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Кафедра иностранных языков №2

МЕТОДИЧЕСКАЯ РАЗРАБОТКА

по развитию навыков чтения и говорения на английском языке
для студентов 2-го курса
ИЭФ, ФКСиС, ФИТУ
дневной формы обучения

***READINGS IN MODERN INFORMATION TECHNOLOGY FOR
COMPUTER AND ECONOMICS STUDENTS***

МИНСК 2006

УДК 802.0 (075.8)
ББК 81.432.1 я 73
М 54

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М 54 Методическая разработка по развитию навыков чтения и
говорения на английском языке для студ. 2-го курса ИЭФ, ФКСиС,
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Методическая разработка предназначена для развития навыков устной речи на английском языке у студентов 2-го курса ИЭФ, ФКСиС и ФИТУ. Содержит оригинальные тексты по современным информационным технологиям.

Цель разработки — способствовать развитию навыков чтения, понимания и реферирования текстов, расширить лексический запас студентов, а также развить навыки профессионально-ориентированной устной речи.

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UNIT 1. COMPUTER USERS

READING

1. Work in groups. Share information on how you use computers in your free time. Compare answers with other groups and make a list of uses for your class.

PRE-READING

2. You are going to hear four people talk about how they use computers. Before you listen, try to predict the uses they describe.

User	Possible use
primary school teacher Open University student girl (Louise), aged 6 artist	

3. Now listen to the recordings and note the actual uses described.

User	Actual use
primary school teacher Open University student girl (Louise), aged 6 artist	

4. Now listen to the recordings again to find the answers to these questions:

- 1) How does the story-telling program encourage children to work together?
- 2) In what way is the children's reaction to this program different from other uses they make of computers?
- 3) What is the OU student studying?
- 4) What opportunity has she to meet other students?
- 5) What can you do with Pets 3?
- 6) What does Louise do with clipart?
- 7) How did the artist display work to dealers in the past?
- 8) What is the difficulty in selling through a website?

5. How do you think these professions might use computers? Compare answers with others in your group.

- | | |
|--------------------|---------------------|
| architects | musicians |
| interior designers | sales people |
| farmers | landscape gardeners |

6. Work in pairs. Find out this information from your partner. Make sure you use the correct tense in your questions. For example:

download music from the Internet [what site]

A *Have you ever downloaded music from the Internet?*

B *What site did you use?*

- | | |
|----------------------------------|------------------|
| 1) send a video email attachment | [who to, when] |
| 2) fit an expansion card | [which type] |
| 3) replace a hard disk | [what model] |
| 4) fix a printer fault | [what kind] |
| 5) make your own website | [how] |
| 6) have a virus | [which virus] |
| 7) watched TV on the Internet | [which station] |
| 8) write a program | [which language] |

7. Describe how you use computers in your study and in your free time.

SPECIALIST READING

A. Find the answers to these questions in the following text.

1. Name some types of devices that use 'computers on a chip'.
2. What uses of handheld computers are mentioned in the text?
3. What are the benefits of using computers with the following items?
 - a Security systems
 - b Cars
 - c Phones
4. What smart devices are mentioned in the text?
5. What are smart cards used for?
6. What are the advantages of multimedia?
7. What can medical expert systems do?
8. How can computers help the disabled?
9. What types of computing systems are made available to people in remote locations using electronic classrooms or boardrooms?
10. What aspects of computing can people power determine?

COMPUTERS MAKE THE WORLD SMALLER AND SMARTER

The ability of tiny computing devices to control complex operations has transformed the way many tasks are performed, ranging from scientific research to producing consumer products. Tiny 'computers on a chip' are used in medical equipment, home appliances, cars and toys. Workers use handheld computing

devices to collect data at a customer site, to generate forms, to control inventory, and to serve as desktop organisers.

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.

These smart machines are designed to take over some of the basic tasks previously performed by people; by so doing, they make life a little easier and a little more pleasant.

Smart cards store vital information such as health records, drivers' licenses, bank balances, and so on. Smart phones, cars, and appliances with built in computers can be programmed to better meet individual needs.

A smart house has a built-in monitoring system that can turn lights on and off, open and close windows, operate the oven, and more.

With small computing devices available for 35 performing smart tasks like cooking dinner, programming the VCR, and controlling the flow of information in an organization, people are able to spend more time doing what they often do best - being creative. Computers can help people work more creatively.

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.

Connectivity enables computers and software that might otherwise be incompatible and to share resources. Now that computers are proliferating in many areas and networks are available for people to access data and communicate with others, personal computers are becoming interpersonal PCs. They have the potential to significantly improve the way we relate to each other. Many people today telecommute -that is, use their computers to stay in touch as with the office while they are working at home. With the proper tools, hospital staff can get a diagnosis from a medical expert hundreds or thousands of miles away. Similarly, the disabled can communicate more effectively with others using computers.

Distance learning and videoconferencing are concepts made possible with the use of an electronic classroom or boardroom accessible to people in remote locations. Vast databases of information are currently available to users of the Internet, all of whom can send mail messages to each other. The information superhighway is designed to significantly expand this interactive connectivity so that so people all over the world will have free access to all these resources.

People power is critical to ensuring that hardware, software, and connectivity are effectively integrated in a socially responsible as well. People - computer users and computer professionals - are the ones who will decide which hardware, software, and networks endure and how great an impact they will have on our lives. Ultimately people power must be exercised to ensure that computers are used not only efficiently but in a socially responsible way.

B. Re-read the text and find the answers to these questions.

1. Match the terms in Table A with the statements in Table B.

Table A	Table B
a. Edutainment b. Multimedia c. Expert system d. Telecommute e. Information superhighway	1. Software that enables computers to “think” like experts. 2. Use computers to stay in touch with the office while working at home. 3. Internet system designed to provide free, interactive access to vast resources for people all over the world. 4. Multimedia materials with a combination of educational and entertainment content.

2. Mark the following statements as True or False.

- 1) Desktop organizers are programs that require desktop computers.
- 2) Computers are sometimes used to monitor systems that previously needed human supervision.
- 3) Networking is a way of allowing otherwise incompatible systems to communicate and share resources.
- 4) The use of computers prevents people from being creative.
- 5) Computer users do not have much influence over the way that computing develops.

UNIT2. COMPUTER APPLICATIONS

READING

1. Work in groups. List as many uses as you can for computers in one of these areas.

- 1) supermarkets
- 2) hospitals

- 3) airports
- 4) police headquarters

2. Let's talk about cars. Assuming cost is not a problem, what computer applications would make today's cars safer, more comfortable, more secure and more efficient? List your ideas; then compare ideas with others in your group.

SPECIALIST READING

A. Find the answers to these questions in the following text.

1. What tool is often used in data mining?
2. What AI method is used for the following processes?
 - a Separate data into subsets and then analyse the subsets to divide them into further subsets for a number of levels.
 - b Continually analyse and compare data until patterns emerge.
 - c Divide data into groups based on similar features or limited data ranges.
3. What term is used for the patterns found by neural networks?
4. When are clusters used in data mining?
5. What types of data storage can be used in data mining?
6. What can an analyst do to improve the data mining results?
7. Name some of the ways in which data mining is currently used.

DATA MINING

Data mining is simply filtering through large amounts of raw data for useful information that gives businesses a competitive edge. This information is made up of meaningful patterns and trends that are already in the data but were previously unseen.

The most popular tool used when mining is artificial intelligence (AI). AI technologies try to work the way the human brain works, by making 10 intelligent guesses, learning by example, and using deductive reasoning. Some of the more popular AI methods used in data mining include neural networks, clustering, and decision trees.

Neural networks look at the rules of using data, 15 which are based on the connections found or on a sample set of data. As a result, the software continually analyses value and compares it to the other factors, and it compares these factors repeatedly until it finds patterns emerging. These 20 patterns are known as rules. The software then looks for other patterns based on these rules or sends out an alarm when a trigger value is hit.

Clustering divides data into groups based on similar features or limited data ranges. Clusters are used when data isn't labelled in a way that is favourable to mining. For instance, an insurance company that wants to find instances of fraud

wouldn't have its records labelled as fraudulent or not fraudulent. But after analysing patterns within clusters, the mining software can start to figure out the rules that point to which claims are likely to be false.

Decision trees, like clusters, separate the data into subsets and then analyse the subsets to divide them into further subsets, and so on (for a few more levels). The final subsets are then small enough that the mining process can find interesting patterns and relationships within the data.

Once the data to be mined is identified, it should be cleansed. Cleansing data frees it from duplicate information and erroneous data. Next, the data should be stored in a uniform format within relevant categories or fields. Mining tools can work with all types of data storage, from large data warehouses to smaller desktop databases to flat files. Data warehouses and data marts are storage methods that involve archiving large amounts of data in a way that makes it easy so to access when necessary.

When the process is complete, the mining software generates a report. An analyst goes over the report to see if further work needs to be done, such as refining parameters, using other data analysis tools to examine the data, or even scrapping the data if it's unusable. If no further work is required, the report proceeds to the decision makers for appropriate action.

The power of data mining is being used for many purposes, such as analysing Supreme Court decisions, discovering patterns in health care, pulling stories about competitors from newswires, resolving bottlenecks in production processes, and analysing sequences in the human genetic makeup. There really is no limit to the type of business or area of study where data mining can be beneficial.

B. Re-read the text to find the answers to these questions.

1. Match the terms in Table A with the statements in Table B.

Table A	Table B
<ul style="list-style-type: none"> a. Data mining b. AI c. Cleansed data d. Data warehouse 	<ul style="list-style-type: none"> 1. Storage method of archiving large amounts of data to make it easy to access 2. Data free from duplicate and erroneous information 3. A process of filtering through large amounts of raw data for useful information. 4. A computing tool that tries to operate in a way similar to the human brain

2. Mark the following as True or False:

- 1) Data mining is a process of analysing known patterns in data,
- 2) Artificial intelligence is commonly used in data mining,

- 3) In data mining, patterns found while analyzing data are used for further analysing the data,
- 4) Data mining is used to detect false insurance claims,
- 5) Data mining is only useful for a limited range of problems.

3. Complete the following description of the data mining process using words from the text:

Large amounts of data stored in data..... are often used for data..... The data is firstto remove.....information and errors. Theis then analysed using a tool such as..... An analysis report is then analysed by anwho decides if the..... need to be refined, other data..... tools need to be used, or if the results need to be discarded because they are The analyst passes the final results to themakers who decide on the action.

UNIT 3. INTERVIEW: FORMER STUDENT

Paul is 24. He has a Higher National Certificate in Computing and a Higher National Diploma in Computing Support which he completed two years ago. He has been working for a company providing support services for the last eighteen months.

STARTER

1. Study this list of some of the subjects included in his Diploma course. In which of these subject areas would he study the topics which follow?

- 1) Computer Architecture
- 2) HW Installation & Maintenance
- 3) Info Tech Applications (1)
- 4) Info Tech Applications (2)
- 5) Multi-user Operating System
- 6) Network Technology
- 7) Software Development Life Cycle
- 8) Standalone Computer System Support
- 9) Software Development Procedural Lang.
- 10) Data Communications
- 11) Information Systems & Services
- 12) Systems Development
- 13) Communication
- 14) Project Management
- 15) Mathematics for Computing

- a LAN Topologies
- b PC Bus Architectures
- c Modems
- d How to connect printers
- e Unix Operating System
- f Pascal
- g Writing a program
- h Creating a database
- i Maintenance of desktops
- j Word processing and other office applications
- k Binary system
- l Making presentations

LISTENING

2. Listen to Part 1 of the recording to find the answers to these questions:

- 1) Which of the subject areas listed in Task 1 does Paul mention?
- 2) Which additional subjects does he mention?
- 3) Why did he choose to do his Diploma in support?
- 4) What practical work was included in the course?
- 5) Which subject did he particularly enjoy?

3. Listen to Part 2 of the recording and answer these questions:

- 1) What suggestions does Paul have for improving the course? Note a) his suggestions for improvement and b) the reasons he gives.
- 2) Which of the subjects he studied has he found useful in his work? Note a) the subjects and b) examples in the work situation.

4. Listen to Part 3 of the recording to answer these questions:

- 1) In which situations does Paul have to learn fast?
- 2) What sources does he use for help?
- 3) What advice did the college provide on sources of information?
- 4) What was the problem with the set book?
- 5) How does he feel about going back to college?

WRITING

5. Study this description of a computer course. Then write a description of your own computing course, or one of its components, in the same way.

COMPUTER USE AND APPLICATIONS

AIMS:

- 1) To introduce complete beginners to computer systems.
- 2) To give a basic foundation in computer technology and to introduce appropriate terminology.
- 3) To give a description of the major components (hardware and software) which make up a computer system.
- 4) To show how computer systems are used in commerce and industry.
- 5) To give practical experience in using various systems.

DESCRIPTION:

The course is in four parts.

Part 1 Introduction to college computer science facilities, including how to access the computers, the Unix filestore, using email, the editor and simple network commands.

Part 2 The basic structure of computer hardware and systems software. Topics include compilers vs interpreters and memory management.

Part 3 Introduces some more advanced software tools, documentation tools and language processors.

Part 4 Discusses various uses of computers including spreadsheets, databases, communications and impacts on society.

STAFF:

Dr Peter Jones

METHOD AND FREQUENCY OF CLASS:

Two lectures per week with practical exercises once every two weeks.

ASSESSMENT:

Three formal coursework assignments.

UNIT 4. OPERATING SYSTEMS

STARTER

1. Study this screen display and answer these questions.

- 1) How do you enter Unix commands?
- 2) Which Unix commands does it show?
- 3) What is the output of each command?
- 4) What will happen when the last command is entered?
- 5) Which other Unix commands do you know?

2. Study this text title. What do you think it means?

OPERATING SYSTEMS: HIDDEN SOFTWARE

READING

3. Now read this text to check your answer and to find the answers to these questions:

- 1) What difference is there between applications software and operating systems?
- 2) Why is the supervisor program the most important operating system program?
- 3) What is the difference between resident and non-resident programs?
- 4) What are the main functions of an operating system?

