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Oxford English for

Information Technology

TEACHER'S GUIDE

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Introduction

READERSHIP

Oxford English for Information Technology is for people studying Information Technology and Computing, or working in the IT sector. It is suitable for use in universities, technical schools and adult education programmes in Europe, the Middle East, the Far East and Latin America. Students will have an intermediate to advanced level of English (having studied English for four years or more) and will want to develop language skills in the context of their specialism.

OBJECTIVES

Oxford English for Information Technology aims at all-round skills development.

Reading: to develop the skill of reading for information from a wide variety of authentic IT texts. These include longer specialist reading texts to provide challenging reading for students already proficient in computing in their own language.

Listening: to develop the ability to understand native speakers with a variety of accents talking about IT. Listening for specific information, and the skill of listening for the main points in a description, explanation and argument are developed.

Speaking: to develop the ability to participate in exchanges of information and opinions in the context of IT, to provide explanations of features of computing and to give advice on IT problems; to develop strategies for coping with not understanding and not being understood.

Writing: to write instructions, descriptions and explanations about topics in computing and IT.

Language: to consolidate and extend the student's understanding and use of structures and functions common to Information Technology and computing at intermediate to

advanced levels. The language content has several strands:

- covers key points of grammar and key functions appropriate to this level
- includes language items important for decoding texts in the specialism
- teaches and practises language skills for reading, listening, speaking and writing.

DESIGN

Oxford English for Information Technology is designed to meet the needs of both teachers and students. The authors recognise that few English teachers have a specialist knowledge of IT although many will use computers in their work and at home. The materials used in this book for presenting language items are selected so that they can be understood by an interested non-specialist but at the same time are not patronising for students of the specialism.

The authors also recognise that IT students need exposure to the full range of IT texts in English. Hence the materials used for practice and production have more specialist content. Problem-solving tasks encourage students to combine their growing knowledge of English with their IT knowledge. The reading passages for homework or self-study in class contain the most specialist content. Some of this content will be unfamiliar to your students, placing them in a real study situation where they have to cope with both English and new information.

The text is graded in two ways. In terms of language, the book progresses from revision items such as question forms in the Past simple to more complex structures such as cleft-sentences. In terms of IT, the book matches the normal teaching sequence of the subject.

ORGANISATION

The Student's Book contains 25 units, each providing around 4 hours of work. Each unit contains work on a mix of skills but Units 5, 10, 15, 20 and 25 focus especially on developing listening skills. Each of these units contains an authentic interview, discussion or an extract from an IT professional at work.

Units are composed of these sections:

Starter: short 'to make you think' warm-up tasks to get students thinking about the topic, to share their knowledge of language and the specialism, and to start working together cooperatively.

Listening: brief listening tasks often based round an authentic diagram or other visual.

Reading: authentic short texts to develop appropriate reading skills and to introduce new content; taken from textbooks, newspapers, popular computing magazines, Internet newsgroups, screen displays, web pages, manuals and adverts.

Language work: explanation of key language items at this level and two practice activities; the first is more controlled, the second is less controlled to encourage more natural use of the newly learned language.

Problem-solving task: to create a need to use language to communicate with other students and as a comprehension check. The solution requires use of language, logic and content from previous units.

Writing: exercises that provide practice in writing instructions, descriptions and explanations.

Speaking: in addition to the speaking opportunities provided by other sections, especially Starter and Problem-solving, there are regular information and opinion exchange tasks for pairs and small group practice and presentation tasks for individual work.

Specialist reading: longer authentic texts dealing with an aspect of the unit topic. These are challenging texts intended to stretch the students. They can be used for self-study or homework.

Authentic interviews: as described above, every fifth unit is built around an authentic interview with IT and computer students and specialists. Each interview unit has a **Word Study** section on new vocabulary studied up to that point in the textbook.

End matter in Student's Book: Listening script and Glossary of technical terms and abbreviations. Definitions and pronunciation of approximately 850 terms in computing and IT are provided.

Spelling

The texts used in this book come from a variety of sources and include US texts. For this reason, some American spellings such as *realize* will be found.

Where possible we have standardised the spelling of terms such as *email*, rather than *e-mail*, taking as our model what seems to be the most common form in current IT literature.

USING THE BOOK

APPROACH

Oxford English for Information Technology takes a broadly communicative approach with the addition of techniques such as problem-solving, a particularly appropriate technique for students of a subject which is very much concerned with finding solutions to problems. Activities focusing on form are also given an important role.

Most of the activities are designed for pair or group work but there are also individual tasks for class-time and for homework. When the class are involved in pair or group activities, use the time to monitor their performance. Try not to interrupt too much.

Make a note of any serious inaccuracies and deal with them at the end of the activity.

Some teachers of English for Specific Purposes worry about their own lack of knowledge of the specialism, that they are not experts in the field. They should not be so concerned. What ESP teachers should aim to be is experts at language teaching. All ESP teachers, however, should have an interest at a lay level in the specialism. It's worth reading an introduction to the subject and developing links with teachers of the specialism who can explain technical aspects to you and may provide help in locating authentic materials for your teaching. It's not difficult these days to keep up with developments in computing. Many national newspapers carry regular articles about computing and some have special supplements on a weekly basis. There are TV programmes from time to time. And of course your students can often help you.

STARTERS

These are best set as pair or group activities ending with a teacher-led round-up so that both language and ideas can be shared. Note down the best ideas on the board or use an overhead projector so that the written form reinforces the spoken.

LISTENING

Most of these comments about listening are equally valid for reading.

Most units contain a pre-listening task. Typically, these tasks consist of a small number of questions often based on a diagram. Ideally, the students are able to answer a third of the questions from the data presented. They can make reasonable guesses about a further third based on inferences from the data and from their own knowledge of the subject matter. They are unable to make accurate guesses about the remaining third. The reasons for this structure are that the easy questions provide

encouragement and the remaining questions provide a reason for listening to the recording which follows – to check whether their guesses are correct and to find the answers to the questions they could not answer. Because pre-listening tasks encourage the students to start thinking about and predicting the content of the text, this makes it easier to make connections between known information and new information from the text. Often students are asked to pool their answers so that what they know about the subject can be shared; hence predictions about the content can be made more accurately.

Pre-listening tasks also serve to introduce important terms which the students will meet in the recording. However, the recording will also contain a number of words which are not familiar to your students. This guide advises you to pre-teach a small number of these words which are important for an understanding of the text. Where a word can be inferred from context, you are advised not to pre-teach it as students should develop this strategy for dealing with unfamiliar words. In most cases, the unfamiliar word can be ignored. Recognising and ignoring irrelevant information is an important survival strategy in listening.

With the interviews in particular, it is important that you set the scene for your students before they listen. They should know how many speakers there are and what the context is. They should be encouraged to predict topics that will occur in the recording.

Setting the scene, sharing information about the content and the language likely to be used in the recording, predicting the answers to the questions and pre-teaching a few essential words, are all ways of helping your students before they listen. But you can also help them as they listen. The simplest way is to pause the recording at suitable points. Suggestions are made in this Guide of suitable

places to pause but you can add additional processing or thinking time for students by increasing the number and length of the pauses. You can also play the recording more than once. When the tasks are complete, it's important that students have an opportunity to hear the recording all the way through without interruption.

Although the answer key gives as full answers as possible, it is not always necessary to insist on such complete answers from your students, nor is it necessary for them to write complete sentences. The focus in these tasks is on understanding, not on production.

READING

Most units contain a pre-reading task which has the same function as the pre-listening tasks described above.

Many of the tasks focus on developing the skill of scanning a text quickly for specific detail. To do this well, students must learn to ignore information which is not relevant to their task and scan the text for clues which relate to the information they seek. Applying a little time pressure can help. If students are not given quite sufficient time to read word by word, they will develop more efficient ways of reading. Reading for main points is a more difficult skill to develop. Students must learn to ignore examples and fine detail. Defending their answers in groups or in whole class round-ups can help students identify what is important in a text.

Many of the reading tasks involve other skills, for example, reading and note-taking or reading and reporting. A common task of this kind combining reading, note-taking and speaking is a jigsaw read-and-report activity. In these tasks, students are asked to work in groups of three and to read one text each, noting its main points. Then they are asked to exchange information with other students in their group to complete a table or note-taking

frame covering all three texts. At the reporting stage, students may attempt to report in their mother tongue or simply exchange notes with the other students in their group. Encourage them to do the reporting stage orally and in English so that all three skills are equally practised.

An alternative to jigsaw read-and-report for more advanced students is to treat these tasks as a 'triad' activity. This is described in detail in the notes for Unit 23 but you can also use this technique with texts of your own.

Most of the texts in group reading tasks are roughly equal in difficulty level. Where a text is easier or more difficult than the others, this is mentioned in this Guide. You can direct these texts to the less and more able students in the group.

Reading aloud is rarely of value in the classroom but you may find the tapescripts of some of the easier listening texts which involve more than one speaker could be used for role plays or scripted interviews. The difference between them and the reading texts is that they are examples of authentic or semi-authentic spoken English.

LANGUAGE WORK

Ways of presenting each language item are included in this Guide. Most of these rely on a simple board presentation using key examples from the reading or listening texts. As far as possible, examples in the context of computing are used. You may have your own favourite way of presenting some of these items which you can substitute. Typically, the presentation is followed by two practice tasks. The first task is usually more controlled and the second a freer and therefore more demanding activity. Depending on the level of your class, you may decide to do these tasks orally in class before the students write or simply set them as individual writing tasks.

PROBLEM-SOLVING

These tasks provide students with the opportunity to use and acquire language in a much less controlled way. The problems have been chosen to interest the students and to allow them to use their knowledge of computing. The reading and listening texts in each unit and earlier units should provide most of the English terms they need, and the language work sections should provide the means of expression. You may wish to revise language you anticipate will be useful. In striving to communicate their solution to the problem to their partner or the other students in the group, students will make this language their own. Do not interfere too much unless communication has broken down completely. It is in making an effort to understand and be understood that language is best acquired.

WRITING

As the book progresses, the writing tasks move from very controlled to less controlled. Where you think your students need more help, do the task orally in class and set the writing as homework. There are many approaches to correcting written work. If you wish to experiment with peer correction where students mark each other's work, our recommendation is that you ask students simply to mark lightly with a pencil dot any item in their partner's work which they do not understand or think may be incorrect. Then return the work to their partner. If he or she does not agree that there is a problem, you can then intervene.

SPEAKING

The speaking tasks are straightforward exchange activities. In the early units, they are mainly information exchange but in the later units there are examples of opinion exchange tasks. Like the problem-solving tasks, these activities provide opportunities for students to

develop strategies for coping with not understanding and not being understood. Encourage your students to rephrase when they are not understood and to think of ways round the problem of not remembering a key word.

WORD STUDY

Train your students in good practice as regards vocabulary right from the beginning of the course. Get them to keep their own vocabulary notebooks in which they record not only the meaning of key terms in computing but examples of their usage. Encourage students to spend a few minutes every day learning new words. Regular vocabulary tests are a stimulus for students to make the effort to do this. You can use these tasks in the textbook as vocabulary tests. They are spaced at five-unit intervals and summarise the key terms presented in preceding units.

Present ways in which students can record and store their growing computing vocabulary. Encourage them to keep related words in the same part of their notebook. For example, names of storage devices. They can also list words with their common collocations. For example, *hard/floppy + disk, disk + drive*. Simple crosswords and word games like 'hang the man' are useful short activities to revise key vocabulary at the start of a lesson.

PROGRESS TESTS

Progress tests are included at the back of this Guide to be used after every five units. The time you allow for these tests depends on the level of your class – 30 minutes is suggested for an advanced class.

UNIT 1

Computer Users

INTRODUCTION

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

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

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

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

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

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

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

access to special programs called **search engines** that are designed to allow the user to find relevant webpages on the Web. An Internet system designed to provide free, interactive access to vast resources for people all over the world is sometimes referred to as an **information superhighway**. Services such as these allow people to **telecommute** (use their computers to stay in touch with the office while they are working at home).

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

OBJECTIVES

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

- listening for specific information
- speaking and writing about their own use of computers.

They should understand the difference between the Past simple and the Present perfect in describing completed past actions and completed past actions with current relevance and be able to use these tenses correctly.

They should know and be able to use terms to describe common computer uses such as: *wordprocessing, sending emails, downloading music, browsing the Web.*

STARTER

1 Use this task as a warm-up and to inform yourself about your Ss' computing habits. If you are new to the class or the class are new to each other, it can also serve as an ice-breaker. Demonstrate what you expect of the groups by asking a few Ss questions such as:

- Do you have a computer at home/at college?
- Do you have access to a computer?
- What do you use it for?
- Do you use the Internet?

Appoint one student in each group to compile a list for their group and to report back to the rest of the class. Ask Ss to add any new uses reported by other groups to their lists or keep a tally yourself on the board, adding new uses and recording the number of times similar uses are mentioned. Feed in terms such as *downloading, browsing, wordprocessing* as required.

LISTENING

2 This provides practice in listening for specific information. Make sure the class knows what the Open University is. Give them time to note possible uses for each speaker. Then record their predictions on the board. Don't comment on their predictions until Task 3 is complete.

3 The recordings are short. Play each one without stopping but pause after each speaker to give the class time to note their answers. Replay, ticking any correct or near-correct prediction on the board list and adding the actual uses where these were not predicted.

Key 3

User	Actual uses
primary school teacher	group story-telling
Open University student	write assignments, email tutor, chat with other students
girl (Louise), aged 6	makes cards, plays games
artist	produce CD of paintings for dealers

4 Give the class time to attempt these questions before they listen. They may be able to complete part answers from points they remember from the Task 3 listening. Then play the recording, pausing after each speaker to allow Ss time for noting the answers. There are two questions on each speaker. Play the recording again only if there is disagreement on the answers.

Key 4

- 1 the more children involved, the more interactive the program becomes
- 2 the computer doesn't get in the way of learning, it's simply a tool
- 3 maths

- 4 face to face at tutorials, through help group online
- 5 adopt a pet, name it, feed it, take its picture
- 6 makes cards for her friends
- 7 using slides
- 8 getting people to visit your site

LANGUAGE WORK

Past simple and Present perfect

This section contrasts the use of the Past simple for completed past actions with the use of the Present perfect for completed past actions with present relevance. Write some contrasting examples on the board, for example: *My PC crashed. I had to replace the hard disk.* and *My PC has crashed. Can you advise me what to do?* Ask the Ss to infer the difference in use. Use the examples given from the artist's recording to further contrast the two tenses. For most Ss at this level, this will be revision.

5 and 6 These are straightforward fill-in-the-blanks exercises for individual practice but as the completed answers form a dialogue, follow up the individual work with paired speaking practice.

Key 5 (Other answers are possible)

- 1 Q What did you do yesterday/today/etc.?
- 2 Q How many have you included?
- 3 Q What have you done/did you do with the others?
- 4 Q How did you record/enter them?
- 5 Q How have you organised them?
- 6 Q Have you added anything/any other features?
- 7 Q How long has it taken you?
- 8 Q When did you start painting?
- 9 Q What did you do before you had a computer?
- 10 Q Have you sold any?

Key 6

- 1 A What *did you do* today?
- 2 B I *worked* on my project. I *searched* the Web for sites on digital cameras.

- 3 A *Did you find* any good ones?
- 4 B I *found* several company sites – Sony, Canon, ... but I *wanted one* which *compared* all the models.
- 5 A Which search engine *did you use*?
- 6 B Dogpile mostly. *Have you ever used* it?
- 7 A Yes, I've *tried* it but I've *had* more luck with Ask Jeeves. Why don't you try it?
- 8 B I've *had* enough for one night. I've *spent* hours on that project.
- 9 A I *haven't started* on mine yet.
- 10 B Yeh? I bet you've *done* it all.

PROBLEM-SOLVING

7 Do this in small groups. Encourage Ss to justify their opinions where there is disagreement to maximise the quality of the interaction.

Key (examples only)

architects:	to design structures
interior designers:	to demonstrate alternative designs to clients
farmers:	to keep financial accounts; to keep a database of livestock
landscape gardeners:	to experiment with different designs
musicians:	to compose music and to play it back
rally drivers:	to plot their best route
salespeople:	to keep a database of clients

SPEAKING

8 This is a freer form of pair practice. Encourage more proficient Ss to go beyond the examples and cues provided. For example, with 8 student B can also ask *What did the program do? Did you include any macros?*

Select some pairs to demonstrate to the rest of the class to check the activity is working well.

Key (other answers are possible)

- 1 Have you ever sent a video email attachment?
Who did you send it to?
When did you send it?
- 2 Have you ever fitted an expansion card?
Which type did you fit?
- 3 Have you ever replaced a hard disk?
What model did you replace?
- 4 Have you ever fixed a printer fault?
What kind of fault was it? What kind of fault did you fix?
- 5 Have you ever made your own website?
How did you make/design it?
- 6 Have you ever had a virus?
Which virus did you have?
- 7 Have you ever watched TV on the Internet?
Which station did you watch?
- 8 Have you ever written a program?
Which language did you use?
Which language did you write it in?

- 7 Help doctors pinpoint a patient's illness, suggest further tests, and prescribe appropriate drugs.
- 8 They help them to communicate more effectively with others.
- 9 Distance learning and videoconferencing
- 10 i That hardware, software, and connectivity are effectively integrated in a socially responsible way.
ii Which hardware, software, and networks endure and how great an impact they will have on our lives.
iii That computers are used not only efficiently but in a socially responsible way.

Key B

- 1 a iv b v c i d ii e iii
- 2 a False b True c True d False e False

WRITING

9 This task reinforces the speaking practice provided in Task 8. At this stage 150 to 200 words is sufficient.

SPECIALIST READING

Key A

- 1 Medical equipment, home appliances, cars, toys
- 2 To collect data at a customer's site, to generate forms, to control inventory, personal organisers
- 3 a Results in safer environments
b Improves energy efficiency
c Provides features such as call forwarding, call monitoring, and call answering
- 4 Smart cards, smart phones, smart cars, smart appliances, smart houses
- 5 To store vital information such as health records, drivers' licences, bank balances, and so on.
- 6 Multimedia greatly enhances the interaction between user and machine and can make information more interesting and appealing to people.

INTRODUCTION

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

Supercomputer (the most powerful type of mainframe)

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

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

Personal computer (PC) (single user)

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

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

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

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

Notebook (size of a sheet of notebook paper)

Handheld (can be held in one hand)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

When specifying a computer the following are normally quoted:

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

- b the capacity (size) of the memory (MB – megabytes)
 - c the capacity (size) of the **magnetic storage devices** e.g. hard disk, floppy disk (MB – megabytes, GB – gigabytes)
 - d the speed of the **optical storage devices** e.g. CD-ROM, DVD (given as a multiple of the speed of the first devices produced e.g. 24× = 24 times, 12× = 12 times)
 - e the display monitor size (measured in inches diagonally across the screen surface)
 - f the monitor image quality (**resolution**) given by the number of **pixels** (picture elements) that are used across and down the screen e.g. 800 × 600, or by the graphics standard used e.g. **VGA** (video graphics array), **SVGA** (super video graphics array)
 - g the graphics card memory size (MB – megabytes)
 - h the speed of the modem (measured in **kbps** – kilobits per second)
- Two different number systems are used in computer specifications:
- a The **decimal system**, which consists of ten digits from 0 to 9, is used for measuring speed.

- b The **binary system**, which only has two digits (1 and 0), is used for measuring capacity.
- The following prefixes are also used in measurements:
- | | Decimal system | Binary system |
|-------------|--------------------------------------|---------------------------------|
| kilo | 10 ³ = 1 thousand | 2 ¹⁰ = 1,024 |
| mega | 10 ⁶ = 1 million | 2 ²⁰ = 1,048,576 |
| giga | 10 ⁹ = 1 thousand million | 2 ³⁰ = 1,073,741,824 |
- e.g. 1.7 GHz = one point seven thousand million cycles per second
 256 MB = 256 × 2²⁰ bytes = approximately two hundred and fifty six million bytes
- Communication is provided between **applications programs** (wordprocessors, drawing programs, etc.) and the computer **hardware** (the physical components of a computer system) by a set of programs collectively known as the **operating system** e.g. Microsoft Windows, MacOS.

OBJECTIVES

- By the end of this unit, Ss should be better at:
- reading for specific information
 - understanding computer advertisements.
- They should understand and be able to use:
- structures for expressing function
 - prepositions of place.
- They should know and be able to use names of types of computers, computer features and sequence words.

STARTER

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

Key 1

- a supercomputer b mainframe
 c workstation d desktop e portable
 f entertainment console g mobile phone
 1f Student using a computer for entertainment while travelling
 2b large company processing payroll data
 3e travelling salesperson giving marketing presentations
 4a large scientific organisation processing work on nuclear research
 5g businessperson keeping in touch with clients while travelling
 6c graphic designer
 7d secretary doing general office work

2 This is a pre-reading task as preparation for Task 3. Ss should do the task individually and then compare answers in pairs. They should use the Glossary to check on any disputed answers.

Key 2

- 1 compact disk read only memory
 2 thin film transistor
 3 megabyte
 4 gigahertz
 5 front side bus
 6 synchronous dynamic random access memory
 7 extended graphics array

READING

3 This task provides practice in reading for specific information, in this case in understanding computer advertisements. Each feature of the computer is explained in the notes. Task 2 should provide sufficient preparation and the task can be done individually with checking in pairs or in plenary. For further practice photocopy some computer ads from computer magazines or the daily press and ask the Ss to work in groups, each with a different ad. They can then report to the class on the features of the computers advertised.

Key 3

- 1 1GB
 2 hard drive, CD-RW drive
 3 19"
 4 3GHz
 5 200GB
 6 Microsoft Windows XP Professional
 7 video card, integrated audio, CD-RW drive

LANGUAGE WORK**Function of an item**

These items should be revision for most Ss. Ask Ss about the functions of different kinds of memory: ROM, RAM, cache. It is a good opportunity for them to tell you about something in which they should be experts. Vary your questions:

- What is it for?
 What does it do?
 What is it used for?
 What is its function?

Write their answers on the board in note form and then expand the notes to illustrate the different structures. For example, *RAM: holds data* expand to *It's used for holding data, It holds data, It's used to hold data.*

4 and 5 Tasks 4 and 5 provide practice in these structures. Task 4 is two-stage: Ss must first find the correct match, then link object and function. They can do this individually. Task 5 requires more thought as Ss must identify and describe the function of each object. Do this individually, then compare answers in pairs. There may be some variation in the ways in which the Ss describe the functions. Make sure they agree with each other that their descriptions are technically correct.

Key 4

A Item	B Function
RAM	holds data read or written to it by the processor
processor	controls all the operations in a computer
mouse	controls the cursor
clock	controls the timing of signals in the computer
flash memory key	reads and writes to electronic chips on a card
monitor	displays the output from a computer on a screen
keyboard	inputs data through keys like a typewriter
DVD-ROM drive	reads DVD-ROMs
cache	provides extremely fast access for sections of a program and its data
ROM	holds instructions which are needed to start up the computer

- RAM holds data read or written to it by the processor.
The function of RAM is to hold data read or written to it by the processor.
- The processor is used to control all the operations in a computer.
The processor is used for controlling all the operations in a computer.
- The mouse controls the cursor.
The mouse is used to control the cursor.
- The clock is used for controlling the timing of signals in the computer.
The function of the clock is to control the timing of signals in the computer.
- The flash memory key is used for reading and writing to electronic chips on a card.
The flash memory key is used to read and write to electronic chips on a card.
- The monitor displays the output from a computer on a screen.
The function of the monitor is to display the output from a computer on a screen.
- The keyboard is used to input data through keys like a typewriter.

The keyboard is used for inputting data through keys like a typewriter.

- The DVD-ROM drive is used for reading DVD-ROMs.
The function of the DVD-ROM drive is to read DVD-ROMS.
- Cache provides extremely fast access for sections of a program and its data.
Cache is used to provide extremely fast access for sections of a program and its data.
- ROM is used to hold instructions which are needed to start up the computer.
ROM is used for holding instructions which are needed to start up the computer.

Key 5 (examples only)

- A scanner is used for inputting text and graphics.
- A printer is used to print out data from a computer.
- An ATM provides cash and account information to bank customers on the evidence of a swipe card.
- A PDA is used to store information such as appointments.
- The function of a hard disk drive is to store programs and data.
- A supercomputer is used to process quickly very large amounts of information, for example in a government department or a university.
- A mainframe computer is used for processing large amounts of data such as a major company's accounts and client database.
- Barcodes provide computer-readable information on a product so that it can be identified and priced automatically.
- Swipe cards are used to provide a secure means of identifying authorised users of many different facilities such as banks, libraries, and computer labs.
- The function of memory is to hold the instructions and data used by the processor.

Prepositions of place

Ask the Ss to explain to you how data flows in computer buses. It may help if you can draw Fig 2.3 on the board and mark the direction of data flow as they explain it to you. Feed in the

correct prepositions as they explain by asking for confirmation. For example, *So data flows from the CPU along the address bus?*

Once the diagram is labelled, ask a few Ss to summarise the function of each of the buses.

6 Ss can do this individually.

Key

- 1 The CPU is a large chip *inside/in* the computer.
- 2 Data always flows *from* the CPU *to* the address bus.
- 3 The CPU can be divided *into* three parts.
- 4 Data flows *between* the CPU and memory.
- 5 Peripherals are devices *outside* the computer but linked *to* it.
- 6 The signal moves *across* the VDU screen *from* one side *to* the other.
- 7 The CPU puts the address *onto* the address bus.
- 8 The CPU can fetch data *from* memory *along* the data bus.

PROBLEM-SOLVING

7 Ss should work in small groups to maximise the opportunity to speak English. When they have completed the task, they can compare answers with a neighbouring group. Then select Ss to report back to the whole class. Make sure they give reasons for their answers. Encourage those with more computer knowledge to give fuller reasons.

Key

- 1 DVD +/-RW drive
- 2 memory module
- 3 APC 1400 Smart-UPS
- 4 10/100/1000 Ethernet controller

SPEAKING

8 This is an information-transfer activity. Give examples of the sort of questions your Ss can ask before they start. For example,

What kind of monitor does it have?
 What is the capacity of the hard disk?

How much cache memory does it have?
 What size of memory does it have?
 What is the speed of the processor?
 What type of case does it have?
 At what speed does the bus operate?
 Does it have a CD-ROM drive?
 How fast is the CD-ROM drive?

Make sure the Ss exchange the information orally and do not simply show each other their data. More able Ss can also exchange information on the options available.

Key 8

feature	A	B
processor type	Dual Xeon	Intel Pentium M 725
processor speed	2.8 GHz	1.6 GHz
bus speed	800 MHz	400 MHz
memory capacity	2 GB	1 GB
memory speed	400 MHz	333 MHz
memory type	ECC DDR2 SDRAM	DDRAM
hard disk capacity	250 GB	60 GB
screen size	19"	17"
screen resolution	XGA (1024x768)	WXGA (1440x900)
optical drive speed	48X CD	8X DVD

WRITING

9, 10 and 11 These tasks provide practice in ordering instructions and marking their sequence with sequence words. As a follow-up, you can ask Ss to write their own instructions for tasks such as *fitting a sound card, upgrading the hard disk, installing more memory, fitting a DVD-ROM drive, replacing a floppy drive.*

Key 9

1b 2d 3c 4a 5e

Key 10

i c ii d iii a iv e

Key 11

First shut down your computer by choosing Shut Down from the Apple menu or the Special menu.

Then unplug all the cables except the power cord from your computer.

Next, if there are security screws on the vertical plate on the back of the computer, remove them with a Philips screwdriver.

After that, release the two catches underneath and lift up to remove the panel.

Finally, pulling gently, slide the tray out.

SPECIALIST READING

Key A

- 1 The time it takes to move data in and out of memory
- 2 Cache
- 3 The cache controller
- 4 Write-back cache
- 5 Before using the space to cache new data
- 6 When data in the cache is changed
- 7 An algorithm

Key B

- 1 a iv b vi c v d iii e i f ii
- 2 a True b False c False d True e True
f False g True

INTRODUCTION

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

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

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

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

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

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

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

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

OBJECTIVES

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

- ignoring irrelevant information when they read
- describing a process
- coping with not understanding and not being understood
- writing a description of a process.

They should understand and be able to use:

- the Present passive for descriptions of processes.

They should know and be able to use terms for describing computer applications.

STARTER

1 Divide the class into four sets of groups with each group within the set working on a different area. Groups who have worked on the same area should then compare answers. Finally, have selected groups report in plenary. Note the uses they describe on the board so that you can correct any important errors as you record their findings.

Key 1 (examples only)

- 1 supermarkets: identifying items; pricing; stock control; checking cash cards; checking sell-by dates; tracking customer buying habits; monitoring and controlling freezer temperatures
- 2 hospitals: database of patient records, appointments; database of equipment, drugs and supplies; patient monitoring; staff records; staff rosters; accounts; statistics on patients treated; wordprocessing of letters; database of patients awaiting transplants for easy matching with donors

- 3 airports: plotting aircraft movements – air traffic control; arrival and departure information displays; check-in facilities; baggage handling – some use bar codes to direct baggage; staff database; security for entry to restricted areas; intranet for internal communications
- 4 police headquarters: database of crimes, criminals, suspects, missing people; files of fingerprints and DNA data which can be matched with suspects; files of stolen cars and other stolen property; staff rosters, etc.

READING

2 Ss should be able to work out most of the stages in the operation of the speed camera system from the diagram which also includes most of the terms they need to describe how the system operates. They should work individually at first, then compare their solutions in pairs.

Key 2

- 1 Camera 1 records the time each vehicle passes.
- 2 It identifies each vehicle by its number plates using OCR software.
- 3 It relays the information to camera 2.
- 4 Camera 2 also records the time each vehicle passes.
- 5 The microprocessor calculates the time taken to travel between the cameras.
- 6 It relays the registration numbers of speeding vehicles to police headquarters.
- 7 A computer matches each vehicle with the DVLC database.
- 8 It prints off a letter to the vehicle owner using mailmerge.

