 the on state of the computer's memory cells). Eight bits make up one byte. A bit is short for binary digit. It is the smallest element of computer storage. Computer memory is measured in bytes. A byte holds the equivalent of a single character - e.g. the letter A or a full stop. Because a byte is such a small unit of storage, computer memory is more commonly measured in terms of thousands of bytes - kilobyte or KB (actually 1024 bytes) - or millions of bytes - megabyte or MB (1024KB) - and even thousands of millions of bytes - gigabyte or GB.

Memory storage devices

If you want to store information so that you can re-use it at a later date or just keep it safe, you would need to store it on one of the following non-volatile storage devices.

<p>Hard disk</p>	<p>Most computers have hard disks installed. A hard disk is a fixed disk consisting of magnetic storage plates encased in a drive unit positioned inside the computer. A hard disk is used as the main permanent store of programs that have been loaded on to the computer so that they are always available. If connected to a network, the computer is sometimes able to access other hard disks on other computers. External hard disks are also available. Hard disks provide fast retrieval of information compared with floppy disks. Because hard disk capacity is large, it is measured in MB or GB.</p>
<p>Floppy disk (diskette)</p>	<p>A floppy disk is a removable storage medium used in drive A. The 3 1/2" floppy disk has become the norm. It provides a cheap way of backing up small amounts of data. It has a hard plastic case (protecting its floppy interior) with a metal cover which slides back when the disk is placed in the disk drive. The amount that can be stored on a floppy disk depends on whether it is single or double sided and whether it is single, double or high density. A double density floppy disk stores approximately 720KB and a high density disk approximately 1.44MB. The majority of the disks are ready formatted, but if not, the first time you use a new floppy disk, you must format it so that it is configured for your particular system.</p>

	<p>Floppy disks have a notch, called the write-protect notch, which will stop you deleting or altering a disk's contents.</p> <p>To ensure floppy disks are not damaged, you should do the following:</p> <ul style="list-style-type: none"> • always store disks carefully • keep the disks away from anything magnetic • keep the disks away from direct heat - e.g. radiators or sunlight • do not touch the exposed recording surface.
Zip disk	<p>A zip disk is a removable disk similar to a floppy disk but can store 100MB or 250MB of information and is much faster. As with other disk drives, zip drives can be internal or external. Zip disks are useful for storing unusually large files or putting your system on to another computer - e.g. a laptop</p>
CR-ROM	<p>A CD-ROM (Compact Disc Read Only Memory) disk is a round and flat optical device (uses a narrow laser beam to read the data, which has been etched on to the surface to form minute patterns). It is usually used in drive M. It can hold in excess of 600MB, equivalent to about 250,000 pages of text or 500 floppy disks. It has fast data retrieval. As the size of software has increased, it is now usually distributed on CD-ROMs instead of floppy disks. A CD-R is a recordable CD that can be recorded on once only. A CD-RW is recordable and can be used many times. A CD-WORM (Write-Once Read-Many) is an optical disk that allows the user to write data onto it once only.</p>
Data cartridges	<p>Data cartridges use magnetic tape technology and are often used for backing up data in large organisations. They are slower and cheaper than other storage devices because they have sequential access (scanning information starting at the beginning and working through until it finds the required information) rather than random access (accessing information without having to read everything that comes before it).</p>

Computer performance

Computer performance can be determined by the following factors.

Speed of the CPU	The speed at which they perform is measured in megahertz (MHz).The greater the number of MHz, the better the performance.
Amount of RAM	Most desktop and notebook computers sold today include at least 32MB of RAM and can normally be upgraded to 128MB.The more RAM you have, the less frequently the computer has to access instructions and data from the more slowly accessed hard disk.
Hard disk speed and capacity	Hard disk speeds vary. It is always a good idea to buy a large hard disk so that you will not run out of storage space and have to rely on using slower floppy disks or have to delete items stored on the hard disk to make room.

Software

Types of software

There are two main categories of software, systems software and applications software. Systems software includes the control programs, such as the operating system. Application software is any program that processes information for the user - e.g. word processor, spreadsheet, payroll.

Operating system software

The operating system (OS) is the software that controls the hardware and runs the programs. It is the first program run when the computer is turned on. Common operating systems include MS-DOS,Windows, Linux, Mac OS and UNI X. Windows is an example of a Graphical User I nterface (GUI) because it uses icons (small pictures), menus and a mouse. These make the software more user-friendly since it is intuitive and you don't have to remember complicated commands.

