ACADEMY OF CRYPTOGRAPHY TECHNIQUES

GIÁO TRÌNH

TIẾNG ANH CHUYÊN NGÀNH CÔNG NGHỆ THÔNG TIN

ENGLISH FOR INFORMATION TECHNOLOGY

Student's book

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INTRODUCTION

This book has been produced in response to the urgent need of a growing number of students and teachers of Information technology and people working with computers to acquire a reading knowledge of IT to study and teach the subject in English to meet the requirements of regional and international integration in the field of IT. The aim of this book is to develop a basic knowledge of how English is used for communication in Information Technology. It is suitable for use in universities, colleges and technical schools with intermediate students who already know how to handle the common English sentence patterns but who want to improve and extend their language skills in the context of IT.

Little or no previous knowledge of Information Technology is assumed, but if students work through the book carefully they will certainly learn a great deal about it since the material does embrace all the basic concepts of Information Technology.

There are 10 units covering a wide range of current IT topics using a variety of texts and visual material taken from textbooks, newspapers, popular computing magazines, Internet newsgroups, Webpages, manuals, and advertisements. The aim is to help students to acquire and develop the skills they will need in order to learn the subject of Information Technology. Emphasis is placed on developing reading skills; important lexical items are isolated for special attention and significant points of grammar are thoroughly treated and revised. The book also includes a comprehensive glossary of current IT terminology with Vietnamese translation, the answer key as well as many teaching notes.

It is user-friendly to both teachers and students and its clear layout, using both photos and graphics, will make it a very popular choice for those wishing to acquire what are now regarded by many to be mandatory skills for employees in almost every palt ofthe workforce.

Author

ACKNOWLEDGEMENTS

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My deep gratitude also goes to the Faculty of Basic Sciences and the Division of English Language for their thorough support in compilation of this course book.

Finally, I must say a special thank you to all of my friends, who gave me a great help in collecting and manipulating documents, being ready to assist me in my endeavors.

This is the first time the course book has been compiled, so unexpected mistakes cannot help being made. Comments from all readers on this book are always welcome and highly appreciated.

Contents

UNIT 1: PERSONAL COMPUTING

1.1. Start-up

Task 1:

1. Name these devices. What are they used for?

a 	c 
b 	d 

2. Match a name of the computer with the correct description.

Types of computer	Description
1. Microcomputer	a. An extremely fast computer that can perform millions of billions of instructions per second.

2. workstation	b. A multi-user computer capable of supporting up to hundreds of users simultaneously.
3. Minicomputer	c. A powerful multi-user computer capable of supporting many hundreds or thousands of users simultaneously.
4. Mainframe	d. A small, single-user computer based on a microprocessor.
5. Supercomputer	e. A powerful, single-user computer. A workstation is like a personal computer, but it has a more powerful microprocessor and, in general, a higher-quality monitor.

1.2. Listening

Task 2: *Listen to six people introducing themselves. What jobs do they do?*

1 Maria is a ________

2 Ahmed is a ________

3 Freddy is a______

4 Hana is a ________

5 Tim is a ________

6 Sophie is a ________

Task 3: *Listen again. Complete these collocations.*

write *software*

1. supervise ………………..
2. have_____ ………………..
3. be responsible……………….. IT projects
4. look _____ computers………………..
5. install………………..
6. diagnose………………..
7. design………………..
8. maintain………………..
9. write for software………………..

Task 4: *Listen to an IT employee telling his new manager about his job.*

What do you think his job is?

Listen again. Tick √ the things that usually happen.

1. □ Robert checks emails.
2. □ Robert has emails waiting for him.
3. □ Robert visits people at their desks.
4. □ Sales people have problems.
5. □ Robert attends meetings.
6. □ Robert visits other companies.

1.3. Reading 1

Task 5: *Before reading the text on the following page, match each word with the correct definition:*

1. Mainframe	a. the set of software that control a computer system
2. Mouse	b. a very small piece of silicon carrying a complex electrical circuit
3. Icon	c. a big computer system used for large-scale operations

4. Operating system d. the physical portion of a computer system

5. Soft ware e. a device moved by hand to indicate position on the screen

6. Hard ware f. a visual symbol used in a menu instead of natural language

7. Microchip g. data, programs, etc., not forming part of a computer, but used when operating it

Task 6: *Now read the text and decide on a suitable title for it.*

In 1952, a major computing company took a decision to get out of the business of making mainframe computers. They believed that there was only a market for four mainframes in the whole world. That company was IBM. The following year they reversed their decision.

In 1980, IBM decided that there was a market for 250,000 PCs, so they set a special team to develop the first IBM PC. It went on sale in 1981 and set a world-wide standard for IBM-compatibility, which over the next ten years, was only serious challenged by one other company, Apple Computers. Since then, over seventy million PCs made by IBM and other manufacturers have been sold. Over this period, PCs have become <u>commodity items</u>. Since IBM made the design <u>non-proprietary</u>, anyone can make ***them***.

The history of the multi-billion dollar PC industry has been one of mistakes. Xerox Corporation funded the initial research on personal computers in their Palo Alto laboratory in California. However, the company failed to <u>capitalize on</u> this work, and the ideas that ***they*** put together went into the operating system developed for Apple's computers. ***This*** was a graphical interface: using a mouse, the user clicks on icons which represent the function to be performed.

The first IBM PC was developed using existing available electrical components. With IBM's badge on the box ***it*** became the standard machine for large corporations to purchase. When IBM were looking for an operating system, they went initially to Digital Research, who were market leaders in command-based operating systems (***these*** are operating systems in which the users type in commands to perform a function). When the collaboration between IBM and Digital Research failed, IBM turned to Bill Gates, then 25 years old, to write their operating system.

Bill Gates founded Microsoft on the basis of the development of MS/DOS, the initial operating system for the IBM PC. Digital Research have continued to develop their operating system, DR/DOS, and it is considered by many people to be better product than Microsoft's. However, without an endorsement from IBM, ***it*** has become a minor player in the market. Novell, the leaders in PC networking, now own Digital Research, so things may change.

The original IBM PC had a minimum of 16K of memory, but ***this*** could be upgraded to 512K if necessary, and ran with a processor speed of 4,77MHz. Ten years later, in 1991, IBM were making PCs with 16Mb of memory, expandable of 64Mb, running with a processor speed of 33MHz. The cost of buying the hardware has come down considerably as the machines have become commodity items. Large companies are considering running major applications on PCs, something which, ten years ago, no one would have believed possible of a PC. In contrast, many computers in people's homes are just used to play computer games.

The widespread availability of computers has in all probability changed the world for ever. The microchip technology which made the PC possible has put chips not only into computers, but also into washing-machines and cars. Some books may never be published in paper form, but may only be made available as part of public databases. Networks of computers are already being used to make information available on the worldwide scale.

Vocabulary

- commodity items: items which can be produced and traded freely

- non-proprietary: not belonging to any single company
- capitalize on: profit from, turn to one's advantage

Task 7: *When you read the text to decide on a title, which of the following did you do? Did you:*

1. read the text slowly and try to understand every word?
2. read quickly and try to understand the main theme?
3. underline or mark sentences that you thought were mportant?
4. make notes about important points?

Which of these reading strategies do you think is most appropriate for this kind of task? Which do you think is least appropriate?

Task 8: *Answer the questions about the text.*

1. How many mainframes did IBM think it was possible to sell in 1952?
2. How many PCs have now been sold?
3. Who paid for the initial research into PCs?
4. Which company later used the results of this research to develop their operating system?
5. What are command-based operating systems?
6. DR/DOS is an acronym. What does it stand for?
7. Since the invention of the IBM PC, many of its features have been improved. Which of the following features does the text *not* mention in this respect?

a . memory   b. speed   c. size   d. cost

8. Give three examples from the text of how the availability of computers has in probability changed the world for ever.

Task 9: *Look back the text and find words that have a similar meaning to:*

1. international (paragraph 2)

2. contested (paragraph 2)

3. errors (paragraph 3)

4. paid for (paragraph 3)

5. buy (paragraph 4)

6. first (paragraph 5)

7. recommendation (paragraph 5)

8. improved (paragraph 6)

1.4. Writing

Task 10: *Translate the sixth paragraph (starting "The original IBM PC ....") into your own language. Look carefully at the tenses before you start.*

- Write a job advertisement for an IT job you would like or your current IT job.

1.5. Speaking

Task 11: *The article states that 'many computers in people's homes are just used to play computer games'.*

Discuss the following questions:

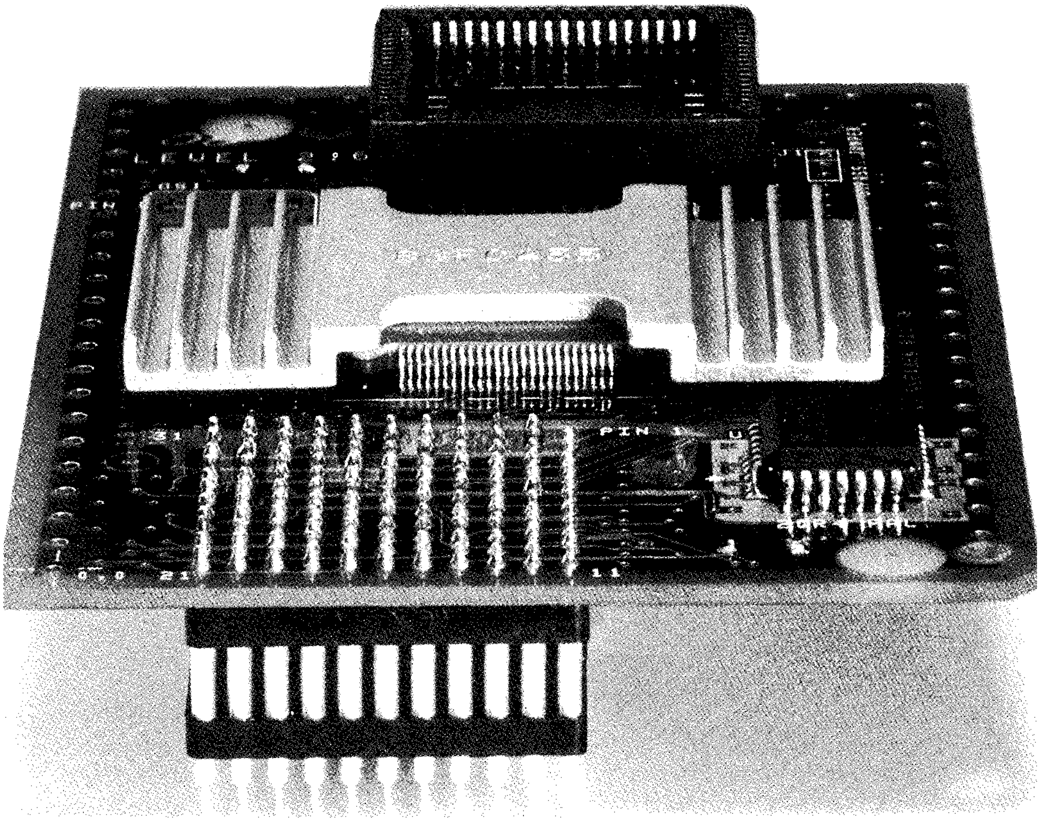
1. In what other ways, or outside work?

2. If you already have a PC, how do you use it?

Task 12: ***IT workplace rules****: Work in pairs or small groups. Look at these signs. What are the rules? Do you think they are good rules or bad rules? Why?*

1.6. Reading 2

The processor



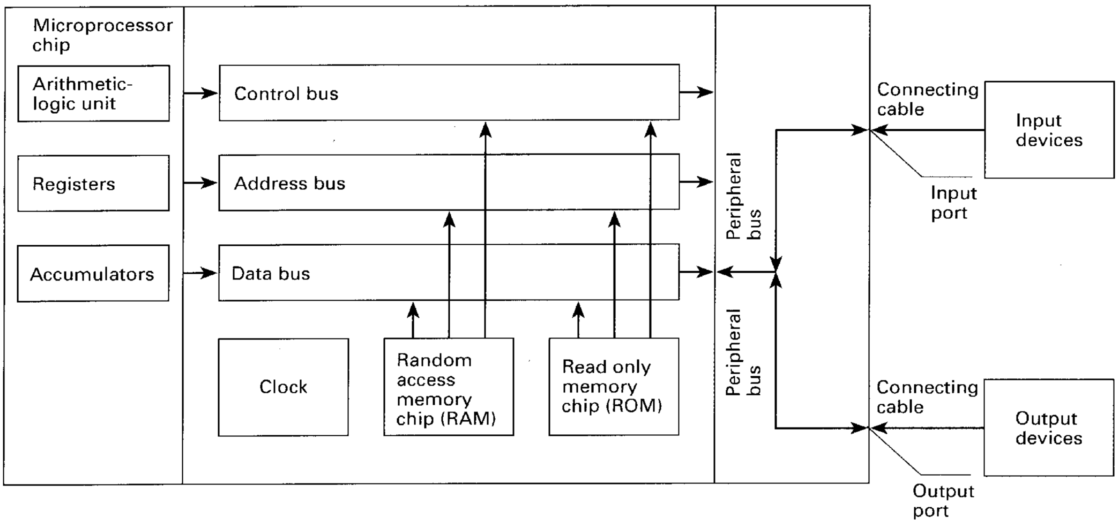
Task 13: *Read the following passage about the structure of the processor and fill in the gaps using the words below.*

adaptor boards	*registers*	*system board*
clock	*conductive*	*accumulators*
buses	*input or output devices*	*microprocessor*

Structure of the processor

The processor consists of a (1) ______________, which is a circuit board on which are mounted (2) _______________ chips, and other components linked together by (3) ______________ lines or channels in the form of control, address, and data (4) _______________. In addition, a processor has (5) _____________, which are electronic circuits providing specialized functions such as graphics, or which connect a system board to (6) _______________. The system board also consists of electronic devices, such as an electronic (7) __________________ for controlling the speed of operation; (8) _________________, which store numeric data during the course of processing; and various (9) ____________, including sequence control register, address register, and function register.

Task 14: *Use the information in the reading passage and the diagram to help you match the terms below with the appropriate explanation or definition.*



A processor consists of many different electronic circuits and devices for performing control functions, arithmetic and logic operations, and data transfers. Data may be transferred from backing storage to the internal memory or from the internal memory to the arithmetic unit by means of conductive channels known as buses. The part of the processor which controls data transfers between the various input and output devices is called the control unit.

1. microprocessor chip b
2. registers g
3. accumulators d
4. control bus h
5. address bus a
6. data bus i
7. clock e
8. RAM i
9. ROM f

a. used to send address details between the memory

b. consists of arithmetic-logic unit, one or more working registers to store data being processed, and accumulators for storing the results of accumulations.

c. a group of signal lines used to transmit data in parallel from one element of a computer to another.

d. groups of bistable devices used to store information in a computer system for high-speed access.

e. an electronic circuit, usually a quartz crystal, that generates electronic pulses at fixed time intervals to control the timing of all operations in the processor.

f. used for storing part of the operating system and application software known as ‘firmware’, can only be read; cannot be written to or altered in any way.

g. used to store numeric data during processing.

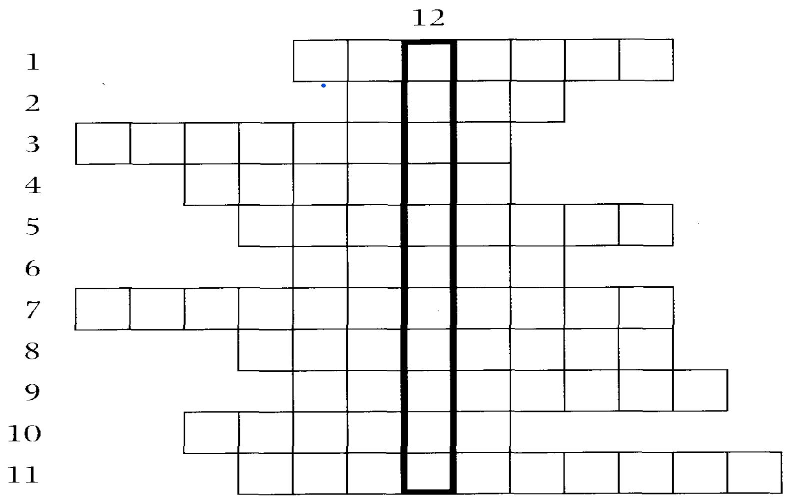
h. a group of signal lines dedicated to the passing of control signals.

i. used for the temporary storage of application programs and data; can be written to and read from.

Task 15

Word-play

Complete the puzzle and find the key word in 12 down.



Across

1. A conductive line such as a data bus (7)

2. A visual symbol used in a menu to represent a file or program. (4)

3. An input device used in computer games. (8)

4. An ______ device converts the electrical signals inside a computer into a form that can exist outside the computer. (6)

5. The name given to system software that is held in ROM. (8)

6. A device with one or more buttons used to point at locations on a computer screen. (5)

7. The part of CPU that transmits co-ordinating control signals and commands to the computer. (7,4)

8. 1,048,576 bytes. (8)

9. A large store of computerized data. (8)

10. The ________ system was first used commercially on the Apple Macintosh computer, but is now widely used on IBM machines. (6)

11. A signal route dedicated to sending information about locations within a computer. (7, 3)

Down

12. A register containing the results of an operation performed by the arithmetic-logic unit.(11)

1.7. Reading 3

Futachiba

Futachiba is a leading international provider of computer hardware. The company is among the top five suppliers internationally of servers and among the top ten manufacturers of laptop computers. We have production facilities in six countries and we sell our products to almost every country in the world. With service centres in all our major markets, we provide a very high level of customer services

IB Group

We are a fast-growing private company that supplies cloud computing services internationally. Our products include online office applications such as word processing, spreadsheet, presentation and database programs, which people can use on the internet anywhere and at any time. Our clients include major corporations, as well as many small and medium-sized companies.

Digital World

At Digital World we proudly design the most popular games in the world! We are excited every day by the great feedback we get from our favourite people: our game-playing customers. You can play our award-winning games on all the major computer operating systems, including Windows and Mac OS. Many of them are also available for Apple iOS and Android. Our wonderful staff started developing games in 2005 and continue to work on new, highly entertaining products. We expect to launch the next version of our biggest game. War of the Suns, next month.

Task 16: *Read the company profiles and find words that match these definitions.*

1. a company or companies that sell things (Futachiba) PROVIDER/SUPPLIER ……………
2. companies that make things to sell (Futachiba) MANUFACTURE ……………………..
3. factories (Futachiba) PLANT / MANUFACTURING FACILITIES ………………………………………………...

4. things a company sells (Futachiba) PRODUCTS ……………………………………..

5. using software that runs and stores information on the internet (IBGroup) CLOUD…………………………..

6. customers (IBGroup) CLIENT, BUYER, USER ……………………………………………………...

7. starting selling a new product (Digital World) LAUNCH …………………….

Task 17: *Read the company profiles in Reading 3 again and answer these questions. Then compare answers with a partner.*

Which company or companies:

1. is getting bigger?
2. develops software? ,
3. makes things in more than one country?
4. has a new product to launch?
5. sells software for use on the internet?

1.8. Language focus

Contextual reference

Transitional markers are words used to link ideas together so that the text is easier to read. When pronouns such as *it, they, them, I, he, she, which, who, whose, that, such, one,* and demonstrative adjectives such as *this, that, these* and *those,* are used as transitional markers, they refer to a word, or words, mentioned earlier in the sentence or paragraph. Their function is to take your thoughts back to something that has already been mentioned. Other words which are often used to refer backwards are *the former, the latter, the first, second, etc., the last.*

Sample paragraph:

A computer, like any other machine, is used because it does certain jobs better and more efficiently than humans. It can receive more information and process it faster than any human. The speed at which a computer works means it can replace weeks or even months of pencil-and-paper work. Therefore, computers are used when the time saved offsets their cost, which is one of the many reasons they are used so much in business, industry, and research.

Exercise 1: *Using the sample paragraph as a model, draw a rectangle around the word, or words, that the circled words refer to. Then join the CD and the =with arrows.*

Modern accounting firms use spreadsheet software to do complicated calculations. They can provide their clients with an up-to-date report whenever it is needed. This software has many functions and can be integrated with other software. The spreadsheet's basic component is a cell. This may contain a formula which performs a mathematical operation. It could also contain a label or data. The former describes the information on the worksheet. The latter is the information itself.

The worksheet is the basic work area of a spreadsheet program. It is made up of cells arranged in rows and columns. The number of these varies depending on the software you are using. You can change the width and format of cells. Such parameters are usually quite easy to change with just a few keystrokes.

Exercise 2: *Using the line reference given, look back at the 1.3 reading 1 in Unit 1, and find the reference for the words in italics.*

1. anyone can make *them* (paragraph 2)
2. the ideas that *they* put (paragraph 3)
3. *This* was a graphical interface (paragraph 3)
4. *it* became the standard machine (paragraph 4)

5. *these* are operating systems (paragraph 4)

6. *it* has become a minor player (paragraph 5)

7. *this* could be upgraded (paragraph 6)

Further Reading

Reading 1: History of the computer

The computer was born not for entertainment or email but out of a need to solve a serious number-crunching crisis. By 1880, the U.S. population had grown so large that it took more than seven years to tabulate the U.S. Census results. The government sought a faster way to get the job done, giving rise to punch-card based computers that took up entire rooms.

Today, we carry more computing power on our smartphones than was available in these early models. The following brief history of computing is a timeline of how computers evolved from their humble beginnings to the machines of today that surf the Internet, play games and stream multimedia in addition to crunching numbers.

1801: In France, Joseph Marie Jacquard invents a loom that uses punched wooden cards to automatically weave fabric designs. Early computers would use similar punch cards.

1822: English mathematician Charles Babbage conceives of a steam-driven calculating machine that would be able to compute tables of numbers. The project, funded by the English government, is a failure. More than a century later, however, the world's first computer was actually built.

1890: Herman Hollerith designs a punch card system to calculate the 1880 census, accomplishing the task in just three years and saving the government $5 million. He establishes a company that would ultimately become IBM.

1936: Alan Turing presents the notion of a universal machine, later called the Turing machine, capable of computing anything that is computable. The central concept of the modern computer was based on his ideas.
1937: J.V. Atanasoff, a professor of physics and mathematics at Iowa State University, attempts to build the first computer without gears, cams, belts or shafts.
1939: Hewlett-Packard is founded by David Packard and Bill Hewlett in a Palo Alto, California, garage, according to the Computer History Museum.
1941: Atanasoff and his graduate student, Clifford Berry, design a computer that can solve 29 equations simultaneously. This marks the first time a computer is able to store information on its main memory.
1943-1944: Two University of Pennsylvania professors, John Mauchly and J. Presper Eckert, build the Electronic Numerical Integrator and Calculator (ENIAC**)**. Considered the grandfather of digital computers, it fills a 20-foot by 40-foot room and has 18,000 vacuum tubes.
1946: Mauchly and Presper leave the University of Pennsylvania and receive funding from the Census Bureau to build the UNIVAC, the first commercial computer for business and government applications.
1947: William Shockley, John Bardeen and Walter Brattain of Bell Laboratories invent the transistor. They discovered how to make an electric switch with solid materials and no need for a vacuum.
1953: Grace Hopper develops the first computer language, which eventually becomes known as COBOL. Thomas Johnson Watson Jr., son of IBM CEO Thomas Johnson Watson Sr., conceives the IBM 701 EDPM to help the United Nations keep tabs on Korea during the war.
1954: The FORTRAN programming language, an acronym for FORmula TRANslation, is developed by a team of programmers at IBM led by John Backus, according to the University of Michigan.

1958: Jack Kilby and Robert Noyce unveil the integrated circuit, known as the computer chip. Kilby was awarded the Nobel Prize in Physics in 2000 for his work.

1964: Douglas Engelbart shows a prototype of the modern computer, with a mouse and a graphical user interface (GUI**)**. This marks the evolution of the computer from a specialized machine for scientists and mathematicians to technology that is more accessible to the general public.

1969: A group of developers at Bell Labs produce UNIX, an operating system that addressed compatibility issues. Written in the C programming language, UNIX was portable across multiple platforms and became the operating system of choice among mainframes at large companies and government entities. Due to the slow nature of the system, it never quite gained traction among home PC users.

1970: The newly formed Intel unveils the Intel 1103, the first Dynamic Access Memory (DRAM) chip.

1971: Alan Shugart leads a team of IBM engineers who invent the "floppy disk," allowing data to be shared among computers.

1973: Robert Metcalfe, a member of the research staff for Xerox, develops Ethernet for connecting multiple computers and other hardware.

1974-1977: A number of personal computers hit the market, including Scelbi & Mark-8 Altair, IBM 5100, Radio Shack's TRS-80 - affectionately known as the "Trash 80" - and the Commodore PET.

1975: The January issue of Popular Electronics magazine features the Altair 8080, described as the "world's first minicomputer kit to rival commercial models." Two "computer geeks," Paul Allen and Bill Gates, offer to write software for the Altair, using the new BASIC language. On April 4, after the success of this first endeavor, the two childhood friends form their own software company, Microsoft.

1976: Steve Jobs and Steve Wozniak start Apple Computers on April Fool's Day and roll out the Apple I, the first computer with a single-circuit board, according to Stanford University.

1977: Radio Shack's initial production run of the TRS-80 was just 3,000. It sold like crazy. For the first time, non-geeks could write programs and make a computer do what they wished.

1977: Jobs and Wozniak incorporate Apple and show the Apple II at the first West Coast Computer Faire. It offers color graphics and incorporates an audio cassette drive for storage.

Advertisement

1978: Accountants rejoice at the introduction of VisiCalc, the first computerized spreadsheet program.

1979: Word processing becomes a reality as MicroPro International releases WordStar. "The defining change was to add margins and word wrap," said creator Rob Barnaby in email to Mike Petrie in 2000. "Additional changes included getting rid of command mode and adding a print function. I was the technical brains - I figured out how to do it, and did it, and documented it. "

1981: The first IBM personal computer, code-named "Acorn," is introduced. It uses Microsoft's MS-DOS operating system. It has an Intel chip, two floppy disks and an optional color monitor. Sears & Roebuck and Computerland sell the machines, marking the first time a computer is available through outside distributors. It also popularizes the term PC.

1983: Apple's Lisa is the first personal computer with a GUI. It also features a drop-down menu and icons. It flops but eventually evolves into the Macintosh. The Gavilan SC is the first portable computer with the familiar flip form factor and the first to be marketed as a "laptop."

1985: Microsoft announces Windows, according to Encyclopedia Britannica. This was the company's response to Apple's GUI. Commodore unveils the Amiga 1000, which features advanced audio and video capabilities.

1985: The first dot-com domain name is registered on March 15, years before the World Wide Web would mark the formal beginning of Internet history. The Symbolics Computer Company, a small Massachusetts computer manufacturer, registers Symbolics.com. More than two years later, only 100 dot-coms had been registered.

1986: Compaq brings the Deskpro 386 to market. Its 32-bit architecture provides as speed comparable to mainframes.

1990: Tim Berners-Lee, a researcher at CERN, the high-energy physics laboratory in Geneva, develops HyperText Markup Language (HTML), giving rise to the World Wide Web.

1993: The Pentium microprocessor advances the use of graphics and music on PCs.

1994: PCs become gaming machines as "Command & Conquer," "Alone in the Dark 2," "Theme Park," "Magic Carpet," "Descent" and "Little Big Adventure" are among the games to hit the market.

1996: Sergey Brin and Larry Page develop the Google search engine at Stanford University.

1997: Microsoft invests $150 million in Apple, which was struggling at the time, ending Apple's court case against Microsoft in which it alleged that Microsoft copied the "look and feel" of its operating system.

1999: The term Wi-Fi becomes part of the computing language and users begin connecting to the Internet without wires.