3 An important reading skill for any student is being able to ignore irrelevant information. The only relevant information in this text is the final sentence which explains how speeding drivers

can be traced. Ask Ss what the equivalent of the UK DVLC is in their country.

Key 3

Only the information that the owner of the vehicle can then be traced using the Driver and Vehicle Licensing Centre database.

4 Ss have a clear purpose for reading Part 2 of the text – to check and complete the stages in their explanation. Ss may know *surfing* from *surfing the Web*. *Outwit* they should be able to infer from context.

LANGUAGE WORK

Present passive

Write these sentences on the board:

- 1 The radar *sends* out a beam of radio waves.
- 2 The information *is stored* on a smart card.

Ask the class to explain why the verb is active in (1) and passive in (2). Explain that in (1) the agent responsible for the action is included – *the radar*. In (2) the agent is not included although we know what it is – *the microprocessor*. Explain that the present passive is often used to describe a process where actions, not the agents, are the important features.

5 Best done as an individual written task. Make sure the class know OCR – Optical Character Recognition.

Key 5

- 1 The time each vehicle passes is recorded by the first unit.
- 2 Each vehicle is identified by its number plates using OCR software.
- 3 The information is relayed to the second unit.
- 4 The time each vehicle passes is also recorded by the second unit.
- 5 The time taken to travel between the units is calculated by the microprocessor.

- 6 The registration numbers of speeding vehicles are relayed to police headquarters.
- 7 Each vehicle is matched with the DVLC database.
- 8 A letter is printed off to the vehicle owners using mailmerge.

6 Make sure EPOS – Electronic Point of Sale and EAN – European Article Number are known. Check that the Ss have correctly sequenced the steps, for example by asking them to compare in pairs, before the class proceed to the written description. This should be done individually. Ss can use the sequence words revised in Unit 2 as alternatives to numbering the steps.

Key 6

- 1 f The checkout operator scans the item.
- 2 c The scanner reads the barcode.
- 3 a The scanner converts the barcode into electrical pulses.
- 4 g The scanner sends the pulses to the branch computer.
- 5 i The branch computer searches the stock file for a product matching the barcode EAN.
- 6 d The branch computer records the sale of the product.
- 7 b The branch computer sends the price and description of the product to the EPOS till.
- 8 e The till shows the item and price.
- 9 h The till prints the item and price on the paper receipt.

PROBLEM-SOLVING

7 Get the class to work individually; then compare their answers in small groups. Ask selected groups to report in plenary and to justify their answers.

Key 7

On-board diagnosis of faults; Internet connections for passengers – for driver only if vehicle has stopped; systems to immobilise the vehicle if the driver is not recognised; automatic adjustment to suit individual drivers – seat height, steering wheel position, mirrors, etc.; monitoring of fuel efficiency; navigation systems; vehicle tracking if stolen, etc.

SPEAKING

8 This pair activity provides practice in speaking and note-taking but also in coping with not understanding and not being understood. Make sure your Ss know phrases such as:

I'm sorry I didn't catch that.
Can you explain the bit about ... again?
What do you mean by ...?

A students can prepare and rehearse with each other, as can B students, to iron out problems in production. Then re-pair A-B, A-B for the information exchange. When the activity is complete, Ss can look at each other's diagrams.

WRITING

9 Best done as an individual writing task. As an alternative, Ss can be asked to write a description of their partner's process based on their notes.

Key 9 (examples only)

ATM

First the customer puts their card into the machine and enters their PIN number on the keypad and the amount they wish to withdraw. The ATM reads the information on the magnetic strip on the card. The strip contains the name of the account holder, their account number and details of the network it is linked to. This information is then sent to a central computer which holds information on many accounts. The customer's PIN number is checked as well as the amount of money in their account. If their account has sufficient funds, the ATM is instructed to dispense the cash requested.

Visa

A customer uses a Visa card to pay for a \$1,295 computer in Chicago. The store uses a swipe card reader to send details of the purchase and the customer's card number to a processing centre in New Jersey. The information may travel by satellite or phone lines. Because the purchase is above a

certain limit, details are forwarded to a computer in Atlanta for closer scrutiny. Next the transaction is sent to San Mateo in California for processing. The California computer checks the card details in a database of card holders and finds that the card was issued by a Portland bank. Then it checks with the Portland bank's computer to see if the transaction request should be approved or denied. The response is sent back to the original store in approximately 15 seconds.

SPECIALIST READING**Key A**

- 1 Artificial Intelligence
- 2 a decision trees b neural networks
c clustering
- 3 Rules
- 4 When data isn't labelled in a way that is favourable to mining.
- 5 All types of data storage, from large data warehouses to smaller desktop databases to flat files.
- 6 a Refine the parameters
b Use other data analysis tools to examine the data
- 7 a Analysing Supreme Court decisions
b Discovering patterns in health care
c Pulling stories about competitors from newswires
d Resolving bottlenecks in production processes
d Analysing sequences in the human genetic makeup

Key B

- 1 a iii b iv c ii d i
- 2 a False b True c True d True e False
- 3 Large amounts of data stored in data warehouses are often used for data mining. The data is first *cleansed* to remove *duplicate* data and errors. The *data* is then analysed using a tool such as *artificial intelligence*. An analysis report is then analysed by an *analyst* who decides if the *parameters* need to be refined, other data *analysis* tools need to be used, or if the results need to be discarded because they are *unusable*. The analyst passes the final results to the *decision* makers who decide on the *appropriate* action.

INTRODUCTION

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

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

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

There is no delay in getting pictures from digital cameras because there is no film requiring chemical processing. They can be attached to a computer to directly transfer pictures for editing using special software and unwanted pictures can be deleted. Two important features when buying a digital camera are:

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

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

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

Types of storage devices include:

magnetic devices (that use magnetism)	magnetic tape made of a magnetic coated flexible plastic; hard disks made of magnetic coated aluminium disks.
optical devices (that use laser light)	CD-ROM – compact disk read only memory CD-/+RW – re-writable compact disk DVD-ROM – digital versatile disk read only memory DVD-/+RW – re-writable digital versatile disk

electronic devices USB flashdrive	CD-MO – electronic flash memory that acts like a disk drive
--	--

Read and write media enable the user to both read data from and write data to the media.
Read only media can only be used for reading data i.e. the stored data cannot be changed in any way.

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

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

Other factors that vary between storage devices include:

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

There are various types of **printers** for out-putting text and graphics to paper:

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

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

Units of measurement used in data storage include:

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

OBJECTIVES

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

- listening for specific information.
- They should understand and be able to use:
- ways to express comparison and contrast.

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

STARTER

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

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

Key 1

Input devices

- Electronic scales
- Barcode reader
- Swipe card reader
- Numeric keypad

Output devices

- Liquid Crystal Display

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

to name any other input and output device not shown in this diagram, for example:

input devices – joystick, touchscreen, mouse
output devices – plotter, headphones.

Key 2

Input	Peripheral	Output
Flower/image	Digital camera	
Text	Scanner	
Barcode	Barcode reader	
Voice	Microphone	
Swipe card	Swipe card reader	
	Monitor	Screen display
	Printer	Text
	Loudspeaker	Sound

LISTENING

3 This is a pre-listening task. Do it as a class activity and list the answers on the board but do not comment on whether or not they are correct at this stage.

Key 3

Using only the visual and captions

- 1 Memory cards not film, LCD screen for playback, editing, etc.
- 2 Image is captured by a CCD
- 3 Advantages: no processing involved, instant viewing of pictures
Disadvantages: none obvious on information available so far

4 Ask Ss to complete as much of the table as they can before they listen. Then play Part 1 of the recording to allow them to check their predictions and Question 1 of Task 3.

Key 4

feature	digital	conventional
lens	✓	✓
viewfinder	✓	✓
requires chemical processing	X	✓
film	X	✓
transfer images directly to PC	✓	X
can delete unsatisfactory images	✓	X

5 Play Part 2 of the recording. It contains informal terms such as *pricey* and *power-hungry*. Ss should be able to infer their meaning. Ss should tick any of the disadvantages they have listed in Question 3 of Task 3 and list any additional disadvantages. Play the recording for a second time to allow the Ss to correct their answers. Pause the recording if Ss request it.

Key 5

- 1 pricey (informal), i.e. expensive
- 2 quality isn't as sharp as a good 35 mm
- 3 If you want prints, you have to invest in a photo-quality colour printer. That can be expensive and printing costs can also be high – the paper, the ink and so on.
- 4 Batteries. Digitals are power-hungry.

6 Give the class time to answer as many of these questions as they can before they listen again to the recording. Then play both parts without pausing. Ss can compare answers in pairs. Do not play again unless there is disagreement on any of the answers.

Key 6

- 1 Thousands of photo-transistors – one for each pixel in the image.
- 2 A kind of dot which makes up a picture. It's short for *picture element*.
- 3 On the LCD.
- 4 Retouch them, manipulate them or print them out.
- 5 Yes, but it comes with the camera.
- 6 The higher the resolution, the more details you'll be able to get in the picture; the better the picture quality.
- 7 Memory size.
- 8 Because the cameras can use a lot of power so batteries need to be replaced often.

LANGUAGE WORK

Revision: Comparison and contrast

These points should be revision for this level. Put the blank table on the board and get the

class to tell you which boxes to cross and which to tick. Then ask what difference there is between the cameras for each of the features in turn. Reshape the Ss' answers to illustrate each of the structures taught in this Unit. For example,

That's right, there's no difference. Both cameras have lenses.

Ss who have specialist knowledge may be able to explain finer points of difference between the cameras. As long as the correct forms are used, this is to be encouraged.

7 Do a few examples orally; then set the rest as an individual writing task.

Key 7

- 1 You can write to hard disks *faster* than optical disks.
- 2 DVD-ROMs have a *higher capacity than* CD-ROMs.
- 3 CD-ROM and CD-RW disks are *both low priced*.
- 4 Removable drives and flash drives cost *more than* other storage media.
- 5 CD-ROMs cannot be re-recorded *but* some optical disks can.
- 6 *Like* hard disks, you can read from and write to flash drives.
- 7 *Unlike* fixed hard disks, DVD-ROMs are removable.
- 8 The cost of a fixed hard disk is *lower than* a removable one.
- 9 *Both* magnetic tapes and fixed hard disks can have very high capacities.
- 10 DVD-RW disks are cheap *but* removable hard disks are more expensive.

8 Do this as an individual writing task.

Key 8 (examples only)

- 1 Ink-jet printers are cheaper than other printers.
- 2 Solid-ink printers are more expensive than ink-jet printers.
- 3 Laser printers give better text quality than electro-static printers.
- 4 Thermal transfer printers have more graphics capability than electro-static printers.

PROBLEM-SOLVING

9 This can be done in pairs or small groups. Ss should justify their answers.

Key 9

- 1 scanner
- 2 robot
- 3 joystick
- 4 touchscreen
- 5 digital videocamera
- 6 barcode reader
- 7 laser printer
- 8 graphics tablet or digitiser
- 9 plotter
- 10 microphone
- 11 headphones
- 12 hard disk
- 13 keyboard
- 14 tape drive

WRITING

10 and 11 Set either or both tasks depending on time available and access to the Internet. If access is possible, you can make Task 11 a project with different Ss asked to search different sites and then report their findings in plenary. You can make a board matrix to fill in the details of each model surveyed so that in addition to comparing the latest models with the model shown in Fig 3, they can compare one model with another.

Key 10 (example only)

barcode reader, swipe card reader for cash cards and loyalty cards, LCD screen, printer for receipts, electronic scales

The EPOS (Electronic Point Of Sale) till is linked to a number of peripherals. These include a barcode reader which is used to identify each item sold and match it to the correct price. It also allows it to provide stock control information. There is a swipe card reader used for reading information from cash cards to check the holder has sufficient money in their accounts or credit to pay for the goods. The EPOS till can also read loyalty cards to record information on the kind of goods bought

by the customer for marketing information and to provide a small discount for the customer. The LCD screen displays the price and a description of each item. There is a printer which is used to print out a detailed receipt for the customer. The electronic scales are used to weigh purchases such as fruit and vegetables.

SPECIALIST READING

Key A

- 1 To build bigger storage
- 2 It doubled every 18 months
- 3 At least another 5 to 10 years
- 4 Superparamagnetism threatens to make densely packed bits unstable.

- 5 10 terabits per square inch
- 6 Atomic force microscopy and holographic storage
- 7 'Pages' of data can be superimposed on a single volume.
- 8 Improved network searches, video on demand, high-end servers, enterprise computing, and supercomputing
- 9 CD-ROMs and DVDs
- 10 Online delivery

Key B

- 1 a iii b iv c v d vi e vii f i g ii
- 2 a False b True c True d True e False

INTRODUCTION

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

Qualifications in computing available in the United Kingdom include:

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

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

Course subjects and topics discussed in this unit include:

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

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

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

OBJECTIVES

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

- listening for specific information in an interview
- speaking and writing about IT courses.

They should understand and be able to use:

- questions in the Past simple.

They should know and be able to use phrasal verbs with *up*.

STARTER

1 Ensure that Ss understand all the subjects on the list. Ask them for mother tongue equivalents in their own course to make sure. Ss should work individually and then compare their answers in pairs or small groups. They should justify their answers. If there is disagreement within their group, they should compare with a neighbouring group.

Key 1

- a 6 b 1 c 10 d 2 e 5 f 9
g 7 h 11 i 8 j 3 k 15 l 13

LISTENING

2 Do not give time for predicting answers before you play the recording. Play Part 1 once without stopping. Give the Ss time to write their answers; then replay pausing after the information which provides the answer to each question.

Key 2

- 1 HW Installation & Maintenance
Info Tech Applications
Software Development
Communication
Mathematics for Computing
- 2 Planning, Design, Programming
- 3 There seemed to be more jobs in support, so support seemed a better career move.
- 4 Assembling computers
- 5 Maths

3 Handle in the same way as Part 1.

Key 3

1

Improvement	Reason
change the programming component perhaps to C++	Pascal and COBOL are not in demand
work experience	employers are looking for it

2

Subject	Example in work situation
Learning Access	has had to design databases for customers
Systems Building	has had to assemble computers for customers
Communication	making presentations to customers, job interviews

4 Do Part 3 in the same way as the other parts but after the second playing you can ask how Paul's comments relate to their own experiences. Ask what improvements they could suggest to their own course, what components they think may be most useful in their future work situations, what they feel about 'Communication skills'.

Key 4

- 1 When he's gone to customers who want something fixed that he doesn't know about.
- 2 Books, manuals, PC magazines, the Internet – Microsoft websites and the manufacturers' websites.
- 3 None formally, but one lecturer gave the students some advice on where to look.
- 4 It was full of mistakes so you had to check it against other books to make sure what was right.
- 5 He'd like to do a degree some time but getting the time and the money to do this is difficult.

LANGUAGE WORK**Revision: Past simple questions**

This should be revision for most Ss. Ask questions in the Past simple about Paul's time as a student. For example,

- 1 What subjects did he study?
- 2 Who gave advice on the best place to look for help?
- 3 How many subjects did he study?
- 4 When did he complete his course?
- 5 What practical work did he do?

Write the questions on the board and make sure Ss are familiar with the question words. Then check they understand the structure of questions in the Past simple by writing this sentence on the board and asking them to make questions which focus on each piece of information in turn.

Paul¹ studied² IT³ in Newcastle⁴ two years ago⁵.

Demonstrate that questions which focus on the subject or agent are not made with *did*.

Who studied IT?

Questions which focus on past actions require the dummy verb *do*.

What did Paul do two years ago?

Questions which focus on other points of information require *did*.

What did Paul study?

5 Ss should do this individually and then compare in pairs. You can also use the answers for a paired speaking activity asking and answering questions about Pauline's study. For example:

- A How many subjects did she study in her first term?
- B Six.

Key 5

- 1 How many subjects did you study in your first term?

- 2 How many days each week did you have classes?
- 3 What did you have on Monday morning?
- 4 Which day was a free day for home study?
- 5 Where/In which room did you have Systems Analysis on Wednesday?
- 6 What did you study on Thursdays?
- 7 When did Programming happen?
- 8 How often did Communication take place?
- 9 Whose classes did you like most?
- 10 When did you have your lunch break?

WORD STUDY**up- and -up verbs**

6 Check that Ss are familiar with the meaning of these verbs, then set the task for individual work.

Key 6

- 1 back up 2 upgrade 3 free up
- 4 uploaded 5 start up 6 update 7 starts up
- 8 set up 9 keep up/catch up
- 10 catch up/keep up 11 built up

SPEAKING**Role play**

7 Pairs should switch roles so that each student has a chance to play both parts.

WRITING

8 This is quite a demanding task and Ss will need help in preparing for it. Refer them to their own college or university prospectus and website where they should find a course description and a statement of objectives. Make sure they know the English equivalents of the terms used. You can find English-language IT course descriptions on many UK college and university websites. It may help to print off a few to provide help with essential vocabulary.

INTRODUCTION

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

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

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

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

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

Some operating systems have a **GUI** (pronounced like 'goo-ey' – **graphical user interface**) that allows the user to use a mouse to click on icons on the screen or choose commands from a list of choices known as a **menu**. Operating systems with graphical interfaces mentioned in this unit include: MacOS, Linux, Windows XP, BC OJ, Palm and Windows Media Centre Edition.

OBJECTIVES

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

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

They should understand and be able to use:

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

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

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

STARTER

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

correct. Any disputes on technical matters should be referred back to the Ss to find the correct answers. They can then work out what the Unix commands mean and compare answers within their groups. BST is British Summer Time.

Key 1

- 1 Type them using a keyboard
- 2 date
passwd
ls
logout
- 3 date displays date and time
passwd allows user to change password
ls lists files on screen
logout closes user's account
- 4 The user's account will close.

READING

2 Give the class a few minutes to try this individually, then check the answers in plenary.

Key 2

- | | |
|-------------------------|--------------------|
| a user | c operating system |
| b applications programs | d hardware |

3 Discuss the meaning of the title; then give the class time to note their predictions for the remaining questions. Allow a fairly tight margin for Ss to read the text to check their answers. Deal with any disagreement on the answers which may arise by referring Ss to the relevant parts of the text.

Key 3

- 1 Applications software does not communicate directly with the computer hardware.
- 2 It controls the entire operating system and loads into memory other operating system programs as needed.
- 3 Programs which remain in memory are resident. Programs which are loaded in from disk storage as required are non-resident.
- 4 (1) manage the computer's resources
(2) establish a user interface
(3) execute and provide services for applications software

4 A summary can be a useful check on the understanding of a text. Advanced Ss can be asked to write their own but for most Ss at this level a gapped summary is a sufficient challenge. Set this as an individual task. Take the opportunity to revise any of these terms for linking ideas which may be unfamiliar to your class.

Key 4

The user is aware of the effects of different applications programs *but* operating systems are invisible to most users. They lie between applications programs, *such as* word processing, and the hardware. The supervisor program is the most important. It remains in memory, *therefore* it is referred to as resident. Others are called non-resident *because* they are loaded into memory only when needed. Operating systems manage the computer's resources, *such as* the central processing unit. *In addition*, they establish a user interface, and execute and provide services for applications software. *Although* input and output operations are invoked by applications programs, they are carried out by the operating system.

LANGUAGE WORK**-ing form (1) as a noun; after prepositions**

This is the first of two *Language work* sections which focus on the *-ing* form. The other is Unit 9. The emphasis here is on the *-ing* form in subject position and after a preposition.

Start by eliciting the functions of an operating system. The answers are all in the text. Write the functions on the board:

- (1) manage the computer's resources
- (2) establish a user interface
- (3) execute applications software
- (4) provide services for applications software.

Then show how the *-ing* form can be used as the subject of sentences such as:

- 1 *Managing* the computer's resources is an important function of the operating system.

Demonstrate the use of the *-ing* form after prepositions using the example sentences in the text. Draw Ss' attention to cases where *to* is a preposition rather than part of the infinitive and is therefore followed by *-ing*. For example *look forward to, object to, used to doing something*.

5 and 6 Both these tasks are best done individually.

Key 5

- 1 Loading into memory non-resident programs as required is one task of the supervisor program.
- 2 Communicating directly with the hardware is the role of the operating system.
- 3 Establishing a user interface is one of the key functions of the operating system.
- 4 Providing services for applications software is an additional role.
- 5 Supporting multiple programs and users is part of the work of mainframe operating systems.
- 6 Facilitating interaction between a single user and a PC is the task in most cases.
- 7 Processing large amounts of data quickly is one of the most important functions of a computer.
- 8 Allowing the computer to process data faster is the main reason for installing more memory.

Key 6

- 1 Don't switch off without *closing down* your PC.
- 2 I want to *upgrade* my computer.
- 3 He can't get used to *logging on* with a password.
- 4 You can find information on the Internet by *using* a search engine.
- 5 He objected to *paying* expensive telephone calls for Internet access.
- 6 He tried to *hack into* the system without *knowing* the password.
- 7 You needn't learn how to *program* in HTML before *designing* webpages.
- 8 I look forward to *inputting* data by voice instead of *using* a keyboard.

PROBLEM-SOLVING

7 Do this in small groups. Encourage Ss to justify their choices where there is disagreement to maximise the quality of the interaction.

Key 7

Action	VMS command	Unix command
List all the files in a directory	directory	ls
Delete a file	delete	rm
Rename a file	rename	mv
Copy a file	copy	cp
Send a file to a printer	print	lpr
Obtain help	help	man
Create a directory	create/directory	mkdir
Show date and time	show time	date
Show users on system	show users	rwho
Talk to other users on system	phone	write
Search for a string in a file	search	grep

SPEAKING

8 Most of these popular operating systems should be known to your Ss either through their studies or the warmup work done for Task 1. The task is a straightforward information exchange

Key 8

- 1 MacOS
- 2 PDAs
- 3 MVS, VM, OS/390
- 4 Unix
- 5 BeOS, Windows Media Center
- 6 Windows XP, Windows Media Center
- 7 Linux
- 8 Netware
- 9 Windows Media Center
- 10 VAX/VMS

WRITING

9 Copy the Mac OS X features onto the board and elicit different ways of combining the table information into full sentences and these sentences into paragraphs. Compare the final version with the description provided in the Student's Book. Note any differences and decide which version is best. Then set the Linux description task for individual work.

Key 9**Linux**

Linux is a Unix-based operating system designed for use on a wide variety of computer systems. The source code is freely available. A variety of distribution kits are available. Graphics are provided by a graphic engine called XFree86. It has both a command line interface and a GUI. Both KDE and Gnome GUIs can be used.

SPECIALIST READING**Key A**

- 1 The GNU programming tools
- 2 The source code was released on the Internet.
- 3 Modify it to fix bugs or add new features.
- 4 Because they believe that if they make it available it will destroy their revenue stream.
- 5 Command interpreters, programming tools, text editors, typesetting tools and graphical user interfaces.
- 6 A complex standard distributed windowing system on which people implement graphical interfaces.
- 7 KDE and Gnome

Key B

- 1 a vi b v c ii d i e iii f iv
- 2 a False b False c True d True e True

INTRODUCTION

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

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

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

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

Common icons on the Microsoft Windows desktop include:

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

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

A + sign used between the names of keyboard keys means that the user should press both keys simultaneously e.g. ALT + TAB. Keyboard keys and combinations of keys mentioned in the text include:

Shift key	allows you to type in upper case (capital letters)
MouseKeys feature	enables you to use the numeric keypad to move the mouse pointer
ALT + TAB	allows you to switch between open programs
StickyKeys feature	helps disabled people to operate two keys simultaneously
PRINT SCREEN key	lets you copy an image of the whole screen to the Clipboard
ALT + PRINT SCREEN	lets you copy an image of the active window to the Clipboard

OBJECTIVES

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

- reading for specific detail quickly.

They should understand and be able to use:

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

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

STARTER

- 1 Do this in small groups to encourage discussion.

Key 1

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

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

Key 2

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

READING

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

Key 3

- 1 Send email if you have Internet access.
- 2 The taskbar
- 3 Pause the mouse pointer over the time box.
- 4 If you take files and documents to and from a PC at work, this feature helps keep them organised and up to date.
- 5 Solid blue
- 6 My Network Places
- 7 My Computer
- 8 The Internet Connection Wizard
- 9 Empty the Recycle Bin

LANGUAGE WORK**Verbs + object + infinitive****Verbs + object + to-infinitive**

The focus is on verbs with the general meaning of *permit* which are often used to describe new developments in computing. Although similar in meaning, they differ in whether they are followed by the infinitive or *to*-infinitive after an object.

Ask Ss what a GUI does, what is special about a GUI and why GUIs were developed. The answer you seek is that people can use a computer without knowing any operating system commands. Show how this idea can be expressed using each of the four 'permit' verbs. For example,

- 1 A GUI *lets you use* a computer without knowing any operating system commands.
- 2 A GUI *allows you to use* a computer without knowing any operating system commands.

4 and 5 Do individually, then compare answers in pairs.

Key 4

- 1 The Help facility enables users *to get* advice on most problems.
- 2 Adding more memory lets your computer *work* faster.
- 3 Windows allows you *to display* two different folders at the same time.

- 4 The Shift key allows you *to type* in upper case.
- 5 The MouseKeys feature enables you *to use* the numeric keyboard to move the mouse pointer.
- 6 ALT + TAB allows you *to switch* between programs.
- 7 The StickyKeys feature helps disabled people *to operate* two keys simultaneously.
- 8 ALT + PRINT SCREEN lets you *copy* an image of an active window to the Clipboard.

Key 5 (examples only)

- 1 In a window, the vertical scroll bar allows you to navigate a document quickly.
- 2 The Find command helps you to locate a file.
- 3 The Undo command enables you to undo previous actions.
- 4 Cut and paste lets you transfer data between files.
- 5 Print Screen allows you to make a copy of any screen display.
- 6 Menus enable you to select an option.
- 7 The Recycle bin allows you to recover deleted documents.
- 8 Tooltips help you to learn about new features.

PROBLEM-SOLVING

6 Do this individually but get Ss to compare in pairs. Ss have to use their computer knowledge as well as their knowledge of English. Refer any dispute on technical matters back to the class to agree on or to find out for the next class.

Key 6

- | | |
|-----|-----------------------|
| 1 b | g delete a file |
| 2 e | h find a file |
| 3 f | i read email |
| 4 a | j draw a picture |
| 5 d | k access a calculator |
| 6 c | l access tools |

SPEAKING

7 Do as the task instructions suggest. When checking, ask selected Ss to explain how to perform one of these tasks to the rest of the class. With advanced Ss, as a follow up ask for

volunteers to give clear instructions for a computer action of their own choice. The rest of the class have to identify the action as soon as possible.

Key 7

- 1 Right-click on the Desktop to open up the context sensitive menu. Choose 'New' on the menu. Choose 'Folder' on the submenu.
- 2 Double-click on the program icon.
- 3 Click on the Start button. Choose 'Shut Down' from the start menu. Select 'Shut down the computer?' in the dialog box. Click the 'Yes' button.
- 4 Double-click on the volume control icon in the system tray. Drag the volume slider up or down to the required volume setting.
- 5 Right-click on the desktop to open up the context sensitive menu. Choose 'Arrange Icons' from the menu. Click on the desired format in the submenu.
- 6 Allow the mouse pointer to hover over the time icon in the system tray. After a short delay the date will be displayed above the time.
- 7 Allow the mouse pointer to hover over an icon.

WRITING

- 8 Do this as an individual writing task.

SPECIALIST READING**Key A**

- 1 i) Cheaper and more powerful personal computers
ii) Breakthroughs in technology, such as speech recognition
iii) Convergence of personal computers and consumer electronics
- 2 The hyperlinked design of the World Wide Web
- 3 They have allowed users to view content, including local and network files, within a single browser interface.
- 4 Palm-size and hand-held PCs
- 5 i) A mouse is a very efficient device for desktop navigation.
ii) A mouse is not so useful for changing the style of a paragraph.
- 6 Speech recognition, handwriting recognition, text to speech (TTS), the ability to recognise faces or gestures, and the ability to observe their surroundings.
- 7 Video cameras
- 8 The rapidly expanding increase of information, both on the Internet and within intranets.
- 9 They can be used as Web browsers, help desks, and shopping assistants.

Key B

- 1 a iii b v c i d ii e iv
- 2 a False b False c False d False e True
f True

INTRODUCTION

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

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

Some **applications programs**, such as wordprocessors, spreadsheets and databases, are commonly referred to as **office programs** because they are commonly used in a typical office. **Office packages** (or **suites**) such as **Microsoft Office** are sets of inter-related office programs. Different versions of office suites are usually available containing different combinations of programs. **Mailmerging** is a useful feature found in most office suites that combines a database with a wordprocessor document to automatically produce a copy of a standard letter for each record in the database.

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

PC	common name for an IBM compatible personal computer
network	computers connected together
file server	a powerful computer that stores and allows users access to data files on a network
laser printer	a very high quality text and graphics printer that has a photosensitive drum that deposits toner powder on the paper
CD-ROM	a compact disk read only memory storage device that is cheap to produce and suitable for storing large amounts of data

The **Patient Browser program (GPASS)** discussed in this unit is a type of **database** for sorting and searching patient records. To search, you select different option screens by clicking on a **tab** with a mouse and inputting the **search criteria** (details of what you are looking for) in text boxes known as **criteria boxes**. Different **button icons** can be clicked to perform different operations e.g. the Find button. The **default button** is the option that is selected automatically.

Games Consoles (specialised computers designed for playing games), such as Microsoft Xbox, Nintendo Gamecube and Sony Playstation, are available for playing a variety of computer games.