Applications software

Common applications software indudes:

Word Processing	Multimedia
Spreadsheets	Presentation
Databases	Desktop Publishing
Payroll	

Systems development

Computer systems development employs a number of specialised staff - e.g. systems analysts, programmers - that work together at different stages. It has a life cycle as follows:

Research, analysis and design	This includes a feasibility study, the overall general design, prototyping, the detail design and the functionality requirement specifications.
Programming	This includes the design and coding of the system.
Testing	The system then needs to be tested to ensure that it will perform correctly.
Implementation	This includes training of staff, converting from the old system and installation of the new one.
User acceptance	The user will accept the system once it has been fully implemented and tested.

Multiple-Choice Quiz

1	Hardware can be defined as:	<input type="checkbox"/> the parts of a computer system that you can touch <input type="checkbox"/> the machines and programs making up a computer system <input type="checkbox"/> the peripherals and operating system of a computer
2	The following are hardware:	<input type="checkbox"/> pointer, mouse, power cable, processor <input type="checkbox"/> monitor, keyboard, mouse mat <input type="checkbox"/> disk drive, modem, computer desk
3	A peripheral is:	<input type="checkbox"/> a fax machine <input type="checkbox"/> a program that connects input devices to a computer <input type="checkbox"/> any device under the control of the CPU
4	Examples of backing storage devices include:	<input type="checkbox"/> hard disk, floppy disk, RAM <input type="checkbox"/> CD disk drive, hard drive, floppy disk drive <input type="checkbox"/> ROM, processor, hardcopy
5	The part of the computer that is sometimes described as its 'brain' is the:	<input type="checkbox"/> buffer <input type="checkbox"/> memory <input type="checkbox"/> processor
6	Storage capacities of computer memory and backing store are measured in:	<input type="checkbox"/> Megahertz (MHz) <input type="checkbox"/> Megabytes (MB), Kilobytes (KB) and Gigabytes (GB) <input type="checkbox"/> bits, bytes and nuggets
7	Random Access memory is used for:	<input type="checkbox"/> storing programs and data that are currently being used by the user <input type="checkbox"/> any programs that are not currently being used <input type="checkbox"/> storing all user data files
8	RAM is sometimes described as being volatile. Volatile means that:	<input type="checkbox"/> its contents are lost when the computer is switched off <input type="checkbox"/> it can be easily corrupted <input type="checkbox"/> it is especially susceptible to virus infection
9	Output devices displays the:	<input type="checkbox"/> processing as it happens <input type="checkbox"/> results of processing <input type="checkbox"/> input, process and output
10	Computers come in varying sizes from super computers to :	<input type="checkbox"/> mini computers <input type="checkbox"/> desk top computers <input type="checkbox"/> hand held e.g. notebook
11	An operating system is best describe as:	<input type="checkbox"/> hardware <input type="checkbox"/> software <input type="checkbox"/> firmware
12	Basic task performed by an	<input type="checkbox"/> checking the keyboard for input, controlling the

	operating system include:	<p>transfer of programs in and out of main memory, communicating with the user, keeping track of files and directories on backing storage</p> <p><input type="checkbox"/> controlling input and output devices, monitoring user activities, virus checking</p> <p><input type="checkbox"/> controlling system security, optimising graphics images, maintaining directories.</p>
13	When purchasing applications software it is important to ensure that it:	<p><input type="checkbox"/> is written to run under the operating system on your machine</p> <p><input type="checkbox"/> will run under all operating systems</p> <p><input type="checkbox"/> contains its own operating system</p>
14	Utility programs are usually supplied as part of an operating system package, although they are not strictly speaking part of the operating system. Common functions these utilities perform are:	<p><input type="checkbox"/> file naming, deletion, copying, sending to printer or other output device, making backups</p> <p><input type="checkbox"/> printer set up, defragmenting the hard drive, monitoring for new email</p> <p><input type="checkbox"/> maintaining time and date, virus checking, keeping a record of Internet access</p>
15	Graphical user interfaces (GUI 's) make it easy for users to interact with the operating system by:	<p><input type="checkbox"/> using a light pen system</p> <p><input type="checkbox"/> pointing at icons and clicking on them</p> <p><input type="checkbox"/> using specially programmed function keys on the keyboard</p>
16	Basil purchased a new computer and had to specify the software he wanted. He wanted to be able to write essays and produce graphs. What software would you recommend?	<p><input type="checkbox"/> an operating system, word processing and a spreadsheet package with graphical capabilities</p> <p><input type="checkbox"/> word processing, spreadsheet and database</p> <p><input type="checkbox"/> desk top publishing package, a paint program and an operating system</p>