When a brand new computer comes off the factory assembly line, it can do nothing. The hardware needs software to make it work. Are we talking about applications software such as wordprocessing or spreadsheet software? Partly. But an applications software package does not communicate directly with the hardware. Between the applications software and the hardware is a software interface - an operating system. An operating system is a set of programs that lies between applications software and the computer hardware.

The most important program in the operating system, the program that manages the operating system, is the supervisor program, most of which remains in memory and is thus referred to as resident. The supervisor controls the entire operating system and loads into memory of other operating system programs (called nonresident) from disk storage only as needed.

An operating system has three main functions: (1) manage the computer's resources, such as the central processing unit, memory, disk drives, and printers, (2) establish a user interface, and (3) execute and provide services for applications software. Keep in mind, however, that much of the work of an operating system is hidden from the user. In particular, the first listed function, managing the computer's resources, is taken care of without the user being aware of the details. Furthermore, all input and output operations, although invoked by an applications program, are actually carried out by the operating system.

PROBLEM-SOLVING

4. Try to find the commands from the lists below which will have these actions.

VMS	Unix
help	write
directory	cp
search	lpr
copy	ls
rename	mkdir
print	date
show users	rm
showtime	man
create/directory	grep
phone	rwho
delete	mv

Action	<i>VMS command</i>	Unix command
List all the files in a directory		
Delete a file		
Rename a file		
Copy a file		
Send a file to a printer		
Obtain help		
Create a directory		
Show date and time		
Show users on system		
Talk to other users on system		
Search for a string in a file		

5. Work in pairs, A and B. Each of you has information about some popular operating systems. Find out from the information you have and by asking each other, the answers to these questions:

Student A

Mac OS The graphically-oriented operating system used on Apple Macintosh microcomputers.

MS-DOS The most widely used operating system ever on PC-compatible microcomputers; MS-DOS has been technologically surpassed in recent years and is no longer being revised.

MVS, VM, OS/390 Operating systems used on IBM mainframes.

NetWare A widely used operating system on local area networks (LANs).

OS/2 The operating system designed for high-end PC-compatible microcomputers; was available in both desktop version and a version for network administration.

Penpoint An operating system designed for pen-based computers.

Windows NT Microsoft Windows operating system built from ideas developed in VMS and used for servers and workstations. More secure and stable than Windows 9X systems.

- 1) Which operating system is used on Apple Macintosh microcomputers?
- 2) What is Penpoint designed for?
- 3) Name one system used on IBM mainframes.
- 4) Which operating system is Linux related to?
- 5) Name an IBM operating system similar to MS-DOS.
- 6) Which operating system replaced MS-DOS?
- 7) Which systems are in fact graphically orientated shells for MS-DOS?
- 8) How many versions of Windows 9X were developed?
- 9) Which operating systems are designed for networks?
- 10) Which operating system is used by DEC VAX minicomputers?

SPECIALIST READING

A. Find the answers to these questions in the following text

1. What did Linus Torvalds use to write the Linux kernel?
2. How was the Linux kernel first made available to the general public?
3. What is a programmer likely to do with source code?
4. Why will most software companies not sell you their source code?
5. What type of utilities and applications are provided in a Linux distribution?
6. What is X ?
7. What graphical user interfaces are mentioned in the text?

Linux has its roots in a student project. In 1992, an undergraduate called Linus Torvalds was studying computer science in Helsinki, Finland. Like most computer science courses, a big component of it was taught on (and about) Unix. Unix was the wonder operating system of the 1970s and 1980s: both a textbook example of the principles of operating system design, and sufficiently robust to be the standard OS in engineering and scientific computing. But Unix was a commercial product (licensed by ATE&T to a number of resellers), and cost more than a student could pay.

Annoyed by the shortcomings of Minix (a compact Unix clone written as a teaching aid by Professor Andy Tannenbaum) Linus set out to write his own 'kernel' — the core of an operating system that handles memory allocation, talks to

hardware devices, and makes sure everything keeps running. He used the GNU programming tools developed by Richard Stallman's Free Software Foundation, an organisation of volunteers dedicated to fulfilling Stallman's ideal of making good software that anyone could use without paying. When he'd written a basic kernel, he released the source code to the Linux kernel on the Internet.

Source code is important. It's the original from which compiled programs are generated. If you don't have the source code to a program, you can't modify it to fix bugs or add new features. Most software companies won't sell you their source code, or will only do so for an eye-watering price, because they believe that if they make it available it will destroy their revenue stream.

What happened next was astounding, from the conventional, commercial software industry point of view - and utterly predictable to anyone who knew about the Free Software Foundation. Programmers (mostly academics and students) began using Linux. They found that it didn't do things they wanted it to do — so they fixed it. And where they improved it, they sent the improvements to Linus, who rolled them into the kernel. And Linux began to grow.

There's a term for this model of software development; it's called Open Source (see www.opensource.org/ for more information).

Anyone can have the source code — it's free (in the sense of free speech, not free beer). Anyone can contribute to it. If you use it heavily you may want to extend or develop or fix bugs in it - and it is so easy to give your fixes back to the community that most people do so.

An operating system kernel on its own isn't a lot of use; but Linux was purposefully designed as a near-clone of Unix, and there is a lot of software out there that is free and was designed to compile on Linux. By about 1992, the first 'distributions' appeared.

A distribution is the Linux-user term for a complete operating system kit, complete with the utilities and applications you need to make it do useful things — command interpreters, programming tools, text editors, typesetting tools, and graphical user interfaces based on the X windowing system. X is a standard in academic and scientific computing, but not hitherto common on PCs; it's a complex distributed windowing system on which people implement graphical interfaces like KDE and Gnome.

As more and more people got to know about Linux, some of them began to port the Linux kernel to run on non-standard computers. Because it's free, Linux is now the most widely-ported operating system there is.

B. Re-read the text to find the answers to these questions.

1. Match the terms in Table A with the statements in Table B.

Table A	Table B
a Kernel b Free Software Foundation c Source code d Open Source e A distribution f X	i A type of software development where any programmer can develop or fix bugs in the software ii The original systems program from which compiled programs are generated iii A complete operating system kit with the utilities and applications you need to make it do useful things iv A standard distributed windowing system on which people implement graphical interfaces v An organisation of volunteers dedicated to making good software that anyone could use without paying vi The core of an operating system that handles memory allocation, talks to hardware devices, and makes sure everything keeps running

2. Mark the following statements as True or False:

- 1) Linux was created in the 1980s,
- 2) Minix was created by a university student,
- 3) Linux is based on Unix,
- 4) Minix is based on Unix,
- 5) Linux runs on more types of computer than any other operating system.

Student B *Questions to Task 5.*

PC-DOS An operating system similar to MS-DOS that has been widely used on IBM microcomputers. **Unix** An operating system used on all sizes of computers, but mostly large ones; available in many versions, such as Linux, HP-UX, Xenix, Venix, Ultrix, A/UX, AIX, Solaris, and PowerOpen.

VAX/VMS An operating system used by DEC VAX minicomputers.

Windows 3.x* Refers to the Windows 3.0 and Windows 3.1 operating environments, and to variants such as Windows for Workgroups 3.11; each of these is a graphically-oriented shell program for Microsoft's MS-DOS operating system.

Windows 9X The operating system that replaced MS-DOS and Windows 3.1, combining the functionality of both programs and much more into a single package; two versions were produced, Windows 95 and Windows 98, although various editions were made available.

Windows 2000 An operating system targeted primarily to corporate client-server applications; available in both a desktop version and a version for network administration.

UNIT 5. APPLICATIONS PROGRAMS

STARTER

1. Conduct a survey to find out who in your class:
 - 1) can name a spreadsheet program
 - 2) has used a spreadsheet
 - 3) can name a database program
 - 4) has used a database
 - 5) knows how to insert graphics into a document
 - 6) can name a wordprocessing program
 - 7) can centre a line of text
 - 8) can disable the autocorrect.

PROBLEM-SOLVING

2. Study these versions of OfficeSuite and decide which version provides the best value for the following users. The versions are listed from cheapest to most expensive.

OfficeSuite Standard	OfficeSuite Small Business Edition	OfficeSuite Professional
<ul style="list-style-type: none"> • word processor • spreadsheet • presentation program • email • PIM 	<ul style="list-style-type: none"> • wordprocessor • spreadsheet • DTP • email • PIM • small business tools 	<ul style="list-style-type: none"> • wordprocessor • spreadsheet • database • DTP • presentation program • email • small business tools

OfficeSuite Premium	OfficeSuite Developer
<ul style="list-style-type: none"> • wordprocessor • spreadsheet • database • DTP • presentation program • email • PIM • small business tools • website editor • image editor 	<ul style="list-style-type: none"> • wordprocessor • spreadsheet • database • DTP • presentation program • email • PIM • small business tools • website editor • image editor • developer tools

- 1) A salesperson who wants to make presentations at conferences.
- 2) An administrative assistant who needs to write office correspondence and send and receive emails.
- 3) A programmer who wants to develop applications tailored to a company's needs.
- 4) A company wanting to produce its own in-house newsletter.
- 5) A company wishing to develop its own website.
- 6) A company which wants to analyze all its sales records.
- 7) A promotions person who wants to be able to edit complex graphics and incorporate them in brochures.
- 8) A company which wants to share documents on a local area network.

SPEAKING

3. Work in pairs: A and B. Each of you has a review of a computer game. Find out from each other this information:

- 1) The name of the game.
- 2) The company who produce it.
- 3) The platform on which it's played.
- 4) The bad points.
- 5) The good points.
- 6) The star rating.

Student A *your game details are as follows:*

Tomb Raider 4: The Last Revelation***
Sega Dreamcast | Core Design/Eidos

Although this is essentially the same game that recently appeared on the PlayStation, some fancy enhancements push this up to accelerated PC level. In fact, *The Last Revelation* is probably the best-looking version so far.

The Dreamcast remains unstretched but the visuals capture the Egyptian mood perfectly. The plot sees Lara returning to what she does best -- raiding tombs in her usual physics-defying manner -- but this time she stays in Egypt rather than globe-trotting.

So, what is *The Last Revelation*? The chances are only a few will ever find out because this is a very tricky game. You will need to prepare for periods of intense frustration and annoyance, punctuated by some superb sequences.

If only Lara would move in the direction you point. If only she jumped when you press 'jump' rather than run those fatal final steps. If only the puzzles were less obscure.

So why bother? Well, the characterization and the storyline are of sufficient quality to encourage perseverance. Also, solving a stubborn puzzle or back-flipping over a chasm is undeniably good fun. This is the best version yet and will do for now, but a radical overhaul is needed before Lara returns again.

Greg Howson

Student B *your game details are as follows:*

Sim City 3000: World edition.

PC I Maxis/Electronic Arts****

The basic game is the same as it was when it first appeared on the Commodore 64: zone land, build roads, set taxes and let simulated citizens build the city of your dreams or nightmares. A huge amount of detail has been added since then, and the World edition integrates hundreds of new buildings, a building editor, a terrain editor, and *a* scenario editor.

You no longer have to build American cities, and you can quickly flip them into a European (German) or Asian (Korean/Japanese) style. You can add landmarks such as the Brandenburg Gate and the Eiffel Tower.

The amount of detail in the 3D buildings, cars and pedestrians is stunning. A new website is introduced also (www.simcity.com). There you can download even more buildings and swap files, buildings, city photos and scenarios with fellow fans.

If you gave up on SC2000, this will restore your faith; and if you haven't played Sim City before, this is a good place to start.

Jack Schofield

SPECIALIST READING

A. Find the answers to these questions in the text below.

1. How do you pay for the applications provided by an ASP?

- a. no charge
 - b. charged according to use
 - c. single payment
2. What two main services does an ASP provide?
 3. How does an ASP ensure that they have enough storage space for the changing needs of customers?
 4. What types of applications are available from ASPs?
 5. Why is it useful for a small business to be able to rent specialist tools from an ASP?
 6. What is one of the best established areas of ASP use?

APPLICATION SERVICE PROVIDERS

If your hard disk is packed to bursting point, the IT department is far too busy to fix your email problems, and your business can't afford to buy the tools that you'd like to develop the company website, then it's time to think about using an application service provider (ASP). Rather than installing software on each machine or server within your organization, you rent applications from the ASP, which provides remote access to the software and manages the hardware required to run the applications.

There are a lot of advantages to this approach. The havoc caused by viruses makes the idea of outsourcing your email and office suite services is an attractive option. It also gives you more flexibility -- you pay for applications as and when you need them, rather than investing in a lot of costly software which you're then tied to for years. Not having to worry about upgrading to the latest version of your office suite or about battling with the complexities of managing an email system, leaves businesses with more time. Time to focus on what they do best.

However, there are some potential pitfalls. To use applications remotely requires a lot of bandwidth, which is only really available from a broadband connection or a leased line to the ASP itself. It is also important to ensure that the ASP will be able to provide a secure, reliable service which will be available whenever you need it.

Providing applications and storage space for vast numbers of users requires some powerful technology on the part of the ASP. This includes security controls and data storage as well as providing the physical links to customers. For the most part, ASPs don't own the data centers that store the information. Instead, they lease space from data storage specialists. In this way, they can be confident of meeting customers' increasing storage requirements by buying more space as it's needed.

There's a wide variety of applications available for use via ASPs. Office suite applications and email services are two of the most generic applications available through ASPs. Large, complex business applications such as enterprise resource

planning tools like SAP are another popular candidate for delivery through an ASP. Other business services, such as payroll and accounting systems are also available. This is particularly beneficial to small businesses which are likely to grow quickly and don't want to deal with the problems caused by outgrowing their existing system and having to move to a high-end package. ASPs also offer a means of using specialist tools that would otherwise prove prohibitively expensive. Small businesses have the opportunity to use such tools for short periods of time as and when they need them, rather than having to buy the software as a permanent investment.