An **ASP (application service provider)** rents applications to users i.e. instead of buying software, the user pays for using applications as and when they need them. The ASP provides the software, manages the hardware and provides storage space, security controls and the physical links to customers. The ASP normally leases storage space for programs and data from **data centres** (facilities for storing large amounts of information) owned by data storage specialists.

The user is provided with **remote access** (access across a communications network) to a wide variety of programs including: generic applications such as **email** (electronic mail) and office suites, **high-end** (advanced) packages including large, complex business

applications such as enterprise resource planning tools (e.g. **SAP**), business services, such as payroll and accounting systems, expensive specialist tools and **e-commerce** resources (electronic commerce – buying and selling on the Internet).

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

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

OBJECTIVES

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

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

They should understand and be able to use:

- simple and complex instructions.

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

STARTER

1 Do this individually, then check in plenary.

Key 1

- | | |
|------------------|------------|
| a wordprocessing | d graphics |
| b spreadsheet | e game |
| c database | |

2 This is the first survey in the textbook. Have Ss work first in small groups. If they are unable to find someone to match each question, they can expand their search to other groups. In plenary, record the results on the board with a simple table showing how many Ss were identified for each question. As a follow-up, make a list of all the spreadsheet, database and wordprocessing and other applications programs the class can identify. For example, Excel, Access, etc.

3 A prediction task for individual work. Do not check the answers until Tasks 4 and 5 are complete.

READING

4 This is a jigsaw reading task. Ss work in groups of three. All Ss read paragraph A and

complete the notes. They can compare notes within their groups and agree on the best version. Check they have completed this first part successfully by asking a few Ss to write their notes or part of their notes on the board.

Then set each member of the group a different text to read and note-take, ensuring that within each group the entire text is read. If you have some groups larger than three, set some Ss the same text to note-take from.

Key 4

B	
Users	Doctors
Use	Patient records, prescribing information on drugs, information on problems
Program types	Databases
Data input	Case notes
Output	Information on drugs and problems, statistics

C	
Users	Reception
Use	Appointment lists, letters to patients
Program types	Tailored package based on a database, patient database
Data input	Appointment dates and times for each doctor
Output	Appointment lists, letters to patients due for vaccination

D	
Users	Practice Manager
Use	Calculating salaries and expenditure, making rotas
Program types	Tailored packages based on spreadsheets and databases
Data input	Income and expenditure figures, doctors available
Output	Payroll and accounts, monthly rota

5 Ss now exchange information orally and complete all sections of the notes. Make sure Ss do not simply show each other their notes. Ask them to suggest questions for each part of the note-taking frame or use the questions suggested in the book.

LANGUAGE WORK**Instructions/complex instructions**

GPASS is a program used by UK general practitioners. Ask the class to read the instructions for finding specific patients so that they can tell you how to do this. Elicit and note on the board simple numbered instructions:

- 1 Click on the appropriate tab.
- 2 Enter the search criteria.
- 3 Select the Defaults button.
- 4 Click on the Find button.

Then ask questions firstly to elicit explanations. Use the explanation to make the instructions on the board more complex. For example, *Why click on the appropriate tab? To find patients. Click on the appropriate tab to find patients.*

Illustrate the other structures in the same way. Note that if the explanation is put first in the instruction, it should be followed by a comma. For example, *To find patients, click on the appropriate tab.*

Explain that the word order depends on what information you wish to make important. Putting the explanation first emphasises the explanation.

Finally, show how the numbers can be replaced by sequence words and how sequence can also be shown by *Having done X*, and *Once X has been done* as in the Student's Book examples.

6 and 7 Do these individually, then compare in pairs. As a follow-up, you can ask Ss to write instructions for any computing activity they are familiar with. The best test of instructions is for others to attempt to follow them. If you can set this up using a computer lab, this can lead to a very lively lesson with each group preparing instructions for others to follow to the letter. Weaknesses in production and comprehension are soon shown up if the planned outcome from following the instructions is not achieved.

Key 6

- 1 Select the Personal tab.
- 2 Enter Smith in 'Surname'.
- 3 Enter 16 in 'Age from' and 50 in 'to'.
- 4 Select Male.
- 5 Select the Registration tab.
- 6 Choose doctors Warner and Roberts.
- 7 Click on Find.

Key 7

- 1 First enter the search criteria by *clicking on the Personal tab*.
- 2 To *find the Green family*, enter Green in the Surname box.
- 3 Ensure both male and female members of the family are found by *clicking Either*.
- 4 *Next / Then / After that* select the Address tab.
- 5 Having *selected the Address tab*, enter the postcode.
- 6 *Next / Then / After that* choose the Registration tab.
- 7 *Once the Registration tab has been chosen*, select All doctors.
- 8 *Finally*, click on Find to start the search process.

PROBLEM-SOLVING

8 Ss should do this in small groups. As with other problem-solving tasks, they should defend their choice and question any choices made by others in the group with which they disagree. PIM is personal information manager, DTP is desk-top publishing.

Key 8

- 1 Standard
- 2 Standard
- 3 Developer
- 4 Small Business Edition
- 5 Premium
- 6 Professional
- 7 Premium
- 8 Professional

SPEAKING

9 This is an information exchange activity. The texts may be a little difficult as they are in informal journalistic style. However, this is common in computer magazines and these form an important means for students and professionals to keep up with the subject. If Ss evince an interest in computer games, which account for large sales of software, as a follow-up you could ask them to find out the top five games for the class.

Key 9

	A	B
Name	Counter-Strike: Condition Zero	Spiderman 2
Company	Universal Games	Activision
Platform	PC Valve/Vivendi	PS2, Xbox, GameCube
Bad points	on-line version very similar to original	none
Good points	play online or alone, if alone, can pick team of bots	good storyline, good moves, impressively modelled city
Rating	****	****

WRITING

10 and 11 Do this in small groups. Make sure Ss know how to make recommendations using verbs such as *recommend*, *advise*, and the modal *should*.

Key 10 (examples only)

1 a museum

A database to catalogue all items and allow details to be accessed by different fields, e.g. period, place found, date added to the collection, etc.

A spreadsheet for accounts, statistics on visitors in different categories, staff salaries, etc.

Wordprocessing for routine correspondence.

Programs to monitor temperature, humidity, and other conditions for special collections.

DTP for in-house publications.

2 publishers of a subscription-only magazine

DTP for preparing copy for printing.
 Wordprocessing for text and correspondence with mailmerging for addressing correspondence intended for subscribers.
 Graphics package for illustrations.
 Spreadsheet for accounts and salaries.
 Database for listing subscribers.

3 police headquarters See also Unit 3, Key, Task 1.4.

Database for crimes, criminals, suspects, missing persons and property and for producing crime statistics and graphic displays.
 Spreadsheet for accounts and salaries.
 Wordprocessing for routine correspondence.
 Specialist packages for producing duty roster.
 Specialist graphics package for producing photofits of offenders.

SPECIALIST READING

Key A

- 1 b
- 2 Provides remote access software, manages required hardware
- 3 They lease space from data storage specialists

- 4 a Office suite applications
 b Email services
 c Enterprise resource planning tools
 d Payroll and accounting systems
 e Specialist tools
 f E-commerce software
- 5 Tools are too expensive for a small business to purchase
- 6 E-commerce

Key B

1	
Advantages	Disadvantages
a Avoids problems with viruses	a Broadband connection or leased line required
b Flexible use of software	b ASP service has to be secure
c No problem of upgrading	c ASP service has to be reliable
d No need to manage email system, etc.	
e More time to do core business	

- 2 a viii b vii c v d i e iii f iv g ii
 h vi
- 3 a False b True c False d True e False

UNIT 9

Multimedia

INTRODUCTION

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

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

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

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

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

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

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

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

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

OBJECTIVES

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

- reading for specific detail
- explaining orally and note-taking.

They should understand and be able to use:

- the *-ing* form for explanations and to link cause and effect pairs.

They should know and be able to use terms and abbreviations used in multimedia such as: **MP3, MIDI, MPEG, DVD, WAV.**

STARTER

1 Start by asking the class to explain to you the meaning of each set of initials: MIDI, DVD and MPEG. MP3 can be left until Task 4. Then set the task in small groups.

Key 1

MIDI	composing music on a PC
MP3	downloading music from the Internet
DVD	watching movies, using reference works like encyclopaedias
MPEG	watching movies

2 and 3

These pre-reading tasks should be done individually with Ss pairing to compare answers.

Key 2

Check this after Task 3.

- 1 It strips out inaudible signals.
- 2 MP3 files of music
- 3 Through your PC speakers, MP3 player or hi-fi

Key 3

1b 2d 3a 4c

READING

4 Do this individually. To encourage faster reading, write the time at one-minute intervals on the board and ask Ss to note how long it took to complete the task.

Key 4

- 1 Motion Picture Experts Group Audio Layer 3
- 2 MP3 files are much smaller than WAV files.
- 3 Notes above a frequency of 16kHz because most people cannot hear them, and quiet sounds masked by noise at the same frequency
- 4 The performer's name, a graphic such as an album cover, the song's lyrics, the musical genre, and a URL for more details

5 Note that this text has US spelling, *randomize*, etc. The focus is on locating specific information quickly. Encourage Ss to use the sub-headings to identify the parts of the text which are likely to contain the answers they want. Check the answers in plenary and discuss the strategies they found most useful in locating the answers.

Key 5

- 1 Through your PC
- 2 Decodes the file and routes the signals to your sound card and then to your speakers
- 3 They let you group songs into playlists and randomise the selections. They offer spectrum analysers, graphic equalisers, and frequency displays to control how the music sounds.
- 4 The information on the MP3 file's tag. (See Task 4.4)
- 5 It makes your player look like a jukebox, a car dashboard, or a Star Trek tricorder.
- 6 You use a ripper to rip songs from a CD in your CD-ROM drive and turn them into WAV files. You use an encoder to convert the WAV files into MP3 files. Your MP3 player may incorporate both.
- 7 A writable CD-ROM drive and a recorder program

LANGUAGE WORK**-ing clauses (2) cause and effect**

This continues the work on *-ing* clauses started in Unit 6.

For the first use, put statements on the board:
DVD drives read DVD disks.

Ask Ss to explain how this is done. Elicit (*blue*) *laser light*. Demonstrate how this explanation can be added using an *-ing* clause before or after the main clause.

DVD drives read DVD disks (by) using blue laser light.

For the second use, write a cause and effect on the board such as:

- 1 *A WAV file may sample a song 44,000 times a second.*
- 2 *This creates a huge mass of information.*

Ask Ss what the relationship is between the sentences. Elicit cause and effect. Demonstrate how they can be linked:

- 3 *A WAV file may sample a song 44,000 times a second, creating a huge mass of information.*

6 Ask Ss first to match each cause and effect and compare answers to make sure this part is correct before linking the cause and effect pairs. Ss can then link the sentences as an individual task. Correct in plenary.

Key 6

- 1e Computers with MIDI interface boards can be connected to MIDI instruments allowing the music being played to be stored and displayed by the computer on the monitor.
- 2d Each side of a DVD can have two layers giving an enormous storage capacity.
- 3h MP3 removes sounds we can't hear producing much smaller files.
- 4b You can download single tracks creating your own compilation.
- 5a Each MP3 file has a tag permitting extra information to be stored on the performer and other track details.
- 6g MP3 players contain several devices allowing you to control the way the music sounds.
- 7f You can download a skin program enabling you to change the appearance of your player.
- 8c You can legally download some music allowing you to sample a new group before buying their CD.

7 This is more demanding than Task 6. Ss should attempt it first individually and then compare in pairs. Where there is dispute on the explanations provided, refer it to the whole class for comment.

Key 7

- 1 MP3 reduces the information stored by removing sounds we don't hear.
- 2 You can alter the look of your MP3 player by downloading a skin program.
- 3 You can 'rip' the audio information from a CD by using a ripper.
- 4 You can convert a WAV file to MP3 format by using an encoder.
- 5 You can view the lyrics, notes and author data by clicking on Track Info.
- 6 You can control how the music sounds by using spectrum analysers and graphic equalisers.
- 7 You can access many free and legal music files for downloading by visiting www.mp3.com.

- 8 You can play MP3 files through your sound system by linking it to your computer.

SPEAKING

8 An information exchange activity. Encourage Ss to query and ask for clarification of any points they do not understand in their partner's explanation. As a follow-up task you can ask Ss to link their notes from Task 8 into a text describing one aspect of multimedia. They may choose either the Student A or the Student B notes.

WRITING

9 Set for homework.

Key 9

Most modern music is mixed using computers. Musicians record their music into a computer system (which is) called a Musical Instrument Digital Interface (MIDI). MIDI was developed as a standard interface for linking music synthesisers and instruments together. Computers fitted with MIDI interface boards can be connected to MIDI instruments allowing the music to be stored on computer and displayed on the monitor when it is being played. The music can be displayed as a musical score and edited using all the features of a mixing desk. The music can also be printed out from the computer while it is being played. MIDI doesn't transmit any sound, only simple binary information. The information, which consists of sound encoded as 8-bit bytes of digital information, is called a MIDI message. The most common messages consist of instructions telling the receiving instrument to play a note for a specific duration of time.

The instructions also contain details of how loud to play that note and a number which indicates which instrument to play, for example, 67 is a saxophone.

SPECIALIST READING

Key A

- 1 Audio and video
- 2 Only information in the picture itself
- 3 Only the difference between the P-frame and the I-frame
- 4 A description of how the position of the ball has changed from the previous I-frame as well as shape or colour changes.
- 5 Only storing differences between the frames
- 6 A small margin of error creeps in with each P-frame.
- 7 The difference between the previous I or P frame and the B-frame and the difference between the B-frame and the following I or P frame
- 8 No other frame is ever based on a B-frame.

Key B

- 1 a False b True c True d False e False
f True
- 2 a iv b vi c v d ii e iii f i

INTRODUCTION

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

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

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

contract the display to show or hide folders and subfolders.

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

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

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

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

OBJECTIVES

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

- understanding a spoken explanation
- explaining orally a computing operation.

They should understand and be able to use:

- *If*-sentences to link actions and effects
- *If*-sentences for polite instructions
- *If*-sentences for imagined actions and effects.

They should know and be able to use common noun + noun compounds in Information Technology covered in previous units.

STARTER

1 This task provides an introduction to Windows Explorer which is used by the Support Officer in the recording which follows and is shown in action in Figs 2(a) to (d). Do this in small groups.

Key 1

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

LISTENING

2 Do this in plenary. The objective is to set the scene, introduce the speakers, Clive and Barbara, and identify the problem Barbara, the Computing Support Officer, has to solve. Once you have completed the task, ask the Ss how they would solve the problem. They can work on this in pairs. Note the steps on the board when they report back. Leave your board notes in place until Task 3 is complete.

Key 2

- 1 The folder 'Contract' is enormous so it's taking time to find things.
- 2 To create subfolders for each country in the folder 'Contract'.

3 Make sure the Ss are familiar with the features of the screenshots. Ss should predict the order before you play the recording. Play Part 2 of the recording, pausing three or four times to give the class time to reflect on what they have heard. They need not worry about detail as long as they can follow the main steps in the explanation.

Check answers. Then replay to decide any disagreement and to compare the sequence of steps noted on the board in Task 2. Pause where there is disagreement.

Key 3

1d 2a 3b 4c

4 Play Part 3 of the recording once for Ss to answer individually. Give time for Ss to compare their answers in pairs, then replay.

Key 4

- 1 Moving files into one of the subfolders.
- 2 It has a little plus sign next to it.
- 3 Hungary and Japan
- 4 Drag and drop
- 5 Undo

LANGUAGE WORK

Revision: *if*-sentences

The class will have studied conditionals before but perhaps not with the focus on these functions.

A Action and Effect

Present the first use, to link an action and its effect, in the same way as the use of *-ing* forms in Unit 9. Write the action and its effect on the board, then demonstrate how the two can be linked using an *if*-sentence. Use the examples in the Student's Book. Point out that the Present simple is used for both parts because in these cases the effect always follows that particular action. Where other effects are possible *can* and *may* are used. For example, *If you spill coffee on your keyboard, it may/can damage the contacts.*

If we wish to stress we are certain an effect will follow a particular action, we can use *will*. *If you spill acid on your keyboard, it will damage the contacts.*

B Polite Instructions

Give the class a series of simple instructions. For example,

- 1 Look at me.
- 2 Listen carefully.
- 3 Remember what I say.

Then demonstrate variations on these instructions.

- 1 Could you look at me.
- 2 If you could listen carefully.
- 3 If you just remember what I say.

Ask the Ss if they note any difference. Explain that *if*-sentences like (2) and (3) are often used in polite instructions. (The same form is often used by doctors examining patients.)

C Imagined Action and Effect

Write a few clearly imagined actions or states on the board. For example,

- 1 You leave your keyboard in the shower.
- 2 You receive an email from the President of the USA.

To demonstrate they are unreal, ask:
Have you left your keyboard in the shower?

Have you received an email from the President of the USA?

Then ask

If you left your keyboard in the shower, what might happen?

If you received an email from the President of the USA, how would you feel?

Write action and elicited effects (try to elicit more than one) on the board pointing out the tenses used to stress that the sequence of action and effect is imagined, not real. Show how the effects can be marked in terms of certainty using *would* and *might/could*.

5 Match the causes and effects individually, then compare in pairs to check the matching is correct. Complete the task individually.

Key 5

- 1f If you press Print Screen, you can make a copy of the screen.
- 2h If you press Ctrl + Alt + Del in Windows XP, it displays the Windows security dialog box.
- 3b If you added more memory, it would speed up the computer.
- 4e If you installed a modem, you would be able to connect to a telephone line.
- 5g If you used a better search engine, you would find more relevant results.
- 6c If you forget to save regularly, you may lose data.
- 7a If you hold down the mouse button over an icon, you can drag it across the screen.
- 8d If you used an LCD display, you would have more space at your desk.

6 Do this individually, then compare in pairs. Select Ss to report back in plenary. Note any alternative answers which are correct.

Key 6

- 1 If you don't virus-check floppies, you could get a virus.
- 2 If there was a power cut while you were using your computer, you might lose data.
- 3 If you install a faster processor, your computer can process data faster.

- 4 If you forgot your password, you would not be able to access your computer.
- 5 If you press the delete key, it will delete the character to the right of the cursor.
- 6 If you use a search engine, you might find information on the Web more quickly.
- 7 If you double-click on an icon, you will open up a program or a folder.
- 8 If you use power-saving options, you can cut your electricity bill.

WORD STUDY

Noun + Noun compounds

7 Do this individually and compare answers in pairs. As a follow-up, ask Ss if they know of other terms beginning or ending with the nouns in column A or B. You can also ask them to explain the relationship between the nouns in these compounds.

Key 7

- 1f barcode reader
- 2e mainframe computer
- 3j laser printer
- 4h expansion card
- 5i search engine
- 6c control bus
- 7b supervisor program
- 8g taskbar
- 9a system tray
- 10d explorer pane

SPEAKING

8 Once they have completed the task, as a follow-up Ss can write up their notes or go on to practise explaining other computer operations they are familiar with.

INTRODUCTION

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

WiFi (Wireless Fidelity) is a set of standards for radio-based **wireless networks** (the interconnection of computers using signals carried through the air, usually radio

waves, instead of through connecting cables). The computers connect to each other and to wired networks using an electronic device known as an **AP** (Access Point). APs enable computers to be connected together to form **WLANs** (Wireless Local Area Network) i.e. a network that uses radio waves to connect computers in a small area. Each computer needs an electronic interface installed, known as a wireless **NIC** (network interfacer card). Some security can be provided on wireless networks by using **encryption programs** (programs that convert data to coded form to make it more secure). **WEP** (Wired Equivalent Privacy) can be used. This is a basic set of standards used to convert data on a wireless network to provide privacy.

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

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

When a message is transmitted through a network, it is processed in various ways by the software and the hardware. It is first processed by the applications program e.g. an email program, and then it is processed by the operating system. It is then processed by the hardware such as the network interface

card and finally by the network electronics e.g. a router, as it passes through the network system. When it arrives at its destination, it is

similarly processed in reverse order to display the message on the display screen of the receiving computer.

OBJECTIVES

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

- reading a diagram and text together
- explaining a diagram orally.

They should understand and be able to use:

- relative clauses with participles.

They should know and be able to use terms associated with networks such as: *backbone, bridge, client, thin client, gateway, hub, network, LAN, router, server.*

STARTER

1 and 2 Do Task 1 in small groups. Then go straight to Task 2 to compare answers.

Discuss any variations the groups may have produced.

READING

3 Ask Ss to look at the diagram first and guess what the symbols mean. Then read the text to check their predictions and complete the matching of key and components. ISDN means integrated services digital network. As follow-up, Ss with Internet access can search for 'home networks' or 'houses of the future'. www.orange.com, www.sisco.com and www.telecomFrance.com may have examples of networked homes. See also www.livtom.com.

Key 3

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

LANGUAGE WORK

Relative clauses with a participle

Demonstrate on the board how we can add information to a noun using an adjective, *personal computer*, a noun acting as an adjective, *mainframe computer* (See Unit 10, Task 7), and a relative clause with a participle, *PCs equipped with ethernet adapters*. The latter is an economical way of squeezing a lot of information into a technical description.

If you feel it would be helpful to your Ss, show that we can think of these participle clauses as reduced relative clauses. Write on the board *PCs which are equipped with ethernet adapters*.

Then rub out *which are*. Do the same with an active example, *A fixed LAN which links computers with cables*.

In this case show how *which* can be deleted but the verb changes to *-ing*.

4 and 5 Do these individually, then compare in pairs.

Key 4

- 1 A *gateway* is an interface *enabling* dissimilar networks to communicate.
- 2 A *bridge* is a hardware and software combination *used* to connect the same type of networks.
- 3 A *backbone* is a network transmission path *handling* major data traffic.
- 4 A *router* is a special computer *directing* messages when several networks are linked.
- 5 A *network* is a number of computers and peripherals *linked* together.
- 6 A *LAN* is a network *connecting* computers over a small distance such as within a company.
- 7 A *server* is a powerful computer *storing* data *shared* by all the clients in the network.

- 8 A *client* is a network computer used for accessing a service on a server.
- 9 A *thin client* is a simple computer comprising a processor and memory, display, keyboard, mouse and hard drives only.
- 10 A *hub* is an electronic device connecting all the data cabling in a network.

Key 5

- 1 The technology needed to set up a home network is here today.
- 2 You only need one network printer connected to the server.
- 3 Her house has a network allowing basic file-sharing and multi-player gaming.
- 4 There is a line receiver in the living room delivering home entertainment audio to speakers.
- 5 Eve has designed a site dedicated to dance.
- 6 She has built in links connecting her site to other dance sites.
- 7 She designed the site using a website creation program called Dreamweaver.
- 8 At the centre of the home of tomorrow is a network accessed through a control pad.
- 9 The network can simulate the owner's presence making sure vital tasks are carried out in her absence.
- 10 The house has an electronic door-keeper programmed to recognise you, giving access to family only.

PROBLEM-SOLVING

- 6 Divide the class into groups with half in A groups and half in B groups. Each A group should compare advantages with another A group. In the same way the B groups should compare disadvantages. Then mix the groups so that each new group contains A and B members. The new groups compare advantages and disadvantages and together consider how the disadvantages can be limited. They should note their findings as they will require these notes for Task 8.

Key 6**Advantages**

Hardware and software can be shared.
 Access to the system can be controlled.
 Maintenance is easier.
 Users can communicate easily with each other.
 It is easier to check for viruses.
 It is easier to make backups.

Disadvantages

Networks are more complex to set up.
 They are more expensive to set up.
 Networks are more vulnerable to viruses.
 The whole network depends on the central server.
 Networks require more expertise to maintain.

Ways to minimise disadvantages

Employ well trained computing staff.
 Use standard systems.
 Try to negotiate bulk discounts.
 Use thin clients instead of full computers.
 Install an anti-virus program on the server.
 Schedule frequent virus checks on the server.
 Buy a good quality server.
 Buy as powerful a server as you can afford.
 Purchase a server with hot-swappable components.
 Install a RAID system on the server.
 Have a good training scheme for computing personnel.

SPEAKING**Transmission modes**

- 7 Make sure Ss ask for clarification of any points they cannot follow in their partner's description. As a follow-up, Ss can write descriptions from their notes or write a comparison of these forms of transmission using both A and B texts as input.

Key 7

Fig 3 Asynchronous transmission

- a start bit
- b error check bit
- c stop bit
- d start bit
- e error check bit
- f stop bit

Fig 4 Synchronous transmission

- a start synch bytes
- b character
- c character
- d error check bytes
- e stop synch bytes

WRITING

8 Demonstrate the use of *however* and *although*, then set the task for homework. Make sure Ss link only statements where a meaningful connection is possible.

Key 8 (examples only)

- 1 Networks are more vulnerable to viruses; however, it is easier to check for viruses.
- 2 Although maintenance is easier, networks require more expertise to maintain.
- 3 Networks are more complex to set up; however, maintenance is easier.
- 4 Although access to the system can be controlled, networks are more vulnerable to viruses.
- 5 Hardware and software can be shared; however, the whole network depends on the central server.

SPECIALIST READING

Key A

- 1 a segments b packets
- 2 To determine if the data was scrambled during transmission
- 3 Until it receives confirmation from the next point along the route that the packet has arrived undamaged
- 4 a The checksum is calculated and verified for each packet.
b The message may be rerouted to avoid congestion on the network.
- 5 a Presentation layer f Session layer
b Transport layer g Network layer
c Physical layer h Transport layer
d Data-link layer i Data-link layer
e Application layer

Key B

- 1 a iii b i c iv d ii
- 2 a True b False c True d True e False
f True g True
- 3 a Presentation layer
b Transport layer
c Network layer
d Session layer
e Application layer
- 4 Sentences shown in correct order.
c The message is reconverted into *bits* by the physical layer.
g The *data-link* layer confirms the arrival of the packets, logs them in and calculates the checksum for each packet.
f The incoming *packets* are recounted by the network layer for *security* and billing purposes.
a The checksum is recalculated by the *transport* layer which also reassembles the message *segments*.
h The parts of the message are *held* by the *session* layer until the message is *complete*.
d The session layer then sends the message to the next *layer*.
b The message is *expanded* and *decrypted* by the presentation layer.
e The application layer converts the bits into *readable* characters, and directs the data to the correct *application*.

INTRODUCTION

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

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

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

1 Basics

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

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

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

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

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

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

OBJECTIVES

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

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

They should understand and be able to use:

- simple and complex warnings.

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

STARTER

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

Key 1

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

READING

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

Key 2

Extract	A
Type of CMC	MOO
Number of participants	4 (excluding Tony)
Topics	virtual reality game, navigation within the MOO
Synchronous or asynchronous	synchronous
Special features of this type of CMC	false identities, emoticons, characters can express themselves by groans, etc. as well as words, asterisks can be used for emphasis, informal punctuation

Extract	B
Type of CMC	web chat (bulletin board)
Number of participants	2 although you could argue 3 if pinkpanther is included
Topics	movies
Synchronous or asynchronous	asynchronous
Special features of this type of CMC	false identities, very informal, some use of abbreviations, e.g. lol, no opening or closing phrases

Extract	C
Type of CMC	newsgroup (alt.fan.elvis-presley)
Number of participants	message is addressed here to any group member
Topics	top ten albums
Synchronous or asynchronous	asynchronous
Special features of this type of CMC	extract from earlier message quoted and then comment or addition made, no opening or closing phrases although this one is signed, very informal

3 Make sure Ss do this information exchange task orally and do not simply show each other their notes.

LANGUAGE WORK

Warnings

Ask the class where they might find the warnings given in the Student's Book and elicit the reasons for warnings.

Illustrate simple warnings like 1, 3 and 5. Draw their attention to *avoid + ing*. Elicit the matching good practice for 1: *Always keep your home address and phone number secret*. Elicit reasons for the other warnings and discuss when it is and is not necessary to add a reason. Finally, show how warnings can be made stronger using *must* and *must not*. Write *Do not smoke, eat or drink at the computer* and convert this to *You must not smoke, eat or drink at the computer*. Discuss the difference. Change *must not* to *should not* and discuss the difference. *Must not* implies a rule, *should not* implies that it is sensible and right to act in this way whether or not there is a regulation forbidding it.

Key

- 1 advice on taking part in IRC
- 2 chassis of computer
- 3 computer handbook
- 4 Data Protection Act
- 5 Computer Lab notice
- 6 technician's handbook

4 Do this individually and compare in pairs.

Key 4

- 1 Avoid giving open access to PCs because you may get viruses.
- 2 Never use your own programs on these machines. You may introduce viruses.
- 3 You must not drink coffee in this lab. If you spill it, you may damage the keyboard.
- 4 Don't give financial information in a chat room. Someone may try to cheat you.
- 5 Always keep your password secret. Someone may try to hack into your system.
- 6 Use up to date anti-virus software. New viruses appear all the time.
- 7 Always wait until a computer has reached normal room temperature before using it or you may damage the hard disk.

- 8 Never remove cards from their anti-static packing until required. Otherwise you may damage them.
- 9 Use an IC extraction tool rather than a screwdriver. The pins are fragile.
- 10 You must not work on a computer with the power on because you may be electrocuted.

5 Ask your Ss to give you a copy of the rules for computer use for this task. Most colleges and universities have a code of practice which Ss are asked to sign up to.

PROBLEM-SOLVING

Choosing an ISP

6 Your Ss will be familiar with ISPs. Elicit the options they would want from an ISP. Then do the task in small groups. Make sure they defend their choices. If Internet access is possible, ask them to visit the sites listed and report back to the rest of the class.

Key 6

- 1 24 seven
- 2 Broadband 2
- 3 Broadband 1
- 4 Pay as you go

WRITING

7 Ss could visit selected newsgroups before trying this task to get some idea of the style used or you could supply a list of possible newsgroups of interest. There are dedicated newsgroups for people who want to try one out, such as misc.test or alt.test. You can subscribe to a newsgroup to have a look at it and then unsubscribe when you have finished looking.