2001: Apple unveils the Mac OS X operating system, which provides protected memory architecture and pre-emptive multi-tasking, among other benefits. Not to be outdone, Microsoft rolls out Windows XP, which has a significantly redesigned GUI.

2003: The first 64-bit processor, AMD's Athlon 64, becomes available to the consumer market.

2004: Mozilla's Firefox 1.0 challenges Microsoft's Internet Explorer, the dominant Web browser. Facebook, a social networking site, launches.

2005: YouTube, a video sharing service, is founded. Google acquires Android, a Linux-based mobile phone operating system.

2006: Apple introduces the MacBook Pro, its first Intel-based, dual-core mobile computer, as well as an Intel-based iMac. Nintendo's Wii game console hits the market.

2007: The iPhone brings many computer functions to the smartphone.

2009: Microsoft launches Windows 7, which offers the ability to pin applications to the taskbar and advances in touch and handwriting recognition, among other features.

2010: Apple unveils the iPad, changing the way consumers view media and jumpstarting the dormant tablet computer segment.

2011: Google releases the Chromebook, a laptop that runs the Google Chrome OS.

2012: Facebook gains 1 billion users on October 4.

2015: Apple releases the Apple Watch. Microsoft releases Windows 10.

2016: The first reprogrammable quantum computer was created. "Until now, there hasn't been any quantum-computing platform that had the capability to program new algorithms into their system. They're usually each tailored to attack a particular algorithm," said study lead author Shantanu Debnath, a quantum physicist and optical engineer at the University of Maryland, College Park.

2017: The Defense Advanced Research Projects Agency (DARPA) is developing a new "Molecular Informatics" program that uses molecules as computers. "Chemistry offers a rich set of properties that we may be able to harness for rapid, scalable information storage and processing," Anne Fischer, program manager in DARPA's Defense Sciences Office, said in a statement. "Millions of molecules exist, and each molecule has a unique three-dimensional atomic structure as well as variables such as shape, size, or even color. This richness provides a vast design space for exploring novel and multi-value ways to encode and process data beyond the 0s and 1s of current logic-based, digital architectures."

Exercise 1: *Which statement best expresses the main idea of the text? Why did you eliminate the other choices?*

1. Computers, as we know them today, have gone through many changes.
2. Today's computer probably won't be around for long.
3. Computers have had a very short history.

Exercise 2: *These sentences are true or false. Correct the false ones.*

1. A mainframe computer is less powerful than a PC.
2. A mainframe is used by large organizations that need to process enormous amounts of data.
3. The most suitable computers for home use are desktop PCs.
4. A laptop is not portable.
5. Laptops are not as powerful as desktop PCs.
6. Using a stylus, you can write directly onto the screen of a tablet PC.
7. A Personal Digital Assistant is small enough to fit into the palm of your hand.
8. A PDA does not allow you to surf the Web.

Reading 2: The didital age

We are now living in what some people call the digital age, meaning that computers have become an essential part of our lives. Young people who have grown up with PCs and mobile phones are often called the digital generation. Computers help students to **perform** mathematical operations and improve their maths skills. They are used to access the Internet, to do basic research and to communicate with other students around the world.

Teachers use projectors and interactive whiteboards to give presentations and teach sciences, history or language courses. PCs are also used for administrative purposes - schools use **word processors** to write letters, and databases to keep records of students and teachers. A school website allows teachers to publish exercises for students to complete **online**. Students can also enrol for courses via the website and parents can **download** official reports.

Mobiles let you make voice calls, send texts, email people and download logos, ringtones or games. With a **built-in** camera you can send pictures and make video calls in face-to-face mode. New smartphones combine a telephone with web access, video, a games console, an MP3 player, a personal **digital** assistant (PDA) and a GPS navigation system, all in one.

In banks, computers **store** information about the money held by each customer and enable staff to access large databases and to carry out **financial** transactions at high speed. They also control the cashpoints, or ATMs (automatic teller machines), which dispense money to customers by the use of a PIN-protected card. People use a Chip and PIN card to pay for goods and services. Instead of using a signature to verify payments, customers are asked to enter a four-digit personal identification number (PIN), the same number used at cashpoints; this system makes transactions more secure. With online banking, clients can easily pay bills and transfer money from the comfort of their homes.

Airline pilots use computers to help them control the plane. For example, **monitors** display **data** about fuel consumption and weather conditions. In airport control towers, computers are used to manage radar systems and regulate air traffic. On the ground, airlines are connected to travel agencies by computer.Travel agents use computers to find out about the availability of flights, prices, times, stopovers and many other details.

Exercise 1: Find the bold words (1 -10) in the text above. Can you guess the meaning from context? Are they nouns, verbs, adjectives or adverbs? Write n, v, adj or adv next to each word.

perform……………………………

word processor…………………..

online …………………………….

download ………………………..

built-in …………………………..

digital ……………………………

store …………………………….

financial …………………………

monitor ………………………….

data ……………………………..

Exercise 2: Match the words in exercise 1 (1 -10) with the correct meanings (a-j).

a. keep, save ……

b. execute, do ……

c. monetary ……

d. screen ……

e. integrated ……

f. connected to the Internet ……

g. collection of facts or figures ……

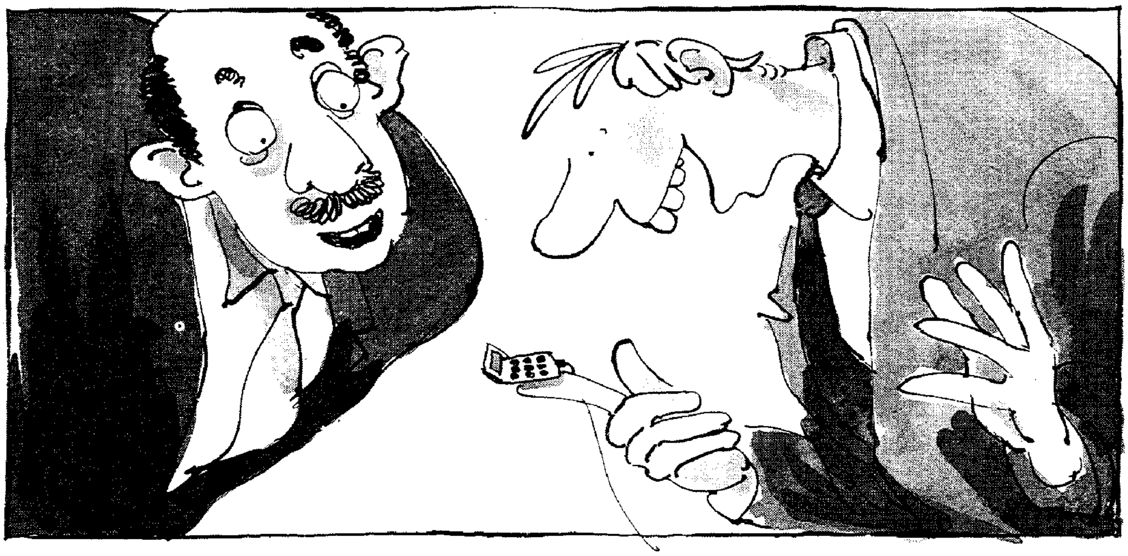
h. describes information that is recorded or broadcast using computers ……………………………..

i. program used for text manipulation ……

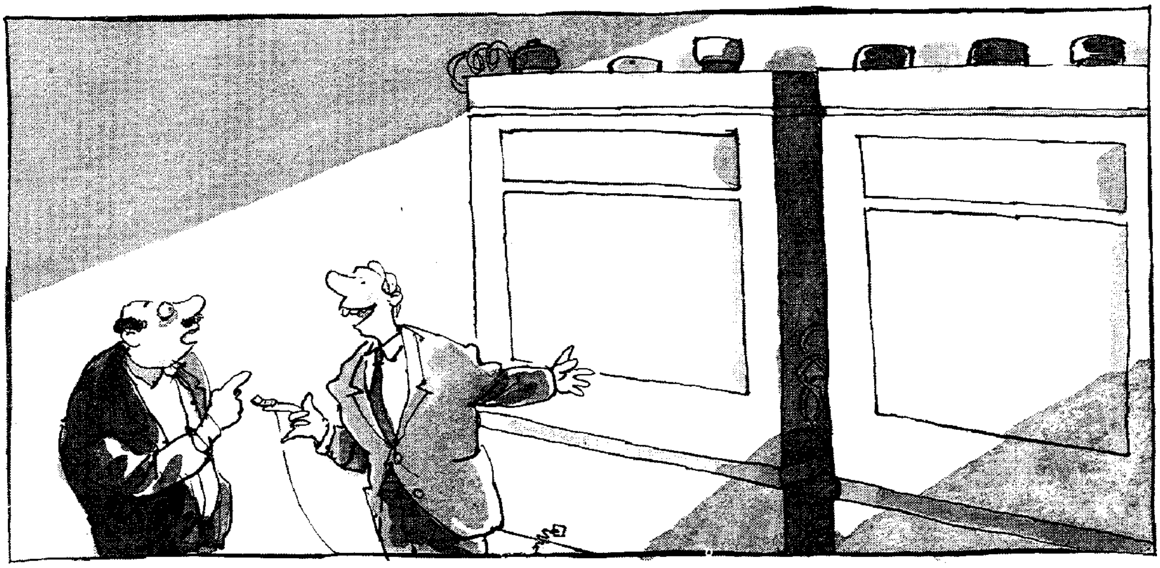
j. copy files from a server to your PC or mobile ……

UNIT 2: PORTABLE COMPUTERS AND OPERATING SYSTEM

Portable computers



'This is the smallest, most powerful computer in the world'



'Those? Those are the batteries.'

2.1. Start-up

Task 1: *Discuss the following questions*

1. How small do you think computers can usefully become**?**

2. To what extent does the size of a computer influence what it can be used for? Think of examples to illustrate your answer.

2.2. Reading 1

Task 2: *Before reading the text, match these words with their definitions:*

a. Clipboard	1. surface on which pictures or data are shown
b. Stylus	2. electrical force
c. Screen	3. pattern used as a guide for creating letters or characters
d. Grid	4. individual dot on a computer screen
e. Voltage	5. network of lines crossing at right angles
f. Pixel	6. pointed implement for drawing or writing
g. Template	7. portable board with a clip at the top for holding papers

Task 3: *Read the text and decide why the author chose the title Delete Keys. Can you suggest a better title?*

Delete Keys – Clipboard Technology

For the last generation, Silicon Valley and Tokyo have been working to design computers that are ever easier to use. There is one thing, however, that has prevented the machines from becoming their user-friendliest: you still have to input data with a keyboard, and that require you to do a lot typing and to memorize a lot of elaborate commands.

Enter the clipboard computer, a technology that has been in development for the last 20 years but took hold in the mass market only this year. Clipboard PCs – which, as their name suggests, are not much bigger than an actual clipboard- replace the keyboard with a liquid crystal display (LCD) screen and an electronic stylus. Users input data by printing individual letters directly on the screen.

There are two technologies at work in a clipboard PC: one allows raw data to get into the computers and the other allows the computer to figure out what that data means. The first technology relies principally on ding on the particular computer. In one system, marketed under the name GRID Pad, and the computer's LCD screen is covered by a sheet of glass with a transparent conductive coating. Voltage is sent across the glass in horizontal and vertical lines forming a fine grid; at any point on the grid, the voltage is slightly different. When the stylus – which is essentially a voltmeter – touches the screen, it informs the computer of the voltage at that point. The computer uses this information to determine where the stylus is and causes a liquid crystal pixel to appear at those coordinates. The position of the stylus is monitored several hundred times a second, so as the stylus moves across the glass, whole strings of pixels are activated. 'What we do if sort of connect the dots,' says Jeff Hawkins, the creator of GRID Pad. 'Users can then write whatever they want on the screen with a kind of electronic ink.'

Making that writing comprehensible to the computer, however, requires the help of some powerful software. When the stylus is being used, the computer is programmed to look for moments when the tips does not touch the screen for a third of a second or more. Every time this happens – and it happens a lot when somebody is <u>printing</u> – software assumes that one letter or number has been written. The pixel positions of this fresh character are then passed on the computer's pattern recognition software, which instantly identifies the letter or number written.

The software does this by first cleaning up the character- smoothing out crooked lines and removing errant dots. The remaining lines and curves are then compared with s series of templates in the computer's memory that represent hundreds of thousands of different versions of every letter in the English alphabet and all ten numerals. When the computer finds the closest match, it encodes the character in memory and displays it on the screen as if it had been typed. The entire process takes just a fraction of a second. To delete a word, you simply draw a line through it. To move to the next page, you flick the stylus at the bottom of the screen as if you're flicking the page of a book.

There are a handful of clipboard computers now on the market including GRID Pad, which is sold in the US; Penvision, manufactured by NCR and sold around the world; and Sony's Palmtop and Canon's Al Note, both sold only in Japan. IBM and Apple are also pouring millions of dollars into the technology.

In addition to this hardware, a variety of software is also making its way to the market. Depending on the power of the computer and the sophistication of the software, clipboard system can be programmed to understand the particular quirks of a particular user's printing; this is an especially useful feature in Japan, where elaborate kanji characters make up most of the written language. Improvements in software may soon allow machines sold in the US to understand not only printing but continuous script as well.

Given such flexibility, the designers of clipboard computers are predicting big things – and a big market – for their products. "There's no doubt about it," says an optimistic Hawkins. "You're going to own one of these things in the not-too-distant future."

Vocabulary

- printing (paragraph 5): (in this case) writing separated letters or numbers by hand
- kanji (paragraph 8): Japanese script which users Chinese characters

Task 4: *Decide whether the following statements are true (T) or false (F) in relation to the information in the text. lf you think a statement is false, change it to make it true.*

1. The Americans and the Japanese are working together to produce user-friendlier computers.

2. he clipboard computer was first sold twenty years ago.
3. On a clipboard, an electronic pen replaces the traditional keyboard.
4. ln the GRlDPad system, when the pen touches the screen, it informs the computer and a liquid crystal pixel appears at that point.
5. The software decides that one character or number is complete if the tip of the stylus is not in contact with the screen for more than half a second.
6. The whole process of recognizing letters or numbers and printing them on the screen takes very little time.
7. There are many clipboard computers sold today which are all available everywhere in the world.
8. There are many clipboard computers sold today which are all available everywhere in the world.

Task 5: *Use the information in the text to complete the following dialogue in your own words.*

1. A How big is a clipboard PC?
   B ____
2. A Does it have a keyboard?
   B ____
3. A How does the stylus work?
   B____
4. A How does the computer know when one letter or number is complete?
   B ____
5. A And how does the computer recognize different letters?
   B____
6. A Can you delete a word after you have written it?
   B Yes, ____
7. A Are these systems capable of recognized joined writing?
   B____

Task 6: *Using the line references given, look back in the text and find words or phrases that have a similar meaning to:*

1. understand (paragraph 3)
2. sold (paragraph 3)
3. points (paragraph 3)
4. join (paragraph 4)
5. making even (paragraph 6)
6. not straight (paragraph 6)
7. made by mistake (paragraph 6)
8. move quickly and sharply (paragraph 6)
9. unique features (paragraph 8)

Task 7: *Choose the correct word to complete each sentence. You may have to change some words slightly.*

1. electtron, electronic, electronics, electronically

a. An………… pen is one example of input device.

b. A computer solves problems …………...

c. Many………… students go on to work as engineers

2. technology, technological, technologically, technologist

a. The computer is the greatest……………..invention of the twentieth century.

b. There are two ……………involved in a clipboard *PC.*

c. Today's computers are …………far superior to those used a few years ago.

3. identify, identifying, identifiable, identity

a. The clipboard's pattern recognition software ………….. the letters and numbers written by the stylus.

b. Most computer companies will not allow people without …………card to enter their premises.

c. A password is a mechanism for……………. the computer-user and allowing access.

4. compute, computing, computation, computerize, computerization

a. The …………….. of the manufacturing division will be expensive in the short term, but cost-effective in the long term.

b. We should be able to …………….. our profit for next year fairly accurately with the new program.

c. I could tell from all…………….. on the board that a maths lesson was in progress.

2.3. Listening

Task 8: *Listen to a technician describing the motherboard to a new trainee. Match these words to A-G in the photo below.*

1. audio socket………. 2. CPU socket….. 3. DIMM slot……

4. Ethernet connector……. 5. graphics card socket…….

6. SATA socket…….. 7. USB port……

Task 9: *Listen to a help desk technician talking to an IT user. What information is the technician looking for?*

Task 10: *Listen again. Number the instructions in the order you hear them.*

- ○ Choose ‘Properties’ from the menu.
- ○ Choose the ‘Details’ tab.
- ○ Just select ‘Manage’.
- ○ Just right-click where it says ‘Disk O’.
- ○ Select ‘Install date’.
- ○ Can you scroll up to the top?

2.4. Writing

Task 11: *Translate the third paragraph (starting “These are two technologies .....” into your language.*

- Summarize the text (from 100-150 words)

Task 12: *Write an email explaining how to transfer photographs from a digital camera to a computer. Give instructions for the steps below.*

- card reader -» computer
- select destination folder
- open software
- ‘OK’ button
- select card reader/drop down menu

2.5. Speaking

Task 13: *Discuss the following questions.*

1. What are the limitations of portable computers?
2. Do you think students should be allowed to use portable computers in class? Why/Why not?
3. What do you use computers for? List as many uses as you can.

2.6. Reading 2

Operating systems

Task 14: *Before you read the text, try to answer these questions*

1. What is an operating system and what is its purpose?

2. Where is an operating system stored and how is it transferred to internal memory?

3. List some of the tasks typically performed by an operating system.

Now read the text and check your answer.

General features of operating systems.

An operating system is a master control program which controls the functions of the computer system as a whole and the running of application programs. All computers do not use the same operating systems. It is therefore important to assess the operating system used on a particular model before initial commitment because some software is only designed to run under the control of specific operating systems. Some operating systems are adopted as 'industry standards' and these are the ones which should be evaluated because they normally have a good software base. The reason for this is that software houses are willing to expand resources on the development of application packages for machines functioning under the control of an operating system which is widely used.

The cost of software is likely to be lower in such circumstances as the development costs are spread over a greater number of users, both actual and potential.

Mainframe computers usually process several application programs concurrently, switching from one to the other, for the purpose of increasing processing productivity. This is known as multiprogramming (multi-tasking in the context of microcomputers), which requires a powerful operating system incorporating work scheduling facilities to control switching between programs. This entails reading in data for one program while the processor is performing computations another and printing out results on yet another.

In multi-user environments an operating system is required to control terminal operations on a shared access basis as only one user can access the system at any moment of time. The operating system allocates control to each terminal in turn. to prevent one user attempting to read a record whilst another another user is updating it, for instance. The first user is allocated control to write to a record (or file in some instances) and other users are denied access until the record is updated and unlocked.

Some environments operate in concurrent batch and real-time mode. This means that a 'background' job deals with routine batch processing whilst the 'foreground' job deals with real-time operations such as airline seat reservations, on-line booking of hotel accommodation, or control of warehouse stocks, etc. The real-time operation has priority, and the operating system interrupts batch processing operations to deal with real-time enquiries or file updates. The stage of batch processing attained at the time of the interrupt is temporarily transferred to backing storage. After the real-time operation has been dealt with, the interrupted program is transferred back to internal memory from backing storage, and processing recommences from a 'restart' point. The operating system also copies to disk backing storage the state of the real-time system every few minutes (periodic check points) to provide a means of 'recovering' the system in the event of a malfunction.

An operating system is stored on disk and has to be booted into the internal memory (RAM) where it must reside throughout processing so that commands are instantly available. The operating system commands may exceed the internal memory capacity of the computer in which case only that portion of the OS which is frequently used is retained internally, other modules being read in from disk as required. Many microcomputers function under the control of a disk operating system known as DOS.

Task 15: *Answer these questions*

1. Why is it important to assess the operating system on a computer before buying it?
2. What is multiprogramming?
3. The text gives some examples of real-time processing. Can you think of some examples of batch-processing?

Task 16: *Here is a list of typical tasks performed by an operating system. In each case the main verb has been omitted. Fill in the blanks from the words given. Sometimes more than one may apply.*

execute ***monitor*** ***format*** ***diagnose***

A typical operating system will:

1. _____________ input and output devices.
2. _____________ the status of hardware devices
3. _____________ hardware interrupts.
4. _____________ new disks.
5. _____________ disk directories.
6. _____________disk reading and writing operations.
7. _____________ disk errors.
8. _____________ disk commands relating to the deletion, copying, renaming, and dumping of files.

Task 17: *Match these common DOS command with the appropriate explanation.*

BACKUP	a. search for a specific string of text in a file
CHDIR or CD	b. allows a text file from the current directory to be display on screen.

CHKDSK	c. allows the user to change the name of a file.
CLS	d. saves the contents of the hard disk to a floppy disk for security purposes.
DEL	e .is used used when it is necessary to change the current directories
DIR: SORT	f. clears data from the screen
REN	g. alphabetically sorts and lists a disk
TYPE	h. makes back-up copies of the contents of one disk to another.
FIND	i. deletes a specified file from the current directory, specified drive, or specified path
DISKCOPY	j. produces a status report of the currently logged-on disk, indicating the amount of disk space used, the available capacity (in bytes), and the number of files on disk.

WORD-PLAY

Task 18: *Find the hidden words in this square. Some appear vertically, some horizontally, and some diagonally. They may be upside-down or back to front. Use the clues below to help you. The number of letters in each word and the first letter of the word appear in brackets after the clue. The first one has been done for you.*

C	T	A	A	R	I	T	P	L	R
L	P	N	T	P	I	D	A	E	E
I	U	E	A	E	E	B	L	X	T
P	R	T	D	L	A	F	M	I	E
B	R	E	E	S	N	O	T	P	M
O	E	T	G	R	I	D	O	T	P
A	E	C	V	K	L	M	P	Y	L
R	N	D	S	T	Y	L	U	S	A
D	E	L	V	E	I	Y	S	T	T
T	P	U	R	R	E	T	N	I	E

Find words which mean:

1. a computer that is small enough to hold in the hand. (7, P)
2. an electronic pen. (6, S)
3. to erase or omit. (6, D)
4. one type of portable computer which operates with an electronic pen. (9, C)
5. the information that the computer processes. (4, D)
6. a network of lines crossing at right angles. (4, G)
7. a signal to a processor to suspend temporarily the current sequence of instructions. (9, I)
8. a pattern used as a guide for creating letters or characters. (8, T)
9. an individual dot on a computer screen. (5, P)

Task 19: *Work in pairs. Put these steps in reinstalling an operating system in the correct order*.

- During the process, the computer will restart by itself several times.

o Near the end of the process, you can partition the hard drives.

o In the BIOS, set the first boot drive to DVD. Then reboot again.

o At the end of the process, the operating system will ask for the product key, time, date, network type and details for user accounts.

o First, put the installation DVD into the optical drive. Then reboot the computer while you press the ‘F2’ key. The BIOS will now start.

o This time, the computer will boot from the DVD and installation will begin.

o Before you start, back up everything.

o Near the start of the process, it will ask you to agree to the licence terms.

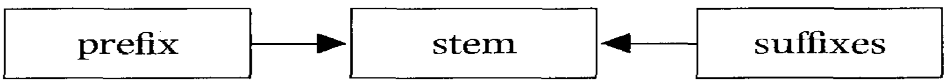
Task 20: *Find words in **task 19** that match these definitions.*

1. start again ....
2. split a hard drive into parts that act like separate drives …….
3. software built into a computer that controls how it starts up ……..
4. the drive that the computer reads first when starting up ……..
5. software comes with this to show you are the owner ……..
6. settings for a user ……..
7. switch a computer off and on again ……..
8. a series of actions to do something …….
9. copy data to another place so that you don’t lose it …….
10. rules about how you can use software ……..

2.7. Language focus

Word formation: prefixes

When you are reading, you will come across unfamiliar words. lt is often possible to guess the meanings of these words if you understand the way words in English are generally formed.



An English word can be divided into three parts: a prefix, a stem, and a suffix. Pre-means 'before'. A prefix, therefore, is what comes before the stem. Consider, as an example, the prefix *de*- (meaning 'reduce' or 'reverse') in a word like demagnetize (meaning 'to deprive of magnetism'). A suffix is what is attached to the end of the stem. Consider, as an example, the suffix -*er* (meaning `someone who') in programmer Ca person who programs').

Suffixes change the word from one part of speech to another. For example, -*ly* added to the adjective *quick* gives the adverb *quickly*. Prefixes, on the other hand, usually change the meaning of the word. For example, *un*- changes a word to the negative. Unmagnetizable means 'not capable of being magnetized'.

Exercise 1: *Read the following sentences and circle the prefixes. For each word that has a prefix, try to decide what the prefix means. Refer back to the table if you need help.*

1. Floppy disks are inexpensive and reuseable.
2. If a printer malfunctions, you should check the interface cable.
3. The multiplexor was not working because someone had disconnected it by mistake.
4. Improper installation of the antiglare shield will make it impossible to read what is on the screen.
5. After you transfer text using the 'cut and paste' feature, you may have to reformat the text you have inserted.
6. You can maximize your chances of finding a job if you are bilingual or even trilingual
7. Peripheral devices can be either input devices (such as keyboards) or output devices (such as printers)

8. Your pay rise is retroactive to the beginning of June and you will receive a biannual bonus.

9. The octal and hexadecimal systems are number systems used as a form of shorthand in reading groups of four binary digits.

10. As the results are irregular, the program will have to be rewritten.

Exercise 2: *Fill in the gaps with the correct prefix from the following list.*

auto	*de*	*dec*	*inter*	*maxi*	*mega*
micro	*mini*	*mono*	*multi*	*semi*	*sub*

1. Most people prefer a colour screen to a ___________ chrome screen.
2. _________ script is a character or symbol written below and to the right of a number or letter, often used in science.
3. A _________ byte equals approximately one million bytes.
4. Once you finish your program, you will have to test it and______bug it to remove all the mistakes.
5. The introduction of ___________ conductor technology revolutionized the computer industry.
6. If a computer system has two or more central processors which are under common control, it is called a _______ processor system.
7. The _______imal system is a number system with a base of 10.
8. When the user and the computer are in active communication on a graphic system, we refer to this as _________ active graphics.

Further Reading

Reading 1:

Large computer systems, or mainframes, as they are referred to in the field of computer science, are those computer systems found in computer installations processing immense amounts of data. These powerful computers make use of very high-speed main memories into which data and programs to be dealt with are transferred for rapid access. These powerful machines have a larger repertoire of more complex instructions which can be executed more quickly. Whereas smaller computers may take several steps to perform a particular operation, a larger machine may accomplish the same thing with one instruction.

These computers can be of two types: digital or analog. The digital computer or general purpose computer as it is often known, makes up about 90 percent of the large computers now in use. It gets its name because the data that are presented to it are made up of code consisting of digits single character numbers. The digital computer is like a gigantic cash register in that it can do calculations in steps, one after another at tremendous speed and with great accuracy. Digital computer programming is by far the most commonly used in electronic data processing for business or statistical purposes. The analog computer works something like a car speedometer, in that it continuously works out calculations. It is used essentially for problems involving measurements. It can simulate, or imitate different measurements by electronic means. Both of these computer types the digital and the analog - are made up of electronic components that may require a large room to accommodate them. At present, the digital computer is capable of doing anything the analog once did. Moreover, it is easier to program and cheaper to operate. A new type of scientific computer systems called the hybrid computer has now been produced that combines the two types into one.

Really powerful computers continue to be bulky and require special provision of their housing, refrigeration systems, air filtration and power suppliers. This is because much more space is taken up by the input output devices the magnetic tape and disk unit and other peripheral equipment than by the electronic components that do not make up the bulk of the machine in powerful installation. The power consumption of these machines is also quite high, not to mention the price that runs into hundreds of thousands of dollars. The future will bring great developments in the mechanical devices associated with computer systems. For a long time these have been the weak link, from the point of view of both efficiency and reliability.