One of the major barriers for small businesses which want to make a start in e-commerce is ensuring that they have sufficient resources to cope with sudden large increases in customers. This means not only having adequate storage for all your customers' details, but ensuring that you have the technology in place to handle stock levels, efficient delivery and large volumes of traffic. It's very rare for an e-commerce business to handle all of these elements by itself, making this one of the best-established areas of ASP use. Being able to respond rapidly to changes in the size of your customer base and the type of product that they want to order from your business, demands more flexibility than traditional software can provide.

B. Re-read the text to find the answers to these questions.

1. Note the advantages and disadvantages of using an ASP.
2. Match the items in Table A with the statements in Table B.

Table A		Table B	
a	Website	i	Set of standard programs used in an office
b	ASP	ii	Facility for storing large amounts of
c	Virus	iii	information
d	Office suite	iv	Capacity of a network connection
e	Bandwidth	v	High capacity Internet connection
f	Broadband	vi	Self-replicating program
g	Data centre	vii	Common enterprise resource planning tool
h	SAP	viii	Application service provider
			Collection of related webpages.

3. Using information from the text, mark the following as **True** or **False**:

- 1) Software from an ASP must be installed locally on a user's computer,
- 2) You need a high bandwidth connection to use an ASP service,
- 3) ASPs usually use their own storage space for customers,
- 4) Using an ASP gives you more flexibility,
- 5) An e-commerce business usually provides all of the required technology itself.

UNIT 6. THE INTERNET

STARTER

1. Match each of the Internet services in Column A with the uses in Column B.

Column A	Column B
1. IRC	a loggings on to your computer at a distance
2. MOOs	b sending and receiving messages
3. email	c downloading a file from a server
4. FTR	d chatting to other users in real-time
5. WWW	e accessing newsgroups
6. Telnet	f browsing webpages
7. Usenet	g taking part in simulations in a shared environment

WRITING

- 1) Never give out your home address or phone number.
- 2) This appliance must be earthed.
- 3) Avoid turning off main power while computer is running.
- 4) It is an offence to make unauthorized access to computer material.
- 5) No smoking, eating or drinking at the computer.
- 6) A machine which has been exposed to a moist atmosphere should be given time to dry out before being put into use.

PROBLEM-SOLVING

2. **Choosing a free ISP** Read these hints on choosing a free ISP. Then decide which of the options available offer the best deal to these users. Be prepared to defend your choice.

- 1) a household with a young family
- 2) a small home-based business
- 3) someone who enjoys online gaming
- 4) someone who doesn't want a lot of spam in their email.

Using a free ISP requires no new technology – all you need is a computer, a modem, a telephone line, and the appropriate software (which is available free of charge when you sign up with the service). Once installed on your PC you can access the Internet as normal, but your connection costs only the price of a local call, and you pay nothing else -- not even for features such as an unlimited number of email addresses, unlimited Web space and original content.

Most of the services are very similar, but it is still worth looking around for a service that offers at least the following features:

CD-ROM or Online sign up

Many free ISPs require you to sign up for their service online (which obviously means you already need to have an Internet connection and some experience with setting up a dial-up networking connection). If you are a complete beginner, you'll need a free ISP which can provide its sign-up software on CD-ROM that will automatically configure your computer to access the Internet.

Local rate calls

Although using the ISP is free, you still have to pay for your online time. Nearly all ISPs however provide local call access numbers. Any free ISP that uses a national rate number or charges an initial setup or administration fee should be avoided.

Email

Having several email accounts is very useful – you can separate business and personal email for example, or provide an address for each member of your family. Many free ISPs also offer only Web-based mail which is great if you need to get into your computer on the move as you can access it from any computer with Internet access. POP3 email however is faster and more efficient and can be downloaded to your PC to read offline – a combination of the two is ideal.

Free Web space

A decent amount of free Web space would be around 25-50Mb. This would be sufficient for most of your own personal website developments. Also check to see if there are any restrictions on your use of Web space, since some free ISPs will not let you use the space for commercial purposes.

Newsgroups

Newsgroups are huge discussion forums on the Internet that are an amazingly rich resource of information and a brilliant way to communicate with other Internet users. Unfortunately they are also the home to some of the most unsavoury content on the Internet (they are largely unmoderated) and as a result many free ISPs restrict access to some or all newsgroups.

Customer Support

Check support line charges; many free ISPs use their support lines as a source of revenue relying on your ignorance to make money from the call.

The target audience is generally Net novices and, as a result, support lines are pretty much jammed all day with queries and connection problems.

Most use premium rate telephone line charges. However, there are a few free ISPs who only charge local or national rates for their telephone helplines.

Reliable Service

Of course all the features in the world won't make a scrap of difference if the ISP is unreliable and you find it impossible to log on. Look out for recommendations from friends and shop around. Interestingly many of the more popular services have become saturated and seem to be in a constant 'upgrading the network' phase.

There is nothing to stop you having more than one free ISP account. Windows will even enable you to run a number of different free ISP connection setups on the same PC so you can easily have multiple accounts and just use the best one on the day.

Option A	Option B	Option C
<p><i>Bigwig</i></p> <ul style="list-style-type: none"> ■ POP3 email accounts each with up to 1,000 aliases ■ Scans all emails for viruses before they reach you ■ 15Mb free Web space ■ Access to 25,000 newsgroups ■ Technical support at 50p/minute ■ Comprehensive online information and easy - to-follow help available 	<p><i>Arsenal</i></p> <ul style="list-style-type: none"> ■ 5 POP3 email accounts ■ Access to most newsgroups ■ 5Mb free Web space ■ Technical support at 50p/minute 	<p>Connect Free</p> <ul style="list-style-type: none"> ■ 5 POP3 email addresses each password-protected ■ Full access to newsgroups ■ Unlimited Web space ■ Free online webpage design service ■ Free access to online multi-player games

Option D	Option E
<p>Bun</p> <ul style="list-style-type: none"> ■ Unlimited email addresses ■ 25Mb Web space ■ Online help section ■ Free access to CyberPatrol for blocking or restricting access to inappropriate content on the Web 	<p>Free 4 all</p> <ul style="list-style-type: none"> ■ Unlimited POP3 email accounts ■ Email virus protection and junk email filters ■ 5Mb of free Web space with option to increase at £1 per Mb per month <ul style="list-style-type: none"> ■ Powerful enough to create quite advanced, functional sites ■ Technical support at local call rates

For further details of ISPs try:

www.net4n0wt.com

www.ispa.org.uk

www.ispc.org

3. Write an article for a newsgroup of your choice. Keep it short and choose a meaningful reference name. Pass it to another student for a reply.

SPECIALIST READING

A. Find the answers to these questions in the following text.

1. What purpose does the Internet address have apart from identifying a node?
2. What data-delivery systems are mentioned in the text?
3. What do IP modules need to know about each other to communicate?
4. How many Internet addresses does a gateway have?
5. What does UDP software do?
6. When does the TCP part of TCP/IP come into operation?
7. What processes are performed by TCP software to provide reliable stream service?
8. What standard protocols are mentioned which are used to deal with the data after TCP brings it into the computer?

HOW TCP/IP LINKS DISSIMILAR MACHINES

At the heart of the Internet Protocol (IP) portion of TCP/IP is a concept called the Internet address. This 32-bit coding system assigns a number to every node on the network. There are various types of addresses designed for networks of different sizes, but you can write every address with a series of numbers that identify the major network and the sub-networks to which a node is attached. Besides identifying a node, the address provides a path that gateways can use to route information from one machine to another.

Although data-delivery systems like Ethernet or X.25 bring their packets to any machine electrically attached to the cable, the IP modules must know each other's Internet addresses if they are to communicate. A machine acting as a gateway connecting different TCP/IP networks will have a different Internet address on each network. Internal look-up tables and software based on another standard - called Resolution Protocol - are used to route the data through a gateway between networks.

Another piece of software works with the IP-layer programs to move information to the right application on the receiving system. This software follows a standard called the User Datagram Protocol (UDP). You can think of the UDP software as creating 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. The UDP software provides the final routing for the data within the receiving system.

The Transmission Control Protocol (TCP) part of TCP/IP comes into operation once the packet is delivered to the correct Internet address and application port. Software packages that follow the TCP standard run on each machine, establish a connection to each other, and manage the communication exchanges. A data-

delivery system like Ethernet doesn't promise to deliver a packet successfully. Neither IP nor UDP knows anything about recovering packets that aren't successfully delivered, but TCP structures and buffers the data flow, looks for responses and takes action to replace missing data blocks. This concept of data management is called reliable stream service.

After TCP brings the data packet into a so computer, other high-level programs handle it. Some are enshrined in official US government standards, like the File Transfer Protocol (FTP) and the Simple Mail Transfer Protocol (SMTP). If you use these standard protocols on different kinds of computers, you will at least have ways of easily transferring files and other kinds of data.

Conceptually, software that supports the TCP protocol stands alone. It can work with data received through a serial port, over a packet-switched network, or from a network system like Ethernet. TCP software doesn't need to use IP or UDP, it doesn't even have to know they exist. But in practice TCP is an integral part of the TCP/IP picture, and it is most frequently used with those two protocols.

B. Re-read the text to find the answers to these questions.

1. Match the terms in Table A with the statements in Table B.

Table A	Table B
a Internet address	i Standard used for software that routes data through a gateway
b Resolution Protocol	ii Standard used by software that moves information to the correct application on the receiving system of a network
c Look-up table	iii Standard used by software that manages communication exchanges between computers on the Internet
d Gateway	iv A 32-bit number identifying a node on an IP network
e User Datagram Protocol	v Stored information used to route data through a gateway
f Transmission Control Protocol	vi A device for connecting dissimilar networks.

2. Mark the following statements as True or False:

- 1) Internet addresses are an integral part of the IP protocol,
- 2) Internet addresses can be written as a series of numbers,
- 3) UDP software provides the final routing for data within the receiving system,
- 4) UDP recovers packets that aren't successfully delivered,
- 5) TCP only works with packet-switched networks,
- 6) TCP only works when it is combined with IP.

UNIT 7. THE WORLD WIDE WEB

STARTER

1. Study this URL (Uniform Resource Locator)

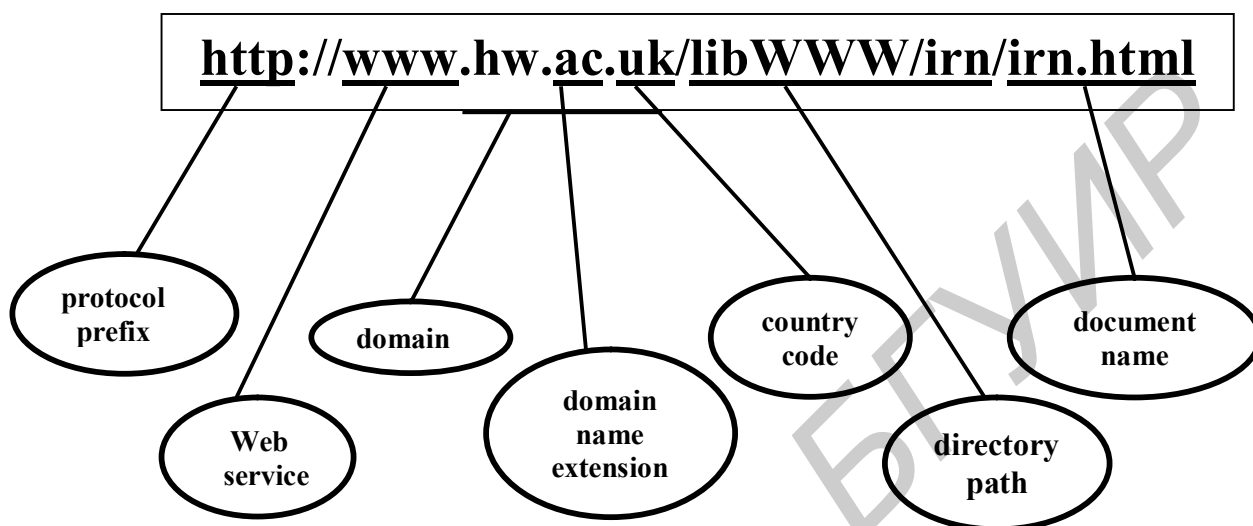


Fig 1. Uniform Resource Locator

Which part of the address tells you:

1. the company is in the UK
2. this is the webpage
3. the type of transmission standard your browser must use to access the data
4. this points to the computer where the webpage is stored
5. this is where the webpage is stored in the computer
6. this is a company
7. this is a Web file.

2. Study these approved domain name extensions and their meanings. Then match these suggestions for new extensions to their meanings.