8 If Ss have no access to newsgroups, copy a query from one of the comp. groups for them to respond to. Choose something reasonably straightforward such as increasing the number of colours on the display screen or changing the default homepage on a Web browser.

SPECIALIST READING

Key A

- 1 It provides a path that gateways can use to route information from one machine to another.
- 2 Ethernet and X.25
- 3 They must know each other's Internet addresses.
- 4 One for each different network it connects.
- 5 Creates a data address in the TCP/IP message that states exactly what application the data block is supposed to contact at the address the IP software has described.
- 6 Once the packet is delivered to the correct Internet address and application port
- 7 Looks for responses and takes action to replace missing data blocks
- 8 File Transfer Protocol and the Simple Mail Transfer Protocol

Key B

- 1 a iv b i c v d vi e ii f iii
- 2 a True b True c True d False e False f False

UNIT 13

The World Wide Web

INTRODUCTION

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

OBJECTIVES

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

- listening and note-taking
- defending a choice.

They should understand and be able to use:

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

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

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

STARTER

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

Heriot-Watt University Library, Edinburgh and is well worth visiting.

Key 1

1 uk	country code
2 irn.html	document name
3 http	protocol prefix
4 hw.ac.uk	domain name
5 libWWW/irn	directory path
5 ac	domain name extension
7 www	Web service

2 For examples of URLs with these extensions, try searching with, for example, url:aero. Again do this task in small groups. As a follow-up, ask the groups to suggest new domain extensions of their own.

Key 2

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

LISTENING

3 Do this individually, then compare in pairs. Once they have agreed on the labelling, ask the pairs to decide how the browser finds the right webpage. Do not correct or comment on their versions at this stage.

Key 3

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

4 Explain that there are four stages. Make sure they understand the sample notes. Explain they should make similar notes for the rest of the process. Play the recording once, pausing briefly after each stage to allow time for note-taking as the text is quite dense. Then compare answers in pairs. Play the recording again pausing only where there is disagreement.

Stage 2 ends after '... back to the browser.'

Stage 3 ends after '... they're put back together again.'

Key 4**Stage 2**

The DNS server finds the IP address of the URL Web server.

It sends the IP address to the browser.

Stage 3

The browser uses the IP address to request the webpage.

It sends the request in a series of data packets via a router.

The router determines the best route for each packet.

The Web server puts the packets together again.

Stage 4

The Web server sends the requested page to the browser computer in the same way.

The browser combines the packets to form the page.

LANGUAGE WORK**Time clauses**

Write the Student's Book examples on the board. Elicit the time links between each pair: *when, until, before, as*. Explain the differences. Note that example 4 uses *as* not *after* because the webpage is built up piece by piece. A visual representation may help.

Demonstrate how *once* can be used in place of *when* to emphasise the completion of the first action. It often occurs with the Present perfect. Similarly, show that we can use a participle with *before* or *after* if the subjects are the same in both actions. You will need to include an example of your own to illustrate *after*. Point out that a comma is used after the time clause when it comes first in a sentence.

5 Do this individually, then compare answers in pairs.

Key 5

- 1 When you use a search engine, it provides a set of links related to your search.
- 2 With POP3, email is stored on the server until you check your email account.
- 3 Once/When you have clicked on a hyperlink, you have to wait for the webpage to be copied to your computer.

- 4 As you listen to the first part of a streamed audio file, the next part is downloading.
- 5 The graphics can be displayed gradually as the webpage is downloaded.
- 6 After/When you receive an email message, you can forward it to another address.
- 7 When you click on a hyperlink, the browser checks to see if the linked webpage is stored in the cache.
- 8 You can bookmark a webpage to make it easier to find in the future when you find one you like.
- 9 After you type in a Web address, you should press the Enter key.
- 10 When you click on the Home button, the browser displays your starting webpage.

6 Ask the class to explain to you what Figure 3 shows. Then ask them to complete this task individually and compare in pairs.

Key 6

- 1 when
- 2 When
- 3 before
- 4 Once/when
- 5 as
- 6 as/before
- 7 When
- 8 until

PROBLEM-SOLVING

Search engines

7 Ask Ss to list their favourite search engines. Then set the task in groups and proceed as the task instruction suggests. Make sure they defend their choices.

Key 7

Many other answers are possible. Natural language questions tend to produce poor results on AltaVista.

- 1 define: spoofing
- 2 sumo wrestling Hawaii -Japan
- 3 satellite receivers \$250...400
- 4 Image search elephant African -Indian filetype:gif
- 5 Directory search News > Newspapers > Regional >Hong Kong

- 6 "Ask not what your country can do for you"
- 7 DVD video recorders 2005...2010
- 8 recipe brownies hazelnut OR chocolate chip
- 9 Image search David -Victoria Beckham
- 10 Advanced search
all of the words: Inca Peru
language: English updated in: past year
occurrences: in the title

8 Set this task only if the class have easy access to the Internet. As a follow-up, you can ask them to compare search engines using the same searches.

WRITING

9 Do this as homework.

SPECIALIST READING

Key A

- 1 SMTP, POP3 and IMAP4
- 2 SMTP
- 3 PCs are not guaranteed to be switched on at all times.
- 4 Unix and Web mail
- 5 On the receiving (local) server.
- 6 The mail server opens a connection to the POP3 server. The messages are then copied into your Web mailbox and read via a browser.
- 7 Advantage: It allows emails to be picked up from different machines without losing any. Disadvantage: If too many messages build up, each download will take a long time and fill up your inbox.
- 8 i It allows you more choice over what messages you download. You can download just those messages you want to read.
ii You can delete individual messages from the server.
iii Some IMAP4 servers let you organise your mail into folders.
iv Download times are shorter.
v There is no danger of losing messages.

Key B

- 1 a True b False c True d False e True
f False g False
- 2 a iv b i c v d iii e ii

INTRODUCTION

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

- 1 Good webpage design.
- 2 A good **navigation** system (a way of allowing visitors to move from webpage to webpage and find their way around your website). Navigation features should include:
 - a Using text hyperlinks, rather than graphical buttons or **image maps** (graphical images that provide links to different webpages depending on where on the image the user clicks).
 - b Providing descriptive text captions for any graphics. These alternative text captions are known as **ALT text captions**.
 - c Providing a webpage that gives an overview to the website with links to various related pages grouped together. This is known as a **site map**. (**FAQs** are the common name for frequently asked questions about the website).
 - d Avoiding **frames** which are a way of dividing the browser screen into separate windows, each with its own **scrollbar** for moving up or down through the text. Frames allow webpages to be displayed inside other webpages.
 - e Keeping the website consistent by not changing the location of the navigation elements and not using links and buttons that appear and disappear.
 - f Making it easy to reach any particular content on the website.
- g Providing multiple paths through a website by using logical, clearly placed links rather than using a **search engine function** (a program designed to find information according to data entered by the user) where the user has to type in **keywords** (words used to categorise documents or records in a file) to find data.
- h Not giving website visitors an overwhelming number of links to follow.
- 3 Website ease of use.
- 4 Accurate and up to date data provided on the website.
- 5 Good use of graphics on the webpages.
- 6 Website compatibility with different types of Web browser programs i.e. using webpage features that are standard and can be displayed on a variety of common browser programs.

Access to the Internet is normally made through an **ISP** (Internet Service Provider). ISPs are organisations that normally charge a fee to provide the server computers, Internet services and Internet connections for users. A number of factors should be taken into consideration when deciding which ISP to use. These include:

- 1 **High speed**. The slowest, **dial-up** connections use devices called **modems** (modulator/demodulator) to connect to ordinary telephone lines. The modems convert the digital data signals to voice signals. Faster connections are referred to as **broadband**. They use special digital connections e.g. **ADSL** (Asymmetric Digital Subscriber Line) connections have a different speed for **uploading** (sending data) than for **downloading** (receiving data).

<p>2 High usage allowance. There is usually a limit on the amount of data that a user can transfer (i.e. sending and receiving emails, web pages, pictures, music, etc.) in a given time period.</p> <p>3 Good value packages. Accounts are often sold as packages where the user pays different prices depending on what available options are chosen. The accounts can be paid for in different ways. Sometimes the cost is reduced after an initial high payment.</p> <p>4 CD-ROM or online access. You can only install the ISPs software from the Internet if you already have an Internet connection, otherwise you must get the ISPs software on a CD-ROM.</p> <p>5 Local call rates and national call rates for online time. The user pays for a telephone call while they are online (connected to the Internet). If the ISP is local, the user need only pay local telephone call rates. If the ISP is not local, the user will have to pay national telephone call rates to connect to the ISP.</p> <p>6 Web-based and POP3 email. ISPs often provide free email facilities. This may be in</p>	<p>the form of Web-based email that uses a browser program to access the email or POP3 email that uses special POP3 email client programs for copying email messages onto the user's computer and allows the user to read and send messages through an email server computer.</p> <p>7 Junk mail filtering and virus checking. Spam (unsolicited email) can be removed by filtering programs. Viruses (destructive programs that reproduce themselves) are often inadvertently picked up from spam.</p> <p>8 Free Web space. Most ISPs provide storage space for users on a Web server computer where the users can set up their own websites.</p> <p>9 Customer support. Most ISPs provide a help service that enables customers to obtain help for common computing problems. The ISP often charges for this type of support.</p> <p>10 Reliable service. The users rely entirely on the ISP to provide their Internet connection. Some ISPs are better than others at maintaining their systems and providing a connection that is fast enough.</p>
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OBJECTIVES

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

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

They should understand and be able to use:

- ways of giving advice.

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

STARTER

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

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

question or set of questions. Give the class time to prepare individual answers, then ask them to work in small groups to compare answers. Avoid giving too much help. Their task is to work out what they think the seven top elements mean.

Key 2

- 1 Are the pages simple and easy to digest or are they cluttered with too much information and too many links? Has the designer considered: Who is the site for? What information do they need? How do they want the information presented?
- 2 Is it easy to move round the site? Can you see the route you've taken from the home page to your current location? Can you get back to the home page with a single click?
- 3 Is the site easy to use?
- 4 Is the information contained accurate and reliable?
- 5 Is the site kept up to date?
- 6 Are the graphics included simply to make the site look more attractive or do they serve a useful purpose?
- 7 Can most browsers access the site without difficulty?

READING

Understanding the writer's purpose

3 This task is designed to encourage Ss to work out the writer's purpose in writing before they read a text. If the writer's purpose matches with that of the reader, the reader is more likely to benefit from the text. The samples of text provided: Title, Subtitle, Author information, Source and First paragraph are usually good clues to the whole text, not simply the writer's purpose. A more complete picture can be gained from also reading the final paragraph. Encourage your Ss both to establish the writer's purpose and to build up a quick picture of a text in this way to help them decide if a text will be useful to them. The task also serves as a pre-reading activity to prepare Ss for meeting the whole text in Task 4.

Key 3

- 1 He is an expert in web design with his own site offering advice to webmasters.
- 2 Business people wanting to improve their websites.
- 3 Provide advice on building an effective navigation system in sites.

4 A jigsaw reading activity but this time requiring Ss to make a summary rather than take notes. Let the As compare summaries with each other, likewise the Bs and Cs, before regrouping for Task 5. Make sure Ss know FAQ – Frequently Asked Questions. The text has US spellings.

5 Divide the class into groups of three, each containing an A, B and C. Make sure the exchange is oral.

Key 4 and 5

Text	Advice
1	Base your navigation system on text links, not graphical buttons.
2	If you use graphical navigation, include ALT text links.
3	Include a site map in outline form with all the major sections and key subpages listed.
4	Don't use frames but if you must use them, include a no-frames version for those whose browsers do not support frames.
5	Be consistent in your navigation links from page to page.
6	No page should be more than four clicks away from any other page.
7	Use well-placed links rather than a search function.
8	Offer alternative routes through your site so that visitors can browse in different ways.
9	Limit choice.

6 Do this only if easy access to the Internet is possible. Check that all the sites are still operational. If not, choose sites of your own.

Give each group a site to evaluate and to report back to the class on, when their evaluation is complete. The environment agency site has been criticised as dull and cluttered. The abcessa site has been chosen as particularly well-designed.

LANGUAGE WORK

Giving advice

The language work in this unit summarises different ways of giving advice, some of which may already be familiar to your Ss. Start by writing a simple instruction from the Task 4 text on the board.

- 1 Visit a few larger sites. Then illustrate alternative forms for expressing advice.
- 2 You should visit a few larger sites. Remind them that *should* is a modal. Demonstrate negative and question forms.
- 3 I recommend you visit a few larger sites.
- 4 You had better visit a few larger sites.

Elicit the implied threat in the use of *had better*. Ask Ss to complete the advice with a suitable warning. For example *or you may make some silly mistakes*. Elicit ways of making the advice more persuasive, for example by adding a reason. Use the Student's Book example or one of your own.

For more advice on website design see these sites:

Top 10 mistakes in web design:

www.useit.com/alertbox/9605.html

Top 10 new mistakes

www.useit.com/alertbox/990530.html

7 Do the first one as an example, then set the task for individual work. Get Ss to compare answers in pairs and do a random check in plenary. Ask Ss to judge whether the reasons given for the advice are suitably persuasive.

Key 7 (examples only)

- 1 It's a good idea to use text links because visitors use them more often than graphical links.
- 2 Avoid using only graphical buttons because some visitors browse with the graphics turned off.
- 3 You should always include ALT text captions if you use graphical links as some browsers do not support them.
- 4 I recommend you include a site map because it helps visitors to navigate your site.
- 5 You had better not use frames because they can be confusing and some browsers do not support them.
- 6 You should keep navigation elements in the same position on each page.
- 7 Use logical links because they will help visitors to find what they want.
- 8 Avoid using a search function as they produce irrelevant answers and visitors may not know how to use them.
- 9 It's not a good idea to have too many links on a page as this may overwhelm visitors.

8 Refer Ss back to the text in Unit 12, Task 6. Get Ss to compare answers in small groups.

Key 8

- 1 If you're a complete beginner, you should choose an ISP which provides its sign-up software on CD-ROM.
- 2 I recommend you choose an ISP which provides local call access numbers.
- 3 Avoid using an ISP which uses national call rates for online time. Charges can be very expensive.
- 4 You should not use an ISP which charges an initial set up fee.
- 5 If you need to access your email from any computer, Web-based email is a good idea.
- 6 You should choose POP3 email for a faster and more efficient service.
- 7 I recommend around 25 to 50 Mb of Web space as this is sufficient for most personal website developments.
- 8 If children use your PC, I recommend you choose an ISP which restricts access to some newsgroups.
- 9 You had better check support line charges as some ISPs use their support lines to raise revenue.

- 10 You should choose an ISP which offers reliable service.

SPEAKING

9 This is an information exchange activity but different from previous exchanges in that the task is to complete a flowchart. Ask Ss to make sure their partner does not see their section of the chart until the task is complete. As a follow-up, Ss can convert the chart into a short paragraph of advice on website construction.

WRITING

10 Ss should report back to the class using the text they have written as a prompt. If access to the Internet is not possible, set the follow-up task suggested in Task 9 for writing practice.

SPECIALIST READING

Key A

- 1 a HTML b XML
- 2 A markup language.
- 3 SGML and XML
- 4 a identity b meaning c structure
- 5 You can define your own custom markup tags.
- 6 You can explicitly define the content in a document.
- 7 The start of a new paragraph.
- 8 Because of the intelligent nature of XML content i.e. they can identify the type of data in a document.
- 9 An e-commerce website.

Key B

- 1 a False b True c False d False e ~~True~~
f True
- 2 a iii b v c iv d i e ii

INTRODUCTION

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

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

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

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

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

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

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

OBJECTIVES

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

- understanding an interview
- exchanging information orally.

They should understand and be able to use:

- *would* in hypothetical contexts.

They should know and be able to use common collocations in Information Technology covered in previous units.

STARTER

1 Do this in small groups. The reviews are all in a fairly light-hearted form of journalese. As a follow-up advanced Ss could attempt a similar brief review of a site they select themselves.

Key 1

1d 2c 3a 4b 5e

2 Omit this task if no one in your class has built a website. The likelihood is that many of your Ss will have their own websites. Revise the question forms quickly that Ss may use to get this information. Elicit examples from your class. For example:

What's your site called?

What's it about?

What's the URL?

What makes it special?

When did you last update it?

If space permits, Ss can leave their seats and try to find information from at least four others. If space does not allow this, ask Ss to work with their neighbours in groups of at least six.

LISTENING

3 This is a simple listening for specific detail task. Ss can also check if any of the questions forms they used in Task 2 occur in the recording. Play the recording without pausing. Warn the Ss that the accent is US English and that some US English forms are used e.g. *gotten*.

Key 3

site name	the movie shrine
Topic	movies
Site address	www.themovieshrine.com
Why special	less formal, unique layout, not specialised
Last updated	as often as possible

4 This is a more demanding task. As a change, you can ask Ss to work in pairs. One acts as scribe but also tries to understand as much as possible. The other focuses on understanding the text and feeding information to the scribe as required. Play the recording again without pausing. Replay for correction pausing where there is disagreement on the answers.

Key 4

- 1 He's a huge fan. Movies are his favourite hobby.
- 2 Adobe.
- 3 He's made two before but lost interest after making the main page.
- 4 All kinds of advertising is sent to you.
- 5 Yahoo takes a long time to respond to submissions for listing.
- 6 Newsgroups.
- 7 Pick a topic you're really interested in. Get a good domain name. Keep your site updated. Look at lots of other sites for good ideas.
- 8 www.themovieshrine.com
www.domainzero.com
www.imdb.com

LANGUAGE WORK**would**

Start with an example of the third type of conditional sentence:

If I had time, I'd like to build in new links.

Ask why John in the interview simply says, *I'd like to build in new links.*

Elicit that the condition is implied from the context. Ask what condition is implied in the other examples from the interview:

My favorite site would have to be the Internet Movie Database.

Answer: If I had to make a choice.

I would look at other sites too for good ideas.

Answer: If I were you.

5 Set this task for individual work. Correct in plenary, then use the completed dialogue for some pair speaking practice.

Key 5

- 1 will
- 2 'd
- 3 will/would
- 4 will
- 5 would
- 6 would
- 7 would/'d
- 8 will
- 9 'll

6 This task revises work on time clauses presented in Unit 13. Set it for individual work, then get Ss to compare answers in pairs. BIOS means Basic Input Output System. A part of the operating system stored on a ROM chip that controls the input and output of data to peripherals.

Key 6 (examples only)

- 1 When you click the mouse pointer on the file, it is highlighted.
- 2 You cannot save a file until you name it.
- 3 As the files are transferred, the transfer is graphically displayed.
- 4 Make sure you have all the details of your set-up before you phone the help line.
- 5 Once the OK button is clicked, the copying process begins.
- 6 The percentage of file transferred is displayed as your browser downloads from the Internet.
- 7 The virus is not activated until you open the infected file.
- 8 Before you repair a PC, ensure the machine is disconnected.
- 9 Don't open an email attachment until you have virus-checked it.
- 10 After you add memory, change the BIOS settings.

WORD STUDY**Definitions and collocations**

7 This revises key vocabulary items from Unit 11 – Networks. Best done individually.

Key 7

- | | |
|------------|---------------|
| 1 gateway | 6 LAN |
| 2 bridge | 7 server |
| 3 backbone | 8 client |
| 4 router | 9 thin client |
| 5 network | 10 hub |

8 All these terms have occurred in previous units. Do this individually or use this task as a test. Ss should be encouraged to contribute other collocations of either the A or B words.

Key 8

- | | |
|---------------|--------------|
| 1 bulletin | board |
| 2 domain | name, button |
| 3 file | name |
| 4 graphical | link, button |
| 5 mobile | phone |
| 6 search | engine |
| 7 site | map |
| 8 synchronous | transmission |
| 9 text | message |
| 10 web | page |

SPEAKING

9 An information exchange and a problem-solving activity. If Internet access is possible, encourage Ss to visit these sites before the lesson so that they are better prepared to provide advice for their partners.

Key 9**Student A**

- 1 www.neoncity.co.uk
- 2 www.thetrainline.co.uk
- 3 No help
- 4 www.fitnesslink.com
www.runnersworld.com

Student B

- 1 www.unitedmedia.com
www.uexpress.com
- 2 www.mapblast.com
- 3 www.weather.com
- 4 No help

As a follow-up activity, students can conduct a search to find suitable websites to provide advice where none of the listed sites are appropriate.

10 Students review a website of their choice.

11 Set this for homework.

WRITING**Planning your website**

12 Set this for homework.

Key 12 (example only)

You need to plan your website carefully before you go ahead and create it. There are three stages to the planning process: Analysis, Design and Implementation, and Evaluation.

In the Analysis stage you have to decide the purpose of the site. Ask yourself why you need a website. You must also decide who the target audience is. What sort of people do you want to attract to your site?

The next stage is Design and Implementation. You have to decide how the site will look, what the feel of the site will be and what it will contain. Once you have decided these things, you have to consider how the site will be created, rolled out on to the Web and managed.

The next stage is Evaluation. How will you know if the site is effective? You may decide to measure the number of hits, the visitors to the site. Your decisions at this stage will feed back to the first stage in the planning process.

Finally, you are ready to begin constructing your site.

INTRODUCTION

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

VoIP (Voice over Internet Protocol) is a set of standards for enabling phone calls to be made across the Internet. It **digitizes** the voice signal i.e. converts the analogue wave into a digital pulse. Then it compresses it using a **codec** (coder/decoder, a program used for converting sound and video signals for use in a computer). It is then broken down into packets (small, fixed size units of data). It uses a **buffer** (a storage area that can delay signals to enable slower systems to connect to faster systems) to reduce **jitter** (differences in the time packets take to arrive at their destination). Companies known as **ITSPs** (Internet Telephone Service Providers) provide

gateway systems that enable computers to be connected to the ordinary telephone system. A new type of **spam** (unsolicited emails) is likely to appear on VoIP systems. This is known as **spit** (unsolicited telephone calls made using VoIP on the Internet).

In the future, computers will become more **powerful** (faster and with bigger storage and processing capacity). They will also become cheaper to produce. This will make them more commonly available and allow them to be integrated with other devices such as **videorecorders** (a device for recording video signals onto magnetic tape cassettes), TVs and telephone systems. They may not even be called computers in the future, but computing devices will be designed for particular purposes and thrown away when they become faulty. Cheaper and more compact, flat **digital panels** are likely to be used for monitor screens in the future and security will be provided by **biometric devices** rather than passwords i.e. devices that measure some aspect of a living being, e.g. eye scanning devices or fingerprint recognition devices. It will also become cheaper and more common to print photographs from a camera using a colour laser printer. **Flexible motherboards** (the electronic circuit boards that hold and connect the main parts of a computer) will allow the design of computers to be more varied in the future. **Voice control** will allow the user to input data and control the computer by speaking. In the future, software will be rented and run across the Internet rather than being bought and installed on individual computers. They will be built into clothing and worn by the user. Domestic appliances such as fridges and cookers will be computer controlled. In the longer term, computers may be operated using laser light or quantum physics rather than electronics

and may even be implanted into the user's body, even into the human brain. This may help people with disabilities.

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

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

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

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

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

OBJECTIVES

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

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

They should understand and be able to use:

- certainty expressions.

They should know and be able to use terms associated with Communication Systems such as: *ISDN, GPS, HTML, mobile phones, pagers, VoIP, DSL.*

STARTER

1 Make sure Ss can use the direct question forms they will need for this task. For example,

- 1 Do you have a mobile phone?
- 2 What do you use it for?
- 3 What make is it?
- 4 How often do you use it per day?
- 5 What additional features does it have?
- 6 Does it have a calculator?, etc.

Do the survey in groups. Appoint a spokesperson for each group to report back in plenary. Keep a tally on the board for each question. As a follow-up, Ss can write a brief report summarising the findings of the survey.

2 Do this in small groups. Elicit other text message abbreviations they may know.

Key 2

- 4 See you later.
- 5 love
- 6 message
- 8 anyone
- 9 no one
- 10 people
- 11 Are you OK?
- 12 thank you
- 13 weekend
- 14 for

READING

3 Do this pre-reading task individually. It covers key abbreviations used in the text.

Key 3

- ADSL asymmetric digital subscriber line
 ITSP Internet Telephony Service Provider
 MP3 MPEG Audio Layer 3
 spit spam by internet telephony
 VoIP Voice over Internet Protocol

4 Do this scanning task individually. As before, write the time at one-minute intervals on the board and ask Ss to record how long it took to find the correct answers. Ss can compare answers in pairs as soon as they have completed the task. As a follow-up, ask Ss to explain any developments which have taken place in mobile phone technology since this article was written in 2004.

Key 4

- 1 It will cut the price of long-distance calls.
- 2 Audio compress digitized sound data.
- 3 It divides the data into very small packets.
- 4 By using a buffer to smooth out the differences.
- 5 The delay between the packets reaching the receiver and you hearing the sound.

LANGUAGE WORK**Predictions 1: certainty expressions**

5 Ask Ss to do this individually, then compare answers in small groups. When they report

back, compare their ranking with the ranking given in the Student's Book. Degrees of certainty cannot be measured like temperature. Even native speakers will disagree so regard the grading given as approximate. Note that no difference is made between *may*, *might* and *could*.

Key 5

This is a possible ranking.
 1g 2a 3c/d 4e 5f/b

6 There are too many predictions for an individual to note all on one listening. Ask Ss to work in pairs noting alternate predictions then combining their lists. Then play again so that they can tick off each prediction they have noted and fill in any gaps.

For the third listening, Ss should focus on the language used for each prediction.

Key 6

- 1 Computers *are certainly going to become* more powerful and *they'll* also get cheaper.
- 2 *They'll become* much more commonly available.
- 3 *It's likely they'll be* integrated with other devices.
- 4 They *may become* specialised devices you throw away when they go wrong.
- 5 Monitors *are going to change* from cathode ray tube monitors to flat screen panels.
- 6 *There's likely to be* devices used for security, biometric devices, for scanning your eye or taking your fingerprints. *They'll be used* instead of passwords.
- 7 More printing *will be done* in colour. *You'll print* your holiday snaps straight from a laser.
- 8 The shape and design of computers *are likely to change* and become much more varied.
- 9 *You'll be able to* talk to your computer to control it without using a keyboard.
- 10 Another development which *I expect* to become more common in the near future is media centre computers.
- 11 *I expect* the way that software is sold *will change*. Instead of buying individual packages people *may* rent or hire the components they need – wordprocessor or whatever – and connect to them over the Internet.

- 12 Service providers *will* make different components available and *you'll be charged* a fee for the ones you use.
- 13 They *won't be able to* make computers any more powerful using electronics so other methods *may* come in for the data signals in the computer. *Perhaps* laser light or even quantum methods *will* be used.
- 14 Computers *will probably* be integrated more with TV systems and with telephony and become much more communication devices.
- 15 *It's likely* much smaller devices *will be made ... probably* built into clothing so that you can walk about wearing a computer which *will allow* you to communicate wherever you go.
- 16 At home our fridges, cookers and other devices *almost certainly will be* computer controlled.
- 17 There *may even be* devices implanted into our bodies to help people with disabilities.
- 18 Computers *might be* implanted into the human brain.
- 19 We *may not* call them computers in the future but they *will* be everywhere.

7 Ask Ss to do some research out of class before tackling this task.

Ask a spokesperson from each group to report back in plenary. This should provoke further discussion where groups disagree. Monitor their use of certainty expressions at this stage and correct any significant errors after the discussion.

8 Do this individually, then compare in pairs.

Key 8 (Examples only. As the answers are a matter of opinion, a wide range is possible.)

- 1 I think it's possible that ATM machines will use iris recognition rather than PIN numbers.
- 2 I think it's probable that people will vote in elections online.
- 3 It's very unlikely that taxis will be robot controlled.
- 4 It's just possible that TV journalists will be able to transmit what they see by using sensors in their optic nerves.
- 5 It's unlikely that there will be more robots than people in developed countries.

- 6 It's very likely that most computers will be voice-controlled.
- 7 Mobile phones may replace computers as the commonest way to access the Internet.
- 8 English might no longer be the commonest language for websites.
- 9 Email probably will be replaced by a voice-based system.
- 10 Computers will certainly become more powerful.

PROBLEM-SOLVING

9 These two poems were the prize winners in a text message poem competition in a UK national newspaper in May 2001.

Ask Ss to write their versions individually and then compare in small groups.

Key 9

Texting is messing
my head and my English.

Try to write essays,
they all come out texts.

Gran(mother) is not pleased with letters
she's getting,
swears I wrote better
before coming to university.
And she's African.

Fourteen: a text message poem.

OR

One for Colin(colon): a text message poem.

His eyes are bunsen burner blue,
his hair like iron filings
with electricity going through.

I sit by him in chemistry,
it splits my atoms
when he smiles at me.

SPEAKING

The world of connectivity

10 and 11 A combined information exchange and problem-solving task. As follow-up, ask Ss to write a description of the completed diagram. You may need to feed in verbs used

in classifying. For example, *X can be divided into/grouped as Y and Z, X consists of Y and Z, Y and Z comprise X, Y is an example of Z, etc.*

Key 11

Pagers are Text and Graphics, Asynchronous MOOs are Multimedia, Synchronous.

WRITING**The Global Positioning System**

12 This task revises ways of linking facts and ideas, including relative clauses, reduced relative clauses with participles and logical connectives. Set for homework and take the opportunity to revise these forms of linking if the resultant texts show significant errors.

Key 12

The GPS was developed by the US military to pinpoint locations anywhere in the world. It consists of 24 earth-orbiting satellites 17,000 km above the earth. Each satellite broadcasts a coded radio signal indicating the time and the satellite's exact position. The satellites have atomic clocks accurate to one second every 70,000 years.