Exercise 1: *Which statement best expresses the main idea of the text? Why did you eliminate the other choices?*

l. Hybrid computers are a combination of digital and analog computers.

2. Digital computers are used more than any other type of computer.

3. There are three types of mainframes.

4. Analog computers can do more varied work than digital or hybrid computers.

Exercise 2: *Decide whether the following statements are true or false (T/F) by referring to the information in the text. Then make the necessary changes so that the false statements become true.*

l. A mainframe is the type of computer that can sit on top of a desk.

2. Mainframes are very powerful and can execute jobs very rapidly and easily.

3. Digital computers are used more than analog computers.

4. The analog computer is far smaller than a digital computer and therefore occupies very little space.

5. The hybrid computer is a combination of both the digital and the analog computer.

6. The analog computer does its calculations one step at a time.

7. The digital computer continuously works out calculations.

8. Mainframes are huge powerful machines whose peripheral equipment takes up a lot of space.

9. Mainframes are expensive to buy and operate.

10. Mainframes technology has reached the end of the road. No further development is needed.

Reading 2: 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 performing smart tasks like cooking dinner, programming the DVD recorder, and controlling the flow of information in an organization, people are able to spend more time doing what they often do best - being creative. Computer 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 to communicate 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 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 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 way. 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.

Exercise 1: Find the answers to these questions in the 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?

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

a. Edutainment	1. Software that enables computers to ‘think’ like experts
b. Multimedia	2. Use computers to stay in touch with the office while working at home
c. Expert system	3. Internet system designed to provide free, interactive access to vast resources for people all over the world
d. Telecommute	4. Multimedia materials with a combination of educational and entertainment content
e. Information superhighway	5. A combination of text with sound, video, animation, and graphics

Exercise 3: Mark the following statements as True or False:

1. Desktop organisers 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.

UNIT 3: ONLINE SERVICE AND COMPUTER CONFIGURATION

Online services

3.1. Start-up

Task 1: *Discuss the following questions*

1. What online services are available in our country?
2. What kind of facilities do online services provide?

3.2. Reading 1

Task 2: *Decide whether the following statements are true (T) or false (F) in relation to the information in the text which follows. If you think a statement is false, change it to make it true.*

1. Most people choose an online service because of the price or the number of available files.
2. Everybody has one service which he/she likes more than all the others.
3. You should judge each service according to whether it is better or worse overall than the service you are currently using.
4. Eventually, all services will be accessible from the service you are using.
5. McGraw-Hill is owned by BIX
6. Tammy Ray and Jeanette Shearer think the BIX service is average.
7. French Minitel users have free access to an English-language version of CompuServe, although they cannot use the e-mail facility.
8. DELPHI's Hobby Shop now has two special-interest areas: one on classic vehicles, and one on new cars and technology.

Online services

I'm frequently asked which online service is 'best', but the answer is there is no best. Rating a particular service over another is entirely subjective. Price is important to some people, while the number of files available for download is important to others.Because of these and so many other different judgments, there can be no absolute. It all comes down to individual needs and preferences.

Still, users tend to be fiercely loyal to their 'home' online service-which is usually the first online service they ever used. They tend to judge all other online services based on this first service - often preventing themselves from seeing the advantages of a specific service. For my part, I like all the services I use and I’m on two dozen.

Each offers one or more products or features that either do not exist elsewhere or are superior to the same features on other services. And I've a really subjective reason for being on one service - I use it to send monthly articles to magazines in Japan.

So, the the real answer to the question is simple: the best online service is the service that has what you want and is easy for you to use. The point? Keep an open mind when checking out an online service. Judge it based on what it offers and how it meets your needs -not in comparison to what you're used to using. (It takes a couple of sessions to shake preconceived notions of what an online service ‘should’ be.) Eventually, we're all going to be interlinked, no matter which service we use, in what DIALOG's Richard Ream calls a 'network of networks’. Until then, most of us have to go to more than one service to find everything we need.

And now the news…

What’s the news on-line

BIX

TAB Book Clubs Online. You’ve probably seen magazine ads for The Book Club and The Computer Professionals’ Book Society. These are sponsored by TAB Books. This division of McGraw-Hill (BIX’s parent company) is now online on BIX, taking orders and answering questions from members and prospective members. The club conference is moderated by Tammy Ray and Jeanetts Shearer. You can check them out by typing JOINTAB.BOOK. CLUBS.

CompuServe

Dell Computer Forum: Dell Corporation has opened a product support area of the PC Vendor D Forum. Type GO DELL or GO PCVEND to take a look.

Minitel Link to CompuServe

CompuServe bolstered its position in Europe by making some of its services available via France's national Minitel system in July. French Minitel users have access to an extra-cost service that is essentially a 'limited edition', English- language version of CompuServe. Among the services available are software and database downloads. E-mail and message-base posting are not available to Minitel users.

DELPHI

Hobby Group Expands: DELPHI's Hobby Shop special-interest group continues to expand is areas of interest. The most recent additions to the database and group topics are Antique Auto, which focuses on classic vehicles, and Autotech, where you can learn about new cars and technology. Type GO GROUP.

Vocabulary

- it all comes down to: It is a question of
- two dozen: about twenty-four
- checking out: examining
- is moderated by: is run by
- bolstered: strengthened

Task 3: *Fill in the gaps in this summary of the first part of the text. Each clue is ananagram. The first and last letters are correct.*

In my opinion, there is no single 'best' online service. The choice depend on your (1) ___________ (prltacuair) needs and preferences. Most users have theirown (2) ____________ (ftrvaioue), but this can prevent them from seeing the (3) ___________ agtvndaaes) of other services. Each one offers something which is either (4) ____________ uqniue) to that service, or which is , (5) ___________ (bteetr) than the same features on other services. So, when considering an online service, decide whether its features (6) ___________ (cosrernopd) to what you need. Until all services are (7) ____________ (iilktneernd), most of us will need to (8) _______ (cunoitne) using more than one.

3.3. Listening

Task 4: *Listen to an admin assistant telephoning an IT specialist about a new browser. Does the IT specialist solve his problem? What does the admin assistant like about the new browser?*

Task 5: *Listen again. What three things does the admin assistant need help with?*

Task 6: *Make these words negative by adding the appropriate prefix from those given below. The first one has been done for you: in- im- un- dis-*

1. ___*in*frequently
2. ___loyal
3. ___advantages
4. ___ specific
5. ___like
6. ___real
7. ___probably
8. ___available

Task 7: *Match each or expression in the first column with a synonym in the second column.*

1. but	a. ultimately
2. while	b. however
3. still	c. whereas
4. For my part	d. nevertheless
5. Eventually	e. personally
6. Until then	f. meanwhile

3.4. Speaking

Task 8:

1. *Discuss the topic: What are the advantages and disadvantages of using the online services / the Internet?*
2. *Which websites do you visit most often?*
3. *Which browsers do you use? Which is your favourite? Why?*
4. *What kind(s) of device(s) do you use to access the internet?*

3.5. Writing

Task 9: *Read the following texts, then write a paragraph to show the differences between analog and digital transmission.*

Analog transmission

The older telephone systems function on the basis of analog signals representing voice modulation patterns which are represented by variations in wave forms. When using telephone lines for transmitting data by terminal to a computer, the digital signals from the terminal need to be converted to analog signals by an acoustic coupler or modern prior to transmission. A modem is a device which serves a dual purpose because it acts as a MOdulator (digital to analog) and DEModulator (analog to digital), hence the name MODEM. An analog communication system requires a modem at either end of the communication. When the signals are received by the distant computer, the signals are reconverted to digital form prior to being input for processing.

Digital transmission

Analog transmission has been in use for many years as the basis of telephone technology and is very effective for this purpose, but it is not so suitable for high-speed transmission of information. Digital transmission consists of electrical pulses representing data in binary code as s series of on/off pulses. A number of different codes exist, some of which are based on a 6-, 7-, or 8-bit structure. ASCII is a 7-bit code and EBCDIC is an 8-bit code. The codes represent characters, transmission control signals, information separators, and device control. Digital technology has a number of advantages compared to analog, including higher transmission speed, lower incidence of errors, and the facility for mixing data consisting of voice, image, and text on the same circuit. It is for this reason that data transmissions will be increasingly digital in the future. A network structure known as Integrated Services Digital Network (ISDN) facilitates these aspects.

Computer configuration

3.6. Reading 2

What is a computer?

Computes are electronic machines which can accept data in a certain form, process the data and give the results of the processing in a specified format as information.

Three basic steps are involved in the process. *First,* data is fed into the computer's memory. *Then,* when the program is run, the computer performs a set of instructions and processes the data. *Finally,* we can see the results (the output) on the screen or in printed form (see the diagram above). Information in the form of data and programs is known as **software**, and the electronic and mechanical parts that make up a computer system are called **hardware**. A standard computer system consists of three main sections: the central processing unit (CPU), the main memory and the peripherals.

Perhaps the most influential component is the **central processing unit**. Its function is to execute program instructions and coordinate the activities of all the other units. In a way, it is the 'brain' of the computer. The **main memory** holds the instructions and data which are currently being processed by the CPU. The **peripherals** are the physical units attached to the computer. They include storage devices and input/output devices.

Storage devices (floppy, hard or optical disks) provide a permanent storage of both data and programs. **Disk drives** are used to handle one or more floppy disks. **Input devices** enable data to go into the computer's memory. The most common input devices are the mouse and the keyboard. **Output devices** enable us to extract the finished product from the system. For example, the computer shows the output on the monitor or prints the results onto paper by means of a printer.

On the rear panel of the computer there are several ports into which we can plug a wide range of peripherals - modems, fax machine, optical drives and scanners.

These are the main physical units of a computer system, generally known as the configuration.

Task 10: *Use the information in the text and match the terms bellow with the appropriate explanation or definition below*

software peripheral devices monitor floppy disk hardware

input port output central processing unit

1. The brain of the computer.

2. Physical parts that make a computer system.

3. Programs which can be used on a particular computer system.

4. The information which is presented to the computer.

5. Results produced by a computer.

6. Hardware equipment attached to the CPU.

7. Visual display unit

8. Small devices used to store information. Same as ‘diskette’.

9. Any socket or channel in a computer system into which an input/output device may be connected.

3.7. Reading 3

What’s inside a microcomputer?

The nerve centre of a microcomputer is the central processing unit or CPU. This unit is built into a single microprocessor chip – an integrated circuit - which executes program instructions and supervises the computer’s overall operation. The unit consists of three main parts:

The **control unit**, which examines the instructions in the use’s program, interprets each instruction and causes the circuits and the rest of the components – disk drives, monitor, etc. – to be activated to execute the function specified; The **arithmetic logic unit** (ALU), which performs mathematical calculations (+, - , etc.) and logical operations (and, or, ect.); The **registers**, which are high-speed units of memory used to store and control information. One of these registers is the program counter (PC) which keeps track of the next instruction to be performed in the main memory. Another is the instruction register (IR) which holds the instruction that is currently being executed.

One area where microprocessors differ is in the amount of data – the number of bits – they can work with at a time. There are 8, 16, 32 and 64-

bit processors. The computer's internal architecture is evolving so quickly that the new 64-bit processors are able to address 4 billion times more information than a 32-bit system.

The program and data which pass through the central processor must be loaded into the main memory (also called the internal memory) in order to be processed. Thus, when the user runs an application, the microprocessor looks for it on secondary storage devices (disks) and transfers a copy of the application into the RAM area. RAM (random access memory) is temporary, i.e. its information is lost the computer is turned off. However, the ROM section (read only memory) is permanent and contains instructions needed by the processor.

Most of today's computers have internal expansion slots that allow users to install adapters or expansion boards. Popular adapters include high-resolution graphics boards, memory expansion boards and internal modems.

Task 11: *From the text, decide if these sentences are true (T) or false (F), and rewrite the false ones to make them true.*

1. The CPU directs and coordinates the activities taking place within the computer system.
2. The arithmetic logic unit performs calculations on the data.
3. 32-bit processors can handle more information than 63-bit processors.
4. A chip is an electronic device composed of silicon elements containing a set of integrated circuits.
5. RAM, ROM and secondary storage are the components of the main memory.
6. Information cannot be processed by microprocessor if it not loaded into the main memory.

7. ‘Permanent’ storage of information is provided by RAM (random access memory).
8. The speed of the microprocessor is measured in megahertz. One MHz is equivalent to one million cycles per second.

3.8. Language focus

Word formation: Suffixes

We have already seen how prefixes can change the meaning of a word. Let us now consider some suffixes, their usual meanings, and how they change the meanings of English words.

SUFFIXES

Nouns	verbs	Adjectives	adverbs
-ance	-ize	-able	-ly
-ence	-ate	-ible	
-or	--fy	-less	
-er	-en	-ic	
-ist	-ity	-ical	
-ness		-ish	
		-ive	

Exercise 1: *Study these tables and try to make additional examples. Use your dictionary if necessary.*

1. Noun-forming suffixes

Suffix	Meaning	Examples
-ance	state	performance
-ence	quality of	independence
-er,-or	a person who	programmer, operator
	a thing which	compiler, accumulator
-ist, -yst	a person who	analyst, typist

-ian	pertaining to	electrician
-tion, -ation	the act of	compilation
-ness	condition of	readiness
-ion	action/state	conversion
-ing	activity	multiplexing
-ment	state/action	measurement
-ity	state/ quality	electricity
-ism	condition/state	magnetism
-dom	domain/condition	freedom
-ship	condition/state	relationship, partnership

2. Verb-forming suffixes

Suffix	Meaning	Examples
-ize/ -ise		computerize
-ate		automate, activate,
-ify	to make	calculate
-en		simplify
		harden, iden

3. Adverb-forming suffix

Suffix	Meaning	Examples
		electronically
-ly	in the manner of	logically,
		comparably
		helpfully

4. Adjective-forming suffix

Suffix	Meaning	Examples
-al		Computational, logical

-ar		Circular
-ic	having the quality of	Magnetic, automatic
-ical		electrical
-able	capable of being	comparable
-ible		divisible
-ous	like, full of	dangerous
-ful	characterized by	helpful
-less	without	careless
-ish	like	yellowish
-ed	having the quality of	computed
-ive		interactive

Exercise 1: *Read the following sentences and mark the suffixes. Underline the stem if it can be used on its own. The first one has been done for you.*

1. A <u>program</u>m**er** designs, writes, and tests programs for <u>perform</u>**ing** various tasks on a <u>comput</u>**er**.

2. A systems analyst studies organizational systems and decides what action needs to be taken to maximize efficiency.

3. Laser printers are preferable to other types of printing devices because of their speed and quietness.

4. The microcomputer we have purchased does not have a FORTRAN compiler. It is programmable in BASIC only.

5. We have found that operators who have the freedom to take short breaks during the day greatly improve their performance.

6. The number of shipments will increase over the coming months.

7. We decided to computerize the entire plant to give each division more independence.

8. Spooling is a way of storing data temporarily on disk or tape until it can be processed by another part of the system.
9. Turning your office into a paperless environment may be expensive at the beginning but can produce big savings in the long run.
10. Software developers are producing increasingly sophisticated applications for a growing global market.

Further Reading

Reading 1: Charateristics of computer

Corpputers are machines designed to process, electronically, specially prepared pieces of information which are termed data. Handling or manipulating the information that has been given to the computer, in such ways as doing calculations, adding information or making comparisons is called processing. Computers are made up of millions of electronic devices capable of storing data or moving them, at enormous speeds, through complex circuits with different functions. All computers have several characteristics in common, regardless of make or design. Information, in the form of instructions and data, is given to the machine, after which the machine acts on it, and a result is then returned. The information presented to the machine is the input; the internal manipulative operations, the processing; and the result, the output. These three basic concepts of input, processing, and output occur in almost every aspect of human life whether at work or at play. For example, in clothing manufacturing, the input is the pieces of cut cloth, the processing is the sewing together of these pieces, and the output is the finished garment.

Figure shows schematically the fundamental hardware components in a computer system. The centerpiece is called either the computer, the processor, or usually, the central processing unit (CPU). The term "computer" includes those parts of hardware in which calculations and other data anipulations are performed, and the high-speed internal memory in which data and calculations are stored during actual execution of programs. Attached to the CPU are the various peripheral devices such as card reader and keyboards (two common examples of input devices). When data or program need to be saved for long period of time, they are stored on various secondary memory devices of storage devices such a magnetic tapes or magnetic disks. Computers have often been thought of as extremely large adding machines, but this is a very narrow view of their function. Although a computer can only respond to certain number of instructions, it is not a single-purpose machine since these instructions can be combined in an infinite number of sequences. Therefore, a computer has no known limit on the kinds of things it can do; its versatility is limited only by the imagination of those using it. In the late 1950s and early 1960s when electronic computers of the kind in use today were being developed, they were very expensive to own and run. Moreover, their size and reliability were such that a large number of support personnel were needed to keep the equipment operating. This has all changed now that computing power has become portable, more compact, and cheaper. In only a very short period of time, computers have greatly changed the way in which many kinds of work are performed. Computers can remove many of the routine and boring tasks from our lives, thereby leaving us with more time for interesting, creative work. It goes without saying that computers have created whole new areas of work that did not exist before their development.

Exercise 1: *Which statement best expresses the main idea of the text? Why did you eliminate the other choices?*

1. Computers have changed the way in which we live.

2. All computers have an input, a processor output and a storage device.

3. Computers have decreased man's workload.

4. All computers have the same basic hardware components.

Exercise 2: *Decide whether the following statements are true or false (T/F) by referring to the information in the text. Then make the necessary changes so that the false statement become true.*

1. All information to be processed must be prepared in such a way that the computer will understand it.
2. Because of the complex electronic circuitry of a computer, data can be either stored or moved about at high speeds.
3. Not all computers can process data given to them and produce results.
4. The basic concepts of data processing are restricted to computers alone.
5. The processor is the central component of a computer system.
6. All other devices used in a computer system are attached to the CPU.
7. Memory devices are used for storing information.
8. Computers are very much restricted in what they can do.
9. Computers today cost less, are smaller, and need fewer people to operate them than in the past.
10. Computers haven't changed our working conditions very much.

Reading 2: Internet FAQs

How old is the Internet (the Net)? When was it created?

It’s hard to say exactly. The research that led to what we now know as the Internet was begun in the 1960s.

Who created the Internet?

Again, it’s hard to say exactly who created it. The initial research was carried out by the Advanced Research Projects Agency in America, funded by the US government.

Did the Internet become popular quickly?

It took many years for the Internet to become popular around the world. It's only really since the mid-90s that the Internet has been a part of our daily lives.

How do you get online?

To get connected, you need a computer, the right connection software and a modem connected to the phone line. You also need an account with an Internet Service Provider (ISP), which acts as a gateway between your PC and the rest of the Net.

How fast are today's internet connections?

Today, ISPs offer a broadband, high-speed connection. The most common types are cable - offered by local cable TV companies - and ADSL (Asymmetric Digital Subscriber Line), which works through phone lines. They are both faster than the traditional dial-up telephone connection. Broadband access is also offered by some electricity networks. This competing technology, known as power-line Internet, provides low-cost access via the power plug, but is still in development.

How long has broadband existed?

Since the late 1990s.

How much does broadband access cost?

It depends on which company you choose. Nowadays, some companies even offer free broadband.

Why do you need a modem?

A modem (modulator/demodulator) converts digital signals into analogue signals so that data can be transmitted across the phone or cable network.

What does TCP/IP mean?

The language used for data transfer on the Internet is known as TCP/IP (transmission control protocol/ Internet protocol). This is like the internet operating system. Every computer connected to the Net is identified by a unique IP address.

Are there other ways of accessing the Internet?

Other methods of internet access include Wi-Fi, satellite, mobile phones and TV sets equipped with a modem. Wi-Fi-enabled laptops or PDAs allow you to connect to the Net if you are near a wireless access point, in locations called hotspots (for example, a Wi-Fi café, park or campus). Satellite services are used in places where terrestrial access is not available (for example, on ships at sea). High-end mobile phones provide access through the phone network.

Choose the correct answers.

1. The Internet was……………

a invented in the mid-90s.

b popular in the 1960s.

c probably created in the USA.

2. Which term describes any fast, high-bandwidth connection?

a broadband b dial-up connection c Wi-Fi connection

3. The power-line Internet provides broadband access through.

a telephone lines. b satellites. c electrical power lines.

4. Which device converts computer data into a form that can be transmitted over phone lines?

a ADSL b a mobile phone c a modem

5. The standard protocol that allows computers to communicate over the Internet is called……………………..

a an IP address b TCP/IP c HTTP

6. The geographical region covered by one or several access points is called a……………..

a wireless access poin

b hotspot

c wireless network device.

UNIT 4: PROGRAMMING AND LANGUAGES

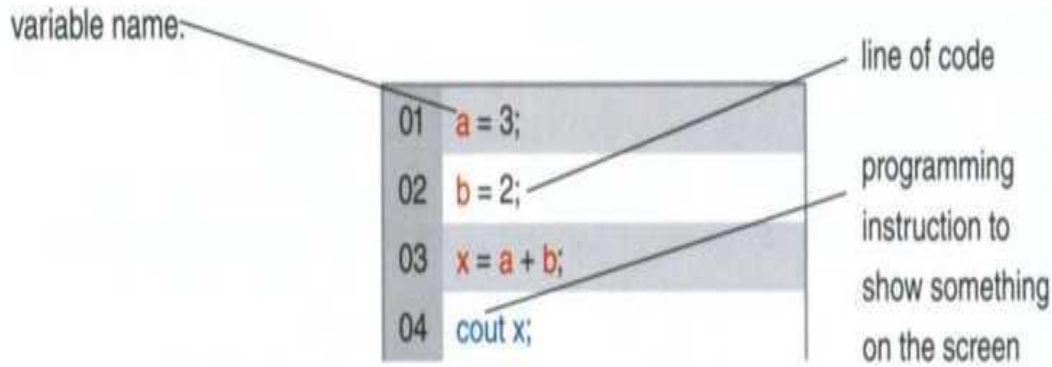
4.1. Start-up

Task 1: *Work in small groups. Have you ever seen any programming code? Would you like to be good at programming?*

Task 2: *Work in pairs. Look at the section of code and the explanations and answer these questions.*

1. Find an example of a constant in the code.
2. What do you think the value of *X* is, after the third instruction?

'a' is a variable. A variable is something that can change its value (which can be a number). The opposite is a constant: a constant can't change its value. For example, here the number '3' is a constant but 'a' is a variable: '3' is always '3' but 'a' can have any value an instruction gives it: it can be 1,2, 3 or any other number. This instruction gives it the value '3', which it keeps until another instruction changes it. Variables can have any name, and sometimes variable names are quite long. For example, 'g_Turn' is a



4.2. Listening

Task 3: *Listen to the first part of a conversation between two programmers talking about this code, which controls a robot using a mobile phone. Number the variables in the order they are explained.*

```
01    int g_Move = 0, g_Turn = 0;
02    void RxHandler(unsigned char { key_Press)
03    if (kev Press ==          g_Move = 1;
04    if (key_ Press ==         g_Move = 2;
05    if (key_ Press ==         g_Turn = 1;
06    if (key_ Press ==         g_Turn = 2;
07
08
09
```

□ **g_Turn**

□ **KeyPress**

□ **g Move**

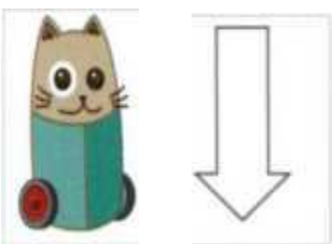
Task 4: *Complete these sentences. Then listen again and check your answers.*

1. If gMoue has the value 0, the robot…………

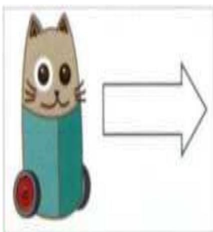
2. If gTurn has the value 0, the robot………….

3. If you press 'x' on the phone, key Press has the value…………..

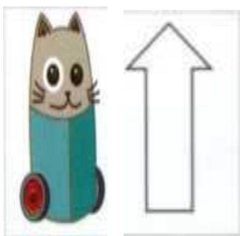
Task 5: *Listen to the second part of the conversation between the two programmers. Which lines of code are they talking about?*



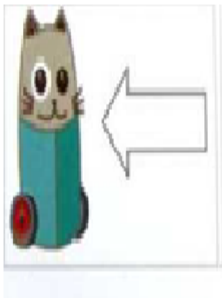
1. ____________



2. ____________



3. ____________



4. ____________

Task 6: *Can you identify these programming language?*

a

```
/* this program finds the minimum of two integers/*
 #include <stdio.h>
main()
  {
    int j,k,m;
    printf("Input two integers:”)
     scanf("%d%d",&j.&k);
    m=min(j,k);
    printf("\n%d is the minimum of %d and %d\n\n" m,j,k);
  }
```

b

```
Class Simple{
        Public static void main (String args [])
        {
          System.out.println(“Hello World”);
        }
  }
```

c

```
Program Example 1;
   Begin
      Write((‘Hello Word’);
  End.
```

4.3. Reading 1

Task 7: *Before reading the text, try to fill in the gaps in these sentences.*

1. A __________ is a program written in one of the high-level languages.
2. A program written in a high-level language must be interpreted into ___________ before the computer will read and process it.
3. A program designed to perform a specific task is called an ____________.
4. A ____________ or _____________ is the program produced when the original has converted into machine code.
5. A ________ is a program that converts a high-level language into machine code.
6. The systems program which fetches required systems routines and links them to the object module is known as the ______________.
7. The ___________ is the program directly executable by the computer.

Now read the text to check your answers

Programs and programming languages

Computers can deal with different kinds of problems if <u>they</u> are given the right instructions for what to do. Instructions are first written in one of the high-level languages, e.g. FORTRAN, COBOL, ALGOL, PL/I, PASCAL, BASIC, or *C*, depending on the type of problem to be solved. A program written in one of these languages is often called a source program, and <u>it</u> cannot be directly processed by the computer until it has been compiled, which means interpreted into machine code. Usually a single instruction written in a high-level language, when transformed into machine code, results in several instructions. Here is a brief description of some of the many high-level languages:

FORTRAN acronym for FORmula and TRANlation. This language is used for solving scientific and mathematical problems. It consists of algebraic formulae and English phrases. It was first introduced in the United States in 1954.

COBL acronym for COmmon Business-Oriented Language. This language is used for commercial purposes. COBOL, which is written using English statements, deals with problems that do not involve a lot of mathematical calculations. It was first introduced in 1959.

ALGOL acronym for ALGOrithmic Language. Originally called IAL, which means International Algebraic Language. It is used for mathematical and scientific purposes. ALGOL was first introduced in Europe in 1960.

PL/I Programming Language I. Developed in 1964 to combine features of COBOL and ALGOL. Consequently, it is used for data processing 25 as well as scientific applications.

BASIC acronym for Beginner's All-purpose Symbolic Instruction code. Developed in 1965 at Dartmouth College in the United States for use by students who require a simple language to begin programming.

C developed in developed in the 19 70s to support the UNIX operating system. *C* is a 30 highly portable general-purpose language.

Other such languages are APL (developed in 1962), PASCAL (named after Blaise Pascal and developed in 1971), and LISP and PROLOG, both of which are used for work in artificial intelligence. LOGO is a development of LISP which has been used to develop computer-based training (CBT) packages.

When a program written in one of these high-level languages is designed to do a specific type of work such as calculate a company's payroll or calculate the stress factor on a roof, <u>it</u> is called an applications program. Institutions either purchase these programs as packages or commission their own programmers to write <u>them</u> to meet the specifications of the users.

The program produced after the source program has been converted into machine code is referred to as an object program or object module. This is done by a computer program called the compiler, which is unique for each computer. Consequently, a computer needs its own compiler for the various high-level languages if it is expected to accept programs written in those languages. For example, in order that an IBM RS/6000 may process a program in FORTRAN, it needs to have a compiler that would understand that particular model and the FORTRAN language as well.