<i>Extension</i>	Meaning
.aero	aviation industry
.biz	businesses
.com (.co in UK)	commercial
.coop	cooperatives
.edu (.ac in UK)	educational and research
.gov	government
.info	general use
.int	international organisation
.mil	military agency
.museum	museums
.name	individuals
.net	gateway or host
.org	non-profit organisation
.pro	professionals

Suggested extension	Meaning
1 .firm	a informative
2 .store	b cultural or entertainment
3 .web	c personal
4 .arts	d firm or agency
5 .rec	e online retail shop
6 .info	f Web-related
7 .nom	g recreational

LISTENING

3. Study this diagram which illustrates how your browser finds the webpage you want. Label these items:

- 1) Router
- 2) Domain Name System (DNS) server
- 3) Remote Web server
- 4) Browser PC
- 5) URL
- 6) Internet Protocol address

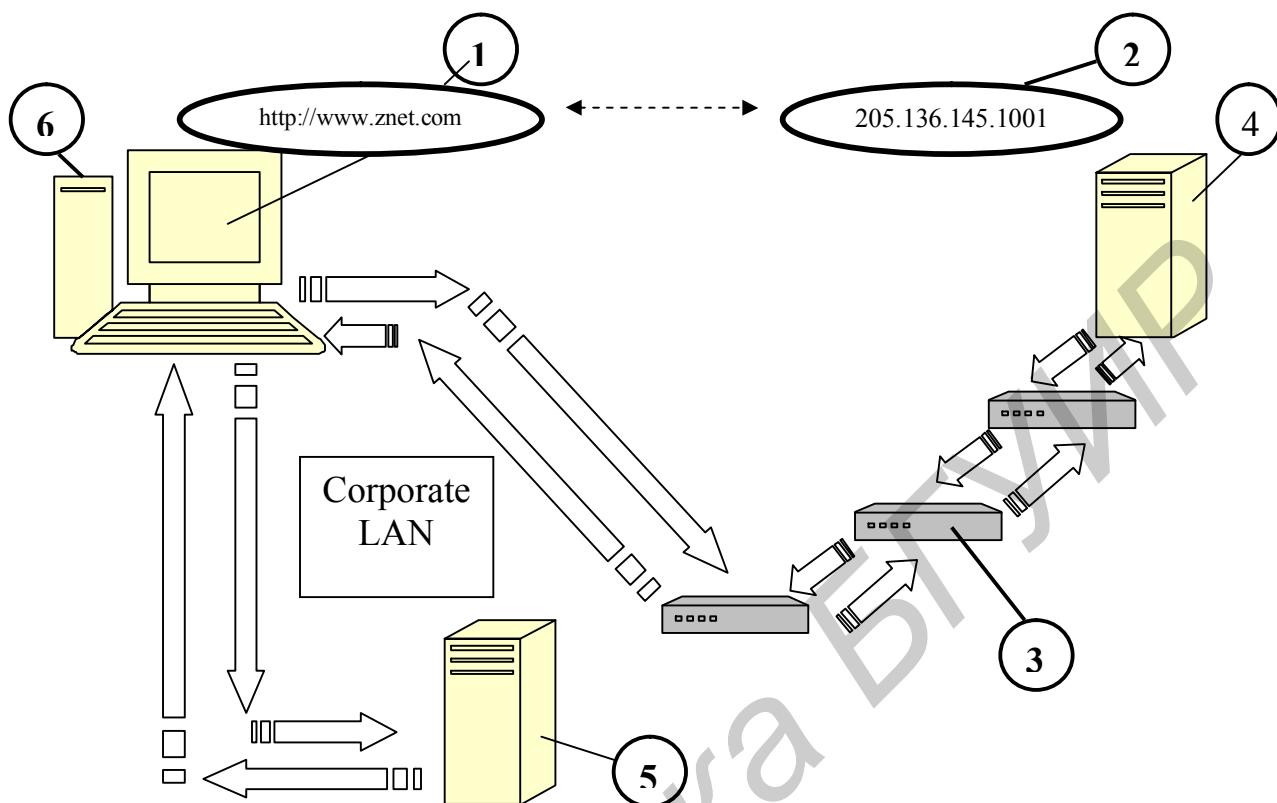


Fig 2. How your browser finds the page you want

4. Now listen to this recording which explains how the process works and take brief notes on each stage. For example:

Stage 1

Click on a webpage hyperlink or URL.

The browser sends the URL to a DNS server.

PROBLEM-SOLVING

5. Search engines Study these tips for conducting searches using AltaVista. Then decide what you would type into the search box to find this data. Compare your answers with others in your group and together decide what would be the best search. Restrict sites to English language.

Tip 1. Don't use simple keywords. Typing in the word *football is* unlikely to help you to find information on your favourite football team. Unless special operators are included, Alta Vista assumes the default operator is OR. If, for example, the search query is *American football*, Alta Vista will look for documents containing either *American* or *football* although it will list higher those documents which contain both.

Tip 2. Alta Vista is specifically case sensitive. If you specify apple as your

search term, Alta Vista will return matches for apple, Apple and APPLE . However, if you use Apple or apPle, Alta Vista will only match Apple and apPLe respectively.

Tip 3. Alta Vista supports natural language queries. If you really aren't sure where to start looking, try typing a natural language query in the search box. The question *Where can I find pages about digital cameras?* Will find a number of answers but at least it will give you some idea of where to start.

Tip 4. Try using phrase searching. This is where you place quotation marks around your search term, e.g. 'alternative medicine'. This will search for all documents where these two words appear as a phrase.

Tip 5. Attaching a + to a word is a way of narrowing your search. It means that word must be included in your search. For example, if you were looking for information on cancer research, use *+cancer+research* instead of just *cancer*.

Tip 6. Attaching a - to a word or using NOT is another way of narrowing your search. This excludes the search item following the word NOT or the - sign. For example, science NOT fiction or science -fiction will exclude sites in which these two words occur together.

Tip 7. Use brackets to group complex searches, for example: (*cakes AND recipes*) AND (*chocolate OR ginger*) will find pages including cakes and recipes and either chocolate or ginger or both.

Tip 8. You can refine your search by doing a field search. Put the field, then a colon and then what you are looking for. For example, *URL:UK+universities* will find only British universities. Title: '*English language*' will find only sites which contain this phrase in their titles.

Tip 9. AltaVista supports the use of wildcard searches. If you insert a * to the right of a partial word, say *hydro**, it will find matches for all words beginning with *hydro* such as *hydrocarbon* and *hydrofoil*. Wildcards can also be used to search for pages containing plurals of the search terms as well as to catch possible spelling variations, for example *alumin*m* will catch both *aluminium* (UK) and *aluminum* (US).

Tip 10. If you are looking for multimedia files then save yourself time by selecting images, audio or video with the radio buttons on Alta Vista's search box and then entering your search.

- 1) a street map of Edinburgh, Scotland
- 2) train times between London and Paris
- 3) the exchange rate of your currency against the US dollar
- 4) a recipe for chocolate chip or hazelnut brownies
- 5) video clips of the Beatles
- 6) sumo wrestler competitions in Japan this year
- 7) the weather in New York city tomorrow
- 8) heart disease amongst women
- 9) New Zealand universities which offer courses in computing
- 10) Sir Isaac Newton's laws of motion

6. Test your answers using AltaVista.

WRITING

7. Write your own description of how your browser finds the page you want. Use Fig 2 to help you. When you have finished, compare your answer with the listening text to Task 4.

SPECIALIST READING

A. Find the answers to these questions in the following text.

1. Name three different email protocols mentioned in the text.
2. Which email protocol is used to transfer messages between server computers?
3. Why is SMTP unsuitable for delivering messages to desktop PCs?
4. Name two host-based mail systems mentioned in the text.
5. Where are email messages stored in an SMTP system?
6. What happens when you use your Web mail account to access a POP3 mailbox?
7. Give an advantage and a disadvantage of having an option to leave POP3 messages on the server.
8. What are the advantages of using the IMAP4 protocol?

EMAIL PROTOCOLS

Although the format of a mail message, as transmitted from one machine to another, is rigidly defined, different mail protocols transfer and store messages in slightly different ways. The mail system you're probably used to employs a combination of SMTP and POP3 to send and receive mail respectively. Others may use IMAP4 to retrieve mail, especially where bandwidth is limited or expensive.

Simple Mail Transfer Protocol

SMTP is used to transfer messages between one mail server and another. It's also used by email programs on PCs to send mail to the server. SMTP is very straightforward, providing only facilities to deliver messages to one or more recipients in batch mode. Once a message has been delivered, it can't be recalled or cancelled. It's also deleted from the sending server once it's been delivered. SMTP uses 'push' operation, meaning that the connection is initiated by the sending server rather than the receiver. This makes it unsuitable for delivering messages to desktop PCs, which aren't guaranteed to be switched on at all times.

In host-based mail systems, such as Unix and Web mail, SMTP is the only protocol the server uses. Received messages are stored locally and retrieved from the local file system by the mail program. In the case of Web mail, the message is then translated into HTML and transmitted to your browser. SMTP is the only

protocol for transferring messages between servers. How they're then stored varies from system to system.

Post Office Protocol

POP is a message-retrieval protocol used by many PC mail clients to get messages from a server, typically your ISP's mail server. It only allows you to download all messages in your mailbox at once. It works in 'pull' mode, the receiving PC initiating the connection. PC-based POP3 mail clients can do this automatically at a preset interval. When you use your Web mail account to access a POP3 mailbox, the mail server opens a connection to the POP3 server just as a PC-based application would. The messages are then copied into your Web mailbox and read via a browser.

Since POP3 downloads all the messages in your mailbox, there's an option to leave messages on the server, so that they can be picked up from different machines without losing any. This does mean that you'll get every message downloaded every time you connect to the server. If you don't clean out your mailbox regularly, this could mean long downloads. When using a Web mail account to retrieve POP3 mail, be careful about leaving messages on the server - if too many build up, each download will take a long time and fill up your inbox. Many Web mail systems won't recognize messages you've already downloaded, so you'll get duplicates of ones you haven't deleted.

Internet Mail Access Protocol

IMAP is similar in operation to POP, but allows you more choice over what messages you download. Initially, only message headers are retrieved, giving information about the sender and subject. You can then download just those messages you want to read. You can also delete individual messages from the server, and some IMAP4 servers let you organize your mail into folders. This makes download times shorter and there's no danger of losing messages.

B. Re-read the text to find the answers to these questions.

1. Mark the following statements as **True** or **False**:

- 1) Different mail systems transfer emails in different ways,
- 2) IMAP4 requires more bandwidth than the other email protocols,
- 3) SMTP is used for sending emails from a PC to a server,
- 4) SMTP delivers messages one at a time,
- 5) SMTP does not allow a delivered message to be cancelled,
- 6) SMTP is only one of many protocols used to send mail between servers,
- 7) POP protocol allows the user to download one message at a time.

2. Match the terms in Table A with the statements in Table B.

Table A	Table B
a SMTP b 'Push' operation c POP d 'Pull' operation e IMAP	i An email transfer process in which the connection is initiated by the sending computer rather than the receiving computer. ii A mail transfer protocol that initially only retrieves the message headers. iii An email transfer process in which the receiving computer initiates the connection. iv A simple mail transfer protocol that is used to send messages between servers. v A message-retrieval protocol that downloads all email messages at the same time.

UNIT 8. WEBSITES

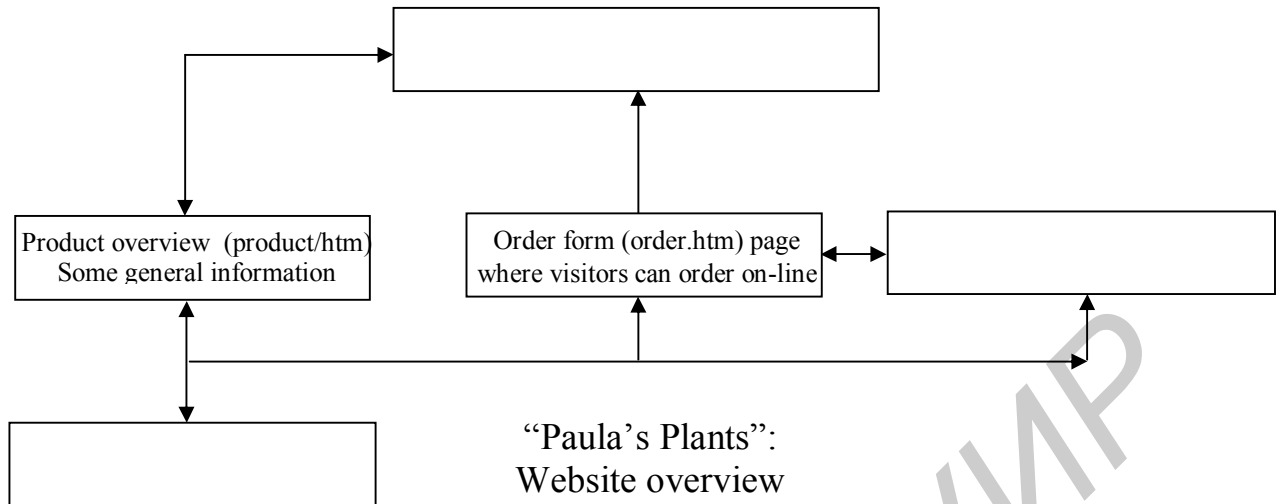
STARTER

1. What features make a good website? Make a list of the key features you look for. Then compare your list with others in your group.

2. Study these seven points for evaluating websites. What questions would you ask to evaluate a website on each point?

- 1) Design
- 2) Navigation
- 3) Ease of use
- 4) Accuracy
- 5) Up to date
- 6) Helpful graphics
- 7) Compatibility

Site diagram for Student B to Task 9.



READING

3. *Understanding the writer's purpose* Knowing who the writer is, what their purpose is and who they are writing for can help us to understand a text.

Study these extracts from a text. Decide:

1. What special expertise does the author have in this field?
2. Who are the intended readers?
3. What is the author's purpose?

<p>Title: Help Web-farers find their way.</p> <p>Subtitle: Here are nine ways to make it easy for visitors to navigate your website.</p> <p>Author information: Matt Micklewicz offers advice and useful links for "webmasters at his Webmaster Resources site (www.webmaster-resources.com).</p>	<p>Source: Windows Magazine, E-Business section</p> <p>First paragraph: Your website may be chock full of information about your company and its products, but if visitors to the site can't easily find their way around its pages they may never return. Besides content, the most important aspect of a website is its navigation scheme. Unfortunately, that may also be the most commonly neglected design consideration. These nine site-design pointers will help you build an effective navigation system.</p>
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4. Work in groups of 3: A, B and C. Summarize the advice in each text you read in one sentence.

Student A Read texts 1 to 3

Student B Read texts 4 to 6

Student C Read texts 7 to 9

1. Trust Text

It's tempting to spice up pages with graphics - but sometimes even a little is too much. If possible your navigation system should be based on text links, rather than image maps or graphical buttons. Studies have shown that visitors will look at and try text links before clicking on graphical buttons.

2. Next Best ALTERNative

If you must use a graphical navigation system, include descriptive ALT text captions. The ALT text will make it possible for visitors who use text browsers such as Lynx or who browse with graphics turned off, to find their way around. In addition to the graphical navigation buttons, be sure to include text links at the bottom of every page that provide a clear route to the main areas of your site.