A GPS receiver contains a microprocessor which compares signals from at least three satellites to calculate the latitude, longitude and altitude of the receiver. Apart from military uses, GPS is used for orienting hikers, aiding the navigation of ships, tracking trucks and buses, and locating stolen cars.

SPECIALIST READING**Key A**

- 1 Three
- 2 Satellite and cellular
- 3 A modem
- 4 Copper coaxial, fibre
- 5 The telephone company's equipment and some of your equipment
- 6 b
- 7 DSL-based services

Key B

- 1 a iv b iii c ii d vi e vii f i g v
- 2 a False b True c False d True e True
f False g False

INTRODUCTION

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

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

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

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

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

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

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

OBJECTIVES

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

- listening and completing forms
- giving advice orally on computing problems
- writing a formal report on a computing problem.

They should understand and be able to use:

- ways of diagnosing faults and giving advice.

They should know and be able to use terms associated with Computer Support such as: *serial no., help centre, helpdesk, helpline, warranty, driver, re-install, reboot, recur, diagnose, settings, FAQs.*

STARTER

1 This provides an opportunity to further revise the question forms practised in Unit 1. In completing their forms, Ss should get information from at least three other Ss.

LISTENING

2 Follow the task instructions. Ss should write down their own questions before comparing with a partner. They will need their list later for Task 4.

Key 2 (examples only)

- 1 Can you give me your name?
- 2 What is your address?
- 3 What make and model of computer do you have?
- 4 Is the computer still under warranty?
- 5 What is the service tag number?
- 6 What type of processor do you have in the computer?
- 7 How much RAM is installed?
- 8 What operating system are you using?
- 9 Is the computer connected to any kind of network? What type of network?
- 10 Can you describe the problem?

3 Tell the class who the speakers are: David, the Computing Support Officer and Jennifer, the user. Jennifer is Canadian. Remind them that this is a recording of a telephone conversation. Play the recording without pausing. Replay to correct and pause where there is dispute or difficulty.

Key 3

Help Desk Technician's Name David Lister

Name	David Lister
Reported By	Jennifer
Address	University of Edinburgh, 21 Hill Place
Under Warranty	Yes
Make	Optiplex
Model	GX 270

Service Tag No.	AM96470
Processor	Pentium 4
RAM Size	512MB
Operating System	Windows XP
Network Type	Windows
Problem Description	Not playing MIDI files
Diagnosis	Faulty sound drivers
Cleared by Phone	Yes
Job Number	E83095
Requires Visit	No
Comments	Will send new sound drivers if reinstalling original sound drivers does not solve problem

4 Replay so that Ss can focus on and note the questions asked by David. Ask them to compare his questions with theirs. Discuss and clarify any differences. The tapescript can be used for a role play with Ss using either David's questions or their own.

LANGUAGE WORK

Diagnosing a fault and giving advice

Write this extract from the recording on the board:

It sounds as if you may have a driver fault.

Ask: *What is David trying to do when he says this? How certain is he? What other ways are there in English to say this?* Elicit the forms given in the Student's Book. Present any which are not known. You can build up to *must* for conclusions by asking them to diagnose the possible causes of this problem.

My computer is completely dead.

Elicit from the class possible diagnoses and write them on the board. These include:

- 1 *Maybe it isn't switched on.*
- 2 *The mains supply could be off.*
- 3 *The on/off switch could be faulty.*
- 4 *There may be a fault in the power pack.*
- 5 *A fuse may have blown.*

Then go through them all but one by saying, *It can't be 1 because I've checked it. When there is only one left, say It must be the fuse.*

Diagnosis is usually followed by advice on how to cure the problem. This unit provides the opportunity to revise the ways of giving advice which were presented in Unit 14. Write the example from the recording in the Student's Book on the board and elicit alternatives. *You could try to reinstall the sound drivers.*

Revise the Unit 14 exponents, then present these alternatives:

I recommend that you reinstall the sound drivers.

I advise you to reinstall the sound drivers.

The best thing to do is to reinstall the sound drivers.

5 Do this individually, then compare in pairs. Go through the task in plenary and compare the range of advice given. Refer any disputes of a technical nature back to the class to resolve.

Key 5

- 1 You should reboot your PC to see if the problem recurs.
- 2 I recommend you use your PC's on-board diagnostic and repair tools.
- 3 It's a good idea to record the details of the problem so you can describe it accurately.
- 4 I advise you to note your system's model name and serial number.
- 5 I strongly recommend that you / you to keep a record of hardware and software you've installed along with any changes you've made to settings.
- 6 You should figure out how to open the case if you think hardware may be at fault.
- 7 The best thing to do is to visit the vendor's website and check the FAQs.
- 8 Never phone in peak times.
- 9 It's a good idea to have your system up and running and be near it when you call.
- 10 When you reach a technician, I advise you to tell him or her if you may have caused the problem.

6 Elicit as much as the Ss can provide on the steps which should be taken before calling a helpline. Compare their advice with the advice given in this task. Then set the task for individual written work followed by comparison in pairs. You can also ask Ss to provide a reason for each piece of advice as follow-up or to make the task more demanding for advanced Ss.

Key 6 (examples only)

- 1 It sounds as if your toner cartridge has run out. You should replace it.
- 2 You probably have a paper feed problem. I advise you to take the paper out and put new paper in.
- 3 It sounds as if there is a mistake in one of your formulae. I recommend that you check each formula carefully.
- 4 You must have pressed Caps Lock. Press it again to unlock it.
- 5 You might have a loose connection. The best thing to do is to tighten the cables and check everything is switched on.
- 6 It sounds as if you're out of paper or you have a paper jam. You should check there's no paper jammed in the printer.
- 7 The image size is not set properly. Try to adjust it with the width control on the monitor.
- 8 The frequency setting is too low. Try adjusting the setting in Control Panel.
- 9 The ball may be sticking. I recommend cleaning it.
- 10 It's possibly because the clocks have changed for summer or winter time. You should go into Date/Time in the control panel and advance the clock.
- 11 It sounds as if the margins are set wrongly. You should reset them using the Page Setup settings.
- 12 It may be a low voltage problem. You could get a voltage regulator but they're expensive.

PROBLEM-SOLVING

7 With the whole class calculate what percentage of Ss have had the hardware problems in the table.

8 This is a demanding task with authentic problems and solutions from the Microsoft Knowledge Base. Pair the As and the Bs together at first to prepare their questions and answers and to help each other understand the extracts from the MS Knowledge Base. Then re-pair, A-B, A-B for the information exchange. Encourage Ss to ask for clarification of any points they do not understand.

WRITING

9 Set this for homework. With advanced Ss work through the Task 3 problem as a model with the class and ask them to use the Task 8 extracts to write a report round either the A or B problem described.

SPECIALIST READING

Key A

- 1 To protect data and provide faster access to data.
- 2 In this type of work, the speed of processing is important and it is not so important how long it takes to replace data.
- 3 A backup exists if the primary drive fails.
- 4 b
- 5 Spread across all the drives in the array.
- 6 RAID 3, 4 and 5
- 7 RAID 0

Key B

- 1 a iii b v c iv d ii e vi f i
- 2 a False b False c False d True e False f True

INTRODUCTION

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

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

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

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

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

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

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

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

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

OBJECTIVES

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

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

They should understand and be able to use:

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

They should know and be able to use terms associated with Data Security such as: *defacing, denial of service attack, hijacking, mail bombing, piggybacking, salami shaving, software piracy, spoofing, trapdoors, trojan horse, viruses.*

STARTER

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

Key 1

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

Key 2

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

READING

3 Do this individually. Do not correct until after Task 4.

Key 3

- 1 To transfer program control to the virus.
- 2 The Misdirection, Reproduction, Trigger and Payload routines.
- 3 It returns control to the program as originally written.

4 Successful scanning depends not only on recognising quickly the information you want but also on learning to ignore information which is not relevant to your task. Encourage the Ss to focus only on those parts which will help them check their answers to Task 3. The first sentence of a paragraph often is a good clue to its contents as a whole. If it suggests the paragraph may contain the answer to one of the questions, it is worth reading on with more care.

5 Do this individually, then compare in pairs. This task requires close reading. The answers have to be inferred as they are not clearly stated.

Key 5

- 1 They reproduce inside a host which they damage or destroy.
- 2 It can copy itself into any program files.
- 3 They can stay dormant in the memory until triggered.
- 4 Displaying a message on the monitor screen or deleting files on the hard disk.
- 5 COM or EXE programs.
- 6 1c 2b 3d 4a
- 7 A Trojan has a payload but no reproduction routine.

LANGUAGE WORK**Cause and effect (1)**

This unit looks at further ways of expressing a key relationship in technology – cause and

effect. Write the cause and effect chain in the Student's Book on the board. Ask the class to identify the links between the sentences. Demonstrate how they can be linked with **cause + to V** or **make + V**.

Many transitive verbs have a causative meaning, such as *activate*, *raise*, *lower*. For example,
The trigger routine runs, which activates the payload routine.

Note that we can also say,
The trigger routine runs, activating the payload routine.

Finally, show how a *when* clause often indicates cause and effect.
When the trigger routine runs, the payload routine activates.

But note that not all *when* clauses indicate a cause and effect relationship. Some are simple time relationships, for example, *When I switch on my computer, I check for emails*. Other ways of showing cause and effect relationships are covered in Units 9 (*-ing* clauses), 10 (*If*-sentences) and 19 (*therefore*).

6 Best done as individual written work. Compare answers in pairs. As a follow-up, ask Ss to research the operation of any other viruses they know about. They can then present their findings to the rest of the class.

Key 6 (examples only)

- 1 When a dismissed employee's name is deleted from the company's payroll, a logic bomb is activated which causes the payroll records to be destroyed.
- 2 When a certain date occurs, a trigger routine is activated which makes keys beep when pressed and corrupts floppies.
- 3 When the operator starts up the computer for the one hundred and twenty-ninth time, a trigger routine is activated which causes the screen to display, 'Bloody! June 4, 1989'.

- 4 When the infected program is run, the boot sector is corrupted which causes the disk content to be overwritten and data to be lost.
- 5 When a particular date occurs, the payload is triggered which makes characters on a text mode screen slide down to the bottom.
- 6 When an infected document is opened in the wordprocessor, the virus macro is executed which attaches the virus code to the default template. When the user saves another document, the virus code attaches to the saved document. When the saved document is opened in the wordprocessor, the virus destroys data, displays a message or plays music.

7 Do as individual work. You can also use this task as a test by setting the task without the list of *en-/-en* verbs. All have been used in earlier units with the exception of *enlarge* and *widen*.

Key 7

- 1 A MIDI message *encodes* sound as 8-bit bytes of digital information.
- 2 The teacher is using a new program to *encourage* children to write stories.
- 3 The new version of SimCity has been *enhanced* in many ways.
- 4 A gateway *enables* dissimilar networks to communicate.
- 5 You can *encrypt* data to make it secure.
- 6 *Ensure* the machine is disconnected before you remove the case.
- 7 Designers can offer good ideas for *brightening* your website.
- 8 Electronic readers allow you to *enlarge* the print size.
- 9 Programmers write software which *enables* the computer to carry out particular tasks.
- 10 You can *widen* the picture on your monitor.

PROBLEM-SOLVING

8 Do this in small groups. As a follow-up, ask Ss about any other computer crimes they know of or any examples of these crimes they may have heard about. There are newspaper reports of computer crimes on an almost weekly basis.

Key 8

- | | |
|-----|------|
| 1 f | 6 g |
| 2 h | 7 b |
| 3 c | 8 d |
| 4 a | 9 j |
| 5 e | 10 i |

SPEAKING

9 As before, get the As to prepare together and the Bs to do the same. Then re-pair A-B, A-B for the information exchange.

WRITING

10 Do this as homework. Ss can write about their own computer crime as an additional task.

SPECIALIST READING

Key A

- 1 a
- 2 c
- 3 public-key cryptography
- 4 decrypt
- 5 b
- 6 information about the company operating the server and the server's public key

Key B

- 1 a iv b iii c i d ii
- 2 a iii b iv c vi d i e ii f v
- 3 a False b True c False d False e False
f False g True h True
- 4 c, d, b, a

INTRODUCTION

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

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

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

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

Data is commonly stored on a **LAN** (Local Area Network) by attaching storage devices to a **server** (a computer that provides a network service). Common storage devices include tape drives, **RAID** (a set of hard disks that work as one unit) and optical devices such as CD-ROMs. In large networks, **server farms** (large collections of networked server computers that work together by sharing the service workload) are used. The storage devices are often attached using a connection standard known as SCSI (Small Computer Systems Interface). LANs with larger storage

needs can add **NAS** (Network Attached Storage) devices. They attach to the LAN and are available to all systems on the LAN without needing to be attached to a server computer. The biggest network systems can also use a **SAN** (Storage Area Network). This is a storage network that uses high-speed copper or fibre-optic connections such as Fibre Channel (a high-speed interconnection standard). The SAN is a separate network that is interconnected to the main LAN. It is therefore available to all LAN users and can be centrally managed.

OBJECTIVES

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

- scanning a table for specific detail
- exchanging information orally
- writing a technical description.

They should understand and be able to use: *allow and permit, prevent and stop links.*

They should know and be able to use terms associated with Data Security such as: *callback, incremental backups, full backups, biometric security devices, encrypt/ion, firewalls, password protect, surge protectors, uninterruptible power supplies, anti-virus, virus protection.*

STARTER

- 1 Do this in small groups.

READING

2 Reading in Information Technology often involves graphics and tables like this one rather than traditional linked text. This task provides practice in scanning a table which contains a considerable amount of condensed

data for specific detail. Do this individually, then compare in pairs.

Key 1 and 2

- 1 Use virus protection programs. Save all attachments to floppies and virus check them.
- 2 Password-protect programs and data with passwords which cannot easily be cracked.
- 3 Make full backups, which copy all files, periodically.
- 4 Control access to hardware.
- 5 Make full backups, which copy all files, periodically.

3 A useful reading skill is to work out the meaning of unfamiliar words from context. In this variation, Ss are asked to match the meaning to the appropriate term in the text. Do this individually. Note that *monitor* in example 8 is a verb.

Key 3

- 1 incremental backups
- 2 shareware
- 3 uninterruptible
- 4 compromise
- 5 cracked
- 6 encrypt
- 7 firewall
- 8 monitor (verb)
- 9 biometric
- 10 periodic

LANGUAGE WORK

Cause and effect (2) links using *allow* and *prevent*

Write the Student's Book examples on the board and elicit the relationship between them.

- 1 *The scanner finds a match for your fingerprint.*
- 2 *The keyboard is unlocked.*
- 3 *You can use the PC.*

1 and 2 are cause and effect. Elicit ways to link them presented in Unit 18: *cause to*, *make*, *when* clause, transitive verb, and from Unit 10, an *if*-sentence. You can also revise the logical connectives *therefore* and *with the result that*.
Examples:

- 1 *The scanner finds a match for your fingerprint which causes the keyboard to be unlocked.*
- 2 *The scanner finds a match for your fingerprint which makes the keyboard be unlocked.*
- 3 *The scanner finds a match for your fingerprint which unlocks the keyboard.*
- 4 *If the scanner finds a match for your fingerprint, the keyboard is unlocked.*
- 5 *When the scanner finds a match for your fingerprint, the keyboard is unlocked.*
- 6 *The scanner finds a match for your fingerprint, therefore/with the result that the keyboard is unlocked.*

Of these, (1) and (2) are clumsy. When there is a suitable transitive verb with a causative meaning, we are unlikely to use *cause to* or *make*.

Allow and *permit* links are also common in Information Technology: 2 **allows** 3 to happen. Demonstrate that we can link them like this:

The keyboard is unlocked, which allows/permits you to use the PC.

Or

The keyboard is unlocked, allowing/permitting you to use the PC.

Similarly demonstrate the use of *prevent* and *stop* using the Student's Book examples.

The keyboard remains locked, preventing you (from) using the PC.

The keyboard remains locked, stopping you (from) using the PC.

- 4** Ask the Ss to explain what smart cards are and how they operate. Make sure ATM – Automatic Teller Machine – is known. Then set this task for individual work. Ss can compare answers in pairs.

Key 4

Smart cards prevent unauthorised users accessing systems and permit authorised users to have access to a wide range of facilities. Some computers have smart card readers *allowing* you to buy things on the Web easily and safely with digital cash. A smart card can also send data to a reader via an antenna *coiled* inside the card. When the card comes within range, the reader's radio signal *creates* a slight current in the antenna *causing* the card to *broadcast* information to the reader which *allows* the user, for example, to *withdraw* money from an ATM or *get* access to a system.

- 5** These preventative measures should be familiar from Tasks 1 and 2. Get volunteers to complete example 1 as a demonstration of what the task requires. Do the rest of the examples individually followed by comparison in pairs.

Key 5

- 1 When a user runs anti-virus software, the software checks files for virus coding. If coding is matched to a known virus in a virus database, a message is displayed to the user that a virus has been found. If the user removes the virus or deletes the infected file, the virus is prevented from spreading or causing further damage.
- 2 When you approach a high-security network, key features of your face are scanned. If the system matches your features to a database

record of authorised staff, your identity is verified allowing you to log on. If your identity is not verified, you are stopped from using the system.

- 3 Voice-activated computers without keyboards will become more common. When the user wants to log on, she speaks to the computer which matches her voice to a database of voice patterns. If the user has a cold or sore throat, she is allowed to use the system because stress and intonation patterns remain the same.

PROBLEM-SOLVING

- 6 Do this in small groups. Ss can produce either a set of instructions e.g. *Look through the eyepiece* or a description e.g. *A person looks through the eyepiece*. Not everything is obvious from the illustrations. Ss will have to use their knowledge of computing as well as the clues provided by the diagrams. As follow-up, ask Ss to describe either form of scanning or to compare both forms of scanning.

Key 6

The original captions are:

Eye scanning

- 1 Person looks through eyepiece.
- 2 Laser scans eye recording microscopic details.
- 3 Computer translates data into a unique barcode.

Hand scanning

- 1 Select the language you wish to converse in.
- 2 Insert ordinary credit card into the console.
- 3 Insert hand to be scanned. Database checks your hand print with one on file and then checks to make sure your ID matches that on the credit card.

SPEAKING

Backups

- 7 The information to be exchanged is fairly complex. As before, get the As to prepare together and the Bs to prepare together, then re-pair A-B, A-B.

There should be ample opportunity to practise asking for clarification.

WRITING

Firewalls

- 8 Ask Ss to read up about firewalls before they tackle this task. The structure of the description is set by the questions given. Listing the questions you plan to answer in a piece of writing is a simple way of structuring a text. Encourage your students to make such plans for other descriptions they may write. When Ss have completed this, ask them to exchange with a partner. Both Ss should underline in pencil any areas of their partner's work which they have difficulty in understanding. This is quite distinct from correction which is your responsibility as teacher. Ss can then discuss areas where lack of understanding has occurred and decide, with your help, whether this is a failure of production or comprehension.

Key 8

The LAN is protected by a firewall gateway that hides the internal IP addresses of the computers in the LAN and filters network traffic going in and out of the LAN. An internal firewall further protects the database server and intranet by filtering the network traffic and changing the network protocol used on the internal part of the LAN. The firewall modules are managed by a management server which is positioned between the internal firewall and the firewall gateway, as is the Web server.

SPECIALIST READING**Key A**

- 1 ecommerce, online-transaction processing, databases
- 2 the amount of information that needs to be managed or stored on a network
- 3 tape libraries, RAID disks, optical storage
- 4 multimedia
- 5 distance limitations
- 6 Ethernet
- 7 throughput limitations due to bandwidth, lack of cohesion among storage devices i.e. managing the devices can prove challenging
- 8 almost any modern server. Most PC midrange and mainframe platforms
- 9 by offloading many storage-related server tasks to the SAN and by better allocating storage resources to servers
- 10 copper cabling or fibre-optic cable

Key B**1**

SANs allow for the addition of bandwidth without burdening the main LAN. SANs also make it easier to conduct online backups without users feeling the bandwidth pinch. When more storage is needed, additional drives do not need to be connected to a specific server; rather, they can simply be added to the storage network and accessed from any point.

2

a iv b vi c i d ii e iii f v

3

a False b True c False d False
e True f False

INTRODUCTION

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

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

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

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

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

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

leaving very rude messages on the system.

- f **Blackmailing** the owners of websites by threatening to damage their systems by doing something like releasing a **virus** (a program that can reproduce itself and is written with the purpose of causing damage or causing a computer to behave in an unusual way) onto their system, although such a threat often turns out to be nothing more than a hoax.

Sometimes, young hackers put their experience and knowledge to good use when they become older. Many former hackers have been hired by large companies as **security experts**. They are employed to test out the company systems by trying to hack into them to find any weaknesses in the systems.

Cyberspace is the combination of all the data on all the computer networks throughout the world, accessed using the Internet. A person who uses their skills to make cyberspace safer is referred to as a '**white hat**' hacker.

A computer system can be **hacked** (broken into) in various ways including:

- guessing somebody's **password** (secret code used to control access to a network system)
- finding a **bug** (a fault in a system) that allows certain passwords to access information they are not supposed to access
- phoning a company, pretending to be a company employee and asking for a password. People tend to be too trusting.

Connecting to a computer network involves **logging in** (sometimes referred to as **logging on**) by typing a username or **ID** (identification username) and a password. Usernames that are often used on networks systems include 'guest', 'demo' and 'help'.

To avoid a computer system being hacked into, the people managing the system must work hard to keep ahead of the hackers. There are different ways of avoiding being hacked into including:

- installing a **firewall** (a combination of hardware and software used to control the data going into and out of a network)
- using a **callback system** (a system that automatically disconnects a telephone line after receiving a call and then dials the telephone number of the system that made the call, to reconnect the line. It is used in remote access systems to make sure that connections can only be made from permitted telephone numbers.)
- having really secure **passwords** (secret codes used to control access to a network system) – don't use common names or dictionary words
- auditing** the system regularly (checking the system regularly using event logs to find failed access attempts).

Some people do not like to give out their credit card numbers on the Internet. Hackers have been known to get **databases** (applications programs used for storing information so that it can be easily searched and sorted) of credit card numbers by hacking computer systems. However, in the opinion of the ex-hacker in this unit, using your credit card on the Internet is no more dangerous than giving your credit card number on the telephone or throwing away a credit card receipt. There are various things you can do to avoid credit card theft on the Internet including:

- using a separate credit card for Internet purchases
- having a small credit limit on the credit card you use

<p>c buying a pre-paid charge card for small purchases.</p> <p>In the future, smart cards (plastic cards containing a processor and memory chip that</p>	<p>can be used to store large amounts of confidential data) will be used instead of credit cards. This will require smart card readers (devices used for reading smart cards) to be attached to computers.</p>
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OBJECTIVES

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

- listening for specific information in an interview.

They should understand and be able to use:

- phrasal verbs.

They should know and be able to use key vocabulary items covered in previous units.

STARTER

1 Ask Ss to consider in small groups what cases of hacking they know of and why they think people hack. Ask a spokesperson from each group to report back. Ss should then do this scanning task individually before comparing answers in the same groups.

Key 1

- 1 Hackers Unite.
- 2 A new phishing scam which substituted a bogus website address for any bank details in the computer.
- 3 Kevin Mitnick.
- 4 The hackers ran up a £1m phone bill.
- 5 2 and 3.
- 6 It forced them to slow down or even stop working.

LISTENING

2 Discuss as a class and record Ss' ideas on the board to discuss after listening to the recording.

3 Give the class time to read through the questions and predict part answers to as many

as they can. Then play Part 1 of the recording, pausing from time to time to give them time to note answers. Replay to check the answers, pausing where Ss have had difficulty in answering. CEO is Chief Executive Officer of a company. In the UK it would be Managing Director.

Key 3

- 1 Hacking into a large American company.
- 2 He's a computer security expert.
- 3 They hand over information such as passwords without checking that the person asking for it is authorised.
- 4 'guest' or 'demo' or 'help'.
- 5 Restricts access to a network.
- 6 You can make sure remote clients are who they say they are.
- 7 A common name or a dictionary word or anything short.
- 8 Failed access attempts.

4 Deal with this task as Task 3. ID is identification.

Key 4

- 1 At school he discovered that what the computers in the lab would let him see depended on what password he typed in.
- 2 He got into part of the system that asked for his ID but also displayed the ID on the same screen.
- 3 For money, for criminal purposes or for political purposes and often because it's challenging and exciting.
- 4 It was a challenge and great fun.
- 5 He and his friend never really tried to cover their tracks. They boasted to friends and girls.
- 6 Because he knows the ways in which he would try to break into their system.
- 7 They tend not to these days because it's so illegal.

- 8 Hollywood shows hackers coming into a system via the Internet. In reality about 75% of all hacks into company computers are done by current staff.
- 9 Not as risky as buying something by credit card and throwing away the receipt.
- 0 Get a separate card with a small limit.

5 These are more difficult questions. Repeat as for Task 3 or ask the Ss to work in pairs. One member in each pair listens for the even numbers and one for the odd. Pairs then exchange answers. This provides practice in ignoring irrelevant information while listening as well as further practice in exchanging information.

Key 5

- 1 A rude message for the CEO.
- 2 Someone who advises companies how to prevent hacking.
- 3 By trying to guess somebody's password or finding a bug that will allow people with certain passwords to get in where they shouldn't.
- 4 A computer geek, a young anorak.
- 5 They meet at conferences from time to time.
- 6 He says he doesn't go much for the Hollywood hacker.
- 7 It's the retailers who are swindled out of money.
- 8 Your computer needs to have a smart card reader.

LANGUAGE WORK

Phrasal verbs

Phrasal verbs are a delight for some teachers anxious to find a point of grammar which will stretch the advanced student. As they are a feature of spoken informal English they are relatively uncommon in IT textbooks and manuals. However, they are a common feature of IT journalese, computer mediated communication and the spoken English of young computing professionals.

Write a few examples on the board. You can

use those given in the Student's Book. Demonstrate that a phrasal verb is a verb + preposition combination and that it may have both literal and figurative meanings. Usually the figurative meaning cannot be worked out from the meaning of the individual words. Elicit any examples Ss know including those used in the recording. You can ask them to scan the tapescript for examples.

6 Set this for individual work. Then compare in pairs. Pairs can form ad hoc as soon as two Ss have completed the task.

Key 6

- 1 find out
- 2 hand over
- 3 tracked (Ralph) down
- 4 break into, hack into, get into
- 5 log on
- 6 go about, set about
- 7 phone up
- 8 throw away
- 9 grown up
- 10 Hacking into
- 11 keep ahead

7 Do this individually or use this task as a revision test. Make sure Ss give the correct word order in example 5. The order is verb – pronoun – preposition, e.g. *call you up* NOT *call up you*.

Key 7

- 1 throw away
- 2 hack into
- 3 grown up
- 4 set about
- 5 phones (you) up, hand (it) over
- 6 shut down
- 7 ran up
- 8 work out
- 9 note down
- 10 Check out

WORD STUDY**Semantic groups**

8 As all the words listed have been used in previous units, you can again use this task as a revision test or do it as an individual task. Correct in plenary marking each heading on the board, A to E, and filling in the terms below as Ss provide them to you. Advise Ss that keeping a vocabulary notebook divided into semantic fields like this is a sensible way of grouping and hence remembering their growing IT vocabulary.

Key 8

B,A	anti-virus software
B	backups
C,D,E	bandwidth
E	browser
E,D	domain name
B	encryption
B	firewalls
D	FTP
C	GPS
D,C,E	IRC
D,E	ISP
E	hyperlink
A	logic bomb
C	paggers
B	passwords
D	router
A	trigger routine
A	Trojan
E,D	URL
D,C	Usenet
E	XML

SPEAKING**Role play**

9 Prepare this in pairs where the interviewers work together and the interviewees work together. Then re-pair interviewer + interviewee for the actual task. Allow Ss to add information of their own to the interview.

Key 9 (examples only)

- 1 When did you first become interested in hacking?
- 2 Why were you arrested?
- 3 What do you do now?
- 4 How can you prevent hacking?
- 5 What do you think of Hollywood hackers?
- 6 What are safe ways of paying for Internet shopping?

WRITING

10 This ties in with Task 1. Ss should exchange texts for their colleagues to comment on and mark any areas they have problems understanding. If Ss have access to a networked computer lab, they can exchange texts electronically, comment and return to the writer.

- 11** Step 1 An infected .EXE file arrives as an email attachment.
 Step 2 The infected .EXE file is opened.
 Step 3 The computer is infected and used to spread the virus.
 Step 4 When first run, the virus may copy one .EXE file using the same file name but with the final character of the filename decreased by 1.
 Step 5 The copied file is then infected.
 Step 6 A WIN.INI entry may be created to execute the infected file when the system starts up.
 Step 7 The copied executable infects other 32 bit .EXE files when run.
 Step 8 Five minutes after the file is opened, the worm creates a .DAT file hidden on the hard disk, named after the machine name.
 Step 9 The worm uses mass mailing techniques to send itself to these addresses.

INTRODUCTION

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

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

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

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

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

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

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

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

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

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

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

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

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

OBJECTIVES

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

- listening for specific information.

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

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

They should know and be able to use terms used in Software Engineering such as: *decision table, flowchart, pseudocode* and the names of current programming languages.

STARTER

1 Do this in small groups. The groups should then agree what each stage means.

Key 1

- d Clarify the problem
- a Design a solution
- b Code the program
- e Test the program
- c Document and maintain the program

2 The same groups as Task 1 should continue with this task. When they have completed, they should compare with a neighbouring group.

Key 2

- 1d Clarify objectives and users: Clarify the problem
- 2e Debug the program: Test the program
- 3c Write programmer documentation: Document and maintain the program
- 4a Do a structured walkthrough: Design a solution
- 5b Select the appropriate programming language: Code the program

LISTENING

3 Do this individually, then compare in groups. Make sure all Ss have a list of questions for Task 4.

4 Make sure that Ss know that *bookings* = *reservations* and are familiar with other common hotel-related terms such as *reception*. Play the recording once so that Ss can tick off their list of questions with those asked by the analyst. Get them also to note any questions they had not predicted.