Multiple-Choice Quiz Answers

1	Hardware can be defined as:	<input checked="" type="checkbox"/> the parts of a computer system that you can touch <input type="checkbox"/> the machines and programs making up a computer system <input type="checkbox"/> the peripherals and operating system of a computer
2	The following are hardware:	<input checked="" type="checkbox"/> pointer, mouse, power cable, processor <input type="checkbox"/> monitor, keyboard, mouse mat <input type="checkbox"/> disk drive, modem, computer desk
3	A peripheral is:	<input type="checkbox"/> a fax machine <input type="checkbox"/> a program that connects input devices to a computer <input checked="" type="checkbox"/> any device under the control of the CPU
4	Examples of backing storage devices include:	<input type="checkbox"/> hard disk, floppy disk, RAM <input checked="" type="checkbox"/> CD disk drive, hard drive, floppy disk drive <input type="checkbox"/> ROM, processor, hardcopy
5	The part of the computer that is sometimes described as its 'brain' is the:	<input type="checkbox"/> buffer <input type="checkbox"/> memory <input checked="" type="checkbox"/> processor
6	Storage capacities of computer memory and backing store are measured in:	<input type="checkbox"/> Megahertz (MHz) <input checked="" type="checkbox"/> Megabytes (MB), Kilobytes (KB) and Gigabytes (GB) <input type="checkbox"/> bits, bytes and nuggets
7	Random Access memory is used for:	<input checked="" type="checkbox"/> storing programs and data that are currently being used by the user <input type="checkbox"/> any programs that are not currently being used <input type="checkbox"/> storing all user data files
8	RAM is sometimes described as being volatile. Volatile means that:	<input checked="" type="checkbox"/> its contents are lost when the computer is switched off <input type="checkbox"/> it can be easily corrupted <input type="checkbox"/> it is especially susceptible to virus infection
9	Output devices displays the:	<input type="checkbox"/> processing as it happens <input checked="" type="checkbox"/> results of processing <input type="checkbox"/> input, process and output
10	Computers come in varying sizes from super computers to:	<input type="checkbox"/> mini computers <input type="checkbox"/> desk top computers <input checked="" type="checkbox"/> hand held e.g. notebook
11	An operating system is best describe as:	<input type="checkbox"/> hardware <input checked="" type="checkbox"/> software <input type="checkbox"/> firmware
12	Basic task performed by an	<input checked="" type="checkbox"/> checking the keyboard for input, controlling the

	operating system include:	<p>transfer of programs in and out of main memory, communicating with the user, keeping track of files and directories on backing storage</p> <p><input type="checkbox"/> controlling input and output devices, monitoring user activities, virus checking</p> <p><input type="checkbox"/> controlling system security, optimising graphics images, maintaining directories.</p>
13	When purchasing applications software it is important to ensure that it:	<p><input checked="" type="checkbox"/> is written to run under the operating system on your machine</p> <p><input type="checkbox"/> will run under all operating systems</p> <p><input type="checkbox"/> contains its own operating system</p>
14	Utility programs are usually supplied as part of an operating system package, although they are not strictly speaking part of the operating system. Common functions these utilities perform are:	<p><input checked="" type="checkbox"/> file naming, deletion, copying, sending to printer or other output device, making backups</p> <p><input type="checkbox"/> printer set up, defragmenting the hard drive, monitoring for new email</p> <p><input type="checkbox"/> maintaining time and date, virus checking, keeping a record of Internet access</p>
15	Graphical user interfaces (GUI 's) make it easy for users to interact with the operating system by:	<p><input type="checkbox"/> using a light pen system</p> <p><input checked="" type="checkbox"/> pointing at icons and clicking on them</p> <p><input type="checkbox"/> using specially programmed function keys on the keyboard</p>
16	Basil purchased a new computer and had to specify the software he wanted. He wanted to be able to write essays and produce graphs. What software would you recommend?	<p><input checked="" type="checkbox"/> an operating system, word processing and a spreadsheet package with graphical capabilities</p> <p><input checked="" type="checkbox"/> word processing, spreadsheet and database</p> <p><input type="checkbox"/> desk top publishing package, a paint program and an operating system</p>