3. Map It

A site map offers a good overview of your site and will provide additional orientation for visitors. It should be in outline form and include all the major sections of your site with key subpages listed beneath those sections. For example, you may group your FAQ, Contact and Troubleshooting pages so they're all accessible from a Support page. It's a good idea to visit a few larger sites to get some ideas on designing an effective site map.

4. Forego Frames

Avoid frames wherever possible. Most veteran browsers dislike them and they can be confusing for visitors who are suddenly presented with multiple scrollbars. If you're committed to using frames on your site, you'd better commit yourself to some extra work too, because you'll have to create a no-frames version of your site for visitors whose browsers don't support frames.

5. Consistency Counts

Don't change the location of your navigation elements, or the color of visited and not-visited links from page to page. And don't get clever with links and buttons that appear and disappear: turning things on and off is usually done as an attempt to let visitors know where they are at a site but more often than not it ends up confusing them.

6. Just a Click Away

Keep content close at hand. Every page on your site should be accessible from every other one within four clicks. You should regularly reexamine your page structure and links, and make necessary adjustments. People come to your site to find information — don't make them dig for it.

7. Shun Search

Most sites have a search function, but try to discourage its use as much as possible. Even the best search engines turn up irrelevant matches, and visitors may not know how to use yours effectively. Logical, clearly placed links are more likely to help visitors find what they want.

8. Passing Lanes

Provide multiple paths through your site so visitors aren't restricted to one style of browsing. For most sites, a pull-down navigation menu is an easy addition that offers an alternative route through your pages, without wasting space.

9. Overwhelming Options

Don't overwhelm visitors by presenting dozens of places that they can go. A large number of choices is not necessarily a good thing.

Finally, if you feel like curling up with a good book, I recommend Jennifer Fleming's *Web Navigation: Designing the User Experience* from O'Reilly & Associates.

5. Now exchange information orally to complete this table summarizing the whole text.

Text №	Advice
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PROBLEM-SOLVING

6. Evaluate any one of these sites using the seven points listed in Task 2.

Use the words: should, avoid (doing), had better (infinitive) and phrases:

I recommend ... , It's a good idea (to do something)

www.environment-agency.gov.uk

www.compaq.com

www.abcissa.force9.co.uk/birds

news.bbc.co.uk

www.orange.co.uk

7. With the help of the texts summarized in Task 5, give advice on these aspects of navigation design. Use a variety of ways. Add reasons for your advice where possible.

1. text links
2. graphical buttons
3. ALT text captions
4. site map
5. frames
6. position of navigation elements
7. logical links
8. search function
9. number of links on a page

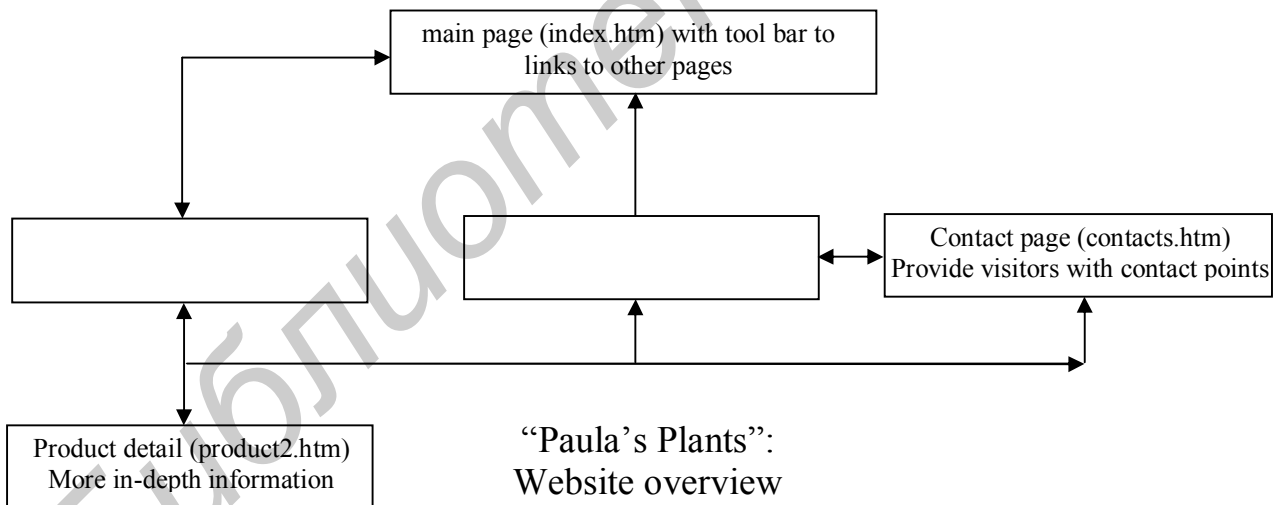
8. With the help of Unit 6, Task 2 (Problem Solving), give advice on these features of free Internet Service Providers.

- 1) Sign up software on CD-ROM
- 2) Local call rates for online time
- 3) National call rates for online time
- 4) Initial set-up fee
- 5) Web-based mail
- 6) POP3 email
- 7) Free Web space
- 8) Access to newsgroups
- 9) Customer support
- 10) Reliable service
- 11) Multiple ISP accounts

SPEAKING

9. Work in pairs, A and B. Complete your website flowchart with the help of your partner. Do not show your section of the flowchart to your partner but do answer any questions your partner asks. Make sure all links are included in your completed chart. (Student B on p. 34)

Site diagram for Student A to Task 9.



10. Write an evaluation of a website of your choice.

SPECIALIST READING

A. Find the answers to these questions in the following text.

1. What languages were derived from SGML?
2. What type of language is used to structure and format elements of a document?
3. Name two metalanguages.
4. What elements of data is XML (but not HTML) concerned with?
5. What is meant by the term 'extensible'?
6. What makes XML a more intelligent language than HTML?
7. What does the HTML markup tag <p> indicate?
8. Why are search engines able to do a better job with XML documents?
9. What type of website is particularly likely to benefit from XML?

XML TAKES ON HTML

Standard Generalized Markup Language (SGML) is the language that spawned both HTML (HyperText Markup Language) and XML (eXtensible Markup Language). SGML is not a true language, it is a metalanguage, which is a language from which you can create other languages. In this case, it is the creation of a markup language (a system of encoded instructions for structuring and formatting electronic document elements).

HTML is an application-specific derivation of SGML. It is a set of codes, generally used for webpages, that creates electronic documents according to rules established by SGML. HTML is a language that is all about the presentation of your information, not what the actual data is. You can, therefore, say that HTML is a presentation language.

XML is a subset of SGML, but it is also, like SGML, a metalanguage. XML defines a specific method for creating text formats for data so that files are program independent, platform independent, and support internationalization (able to read different languages, etc.) In fact, because XML is an extensible language, you don't even have to have a browser to interpret the page. Applications can parse the XML document and read the information without any human intervention.

XML, unlike HTML, is concerned with the identity, meaning and structure of data. XML is extensible because it lets website developers create their own set of customized tags for documents. This ability to define your own tags is the main feature of XML, and it is what gives developers more flexibility.

By defining your own markup tags, you can explicitly define the content in the document. This makes XML a more intelligent markup language than HTML. For example, in HTML, you could have a paragraph tag <p> preceding a paragraph about baseball. Your Web browser sees this tag and knows to present the following text as a paragraph. All your browser knows about the text, however, is that it is text; it doesn't know that it is specifically about baseball. In an XML document, you could define a <BASEBALL> tag to refer specifically to the text in the paragraph in your

document. This way, when your XML browser examines the document, the document knows what data it contains, and that makes the content more intelligent. Search engines that make use of XML data can do a better job of finding the pages you are looking for because of the intelligent nature of XML content.

XML, by design, does not deal with how the data is displayed to the end user. Because HTML is a presentation language, XML documents use HTML tags to help handle the visual formatting of the document. Also, you can use XML in your HTML documents to provide metadata, which is data about data in the document.

XML will do to the Web and e-commerce what HTML originally did to the Internet. XML and its associated applications have the potential to blow the roof off the Internet and how we do business.

B. Re-read the text to find the answers to these questions.

1. Mark the following statements as *True* or *False*:

- 1) HTML is no longer useful for creating webpages.
- 2) SGML is more complex than XML.
- 3) XML files can only be used on Unix systems,
- 4) XML files can only be read by browser programs,
- 5) HTML is a markup language,
- 6) Internet searches will be better with XML files.

2. Match the terms in Table A with the statements in Table B.

Table A		Table B	
a	Metadata	i	Extensible markup language
b	Metalanguage	ii	A coding system used for structuring and formatting documents
c	HTML	iii	Data about data
d	XML	iv	An example of a page presentation language
e	Markup language	v	A language from which you can create other languages

UNIT 9. DATA SECURITY

READING

1. Read the whole text to find the answers to these questions.

THE ANATOMY OF A VIRUS

A biological virus is a very small, simple organism that infects living cells, known as the host, by attaching itself to them and using them to reproduce itself. This often causes harm to the host cells.

Similarly, a computer virus is a very small program routine that infects a computer system and uses its resources to reproduce itself. It often does this by patching the operating system to enable it to detect program files, such as COM or EXE files. It then copies itself into those files. This sometimes causes harm to the host computer system.

When the user runs an infected program, it is loaded into memory carrying the virus. The virus uses a common programming technique to stay resident in memory. It can then use a reproduction routine to infect other programs. This process continues until the computer is switched off.

The virus may also contain a payload that remains dormant until a trigger event activates it, such as the user pressing a particular key. The payload can have a variety of forms. It might do something relatively harmless such as displaying a message on the monitor screen or it might do something more destructive such as deleting files on the hard disk.

When it infects a file, the virus replaces the first instruction in the host program with a command that changes the normal execution sequence. This type of command is known as a JUMP command and causes the virus instructions to be executed before the host program. The virus then returns control to the host program which then continues with its normal sequence of instructions and is executed in the normal way.

To be a virus, a program only needs to have a reproduction routine that enables it to infect other programs. Viruses can, however, have four main parts. A misdirection routine that enables it to hide itself; a reproduction routine that allows it to copy itself to other programs; a trigger that causes the payload to be activated at a particular time or when a particular event takes place; and 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.

- 1) How are computer viruses like biological viruses?
- 2) What is the effect of a virus patching the operating system?
- 3) Why are some viruses designed to be loaded into memory?
- 4) What examples of payload does the writer provide?
- 5) What kind of programs do viruses often attach to?
- 6) Match each virus routine to its function.

Routine	Function
1 misdirection	a does the damage
2 reproduction	b attaches a copy of itself to another program
3 trigger	c hides the presence of the code
4 payload	d decides when and how to activate the payload

7) How does a Trojan differ from a virus?

PROBLEM-SOLVING

2. Decide in your group what these kinds of computer crime are. Then match the crimes to the short descriptions which follow.

- 1) Salami Shaving
- 2) Denial of Service attack
- 3) Trojan Horse
- 4) Trapdoors
- 5) Mail bombing
- 6) Software Piracy
- 7) Piggybacking
- 8) Spoofing
- 9) Defacing
- 10) Hijacking

a. Leaving, within a completed program, an illicit program that allows unauthorised - and unknown - entry.

b. Using another person's identification code or using that person's files before he or she has logged off.

c. 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.

d. Tricking a user into revealing confidential information such as an access code or a credit-card number.

e. Inundating an email address with thousands of messages, thereby slowing or even crashing the server.

f. 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.

g. Unauthorised copying of a program for sale or distributing to other users.

h. Swamping a server with large numbers of requests.

i. Redirecting anyone trying to visit a certain site elsewhere.

j. Changing the information shown on another person's website.

SPECIALIST READING

A. Find the answers to these questions In the following text.

1. What does data encryption provide?
 - a privacy
 - b integrity
 - c authentication

2. A message encrypted with the recipient's public key can only be decrypted with
 - a the sender's private key
 - b the sender's public key
 - c the recipient's private key

3. What system is commonly used for encryption?

4. What is the opposite of 'encrypt'?

5. A message-digest function is used to:
 - a authenticate a user
 - b create a MAC
 - c encrypt a message

6. What information does a digital certificate give to a client?

SAFE DATA TRANSFER

Secure transactions across the Internet have three goals. First, the two parties engaging in a transaction (say, an email or a business purchase) don't want a third party to be able to read their transmission. Some form of data encryption is necessary to prevent this. Second, the receiver of the message should be able to detect whether someone has tampered with it in transit. This calls for a message-integrity scheme. Finally, both parties must know that they're communicating with each other, not an impostor. This is done with user authentication.

Today's data encryption methods rely on a technique called public-key cryptography.

Everyone using a public-key system has a public key and a private key. Messages are encrypted and decrypted with these keys. A message encrypted with your public key can only be decrypted by a system that knows your private key.

For the system to work, two parties engaging in a secure transaction must know each other's public keys. Private keys, however, are closely guarded secrets known only to their owners.

When I want to send you an encrypted message, I use your public key to turn my message into gibberish. I know that only you can turn the gibberish back into the

original message, because only you know your private key. Public-key cryptography also works in reverse - that is, only your public key can decipher your private key's encryption.

To make a message tamper-proof (providing message integrity), the sender runs each message through a message-digest function. This function within an application produces a number called a message-authentication code (MAC). The system works because it's almost impossible for an altered message to have the same MAC as another message. Also, you can't take a MAC and turn it back into the original message.

The software being used for a given exchange produces a MAC for a message before it's encrypted. Next, it encrypts the MAC with the sender's private key. It then encrypts both the message and the encrypted MAC with the recipient's public key and sends the message.

When the recipient gets the message and so decrypts it, they also get an encrypted MAC. The software takes the message and runs it through the same message-digest function that the sender used and creates its own MAC. Then it decrypts the sender's MAC. If the two are the same, then the message hasn't been tampered with.

The dynamics of the Web dictate that a user-authentication system must exist. This can be done using digital certificates.