5 Do this individually. Play the recording again, pausing to give time to note the answers after this exchange which is roughly half-way through:

- A *Has the system to print out addressed envelopes?*
- H *If it could, that would be very useful.*

Key 5

- 1 A simple bookings system.
- 2 It is not linked to invoicing.
- 3 Bills for the guests, room bookings on screen and lists of previous guests.
- 4 Reception staff, the accountant, bar and restaurant staff.
- 5 The accountant.
- 6 She does not want unauthorised people to be able to access the accounts and the printers must not be noisy.
- 7 In addition to the existing PCs at reception and in the office, she will need one for the accountant and one in the bar and restaurant. They will have to be networked. She will need laser printers.
- 8 The analyst will make a plan to discuss with the hotelier. Then he will make a program to try.

LANGUAGE WORK**Revision: If X, then Y**

This section focuses on structures commonly used in programming. All have been met in earlier units but in different contexts.

Write the decision table in the Student's Book on the board. Demonstrate one of the rules:

- 1 If a guest stays 3 nights in January and if one night is Sunday, then charge 2 nights at full price and 1 night at half-price.

Elicit other rules by giving the *if*-clause:

- 2 If a guest stays 3 nights and one night is not Sunday and it is not January, *then charge 3 nights at full price.*
- 3 If a guest stays 3 weekday nights in January, *then charge 3 nights at full price.*

6 Do this individually, then compare answers in pairs.

Key 6 (examples only)

- 1 If a guest books bed and breakfast and has no other meals, then charge rate A.
- 2 If a guest books bed and breakfast and also has lunch, then charge rate A plus menu price less 20%.

- 3 If a guest books bed and breakfast and also has dinner, then charge rate A plus menu price less 20%.
- 4 If a guest books half-board and has no other meals, then charge rate B.
- 5 If a guest books half-board and has lunch, then charge rate B plus menu price less 20%.
- 6 If a guest books full board, then charge rate C.

Do until, do while

7 Ss will be familiar with these time words from their study of time clauses. *Until* links an action and the limit of that action. *While* links actions or states happening at the same time. Use the Student's Book examples to illustrate the structures when used to describe loops in flowcharts, then set Task 7 for individual work.

Key 7

- 1 Calculate all sales until there are no more sales.
- 2 Search for records containing the term while there are still records containing the term.
- 3 Total extra items while extra items remain.
- 4 Search member records until there are no more records.
- 5 Print all addresses while there are still addresses available.
- 6 Display client names until there are no names remaining.
- 7 List all guests until there are no guests left.
- 8 Total monthly sales until there are no more sales for the current year.

8 Do this individually. Then ask selected Ss to explain each step orally as a means of checking the task. Advanced Ss can draw a flowchart of their own for their partners to explain orally.

Key 8

First input the room number. Then set the total to zero. Next, set the VAT to zero. Then set the count to zero. After that, read a record. If it is for this room number then, if the count is zero, print the guest details. Next, add the record amount to the total. Then add one to the count. After that, print the record details. If there are more records, then read another record. If there are not more records, then, if the count is greater than zero, calculate the VAT. Then calculate the gross. Next print the total. After that, print the VAT. Finally, print the gross.

SPEAKING

9 Work in pairs, then compare answers with another pair.

Key 9

- 1 Logo
- 2 Visual Basic
- 3 FORTRAN
- 4 HTML
- 5 C++
- 6 Ada
- 7 COBOL
- 8 XML
- 9 Prolog, LISP
- 10 Pascal, Visual Basic
- 11 LISP, Prolog
- 12 Java, Perl

WRITING**Converting to a new system**

10 For individual work. Ss should exchange completed texts with each acting as critical reader for the other. As before, the readers should simply underline with a pencil any area where they feel the meaning of the text is unclear and return it to the writer for action.

Key 10

- 2 *Parallel implementation*: Parallel implementation means that both systems run at the same time for a period. The advantage is that if the new system does not operate properly, the old system is available as a fallback. The disadvantage is that two systems have to be maintained.
- 3 *Phased implementation*: Phased implementation is when parts of the system are converted separately. This may be done gradually or in groups. The advantage is that people can gradually get used to the new system and certain problems can be dealt with as they arise. The disadvantage is that this method is more complex and time-consuming. In addition, there may be problems of incompatibility between the old and new systems.

- 4 *Pilot implementation*: Pilot implementation is when the new system is piloted in part of the company before extending it to the whole company. The advantage is that problems can be identified and solved before the new system is implemented throughout the company. The disadvantage is that it takes longer to introduce the new system.

SPECIALIST READING

Key A

- 1 simplifies the handling of multimedia applications; program code is more intuitive and reusable
- 2 encapsulation; inheritance; polymorphism
- 3 sound; video; text; graphics
- 4 right; equilateral; isosceles
- 5 encapsulation
- 6 square
- 7 has 4 sides; contains 4 right angles
- 8 program development; program maintenance

Key B

- 1 a vi b i c v d ii e vii f iii g iv
- 2 Encapsulation, *inheritance* and polymorphism are key features of *object-oriented* programming. Encapsulation allows data and program instructions to be bundled together in *modules* called objects. Inheritance means that specific *instances* of a class of objects *inherit* the properties of the class of objects. Polymorphism means that instructions are treated differently by different *objects*. The combination of these key features of OOP means that program code is reusable. This speeds up *development* and *maintenance* of programs.

INTRODUCTION

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

OBJECTIVES

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

- reading and note-taking
- writing a c.v.

They should understand and be able to use structures used for requirements:

- *need to, have to, must, be + essential, critical.*

They should have a better understanding of terms used in job advertisements.

STARTER

1 Do this in pairs. As follow-up, Ss can list all the other occupations they know in Information Technology.

Key 1

- 1 The person responsible for setting up and maintaining an organisation's Internet website.
- 2 A person who, by phone or computer, advises users on software and hardware problems.
- 3 A programmer who codes applications software.
- 4 The person responsible for ensuring that an organisation's hardware, software and data are protected from computer criminals, accidental damage and loss.
- 5 A person who codes systems software, fine-tunes operating system performance, and handles other systems software-related tasks.

READING

2 This is a jigsaw reading task for groups of three. If you wish, you may do Text A together as an example; then set the remaining texts for groups of two. Warn the Ss that they may not find information for each section of their table.

Key 2**A**

- 1 Programmer
- 2 creating software
- 3 needed but not specified

- 4 good memory, attention to detail, logical mind and the ability to work through a problem in a methodical manner
- 5 Knowledge of Windows, C, C++, Delphi, Java and Visual Basic
- 6 Subscribe to programming magazines such as Microsoft Systems Journal. Get 'student' editions of C++, Visual Basic and Delphi. Get a decent book on Windows programming.
- 7 Spend more money on a training course.

B

- 1 Computer Consultant
- 2 Working freelance to provide expert advice to companies and other clients in aspects of computing for short-term periods.
- 3 University degree simply to get a job. Microsoft Certified Systems Engineer and Novel Linux Certification are of real value.
- 4 Not stated but we can infer ambitious, determined, hard-working.
- 5 Knowledge of Visual Basic, C++, and other computer languages.
- 6 Get a technical role in a company and spend your evenings and weekends learning the tools of your trade – and getting your current employer to pay for your exams.
- 7 Don't stay in one company for more than two years. Move on and up to become a junior consultant in one of the larger consultancy companies.

C

- 1 IT Manager
- 2 Managing projects, technology and people, for example, developing and implementing computer software, development projects and the implementation and support of systems.
- 3 A first degree and often a second one as well but not necessarily in computing science.
- 4 Bright, communicative and able to earn the trust of your teams.
- 5 Basic hardware and software expertise. We can add ability to manage and budget.
- 6 Gain experience in looking after a small team or a project.
- 7 Not stated.

Make sure Ss do the information exchange orally.

Do this individually, then compare in pairs. Ss may need to refer to the texts if their notes are deficient. Make sure Ss justify their answers.

Key 4

- | | |
|-----|-----|
| 1 B | 5 A |
| 2 A | 6 B |
| 3 C | 7 B |
| 4 A | 8 C |

LANGUAGE WORK

Requirements: need to, have to, must, be + essential, critical

Divide the board into two sections. Label one *Required* and the other *Not required*. Ask Ss to search the texts for examples of both. Write the examples they find on the board in the correct section. Draw their attention to each of the ways used:

Required

- You need to be able to empathise with the person at the other end of the phone.*
- IT managers have to take responsibility for budgets.*
- You must be interested in your subject.*
- You must have worked for at least two years in systems analysis.*
- Experience with mainframes is essential/critical.*

Not required

- You don't need to have a degree in computing science.*
- You needn't have a degree in computing science.*
- You don't have to be an expert in everything.*

Point out that *have to do sth* is similar to *must do sth* but the negative forms have different meanings. *Don't have to* = not required, *mustn't* = a warning or rule that it is important not to do *sth*. Show that *need* can behave like a modal and an ordinary verb.

You may also wish to present the language used in job advertisements for desirable but not essential criteria. For example:

A knowledge of C++ would be an advantage.

5 Do this individually, then compare in pairs.

Key 5 (examples only)

- need
- mustn't
- need
- needn't
- must
- have to
- must, needn't
- need
- must
- needn't

6 Make sure Ss are familiar with the abbreviations often used in advertisements such as *yrs, min, exp, &*. They can refer to the Glossary for any of the many technical abbreviations used.

Key 6

- You must be a technical specialist with a minimum of two years' work in systems programming. You need to have experience of Netview, automation, design and support.
- You must be an IBM MVS support technician. You must have worked for at least one year with VTAM, NCP, SSP, NPM and IBM hardware. Being authorised to work in the EU is essential.
- You must have three years' experience in a SAP Basic Technical Environment. You need to be a team player with strong analytical and problem-solving skills. Ability to communicate issues and solutions and manage time effectively is critical.

- 4 You need to have strong Unix experience. The ability to use HTML, DHTML, XML and JavaScript is essential. You must have knowledge of Shell Scripts.
- 5 You must be CCNA qualified with excellent skills in the surrounding technologies. You must have worked for at least two years in support.
- 6 You need to have knowledge of current Network Operating Systems. You must have experience of ERP systems implementation. Very strong managerial skills are essential.

PROBLEM-SOLVING

7 When pairs have completed this task you can ask them to write descriptions of the requirements of some of these posts in full sentences.

Key 7

- 1b IT Engineer (Network & Database)
- 2f Team Leader
- 3e E-commerce Consultant
- 4a Visual Basic Developer
- 5c Web Developer
- 6d Network Support

SPEAKING

8 This is a variation of the game *Twenty Questions*. Ss can ask only *Yes/No* questions to identify their partner's occupation. When they're fairly sure they know, they can say, *You're a programmer/I think you're a programmer/You must be a programmer.*

WRITING

9 Explain the conventions of a c.v. In the UK GCSE grades are taken in the fifth year of secondary school. HNC and HND are Higher National Certificate and Diploma. Ss can be creative in the experience they list and optimistic in the qualifications they claim for the purpose of this exercise.

SPECIALIST READING

Key A

- 1 To improve your marketability to potential employers by upgrading your skill-set.
- 2 Whose training should you undertake?
Whose certificates should you get?
How certain can you be that your salary will rise as a result of your training?
- 3 Microsoft Word
- 4 Taking a training course and self-study
- 5 The amount of work you'll have to do to get up to speed for the exams and the difference between passing or failing the exam.
- 6 Because the exams have time limits, and you need to get used to answering the requisite number of questions within the allotted time.
- 7 The title of a course
Details of what the course offers
Whether there are pre-requisites for attendants
What the training company is prepared to do if attendants don't have the minimum knowledge necessary to be on the course.
- 8 You lose your certification until you take an update.

Key B

- 1 a MCSA b MCSE c MCT d MCSA
- 2 a True b False c False d True e False
f True g True

INTRODUCTION

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Robotics is the study of robot systems.

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

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

Computerised (operated or controlled using a computer) versions of common household items, such as fridges and washing machines, are becoming available. These devices have touch-sensitive display screens and can be connected to the Internet to enable **email** (electronic mail) and **browsing** (moving from webpage to webpage using a Web browser program). **Computerised fridges** can use radio-frequency tags to keep track of the items in the fridge, suggest menus or provide a shopping list.

Computerised fabric patches are electronic computer devices that have **transceivers** (a device that transmits and receives signals). Patches can have a waterproof **circuitboard** (base that holds electronic components), a **Bluetooth** transmitter (a high-speed microwave wireless network system) and a small **motherboard**

(circuitboard that holds the main electronic components of a computer). Special, silver-coated Velcro can be used to connect and re-arrange the patches into different items that provide information or sense the environment e.g. intelligent clothing, money wallets and wall hangings.

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

controlled by **Java applets** (small, self-contained programs written using the Java computer language).

New computer controlled **road traffic navigation systems** will be used in the future to control the movement of cars. Cars will communicate with each and be locked together during journeys. **Drive by wire** systems will stop cars changing lanes if there is no gap. **Communication systems** will provide car users with useful travel information and enable cars to communicate with each other. **Sensors** will be used to monitor car functions and the state of the driver. **Biometric devices** such as retina scans (eye scans), voice and fingerprints will be used to provide security systems. The look of cars may also be changed by using computing devices to control the colour of the bodywork.

Walking robots (mechanical devices controlled by a computer) are being built that help people with physical disabilities and make awkward lifting jobs easier. **Biped** (two-legged) robots and multi-legged robots are useful on stairs and uneven ground. Sporting events such as **Robocup** (a football competition) and Robot Volley Ball are organised for walking robots to develop systems that enable robots to work together.

OBJECTIVES

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

- reading and note-taking
- speaking from notes
- listening to two different versions of a text and comparing them
- making a short presentation.

They should understand and be able to use:

- *can, could, be able to* to describe ability.

They should have a better understanding of terms used to describe developments in IT in

the areas of domestic appliances, avatars and robotics.

STARTER

1 Work in pairs, then have each pair compare with others. This task is likely to promote discussion as there may be disagreement on some developments. Encourage Ss to resolve any arguments by producing evidence from any research they may do outside class. Check for updates on these predictions at www.labs.bt.com/people/pearson.

READING

These texts provide input for Triads, an activity for practising reading and note-taking, speaking and listening skills. Make sure Ss take notes and do not simply write down sentences from the texts. Put a time limit on his part of the activity. Set the time according to the ability of your Ss.

Key 2

A1 Licence to chill

Screenfridge is a fridge with built-in PC. When r.f. tags replace bar codes on groceries, Screenfridge will be able to read them to make menus, hopping lists and track 'use by' dates. Has a touch-sensitive screen linked to the Internet. Can be used as a message centre and be linked to a surveillance camera.

A2 Smart fabrics make for enhanced living

- All these bizarre objects could soon be possible thanks to a system of computerised fabric patches developed by engineers at the Massachusetts Institute of Technology.
- You could wear a system as a scarf today and a belt tomorrow.

B1 Dawn of the cyberbabes

EVAs can be used in call centres, e-commerce, etc. to give illusion of personal service cheaply. They can make gestures and imitate moods. EVAs utilise two features of website design: ability to make images look 3D and to search and retrieve information from data banks quickly.

EVAs are programmed with information such as product details and have a search engine to interpret customer queries. They can add answers to new questions to their database. They're run via a Java applet.

B2 The future of cars

- Road traffic navigation systems will be much more advanced.
- We will be able to tell our computer what time we want to arrive and it will be able to negotiate slots with the traffic management systems for the appropriate roads to ensure we arrive there on time.
- It will be possible to more than double the capacity of the roads.

- Driving will become safer, faster, and easier as news and information will be supplied to the driver.
- Identification systems will protect against crime.

C1 Walking robot carries a person

- Its creators at Waseda University in Tokyo and the robotics company Tsmuk hope their two-legged creature will one day enable wheelchair users to climb up and down.
- This biped robot, which its creator prefers to call a two-legged walking chair rather than a wheelchair, will eventually enable people to go up and down the stairs.
- Multi-legged robots will be more useful than so-called "caterpillar models" for moving over uneven ground.
- It will take "at least two years" to develop the WL-16 into a working model.

C2 Sporting robots

There is an annual robot football match. Each year the players have to be more skilled. There will soon be a humanoid league for two-legged robots. BAAS run a two-a-side robot volleyball competition. One of the key elements is getting robots to work together.

Rush Robnett is working on swarming robots – cheap robots who together are more efficient than smarter individual robots.

3 Make sure the roles are clearly understood and that the rotation is clear. If you have a group of two, use the roles of Speaker and Reporter only. The Speaker can then judge on the accuracy of the Reporter. The roles are:

The *Speaker* explains the main points of one text using only their notes. Books closed.

The *Reporter* listens carefully and reports back to the Speaker a summary of the main points.

The *Judge* listens carefully to both Speaker and Reporter and points out any mistakes, main points omitted or additions the Reporter has made. Judges can make notes if they wish.

Where there is dispute, Ss should refer back to the original texts.

It's a good idea to collect brief texts on other developments in IT so that you can repeat this activity at other times. It requires little preparation and is a useful standby when you have to cover a class at short notice.

4 Ss should list any predictions in their texts individually, then compare and discuss with others who have read the same texts. You can choose to set this task on the texts which the Ss read for Task 2 or ask them to do the task using texts they have not already read.

Key 4

A1

- 1 Barcodes in the packaging of groceries will soon be replaced with radio-frequency tags that can be read at a distance and with greater reliability.
- 2 The tags will include additional information such as the 'best before' date and even nutritional data.

B1

- 1 Eighty per cent of call centre requests could be dealt with by an EVA.
- 2 EVAs could provide the illusion of personal service without the cost.

C2

- 1 By mid-21st century, a team of fully autonomous humanoid soccer players will win a soccer game, complying with the official rules of FIFA, against the winner of the most recent World Cup.

LANGUAGE WORK

Ability: *can, could, be able to*

Write the Student's Book examples on the board and distinguish between *could* for general past abilities and *was/were able to* for past ability on specific occasions. A few contrasting examples may be helpful:

- 1 *My computer crashed yesterday but I was able to retrieve all my data.*
- 2 *When I was a student, I could run really fast.*

5 Set this for individual work, then compare answers with a partner. A websearch for Professor Warwick will update you on his current research.

Key 5

- 1 being able to
- 2 could
- 3 was able to
- 4 can
- 5 cannot
- 6 to be able to
- 7 will be able to
- 8 could
- 9 could
- 10 would be able to

6 Set this for individual work. As an additional task, Ss can attempt to identify the sources of these sentences with the help of the titles of the Task 2 texts. To correct their work, they can compare answers with a partner or search the original texts.

Key 6

- | | |
|---------|------------|
| 1 will | 5 unlikely |
| 2 could | 6 likely |
| 3 could | 7 will |
| 4 will | 8 will |

PROBLEM-SOLVING

7 Do this in small groups. First elicit some examples of domestic appliances and some possible functions an in-built computer would allow it to perform. Then let groups work together providing help as necessary. Ask selected Ss to read out some of their ideas.

SPEAKING

8 Inevitably, some of the websites listed will no longer be active or the addresses will have changed. Ss should also use printed sources to make their report. Limit the presentation time to a few minutes only and ask Ss to field questions from the class also.

WRITING

9 For individual work in class or for homework. Ss should have their text read by at least one other student who may mark any area where he or she has difficulty understanding. The author should then decide whether the text can be made clearer at that point.

SPECIALIST READING**Key A**

- 1 Connectivity, i.e. the problem of connecting different portable computing devices together.
- 2 Ericsson, IBM, intel, Nokia and Toshiba.
- 3 It uses low power, is very small and is very cheap.
- 4 An operating frequency band.
- 5 Laptops, PDAs, cellphones, wired telephone access points, wristwatch devices, headphones, digital cameras.
- 6 It has a very low radiation level.
- 7 Frequency hopping and 40-bit encryption.
- 8 Feedback from the remote side of the link sets the output power of the transmitter to the lowest level that gives error-free operation.
- 9 It was decided not to make the system a fully-fledged LAN, to keep down power consumption and cost.
- 10 To prevent simultaneous operation by different devices on the same frequency.
- 11 a The transmission power can be kept very low.
b It increases the number of devices that can be used in the same area.
c It increases battery life.

Key B

- 1 a iii b v c i d vi e vii f ii g iv
- 2 a False b False c True d True e False
f False g True

INTRODUCTION

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

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

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

Homo Optimus is the name given to biologically optimised humans.

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

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

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

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

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

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

OBJECTIVES

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

- reading and note-taking
- listening and note-taking
- arguing a case
- writing a summary.

They should understand and be able to use:

- predictions with the Future perfect and *It* in subject position.

They should know and be able to use terms used in discussing the future of IT.

STARTER

1 and 2 Task 1 is the individual phase of a group task. As a variation, you can ask Ss to work in small groups. Set each group one of these areas to consider. Then regroup so that representatives of all three areas are together to discuss their predictions for Task 2.

READING

The future of Information Technology

3 This is pre-reading for the jigsaw reading Task 4. It should be done individually. Note the use of the Past perfect after *as though* in the last sentence of paragraph 2. We can use *as though* and *as if* in this way for unreal comparisons.

Key 3

- 1 Using the text and our knowledge of the world, we can infer that his argument is: Both hardware and applications are converging.

Computers, phones and other electronic items use the same technology and can perform similar functions. With the development of the Internet, information, entertainment, communications, shopping, commerce and education are becoming one.

- 2 In terms of mental capability, there will be no difference.
- 3 Each generation of computers helps design the next generation.
- 4 Computers will respond to spoken language.

4 If your Ss need extra help with this task, have them work first in groups of three with each student reading the same text, then compare predictions before regrouping for the information exchange in Task 5. Otherwise, group them A, B and C with each student noting predictions from a different text. The three areas covered by the extracts are Commerce, Work, Humans and Computers.

Key 4

Text A

- 1 Area of IT: Commerce
- 2 Predictions:

The electronic marketplace will bring customers and suppliers together in smart databases and virtual environments, with ID verification, encryption, translation, billing, taxation and electronic funds transfer, automatic accounts and auditing.

Services will be based on voice processing.

E-cash can be completely global and could be used as a de facto standard. Its growing use on the Net will lead to its acceptance on the street and we may hold a large proportion of our total funds in this global electronic cash.

People will increasingly buy direct from customised manufacturers. Shops will be places where people try on clothes, not buy them.

Text B

- 1 Area of IT: Work
- 2 Predictions:

Many jobs will be automated and new jobs will be created in the new technologies. There will be virtual companies with a small core of key employees supported by contracted workers as required, possibly working from telework centres. The desks they will use will have multiple flat screens, voice interfaces, computer programs with human-like faces and personalities, full-screen video-conferencing and 3D sound positioning. Connections will be wireless. Workers will be fully mobile and could stay in touch via satellite systems. Tools they might have include: communicator badge, earphones to listen to their emails, and glasses or contact lenses to display information.

Text C

- 1 Area of IT: Humans and computers
- 2 Predictions:

By around 2030, we may be able to link our brains with computers, giving us so much extra brainpower. Geneticists may have created the first biologically optimised humans. Linking them and computers would create something with the body of an Olympic athlete and a brain the size of the planet. This new form may converge with the machine world, meaning Homo Sapiens could become extinct, perhaps as early as 2200.

- 5 For this exchange and discussion phase, follow the task rubric.

LANGUAGE WORK

Predictions (2): Future perfect and *It* in subject position

- 1 Future perfect
Write 2020 or any other future date on the board and elicit developments we will have by that date – simple noun phrases are sufficient, for example, *computer-guided cars*. Then show how we can link date and development to make a prediction using the

Future perfect. For example,
By 2020 engineers will have designed computer-guided cars.

If some of the developments elicited are less likely, use the opportunity to demonstrate *may*, *might* and *could* in place of *will*.

- 2 Predictions with *It* in subject position
Write predictions on the board like these:
 - 1 *I think computers will be used to develop other faster computers.*
 - 2 *We may work from telework centres in future.*

Elicit other examples of opinions like these. Then write the equivalent statements with *It* in subject position:

- 1 *It's likely that computers will be used to develop other faster computers.*
- 2 *It's possible that we'll work from telework centres in future.*

Elicit the similarities and difference between the first and second sets of statements. Both are opinions and are similar in meaning and in the certainty of the prediction, but the second set are made to appear less subjective by using *it* in subject position.

6 Do this individually, then compare in pairs.

Key 6 (examples only)

- 1 Computing power will have increased ten times.
- 2 Interfaces will have become much easier to use.
- 3 Flat screen LCD monitors may have replaced all others.
- 4 Teleworking might have replaced working in offices.
- 5 Money will have been replaced by e-cash.
- 6 Shops may have disappeared because of on-line shopping.
- 7 Machine intelligence may have overtaken human intelligence.
- 8 The Internet may have been replaced by a better system.
- 9 Keyboards may have disappeared.
- 10 Speech recognition will have been perfected.

7 For individual work, then pair and compare. Note that adverbs such as *well* and *easily* do not appear in the transformation. The choice of certainty expression reflects their meaning.

Key 7

- 1 It is certain that we won't use magnetic tape.
- 2 It is probable that we will have electronic chips in our bodies.
- 3 It is likely that computers could be used to develop other computers.
- 4 It is unlikely that we will replace teachers with robots.
- 5 It is possible that we will develop alternatives to silicon.
- 6 It is very unlikely that we will have replaced the motor car before 2020.
- 7 It is highly probable most people will use colour laser printers in the next few years.
- 8 It is certain that we will have more virtual personalities on the Web.
- 9 It is possible we will adopt Bluetooth as a standard for wireless applications.
- 10 It is quite likely that doctors will be able to operate on patients at a distance.

SPEAKING

8 Do this individually. Although Ss will have to choose one side for Task 9, they need to consider both sides as preparation.

9 Play the recording, pausing after each speaker. Ask Ss to compare with someone who has taken notes for the same side.

Key 9**For the first part of the statement**

Speaker A We'll have the right hardware by 2020. We'll know how the brain works by 2030. After that we'll be able to recreate it.

For the first part of the statement, considers second part possible

Speaker C Rate of change is accelerating. It's only a matter of time before these artificial children of ours are able to outdo us. If we play it right, machines will look after us. If we get it wrong, machines may replace us. And it could happen sooner than we imagine.

Against both parts

Speaker B Not with today's computers but if we start having parallel computers we will begin to make a start reproducing some of the higher functions of the human brain. But we'll never be able to program in human emotions, moral responsibility and the uniqueness of the individual.

10 Place the Ss in groups of four, two for and two against. Ask them to try and reach agreement for or against the proposition or a compromise statement of their own.

WRITING

11 Ss should combine their notes from Tasks 4, 5, 8 and 9 for this task.

SPECIALIST READING**Key A**

- 1 That anything is possible if you really put your mind to it
- 2 All the details of his passport, bank account, medical records and driving licence
- 3 Shopping
- 4 Software programs, networks, telephones and machines with a degree of intelligence built in
- 5 Increasing the speed of evolution
- 6 The deluge of information
- 7 Watching TV became interactive and therefore more active
- 8 a Keeping hospital wards clearer by putting people on-line
b A pack for heart attack victims that monitors their progress and uploads information via a radio link back to the hospital
- 9 We will be eclipsed by a supercomputer more powerful than the human brain

Key B

- 1 a vi b v c i d vii e iii f iv g ii
a True b False c False d True e True
f False

INTRODUCTION

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

OS X is an operating system designed for Apple computers.

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

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

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

AMD (Advanced Micro Devices) is a company that competes with Intel Corporation to design and supply processors and other chips for computing systems.

A **64-bit processor** is an electronic chip for controlling a computer, that is faster than earlier devices. It processes **64 bits** (binary digits) at a time instead of 32 bits used by earlier devices.

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

mega in the decimal system

= 10^6 = 1 000 000 (one million)

mega in the binary system

= 2^{20} = 1 048 576 (approximately one million).

teleworking is working at a distance

binary is a system of numbers with 2 as its base

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

megabyte is approximately one million bytes of information

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

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

multi-tasking means performing many tasks at the same time

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

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

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

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

autocorrect is a wordprocessing feature which corrects by itself

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

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

OBJECTIVES

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

- defending a decision
- listening and note-taking.

They should understand and be able to use:

- cleft sentences.

They should know and be able to use prefixes used in IT terminology and *-ise* verbs.

STARTER

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

Key 1

Arguments could include:

- 1 national newspaper
 - paper cheap to produce, easy to read on the train, recyclable, people often buy other goods at the same time
 - electronic always up to date, no waste
- 2 IT textbook
 - paper can study anywhere without expensive reader
 - electronic quickly out of date
- 3 laser printer manual
 - paper easy to refer to without a computer
 - electronic rarely used, can be updated easily
- 4 Shakespeare's plays
 - paper read for pleasure at any time, a book to keep
 - electronic can be packaged with hyperlinks on difficult passages and references, video backup, etc.
- 5 detective story
 - paper can be read anywhere, e.g. on a plane
 - electronic disposable literature, read once and throw away
- 6 travel guide to India
 - paper good for backpackers, easy to use anywhere
 - electronic more information, updated easily, could select only the sections you need
- 7 schoolbooks
 - paper study anywhere
 - electronic no weight problems, updated easily, other study aids can be included
- 8 encyclopaedia
 - paper good quality illustrations, a book to keep
 - electronic easily updated, easy cross-references – hyperlinks

LISTENING

2 Do this in whole class mode and record Ss' ideas on the board or do it individually with Ss recording their predictions.

3 Play the recording pausing after each speaker to allow time for note-taking.

Play again to check answers. At the same time, discuss the Ss' predictions against the actual points made by the speakers.