The compiler is a systems program which may be written in any language, but the computer's operating system is a true systems program which controls the central processing unit (CPU), the input, the output, and the secondary memory devices. Another systems program is the linkage editor, which fetches required systems routines and links them to the object module (the source program in machine code). The resulting program is then called the load module, which is the program directly executable by the computer. Although systems programs are part of the software, they are usually provided by the manufacturer of the machine.

Unlike systems programs, software packages are sold by various vendors and not necessarily by the computer manufacturer. They are a set of programs designed to perform certain applications which conform to the particular specifications of the user. Payroll is an example of such a package which allows the user to input data - hours worked, pay rates, special deductions, names of employees – and get salary calculations as as output. These packages are coded in machine language (Os and 1s) on magnetic tapes or disks which can be purchased, leased, or rented by users who choose the package that most closely correspond to their needs.

Vocabulary

- payroll: list of employees and the amount of money to be paid to each of them

Task 8: *These are answers to questions about the text. Write the questions*

1. No, it is quite wordy so it is used for commercial purposes.
2. To support the UNIX operating system.
3. An applications program.
4. It is done by the compiler.
5. It fetches required systems routines and links them to the object module.
6. No, they are also sold by other vendors.

Task 9: *Summarize the information on different high-level computer languages by completing the table below.*

Language	**Developed**	**Function**	**Characteristic**
FORTRAN			
	1959		
		mathematical and scientific purposes	
			combines features of COBOL and ALGOL
BASIC			
		to support Unix operating system	
	1962		

Task 10: *Find the paragraphs in the text where the following ideas are expressed. Identify the clues.*

1. Systems programs control the work of the computer system.
2. Software packages are not always sold by the manufacturer.
3. Usually, every high-level instruction translates into many more in machine code.
4. Systems programs are usually provided by the manufacturer.
5. Programmers may be required to write software for their employers.

Task 11: *Using the paragraph reference given and underlined words in the text, find the reference for the words in italics.*

1. if *they* are given the right (paragraph 1)
2. *it* cannot be directly processed (paragraph 1)
3. *it* is called an applications program. (paragraph 9)
4. to write *them* to meet (paragraph 9)
5. *that* would understand (paragraph 10)
6. *which* controls the central (paragraph 11)
7. *They* are a set of programs (paragraph 12)
8. *which* can purchase (paragraph 12)

Task 12: *Using the paragraph reference given, refer back to the text and find words or phrases that have a similar meaning to:*

1. converted (paragraph 1)
2. give the responsibility to (paragraph 9)
3. brings (paragraph 11)
4. are compatible with (paragraph 11)
5. matches (paragraph 12)

Task 13: *Choose the correct form of the word to complete each sentence.*

1. instruction, instruct, instructed, instructor

a. Our maths _________ explained to us the principles of binary arithmetic.

b. We were __________ to to document our programs very carefully.

c. Both ___________ and data have to be changed to machine code before the computer can operate on them.

2. *compilation, compiler, compile, compiled*

a. Our university computer does not have a PASCAL ___________.

b. Usually, a programmer __________ his program before he puts in the data.

c. A source program cannot be directly processed by the computer until it has been __________.

3. Result, results, resulting

a. The linkage editor links systems routines to the object module. The ______program, referred to as the load module, is directly executable by the computer.

b. The ____________ of these mathematical operations were obtained from the university mainframe and not from my micro.

4. *specification, specify, specific, specified, specifically*

a. Our company bought three packages with very __________ applications payroll, accounts receivable, and accounts payable.

b. An applications program is designed to do a _________ type of work, such as calculating the stress factor of a roof.

c. Did the analyst give the new programmer the _________ necessary to start on the project?

C language

4.4. Reading 2

Task 14: *Read the program below and the text bellow, then complete the sentences which follow.*

```
/* CALCULATE AVERAGES */ main()
float a,b,c,d,average;
 printf("Enter three numbers:");
scanf("%f %f %f",&a,&b,&c);
d=a+b+c;
average=d/3.0;
printf("The average is %f", average);
```

Comment Lines

A C source program consists of statements and *comment lines.* Comment lines are enclosed by the characters /* (at the start of the comment) and */ (at the start of the comment) and (at the end of the comment).

The Function main {}

Every *C* program must have a function called **main** which must appear only once in a program. The parentheses following the word **main** must be present, but there must be no parameters included Every *C* program must have a function called **main** which must appear. The main part of the program is enclosed within braces {} , and consists of declaration statements, assignment statements, and other *C* functions. In the above program there are six statements of the main program starting with the word **float), two** assignment statements (the fourth and fifth statements starting with the variable names **d** and **average),** and three function statements, two to print information on the screen and one to scan the keyboard for input.

As C is a free form language, the semicolon (;) at the end of each line is a must. It acts as a statement terminator, telling the compiler where an instruction ends. Free form means that statements can be identified and blank lines inserted in the source file to improve readability, and statements can span several lines. However, each statement must be terminated with a semicolon. If you forget to include the semicolon, the compiler will produce an error, indicating the *next* line as the source of the error. This can cause some confusion, as the statement objected to can be correct, yet as a syntax error is produced.

Variable and the Declaration Statement

A variable is a quantity that is referred to by name, such as **a, b, c; d,** and average in the the above program. A variable can take on many values during program execution, but you must make sure that they are given an initial value, as *C* does not do do so automatically. However, before variables can be used in a program, they must be declared in a *type* declaration statement.

1. The Function ________ must appear only once in a program.
2. **/* CALCULATE AVERAGES */** is a ________ line.
3. The statement **float a,b,c,d,average;** is a _________ statement.
4. The program below contains _________ function statements.
5. The assignment statements are on lines ________ and ________.
6. The main part of the program is enclosed within __________.
7. Each line of any *C* program must end with a _________, which acts as a statement _____________.
8. If you forget to include the correct punctuation, the ________ will produce a __________ error.
9. A quantity referred to by name is known as a ___________.
10. A _________ statement must be used to declare variables.

Task 15: *Find the words in the text which mean:*

1. brackets (paragraph 2)
2. not fixed (paragraph 2)
3. systematically (paragraph 2)
4. recognized (paragraph 3)

5. completed (paragraph 3)

6. starting (paragraph 4)

Task 16: *The table below shows C's relational operators. Fill in the gaps in the table.*

C symbol	Meaning
= =	equal to
<	(1) ____________
(2) ______	equal to or less than
>	(3) ____________
>=	(4) ____________
!=	(5) ____________

4.5. Writing

Task 17: *Using the completed table above, write sentences to illustrate the following*

1. a!= b ______________________________________

2. a > b ____

3. a <= b ____

4. a >= b ____

5. a < b ____

6. a = = b ____

4.6. Speaking

Task 18: *Read the following statements. Which do you agree with more? Why?*

1. 'Learning a programming language is like learning any natural language. The only difference is that you are communicating with a machine instead of another person.'

2. ‘I get annoyed when I hear people comparing programming languages with natural languages. They have almost >=thing in common.’

Word-play

Task 19: *Solve the anagrams in the right-hand column and match them with the words in the left-hand column to complete the phrases. The first one has been done for you.*

1. high-level	a. mestntae	________
2. machine	b. thirmacite	________
3. systems	c. peat	________
4. object	d. taporeor	________
5. linkage	e. omelud	________
6. magnetic	f. egguanal	________
7. binary	g. trodite	________
8. declaration	h. deco	________
9. comment	i. enil	________
10. relational	j. nituroe	________

e.g. 1f - *language*

4.7. Language focus

Organizing information

A paragraph is a group of related sentences that develop an idea. In nearly every paragraph, there is one idea that is more important than all the others. The main idea of the paragraph is usually found at the beginning.

Sample paragraph 1:

All computers, whether large or small, have the same basic capabilities. They have circuits for performing arithmetic operations. They all have a way of communicating with the person(s) using them. They also have circuits for making decisions.

In sample paragraph 1, the first sentence, *All computers, whether large or small, have the same basic capabilities.* expresses the main idea of the paragraph.

All main idea sentences have a topic and say something about the topic.

Example:

All computers [topic], *whether large or small, have the same basic capabilities* [about the topic].

In some of your reading, finding main ideas may serve your needs but, in much of your studying, you need to understand details. It is sometimes more difficult to understand details than main ideas. You will find it helpful if you think of details as growing out of the main idea. In sample paragraph 1, there are three major details growing out of the main idea. These are major details:

1. *They have circuits for* ***performing arithmetic operations.***
2. *They all have a way of* ***communicating with the person(s) using them.***
3. *They also have circuits for* ***making decisions.***

A major detail often has minor details growing out of it. These minor details tell more about a major detail, just as major details tell more about a main idea. In studying, you often find a paragraph that has many small details that you must understand and remember. Breaking up a paragraph of this kind into its three components: the main idea, major details, and minor details will help you to understand and remember what it is about.

Sample paragraph 2:

It is the incredible speed of computers, along with their memory capacity, which makes them so useful and valuable. Computers can solve problems in a fraction of the time it takes man. For this reason, businesses use them to keep their accounts, and airline, railway, and bus companies use them to control ticket sales. As for memory, modern computers can store information with high accuracy and reliability. A computer can put data into its memory and retrieve it again in a few millionths of a second. It also has a storage capacity for as many as a million items.

Exercise 1: *Practise finding the main idea, major details, and minor details by completing the block diagram after reading the following paragraph.*

The computer has changed the production of copy in the newspaper industry. There are three steps involved in the process: input, correction, and output. First, the computer numbers each story, counts words, and gives a listing of the length of each story, Then, a page is made up, advertisements are placed in, the copy is shifted or deleted, and corrections are made. Finally, the computer hyphenates words, and the result of all this is a newspaper page.

<table>
<tr><td>Main idea</td><td colspan="3">The computer has changed the production of copy in the newspaper industry</td></tr>
<tr><td>Major details</td><td colspan="3"></td></tr>
<tr><td>Minor details</td><td></td><td></td><td></td></tr>
</table>

Exercise 2: *Practise finding the main idea, major details, and minor details by completing the diagram after reading the following paragraph.*

Railway companies use large computer systems to control ticket reservations and to give immediate information on the status of their trains. The computer system is connected by private telephone lines to terminals in major train stations, and ticket reservations for customers are made through these phone lines. The passenger's name, type of accommodation, and the train schedule is put into the computer's memory. On a typical day, a railway's computer system gets thousands of telephone calls about reservations, space on other railways, and requests for arrivals and departures. A big advantage of the railway computer ticket reservation system is its rapidity because a cancelled booking can be sold anywhere in the system just a few seconds later. Railway computer systems are not used for reservations alone. They are used for a variety of other jobs including train schedules, planning, freight and cargo loading, meal planning, personnel availability, accounting, and stock control.

Main idea			
Major details	Terminals for ticket reservations		
Minor details		Thousands of calls for reservations, space, arrivals, and departures,	

Further Reading:

Reading: Computer languages

Unfortunately for US, computers can't understand spoken English or any other natural language. The only language they can understand directly is machine code, which consists of 1 s and Os (binary code).

Machine code is too difficult to write. For this reason, we use symbolic languages to communicate instructions to the computer. For example, assembly languages use abbreviations such as ADD, SUB, MPY to represent instructions. The program is then translated into machine code by a piece of software called an assembler. Machine code and assembly languages are called low-level languages because they are closer to the hardware. They are quite complex and restricted to particular machines.To make the programs easier to write, and to overcome the problem of intercommunication between different types of computer, software developers designed high-level languages, which are closer to the English language. Here are some examples:

■ FORTRAN was developed by IBM in 1954 and is still used for scientific and engineering applications.

■ COBOL (Common Business Oriented Language) was developed in 1959 and is mainly used for business applications.

■ BASIC was developed in the 1960s and was widely used in microcomputer programming because it was easy to learn. Visual BASIC is a modern version of the old BASIC language, used to build graphical elements such as buttons and windows in Windows programs.

■ PASCAL was created in 1971. It is used in universities to teach the fundamentals of programming.

■ C was developed in the 1980s at AT&T. It is used to write system software, graphics and commercial applications. C++ is a version of c which incorporates object-oriented programming: the programmer concentrates on particular things (a piece of text, a graphic or a table, etc.) and gives each object functions which can be altered without changing the entire program. For example, to add a new graphics format, the programmer needs to rework just the graphics object. This makes programs easier to modify.

■ Java was designed by Sun in 1995 to run on the Web. Java applets provide animation and interactive features on web pages.

Programs written in high-level languages must be translated into machine code by a compiler or an interpreter. A compiler translates the source code into object code - that is, it converts the entire program into machine code in one go. On the other hand, an interpreter translates the source code line by line as the

It is important not to confuse programming languages with markup languages, used to create web documents. Markup languages use instructions, known as markup tags, to format and link text files. Some examples include:

■ HTML, which allows US to describe how information will be displayed on web pages.

■ XML, which stands for Extensible Markup Language. While HTML uses pre-defined tags, XML enables US to define our own tags; it is not limited by a fixed set of tags.

■ VoiceXML, which makes Web content accessible via voice and phone. VoiceXML is used to create voice applications that run on the phone, whereas HTML is used to create visual applications (for example, web pages).

Exercise 1: Read the text again and answer these questions.

1. Do computers understand human languages? Why? / Why not?
2. What is the function of an assembler?
3. Why did software developers design high-level languages?
4. Which language is used to teach programming techniques?
5. What is the difference between a compiler and an interpreter?
6. Why are HTML and VoiceXML called markup languages?

Exercise 2: Complete these sentences with a computer language from the text.

1 ……………… allows us to create our own tags to describe our data better. We aren't constrained by a pre-defined set of tags the way we are with HTML

2 ………………. IBM developed in the 1950s. It was the first high-level language in data processing.

3 ……………….. applets are small programs that run automatically on web pages and let you watch animated characters, play games, etc.
4 ………………. is the HTML of the voice web. Instead of using a web browser and a keyboard, you interact with a voice browser by listening to pre-recorded audio output and sending audio input through a telephone.
5. This language is widely used in the business community. For example, the statement ADD VAT to NET-PRICE could be used in a ………….. ……….program.

Exercise 3: Look at the words bellow. Are they nouns, verbs or adjectives? Write N, V or Adj next to each word. There may be more than one possible answer. Complete the sentences with words from the boxes.

program ……………….   programmers ……………

programming …………..   programmable …………..

1 ………. is the process of writing a program using a computer language.
2. A computer …………….. is a set of instructions that tells the computer how to do a specific task.
3. Most computer……… make a plan of the program before they write it.
4. A …………… keyboard allows the user to configure the layout and meaning of the keys.

compile ……..   compiler ……….   compilation ………..

5. Programs written in a high-level language require ……….......... that is, translation into machine code, the language understood by the processor.
6. A source program is converted into machine code by software called a ………………
7. Programmers usually ……………… their programs to generate an object program and diagnose possible errors.

bug ………   debug …… debugger …….   debugging……

8. Any error or malfunction of a computer program is known as a ……………..
9. A …………… is a program used to test and ………… other programs.
10. The process of going through the code to identify the cause of errors and fixing them is called ………………….

UNIT 5: COMPUTER SOFTWARE AND HARDWARE

5.1. Start-up

Task 1: *Make up a list of software products that you use (e.g. word processing, spreadsheets, databases, etc.). Are there some features of the products you never use? What do you know about hardware? Give some examples of hardware.*

Computer software

5.2. Reading 1

Task 2: *In the magazine article which follows, a number of software developers express their opnions on the future of software technology. Read the article and tick (✓) the relevant boxes to show which opinions are expressed by the speakers*

Opinions	Mary Evans	Garry Harper	Matt Andrews	Bob Bolton
In general, customers are getting what they want.				
In general, customers are not getting what they want.				
Software is too complex				
Software is not complex enough.				
Software developers know what users want.				
Software developers know what users want.				

Catherine Bull Investigates

THIS WEEK: Software

Software technology is getting more complicated. Developers have to cut through a jungle of computer languages, operating environments, and shifting standards to choose how they'll create their software. It's not an easy job. Software purchasers will have to live with the results for years to come. Which advances in software technology will prevail? Which ones will be just a flash in the pan?

I chose four well-known software developers and asked each to talk about current and future trends in software technology. Their comments reveal some common and diverse themes. I began by asking them if they thought that software purchasers are getting what they need. What should developers be doing differently to give purchasers a better product?

Mary Evans: 'In general, I think people are getting what they want - there are a lot of creative things being done with paint software, word processing. DTP (desktop publishing) systems, and the like. Do users want more? Of course! Users will always want more. The computer is an incredibly powerful tool, and any software that makes it easier, faster, more creative, or more cost-effective will inevitably be in demand. But I'm generally optimistic about the way things are going at the moment. I think most of the major software manufacturers are able to read the market quite well.'

Gerry Harper: 'I'm afraid I completely disagree with Mary. I just don't think that software purchasers are getting the technical support they need. While the products are getting more and more complex, and more and more expensive, it seems that support is starting to be thought of as an additional businessopportunity. More generally, I've thought for some time that applications are getting too big, and that they're trying to do too much. Yes, they're versatile and powerful, but they're also often overwhelming. I think what we need are simple little programs that are easy to understand and use, and that work together to accomplish more complex tasks.'

Matt Andrews: 'I really can't agree with that. To imagine we can just go back to "simple little programs" just ignores the complex needs of many of today's software users. No, I'm sure that you can't stop progress. Suppliers know what their customers want - they just can't supply it quickly enough. I've studied the market very closely, and I've found that purchasers' needs seem always to exceed the capability of the available software by a constant time-frame of about six to twelve months'

Bob Bolton: 'I think users are getting what they want, provided that their needs fit the off-the-shelf application. Specialized software is usually so specific that it should be written in-house for businesses. Developers should add features that the customer needs, not what they think customers want. Some effort should be made to get feedback from the users before making an upgrade so that the proper features are added.'

Vocabulary

- A flash in the pan – a success that lasts only a short time and is not repeated.
- Off-the-shelf – mass-produced; not made according to the individual needs of the customer.

Task 3: *Each of the following comments from the text is followed by two paraphrases. Decide which paraphrases (a or b) is closer in meaning to the original comment. Remember to look at the comments in their original context.*

1. "Developers have to cut through a jungle of computer languages, operating environments, and shifting standards..."

a. The huge number of languages, environments, and standards makes life difficult for software developers.

b. Software developers have to act to reduce the number of languages, environments, and standards which currently exist.

2. **“**Their comments reveal some common and diverse themes.”

a. They talk ordinary and wide-ranging topics.

b. They agree about some issues, but disagree about others.

3. “I think most of the major software manufacturers are able to read the market quite well.”

a. Most software manufacturers understand what consumers want.

b. Most software manufacturers know how to influence users to buy more of their products’

4. “it seems that support is starting to be thought of as an additional business opportunity.”

a. Increased technical support is a means of making software more attractive to businesses

b. Software manufacturers are using the fact their products are complex to start selling technical support to their customers.

5. “purchasers' needs seem always to exceed the capability of the available software by a constant time-frame of about six to twelve months.”

a. It takes about six to twelve months for purchasers to understand fully the software they buy.

b. The software customers want now what will only become available in about six to twelve months.

Task 4: *which of the four speakers do you most agree with? Why?*

Task 5: *Using the paragraph reference given, look back in the text and find words or phrases in the text that have a similar meaning to:*

1. penetrate (paragraph 1)

2. changing (paragraph 1)

3. win, survive (paragraph 2)

4. buyers (paragraph 3)

5. understand (paragraph 4)

6. flexible (paragraph 5)

7. too big/complex to manage (paragraph 5)

8. achieve (paragraph 5)

9. go beyond (paragraph 6)

10. information about a product/service (paragraph 7)

5.3. Writing

Task 6:

1. Translate Mary Evan's comments (the paragraph beginning 'In general, I think people ....') into your own language.

2. Summarize Gerry's comments in just one or two sentences.

5.4. Speaking

Task 7: *Discuss the following questions*

1. If you were a developer of software, what kind of software package would you develop? Why?

2. Do you think software developers should develop educational software more like the software developed for games? Why?

Computer hardware

5.5. Listening

Task 8: *Listen to a systems administrator asking a technician about the status of the company's computer systems. Is it a small company? How do you know?*

Task 9: *Listen again and tick √ the correct column in this table. Were there any big problems?*

	Worked fine	Problem found	Not mentioned
1. deploy new software			
2. deploy new software			
3. backup systems			
4. disk drives			
5. set permissions			
6. check logs			
7. reset passwords			

Task 10: *Listen to an IT manager and assistant talking about a problem with a delivery of new computers. Correct this delivery slip to show what was ordered*

Order for: Wood Publishing	
5 × Expression 5710 laptop computers with the following specifications:	***10 × Domination 8720 desktop computers***
Entel 2.73 GHz dual-core CPU 1 × 390 GB SDD 8 GB dual-channel DDR3 1666 MHz RAM Ladeon 3850 1 GB graphics card No optical drive 15.6-inch WLED 1920 X 1080 screen 4 × USB ports No operating system installed 1 year next business day on-site service	Entel 3.4 GHz quad-core CPU 1 × Eastern Digital 2 TB 7200 rpm SATA HDD 16 GB 2000 MHz memory Ladeon 7950 2 GB graphics card 6 × Blu-ray combo optical drive (Blu-ray, DVD+/-RW&CD) 4 × USB ports 802. lln WLAN wi-fi mini card No operating system installed 1 year next business day on-site service

5.6. Reading 2

Task 11: *Work in small groups. What is the difference between peripherals and internal hardware? Name as many of each as you can. Can you install any?*

Task 12: *Are these items internal components (I), peripherals (P) or storage (S)? For some items, there may be more than one possible answer.*

1. external drive ………….	7. mouse ………….
2. hard disk drive …………	8. memory ………….
3. headphones …………….	9. monitor ………….
4. optical drive ……………	10. power supply unit ………….
5. keyboard ………………	11. printer ………….
6. solid state drive …………	12. screen ………….

What is computer hardware?

	
Desktop	**Laptop**

Computer **hardware** is the physical part of a computer, as distinguished from the computer software which executes or runs on the hardware. The hardware of a computer is infrequently changed, while software and data are modified frequently. Computer software, on the other hand, is not something you can touch. Software is a set of instructions for a computer to perform specific operations. The term soft refers to readily created, modified, or erased. These are unlike the physical components within the computer which are hard. Some hardware components are easy to recognize, such as the computer case, keyboard, mouse, and monitor. It also includes all parts inside the computer case such as motherboard, video card, hard disk drive, and many others. Computer hardware is what you can physically touch. You need both hardware and software for a computer system to work.

When you think of the term computer hardware you probably think of the guts inside your personal computer at home or the one in your classroom. However, computer hardware does not specifically refer to personal computers. Instead, it is all types of computer systems. Computer hardware is embedded systems in automobiles, microwave ovens, CD players, and many more devices. In 2003, only 0.2% of all microprocessors sold were for personal computers. How many other things in your house or your classroom use computer hardware?

Hardware components

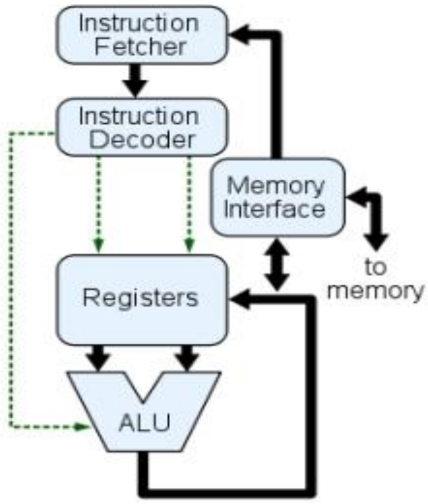
Motherboard

The motherboard is the body or mainframe of the computer, through which all other components interface. It is the central circuit board making up a complex electronic system. A motherboard provides the electrical connections by which the other components of the system communicate. The mother board includes many components such as: central processing unit (CPU), random access memory (RAM), firmware, and internal and external buses.

Central Processing Unit

The Central Processing Unit (**CPU**; sometimes just called processor) is a machine that can execute computer programs. It is sometimes referred to as the brain of the computer.

There are four steps that nearly all CPUs use in their operation: *fetch*, *decode*, *execute*, and *writeback*. The first step, fetch, involves retrieving an instruction from program memory.



Mother board **CPU diagram**

In the decode step, the instruction is broken up into parts that have significance to other portions of the CPU. During the execute step various portions of the CPU, such as the arithmetic logic unit (ALU) and the floating point unit (FPU) are connected so they can perform the desired operation. The final step, writeback, simply writes back the results of the execute step to some form of memory.

Random Access Memory

Random access memory (RAM) is fast-access memory that is cleared when the computer is power-down. RAM attaches directly to the motherboard, and is used to store programs that are currently running. RAM is a set of integrated circuits that allow the stored data to be accessed in any order (why it is called random). There are many different types of RAM. Distinctions between these different types include: writable vs. read-only, static vs. dynamic, volatile vs. non-volatile, etc.

Firmware

Firmware is loaded from the Read only memory (ROM) run from the Basic Input-Output System (BIOS). It is a computer program that is embedded in a hardware device, for example a microcontroller. As it name suggests, firmware is somewhere between hardware and software. Like software, it is a computer program which is executed by a microprocessor or a microcontroller. But it is also tightly linked to a piece of hardware, and has little meaning outside of it. Most devices attached to modern systems are special-purpose computers in their own right, running their own software. Some of these devices store that software ("firmware") in a ROM within the device itself

Removable Media Devices

If your putting something in your computer and taking it out is most likely a form of removable media. There are many different removable media devices. The most popular are probably CD and DVD drives. One type of removable media which is becoming less popular is floppy disk.

CD

CDs are the most common type of removable media. They are inexpensive but also have short life-span. There are a few different kinds of CDs. CD-ROM which stands for Compact Disc read-only memory are popularly used to distribute computer software although any type of data can be stored on them. CD-R is another variation which can only be written to once but can be read many times. CD-RW (rewritable) can be written to more than once as well as read more than once. Some other types of CDs which are not as popular include Super Audio CD (SACD), Video Compact Discs (VCD), Super Video Compact Discs (SVCD), PhotoCD, PictureCD, CD-i, and Enhanced CD.

There are two types of devices in a computer that use CDs: CD-ROM drive and a CD writer. The CD-ROM drive used for reading a CD. The CD writer drive can read and write a CD. Both kinds of CD drives are called optical disc drives because the use a laser light or electromagnetic waves to read or write data to or from a CD.

DVD

DVDs (digital versatile discs) are another popular optical disc storage media format. The main uses for DVDs are video and data storage. Most DVDs are of the same dimensions as compact discs. Just like CDs there are many different variations. DVD-ROM has data which can only be read and not written. DVD-R and DVD+R can be written once and then function as a DVD-ROM. The devices that use DVDs are very similar to the devices that use CDs. There is a DVD-ROM drive as well as a DVD writer that work the same way as a CD-ROM drive and CD writer.

USB

USB (Universal Serial Bus) is the most popular connection used to connect a computer to devices such as digital cameras, printers, scanners, and external hard drives. USB is a cross-platform technology that is supported by most of the major operating systems. On Windows, it can be used with Windows 98 and higher. USB is a hot-swappable technology, meaning that USB devices can be added and removed without having to restart the computer. USB is also “plug and play”. When you connect a USB device to your PC, Windows should detect the device and even install the drivers needed to use it.

Task 13: *Answer these questions*

1. What is computer hardware?
2. What are the differences between hardware and software?
3. What components are included in the motherboard?

4. What is the most important component in the computer? Why?
5. What is RAM?
6. What is firmware?
7. How many removable media devices are mentioned in the text? What are they?
8. What is the most popular removable storage device?
9. Why has the floppy disk become less popular?