A server authenticates itself to a client by sending an unencrypted ASCII-based digital certificate. A digital certificate contains information about the company operating the server, including the server's public key. The digital certificate is 'signed' by a trusted digital-certificate issuer, which means that the issuer has investigated the company operating the server and believes it to be legitimate. If the client trusts the issuer, then it can trust the server. The issuer 'signs' the certificate by generating a MAC for it, then encrypts the MAC with the issuer's private key. If the client trusts the issuer, then it already knows the issuer's public key.

The dynamics and standards of secure transactions will change, but the three basic tenets of secure transactions will remain the same. If you understand the basics, then you're already three steps ahead of everyone else.

B. Re-read the text to find the answers to these questions.

1. Match the functions in Table 1 with the keys in Table 2.

Table 1	Table 2
a to encrypt a message for sending	i sender's private key
b to decrypt a received message	ii trusted issuer's private key
c to encrypt the MAC of a message	iii the recipient's private key
d to encrypt the MAC of a digital signature	v the recipient's public key

2. Match the terms in Table A with the statements in Table B.

Table 1	Table 2
a Gibberish	i Message-authentication code
b Impostor	ii Principal features
c Decipher	iii Meaningless
d MAC	iv data
e Tenets	iv Person pretending to be someone else
f Tamper	v Make unauthorised changes
	vi Convert to meaningful data

3. Mark each of the following statements with True or False:

- 1) A message encrypted with a public key can be decrypted by anyone.
- 2) To send a secure message you must know the recipient's public key.
- 3) Secure messages are normally encrypted using a private key before they are sent.
- 4) A message can be reconstructed from its MAC.
- 5) Two message can often have the same MAC.
- 6) A digital certificate is sent to a client in an encrypted form.
- 7) A digital certificate should be signed by a trusted digital-certificate issuer.
- 8) A MAC is used to check that a message has not been tampered with.

UNIT 10. THE EX-HACKER

STARTER

1. Scan the text find the answers to these questions as quickly as you can.

- 1) Which group hacked into Hotmail?
- 2) Who was 'The Analyser' and what did he do?
- 3) Which hacker was sent to jail for fraud?
- 4) What was the effect of the 1996 raid on Scotland Yard?
- 5) Which of the cases reported here involved teenagers?
- 6) What did hackers do to the Yahoo! website?
- 7) What crime was Raphael Gray accused of?

Kevin Mitnick is the hackers' hero. His latest spell in jail was, a 46-month sentence for fraud relating to breaking into the systems of several multinational corporations. He was released on condition that he did not have any contact with a computer.

In March 2000, a Welsh teenager allegedly stole information from more than 26,000 credit card accounts across Britain, the US, Japan, Canada and Thailand, and published the details on the Internet. FBI agents and British police raided the home of Raphael Gray, 18, and arrested him and his friend. He has been charged with 10 counts of downloading unauthorised information.

In 1998 Washington revealed that an Israeli hacker called 'The Analyser' was responsible for 'the most organised attempt to penetrate the Pentagon's computer systems'. He turned out to be Ehud Tenenbaum, 18, who had planted a list of his own passwords in the Pentagon system and passed them to other hackers.

In 1997 the son of a fraud squad detective walked free from a court in London after charges of breaching the security of the US air force were dropped. Three years earlier Mathew Bevan, then 19, and a friend, Richard Pryce, 16, used the Internet to gain access to several US military bases. Pryce was fined £1,200 after admitting several other offences.

Hotmail, Microsoft's free email service, was hacked into last September, exposing the correspondence of more than 40m users. A group calling itself Hackers Unite posted a Web address with details of how to access any Hotmail account. The service was shut down for five hours.

The UK Department of Trade and Industry has twice been prey to hackers, once in 1996 and again in 2000 when a DTI computer was programmed to reroute email. The Home Office investigated nine cases of hacking last year, one of which was the leaking of a report on a murder. In August 1996 hackers ran up a £ 1m phone bill for Scotland Yard but did not access files.

In 1997 hackers got into the Yahoo! website, replacing the homepage with a ransom note demanding the release of their hero, Kevin Mitnick. Unless the demand was met, the note said, a virus would be released in all Yahoo!'s computers. The company dismissed the threat as a hoax, but the 'Free Kevin' slogan continued to appear on other hijacked sites.

LISTENING

2. Think about these questions before you listen.

- 1) How could you hack into a system?
- 2) How could you stop people hacking into a system?

3. Now listen to Part 1 of the recording to check your answers to Task 2 and to find the answers to these questions:

- 1) What was Ralph arrested for?
- 2) What does he do now?
- 3) Why does he say people are too trusting?
- 4) What passwords does he suggest for trying to get into a system?
- 5) What does a firewall do?
- 6) What is the advantage of a callback system?
- 7) To prevent hacking, what sort of passwords should you avoid?
- 8) What do event logs show?

4. Now listen to Part 2 of the recording and find the answers to these questions:

- 1) How did Ralph start thinking about computer security?
- 2) How did he find the most senior ID in the American company's system?
- 3) According to Ralph, why do people hack?
- 4) Why did he and his friend hack?
- 5) How did the police find him?
- 6) Why does he say companies should use his services?
- 7) Do hackers know each other?
- 8) What's the difference between Hollywood hackers and the real world?
- 9) How risky is credit card use on the Internet?
- 10) What advice does he give for people intending to use credit cards over the Internet?

5. Now listen to both parts again to find the answers to these questions:

- 1) What evidence did Ralph and his friend leave to show that they had hacked into the American company's system?
- 2) What is a 'white hat' hacker?
- 3) What two ways does Ralph give for hacking into a system?
- 4) What terms does Ralph use to describe someone obsessed by computers?
- 5) How does he maintain contact with the policeman who arrested him?
- 6) How does he describe his lack of enthusiasm for the Hollywood hacker?
- 7) What does he mean by 'It's the retailers who get done'?
- 8) What's the problem with using smart cards for Internet purchases?

SPEAKING

6. Role play. Work in pairs. Together make up your own questions on these prompts. Then play the parts of the interviewer and Ralph.

- 1) first interested in hacking
- 2) reason for being arrested
- 3) present job
- 4) ways to avoid hackers
- 5) views on Hollywood hackers
- 6) safe ways of paying for Internet shopping

WRITING

7. Write a news item like the short newspaper texts given in Task 1 about Ralph or about any other hacking case known to you.

UNIT 11. SOFTWARE ENGINEERING

STARTER

1. Put these five stages of programming in the correct sequence.

- a. Design a solution
- b. Code the program
- c. Document and maintain the program
- d. Clarify the problem
- e. Test the program

2. To which stage do each of these steps belong?

- 1) Clarify objectives and users
- 2) Debug the program
- 3) Write programmer documentation
- 4) Do a structured walkthrough
- 5) Select the appropriate programming language

LISTENING

3. You are going to hear an interview between a systems analyst and a hotel owner who wants to introduce a better computer system. What questions do you think the analyst will ask? Make a list; then compare your list with others in your group.

4. Listen to the recording to compare your list of questions with those asked by the analyst.

5. Listen again to find the answers to these questions:

- 1) What system does the hotelier have at present?
- 2) What problem is there with the existing system?
- 3) What form of output does the hotelier want?
- 4) Who will use the new system?
- 5) Which members of staff will require the most training?
- 6) What concerns has the hotelier about the new system?
- 7) What kind of hardware will be required?
- 8) What is the next step?

SPECIALIST READING

A. Find the answers to these questions in the following text.

1. What advantages of using object-oriented programming are mentioned in the text?
2. What are the three key features of OOP?
3. What multimedia data types are referred to in the text?
4. List the different types of triangle mentioned in the text.
5. What feature avoids the problem of deciding how each separate type of data is integrated and synchronized into a working whole?
6. What specific type of rectangle is named in the text?
7. What common properties of a rectangle are mentioned in the text?
8. What features are made quicker by code reusability?

OBJECT-ORIENTED PROGRAMMING

One of the principal motivations for using OOP is to handle multimedia applications in which such diverse data types as sound and video can be packaged together into executable modules.

Another is writing program code that's more intuitive and reusable; in other words, code that shortens program-development time.

Perhaps the key feature of OOP is encapsulation - bundling data and program instructions into modules called 'objects'. Here's an example of how objects work. An icon on a display screen might be called 'Triangles'. When the user selects the 'Triangles' icon - which is an object composed of the properties of triangles (see fig. below) and is other data and instructions - a menu might appear on the screen offering several choices. The choices may be (1) create a new triangle and (2) fetch a triangle already in storage. The menu, too, is an object, as are the choices on it. Each time a user selects an object, instructions inside the object are executed with whatever properties or data the object holds, to get to the next step. For instance, when the user wants to create a triangle, the application might execute a set of instructions that displays several types of triangles - right, equilateral, isosceles, and so on.

Many industry observers feel that the encapsulation feature of OOP is the natural tool for complex applications in which speech and moving images are integrated with text and graphics. With moving images and voice built into the objects themselves, program developers avoid the sticky problem of deciding how each separate type of data is to be integrated and is synchronized into a working whole.

A second key feature of OOP is inheritance. This allows OOP developers to define one class of objects, say 'Rectangles', and a specific instance of this class, say 'Squares' (a rectangle with equal sides). Thus, all properties of rectangles - 'Has 4 sides' and 'Contains 4 right angles' are the two shown here - are automatically inherited by Squares. Inheritance is a useful property in rapidly processing business data. For instance, consider a business that has a class called 'Employees at the Dearborn Plant' and a specific instance of this class, 'Welders'. If employees at the Dearborn plant are eligible for a specific benefits package, welders automatically qualify for the package. If a welder named John Smith is later relocated from Dearborn to Birmingham, Alabama, where a different benefits package is available, revision is simple. An icon representing John Smith - such as John Smith's face - can be selected on the screen and dragged with a mouse to an icon representing the Birmingham plant. He then automatically 'inherits' the Birmingham benefit package.

A third principle behind OOP is polymorphism. This means that different objects can receive the same instructions but deal with them in different ways. For instance, consider again the triangles example. If the user right clicks the mouse on 'Right triangle', a voice clip might explain the properties of right triangles. However, if the mouse is right clicked on 'Equilateral triangle' the voice instead explains properties of equilateral triangles.

The combination of encapsulation, inheritance and polymorphism leads to code reusability. 'Reusable code' means that new programs can easily be copied and pasted together from old programs. All one has to do is access a library of objects and stitch them into a working whole. This eliminates the need to write code from scratch and then debug it. Code reusability makes both program development and program maintenance faster.

B. Re-read the text to find the answers to these questions.

1. Match the terms in Table A with the statements in Table B.

Table A	Table B
a OOP	i An OOP property that allows data and program instructions to be bundled into an object
b Encapsulation	ii A list of choices
c Object	iii An OOP property that enables different objects to deal with the same instruction in different ways
d Menu	iv A reusable collection of objects
e Square	v A module containing data and program instructions
f Polymorphism	vi Object-Oriented Programming
g Library	vii Rectangle with equal sides

2. Complete the following text using words from the reading text:

Encapsulation,..... and polymorphism are key features of programming. Encapsulation allows data and program instructions to be bundled together in called objects. Inheritance means that specific of a class of objects the properties of the class of objects. Polymorphism means that instructions are treated differently by different..... The combination of thesefeatures of OOP means that program code is reusable. This speeds up and of programs.

UNIT 12. PEOPLE IN COMPUTING

STARTER

1. What do the following people in computing do? Compare answers with your partner.

- 1) Webmaster
- 2) Help-desk troubleshooter
- 3) Applications programmer
- 4) Security specialist
- 5) Systems programmer

READING

2. Work in groups of three: A, B and C. Read your text and complete this table. You may not find information for each section of your table.

	A	B	C
1. job title			
2. nature of work			
3. formal qualifications			
4. personal qualities			
5. technical skills			
6. how to get started			
7. how to make progress			

TEXT A

HOW TO BECOME A PROGRAMMING EXPERT

The primary requirements for being a good programmer are nothing more than a good memory, an attention to detail, a logical mind and the ability to work through a problem in a methodical manner breaking tasks down into smaller, more manageable pieces.

However, it's not enough just to turn up for a job interview with a logical mind as your sole qualification. An employer will want to see some sort of formal qualification and a proven track record. But if you can show someone an impressive piece of software with your name on it, it will count for a lot more than a string of academic qualifications.

So what specific skills are employers looking for? The Windows market is booming and there's a demand for good C, C++, Delphi, Java and Visual Basic developers. Avoid older languages such as FORTRAN and COBOL unless you want to work as a contract programmer.

For someone starting out, my best advice would be to subscribe to the programming magazines such as Microsoft Systems Journal. Get one or two of the low-cost 'student' editions of C++, Visual Basic and Delphi. Get a decent book on Windows programming. If you decide programming is really for you, spend more money on a training course.

TEXT B

HOW TO BECOME A COMPUTER CONSULTANT

The first key point to realise is that you can't know everything. However you mustn't become an expert in too narrow a field. The second key point is that you must be interested in your subject. The third key point is to differentiate between contract work and consultancy. Good contractors move from job to job every few months. A consultant is different. A consultant often works on very small timescales - a few days here, a week there, but often for a core collection of companies that keep coming back again and again.

There's a lot of work out there for people who know Visual Basic, C++, and so on. And there are lots of people who know it too, so you have to be better than them. Qualifications are important. Microsoft has a raft of exams you can take, as does Novell, and in my experience these are very useful pieces of paper. University degrees are useless. They merely prove you can think, and will hopefully get you into a job where you can learn something useful. Exams like Microsoft Certified Systems Engineer are well worth doing. The same goes for NetWare Certification. However, this won't guarantee an understanding of the product, its positioning in the market, how it relates to other products and so on. That's where the all-important experience comes in.

Here's the road map. After leaving university you 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. You don't stay in one company for more than two years. After a couple of hops like that, you may be in a good position to move into a junior consultancy position in one of the larger consultancy companies. By the age of 30, you've run big projects, rolled out major solutions and are well known. Maybe then it's time to make the leap and run your own life.