Key 3

Speaker	Points for	Points against
telecommunications engineer	Books on technology are out of date before they are printed.	
author	People can read my books anywhere.	
electronic publisher	It's cheaper so we can publish books with a small readership.	
developer of an ebook reader	Will replace throwaway books, technical books and schoolbooks.	
keen reader		Not cheap because of time and printing out costs. Like the feel of books. Less likely to be stolen than ebook readers. Paper lasts longer than other storage media.

LANGUAGE WORK**Emphasising: cleft sentences**

Demonstrate the *What ... be* cleft sentence using the Student's Book examples:

- 1 We need an electronic version available anywhere and updated regularly.
- 2 What we need is **an electronic version available anywhere and updated regularly.**

Note that the stress falls on *electronic*.

Write a clearly false statement on the board to elicit the *It is/was ... that* cleft sentence. For example,
RAM permanently stores the computer startup instructions.

Ask the class to correct the statement. Elicit,
ROM permanently stores the computer startup instructions.

Show how the correction can be emphasised by using a cleft sentence.
It's ROM that permanently stores the computer startup instructions.

Note that the tonic falls on *ROM*. Ask the class to correct a few more examples in the same way. Vary the position of the incorrect item to show that any part of the sentence can be emphasised in this way.

4 Do a couple of examples with the class. Demonstrate that both forms of cleft sentence can be used to emphasise the subject and object but the *It is/was ... that* should be used when other parts are to be emphasised. For example,

- 1 *I like the fact that my books are available everywhere.*
It is the fact that my books are available everywhere that I like.
OR
What I like is the fact that my books are available everywhere.

- 2 Bill Gates introduced the Windows NT operating system *in 1993*.
ONLY
It was in 1993 that Bill Gates introduced the Windows NT operating system.

Compare answers in pairs and check in plenary.

Key 4

- 1 It is the fact that my books are available everywhere that I like.
- 2 It was in 1993 that Bill Gates introduced the Windows NT operating system.
- 3 It was Bill Gates who/that introduced the Windows NT operating system in 1993.
- 4 It was the Windows NT operating system that Bill Gates introduced in 1993.
- 5 What I need quickly is information.
- 6 What ebooks will replace are all the throwaway books we read.
- 7 It is ebooks that will replace all the throwaway books we read.
- 8 What it is not is cheap.
- 9 It is the look and feel of books that I like.
- 10 It is reading off a computer screen that I don't like.

5 Most of these statements are in note form; hence the articles have been omitted. Make sure Ss restore them when they correct the statements. Set the task for individual work and correct in plenary. Get Ss to read out their answers with the correct intonation.

You can also use this brief history of PCs to revise past question forms. Get Ss to make questions, then practise them in pairs. For example,
Who demonstrated the first mouse?
What happened in 1968?
What did Engelbart do?

Key 5

- 1 It was Gates and Allen who/that founded Microsoft in 1975.
- 2 It was the ZX80 that Sinclair launched in 1980.
- 3 It was in 1990 that Windows 3 was introduced.
- 4 It was Intel who/that designed the first microprocessor.

- 5 It was the first Apple Macintosh that appeared in 1984.
- 6 It was the OS X operating system Apple launched in 2001.
- 7 It was the BBC Micro that Acorn produced in 1982.
- 8 It was in 1993 that the Intel Pentium was launched.
- 9 It was a personal computer with a Microsoft MS-DOS operating system that IBM introduced in 1981.
- 10 It was in New Mexico that Microsoft was founded in 1975.

6 This revises ways of expressing requirements presented in Unit 22 and ability from Unit 23. Set this for individual work.

Key 6

- 1 was able to
- 2 mustn't
- 3 need
- 4 have to, must
- 5 had to
- 6 could
- 7 be able to
- 8 could
- 9 can
- 10 needn't

WORD STUDY

Prefixes, -ise verbs

Build up these tables on the board starting with quantity. Write some of the prefixes in and elicit the others and their meanings. Ss may know other prefixes such as *nano* and *pico* from their study of electronics but these tiny units are less often used in IT. Elicit as many examples as your Ss can provide.

Repeat this for the prepositions table and other common prefixes they may know.

7 Do this individually, then compare in pairs.

Key 7

- 1 teleworking

- 2 binary
- 3 interface
- 4 megabyte
- 5 interactive
- 6 macro(program)
- 7 multimodal
- 8 supercomputer
- 9 Automatic
- 10 microprocessor
- 11 multi-user *system*
- 12 autocorrect

*synchronous
- module*

8 For individual work or can be used as a test as all the -ise verbs have been used earlier in the book.

Key 8

- 1 Players let you group songs into playlists and *randomise* the selection.
- 2 If you adopt differential backup, this *minimises* the size of your backup set.
- 3 Most hotels use *computerised* systems.
- 4 Software developers can produce *customised* solutions.
- 5 Some software houses produce *specialised* applications.
- 6 Utilities can be *categorised* as editors, filters or communications programs.
- 7 You can protect data by putting it in a form only *authorised* users can understand.
- 8 It is an offence to make *unauthorised* copies of software.

SPEAKING

9 Play recording 4 again or refer Ss to the listening script to note the specifications of the reader described. Ss can compare their notes in small groups and then decide together the best specifications for an electronic book reader. If Internet access is possible, Ss should compare their specifications with commercially available readers such as those described at: www.rocket.com

10 Do this in plenary. Ss should defend their specifications and be prepared to take questions from the class.

Listening Script

UNIT 1

Computer Users

Primary school teacher We've got a new program with 3D graphics to encourage young children to tell stories. We tried it out last term and now we use it regularly. There's a mat in front of the monitor, like a carpet. There are pressure pads under the mat. When the children stand on them, they can move about inside the pictures on the screen. If they stand on the right, they, er, can move to the right, and so on. The good thing is that it works better if there are more children on the mat. This encourages them to work together.

What I like about this program is that if you ask the children what they've been doing, they don't say, 'We've been working with the computer', they say, 'We've been telling stories'. The computer doesn't get in the way of learning, it's just a tool. We don't get that reaction when we sit them down at a keyboard.

Open University student I've had a computer for about, oh, three years now. I'm an OU student doing a degree in mathematics. I work full-time so I study at home in the evenings and at weekends. Some Saturdays there are tutorials I can attend in town but mostly I work alone. I use the computer to write my assignments. I also use the Internet to email my tutor if I have any problems with the course work. There's a help group too on the Web made up of other students doing my course...not just here in the UK but around the world. We can chat about assignments and help each other out if we're in difficulty.

Louise, aged 6 Well, I make cards for my friends. I made one for Mary's birthday last week. I use Word and you go into clipart. Then these things come up on the screen. And you can click on any one like animals and two people with a heart, and a star and a hat. I've got CD-ROMS. I like Splat the Cat and Pets 3. You click on Go to the Adoption Centre, then you go to Pick a Pet and you can choose what you want, a cat or a dog. And you can give it a name and feed it. The one I'm going to adopt is a cat... And you've got to give your cat a name. But first I'll take its picture, then I'll save it.

Artist I paint mainly figures in imaginary interiors. Erm, they represent myths. I work in acrylics although I also make woodcuts. Erm, I keep photographs of

most of what I've done, apart from the work I've destroyed...the ones I didn't like. I've scanned in about a third of these photographs, around 100 paintings, to make a CD. I've organised the paintings into themes and added a soundtrack so that each group of paintings is accompanied by music. Erm, I'll send the CD to dealers. In the past it would have been slides. I'm also going to start my own website to try to sell directly. The difficult thing is trying to get people to visit your site.

UNIT 4

Peripherals

PART 1

- A** What's the difference between an ordinary camera...a conventional camera, and a digital camera?
- B** At the most basic level, a digital camera isn't much different from a conventional camera. There's a lens, a viewfinder and it takes pictures. The only fundamental change is that a Charge-Coupled device – a CCD – is used in place of the film.
- A** What's a CCD?
- B** It's an assembly...a set of thousands of photo-transistors – one for each pixel in the image. You know what a pixel is?
- A** Yes, it's a kind of dot...it makes up a picture, an image on a screen.
- B** It's short for picture element. Well, each pixel in the CCD consists of three photo-transistors, one covered by a red filter, one by a blue one and one by a green. Three images – one for each of these colours – are built up. When they're combined, you get a full-colour photograph.
- A** What are the advantages, the plus points, of a digital camera?
- B** You never have to buy another film: there's no film, there's no chemical processing involved. There's no delay waiting for the film to be developed. Instead of being held on film, the images are written to solid state memory. Most cameras have an LCD on the back. You can see straight away what your last shot looks like. If you don't like it, you can delete it and take another. You can download the images to a PC for retouching, manipulating, or printing out.
- A** Do you need any special software?
- B** Yes, but it comes with the camera. It's not difficult to install. You can also use your TV to give slide shows and you can email copies to your friends.

PART 2

- A** Any disadvantages? What's the down side?
- B** Well, they're still pricey but they're getting cheaper. And the quality isn't usually as sharp as a good 35 mm. People forget too that if you want prints, you have to invest in a photo-quality colour printer. That can be expensive and printing costs can also be high – the paper, the ink and so on.
- A** Anything else?
- B** Batteries. You get through them. Digitals are power-hungry, especially if you use the LCD a lot for playback.
- A** If I wanted to buy one, what should I look for?
- B** First of all, the resolution. It's like buying a monitor. The higher the resolution, the more details you'll be able to get in the picture. Don't buy anything less than three million pixels.

A second major specification, and it's tied up with image quality, is the number of pictures you can store before the camera is full and you need to download to your PC. A 1280 by 960 image takes over a megabyte of memory. There's a limit to the number of shots you can store in a flashcard. Fortunately you can compress the data and squeeze a lot more lower resolution shots onto one card.

It's worth considering too the type of battery used. Get one with rechargeable cells.

UNIT 5

Interview: Former Student

PART 1

- Interviewer** What was your course called?
- Paul** The first one was a Higher National Certificate in Computing. That was mainly programming.
- I** Uhum.
- P** And the second one was a Higher National Diploma in Computing Support.
- I** That's quite a change. Did you originally think of being a programmer?
- P** Yes, but when I finished the course there weren't a lot of jobs in programming and there seemed to be more in support. So support seemed a better career move.
- I** Erm, what were the main subjects in your diploma course?
- P** Hardware, Planning, Design, Software

Development, Applications, Communication. We did some programming too.

- I Communication, anything to do with Telecommunications?
- P No, it's, er, language skills. How to get your point over. How to make a presentation. We also had Maths. I've always liked Maths.
- I Was there a practical component in the course?
- P Yes, we had to assemble computers.
- I And how small were the components you started with? Was it down to the level of the motherboard, for example?
- P Yes, we had to link the motherboard and the CPU and all the other components of a computer and make it run.

PART 2

- I How up to date did you feel the course was?
- P I always felt it was a bit behind current developments.
- I That question really relates to my next one. Is there anything that you would add to or take away from the course?
- P I would change the programming component. We did Pascal. That's one reason I didn't want to continue with programming because you never saw any jobs which asked for Pascal. We did COBOL also but that was quite old too and even the banks were stopping using it. A more up-to-date language like C++ would've been better. And I would add work experience. I always felt they should have given some sort of work experience. I know some colleges do.
- I Erm, that would be a great thing because most students have paper qualifications and no practical experience.
- P I think that even if it was just summer work it would be really useful. Employers are looking for qualifications and experience.
- I Which of the subjects you studied have you found most useful in your work?
- P Erm, Learning Access. I've had to do database designs for a couple of customers. Systems Building as well. I've had to go in and replace components for customers and we've had to build computers from scratch. Last Christmas I had to assemble fifty in a four-week period.
- I Phoo, erm, what about Communication? I'm sure a lot of students would see Communication and say that's really the least important thing in the course.
- P Oh, I've found it very useful. I have to go to customers I've never met before

and put my points across. It's been helpful too in going for job interviews. Just getting confidence in presenting yourself.

- I Did they give you any practice in explaining things to non-specialists? In simple, non-technical ways to users?
- P What you had to do in front of a video camera, was to choose a subject and, erm, break it down so that everyone could understand it. Even though your classmates were all technically-minded, you had to make it so that the teacher could understand. The teacher who was marking it had to understand. If she didn't, she wouldn't pass you.

PART 3

- I Now that the course is over, how do you keep up?
- P That's the difficult thing. You get a lot from work when you're thrown into situations you don't know much about. You have to learn fast.
- I Uhum.
- P I've noticed a few times when I've gone to customers who want something fixed that I don't know about that I learn really fast.
- I So you're teaching yourself?
- P Yes. You have to do this from books and manuals and by reading the PC magazines.
- I Did the college give you any advice on the best magazines to read?
- P No.
- I So how did you get that information? How did you know where to look for help?
- P There was one lecturer. He used to work for a chip company. Even the college technical staff used to ask him for advice. He gave us some advice on where to look. The magazines themselves often recommend books to buy. The Internet is good. You go to the Microsoft websites and the manufacturers' websites also help.
- I That's not something the college gave you. They didn't say, erm, 'Here are a useful set of Web addresses.?'
- P No. There was a set book on support which was useful but it was full of mistakes so you had to check it against other books to make sure what was right.
- I OK. One last question. Would you ever go back to college?
- P Yes, I'd like to do my degree some time but it's getting the time and the money to do this.

UNIT 10

Interview: Computing Support Officer

PART 1

Clive I've got a whole lot of files in a folder which I call 'Contract' which has just grown over the years so if, er, I go into it and let you see it... These are all Word files. Each time a new contract has come along, I've simply added it there and it's got the label sometimes of the client, sometimes it's got a country label. It's got so enormous that I'm...it's now taking time to find things. What I want to do is to create subfolders for certain countries where we have a lot of clients.

Barbara OK ...

- C Starting with Japan, for example, so I want to have Contract as the main heading, if you like, and I want to be able to have subfolders...
- B Underneath there...
- C ...underneath, certainly for Japan, Italy, Finland and Hungary, and there may be others.

PART 2

- B OK. So the way I'll do it is to go through Windows Explorer.
- C So, OK, so how do I get into Windows Explorer?
- B So let's click on Start on your status bar. The Start button and...
- C Er, sorry, where are we?
- B If you bring your cursor down to the very bottom. You see that little status bar that comes up.
- C Oh, right. OK.
- B And there should be a Windows Explorer option...and you don't have one!
- C Erm, how odd.
- B OK. Not a problem though. Instead of clicking on Programs, you can click on Run on your Start menu and just type in the word Explorer and hit...
- C In this box? Just Explore.
- B Explorer. And hit OK. And that should launch it.
- C Oh, yeh.
- B OK. This is Windows Explorer and if you'll notice next to where it says Windows in your C drive there's a little minus sign.
- C Right.
- B If you click on that, that'll just compact your C drive.
- C Single click?
- B Yes. And that just gets it out of the way so now we can see all of our drives.
- C Right.

- 3 And you store everything on DIRDATA? Is that right?
 - Yes.
 3 So right next to your C drive there's a little plus sign. If you click on that.
 - What...? OK.
 3 That opens it up and shows you all your folders.
 - Why are...Does the plus indicate that there are other folders?
 3 Yes. If there were no other folders in there you wouldn't have a little box there. You'd just have the one folder name whatever it was.
 - And what's the minus? Is that just open and close?
 3 Yes, basically. So expand and contract.
 - OK.
 3 And you're storing them in Word, are you?
 - Yes.
 3 So click on the little plus sign next to the Word folder. And that shows you all your folders in Word.
 - Right.
 B And now you want your Contract folder. So we can click once on Contract and you'll notice on the right-hand side it shows us all the files we have within that folder.
 C Right.
 B So what we can do now is...in our Explorer window click on File on the menu bar and click on the word New on the top.
 C Right.
 B And that will bring us another little box up...And click on Folder. And that's going to create a subfolder in Contract because we had Contract highlighted.
 C Ah, OK.
 B And now we can give it a new name. It gives it a default name of New Folder and we want to type in what we want to actually call it.
 C So within...where it says New Folder, I remove that and I put in whatever the name of the new folder is.
 B Yes, you can delete that.
 C So let's put in the new name 'Japan' and...
 B You can either hit Enter or just click outside the box. OK and is that the only folder you want to create?
 C No, I'm going to create Italy, Finland and Hungary.
 B OK so we want to make sure that we have Contract highlighted. Right, now Japan remains highlighted and if you clicked File, New and Folder now it would create a folder in Japan.
 C Ah, so it would create a sub-sub-folder?
 B Right.
 C OK.

- B So you just need to click on Contract to make sure it's highlighted and go File and there you are.
 C So it's the same again. File, New, Folder.

PART 3

- C OK. Now if I want to start moving into that sub-folder some of these files how do I do that?
 B Well, how I would do it is...You'll notice on the left hand...on the left hand side where it's showing you all your folders...that Contract now has a little plus sign next to it...
 C Right.
 B ...because we've created sub-folders within Contract.
 C Uhu...
 B So if you click on the little plus sign next to your Contract folder...
 C Right.
 B ...it shows you your two sub-folders in there.
 C Oh, yeh. OK. So Hungary and Japan.
 B And on your right hand side you're still looking at all of your files that are within Contract.
 C Right.
 B So now you can actually click on one of those files, hold your mouse button down, and drag it over to the sub-folder...
 C OK.
 B ...and that will drop it into the sub-folder.
 C This is one.
 B Yeh. Bring it over and it'll highlight the sub-folders.
 C Just over the top of Japan?
 B Yes, because Japan is highlighted now that's telling you that's where it's going to go.
 C So just like that. As soon as it's highlighted, that's it?
 B Yeh. So if you click on to the Japan folder on the left you'll notice on the right it shows you your file there.
 C Oh, right. How do I go back?
 B Click on Contract again on the left.
 C OK. And that's it.
 B Yeh. And if you actually drag anything over there and you realise you've dragged it to the wrong place, and you're not sure if you dragged it to the right place, there is an Undo. Under Edit on the menu bar.
 C Right.
 B So that's a handy tool. Sometimes you drag something and then your hand twitches and you never know...
 C Right. I think I can do it.
 B OK.

UNIT 13

The World Wide Web

To find the webpage you want, you have to click on a webpage hyperlink or enter a URL, a Uniform Resource Locator, into a browser. The URL is the address of the page. When you do that, the browser sends the URL to a DNS server.

The DNS server is the Domain Name Server. It uses a look-up table to find the IP address of the Web server referred to in the URL. The IP address is a unique, 32-bit set of numbers. Erm, every computer on the Web has its own IP address.

Once the DNS server has found the IP address, it sends it back to the browser.

The browser then uses this IP address to send a request to the Web server. Erm, the request is sent as a series of separate data packets which include both the IP address of the Web server and the IP address of the browser computer. These data packets are first sent to a router computer, which uses the IP address of the Web server to determine the best available route for each packet.

The packets are passed from router to router until they reach the Web server. They may travel by different routes before reaching the server.

As the individual packets reach the Web server, they're put back together again.

The Web server now services the request by sending the requested webpage back to the browser computer. Again it travels as a series of separate data packets from router to router. This time the router uses the IP address of the browser computer to work out the best available path for each packet. As the packets arrive at the browser computer, they're combined to form the webpage you requested and are displayed in your browser.

UNIT 15

Interview: Webpage Creator

Interviewer How long has your site been up?

John Just a couple of months. It's brand new.

I What's your site all about?

J It's called The Movie Shrine, www.themoviesthrine.com, and it's just a site with movie reviews, strange things I've noticed about certain films, and lots of links to other movie sites.

- I Why dedicate your site to this subject?
 J I decided to make a site about movies because I've been a huge movie fan for a long time. Right now, films are my biggest hobby.
- I What makes your site special?
 J I guess my site is just a little less formal than most of the film sites on the Internet. I've tried to make the layout unique and include material for movie fans of all types. It's for people who like movies of all kinds. There are plenty of sites for fans of particular actors or genres of movies like sci-fi, horror, films noir and so on.
- I How did you create your site?
 J I created the site pretty easily using Dreamweaver which is one of the Adobe packages.
- I What was the most difficult part?
 J Oh, the design. Just working out how the site would look and how the pages would link up. I'd tried to put up a couple of websites before but after constructing the main page, I'd lost interest.
- I How did you get your domain name?
 J I got a free domain name from www.domainzero.com. The price of a 'free' domain is that all kinds of advertising is sent to you by email, but that's a small price to pay.
- I Have you registered your site on a search engine?
 J No, I haven't gotten around to registering on a search engine yet. I'm told you have to really persevere to get listed. Yahoo! just seems to swallow submissions.
- I Have you included links to other sites?
 J I include many links to other sites. That may be the best thing about my site, the huge number of links. I'm also in a lot of Yahoo! Clubs and I've linked to them too.
- I Has anyone linked to you?
 J Since my site hasn't been around for very long at all, I don't think anybody has linked to me yet except for a couple of Yahoo! Clubs.
- I How long do you spend updating your site?
 J As often as possible but it's difficult during the week. My studies don't leave me a lot of time and I've got other interests. And I need to watch movies sometimes! Generally the update will take from forty-five minutes to an hour.
- I What sort of feedback do you get from visitors?
 J I haven't really gotten much feedback so far except from people I know and they like it, or say they do! I'm hoping that after more people discover the

site I'll start to get more reactions via email.

- I Do you have any tips for others creating a homepage?
 J Pick a topic you're really interested in. Get a good domain name. Keep your site updated – nobody likes a static site. I would look at lots of other sites for good ideas.
- I What do you intend to do next with your site?
 J I'm going to update the Movie Journal section and I'd like to build in new links.
- I What's your favourite site?
 J It would...my favourite site would have to be the Internet Movie Database, www.imdb.com. That's not a very original answer but that site just has such a wealth of information about every kind of movie that it's probably my favourite.
- I (John's site is no longer running. He's too busy with his studies.)

UNIT 16

Communications Systems

In the short term, computers are certainly going to become more powerful and they'll also get cheaper. Erm, that means they'll become much more commonly available. It's likely they'll be integrated with other devices, erm, and may even become specialised...specialised devices you throw away when they go wrong. Flat panel screens will certainly replace cathode-ray tube monitors almost completely because they take up less space and use less power. They look better as well. Erm, there's likely to be devices used for security, biometric devices for scanning your eye or taking your fingerprints. They'll be used instead of passwords. Printing...printers...colour printers, colour laser printers are becoming cheaper so more printing will be done in colour. Erm, you'll print your holiday snaps straight from a laser. The shape and design of computers are likely to change and become much more varied because we can now construct the motherboards in flexible form. Er, on the software side, companies are trying hard to improve voice control so you'll be able to talk to your computer to control it without using a keyboard.

Erm, yeh, another development which I expect to become more common in the future is media centre computers. This type of computer makes it easy to record video, play DVDs, listen to music and

watch TV. I expect the way that software is sold with change too. Erm, instead of buying individual packages, people may rent or hire the components they need – wordprocessor or whatever – and connect to them over the Internet. Service providers will make different components available and you'll be charged a fee for the ones you use.

In the longer term they won't be able to make computers any more powerful using electronics so other methods may come in for the data signals in the computer. Perhaps laser light or even quantum methods will be used. Computers will probably be integrated more with TV systems and with telephony and become much more communication devices. It's likely much smaller devices will be made...probably built into clothing so that you can walk about wearing a computer which will allow you to communicate wherever you go. At home our fridges, cookers and other devices almost certainly will be computer controlled. In the longer term there may even be devices implanted into our bodies to help people with disabilities. Computers might be implanted into the human brain. We might not call them computers in the future but they'll be everywhere.

UNIT 17

Computing Support

- David** Hello, this is Dell Computers Service Division. My name's David, how can I help you?
Jennifer Hello, my name is Jennifer and we're having a problem with one of our computers.
D Now can you tell me what model of computer you have?
J Yeh, it's an Optiplex GX 270.
D An Optiplex GX 270. OK, is the computer still under warranty?
J Yes, we only got it a month ago. So it should still be covered.
D Can you give me the service tag number?
J Yes, let me look. It's AM 964...70.
D That's AM96470. Wait a moment and I'll just look it up in my database...Is that University of Edinburgh, 21 Hill Place?
J Yes, that's us.
D So can you describe what the problem is?
J Well, it doesn't seem to be playing MIDI sound files from the Internet.

- D Erm, MIDI sound files. Does it play other types of sound files?
 J Yeh.
 D And is it only when you're in the browser on the Internet that you're having this problem?
 J No, we're getting the same fault when we use other programs like...erm... Microsoft Encarta.
 D Right. What operating system are you using?
 J Microsoft Windows.
 D Which version of Windows?
 J It's Windows XP.
 D And what type of processor do you have in the computer?
 J It's got a Pentium 4.
 D And how much RAM is installed?
 J Let's see...512 Megabytes.
 D Is the computer connected to any kind of network?
 J Yes, we have a LAN.
 D What type of network?
 J It's a Windows network.
 D OK. Right. It sounds as if you may have a driver fault. Do you still have the original driver disk you got with the machine?
 J Yes, we've only had it a month so it's all there.
 D Well, you could try to reinstall the sound drivers and see if that cures the problem. If that doesn't cure the problem, can you contact us again and we'll send you out some new drivers to try.
 J OK, I'll give that a try and get back to you if we have a problem.
 D Er, if you're going to contact us again with this problem, can you quote this job number. It's E83095.
 J Er, just a moment. I need to get a pen. Can you repeat that?
 D OK, E...83095.
 J E83095.
 D That's correct.
 J Can I take down your name?
 D Yes, my name's David, David Lister.
 J OK, thank you David and...er...we'll be in touch if there's any further problems.
 D OK.
 J Bye.
 D Bye.

UNIT 20

Interview: The ex-hacker

PART 1

Interviewer Ralph was one of two 18-year-olds arrested in the 1990s for hacking into a large American

company. They got into the CEO's personal files and left a very rude message. Well, he's grown up a bit and has been putting his knowledge to very good use. He's now a computer security expert, a 'white hat' hacker who uses his skills to make cyberspace safer. Ralph, what exactly is hacking and how do you go about hacking into a system?

Ralph Hacking simply means getting into computer systems...you don't have permission to get into. Erm, there are various ways of doing it. You can get in by trying to guess somebody's password. Or you find a bug in a computer system that will allow people with certain passwords to get in where they shouldn't.

I So you're sitting in front of your computer...somewhere, how do you set about getting into someone else's system?

R Sometimes it's very simple. People who hack into systems for a living – because they're employed by companies to test their systems – would say the first thing you do is to phone up someone who uses the system and you say, 'Hello, I'm from your company. We want to test a new system...We need your password, please, so that we can include you in the trial.' People are too trusting. They normally hand it over.

That's the easy way. If that doesn't work, then you find out by trying to connect to it over the Internet. And normally that's not desperately difficult.

Once you connect to the computer it will...ask you to...log on and type an ID and password. You might at the simplest level try typing in 'guest' or 'demo' or 'help' and see what it gives you.

I How can you avoid being hacked into?

R There's a lot you can do but you have to keep at it to keep ahead of the hackers. Erm, you can install firewalls to restrict access to a network. You can have a callback system to make sure remote clients are who they say they are. Having really secure passwords helps. Don't use a common name or a dictionary word or anything short. Check the system regularly using event logs to find failed access attempts.

PART 2

I How did you get into this business in the first place? Were you a computer geek at school?

R I was a computer geek, a young anorak. I got into computers at school.

I discovered that what the computers in the lab would let me see depended on what password I typed in and that's really where I started thinking about security.

I And how did you manage to get into the American company's files?

R I guessed some passwords and so on and because of various very silly mistakes the operators of the system made I managed to get right into the system at the highest level.

I And managed to get into the CEO's personal files.

R Yes, what happened there was that I got into part of the system that said 'Please enter your ID' and then underneath that on the same screen told you what the ID was. It was the most senior ID on the system so I typed it in. It said, 'You're logged on as systems manager, what would you like to do?' And I said, 'I'll have some passwords, please'. And because I was logged on at the highest level it said, 'Whose do you want?' And I said, 'The CEO' because there was an account on the system in his name. And it gave it to me.

I Did you feel terribly excited?

R Yes, absolutely. People sometimes hack for money, for criminal purposes or for political purposes...they want to expose something. But often you hack because you're challenged. Because it's exciting. It is a very big challenge for a couple of 18-year-olds working on a basic PC to link directly to a very powerful machine they've completely penetrated. It was great fun and it's a wonderful feeling and that's why we did it.

We never thought about the legal side of it. My parents knew that the phone bill was horrendous and that I spent an awful lot of time in my bedroom on the computer but they didn't know quite what I was doing.

I How did they track you down?

R Well, because we never really tried to cover our tracks. We would boast to our friends, we would boast to girls. That got us known to the police and the computer crime unit. They arrested us. The guy who arrested us, the detective inspector, I'm now quite friendly with. I see him at computer conferences all over the world. But I met him first when he knocked at my door and took away the contents of my bedroom in black plastic bags.

I Now you're helping companies to avoid people like you.

R Yes, if you want to protect your systems it's a good idea to talk to

people like myself rather than big city consultants...because I know the ways in which I would try to break into your system.

I Do you hackers know each other? Is there a competitive element to all this? Is there a kind of rivalry?

R I think in the beginning people did. You know they would...sit round...talking about hacking and sharing passwords but nowadays because of the Internet...hackers are all over the world and they tend not to know each other and you tend not, because it's so illegal now and so many people are scared of it, people tend not to want to be known.

There is rivalry. Everyone wants to be the first to hack into a really powerful system. The Pentagon gets something like 200 attempts a day to break into their systems.

I Movies sometimes feature hackers.

R I don't go much for the Hollywood Hacker. They show hackers coming into your system via the Internet and stealing all your data. That's not generally what happens. In reality about 75% of all hacks into company computers are done by current staff who are simply misusing the privileges you've given them...

I A recent survey found that four out of ten UK consumers are reluctant to use credit cards for Internet purchases. How risky is it really?