Task 14: *Read the text and decide if these sentences are true (T), false (F) or no information (NI).*

1. Motherboard is an electronic device by which all other computer components are connected to.
2. CPU is the most important part in a computer system.
3. Hardware is more important than software for the users.
4. It is safe to store information in RAM.
5. Firmware is linked inside hardware.
6. CDs are common because they are cheap and last for long.
7. DVDs are more expensive than CDs.
8. We can read and write data on the DVD-ROM.
9. In some way, CDs are quite similar to DVDs.

Task 15: *Discuss advantages and disadvantages of the removable media devices: CD, DVD, and floppy disk with your partner.*

5.7. Language focus

Making comparisons

Revision of Comparisons of adjectives and adverbs

The regular comparative and superlative forms of descriptive words (adjectives and adverbs) are shown below:

1. Words of one syllable add the ending -er and -est

	Absolute	Comparative	Superlative
Adjectives	new	newer	newest
Adverbs	soon	sooner	soonest

2. Words with three or more syllables are preceded by more and most

	Absolute	Comparative	Superlative
Adjectives	interseting	more interesting	the most interesting
Adverbs	easily	more easily	the most easily

3. Adjectives with two syllables may be like 1 or 2 above in that they will add the ending -er and -est if they end in -y or -ly, -ow, -le and -er

	Absolute	Comparative	Superlative
	tiny	tinier	tiniest
Adjectives	early	earlier	earliest
	shallow	shallower	shallowest
	clever	cleverer	cleverest

4. Some common two-syllable adjectives can have either type of formation

	Absolute	Comparative	Superlative
Adjectives	common	commoner/more common	commonest/most common
	gentle	gentler/more gentle	gentlest/most gentle
	quiet	quieter/more quiet	quietest/most quiet

5. Two-sylable adverbs ending in-ly take more and most

	Absolute	Comparative	Superlative
Adverb	quickly	more quickly	most quickly
	slowly	more slowly	most slowly

6. *A small number of adjectives and adverbs have an irregular comparative and superlative form*

	Absolute	Comparative	Superlative
	bad	worse	worst
	good	better	best
	far	farther/further	farthest/furthest
	many	more	most
Adjectives			
	badly	wore	worst
Adverbs	little	less	least
	well	better	best

7. Equivalence: the following words or constructions are used to show that things or people are similar in some way

as… as	are similar	each
as many …. as	equal to	either
as much…. as	is like	all
the same … as	similar/ly	both
similar to	equal/ly	alike
the same	compared to/with	

8. Non-equivalence: the following words and constructions are used to compare or contrast things or people that are separate from each other

not as …as	greater than	unequal(ly)
..-er than	not as many…as	unlike
more … than	not as much …as	not the same as
fewer … than	not equal to	not all

9. The highest degree: the following words and constructions are used to compare one member of a group with the whole group (superlative)

the …-est	the most …	the least …

Examples:

1. This is **the most popular** package on the market today.

2. BASIC is probably **the least difficult** programming language to learn.

3. **The best** programs are those adapted specifically to your own needs.

10. Parallel increase: the following words and constructions are used to show parallel increase (two comparatives)

the …-er, the more …	the more ..., the …-er	the …-er, the less …

Examples:

1. The more memory your computer has, **the more data** it can store.

2. **The bigger** your computer system, **the less time** you spend waiting.

3. **The more** training you give to your employees, **the better** they will perform.

Further Reading

Reading 1: GUI operating systems

The term **user interface** refers to the standard **procedures** that the user follows in order to interact with a computer. In the late 1970s and early 80s, the way users accessed computer systems was very complex. They had to memorize and type a lot of **commands** just to see the contents of a disk, to copy files or to respond to a single prompt. In fact, it was only experts who used computers, so there was no need for a user-friendly interface.

In 1984, Apple produced the Macintosh, the first computer with a mouse and a graphical user interface (GUI). Macs were designed with one clear aim: to facilitate interaction with the computer. A few years later, Microsoft launched Windows, another operating system based on graphics and intuitive **tools**. Nowadays, computers are used by all kinds of people, and as a result there is a growing emphasis on accessibility and user-friendly systems.

A GUI makes use of a WIMP environment: windows, icons, menus and pointer. The background of the screen is called the **desktop**, which contains labelled pictures called icons. These icons represent files or folders. Double-clicking a folder opens a window which contains programs, documents, or more **nested folders**. When you are in a folder, you can **launch a program** or document by double-clicking the icon, or you can drag it to another location. When you run a program, your PC opens a window that lets you work with different tools. All the programs have a high level of consistency, with similar toolbars, menu bars, and buttons and dialog boxes. A modern OS also provides access to networks and allows multitasking, which means you can run several programs - and do various tasks - at the same time.

The most popular operating systems are:

- The Windows family - designed by Microsoft and used on most PCs. The most recent version is Windows Vista.
- Mac OS - created by Apple and used on
- Macintosh computers.
- Unix - a multi-user system, found on mainframes and workstations in corporate installations.
- Linux - open-source software developed under the GNU General Public License. This means
- anybody can copy its **source code**, change it and distribute it. It is used in computers, appliances and small devices.
- Windows Mobile - used on most PDAs and smartphones (PDAs incorporating mobile phones).
- Palm OS - used on Palm handheld devices.
- RIM - used on BlackBerry communication devices. Developed by Research In Motion.
- The Symbian OS - used by some phone makers, including Nokia and Siemens.

These computer platforms differ in areas such as device installation, network connectivity or compatibility with application software.

Exercise 1: Translate these bold terms and expressions in the text above into your own language. Use a dictionary or the Internet to help you.

1. user interface
2. procedures
3. commands
4. tools
5. desktop
6. nested folders
7. launch a program
8. source code

Reading 2: ***Word-processing facilities***

Writing letters, memos or reports are the ways most people use computers. They manipulate words and text on a screen primarily to print at some later time and store for safe keeping. Computers alleviate much of the tedium associated with typing, proofing and manipulating words. Because computers can store and recall information so readily, documents need not be retyped from scratch just to make corrections or changes. The real strength of word processing lies in this ability to store, retrieve and change information. Typing is still necessary (at least, for now) to put the information into the computer initially but once in, the need to retype only applies to new information. Word processing is more than just typing, however. Features such as Search and Replace allow users to find a particular phrase or word no matter where it is in a body of text. This becomes more useful as the amount of text grows. Word processors usually include different ways to view the text. Some include a view that displays the text with editor's marks that show hidden characters or commands (spaces, returns, paragraph endings, applied styles, etc.). Many word processors include the ability to show exactly how the text will appear on paper when printed. This is called WYSIWYG (What You See Is What You Get, pronounced 'wizzy-wig'). WYSIWYG shows bold, italic, underline and other type style characteristics on the screen so that the user can clearly see what he or she is typing. Another feature is the correct display of different typefaces and format characteristics (margins, indents, super- and sub-scripted characters, etc.). This allows the user to plan the document more accurately and reduces the frustration of printing something that doesn't look right. Many word processors now have so many features that they approach the capabilities of layout applications for desktop publishing. They can import graphics, format multiple columns of text, run text around graphics, etc. Two important features offered by word processors are automatic hyphenation and mail merging. Automatic hyphenation is the splitting of a word between two lines so that the text will fit better on the page. The word processor constantly monitors words typed and when it reaches the end of a line, if a word is too long to fit, it checks that word in a hyphenation dictionary. This dictionary contains a list of words with the preferred places to split it. If one of these cases fits part of the word at the end of the line, the word processor splits the word, adds a hyphen at the end and places the rest on the next line. This happens extremely fast and gives text a more polished and professional look. Mail merge applications are largely responsible for the explosion of ‘personalized' mail. Form letters with designated spaces for names and addresses are stored as documents with links to lists of names and addresses of potential buyers or clients. By designating what information goes into which blank space, a computer can process a huge amount of correspondence substituting the 'personal' information into a form letter. The final document appears to be typed specifically to the person addressed. Many word processors can also generate tables of numbers or figures, sophisticated indexes and comprehensive tables of contents.

UNIT 6: COMPUTER NETWORKS

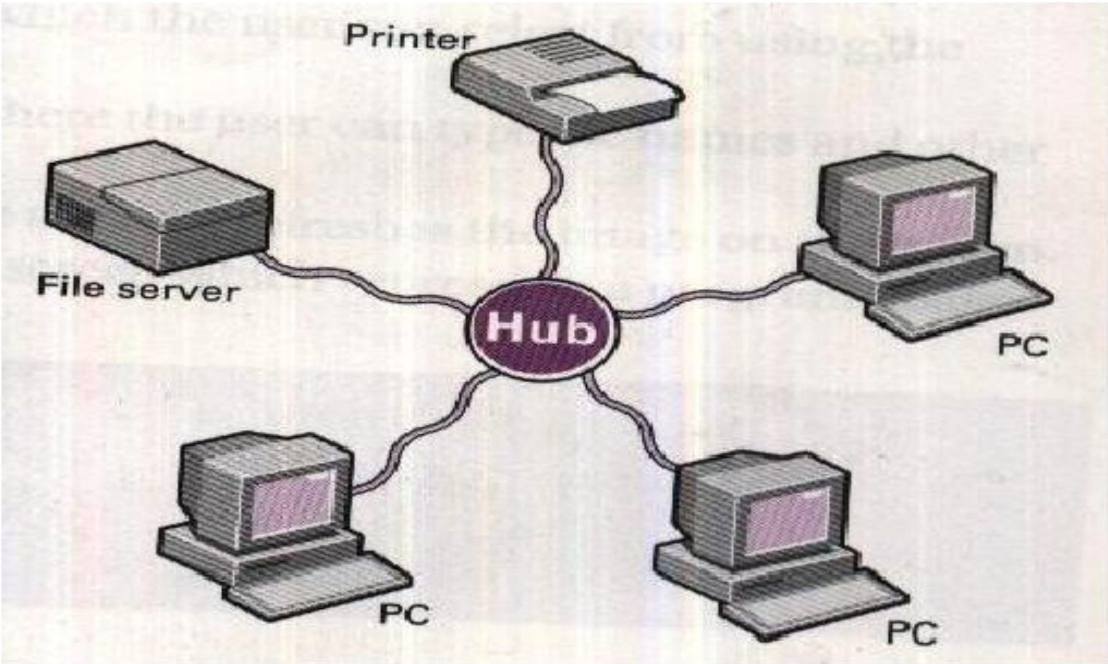
6.1. Start-up

Task 1: *Work in pairs. Ask and answer these questions.*

1. What computing devices do you use in your daily life (e.g. ATMs)?

2. Do you think they are on a network? Is it wired or wireless?

3. Are these devices secure? What security features do they have (e.g. a PIN)?



A typical network system

Task 2: *Try to answer these questions.*

1. What is LAN?
2. What is WAN?
3. What is a distributed system?

6.2. Reading 1

Task 3: *Before you read the text, match these words and phrases with their definitions.*

Protocol a. analyse the syntax of a string of input symbols

bulletin board	b. a teleconferencing system allowing users to read messages left by other users.
user interface	c. agreement governing the procedures used to exchange information between co-operating computers.
make a query	d. means of communication between a human user and a computer system
parse	e. taking place at exactly the same time as something else.
synchronous	f. request a search.

Task 4: *Read quickly through the text below, then match each paragraph with appropriate summary.*

a. Network uses, past and present

b. How distributed systems work

c. Networks and the future

d. What networks and how they operate

e. The growth of networks, past and present

Computer networks

Computer networks link computer by communication lines and software protocols, allowing data to be exchanged rapidly and reliably. Traditionally, networks have been split between wide area networks (WANs) and local area networks (LANs). A WAN is a network connected over a long-distance telephone lines, and a LAN is a localized network usually in one building or a group of buildings close together. The definition, however, is becoming blurred. It is now possible to connect up LANs remotely over telephone links so that they look as though they are a single LAN.

Originally, networks were used to provide terminal access to another computer and to transfer files between computers. Today, networks carry e-mail, provide access to public databases and bulletin boards, and are beginning to be used for distributed systems. Networks also allow users in one locality to share expensive resources,such as printers and disk-systems.

Distributed computer systems are built using networked computers that co-operate to perform tasks. In this environment each part of the networked system does what it is best at. The high-quality bit-mapped graphics screen of a personal computer or workstation provides a good user interface. The mainframe, on the other hand, can handle large numbers of queries and return the results to the users. In a distributed environment, a user might use his PC to make a query against a central database. The PC passes the query, written in a special language (e.g. Structured Query Language - SQL), to the mainframe, which then parses the query, returning to the user only the data requested. The user might then use his PC to draw graphs bases on the data. By passing back to the user's PC only the specific information requested, network traffic is reduced. If the whole file were transmitted, the PC would then have to perform the query itself, reducing the efficiency of both network and PC. In the 1980s, at least 100, 000 LANs were set up in laboratories and offices in the world. During the early part of this decade, synchronous orbit satellites lowered the price of long-distance telephone calls, enabling computer data and television signals to be distributed more cheaply around the world. Since then, fibre-optic cable has been installed on a large scale, enabling vast amounts of data to be transmitted at a very high speed using light signals.

The impact of fibre optics will be considerably to reduce the price of network access. Global communication and computer networks will become more and more a part of professional and personal lives as the price of microcomputers and network access drops. At the same time, distributed computer networks should improve our work environments and technical abilities.

Task 5: *Read this summary of the text and fill in the gaps using the list of words below.*

Distinction	*fibre-optic*	*protocols*	*distributed systems*
Synchronous	*LANs*	*queries*	*workstations*
Environments	*parses*	*screen handling*	

Computer networks link computers locally or by external communication lines and software (1) __________, allowing data to be exchanged and reliably. The (2) _____________ between local area and wide area networks is, however, becoming unclear. Networks are being used to perform increasingly diverse tasks, such as carrying e-mail, providing access to public databases, and for (3) __________. Networks also allow users in one locality to share resources.

Distributed systems use networked computers. PCs or (4) _________ provide the user (5) __________. Mainframes process (6) _________ and return the results to the user. A user at his PC might make a query against a central database. The PC passes the query, written in a special language, to the mainframe, which then (7) _________ the query, returning to the user only the data requested. This allows both the network and the individual PC to operate efficiently.

In the 1980, at least 100, 000 (8) ___________ were set up world-wide. As (9) __________ orbit satellites have lowered the price of long-distance telephone calls, data can be transmitted more cheaply. In addition, (10) ____________ cable has been installed on a large scale, enabling vast amounts of data to be transmitted at a very high speed using light signals.

This will considerably *reduce* the price of network access, making global networks more and more a part of our professional and personal lives. Networks should also improve our work (11) _______ and technical abilities.

Task 6*: Using the paragraph reference, look back the text and find words that have a similar meaning to:*

1. unclear (paragraph 1)
2. place (paragraph 2)
3. carry out (paragraph 3)
4. cost (paragraph 4)
5. world-wide (paragraph 5)

Task 7: *Using the paragraph reference, look back the text and find words that have an opposite meaning to:*

1. disparate (paragraph 1)
2. conflict (v) (paragraph 1)
3. preventing (paragraph 1)
4. tiny (paragraph 1)
5. increase (paragraph 1)

6.3. Writing

Task 8: *Write a paragraph from 120 to 150 words about the advantages of using the Internet.*

6.4. Listening

Task 9: *Listen to a sales representative explaining a new service to a client. Answer these questions.*

1. How secure is the current system?
2. How secure is a VPN?
3. Compared with the current system, how easy is a VPN to use?

Task 10: *Listen again and take notes on these items. Then write a definition for each item.*

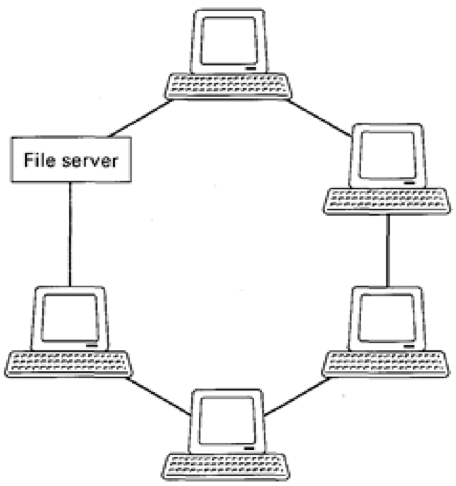
1. dongle 2. wi-fi 3. VPN

6.5. Reading 2

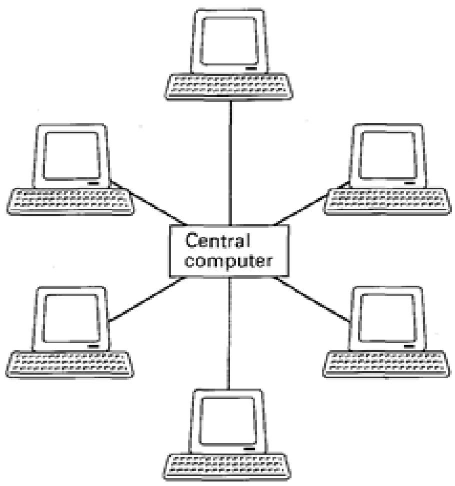
Network configurations

Task 11: *Read the following texts. Match each text with the correct illustration*

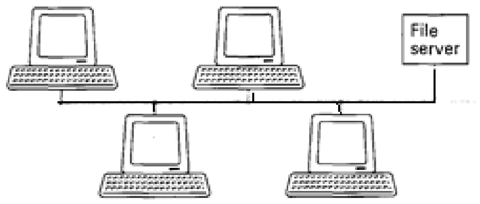
a.



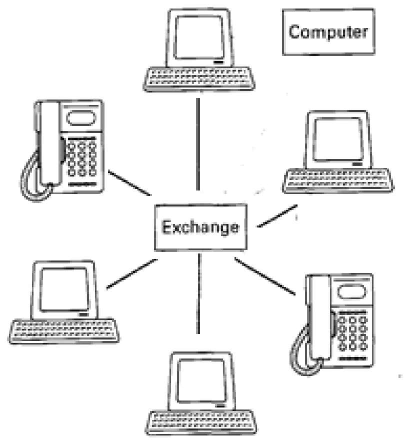
b.



c.



d.



1. Star

In the star configuration, the central computer performs all processing and control functions. All access devices are linked directly to the central computer. The star configuration has two major limitations. First of all, the remote devices are unable to communicate directly. Instead, they must communicate via the central computer only. Secondly, the star network is very susceptible to failure, either in the central computer or the transmission links.

2. Switched

The central switch, which could be a telephone exchange, is used to connect different devices on the network directly. Once the link is established, the two devices communicate as though they were directly linked without interference from any other device. At the end of the session, the connection is closed, freeing capacity for other users and allowing access to other devices. Multiple switches can be used to create alternative transmission routes.

3. Ring

Each device is attached to a network shaped as a continuous loop. Data proceeds in only one direction and at a constant speed round the loop. Devices may send information only when they are in control of the 'token'. The token is a package of data which indicates which device has control. The receiving device picks up the token, then clears it for another's use once it has received the message. Only one device may send data at any given moment, and each device must be working for the network to function.

4. Bus / Ethernet

A bus network consists of one piece of cable terminated at each end to which all devices are connected. In a bus-based network, each device is able to broadcast a message when it has detected silence for a fixed period of time. All devices receive the broadcast and determine from the content of the message whether it was intended for them. The only problem occurs when two devices try to send at the same time. When a sending device detects another's transmission, it aborts its own.

Task 12: *These are answers to questions about the text. Write the questions.*

1. To connect different devices on the network directly.
2. No, it goes in only one direction round the loop.
3. No, only one device may send data at any given moment.
4. From the content of the message.
5. It cancels its own transmission.

Task 13: *Which topologies do these statements refer to?*

1. If one of the computers fails, the whole network will be affected.

2. If we remove a computer from the network, it won't affect the other computers.

3. If the main cable fails, the whole network will fail.

4. If the central server fails, the whole network will fail.

5. If a cable breaks, the whole network will be affected.

6. If a computer fails, it won't affect the other computers.

6.5. Speaking

Task 14: *Discuss the advantages and disadvantages of all the four network topologies described in the text.*

Word-play

Task 15: *Use the clues below to solve the crossword puzzle.*

Across

1. The means of communication between a human and a computer.(4,9)

5. To load software on to a computer, ready for use. (7)

7. To transmit a message to all nodes on a network. (9)

9. (and **3** down) Usually found in one building or a group of buildings close together. (5 ,4, 7)

10. This kind of network often uses a telephone exchange to connect different devices directly. (8)

Down

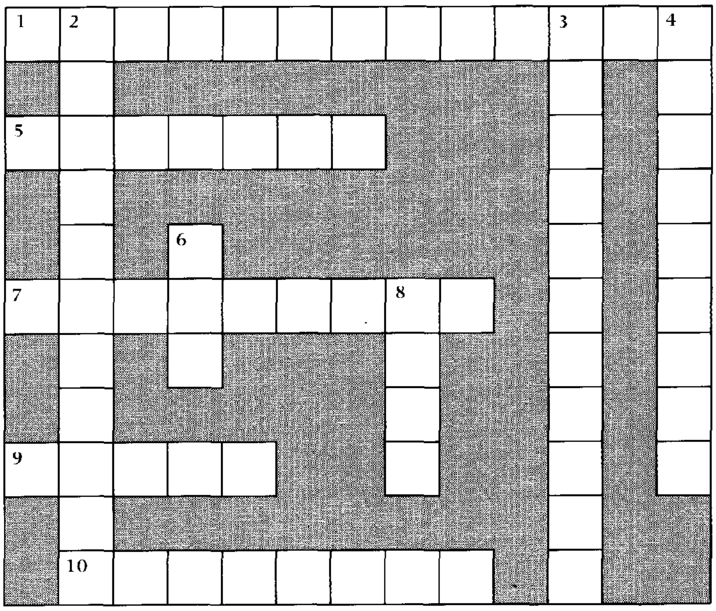
2. Taking place at exactly the same time as something else. (11)

3. See **9** across

4. An ______ board may be inserted into a computer to give it added features. (9)

6. The opposite of **9** across and **3** down. (3)

8. The network configuration in which all devices are linked through the central computer. (4)



6.6. Language focus

Revision of first conditional sentence

Predict the consequences of an action. The action is in the Present simple, and the consequence in the *will* future.

Examples

If you don't save your document, you will lose the information

Exercise 1: *Link each action (1-10) with a suitable consequence (a-j).*

Example: *If you place a floppy disk near a magnet, you will destroy the data.*

1. you place a floppy disk near a magnet	a. the cursor moves to the left
2. you press Print Screen	b. the computer hangs
3. you input the correct password	c. it is lost when you switch off
4. you add memory to a computer	d. you damage the drive
5. you move the mouse to the left	e. you copy the screen
6. you store data in RAM	f. you have access to the network
7. you use a faster modem	g. you destroy the data
8. there is a memory fault	h. it runs faster
9. you press the arrow key	i. your phone bills are lower
10. you move a CD-ROM drive with the disk in place	j. the cursor moves across the screen

Exercise 2: *Complete these statements with a suitable action or consequence.*

1. Your data in RAM will be lost if …………………………………

2. ………………………………………., the whole net work will fail.

3. If you input the wrong password, ………………………………

4. If your monitor is too bright, ……………………………………

5. ……………………………………….. if you remove one of the computers from the bus topology.

Further Reading

Reading 1: Network Communication

The application layer is the only part of a communications process that a user sees, and even then, the user doesn't see most of the work that the application does to prepare a message for sending over a network. The layer converts a message's data from human-readable form into bits and attaches a header identifying the sending and receiving computers.

The presentation layer ensures that the message is transmitted in a language that the receiving computer can interpret (often ASCII). This layer translates the language, if necessary, and then compresses and perhaps encrypts the data. It adds another header specifying the language as well as the compression and encryption schemes.

The session layer opens communications and has the job of keeping straight the communications among all nodes on the network. It sets boundaries (called bracketing) for the beginning and end of the message, and establishes whether the messages will be sent half-duplex, with each computer taking turns sending and receiving, or full-duplex, with both computers sending and receiving at the same time. The details of these decisions are placed into a session header.

The transport layer protects the data being sent. It subdivides the data into segments, creates checksum tests - mathematical sums based on the contents of data - that can be used later to determine if the data was scrambled. It can also make backup copies of the data. The transport header identifies each segment's checksum and its position in the message.

The network layer selects a route for the message. It forms data into packets, counts them, and adds a header containing the sequence of packets and the address of the receiving computer.

The data-link layer supervises the transmission. It confirms the checksum, then addresses and duplicates the packets. This layer keeps a copy of each packet until it receives confirmation from the next point along the route that the packet has arrived undamaged.

The physical layer encodes the packets into the medium that will carry them - such as an analogue signal, if the message is going across a telephone line - and sends the packets along that medium.

An intermediate node calculates and verifies the checksum for each packet. It may also reroute the message to avoid congestion on the network.

At the receiving node, the layered process that sent the message on its way is reversed. The physical layer reconverts the message into bits. The data-link layer recalculates the checksum, confirms arrival, and logs in the packets. The network layer recounts incoming packets for security and billing purposes. The transport layer recalculates the checksum and reassembles the message segments. The session layer holds the parts of the message until the message is complete and sends it to the next layer. The presentation layer expands and decrypts the message. The application layer converts the bits into readable characters, and directs the data to the correct application.

Exercise 1: Find the answers to these questions in the following text.

1. Into what units is data subdivided by the following layers?

a transport layer b network layer

2. What is the purpose of a transmission checksum test?

3. How long does the data-link layer keep a copy of each packet?

4. What processes can be carried out at intermediate nodes?

5. Which network communications layer is described by each of the following statements?

a. Makes sure that the message is transmitted in a language that the receiving computer can understand

b. Protects the data being sent

c. Encodes and sends the packets

d. Supervises the transmission

e. The part of a communications process that a user sees

f. Starts communications and looks after communications among network nodes

g. Chooses a route for the message

h. Makes backup copies of the data if required

i. Confirms the checksum, then addresses and duplicates the packets

Exercise 2: Mark the following statements as True or False

a. Most of the work that an application does to prepare a message for sending over a network is not seen by the user.

b. ASCII is always used to transmit data.

c. The encryption layer compresses the message.

d. The network layer keeps track of how many packets are in each message.

e. The network layer keeps a copy of each packet until it arrives at the next node undamaged.

f. Analogue signals are used on ordinary telephone lines.

g. When a message arrives at its destination, it passes through the same seven network communications layers as when it was sent, but in reverse order.

Reading 2: 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, rhe UDP sort ware 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 How, 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 computer, other high-level programs handle it. Some are enshrined in official US government standards, like the File Transfer Protocol (FT P) 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.

Exercise 1: 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?

Exercise 2: Mark the following statements as True or False

a. Internet addresses are an integral part of the IP protocol.

b. Internet addresses can be written as a series of numbers.

c. UDP software provides the final routing for data within the receiving system.

d. UDP recovers packets that aren’t successfully delivered.

e. TCP only works with packet-switched networks.

f. TCP only works when it is combined with IP.