TEXT C

HOW TO BECOME AN IT MANAGER

IT managers manage projects, technology and people. Any large organisation will have at least one IT manager responsible for ensuring that everyone who actually needs a PC has one and that it works properly. This means taking responsibility for the maintenance of servers and the installation of new software, and for staffing a help-desk and a support group.

Medium to large companies are also likely to have an IT systems manager. They are responsible for developing and implementing computer software that supports the operations of the business. They're responsible for multiple development projects and oversee the implementation and support of the systems. Companies will have two or three major systems that are probably bought off the shelf and then tailored by an in-house development team.

Apart from basic hardware and software expertise, an IT manager will typically have over five years' experience in the industry. Most are between 30 and 45. Since IT managers have to take responsibility for budgets and for staff, employers look for both of these factors in any potential recruit.

Nearly all IT managers have at least a first degree if not a second one as well. Interestingly, many of them don't have degrees in computing science. In any case, the best qualification for becoming a manager is experience. If your personality is such that you're unlikely to be asked to take responsibility for a small team or a project, then you can forget being an IT manager. You need to be bright, communicative and be able to earn the trust of your teams. Most of this can't be taught, so if you don't have these skills then divert your career elsewhere.

SPECIALIST READING

A. Find the answers to these questions in the following text.

1. What advice is given for someone who is stuck in a computing support job?
2. What questions should you ask yourself if you are thinking of getting extra training?
3. What computer program is mentioned in the text?
4. Name two ways of studying that are mentioned in the text.
5. What two factors will be affected by your level of experience?
6. Why is it important to become used to answering exam questions?
7. What factors help you decide whether the course will be suitable or cost effective?
8. What happens if you don't upgrade your certification?

BECOMING CERTIFIED

Suppose you're a support engineer. You're stuck in a job you don't like and you want to make a change. One way of making that change is to improve your

marketability to potential employers by upgrading your skill-set. If you're going to train yourself up however, whose training should you undertake? If you need certificates, whose certificates should they be? Even if you get those certificates, how certain can you be that your salary will rise as a result? One solution is the range of certifications on offer from Microsoft.

Microsoft offers a large array of certification programmes aimed at anyone from the user of a single program such as Microsoft Word, to someone who wants to become a certified support engineer. There are a myriad of certificates to study for too. If you're the proud holder of any of those qualifications, then you're entitled to call yourself a Microsoft Certified Professional (MCP).

Once you've decided which track you want to take, you should consider just how qualified you already are in terms of experience and knowledge. Will you need to go and take some courses with a training company, or are you the type who can make good use of self-study materials? How much time do you genuinely have to devote towards this? Will your employer pay for your course? Will it grant you leave to go and do the course - assuming you can find one - on either a full-time or part-time basis?

The key question here is experience. This will not only influence the amount of work you'll have to do to get up to speed for the exams, it could also mean the difference between passing or failing the exam.

While you're busy learning all you need to know for your certification, the practice exams are an absolute godsend. They show you the type of questions you'll encounter, and they familiarize you with the structure of the exam. This is essential if you want to pass: the exams have time limits, and you need to get used to answering the requisite number of questions within the allotted time. It's as simple as that.

If you decide a training course will help you out, don't let the title of a course alone convince you that it will be suitable or cost effective. Find out exactly what the course offers and whether there so are pre-requisites for attendants. You should also find out what the training company is prepared to do if attendants don't have the minimum knowledge necessary to be on the course.

As exams are replaced by 'updated' ones, you need to upgrade your certification to stay current. Ultimately it's your responsibility to make sure you stay up to date. If you don't, you lose your certification until you take an update.

As a support engineer, you get the satisfaction of knowing that you passed a tough test, and the happy knowledge that your network manager is sweating a bit over the fact that you could be head-hunted at any time.

QUALIFICATIONS

Microsoft Certified Systems Engineer (MCSE)

MCSEs design, install, support and troubleshoot information systems. MCSEs are network gurus, support technicians and operating system experts.

Microsoft Certified Solution Developer (MCSD)

MCSDs use development tools and platforms to create business solutions.

Microsoft Certified Product Specialist (MCPS)

MCPSes know all about at least one Microsoft operating system. Some also specialise in other Microsoft products, development tools or desktop applications.

Microsoft Certified Trainer (MCT)

MCTs teach others about Microsoft products using the Microsoft Official Curriculum at Microsoft Authorised Technical Education Centres.

B. Re-read the text to find the answers to these questions.

1. Which qualification would be most useful if you wanted to do each of the following:

- a. be an operating system expert
- b. troubleshoot systems
- c. teach computing
- d. design business solutions

2. Mark the following statements as True or False:

- a. Microsoft offers a large range of certification programmes to study.
- b. You must get an advanced certificate before you can call yourself a Microsoft Certified Professional.
- c. All Microsoft training courses involve a period of full-time study.
- d. Practice exams allow you to become familiar with the structure of the exams.
- e. You can decide on the suitability of a course by its title.
- f. It is your responsibility to make sure that your certification is kept up to date.
- g. Gaining a certificate is likely to make you more attractive to other employers.

UNIT 13. RECENT DEVELOPMENTS INIT

READING

1. Study the texts on recent developments in one area of Information Technology, A, B or C, as your teacher directs and make brief notes on the main points in each of the two texts.

A Domestic appliances

B Avatars

C Robotics

LICENCE TO CHILL

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. As well as indicating what the product is, the data in the tags will include additional information such as the 'best before' date and even nutritional data. Now, imagine that a fridge could read these tags and keep track of the items placed there.

If an item is about to exceed its 'use by' date, the fridge tells you, and you can either use it or throw it out. Fancy something different for dinner? No problem, ask the fridge to suggest some menus based on the ingredients it knows you have in stock. Or tell the fridge the menu you require and it will provide you with a shopping list of the items you don't have or order the items via email. This is the Screenfridge from Electrolux.

But why 'Screenfridge'? On the door is a touch-sensitive panel or screen that provides a means of communicating with the users. For many households, life revolves around the kitchen. This is the assumption Electrolux made in designing the Screenfridge. The same screen is a messaging centre. Since the fridge is equipped with a microphone, speaker and video-camera, you're not limited to textual information. The fridge is connected to the Internet, so it can be used to send and receive email or you could surf the Web to find a new recipe.

Many people have a TV in the kitchen, but if you already have a screen on the fridge, why clutter up the work surface with a TV? Call the Screenfridge's TV mode and watch your favourite programme on the fridge. The Screenfridge can be interfaced to a surveillance camera to check out visitors or to keep an eye on the children.

Finally, the Screenfridge can perform some of the household management tasks normally associated with a PC. For example, it has a diary, address pad and a notepad.

TALKING TO THE WASHING

A washing machine that can communicate with the Internet using its own builtin mobile phone has been launched by Ariston. The margherita 2000.com washing machine will be able to send breakdown reports for repair and download new washing cycles from its own website. And the householder will be able to control the washing cycle remotely using a mobile phone or by logging on to the machine's own website.

But the importance of the machine is that it is the first of a line-up of Web-connected domestic appliances that will be able to talk to each other using a new open communication system called WRAP - Web-Ready Appliances Protocol.

Ariston will be launching a dishwasher, fridge and oven using WRAP early next year according to Francesco Caio, head of Ariston's parent company Merloni Elettrodomestici. Eventually it will be joined by Leon@rdo, a

touch-screen kitchen computer. All the machines will communicate through the house's ring main, and to the Web through the washing machine's mobile phone.

Mr Caio believes he can sell 30 to 50,000 washing machines each year in Europe. But he must leap some big hurdles before the system can become widely accepted. WRAP is a proprietary Merloni standard, and people are unlikely to buy if locked in to Ariston for other networked appliances. Caio claims the standard is open to other manufacturers to adopt but so far none have signed up, whereas the huge Japanese manufacturers are adopting rival systems. The main obstacle is the cost – the margherita 2000.com will cost much more than a traditional washing machine.

DAWN OF THE CYBERBABES

Stratumsoft are developing the first electronic virtual assistant, or EVA. If EVAs live up to the developers' claims, they could provide the illusion of personal service without the cost. Call centres, online advertisers and Internet service providers are among the initial targets. Eighty per cent of call centre requests could, Stratumsoft argues, be dealt with by an EVA. E-commerce is another application. 'The best experience you can have as a shopper is personal contact, and EVA is designed to give that', says Stratumsoft's director of marketing.

The technology behind EVA combines two global trends in website design. One, developed out of the computer animation and gaming industry, is the ability to give Web images the impression of three dimensions. The other is the use of dynamic database skills and artificial intelligence-style searching to retrieve information from data banks.

Each EVA can be programmed with information such as a product catalogue, answers to frequently asked questions or an online encyclopaedia. It is also equipped with a search engine to interpret customer requests made in colloquial language. Queries are typed in and answered via on-screen text boxes.

If the EVA does not have an answer, it will interrogate the questioner, record the response, and add the answer to its database for future enquiries. EVAs are not fully animated to imitate human features but they can be programmed to gesture and imitate different moods. An EVA is run via a Java applet - a small, self-contained program coded to download on to any type of personal computer rather than being transmitted over the Internet.

ANANOVA

Ananova is the world's first digital newsreader. She was created to front an Internet 24 hours a day news service by Digital Animations Group, a Scottish 3D digital entertainment company and PA New Media.

Mark Hird, Director of PA New Media said, 'We have given her a full range of human characteristics after researching the personality most people want to read news and other information. Ananova has been programmed to deliver breaking news 24

hours a day via the Internet, and later on mobile phones, televisions and other digital devices.'

The Ananova character fronts a computer system which is constantly updated with news, sport, share prices, weather and other information. This is converted into speech while another program simultaneously creates real-time animated graphics. This ensures that the virtual newscaster can be on top of the news as it breaks, with very little delay at all. People using the service can also tailor their own news bulletins by using search words to hear the latest information on their chosen subjects.

Mr Hird believes the invention will dramatically change the role of the traditional newscaster, 'In 20 years time we could be seeing that type of job being replaced by computer-generated images.' But not everyone agrees. Professor Bill Scott said that people prefer people to teach them things and in a world where information was increasingly important, an established face was important in terms of public trust. 'You don't get that confidence with computer characters.'

THE RISE OF THE ROBOTS

Japan produced the first commercially available robotic pet, called Aibo, a small electronic dog that several owners on Aibonet.com describe as part of the family. Aibo is not alone. Dr Thomas Consi of MIT has produced the 'robolobster' which is capable of imitating lobsters' abilities to sense chemicals in the water surrounding them. Researchers at Edinburgh's Mobile Robot Group have made the world's first cyber-cricket.

These machines are important because they demonstrate that simple processes can result in complex behaviours. The robots use 'neural nets', connected processors that have an input level associated with each processor. When an input signal exceeds a certain value, the processor 'fires' a signal to other processors as output. Because neural nets can recognise patterns in data, they can be 'trained' with samples of data which are then revised to improve the response.

The most important crossover, however, is not between animal and robot but between man and machine. Quadriplegics and paraplegics have been testing computer connections for some time to bypass injured nerves, but Professor Kevin Warwick, head of the Department of Cybernetics at the University of Reading, is currently conducting experiments which could lead to more of us becoming cyborgs.

Professor Warwick has previously had a chip fitted into his arm which could activate sensors in doors and computers as he approached. He will soon have another transponder surgically implanted in his arm to record electrical signals controlling his movements, which can be played back so that he is then controlled by a prerecorded self. He predicts that such a technology could, one day, enable us to interact with machines in a completely different way. For example, we could soon be driving cars without steering wheels.

SPORTING ROBOTS

Each year teams take part in an international football competition. The teams are organised into five leagues and the prize is a cup. Not just any cup, but the Robocup, for the players are all robots. They don't play on turf but the objective is the same, to hit a ball into a goal. The aim behind the Robocup is to promote the development of robots which can work together. Football is a good test of cooperation for any team and the robots are no exception. Although robot footballers are poor competition for a human team, each year their performance gets better and each year the standards expected are raised so that competitors must constantly develop better hardware and software.

The top league is the Sony legged robot division. They use modified versions of the well known Sony robodog AIBO. A humanoid league will start as soon as there are sufficient two-legged players. The organiser of the Robocup is confident in the future of robotics, '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.'

Other sporting events for robots exist. For example, The British Association for the Advancement of Science organises a two-a-side event called Robot Volley Ball. The players' task is simply to return a ball within 60 seconds of its being served. The objective again, is to promote the development of robots which can work cooperatively. The advantages of having robots which can tackle a range of tasks together rather than constructing single expensive robots designed for one task only are obvious.

2. Work in groups of three, A, B and C. Play these roles in rotation: Speaker, Reporter and Judge.

The Speaker explains the main points of one text using only their notes.

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.

Repeat this activity until you have played all three roles and all of your texts have been covered.

3. List the predictions, if any, in the articles you have read. Have any of them already taken place since the article was written? How likely are the others to happen in the near future? Discuss your answers with others who have read the same texts.

Text	Predictions

4. Use an appropriate certainty expression from the list studied in Unit 16 to complete these predictions from the Task 2 texts. More than one answer is possible in some cases.

- 1) Barcodes soon be replaced with radio-frequency tags.
- 2) People are to buy if locked in to Ariston for other networked appliances.
- 3) If EVAs live up to the developers' claims, they provide the illusion of personal service without the cost.
- 4) 4. Mr Hird believes the invention will dramatically change the role of the traditional newscaster, 'In 20 years' time we be seeing that type of job being replaced by computer-generated images.'
- 5) We soon be driving cars without steering wheels.
- 6) Professor Warwick is currently conducting experiments which lead to more of us becoming cyborgs.
- 7) By mid-21st century, a team of fully autonomous humanoid soccer players win a soccer game against the winner of the most recent World Cup.
- 8) A virtual world populated by virtual humans become a very tangible reality.

PROBLEM-SOLVING

5. In groups, choose a domestic appliance and decide what functions an in-built computer would allow it to perform in addition to its basic function. Consider also how it could be marketed. Present your ideas to the rest of the class.