R Some people are nervous about giving their credit card number on the Internet. We've seen in the press, partly due to hackers, partly due to the incompetence of people who are running websites, that you can get databases of credit card numbers. But usually it's the retailers, not the buyers, who get done by people using fake or stolen cards.

Using your credit card on the Internet is no more dangerous than giving your credit card number down the phone or paying at the supermarket with a credit card, throwing the receipt away where somebody can pick it up and then they've got your credit card number and a copy of your signature. The Internet is not as dangerous as that.

My advice is, if you want to buy things on the Internet, get a separate credit card. Ask for a small limit. Then if it gets misused, you've cut your losses. You can buy a pre-paid charge card for small purchases. Long term, smart cards are probably the answer but you would need a reader on your PC.

UNIT 21

Software Engineering

Analyst If I could find out what you do at present. What kind of system do you have at the moment?

Hotel owner Well, we introduced, erm, a computerised system about five years ago but I'm not very happy with it. What we've got is, erm, just a system that allows us to enter bookings as they come in.

A So is everything computerised or...?

H No, it's only the reservations system.

A So what features would you like to add to this?

H Well, there are a number of things. I would like a more sophisticated system that would allow me to link reservations and invoicing. I'd like the system to handle invoices also.

A OK. Now the output. What kind of output are you looking for from this?

H Erm, well there are a number of things I'd like. One is of course the total invoice, a bill for the guests. I'd like it also to display room bookings so that if someone phones up it's easy for the reception staff to identify quickly which rooms are occupied and which are available.

A Is that on the screen?

H Yes, I would like it to be on the screen if possible. A sort of room chart on the screen.

A And the invoices, is it pre-printed forms you use?

H Would pre-printed forms be useful?

A Well, if you have a coloured logo, it's better to have the forms pre-printed.

H Yes, I'd like that. And of course I want the invoice to have details of all expenditure so if the guest has a drink at the bar, extra meals at the restaurant, anything of that nature, it's all detailed. I'd also like the system to generate lists of previous guests so I can send them news of special offers.

A Has the system to print out addressed envelopes?

H If it could, that would be very useful.

A Now, who's going to be inputting the information?

H Right, the main users would be the reception staff. They would be dealing with bookings, largely by phone but some by fax or letter. The accountant, of course, would be using the system to create bills. And, erm, bar and restaurant staff would have to enter sales.

A Are the staff experienced in using computers or would they need a lot of training?

H Reception staff are quite experienced, however, our accountant would need some training as she's used to a paper system.

A What about the bar and restaurant staff?

H Well, I suppose they would be entering only very restricted information on sales.

A Hm. What computer hardware do you have at the moment?

H We've got one PC at reception and one in the office. What would I need?

A One for the accountant, one in the bar and restaurant. And they would have to be networked.

H If they're networked together, that doesn't mean that people can get into the accounts, does it?

A No, it would be password-protected. And the printers?

H I don't want anything too noisy.

A Laser printers tend to be quieter.

Now, it would be useful to talk to the receptionist to get details of the input for the guest records and to the accountant to find out what she needs.

H Great, I'll set up meetings for you. What's the next step?

A I'll come back to you with a plan and we'll check through to make sure it has all the features you want. Then we'll create a program and try it out. We'll have to keep adapting it depending how well it works. And once you're happy with it, we'll put it into service and I'll fix some training for the staff.

H Thanks very much.

UNIT 24

The Future of IT

Speaker A To recreate human intelligence we need speed, we need memory capacity to match the human brain and we need the right hardware. We'll have all this by 2020 but these things aren't enough. We also need to capture the complexity, range and richness of human intelligence. That's more difficult...but we will do it. And we'll do it by reverse engineering of the human brain. What I mean is that we'll explore the human brain from the inside and find out how it works, how it's connected, how it's wired up. We're already well on the way to this. With brain scanning we can see inside the brain. But by 2030 we'll have another instrument for exploring the brain. We'll be able to send tiny scanning robots along blood vessels to map the

brain from the inside. This will give us all the data of how the brain is connected and all the features which enable it to perform as it does. When we know how the brain works, we'll be able to recreate its operation using the powerful computers which will have been developed even before this date.

Speaker B The most important difference at the moment between computers and brains is that computers work in serial and brains work in parallel. This means that we can do incredible amounts of processing compared to what a computer can achieve running for weeks, or even months. What's interesting is not so much that the brain is fast, it's the fact that it operates in parallel. If you look at the way a signal flows down neurons, they don't move extraordinarily quickly. But there are billions of them doing it all at once, whereas in a computer everything has to be done one thing after another.

Many people say we will never have an intelligent computer. They say it's not possible to have a computer that thinks. My own view is that it is possible but not with computers as they are today. If we start having parallel computers, only then I feel we will even start to approach the kind of computing power necessary to begin to make a start to reproducing some of the higher functions of the human brain. But we'll never be able to program in human emotions, moral responsibility and the uniqueness of the individual.

Speaker C What people really don't realise is the accelerating speed of change. They think that a hundred years from now we'll have made a hundred years of progress at today's rate. But we'll see a hundred years of progress at today's rate in twenty-five years because the speed of technical progress is accelerating. Right now we're doubling the rate of technical progress every decade so the next decade will mean twenty years of progress; and the following decade will be like forty. We'll make two thousand years of progress at today's rate this century. Things are changing faster and faster.

Erm, we already have computers that run factories and computers which help to build other computers. It's only a matter of time before these artificial children of ours are able to outdo us. They will think faster than we do. They will make smarter decisions than we do. Who then will be the masters – us

or the machines? If we play it right, machines will look after us. If we get it wrong, machines may replace us. And it could happen sooner than we imagine.

UNIT 25

Electronic Publishing

1 Telecommunications engineer

I need information quickly; it's a vital part of my life. Every technology book in my specialism is out of date before it gets printed so I don't buy technical books. I go straight to the research groups who publish on the Web. Electronic books make good sense to me. Publishing something like a laser printer manual is just a waste of paper. What we need is an electronic version available anywhere and updated regularly.

2 Author

What I like about it is my books are available all over the world. They're available in countries where English-language books are hard to get. It doesn't matter if you live in Beijing or Buenos Aires, people can read my books anywhere.

3 An e-publisher

It's much cheaper to publish electronically than to print. It means we can take risks. We can publish books a traditional publisher wouldn't publish because they have a smaller readership. By 2025 electronic publishing will have caught up with traditional publishing.

4 Developer of an ebook reader

Our reader is the size of a paperback. It holds about 200 books at a time. You can download books over the Internet in a few minutes and you can read for twenty hours before recharging the battery. There's a back light so you can read in any lighting conditions. The print size can be adjusted to any size you like. Pop it in a plastic bag, and you can read it in the bath. I'm confident it will replace all the throwaway books we read when we travel, textbooks that date very quickly, technical books that are out of date as soon as they're printed. It's just right for schools. Children have to carry far too many books. An ebook can hold about 150,000 pages of text so you could have all of your schoolbooks for a year in a paperback-sized package.

5 Keen reader

I've tried it, it's not complicated. I paid a dollar for the first chapter of Stephen King's book and another dollar because I wanted to read the next chapter. But then I thought...there's the time on the Internet trying to get to the site, there's time taken to download it and all that time I'm paying just for being on the Internet. Then there's the printing costs because I don't like reading off a computer screen. It's not cheap. And besides I like the look and the feel of books and the fact that you can take them anywhere and who's going to steal a paperback?

And another thing. Paper lasts from 50 to 500 years. Most electronic storage media are obsolete in ten to twenty years. Magnetic tape stretches, CDs delaminate. Printed books are still the best way to preserve knowledge.

Key to Progress Tests

KEY UNITS 1-5

Task 1

- 1 flash memory key
- 2 keyboard
- 3 clock
- 4 processor
- 5 ROM
- 6 monitor
- 7 cache
- 8 RAM

Task 2

- 1 The computer is turned off and the case (is) opened.
- 2 The new motherboard is checked to ensure it fits the system case.
- 3 Wires and cables are disconnected and (are) labelled with tape.
- 4 All external peripherals are unplugged.
- 5 The add-in cards are taken out.
- 6 The screws holding the motherboard are removed.
- 7 The motherboard is lifted carefully from the case.
- 8 The CPU and memory are added to the new motherboard.
- 9 The new motherboard is inserted.
- 10 The screws are replaced.
- 11 Cards and cables are replaced.
- 12 The computer and monitor are switched on.

Task 3

Not only is computing equipment *getting* smaller, it is getting more sophisticated. *Computers* are part of many machines and *devices* that once required continual *human* supervision and control. Today, computers in *security* systems result in safer *environments*, computers in cars improve energy *efficiency*, and computers in phones provide *features* such as call forwarding, call monitoring, and call answering.

Multimedia *systems* are known for their *educational* and entertainment value – which we call edutainment. *Multimedia* combines text with sound, *video*, animation, and graphics, which greatly *enhances* the interaction between user and *machine* and can make information *more* interesting and appealing to people. *Expert* systems software *enables* computers to 'think' like experts. Medical diagnosis expert systems, for

example, can help doctors pinpoint a patient's illness, suggest further tests, *and* prescribe appropriate drugs.

KEY UNITS 6-10

Task 1

- 1 checking
- 2 to type
- 3 to changing
- 4 work
- 5 to hack into
- 6 phoning
- 7 to scroll
- 8 paying
- 9 to learn
- 10 switching off

Task 2

- 1 After entering the selection criteria, click on the Find button.
OR After you enter the selection criteria, click on the Find button.
OR Before clicking on the Find button, enter the selection criteria.
OR Before you click on the Find button, enter the selection criteria.
OR Enter the selection criteria, then click on the Find button.
- 2 Each MP3 file has a tag which permits extra information to be stored.
- 3 If you forget to save regularly, you risk losing data.
- 4 Start the search by clicking on the Find button.
- 5 The user is aware of the effects of different applications programs but/;however, operating systems are invisible to most users.
- 6 Each side of a DVD has two layers, giving enormous storage capacity.
OR Each side of a DVD has two layers which gives enormous storage capacity.
- 7 The supervisor program remains in memory, therefore it is referred to as *resident*.
- 8 DVD drives read DVD disks (by) using blue laser light.
- 9 Input and output operations are invoked by applications programs but/although/;however, they are carried out by the operating system.
- 10 If you use a simple password, a hacker may guess it easily.

Task 3

MP3 is a set of standards for *compressing* and storing *digital* audio and video. Whereas CDs and WAV files require about 11MB for one minute of sound, MP3 files give you the same *sound* quality in a *format* which requires only about 1MB for each *minute* so a single track takes only three to five *megabytes*.

Computers store sound as digital information. They do this by *sampling* – taking a sample of the sound thousands of times *per* second. CDs store information in a format called CD-DA. This samples 44,000 times *per* second and is broadly similar to WAV.

MP3 files depend on the fact that our *brains* do not detect all *sounds*. An MP3 encoder removes from a WAV file all but the parts we don't *hear*. Sounds above 16kHz are *inaudible* for most people so these can be *removed*. Quieter sounds masked by loud sounds of a similar *frequency* are also removed. The result is an MP3 file which is much *smaller* than the WAV original.

KEY UNITS 11–15

Task 1

- 1 Avoid leaving the email subject line blank.
- 2 Never send very large attachments without asking the recipient's permission.
- 3 You must not use the same password all the time.
- 4 Don't use capital letters; it's considered shouting.
- 5 Before joining a new online group, you should observe for a while.
- 6 It's a good idea to check out the FAQ page before you ask questions.
- 7 Never email any information you want to keep secure.
- 8 You had better not leave a running machine unattended.
- 9 I recommend you delete flames. Don't start a flame war.
- 10 You should not borrow from someone's website without asking permission.

Task 2

- 1 *Telnet* is an Internet service enabling users to log on to their computers at a distance.

- 2 *FTP* is an Internet service used to download files from a server.
- 3 *IRC* is an Internet service allowing users to chat in real time.
- 4 The *Web* is an Internet service making webpages available to millions of users worldwide.
- 5 The *Internet* is a huge number of computers linked together.
- 6 A *LAN* is usually a network connecting computers over a small distance such as within a company.
- 7 *CMC* is communication using computers.
- 8 A *search engine* is an Internet search tool consisting of databases of information that can be searched using keywords or phrases.
- 9 *Subject directories* are hierarchically organised indexes categorised into subject areas.
- 10 A *gateway* is a collection of hardware and software enabling a network to communicate with a dissimilar network.

Task 3

No search engine covers the *entire* Web. The scale is too enormous. Meta search tools may cover forty per cent at *best*. When you use a search *engine*, you are searching a *database*. Keyword search engines build their own *database* of search items. They depend *on* search robots which *browse* the Web stopping at each site to find *keywords* to add to their indexes. Most of them *index* every word they find in a document. These *search* engines can produce a huge number of *hits* for any keyword you enter but many may have no relevance to your search.

Because search engines can only find *Web* pages that are *linked* to other websites or Usenet *news* articles, they cannot find *sites* which stand alone. In addition, they *cannot* evaluate in any way the material they find. The result can be that you have a large amount of irrelevant and inappropriate hits and may *miss* the most helpful site.

Searching for phrases or a *combination* of key words is more effective than searching for *single* words. Most search engines offer advanced search facilities *which* can be used to combine and *exclude* words and phrases from your search.

KEY UNITS 16–20

Task 1

- 1 to find/find
- 2 getting
- 3 to locate
- 4 orbiting
- 5 built
- 6 to calculate
- 7 using
- 8 used
- 9 to be broadcast
- 10 flash

Task 2

- 1 It is possible VoIP phones will revolutionise the way we communicate.
- 2 Mobile phone use will certainly increase each year.
- 3 It's probable new phones will have more and more features.
- 4 The next generation of mobile phones could be introduced next year.
- 5 The new phones might be a big disappointment.

Task 3

- 1 Ensure the PC is disconnected before you remove the case.
- 2 You can widen the picture on your monitor.
- 3 Hackers shut down Hotmail for five hours.
- 4 Although it is not recommended, most people write down their passwords.
- 5 A gateway enables different kinds of networks to communicate.

Task 4

A virus is a program that *infects* computers by attaching itself to other *programs* and replicating itself, i.e. making *copies* of itself. It might also *release* a payload. For example, it might *delete* files from the hard disk. The term 'virus' can be used to refer to a variety of malware (malicious software), including worms and Trojans.

A program virus *attaches* itself to a host program. It then infects other programs that are *run* while the virus is *active*. A macro virus attacks *data* files rather than programs.

A *worm* can propagate without using a host program and is usually *spread* when computers communicate using *services* such as email and peer-to-peer systems.

A *Trojan* is programmed to look like a useful program but *conceals* an *unwanted* payload. It might perform *spying* functions, gathering information about your computer, or it might open a backdoor that gives hackers *access* to your computer. Trojans don't *attach* themselves to other programs or data files.

Sometimes different types of *viruses* are combined. For example, a Trojan might release a worm when *activated*.

KEY UNITS 21–25

Task 1

- 1 You must be able to provide leadership to junior team members.
- 2 Excellent communication skills are essential.
- 3 You have to be able to manage a team.
- 4 You need to have/possess a positive and flexible attitude.
- 5 You must have/possess good resource planning skills.

Task 2

- 1 Laser light *can* travel faster than an electric current.
- 2 In future, domestic appliances *will be able* to report any breakdowns for repair.
- 3 Marconi *was able* to send a radio signal across the Atlantic.
- 4 Professor Warwick had a chip fitted into his arm which *could* open doors and switch on computers as he approached.
- 5 Imagine *being able* to access the Internet from a kitchen appliance.

Task 3

- 1 It was the Intel Pentium that was introduced in 1993.
OR What was introduced in 1993 was the Intel Pentium.
- 2 It was in 2001 that Microsoft launched Windows XP.
- 3 It was the Wap phone that was the first mobile phone to make Internet access possible.
- 4 It was Gordon Moore that Moore's Law is named after.
OR It was Gordon Moore after whom Moore's Law is named.

- 5 What we need is an alternative to silicon.
OR It is an alternative to silicon that we need.
- 6 It was the GPRS phone that became available in 2001.
OR What became available in 2001 was the GPRS phone.
- 7 It is laser light that can switch faster than electric current.
OR What can switch faster than electric current is laser light.
- 8 What Intel did in 1971 was design the first microprocessor.
- 9 What Wap phone users didn't like was waiting for Internet access.
OR It was waiting for Internet access that Wap phone users didn't like.
- 10 What I don't like is electronic books.
OR It is electronic books that I don't like.

Task 4

A chip is basically millions of switches on a tiny *piece* of silicon. Each *switch* is a transistor. Gordon Moore, the co-founder of Intel, was the first *person* to predict that the *number* of transistors on a standard size of silicon *would* double every eighteen months. This *prediction* became known

as Moore's Law. It's not a law of physics *but* developments have shown it to be broadly true. With the number of transistors on a *chip* now approaching fifty million, *even* the most optimistic processor designers are beginning to realise that limits will *soon* be reached.

The problem is that there is a natural *limit* on the number of transistors which can be squeezed onto a chip *before* it melts or the operation of the transistors becomes unpredictable. By the 2010s, chip *designers* expect that processors will be built with 0.07 micron technology. That means the distance *between* circuits will be a 700,000th of a millimetre. To reach even that stage will cost billions of dollars.

So designers have to look at *alternatives* to silicon. Optical computing works on the *principle* that laser light is faster than an electric *current*. Quantum computers would permit a kind of mega-parallel *computing*. Computers which use superconductivity are another *possibility*. Fine-grained multiprocessing which consists of thousands of simple processors working together, may be a *cheaper* alternative. Even biological computing using DNA molecules is being considered.

Progress test – Units 1 to 5

1 Identify these items.

- 1 It's used for reading and writing to electronic chips on a card.
- 2 It's used to input data through keys like a typewriter.
- 3 Its function is to control the timing of signals in the computer.
- 4 It's used to control all the operations in a computer.
- 5 It's for holding instructions which are needed to start up the computer.
- 6 It displays the output from a computer on a screen.
- 7 It's a kind of memory which provides extremely fast access for sections of a program and its data.
- 8 Its function is to hold data read or written to it by the processor.

2 Convert these instructions for fitting a new motherboard into a description in the Present passive.

Example:

Access the PC's system start-up program and note the hard disk's parameters.

The PC's system start-up program is accessed and the hard disk's parameters are noted.

- 1 Turn off the computer and open the case.
- 2 Check the new motherboard to ensure it fits the system case.
- 3 Disconnect wires and cables and label them with tape.
- 4 Unplug all external peripherals.
- 5 Take out the add-in cards.
- 6 Remove the screws holding the motherboard.
- 7 Lift the motherboard carefully from the case.
- 8 Add the CPU and memory to the new motherboard.
- 9 Insert the new motherboard.
- 10 Replace the screws.

11 Replace cards and cables.

12 Switch on the computer and monitor.

3 Complete each gap in this text with a suitable word from this list.

a	efficiency	expert
more	and	enables
features	multimedia	computers
enhances	getting	security
devices	environments	human
systems	educational	example
machine	video	

Not only is computing equipment¹ smaller, it is getting more sophisticated.² are part of many machines and³ that once required continual⁴ supervision and control. Today, computers in⁵ systems result in safer⁶, computers in cars improve energy⁷, and computers in phones provide⁸ such as call forwarding, call monitoring, and call answering.

Multimedia⁹ are known for their¹⁰ and entertainment value – which we call edutainment.¹¹ combines text with sound,¹², animation, and graphics, which greatly¹³ the interaction between user and¹⁴ and can make information¹⁵ interesting and appealing to people.¹⁶ systems software¹⁷ computers to 'think' like experts. Medical diagnosis expert systems, for¹⁸, can help doctors pinpoint¹⁹ patient's illness, suggest further tests,²⁰ prescribe appropriate drugs.

Progress test – Units 6 to 10

1 Complete these sentences with the correct form of the verb in brackets.

- 1 Don't switch on without (check) the A drive for a floppy.
- 2 The Caps Lock key allows you (type) all in capitals.
- 3 You'll have to get used (change) your password each month.
- 4 Changing the motherboard lets your computer (work) faster.
- 5 They tried (hack into) the Pentagon's computers.
- 6 You can get advice by (phone) their help-line.
- 7 The mouse wheel enables you (scroll) up and down the document.
- 8 He objected to (pay) for long-distance calls to use the Internet.
- 9 I want (learn) how to program in XML.
- 10 Before (switch off), make sure you have saved your work.

2 Link these pairs in the most appropriate way.

- 1 Enter the selection criteria.
Click on the Find button.
- 2 Each MP3 file has a tag.
This permits extra information to be stored.
- 3 You forget to save regularly.
You risk losing data.
- 4 Start the search.
Click on the Find button.
- 5 The user is aware of the effects of different application programs. Operating systems are invisible to most users.
- 6 Each side of a DVD has two layers.
This gives enormous storage capacity.
- 7 The supervisor program remains in memory.
It is referred to as resident.
- 8 DVD drives read DVD disks.
They use blue laser light.

- 9 Input and output operations are invoked by applications programs. They are carried out by the operating system.
- 10 You use a simple password.
A hacker may guess it easily.

3 Complete each gap in this text with a suitable word from this list.

brains	format	minute
second	CDs	frequency
MP3	smaller	compressing
hear	per	sound
digital	inaudible	removed
sounds	file	megabytes
sampling	WAV	

MP3 is a set of standards for¹ and storing² audio and video. Whereas CDs and³ files require about 11MB for one minute of sound,⁴ files give you the same⁵ quality in a⁶ which requires only about 1MB for each⁷ so a single track takes only three to five⁸.

Computers store sound as digital information. They do this by⁹ – taking a sample of the sound thousands of times¹⁰ second.¹¹ store information in a format called CD-DA. This samples 44,000 times per¹² and is broadly similar to WAV.

MP3 files depend on the fact that our¹³ do not detect all¹⁴. An MP3 encoder removes from a WAV¹⁵ all but the parts we don't¹⁶. Sounds above 16kHz are¹⁷ for most people so these can be¹⁸. Quieter sounds masked by loud sounds of a similar¹⁹ are also removed. The result is an MP3 file which is much²⁰ than the WAV original.

Progress test – Units 11 to 15

1 Rewrite these warnings and pieces of advice on netiquette (= net etiquette), according to the prompt.

- 1 Don't leave the email subject line blank. Avoid...
- 2 You must not send very large attachments without asking the recipient's permission. Never...
- 3 Don't use the same password all the time. ...must not...
- 4 Avoid using capital letters; it's considered shouting. Don't...
- 5 Before joining a new online group, observe for a while. ...should...
- 6 Check out the FAQ page before you ask questions. ...good idea...
- 7 You must not email any information you want to keep secure. Never...
- 8 Don't leave a running machine unattended. ...had better not...
- 9 Delete flames. Don't start a flame war. ...recommend...
- 10 Don't borrow from someone's website without asking permission. ...should not...

2 Complete these definitions with the correct participle of the verb given in brackets.

- 1 *Telnet* is an Internet service (enable) users to log on to their computers at a distance.
- 2 *FTP* is an Internet service (use) to download files from a server.
- 3 *IRC* is an Internet service (allow) users to chat in real time.
- 4 The *Web* is an Internet service (make) webpages available to millions of users worldwide.
- 5 The *Internet* is a huge number of computers (link) together.
- 6 A LAN is usually a network (connect) computers over a small distance such as within a company.
- 7 *CMC* is communication (use) computers.
- 8 A *search engine* is an Internet search tool (consist of) databases of information that can be searched using keywords or phrases.

9 *Subject directories* are hierarchically organised indexes (categorise) into subject areas.

10 A *gateway* is a collection of hardware and software (enable) a network to communicate with a dissimilar network.

3 Complete each gap in this text with a suitable word from this list.

best	engine	keywords
search	browse	entire
linked	single	cannot
exclude	miss	sites
combination	hits	news
Web	database	index
on	which	

No search engine covers the¹ Web. The scale is too enormous. Meta search tools may cover forty per cent at². When you use a search³, you are searching a database. Keyword search engines build their own⁴ of search items. They depend⁵ search robots which⁶ the Web, stopping at each site to find⁷ to add to their indexes. Most of them⁸ every word they find in a document. These⁹ engines can produce a huge number of¹⁰ for any keyword you enter but many may have no relevance to your search.

Because search engines can only find¹¹ pages that are¹² to other websites or Usenet¹³ articles, they cannot find¹⁴ which stand alone. In addition, they¹⁵ evaluate in any way the material they find. The result can be that you have a large amount of irrelevant and inappropriate hits and may¹⁶ the most helpful site.

Searching for phrases or a¹⁷ of key words is more effective than searching for¹⁸ words. Most search engines offer advanced search facilities¹⁹ can be used to combine and²⁰ words and phrases from your search.

Progress test – Units 16 to 20

1 Put the verbs in brackets in the correct form in this description of GPS.

GPS helps drivers¹ (find) the quickest route and prevents walkers² (get) lost. It allows mapmakers³ (locate) a feature exactly. GPS is made up of satellites⁴ (orbit) the earth combined with mapping software⁵ (build) into receivers. The receivers pick up signals from at least three satellites and use that information⁶ (calculate) their exact position. To prevent terrorists⁷ (use) the system for missile control, the US Defense Department⁸ (use) to build in some error but this is no longer done. GPS is the basis for car navigation systems. If the driver goes off route, the system causes warnings⁹ (broadcast) in the car or makes a light¹⁰ (flash) on and off.

2 Rewrite each of these statements using the certainty expression in brackets to produce a statement of similar meaning.

- 1 VoIP phones may revolutionise the way we communicate. (possible)
- 2 It is certain mobile phone use will increase each year. (certainly)
- 3 New phones will probably have more and more features. (probable)
- 4 It is possible the next generation of mobile phones will be introduced next year. (could)
- 5 The new phones could be a big disappointment. (might)

3 Rewrite each of these statements by replacing the words in italics with *en-/en* or phrasal verbs of a similar meaning.

- 1 *Make sure* the PC is disconnected before you remove the case.
- 2 You can *make* the picture on your monitor *wider*.
- 3 Hackers *closed* Hotmail for five hours.

- 4 Although it is not recommended, most people *record* their passwords.
- 5 A gateway *makes it possible* for different kinds of networks to communicate.

4 Complete each gap in this text with a suitable word from this list.

copies	conceals	run
data	spying	Trojan
attach	attaches	unwanted
active	spread	worm
infects	viruses	delete
activated	release	services
programs	access	

A virus is a program that¹ computers by attaching itself to other² and replicating itself, i.e. making³ of itself. It might also⁴ a payload. For example, it might⁵ files from the hard disk. The term 'virus' can be used to refer to a variety of malware (malicious software), including worms and Trojans.

A program virus⁶ itself to a host program. It then infects other programs that are⁷ while the virus is⁸. A macro virus attacks⁹ files rather than programs.

A¹⁰ can propagate without using a host program and is usually¹¹ when computers communicate using¹² such as email and peer-to-peer systems.

A¹³ is programmed to look like a useful program but¹⁴ an¹⁵ payload. It might perform¹⁶ functions, gathering information about your computer, or it might open a backdoor that gives hackers¹⁷ to your computer. Trojans don't¹⁸ themselves to other programs or data files.

Sometimes different types of¹⁹ are combined. For example, a Trojan might release a worm when²⁰.

Progress test – Units 21 to 25

1 Make each of these essential specifications for an IT Team Leader into a sentence using the words given in brackets.

- 1 Ability to provide leadership to junior team members. (must)
- 2 Excellent communication skills. (essential)
- 3 Ability to manage a team. (have to)
- 4 Positive and flexible attitude. (need to)
- 5 Good resource planning skills. (must)

2 Fill in the blanks with the correct form of *can* or *be able to*.

- 1 Laser light travel faster than an electric current.
- 2 In future, domestic appliances report any breakdowns for repair.
- 3 Marconi send a radio signal across the Atlantic.
- 4 Professor Warwick had a chip fitted into his arm which open doors and switch on computers as he approached.
- 5 Imagine to access the Internet from a kitchen appliance.

3 Rewrite these sentences to emphasise the words in italics.

- 1 *The Intel Pentium* was introduced in 1993.
- 2 Microsoft launched *Windows XP* in 2001.
- 3 *The Wap phone* was the first mobile phone to make Internet access possible.
- 4 Moore's Law is named after *Gordon Moore*.
- 5 We need *an alternative to silicon*.
- 6 *The GPRS phone* became available in 2001.
- 7 *Laser light* can switch faster than electric current.
- 8 Intel *designed the first microprocessor* in 1971.
- 9 Wap phone users didn't like *waiting for Internet access*.
- 10 I don't like *electronic books*.

4 Complete each gap in this text with a suitable word from this list.

alternatives	chip	limit
prediction	before	computing
number	principle	between
current	person	soon
but	designers	piece
switch	cheaper	even
possibility	would	

A chip is basically millions of switches on a tiny¹ of silicon. Each² is a transistor. Gordon Moore, the co-founder of Intel, was the first³ to predict that the⁴ of transistors on a standard size of silicon⁵ double every eighteen months. This⁶ became known as Moore's Law. It's not a law of physics⁷ developments have shown it to be broadly true. With the number of transistors on a⁸ now approaching fifty million,⁹ the most optimistic processor designers are beginning to realise that limits will¹⁰ be reached.

The problem is that there is a natural¹¹ on the number of transistors which can be squeezed onto a chip¹² it melts or the operation of the transistors becomes unpredictable. By the 2010s, chip¹³ expect that processors will be built with 0.07 micron technology. That means the distance¹⁴ circuits will be a 700,000th of a millimetre. To reach even that stage will cost billions of dollars.

So designers have to look at¹⁵ to silicon. Optical computing works on the¹⁶ that laser light is faster than an electric¹⁷. Quantum computers would permit a kind of mega-parallel¹⁸. Computers which use superconductivity are another¹⁹. Fine-grained multiprocessing, which consists of thousands of simple processors working together, may be a²⁰ alternative. Even biological computing using DNA molecules is being considered.