UNIT 7: COMPUTER VIRUSES AND COMPUTER SECURITY

7.1. Start-up

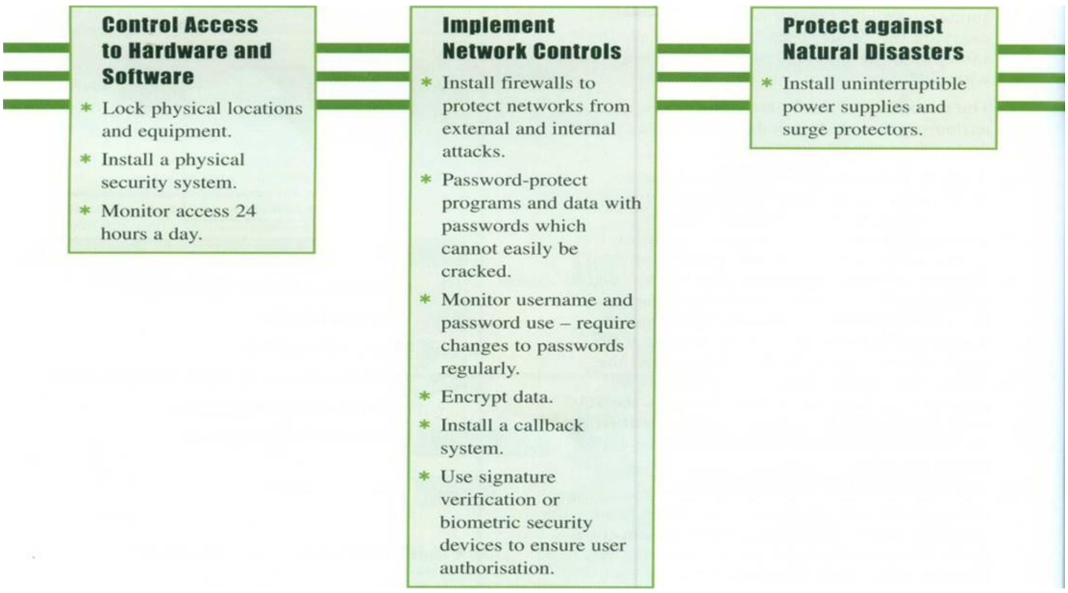
Task 1: *Try to answer these questions*

1. What is computer viruses?
2. How does a virus work?
3. How do you protect your computer system and resources?
4. How many kinds of computer hackers do you think there are? What are they?

Task 2: *Consider these examples of computer disasters. How could you prevent them or limit their effects? Compare answers within your group.*

1. You open an email attachment which contains a very destructive virus.
2. Someone guesses your password (the type of car you drive plus the day and month of your birth) and copies sensitive data.
3. Your hard disk crashes and much of your data is lost permanently.
4. Someone walks into your computer lab and steals the memory chips from all the PCs.
5. Your backup tapes fail to restore properly.

Task 3: *Study this table of security measures to protect hardware and software. Which measures would prevent or limit the effects of the disasters in Task 2?*



Computer viruses

7.2. Reading 1

Task 4: *Before reading the text, match the words and definitions listed below.*

1. a detonator	a. a protective device
2. an infector	b. to remove all traces of something
3. to boot	c. a device used to set off an explosion or other destructive process
4. to trigger	d. to discover or recognize that something is present
5. to erase	e. to set a process in motion
6. pirated	f. something which transmits a disease or virus
7. a shield	g. stolen, obtained without the owner's consent
8. to detect	h. to load the operating system into memory

Task 5: *Now read the text and check your answer to Task 1.*

Computer virus definition

A computer virus is a form of malicious software that piggybacks onto legitimate application code in order to spread and reproduce itself.

Like other types of malware, a virus is deployed by attackers to damage or take control of a computer. Its name comes from the method by which it infects its targets. A biological virus like HIV or the flu cannot reproduce on its own; ***it*** needs to hijack a cell to do that work for it, wreaking havoc on the infected organism in the process. Similarly, a computer virus isn't itself a standalone program. It's a code snippet that inserts itself into some other application. When that application runs, it executes the virus code, with results that range from the irritating to the disastrous.

In everyday conversation and the popular press, people often use virus and malware interchangeably. But strictly speaking a virus is a specific type of malware that fits the definition above. The two other main types are

Trojans, ***which*** masquerade as harmless applications to trick users into executing them, and worms, which can reproduce and spread independently of any other application. The distinguishing feature of a virus is that it needs to infect other programs to operate.

What do computer viruses do?

Imagine an application on your computer has been infected by a virus. How does the virus do its dirty work? Bleeping Computer provides a good high-level overview of how the process works. The general course goes something like this: the infected application executes (usually at the request of the user), and the virus code is loaded into the CPU memory before any of the legitimate code executes.

At this point, the virus propagates ***itself*** by infecting other applications on the host computer, inserting its malicious code wherever it can. (A resident virus does this to programs as they open, whereas a non-resident virus can infect executable files even if ***they*** aren't running.) Boot sector viruses use a particularly pernicious technique at this stage: they place their code in the boot sector of the computer's system disk, ensuring that it will be executed even before the operating system fully loads, making it impossible to run the computer in a "clean" way.

Once the virus has its hooks into your computer, it can start executing its payload, which is the term for the part of the virus code that does the dirty work its creators built it for. These can include all sorts of nasty things: Viruses can scan your computer hard drive for banking credentials, log your keystrokes to steal passwords, turn your computer into a zombie that launches a DDoS attack against the hacker's enemies, or even encrypt your data and demand a bitcoin ransom to restore access. (Other types of malware can have similar payloads, of course: there are ransomware worms and DDoS Trojans and so forth.)

How do computer viruses spread?

In the early, pre-internet days, viruses often spread from computer to computer via infected floppy disks. The SCA virus, for instance, spread amongst Amiga users on disks with pirated software. It was mostly harmless, but at one point as many as 40% of Amiga users were infected.

Today, viruses spread via the internet. In most cases, applications that have been infected by virus code are transferred from computer to computer just like any other application. Because many viruses include a logic bomb - code that ensures that the virus's payload only executes at a specific time or under certain conditions - users or admins may be unaware that their applications are infected and will transfer or install them with impunity. Infected applications might be emailed (inadvertently or deliberately - some viruses actually hijack a computer's mail software to email out copies of themselves); they could also be downloaded from an infected code repository or compromised app store.

One thing you'll notice that all of these infection vectors have in common is that ***they*** require the victim to execute the infected application or code. Remember, a virus can only execute and reproduce if its host application is running! Still, with email such a common malware dispersal method, a question that causes many people anxiety is: Can I get a virus from opening an email? The answer is that you almost certainly can't simply by opening a message; you have to download and execute an attachment that's been infected with virus code. That's why most security pros are so insistent that you be very careful about executing email attachments, and why most clients email and webmail services include virus scanning features by default.

A particularly sneaky way that a virus can infect a computer is if the infected code runs as JavaScript inside a web browser and manages to exploit security holes to infect programs installed locally. Some email clients will execute HTML and JavaScript code embedded in email messages, so strictly speaking, opening such messages could infect your computer with a virus. But most email clients and webmail services have built-in security features that would prevent this from happening, so this isn't an infection vector that should be one of your primary fears.

Types of computer virus

Symantec has a good breakdown on the various types of viruses you might encounter, categorized in different ways. We've already met resident and non-resident viruses, boot sector viruses, web scripting viruses, and so on. There are a couple other types you might want to be aware of:

A macro virus infects macro applications embedded in Microsoft Office or PDF files. Many people who are careful about never opening strange applications forget that these sorts of documents can themselves contain executable code. Don't let your guard down!

A polymorphic virus slightly changes its own source code each time it copies itself to avoid detection from antivirus software.

Keep in mind that these category schemes are based on different aspects of a virus's behavior, and so a virus can fall into more than one category. A resident virus could also be polymorphic, for instance.

Computer virus protection

Antivirus software is the most widely known product in the category of malware protection products. CSO has compiled a list of the top antivirus software for Windows, Android, Linux and macOS, though keep in mind that antivirus isn't a be-all end-all solution. When it comes to more advanced corporate networks, endpoint security offerings provide defense in depth against malware. They provide not only the signature-based malware detection that you expect from antivirus, but anti-spyware, personal firewall, application control and other styles of host intrusion prevention. Gartner offers a list of its top picks in this space, which include products from Cylance, CrowdStrike, and Carbon Black.

One thing to keep in mind about viruses is that they generally exploit vulnerabilities in your operating system or application code in order to infect your systems and operate freely; if there are no holes to exploit, you can avoid infection even if you execute virus code. To that end, you'll want to keep all your systems patched and updated, keeping an inventory of hardware so you know what you need to protect, and performing continuous vulnerability assessments on your infrastructure.

Computer virus symptoms

How can you tell if a virus has slipped past your defenses? With some exceptions, like ransomware, viruses are not keen to alert you that they've compromised your computer. Just as a biological virus wants to keep its host alive so it can continue to use it as a vehicle to reproduce and spread, so too does a computer virus attempt to do its damage in the background while your computer still limps along. But there are ways to tell that you've been infected. Norton has a good list symptoms include:

- Unusually slow performance
- Frequent crashes
- Unknown or unfamiliar programs that start up when you turn on your computer
- Mass emails being sent from your email account
- Changes to your homepage or passwords

If you suspect your computer has been infected, a computer virus scan is in order. There are plenty of free services to start you on your exploration: The Safety Detective has a rundown of the best.

Computer virus removal

Once a virus is installed on your computer, the process of removing it is similar to that of removing any other kind of malware - but that isn't easy. CSO has information on how to remove or otherwise recover from rootkits, ransomware, and cryptojacking. We also have a guide to auditing your Windows registry to figure out how to move forward.

If you're looking for tools for cleansing your system, Tech Radar has a good roundup of free offerings, which contains some familiar names from the antivirus world along with newcomers like Malwarebytes. And it's a smart move is to always make backups of your files, so that if need be you can recover from a known safe state rather than attempting to extricate virus code from your boot record or pay a ransom to sketchy Eastern European gangsters.

Task 6: *Decide whether the following statements are true (T) or false (F) or no information (NI) in relation to the information in the text. If you feel a statement is false, change it to make it true.*

1. Viruses can be spread through a computer network, only via floppies transported from computer to computer.
2. The virus will spread as soon as you put the infected floppy in your PC.
3. There are 4 types you might want to be aware of.
4. There are 100 types of viruses you can encounter
5. Most viruses spread through pirated games.

Task 7: *Answer the questions about the text.*

1. What is a computer virus?
2. How do computer viruses spread in the early time? and today?
3. How many types of computer viruses are there?
4. Is it easy to remove computer viruses?
5. How do you protect your computer?

Task 8: *Look back the text decide what the italic words refer to.*

1. *it* needs to hijack a cell
2. *they* aren't running
3. *they* require the victim
4. *itself* by infecting other applications
5. *which* masquerade as harmless applications

Task 9: *Using the paragraph reference given, look back the text and find words or phrases with similar meaning to:*

1. replicate (Computer viruses definition)
2. not dangerous (How do computer viruses spread)
3. to spread (what do computer viruses do)
4. remove (computer virus removal)
5. working slowly (computer virus symptom)

7.3. Listening

Task 10: *Listen to a general manager talking to an IT officer about replacing the company's social networking system. Will it be easy or difficult to get the features the manager wants?*

Task 11: *Listen again. Tick √ the correct column to show which features the company has now and which the manager wants in the new system.*

	Current system	**New system**
1. instant messaging		
2. forums		
3 document management system		
4. comments feature		
5. mobile phone access		
6. basic security features		
7. encryption		
8. speech-to-text capability		

7.4. Reading 2

Computer security

The Internet has transformed our lives in many good ways. Unfortunately, this vast network and its associated technologies also have brought in their wake, the increasing number of security threats. The most effective way to protect yourself from these threats and attacks is to be aware of standard cybersecurity practices. This article on "What is Computer Security?" presents an introduction to computer security and its key concepts.

What is computer security?

Computer security basically is the protection of computer systems and information from harm, theft, and unauthorized use. It is the process of preventing and detecting unauthorized use of your computer system.

Often people confuse computer security with other related terms like information security and cybersecurity. One way to ascertain the similarities and differences among these terms is by asking what is being secured. For example,

- Information security is securing information from unauthorized access, modification & deletion
- Computer Security means securing a standalone machine by keeping it updated and patched
- Cybersecurity is defined as protecting computer systems, which communicate over the computer networks

It's important to understand the distinction between these words, though there isn't necessarily a clear consensus on the meanings and the degree to which they overlap or are interchangeable.

So computer security can be defined as controls that are put in place to provide confidentiality, integrity, availability and authentication for all components of computer systems. Let's elaborate the definition.

Components of computer system

The components of a computer system that needs to be protected are:

- Hardware, the physical part of the computer, like the system memory and disk drive
- Firmware, permanent software that is etched into a hardware device's nonvolatile memory and is mostly invisible to the user
- Software, the programming that offers services, like operating system, word processor, internet browser to the user

Computer security is mainly concerned with four main areas:

- Confidentiality is ensuring that information is available only to the intended audience
- Integrity is protecting information from being modified by unauthorized parties
- Availability is protecting information from being modified by unauthorized parties
- Authentication are you really communicating with whom you think you are communicating with

In simple language, computer security is making sure information and computer components are usable but still protected from people or software that shouldn't access it or modify it.

Computer security threats

Computer security threats are possible dangers that can possibly hamper the normal functioning of your computer. In the present age, cyber threats are constantly increasing as the world is going digital. The most harmful types of computer security are:

Viruses, Computer worm, Phishing, Botnet, Rootkit and Key logger

A computer virus is a malicious program which is loaded into the user's computer without user's knowledge. It replicates itself and infects the files and programs on the user's PC. The ultimate goal of a virus is to ensure that the victim's computer will never be able to operate properly or even at all.

Computer Worm

A computer worm is a software program that can copy itself from one computer to another, without human interaction. The potential risk here is that it will use up your computer hard disk space because a worm can replicate in greate volume and with great speed.

Phishing

Disguising as a trustworthy person or business, phishers attempt to steal sensitive financial or personal information through fraudulent email or instant messages. Phishing in unfortunately very easy to execute. You are deluded into thinking it's the legitimate mail and you may enter your personal information.

Botnet

A botnet is a group of computers connected to the internet that have been compromised by a hacker using a computer virus. An individual computer is called 'zombie computer'. The result of this threat is the victim's computer, which is the bot will be used for malicious activities and for a larger scale attack like DDoS.

Rootkit

A rootkit is a computer program designed to provide continued privileged access to a computer while actively hiding its presence. Once a rootkit has been installed, the controller of the rootkit will be able to remotely execute files and change system configurations on the host machine.

Keylogger

Also known as a keystroke logger, keyloggers can track the real-time activity of a user on his computer. It keeps a record of all the keystrokes made by user keyboard. Keylogger is also a very powerful threat to steal people's login credential such as username and password.

Task 12: *Answer the questions*

1. What is computer security?
2. What are the concerns of computer security?
3. What are computer security threats?
4. How different are among computer security, information security and cybersecurity?
5. Which are the most harmful kinds of computer security?

7.5. Speaking

Task 13: *In groups or pairs, note down the advantages and disadvantages of the possible solutions. Think about safety, cost, and case of use. Try to decide on the best.*

7.6. Writing

Task 14: *Read the text carefully and write a summary of about 100 -150.*

7.7. Language focus

Listing

It is important when reading to recognize and understand the relationship in which sentences and groups of sentences combine to present information. This information may be linked by means of a connective word or marker. The ones given in the box below are the most common ones used in listing or enumerating. The *-ly* forms are usually used when listing.

Another, next, then, furthermore, afterwards, moreover First(ly), second(ly), third (ly) …. last (ly)/finall(y). To begin/start with, … to conclude First and foremost/ first and most importantly => mark the beginning of a descending order. Above all/ last but not least => mark the end of an ascending order.

Exercise 1: *Complete the following paragraph about the various steps in the creation of a database by filling in the blanks with appropriate listing markers.*

When you are creating a new database, you must (1) ___________ decide how many fields you will need in your database. (2) ____________, you will have to provide up to five items of information about each field. (3) _________, each field needs to have a name. (4) __________, the field type has to be defined. Character, numeric, date, and logical are some common types. (5) _________ choice to be made is the width of the field. However, some fields, such as date, have present default values. The (6) _____ step is to set the number of decimal places if the field is numeric. (7) _________, you will have to indicate whether the field is to be indexed or not.

Exercise 2: *Complete the following paragraph by filling in the banks with appropriate listing markers.*

Computers can do wonders, but they can waste a lot of money unless careful consideration goes into buying them. Businessmen and women thinking of buying a computer system should (1) ___________ admit they know very little about computers. (2) ________, they must realize that the computer sales people don't always know their business works.

(3) ___________, it is essential that buyers should get outside advice, not necessarily from consultants but from other executives who have had recent experience in buying a computer system. (4) _______ they should try to *see* systems similar to ones under consideration in operation because their

operations will have differences that must be accommodated, they should (5) ________ find out what would be involved in upgrading a system. (6) ___________ important thing to know before buying a computer is the financial situation of the supplier because computer companies come and go and not all financially stable.

(7) _______ , the prospective buyer should demand that every detail be covered in writing, including hardware and software if they are supplied by different companies. There's nothing wrong with computers themselves, its how and why they are used that can cause problems.

Cause and effect

Understanding the different ways of expressing the relationship between the causes and the effects of an action is very important when you are reading English. This cause—effect relationship is commonly used in texts about computing.

1. Verbs linking cause and effect:

Result	Cause
produce	result in
allow	result from
prevent	bring about
enable	

Examples:

1. *The introduction of the computer technology* ***brought about*** *significant changes in office routines.* (cause $\rightarrow$ effect)

2. *The problems* ***were caused by*** *the volume of network traffic*. (effect $\leftarrow$ cause)

2. Connectives introducing cause:

Due to	*Because*
As the/ a result of	*In response to*
Since	*As*

Example:

Early computers developed quickly ***as a result of*** *their use in military applications.* (effect ← cause)

3. Connectives introducing result:

with the result that	*consequently*
so that	*hence*
thus	*for this reason*
therefore	*thereby*

Examples:

When using an online database service, you must pay for the time you use. ***Consequently,*** *you should have a good idea of what you want before you log on.* (cause → effect)

Exercise 1: *Read the following sentences and underline the part which expresses the cause.*

1. Because a modem can be used for inter-computer communication, many people can now do their office work on their computer at home and transfer the files to a computer at the office.

2. Many people do not explore new software because they are comfortable with what they already have.

3. When robots malfunction, it is usually due to mistakes in the programming or the design.

4. Laser printers can be quite expensive and are therefore often shared through networks.

5. Voice-recognition systems are becoming more sophisticated. Thus, keyboards may be unnecessary in the future.

Exercise 2: *Read the following sentences and underline the part which expresses the effect/result*

1. Computers can remove many of the routine and boring tasks from our lives, thereby leaving us with more time for interesting and creative work.
2. Because there are many different types of printers, you must analyse your needs before making a purchase.
3. Since anyone can consult your files on a computer, it is a good idea to protect sensitive files with a password.
4. Fax boards are available to plug into your computer, so you do not have to buy a fax machine.
5. Computers have been reduced in both size and cost as a result of advances in design and technology.

Further Reading

Reading 1: *Security and privacy on the Internet*

There are a lot of benefits from an open system like the Internet, but we are also exposed to hackers who break into computer systems just for fun, as well as to steal information or propagate viruses. So how do you go about making online transactions secure? Security on the Web The question of security is crucial when sending confidential information such as credit card numbers. For example, consider the process of buying a book on the Web. You have to type your credit card number into an order form which passes from computer to computer on its way to the online bookstore. If one of the intermediary computers is illustrated by hackers, your data can be copied. It is difficult to say how often this happens, but it's technically possible. To avoid risks, you should set all security alerts to high on your Web browser. Netscape Communicator and Internet Explorer display a lock when the Web page is secure and allow you to disable or delete 'cookies'. If you use online bank services, make sure your bank uses digital certificates. A popular security standard is SET (secure electronic transactions). E-mail privacy similarly, as your e-mail message travels across the net, it is copied temporarily on many computers in between. This means it can be read by unscrupulous people who illegally enter computer systems.

The only way to protect a message is to put it in a sort of 'envelope', that is, to encode it with some form of encryption. A system designed to send e-mail privately is Pretty Good Privacy, a freeware program written by Phil Zimmerman. Network security Private networks connected to the Internet can be attacked by intruders who attempt to take valuable information such as Social Security numbers, bank accounts or research and business reports. To protect crucial data, companies hire security consultants who analyse the risks and provide security solutions. The most common methods of protection are passwords for access control, encryption and decryption systems, and firewalls. Virus protection Viruses can enter a PC through files from disks, the Internet or bulletin board systems. If you want to protect your system, don't open e-mail attachments from strangers and take care when downloading files from the Web. (Plain text e-mail alone can't pass a virus.) Remember also to update your anti-virus software as often as possible, since new viruses are being created all the time.

Exercise 1: Gap filling

field, layout, merging, record, sorted, updated

1. In order to personalize a standard letter you can use mail ….. (a technique which consists of combining a data base with a document made with a word processor).

2. Records can be………… automatically into any order.

3. You can decide how many fields you want to have on a……………..
4. Files can easily be ………..by adding new information or deleting the old one.
5. A …........................program can be used to store, organize and retrieve information of any kind.
6. The ………………..of the records can be designed by the user.
7. Each piece of information is given in a separate…………

Reading 2: ***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 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.

Exercise 1: 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?

Exercise 2: *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	iv. the recipient's public key

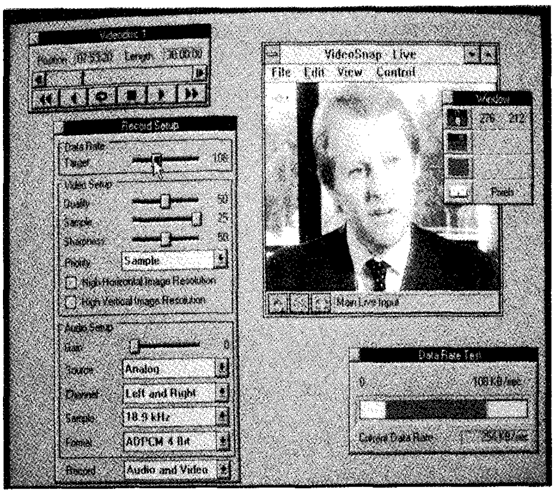
UNIT 8: COMPUTER APPLICATIONS

Start-up

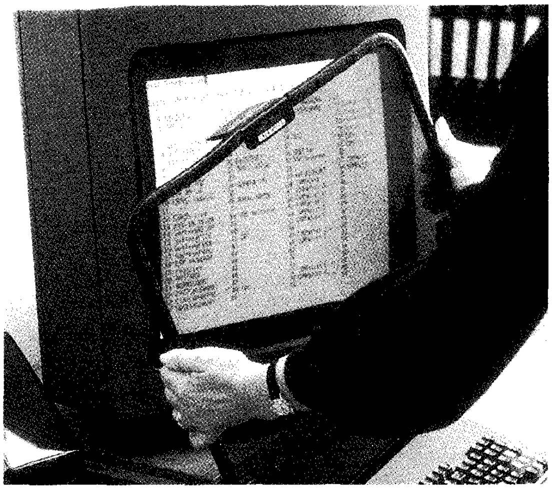
Task 1: *Try to answer these questions*

What aspects of computer technology are illustrated below? Make a list of any other examples of computer applications.

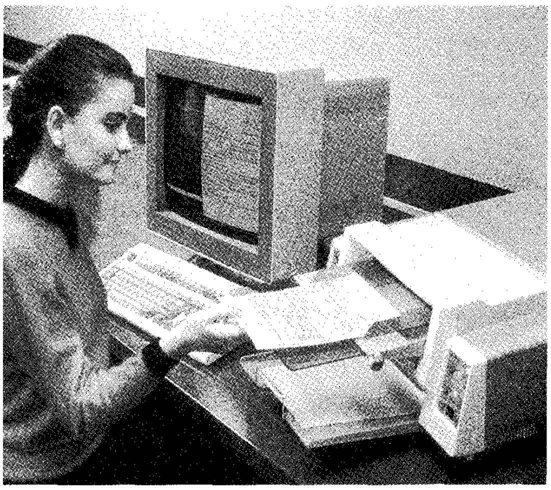
a



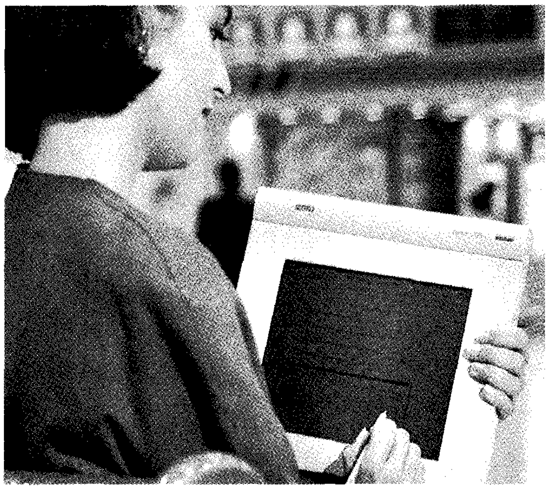
c



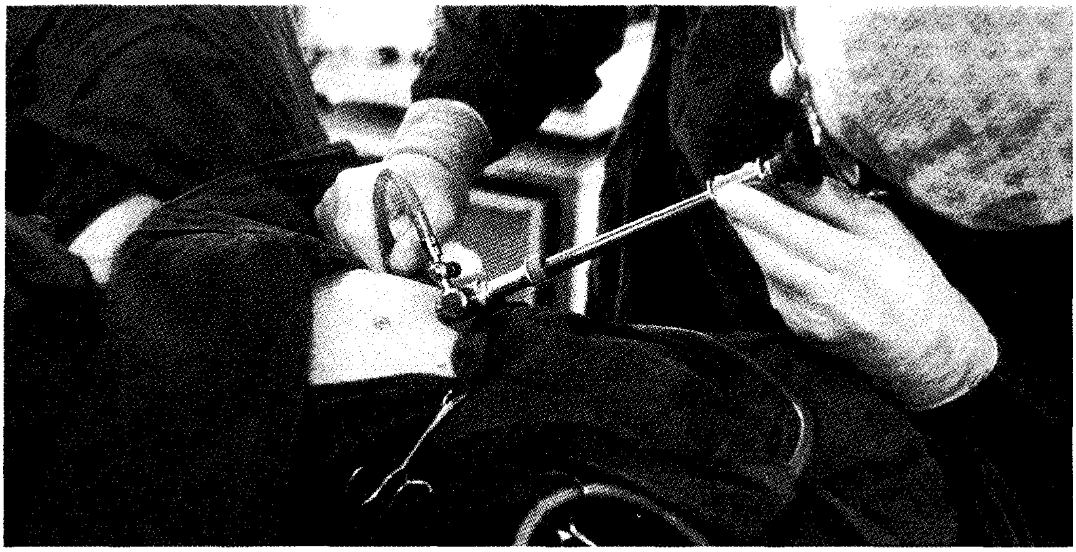
b



d



e



f **g**

8.2. Reading 1

Computer in future office

First, safety. Radiation screens are available, and have been for some years. Most of them place an emissions barrier between you and the front of your display, while others encase the entire monitor, protecting you from side and rear emissions as well. Many offices already have these screens available for their workers.

The paperless office office is still a dream, but the basic tools are in place. We receive mail in two basic forms: on paper in an envelope, or electronically on our computers. Most of us have access to e-mail in one form or another. That's half the battle won. The other half is a bit more difficult, but it can be, and is being, done. All mail can be opened in the mail room and scanned into the computer using optical character recognitnn 'OCR). Then a document-imageprocessing program takes over and lets you accomplish electronically what you would normally do with paper. Various personal computer products are available for this purpose.

Pen-based computing is coming into its own. Pen- input capabilities are beginning to show up in hardware, applications, and operating systems. You can't take notes that will go directly into your computer, and the technology wouldn't know what to do with your doodles, but it would know that a doodle isn't a valid word. And that's a start - a good one.

Multimedia really needs no explanation. There are many packages that help you create multimedia presentations, and the tools to create customized multimedia training programs are also plentiful. CD-ROM disks, such as ZiffDavis's Computer Select and Microsoft's Bookshelf, let you access mountains of information with ease.

Computers are already much smaller than they used to be, and you can't go to an industry show these days without finding some company promoting its 'small footprint'. When you start talking about laptops, notebooks, and palmtops, the question becomes, 'How small is too small?' FAX capabilities are already available on boards that you can plug into your computer. When you combine the technologies present in internal modems with voice recognition, the basics for having your computer replace your phone-voice line are in place.