SPECIALIST READING

A. Find the answers to these questions in the following text.

1. What frustrating problem does Bluetooth solve?
2. Who first developed Bluetooth?
3. In what ways is Bluetooth particularly suited to portable systems?
4. What do Bluetooth devices share with microwave ovens?
5. List some devices that are suitable for use with Bluetooth.
6. Why is Bluetooth suitable for use on aeroplanes?
7. What factors provide security for Bluetooth communications?
8. How is the output power level of the transmitter set?
9. Why is there no collision detection in the Bluetooth specification?
10. Why are all devices on a piconet synchronised and controlled by a master device?
11. What are the consequences of Bluetooth having the following characteristics?

- a It is good at avoiding conflicting signals from other sources,
- b The transmitter output level is kept as low as possible,
- c It uses power-saving modes when devices aren't transmitting.

BLUETOOTH

As portable computing devices get smarter and more capable, connectivity frustrations increase.

This is where Bluetooth comes in. The brainchild of Ericsson, IBM, Intel, Nokia and Toshiba, Bluetooth is a microwave high-speed wireless link system that's designed to work with portable equipment. To that end, it's low power, very small and very low cost. It uses the same frequencies as existing radio LANs (and, incidentally, microwave ovens) to create a secure 1 Mbit/s link between devices within 10m of each other. These devices can be laptops, PDAs, cellphones, wired telephone access points, even wristwatch devices, headphones, digital cameras and so on. With them, your notebook PC will be able to access your cellular phone and thus the Internet — without your having to take the phone out of your pocket. Files can be exchanged and communications set up for voice and data between just about any device capable of handling the information.

Bluetooth operates in the unlicensed SM (Industrial, Scientific and Medical) band at 2.45GHz, which is globally available for products.

There's 89MHz of bandwidth allocated here, and since Bluetooth is very low power, it actually radiates less than most national and international standards allow non-transmitting devices to leak as part of their normal operation. This is key, as it allows the technology to operate without restriction on aircraft.

As befits their status as radio frequency experts, Ericsson and Nokia developed the RF side of Bluetooth. The link works in a similar way to the IEEE 802.11 wireless networking system, with a packet-switching protocol based on fast-frequency hopping direct sequence spread spectrum. In other words, it constantly switches channel to avoid interference. It changes frequency 1,600 times a second through 79 frequency bands. It's expected that this will be so good at avoiding conflicting signals from other sources that the transmission power can be kept very low.

Security is taken care of through the frequency hopping and 40-bit encryption. As the system uses radio, it can work through some barriers — briefcases, shirt pockets and desktops, for example — but it won't carry through office buildings. The power level of the transmitter can be varied, with feedback from the remote side of the link used to set the output to the lowest level commensurate with error-free operation. This saves power and increases the usable density of devices. The device can operate at up to 1mW (an optional power amplifier can increase this to 100m W) and the whole lot consumes between 8mA and 30mA at 2.7V. Various power-saving modes can be used when a device isn't transmitting, trading off speed of response for battery life. These work with current levels between 300pA and 60pA.

Within the 10m radius of a unit, up to 10 independent full-speed piconets can operate, with bandwidth reduced proportionately if more than this are in use. Each can handle up to eight devices, and can be further subdivided into separate services: 432Kbit/s full-duplex data, 721/56Kbit/s asymmetric duplex, or 384Kbit/s third-generation GSM. Each channel can also support three 64Kbit/s full-duplex voice channels. An optional variation in modulation technique would double the basic data rate to 2Mbit/s.

Power consumption and cost were very significant factors in Bluetooth's design, and it was decided not to make the system a fully-fledged LAN. As a result, there's no collision detection. All devices on a piconet are synchronized to a master device and are controlled by it to prevent simultaneous operation on the same frequency. Any device can be a master, and is elected dynamically when the link starts up.

The standard is open and royalty-free to members of the Bluetooth special interest group.

B. Re-read the text to find the answers to these questions.

1. Match the terms in Table A with the statements in Table B.

Table A	Table B
a Bluetooth	i Radio frequency
b SM band	ii The number of devices that can be used in the same area
c RF	iii A microwave high-speed wireless link system designed to work with portable equipment
d IEEE802.il	iv Very low power network links between Bluetooth devices
e Frequency hopping	v An unlicensed frequency range at 2.45GHz
f Usable density	vi A standard for networking systems with a packet-switching protocol
g piconet	vii Constantly switching channels

2. Mark the following as True or False:

- 1) Bluetooth is an expensive system.
- 2) Bluetooth devices can communicate at a distance of up to 20m.
- 3) The SM band is available throughout the world.
- 4) Bluetooth has a very low radiation level.
- 5) Each Bluetooth connection operates at one fixed frequency.
- 6) Bluetooth signals will pass through walls of buildings.
- 7) The master Bluetooth device is determined when a link is first established.

UNIT 14. THE FUTURE OF IT

STARTER

1. How do you think developments in IT will affect these areas of life in the next ten years?

- 1) commerce
- 2) work
- 3) the relationship between humans and computers.

2. Compare your predictions with others in your group. Try to agree on a ranking from most likely to least likely.

READING

3. Read the three opening paragraphs of the text below and answer these questions:

- 1) How does the author justify his claim that we are 'in the midst of convergence'?
- 2) What will be the difference between computers and humans after 2015?
- 3) What does he mean by a 'positive feedback loop' in computer development?
- 4) Why will knowledge of a major language be the only IT skill needed?
- 5) Which of the author's predictions do you accept?

THE FUTURE OF INFORMATION TECHNOLOGY

We are in the midst of convergence. At the hardware layer, computers, phones and consumer electronics are converging. At the applications layer, we see convergence of information, entertainment, communications, shopping, commerce, and education.

Computers have come from nowhere 50 years ago and are rapidly catching up in capability with the human brain. We can expect human:machine equivalence by about 2015. But after this, computers will continue to get smarter. There is a noticeable positive feedback loop in technology development, with each generation of improved computers giving us more assistance in the design and development of the next. Ultimately, they will design their offspring with little or no human involvement. This technology development will push every field of knowledge forwards, not just computing. It will be almost as though extraterrestrials had landed in 2020 and given us all their advanced technology overnight.

But we will never get far unless we can solve the interface problem. In the near future we may have electronic pets, with video camera eyes and

microphone ears, linked by radio to the family computer. With voice and language recognition we will have easy access to all that the Internet can provide. We can tell the pet what we want and it will sort it out for us. It will be impossible to be technophobic about such an interface, and the only IT skill needed will be to speak any major language.

4. Now work in groups of three, A, B and C. Read your text extract and complete parts 1 and 2 of this table.

1. Area of IT	
2. Predictions	
3. Comments	

TEXT A

Telecoms applications will soon be bundled together in much the same way as office application suites are today. A major example is the electronic marketplace, which will bring customers and suppliers together in smart databases and virtual environments, with ID verification, encryption and translation. It will then implement the billing, taxation and electronic funds transfer, while automatically producing accounts and auditing. The whole suite of services will be based on voice processing, allowing a natural voice interface to talk to the computer, all the AI to carry out the request, and voice synthesis and visualisation technology to get the answer out.

Electronic money will be very secure but much more versatile than physical alternatives. E-cash can be completely global and could be used as a de facto standard. It does not have to be linked to any national currency, so can be independent of local currency fluctuations. 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. Their exact measurements can be sent instantly to the manufacturer as soon as they have chosen an outfit. The shops may be paid by the manufacturer instead.

TEXT B

Employment patterns will change, as many jobs are automated and new jobs come into existence to serve new technologies. Some organizations will follow the virtual company model, where a small core of key employees is supported by contractors on a project by project basis, bringing together the right people regardless of where they live. The desks they will use will have multiple flat screens, voice interfaces, computer programs with human-like faces and personalities, full-screen videoconferencing and 3D sound positioning. All this will be without any communication cables since the whole system uses high capacity infrared

links. The many short-term contractors may not have enough space in their homes for an office and may go instead to a new breed of local telework centre.

Of course, workers can be fully mobile, and we could see some people abandon offices completely, roaming the world and staying in touch via satellite systems. Even in trains and planes there may be infrared distribution to each seat to guarantee high bandwidth communication. One tool they may have in a few years is effectively a communicator badge. This will give them a voice link to computers across the network, perhaps on their office desk. Using this voice link, they can access their files and email and carry out most computer-based work. Their earphones will allow voice synthesisers to read out their mail, and glasses with a projection system built into the arms and reflectors on the lenses will allow a head-up display of visual information. Perhaps by 2010, these glasses could be replaced by an active contact lens that writes pictures directly onto the retina using tiny lasers.

TEXT C

Finally and frivolously to the very long term. By around 2030, we may have the technology to directly link our brain to the ultra-smart computers that will be around then, giving us so much extra brainpower that we deserve a new name, Homo Cyberneticus. In much the same time frame, geneticists may have created the first biologically optimised humans, Homo Optimus. It would make sense to combine this expertise with information technology wizardry to make something like the Borg, Homo Hybridus, with the body of an Olympic athlete and a brain literally the size of the planet, the whole global superhighway and every machine connected to it. Over time, this new form may converge with the machine world, as more and more of his thoughts occur in cyberspace. With a complete backup on the network, Homo Hybridus would be completely immortal. Ordinary biological humans would eventually accept the transition and plain old Homo Sapiens could become voluntarily extinct, perhaps as early as 2200.

5. Now exchange information with others in your group to list all the predictions made in the text. Discuss with your group the predictions made and add your own comments on the predictions in the last section of the table.

SPECIALIST READING

A. Find the answers to these questions in the text below.

1. Of what is Professor Cochrane completely convinced?
2. What is stored in the professor's signet ring?
3. What will change dramatically when we start using rings like these?
4. What is the BT lab developing with artificial intelligence?
5. What effect are the professor's AI experiments having on evolution?
6. What does the professor see as the negative side of the electronic revolution?

7. What was the result of combining the Internet with TV?
8. What developments does the professor suggest in the field of biotechnology?
9. According to the professor, what will happen by the year 2015?

FUTURES

Talking to Professor Cochrane is probably as close as you can get to time travelling without leaving the current dimension, as his vision stretches far into the 21st century and beyond. His seemingly unshakeable conviction is that anything is possible if you really put your mind to it. In fact, BT (British Telecom) is already sitting on a host of innovations poised to blow your mind during this century.

Designed for the 21st century, Peter Cochrane's signet ring is built around a chip that holds all the details of his passport, bank account, medical records and driving licence. According to Cochrane, it's set to revolutionise shopping.

The ring is already a fully operational prototype, but it will be some time before you'll be trading your credit card in for the ultimate fashion accessory.

It's not just jewellery that's set to get smarter.

One of the biggest projects down at the Lab is looking at artificial intelligence as a way of creating software programs, networks, telephones and machines with a degree of intelligence built in. By sensing their environment, they should be able to develop new capacities as demands change. "I have software that is breeding, which is interchanging genes and creating adaptable behaviour. This means you'll see the network come alive – it will watch what you do and it will adapt."

It doesn't stop there, though, as BT has taken artificial intelligence one step further and created machines that are solving their own problems. "We've created solutions that a human being could never have dreamed of. We have solutions, and although we don't understand how they work, they do work. We're effectively increasing the speed of evolution", says Cochrane.

It's already good to talk, but with artificially intelligent phones on the way it will be even better. Cochrane is at present working on smart phones that can translate English into German, Japanese and French in real-time. "Some of it's rocket science, but a lot of it's extremely simple. What we've built is a kernel of understanding inside a machine that extracts meaning from the sentence itself - at the moment we can do simple things such as phrase books," he says.

The system uses a non-linear approach that sends the English to the understanding kernel in the machine and then fans it out to all the other languages simultaneously.

There's no doubt that Cochrane is putting a lot of faith in intelligent machines, particularly when it comes to cutting through the deluge of information that he says is the downside of the electronic revolution. BT's solution is the development of intelligent agents that watch, learn and start communicating.

It's not all work down at the Lab, though. BT's also involved in an on-going trial that it claims will revolutionise our leisure time, in particular the way we watch TV.

“We put people on the Internet and broadcast TV at the same time, so that the people at home could actually influence what was happening on their TV sets. As a result, it became interactive and therefore more active.”

BT has its fingers in multiple pies and has made biotechnology another core focus of R&D. “Personally, I think hospitals are very dangerous places to be. There are lots of viable alternatives. For a start, we can stop bunging up hospital wards by putting people online.” BT has already developed a pack for heart attack victims that monitors their progress and uploads information via a radio link back to the hospital.

So what will the 21st century hold for us if Peter Cochrane and his futurologists have their way? Well, by the year 2015, it's likely that we will be eclipsed by a supercomputer more powerful than the human brain. And if that's got visions of Terminator dancing in your head, don't worry - Cochrane's got it covered. “I'd really hate one morning to find myself considered an infestation of this planet. Our inclination is to nurture life and not to destroy it. Before we let loose a bunch of artificial intelligence, we ought to be thinking through the necessity of building in a number of rules that hold your life as a human being sacrosanct.”

B. Re-read the text to find the answers to these questions.

1. Match the terms in Table A with the statements in Table B.

Table A	Table B
a BT	i A computer program that watches, learns and communicates with the user
b Smart phone	ii Most powerful type of computer
c Intelligent agent	iii Research and development
d Rocket science	iv Transfer data from a client device to a server
e R&D	v computer
f Upload	vi A telephone that can translate English into various languages in real-time
g Supercomputer	vii British Telecom
	viii Very advanced study

2. Mark the following statements as True or False:

- 1) BT has a lot of new ideas that will astound people.
- 2) jewellery that can store large amounts of personal data has started to replace credit cards.
- 3) BT's smart phone can only translate English into one other language at a time.
- 4) Intelligent agents can help users deal with an overload of information.
- 5) Watching TV will be a more active pastime in the future.
- 6) The professor thinks that humanity will be destroyed by very powerful computers in the future.

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