Voice recognition is another technology that may appear limited in its present form, but it shows great promise for the future. Current voice-recognition systems can handle speaker-dependent continuous speech or speaker- independent discrete speech.

Speaking to your computer will be a major factor in the office of the future. In some locations, it is already a major factor in the office of today. Stock is traded in some brokerage houses by verbal command from the broker to the computer. So, you ask your computer a question, and it answers you- verbally. Depending on the rate of speech sampling used and the resolution the A/D converter uses for each sample, we can already create a credible approximation of human speech with digitized sound.

Large display screens? You can get screens of up to 35 inches now, and between Barco and Mitsubishi competing for the honor of having the largest monitor, it's hard to predict just how big they will get in the future. As for color, some companies offer upwards of 16 million. Somewhere in that number must lie the perfect color for reducing eye-strain.

The real disaster that most of us still have to deal with is the traditional keyboard, which is the cause of much pain and suffering in the form of carpal tunnel syndrome and other repetitive-strain injuries. Wrist rests are available to alleviate the problem, and new designs for strange-looking keyboards, *Star Trek*-style, are moving from the drawing board to the factory.

Enterprise networks are proliferating almost as fast as LANs did just a year or two ago. Public data networks are ripe for the dialling up and signing on. And the Internet already exists, with several of the research and educational facilities on its membership rolls.

Worldwide connectivity is already available in the enterprise networks of some major corporations (e.g. DEC's DECnet and IBM's Systems Network Architecture). Admittedly, these are proprietary networks, but they are living proof that the concept can and does work.

Vocabulary

- doodle: meaningless drawing
- brokerage houses: companies that buy and sell shares for clients carpal tunnel syndrome - chronic wrist-strain caused by repetitive movement, such as typing.
- Star trek*:* futuristic American television series of the 1970s/1980s.

Task 2: *Using the paragraph references given, look back the text and find the words with a similar meaning to:*

1. whole (paragraph 1)
2. usually(paragraph 2)
3. acceptable (paragraph 3)
4. seem (paragraph 6)
5. believable (paragraph 7)
6. decreasing (paragraph 8)
7. spreading (paragraph 10)
8. ready (paragraph 10)

Now find the words that mean the opposite of:

9. danger (paragraph 1)
10. destroy (paragraph 4)
11. rare (paragraph 4)
12. separate (paragraph 5)
13. minor (paragraph 7)
14. less than (paragraph 8)
15. enjoyment (paragraph 9)
16. aggravate (paragraph 9)

8.3. Listening

Task 3: *Listen to two technicians talking about video conferencing technology. Which two types of system does the woman talk about?*

Task 4: *Complete these glossary definitions with the words in the box*

(data) compression	*dedicated system*
MCU	*remote control*

Glossary of video conferencing terms:

1…………..: a system that is used for only one purpose, e.g. for video conferencing only, nothing else

2…………….: a device that can control the video conferencing system from a distance, without wires. It can be passed from person to person easily.

3…………..: a device that allows video conferencing systems to use more than two locations

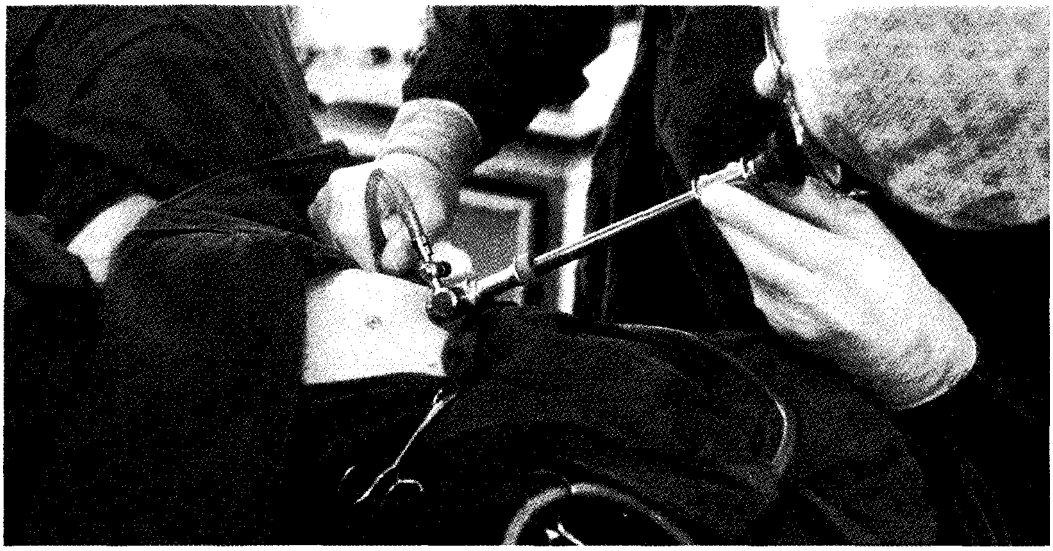
4…………..: a way to fit audio or video into a smaller space and use less bandwidth

Task 5: *Listen to five people talking about video conferencing. Do they think the situation is likely or unlikely? Tick √the correct column for each speaker.*

	Likely	**Unlikely**
Speaker 1		
Speaker 2		
Speaker 3		
Speaker 4		
Speaker 5		

8.4. Reading 2

Computer in medicine



Task 6: *Before reading the text, match the following words with their definitions*

1. logical record	a. the collection of data transferred as a unit
2. field	b. the user's permitted view of the data
3. physical record	c. the logical design of the database
4. internal schema	d. an item of data such as a number, a name, or an address
5. external schema	e. the way that the data is physically held
6. conceptual schema	f. the collection of data relating to one subject

Task 7: *Try to answer the questions in pairs.*

1. How many medical uses of database can you think of?
2. What is DBMS?
3. What is its function?

Now compare your answers with the information in the text

Database management systems

Databases are used within a medical context for many purposes. For example, they are used to hold patient details so they can be accessed from anywhere within a hospital or network of hospitals. With the recent improvements in image compression techniques, X-rays and scan output can also be held in databases and accessed in the same way.

These multi-user databases are managed by a piece of software called a database management system (DBMS). It is this which differentiates a database from an ordinary computer file. Between the physical database itself (i.e. the data as actually stored) and the users of the system is the DBMS. All requests for access to data from users - whether people at terminals or other programs running in batch - are handled by the DBMS.

One general function of the DBMS is the shielding of database users from machine code (in much the same way that COBOL shields programmers from machine code). In other words, the DBMS provides a view of the data that is elevated above the hardware level, and supports user-requests such as 'Get the PATIENT record for patient Smith', written in a higher-level language.

The DBMS also determines the amount and type of information that each user can access from a database. For example, a surgeon and a hospital administrator will require different views of a database.

When a user wishes to access a database, he makes an access request using a particular data-manipulation language understood by the DBMS. The DBMS receives the request, and checks it for syntax errors. The DBMS then inspects, in turn, the external schema, the conceptual schema, and the mapping between the conceptual schema and the internal schema. It then performs the necessary operations on the stored data.

In general, fields may be required from several logical tables of data held in the database. Each logical record occurrence may, in turn, require data from more than one physical record held in the actual database. The DBMS must retrieve each of the required physical records and construct the logical view of the data requested by the user. In this way, users are protected from having to know anything about the physical layout of the database, which may be altered, say, for performance reasons, without the users having their logical view of the data structures altered.

Task 8: *The steps below show how a DBMS deals with an access request. Find the relevant section in the text, then put the steps in the correct order*.

The DBMS:

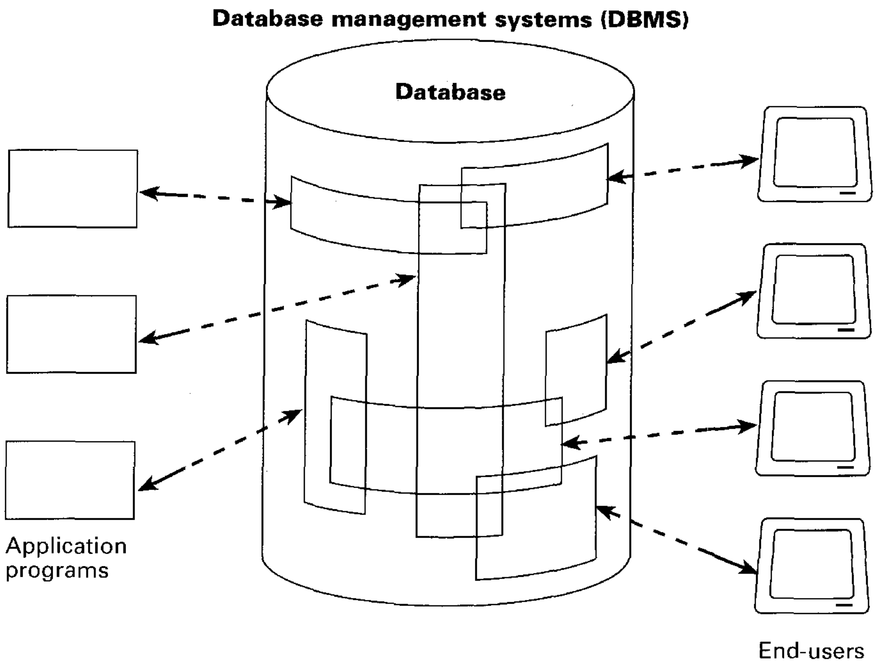
1. inspects the mapping between the conceptual schema and internal schema
2. checks for syntax errors
3. inspects the external schema
4. receives the request
5. performs operations on the stored data
6. inspects the conceptual schema

Task 9: *The diagram below represents a simplified database. In pairs, use the diagram to explain to your partner the following:*

Student A: What a DBMS is and how it works

Student B: How an access request is processed

Try not to refer to the text. Use your own words.



Task 10: *Choose the correct word to complete each sentence. You may have to change the form of the word.*

1. consider, considered, consideration, considerable, considerably

a. We'll have to __________ using another company if they can't provide the software

b. The company has invested a ________ sum of money in ergonomic workstations.

c. The CEO has submitted this proposal for your ________.

d. This computer is _________ faster than the old one.

2. apply, applying, applicant, application, applicable

a. We have interviewed five ________ for the new position.

b. The last part of the form is not _______ to foreign students.

c. My students is thinking of __ for a government grant to continue his research.

d. The new book uses business_______ to teach computer studies.

3. Explain, explained, explaining, explanation, explanatory

a. The package includes an __________ booklet.

b. The instructions are very clear and do not require any further ______.

c. It will only take c couple of minutes to __________how the program works.

d. If you are new to this system, almost everything will have to be __________.

4. Depend, depending, dependent, dependence, dependable, dependably

a. The company has supplied us _____ for over ten years.

b. We have to reduce our _______ on imported goods.

c. This is very ____ equipment. We have never had a serious breakdown.

d. Today, many companies ________ more on FAXes than on mail.

5. Connect, connected, connecting, connector, connectivity, connection

a. _______ is an important concept in global communications.

b. He only got that contract because he has ______ in the government.

c. Make sure the _____ is not loose before you call a service technician.

d. Once the new telephone lines are ________, our system should be more efficient.

8.5. Speaking

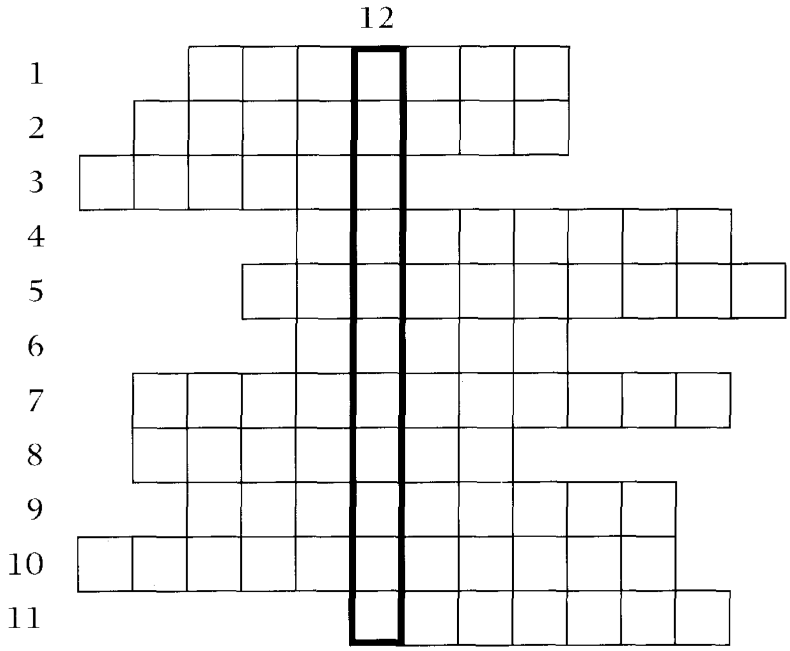
Task 11: *We have looked at some of the benefits of replacing people with computers in the office. What are the negative aspects of this policy?*

8.6. Writing

Task 12: *Write two paragraphs, one is about the benefits, the other is about the negative aspects of replacing people with computers.*

WORD-PLAY

Task 13: *Complete the puzzle and find the key word in 12 down*



Across:

1. and **11** The creation of an artificial environment in the memory of a computer in which the user can apparently exist. (7,7)

2. and **3** The user's permitted view of the data in a database. (8,6)

4. The opposite of **2** (8)

5. A surgical ______ is a tool used for carrying out operations. (10)

6. and **10** A technique for reducing the amount of space that a graphic image will use when stored in computer memory. 5,11)

7. A program must be converted into this before a computer will read and process it. (7,4)

8. Programs that run ___ - ___ do not involve any terminal or user interaction.(2-5)

9. Used to describe computer systems that allow access by more than one user simultaneously. (5-4)

10. See **6**

11. See **1**

Down

12.A device for sending a radio message. (11)

8.7. Language focus

The passive: Revision

Passives are very common in technical writing where we are more interested in facts, processes, and events than in people. We form the passive by using the appropriate tenses of the verb *to be* followed by the past participle of the verb we are using.

<u>Facts and processes</u>

When we write or talk about facts or processes that occur regularly, we use the present passive.

Examples:

Data ***is transferred*** *from the internal memory to the arithmetic-logical unit along channels known as buses.*

<u>Events</u>

When we write or talk about past events, we use the past passive. Let us look at some examples.

Examples:

Microsoft was founded on the basis of the development of MS/DOS.

Exercise 1: *Read the text below, which describes the insurance company's procedure for dealing with PC-users' problems. Fill in the gaps using the correct form of the verb in brackets.*

All calls (1) _____________ (register) by the Help Desk staff. Each call (2) ________________ (evaluate) and then (3) _________ (allocate) to the relevant support group. If a visit (4) __________ (require), the user (5) __________ (contact) by telephone, and an appointment (6) __________ (arrange). Most calls (7) _________ (deal with) within one working day. In the event of major problem requiring the removal of a user's PC, a replacement can usually (8) _________ (supply)

Exercise 2*: Fill in the gaps in the following sentences using the appropriate for of the verb in brackets.*

1. The part of the processor which controls data transfers between the various input and output devices __________ (call) the control unit.

2. The address bus _________ (use) to send address details between the memory and the address register.

3. The pixel positions _________ (pass on) to the computer's pattern recognition software.

4. An operating system ___________ (store) on disk.

5. Instructions written in high-level language ________ (transform) into machine code.

6. In the star configuration, all processing and control functions __________ (perform) by the central computer.

7. When a document arrives in the mail room, the envelope ________ (open) by a machine.

8. Once the index ___________ (store), a temporary key number _________ (generate) and _________ (write) on the document.

Exercise 3: *Fill in the gaps in the following sentences using the appropriate form of the verb in brackets.*

1. Microsoft _____________ (found) by Bill Gates.
2. A language ___________ (develop0 in the 1970s.
3. During that period, enormous advances __________ (make) in computer technology.
4. The following year, twice as many PCs __________ (sell).
5. In the 1980s, at least 100, 000 LANs ___________(set up) in laboratories and offices around the world.
6. The first digital computer ____________ (build) by the University of Pennsylvania in 1946.
7. Last year, more software computers __________ (launch) than ever before.
8. IBM's decision not to continue manufacturing mainframes ___________ (reverse) the year after it ____________ (take).

Further Reading

Reading 1

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 arc already in the data but were previously unseen.

The most popular tool used when mining is artificial intelligence (Al). Al technologies try to work the way the human brain works, by making intelligent guesses, learning by example, and

using deductive reasoning. Some of the more- popular Al methods used in data mining include neural networks, clustering, and decision trees.

Neural networks look at the rules of using data, 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 patterns arc 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.

('lustering divides data into groups based on similar features or limited data ranges, ('lusters arc 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 our rules that point to which claims are likely to be false.

Decision trees, like clusters, separate rhe 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, ('leansing 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 arc storage methods that involve archiving large amounts of data in a way that makes it easy 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 refilling 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.

rile 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.

Exercise 1: Find the answers to these questions in the following text.

1. What tool is often used in data mining?
2. What Al 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.

Exercise 2: Mark the following as True or False

a. Data mining is a process of analysing known patterns in data.

b. Artificial intelligence is commonly used in data mining.

c. In data mining, patterns found while analysing data are used for further analysing the data.

d. Data mining is used to detect false insurance claims.

e. Data mining is only useful for a limited range of problems.

Reading 2: *National Council for Educational Technology*

The Council's purpose is to bring beneficial change to the processes of learning in education and training through the development and application of educational technology.

Educational technology - or learning technology, as it is sometimes known embraces everything from the way computers, satellites, and interactive video are used in schools, colleges, and industry to issues of copyright and flexible learning. Focusing on the learner, our purpose is tn support change in the ways we learn by applying the benefits of educational technology - especially the new information technologies - to the process of learning.

We design and produce learning materials in all subjects to support education and training. We carry out research and manage projects, offer consultancy on technical matters, support training for trainers and teachers, and offer expertise in areas such as open and flexible learning, resource management, and educational software. We provide a comprehensive information and enquiry service.

Information Technology in schools

Through its l.T. in Schools Programme. NCET's Schooling Directorate is pursuing four priorities:

■ to identify and promote and spread good practice in the use of new technologies to provide professional guidance to teacher trainers so that they can help teachers and schools in managing l.T. and in applying it to all areas of study

■ to develop high-quality curriculum materials and encourage other publishers to do the same

■ to give particular support for those concerned with children and young adults with special educational needs, including the handicapped.

Learning after school and at work

NCET's Training Directorate focuses on the needs of those wishing to learn after the school-leaving age. Projects under the Vocational Training programme include looking into the training needs of women, older workers, 30 and those who use information technology to work from home. In further education, lecturers and senior managers arc being helped to plan for I.T. and changing client needs. For industry, our work has included language training in the run-up to 1992, and the application of artificial intelligence systems to training. This directorate also takes the lead in important trans-sectoral issues such as open and flexible learning, copyright, and the use of computers in careers guidance.

Technical expertise

Keeping abreast of developments in technology and maintaining a national expertise on standards and specifications is the work of NCET's Technical Consultancy Directorate. Through links with other organizations, it identifies issues associated with the adoption of new technologies and. where appropriate, carries out projects to assess or develop their potential in education and training. It has a watching brief and provides consultancy on new and developing technologies such as satellites, CD-ROM. and interactive video. Current projects involve the examination of the use of educational software in schools, the use of massive storage systems, and the use of satellites in education and training. The Directorate also produces guidance to users on a wide range of technology, from desk-top publishing and remote sensing to teleconferencing and audio-visual systems.

Exercise 1: Using the line references given, look back in the text and find words or phrases in the text which have a similar meaning to:

1. includes (lines 1-5)
2. advantages (lines 5-10)
3. covering everything (lines 10-15)
4. course (lines 20-25)
5. physically or mentally challenged (lines 2 5-30)
6. approach (lines 30-35)
7. up-to-date with (lines 3 5-40)
8. instructions to monitor (lines 40-45)

Reading 3

In the last ten years, police have installed speed trap units on many busy roads. These contain a radar set, a microprocessor and a camera equipped with a flash. The radar sends out a beam of radio waves at a frequency of 24 gigahertz. This is equivalent to a wavelength of 1.25 CI11S. If a car is moving towards the radar, the reflected signal will bounce back with a slightly smaller wavelength. If away from the radar, the waves will reflect with a slightly longer wavelength. The microprocessor within the unit measures the difference in wavelength between outgoing and returning signals and calculates the speed of each vehicle. If it is above the speed pre-set by the police, the camera takes a picture of the vehicle, rhe information is stored on a smart card for transfer to the police computer. The owner of the vehicle can then be traced using the Driver and Vehicle Licensing Centre database.

Some drivers have now got used to these traps. They slow down when they approach one to ensure that the camera is not triggered. They speed up again as soon as they have passed. This is known as 'surfing'. One way of outwitting such motorists is a new computerised system. This consists of two units equipped with digital cameras positioned at a measured distance apart, rhe first unit records the time each vehicle passes it and identifies each vehicle by its number plates using optical character recognition software. This information is relayed to the second unit which repeats the exercise, rhe microprocessor within the second unit then calculates the time taken by each vehicle to travel between the units. The registration numbers of those vehicles exceeding the speed limit are relayed to police headquarters where a computer matches each vehicle with the DVLC database. Using mailmerge a standard letter is then printed off addressed to the vehicle owner.

UNIT 9: OVERVIEW OF MOBILE AND EMBEDDED SOFTWARE ENGINEERING

9.1. Start- up

Task 1:

1. Name these mobile apps.

2. Fill a name of mobile app in the correct description

Names of mobile apps	Description
a.	Getting your messages instantly via push notifications, reading and responding online & offline, and finding any message quickly
b.	Having many features in common, including turn-by-turn navigation, street view, and public transit information and helping users to find available parking spots in cities
c.	The idea of creating a taxi-booking mobile app first came from Anthony Tan
d.	Helping you spend less time managing your schedule
e.	Let you surf the web with your favorite browsers. To visit a web page, type its address in the address box. You can also type a search word, if you don't know the exact web page address.
f.	It is a popular free social networking website that allows registered users to create profiles, upload photos and video, send messages and keep in touch with friends, family and colleagues
g.	It provides simple and advanced mathematical functions in a beautifully designed app

9.2. Reading 1

Task 2: *Read the text and find the names of mobile apps mentioned.*

A **mobile app** is a software application designed to run on mobile devices such as smartphones and tablet computers. Most such devices are sold with several apps bundled aspre-installed software, such as a web browser, email client, calendar, mapping program, and an app for buying music or other media or more apps. Some pre-installed apps can be removed by an ordinary uninstall process, thus leaving more storage space for desired ones. Where the software does not allow this, some devices can be rooted to eliminate the undesired apps.

Native mobile apps often stand in contrast to applications that run on desktop computers, and with web applications which run in mobile web browsers rather than directly on the mobile device.

Apps that are not pre-installed are usually available through distribution platforms called app stores. They began appearing in 2008 and are typically operated by the owner of themobile operating system, such as the Apple App Store, Google Play, Windows Phone Store, and BlackBerry App World. Some apps are free, while others must be bought. Usually, they are downloaded from the platform to a target device, but sometimes they can be downloaded to laptops or desktop computers. For apps with a price, generally a percentage, 20-30%, goes to the distribution provider (such as iTunes), and the rest goes to the producer of the app.[1] The same app can therefore cost a different price depending on the mobile platform.

The term "app" is a shortening of the term "application software". It has become very popular, and in 2010 was listed as "Word of the Year" by the American Dialect Society.[2] In 2009, technology columnist David Pogue said that newer smartphones could be nicknamed "app phones" to distinguish them from earlier less-sophisticated smartphones.[3]

Mobile apps were originally offered for general productivity and information retrieval, including email, calendar, contacts, stock market and weather information. However, public demand and the availability of developer tools drove rapid expansion into other categories, such as those handled by desktop application software packages. As with other software, the explosion in number and variety of apps made discovery a challenge, which in turn led to the creation of a wide range of review, recommendation, and curation sources, including blogs, magazines, and dedicated online app-discovery services. In 2014 government regulatory agencies began trying to regulate and curate apps, particularly medical apps.[4] Some companies offer apps as an alternative method to deliver content with certain advantages over an official website.

Usage of mobile apps has become increasingly prevalent across mobile phone users.[5] A May 2012 comScore study reported that during the previous quarter, more mobile subscribers used apps than browsed the web on their devices: 51.1% vs. 49.8% respectively.[6]Researchers found that usage of mobile apps strongly correlates with user context and depends on user's location and time of the day.[7]Mobile apps are playing an ever increasing role within healthcare and when designed and integrated correctly can yield many benefits.[8][9]

Market research firm Gartner predicted that 102 billion apps would be downloaded in 2013 (91% of them free), which would generate $26 billion in the US, up 44.4% on 2012's US$18 billion.[10] By Q2 2015, the Google Play and Apple stores alone generated $5 billion. An analyst report estimates that the app economy creates revenues of more than€10 billion per year within the European Union, while over 529,000 jobs have been created in 28 EU states due to the growth of the app market.[11]

Task 3: *Answer the questions about the text.*

1. What does the term “app” refer for?
2. What is mobile app?
3. What are app stores?

4. Who operate the app stores?

5. How much does the producer usually get for an expensive app?

6. What did the American Dialect Society call as “Word of the Year” in 2010?

7. Why can newer smartphone be nicknamed as “app phone”?

8. Why were later mobile apps offerd for other categories?

9. How many apps were Market research firm Gartner predicted to be downloaded free in 2013?

10. According to the text, how many jobs have been created in 28 EU states due to the growth of the app market?

Task 4: *Look back the text and find words that have a similar meaning to:*

1. unwanted (paragraph 1)
2. opposite to (paragraph 2)
3. named (paragraph 3)
4. expensive apps (paragraph 3)
5. refers to (paragraph 4)
6. fast (paragraph 5)
7. popular (paragraph 6)

Task 5: *Decide whether the following statements are true (T) or false (F) in relation to the information in the text. lf you think a statement is false, change it to make it true*.

1. The app stores were borned in 2008.
2. You have to buy any mobile apps when you want to use them?
3. Technology commentator David Pogue thought newer smartphones could be nicknamed "app phones" to distinguish them from earlier less-sophisticated smartphones.
4. The explosion in number and variety of apps made discovery an advantage.
5. The Google Play and Apple stores generated $5 billion in 2015.

9.3. Reading 2

Ethernet networking has become extremely popular in embedded systems. With the explosion of TCP/IP Ethernet wiring around the world, it makes a lot of sense for new embedded systems to view Ethernet as an important interface to higher level supervisory computers, or to remote users. For 16-bit systems, most OS products do not support TCP/IP networking directly. For this reason, Micro/sys developed the Embedded Netsock system, which is stored in flash with our RUN.EXE firmware. In simplistic terms, Embedded Netsock extends the on-board BIOS to be able to directly manage a very limited subset of TCP/IP networking with no third party products. Therefore, no OS needs to be installed, as a single .EXE file that has included the NETSOCK.H include file can be executed directly by the computer's on-board firmware.

Other solutions for 16-bit systems include networking add-ons from DOS-compatible OS vendors, and the PC/TCP linkable library from NetManage, which requires a full DOS compatible OS as opposed to RUN.EXE. These approaches provide support for many more TCP/IP protocols than Micro/sys' Embedded Netsock.

If you are using a 32-bit OS, it is most advisable to use the TCP/IP network stack that is supplied with that OS. This provides the maximum amount of integration, and therefore the least amount of work. Windows CE, Linux, and all RTOS packages offer excellent networking capabilities. Once the edit, compile, link, and optionally locate, cycle is done, you need to have a debug strategy. At the very lowest level, you can always embed debug printout messages into your source code, and have it tell you what it's up to. At the other end of the spectrum are hardware In Circuit Emulators (ICE) which can allow complete control over the CPU chip socket on a computer board - even if the board hardware has not been debugged yet.

Debug printouts are free, ICE systems can cost tens of thousands of dollars. If you plan on using an ICE, contact your embedded computer supplier to ensure that CPU chip packaging, socketing, and orientation will support the specific ICE you plan on using.

One of the most popular approaches is that of a remote software debugger. With this approach, you connect a desktop development PC (where you do your editing, compiling, and linking) with the target embedded computer through a serial cable or a network connection. A program is

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downloaded into target RAM, and it can be debugged using breakpoints, source code display, variable examination, single-stepping, etc.

For 16-bit remote debugging, Micro/sys provides, free of charge, remote Turbo Debugger interface programs that can be run on Micro/sys embedded computers. This allows remote debugging with the Borland Turbo Debugger product. Because there are many versions of Turbo Debugger, we supply many versions of the interface program. We also stock full release CDs for two Borland C++ versions, each with the proper Turbo Debugger included. You must match compiler, linker, and debugger versions in order to use remote debugging. Serial connection at 115KB is supported.

Each 32-bit operating system has its own debug strategy. Some require a disk-based version of the OS on the target system, so that a "native" debugger can be used. Others, such as Linux with its GDB debugger, include remote debug capabilities. With a 32-bit OS, we advise you to discuss debug strategy with the OS vendor, and with the embedded computer hardware vendor, to ensure that there are no architectural incompatibilities.

Micro/sys supports a number of popular language tools for use during the development of systems incorporating Micro/sys embedded PCs

These languages have been developed with PC programming in mind. The 16-bit compilers have run-time calls for DOS and BIOS resources. With a few minor exceptions, these languages will execute on Micro/sys embedded PCs under the RUN.EXE™ firmware. This low cost, royaltyfree 16-bit run-time environment allows the .EXE files generated by these languages to be loaded directly onto a Micro/sys computer board for automatic execution upon power-up.

Tools for Generating 16-bit Applications

Borland C++ Versions 2.1 through 5.0

Borland C++ offers a complete development system for developing 16-bit applications. Compiler, linker, and libraries are included, in addition to the Turbo Debugger system that allows source level remote debugging across a fast serial line. The availability of this debug capability makes the Borland tools the preferred 16-bit development tools.

Versions 2.1 and 3.1 generate small executables, and their Integrated Development Environment (IDE) is DOS character-based. Versions 4.5 and 5.0 generate slightly larger executables, but offer a multi-window graphical IDE for editing, visual makefiles, and support for in-line assembler statements. The 16-bit output of all versions can be used on Micro/sys embedded PCs under RUN.EXE or MSDOS with excellent results.

Micro/sys stocks book/CD packages for Borland C++ 3.1 and 4.5. For a very low cost, we can supply an entire 16-bit development toolset.

Microsoft C/C++ Versions 5.1, 6.0, and 7.0

Microsoft C/C++ compilers, from version 5.1 through 7.0 can be used to generate 16-bit .EXE files for execution under 16-bit environments such as RUN.EXE or DOS. Early versions are DOS command line driven, while later versions execute in DOS boxes under Windows. Note that these compilers are no longer supported by Microsoft, but they are installed in thousands of locations. Microsoft does not support remote debugging, and this is a disincentive for their use in embedded applications.

Microsoft Visual C++ Version 1.52

Visual C++ Version 1.52 presents a full Windows graphical IDE, offering visual makefiles, project trees, and multi-window editing. This was the last version of Visual C++ that generated 16-bit executables, and it is no longer supported by Microsoft. It can be used for creating 16-bit applications, but suffers from the same lack of a remote debugger as other Microsoft C/C++ compilers. Once again, it is installed in thousands of locations.

Task 6: *Answer the questions about the text.*

1. Why did Micro/sys develop the Embedded Netsock system for 16-bit systems?
2. Why don't you have to install any OS if you have an embedded netsock system?
3. For 32-bit OS, what provides the maximum amount of integration?
4. What must you have when you edit?
5. What tools for generating 16-bit applications are there in the text?

Task 7: *Decide whether the following statements are true (T) or false (F) in relation to the information in the text. lf you think a statement is false, change it to make it true.*

1. For 16-bit systems, most OS products do not support TCP/IP networking indirectly.
2. Embedded Netsock can directly manage many subsets of TCP/IP networking with no third party products.
3. You shouldn't use the TCP/IP network stack with a 32-bit OS.

4. One of debug strateges is adding debug printout messages in your source code.

5. Micro/sys supports Microsoft C/C++ Versions 6.0

9.4. Speaking

Task 8: *In groups or pairs, note down the advantages of some mobile apps*

Task 9: *In groups or pairs discuss about Ethernet networking*

9.5. Writing

Task 10: *Read the text carefully and write a summary of about 100 -150.*

9.6. Language focus

Relative clauses

- We can use relative clauses to join two sentences, or to give more information about something.

Ex: I bought a new car. It is very fast.

→ I bought a new car that is very fast.

- There are defining and non-defining relative clauses

1. A defining relative clause tells which noun we are talking about:

Ex: I like the woman who lives next door.

(If I don't say 'who lives next door', then we don't know which woman I mean).

- The function of defining relative clauses:
    - ***Subject***

When the relative pronoun is the subject of a defining relative clause, we can use 'who', 'which' or 'that'. We use 'who' for people and 'which' for things. We can use 'that' for people or things. We can't drop the relative pronoun.

Ex: I'm looking for a secretary who can use a computer well.

- ***Object***

When the relative pronoun is the object of the clause. In this case we can drop the relative pronoun if we want to.

Ex: She loves the chocolate (which / that) I bought.

2. A non-defining relative clause gives us extra information about something. We don't need this information to understand the sentence. We don't use 'that' in non-defining relative clauses, so we need to use 'which' if the pronoun refers to a thing, and 'who' if it refers to a person. We can't drop the relative pronoun.

Ex: I live in London, which has some fantastic parks.

(Everybody knows where London is, so 'which has some fantastic parks' is extra information).

Further reading

Reading 1: *Read the following text and decide a suitable title for the text.*

Developing apps for mobile devices requires considering the constraints and features of these devices. Mobile devices run on battery and have less powerful processors than personal computers and also have more features such as location detection and cameras. Developers also have to consider a wide array of screen sizes, hardware specifications and configurations because of intense competition in mobile software and changes within each of the platforms (although these issues can be overcome with mobile device detection).

Mobile application development requires use of specialized integrated development environments. Mobile apps are first tested within the development environment using emulators and later subjected to field testing. Emulators provide an inexpensive way to test applications on mobile phones to which developers may not have physical access.

Mobile user interface (UI) Design is also essential. Mobile UI considers constraints and contexts, screen, input and mobility as outlines for design. The user is often the focus of interaction with their device, and the interface entails components of both hardware and software. User input allows for the users to manipulate a system, and device's output allows the system to indicate the effects of the users' manipulation. Mobile UI design constraints include limited attention and form factors, such as a mobile device's screen size for a user's hand. Mobile UI contexts signal cues from user activity, such as location and scheduling that can be shown from user interactions within a mobile application. Overall, mobile UI design's goal is primarily for an understandable, user-friendly interface.

Mobile UIs, or front-ends, rely on mobile back-ends to support access to enterprise systems. The mobile back-end facilitates data routing, security, authentication, authorization, working off-line, and service orchestration. This functionality is supported by a mix of middleware components including mobile app servers, Mobile Backend as a service(MBaaS), and SOA infrastructure.

Conversational interfaces display the computer interface and present interactions through text instead of graphic elements. They emulate conversations with real humans. There are two main types of conversational interfaces: voice assistants (like the Amazon Echo) and chatbots.

Conversational interfaces are growing particularly practical as users are starting to feel overwhelmed with mobile apps (a term known as “app fatigue”). David Limp, Amazon’s senior vice president of devices, says in an interview with Bloomberg, “We believe the next big platform is voice.”

Reading 2: Open Source Software

What is open source?

The term "open source" refers to something people can modify and share because its design is publicly accessible.

The term originated in the context of software development to designate a specific approach to creating computer programs. Today, however, "open source" designates a broader set of values-what we call "the open source way." Open source projects, products, or initiatives embrace and celebrate principles of open exchange, collaborative participation, rapid prototyping, transparency, meritocracy, and community-oriented development.

What is open source software?

Open source software is software with source code that anyone can inspect, modify, and enhance.

"Source code" is the part of software that most computer users don't ever see; it's the code computer programmers can manipulate to change how a piece of software - a "program" or "application" works. Programmers who have access to a computer program's source code can improve that program by adding features to it or fixing parts that don't always work correctly.

What's the difference between open source software and other types of software?

Some software has source code that only the person, team, or organization who created it - and maintains exclusive control over it - can modify. People call this kind of software "proprietary" or "closed source" software. Only the original authors of proprietary software can legally copy, inspect, and alter that software. And in order to use proprietary software, computer users must agree (usually by signing a license displayed the first time they run this software) that they will not do anything with the software that the software's authors have not expressly permitted. Microsoft Office and Adobe Photoshop are examples of proprietary software.

Open source software is different. Its authors make its source code available to others who would like to view that code, copy it, learn from it, alter it, or share it. LibreOffice and the GNU Image Manipulation Program are examples of open source software.

As they do with proprietary software, users must accept the terms of a license when they use open source software - but the legal terms of open source licenses differ dramatically from those of proprietary licenses.

Open source licenses affect the way people can use, study, modify, and distribute software. In general, open source licenses grant computer users permission to use open source software for any purpose they wish. Some open source licenses—what some people call "copyleft" licenses-stipulate that anyone who releases a modified open source program must also release the source code for that program alongside it. Moreover, some open source licenses stipulate that anyone who alters and shares a program with others must also share that program's source code without charging a licensing fee for it.

By design, open source software licenses promote collaboration and sharing because they permit other people to make modifications to source code and incorporate those changes into their own projects. They encourage computer programmers to access, view, and modify open source software whenever they like, as long as they let others do the same when they share their work.

Is open source software only important to computer programmers?

No. Open source technology and open source thinking both benefit programmers and non-programmers.

Because early inventors built much of the Internet itself on open source technologies - like the Linux operating system and the Apache Web server application - anyone using the Internet today benefits from open source software.

Every time computer users view web pages, check email, chat with friends, stream music online, or play multiplayer video games, their computers, mobile phones, or gaming consoles connect to a global network of computers using open source software to route and transmit their data to the "local" devices they have in front of them. The computers that do all this important work are typically located in faraway places that users don't actually see or can't physically access—which is why some people call these computers "remote computers."

More and more, people rely on remote computers when performing tasks they might otherwise perform on their local devices. For example, they may use online word processing, email management, and image editing software that they don't install and run on their personal computers. Instead, they simply access these programs on remote computers by using a Web browser or mobile phone application. When they do this, they're engaged in "remote computing."

Some people call remote computing "cloud computing," because it involves activities (like storing files, sharing photos, or watching videos) that incorporate not only local devices but also a global network of remote computers that form an "atmosphere" around them.

Cloud computing is an increasingly important aspect of everyday life with Internet-connected devices. Some cloud computing applications, like Google Apps, are proprietary. Others, like ownCloud and Nextcloud, are open source.

Cloud computing applications run "on top" of additional software that helps them operate smoothly and efficiently, so people will often say that software running "underneath" cloud computing applications acts as a "platform" for those applications. Cloud computing platforms can be open source or closed source. OpenStack is an example of an open source cloud computing platform.

Why do people prefer using open source software?

People prefer open source software to proprietary software for a number of reasons, including:

Control. Many people prefer open source software because they have more control over that kind of software. They can examine the code to make sure it's not doing anything they don't want it to do, and they can change parts of it they don't like. Users who aren't programmers also benefit from open source software, because they can use this software for any purpose they wish - not merely the way someone else thinks they should.

Training. Other people like open source software because it helps them become better programmers. Because open source code is publicly accessible, students can easily study it as they learn to make better software. Students can also share their work with others, inviting comment and critique, as they develop their skills. When people discover mistakes in programs' source code, they can share those mistakes with others to help them avoid making those same mistakes themselves.

Security. Some people prefer open source software because they consider it more secure and stable than proprietary software. Because anyone can view and modify open source software, someone might spot and correct errors or omissions that a program's original authors might have missed. And because so many programmers can work on a piece of open source software without asking for permission from original authors, they can fix, update, and upgrade open source software more quickly than they can proprietary software.

Stability. Many users prefer open source software to proprietary software for important, long-term projects. Because programmers publicly distribute the source code for open source software, users relying on that software for critical tasks can be sure their tools won't disappear or fall into disrepair if their original creators stop working on them. Additionally, open source software tends to both incorporate and operate according to open standards.

Doesn't "open source" just mean something is free of charge?

No. This is a common misconception about what "open source" implies, and the concept's implications are not only economic.

Open source software programmers can charge money for the open source software they create or to which they contribute. But in some cases, because an open source license might require them to release their source code when they sell software to others, some programmers find that charging users money for software services and support (rather than for the software itself) is more lucrative. This way, their software remains free of charge, and they make money helping others install, use, and troubleshoot it.

While some open source software may be free of charge, skill in programming and troubleshooting open source software can be quite valuable. Many employers specifically seek to hire programmers with experience working on open source software.

What is open source "beyond software"?

At Opensource.com, we like to say that we're interested in the ways open source values and principles apply to the world beyond software. We like to think of open source as not only a way to develop and license computer software, but also an attitude.

Approaching all aspects of life "the open source way" means expressing a willingness to share, collaborating with others in ways that are transparent (so that others can watch and join too), embracing failure as a means of improving, and expecting - even encouraging - everyone else to do the same.

It also means committing to playing an active role in improving the world, which is possible only when everyone has access to the way that world is designed.

The world is full of "source code" - blueprints, recipes, rules - that guide and shape the way we think and act in it. We believe this underlying code (whatever its form) should be open, accessible, and shared - so many people can have a hand in altering it for the better.

Here, we tell stories about the impact of open source values on all areas of life - science, education, government, manufacturing, health, law, and organizational dynamics. We're a community committed to telling others how the open source way is the best way, because a love of open source is just like anything else: it's better when it's shared.

UNIT 10: DEVELOPMENT OF SOFTWARE FOR MOBILE DEVICES

10.1. Start-up

Task 1: *Answer these questions.*

1. Do you want to be a developer of software for mobile devices? Why?
2. Which software do you want to develop for mobile devices?

10.2. Reading 1

Task 2: *Read the following text.*

The lifecycle of mobile development is largely no different than the Software Development Lifecycle (SDLC) for web or desktop applications. As with those, there are usually 5 major portions of the process:

(Paragraph 1)

1. **Inception** – All apps start with an idea. That idea is usually refined into a solid basis for an application.
2. **Design** – The design phase consists of defining the app's User Experience (UX) such as what the general layout is, how it works, etc., as well as turning that UX into a proper User Interface (UI) design, usually with the help of a graphic designer.
3. **Development** – Usually the most resource intensive phase, this is the actual building of the application.
4. **Stabilization** – When development is far enough along, QA usually begins to test the application and bugs are fixed. Often times an application will go into a limited beta phase in which a wider user audience is given a chance to use it and provide feedback and inform changes.
5. **Deployment**

Often many of these pieces are overlapped, for example, it's common for development to be going on while the UI is being finalized, and it may even inform the UI design. Additionally, an application may be going into a stabilization phase at the same that new features are being added to a new version.

Furthermore, these phases can be used in any number of SDLC methodologies such as Agile, Spiral, Waterfall, etc. Let’s cover how each of these phases play a part in Mobile Development.

Inception (paragraph 2)

The ubiquity and level of interaction people have with mobile devices means that nearly everyone has an idea for a mobile app. Mobile devices open up a whole new way to interact with computing, the web, and even corporate infrastructure.

The inception stage is all about defining and refining the idea for an app. In order to create a successful app, it’s important to ask some fundamental questions. For example, if you’re developing an app for distribution in a public app store, some considerations are:

- **Competitive Advantage** – Are there similar apps out there already? If so, how does this application differentiate from others?

If you’re intending for the app to be distributed in the enterprise:

- **Infrastructure Integration** – What existing infrastructure will it integrate with or extend?

Additionally, you should evaluate the usage of the app in a mobile form factor:

- **Value** – What value does this app bring users? How will they use it?
- **Form/Mobility** – How will this app work in a mobile form factor? How can I add value using mobile technologies such as location awareness, the camera, etc.?

To help with designing the functionality of an app, it can be useful to define Actors and Use Cases. Actors are roles within an application and are often users. Use cases are typically actions or intents.

For instance, if you're building a task tracking application, you might have two Actors: *User* and *Friend*. A User might *Create a Task*, and *Share a Task* with a Friend. In this case, creating a task and sharing a task are two distinct use cases that, in tandem with the Actors, will inform what screens you'll need to build, as well as what business entities and logic will need to be developed.

If you've captured the appropriate use cases and actors, it's much easier to begin designing an application because you know exactly what you need to design, so the question becomes, how to design it, rather than what to design.

Designing Mobile Applications (paragraph 3)

Once you have a good idea of what it is you want to design, the next step is start trying to solve the User Experience or UX.

UX Design

UX is usually done via wireframes or mockups using tools such as Balsamiq, Mockingbird, Visio, or just plain ol' pen and paper. UX Mockups allow you to quickly design UX without having to worry about the actual UI design.

When creating UX Mockups, it's important to consider the Interface Guidelines for the various platforms that you're designing for. By adhering to platform-specific guidelines, you can ensure that your apps feel at home on each platform. You can find each guide as follows:

1. **Apple** - Human Interface Guidelines
2. **Android** -Design Guidelines
3. **Windows Phone**- Design library for Windows Phone

For example, each app has a metaphor for switching between sections in an application. iOS uses a tabbar at the bottom of the screen, Android uses a tabbar at the top of the screen, and Windows Phone uses the Panorama view:

Additionally, the hardware itself also dictates UX decisions. For example, iOS devices have no physical *back* button, and therefore introduce the Navigation Controller metaphor.

Furthermore, form factor also influences UX decisions. A tablet has far more real estate, so you can fit more information, and often what needs multiple screens on a phone is compressed into one for a tablet. And due to the myriad of form factors out there, there are often mid-size form factors (somewhere between a phone and a tablet) that you may also want to target.

User Interface (UI) Design

Once you've nailed down the UX in your application, the next step is to create the UI design. While UX is typically just black and white mockups, the UI Design phase is where colors, graphics, etc., are introduced and finalized. Spending time on good UI design is important and generally, the most popular apps have a professional design.

As with UX, it's important to understand that each platform has it's own design language, so a well-designed application may still look different on each platform:

Additionally, you can find graphic designer portfolios at sites such as Behance.com and Dribbble.com. Designers from all over the world can be found there, often times in places where the exchange rate is favorable, so good graphic design doesn't necessarily have to cost a lot.

Development (paragraph 4)

The development phase usually starts very early. In fact, once an idea has some maturation in the conceptual/inspiration phase, often a working prototype is developed that validates functionality, assumptions, and helps to give an understanding of the scope of the work.

Stabilization (paragraph 5)

Stabilization is the process of working out the bugs in your app. Not just from a functional standpoint, e.g.: "It crashes when I click this button," but also Usability and Performance. It's best to start stabilization very early within the development process so that course corrections can occur before they become costly. Typically, applications go into *Prototype*, *Alpha*,*Beta*, and *Release Candidate* stages. Different people define these differently, but they generally follow the following pattern:

1. **Prototype** – The app is still in proof-of-concept phase and only core functionality, or specific parts of the application are working. Major bugs are present.
2. **Alpha** – Core functionality is generally code-complete (built, but not fully tested). Major bugs are still present, outlying functionality may still not be present.
3. **Beta** – Most functionality is now complete and has had at least light testing and bug fixing. Major known issues may still be present.
4. **Release Candidate** – All functionality is complete and tested. Barring new bugs, the app is a candidate for release to the wild.

It's never too early to begin testing an application. For example, if a major issue is found in the prototype stage, the UX of the app can still be modified to accommodate it. If a performance issue is found in the alpha stage, it's early enough to modify the architecture before a lot of code has been built on top of false assumptions.

Typically, as an application moves further along in the lifecycle, it's opened to more people to try it out, test it, provide feedback, etc. For instance, prototype applications may only be shown or made available to key stakeholders, whereas release candidate applications may be distributed to customers that sign up for early access.

For early testing and deployment to relatively few devices, usually deploying straight from a development machine is sufficient. However, as the audience widens, this can quickly become cumbersome. As such, there are a number of test deployment options out there that make this process much easier by allowing you to invite people to a testing pool, release builds over the web, and provide tools that allow for user feedback.

Some of the most popular ones are:

1. **Testflight** – This is an iOS product that allows you to distribute apps for testing as well as receive crash reports and usage information from your customers. This is included as part of iTunes connect, and is not available if you are part of an Apple Developer Enterprise membership.
2. **LaunchPad (launchpadapp.com)** – Designed for Android, this service is very similar to TestFlight.
3. **Vessel (vessel.io)** – A service for iOS and Android that lets you monitor usage, track customers and even do A/B testing from inside your app.
4. **hockeyapp.com** - Provides a testing service for iOS, Android and Windows Phone.

Distribution (paragraph 6)

Once you've stabilized your application, it's time to get it out into the wild. There are a number of different distribution options, depending on the platform.

Xamarin.iOS and Objective-C apps are distributed in exactly the same way:

1. **Apple App Store** – Apple's App Store is a globally available online application repository that is built into Mac OS X via iTunes. It's by far the most popular distribution method for applications and it allows developers to market and distribute their apps online with very little effort.

2. **In-House Deployment** – In-House deployment is meant for internal distribution of corporate applications that aren't available publicly via the App Store.

3. **Ad-Hoc Deployment** – Ad-hoc deployment is intended primarily for development and testing and allows you to deploy to a limited number of properly provisioned devices. When you deploy to a device via Xcode or Xamarin Studio, it is known as ad-hoc deployment.

Task 3: *Answer these questions about the text.*

1. How many major phases are there in the lifecycle of mobile development? What are they?
2. What are you interested in when you develop a public app?
3. How do fundamental questions play a role in developing app?
4. Why should you define actors and use cases when you creat an app?
5. What are actors within an app?
6. Which tools may you use to design UX?
7. What is switching between sections different from iOS and Android?
8. Which graphic designer portfolios may you find at websites?
9. What do you do in the Stabilization phase?
10. How many ways of distribution does the text mention? What are they?

Task 4: *Look back the text and find words that have a similar meaning to:*

1. contains (paragraph 1)
2. stage (paragraph 4)
3. creating (paragraph 2)
4. be expensive (paragraph 3)
5. errors (paragraph 5)

Task 5: *Decide whether the following statements are true (T) or false (F) in relation to the information in the text. lf you think a statement is false, change it to make it true.*

1. The lifecycle of mobile development is exactly similar to the Software Development Lifecycle for web or desktop applications.
2. Phases in the lifecycle of mobile development may be done insequently.
3. Use cases are users within an app.
4. According to the text two use cases Creat a Task and Share a Task in task tracking app are different.
5. Windows Phone uses a tabbar at the bottom of the screen to switch between sections.
6. The development phase usually starts quite lately.

10.3. Reading 2

While developing mobile applications isn't fundamentally different that traditional web/desktop development in terms of process or architecture, there are some considerations to be aware of. Let's take a look at common considerations and then we'll examine platform specific considerations.

Common Considerations

Multitasking

There are two significant challenges to multitasking (having multiple applications running at once) on a mobile device. First, given the limited screen real estate, it is difficult to display multiple applications simultaneously. Therefore, on mobile devices only one app can be in the foreground at one time. Second, having multiple applications open and performing tasks can quickly eat battery power.

Each platform handles multitasking differently, which we'll explore in a bit.

Form Factor

Mobile devices generally fall into two categories, phones and tablets, with a few crossover devices in between. Developing for these form factors is generally very similar, however, designing applications for them can be very different. Phones have very limited screen space, and tablets, while bigger, are still mobile devices with less screen space than even most laptops. Because of this, mobile platform UI controls have been designed specifically to be effective on smaller form factors.

Device and OS Fragmentation

It's important to take into account different devices throughout the entire software development lifecycle:

1. **Conceptualization and Planning** – Because different devices can have different hardware and device features, you must keep in mind that an application that relies on certain features may not work properly on certain devices. For example, not all devices have cameras, so if you're building a video messaging application, some devices may be able to play videos, but not take them.

2. **Design** – When designing an application's User Experience (UX), different screen ratios and sizes should be kept in mind. Additionally, when designing an application's User Interface (UI), different screen resolutions should be considered.

3. **Development** – When using a feature from code, the presence of that feature should always be tested first. For example, before using a device feature, such as a camera, always query the OS for the presence of that feature first. Then, when initializing the feature/device, make sure to request currently supported from the OS about that device and then use those configuration settings.

4. **Testing** – It's incredibly important to test your application early and often on actual devices. Even devices with the same hardware specs can vary widely in their behavior.

Limited Resources

Mobile devices get more and more powerful all the time, but they are still mobile devices that have limited capabilities in comparison to desktop or notebook computers. For instance, desktop developers generally don't worry about memory capacities; they're used to having both physical and virtual memory in copious quantities, whereas on mobile devices you can quickly consume all available memory just by loading a handful of high-quality pictures.

Additionally, processor-intensive applications such as games or text recognition can really tax the mobile CPU and adversely affect device performance.

Because of considerations like these, it's important to code smartly and to deploy early and often to actual devices in order to validate responsiveness.

iOS Considerations

Multitasking

Multitasking is very tightly controlled in iOS, and there are a number of rules and behaviors that your application must conform to when another application comes to the foreground, otherwise your application will be terminated by iOS.

Device-Specific Resources

Within a particular form factor, hardware can vary greatly between different models. For instance, some devices have a rear-facing camera, some also have a front-facing camera, and some have none.

Some older devices (iPhone 3G and older) don't even allow multitasking.

Because of these differences between device models, it's important to check for the presence of a feature before attempting to use it.

OS Specific Constraints

In order to make sure that applications are responsive and secure, iOS enforces a number of rules that applications must abide by. In addition to the rules regarding multitasking, there are a number of event methods out of which your app must return in a certain amount of time, otherwise it will get terminated by iOS.

Also worth noting, apps run in what's known as a Sandbox, an environment that enforces security constraints that restrict what your app can access. For instance, an app can read from and write to its own directory, but if it attempts to write to another app directory, it will be terminated.

Android Considerations

Multitasking

Multitasking in Android has two components; the first is the activity lifecycle. Each screen in an Android application is represented by an Activity, and there is a specific set of events that occur when an application is placed in the background or comes to the foreground. Applications must adhere to this lifecycle in order to create responsive, well-behaved applications. For more information, see the Activity Lifecycle guide.

The second component to multitasking in Android is the use of Services. Services are long-running processes that exist independent of an application and are used to execute processes while the application is in the background. For more information see the Creating Services guide.

Many Devices & Many Form Factors

Unlike iOS, which has a small set of devices, or even Windows Phone, which only runs on approved devices that meet a minimum set of platform requirements, Google doesn't impose any limits on which devices can run the Android OS. This open paradigm results in a product environment populated by a myriad of different devices with very different hardware, screen resolutions and ratios, device features, and capabilities.

Because of the extreme fragmentation of Android devices, most people choose the most popular 5 or 6 devices to design and test for, and prioritize those.

Security Considerations

Applications in the Android OS all run under a distinct, isolated identity with limited permissions. By default, applications can do very little. For example, without special permissions, an application cannot send a text message, determine the phone state, or even access the Internet! In order to access these features, applications must specify in their application manifest file which permissions they would like, and when they're being installed; the OS reads those permissions, notifies the user that the application is requesting those permissions, and then allows the user to continue or cancel the installation. This is an essential step in the Android distribution model, because of the open application store model, since applications are not curated the way they are for iOS, for instance. For a list of application permissions, see the Manifest Permissionsreference article in the Android Documentation.

Windows Phone Considerations

Multitasking

Multitasking in Windows Phone also has two parts: the lifecycle for pages and applications, and background processes. Each screen in an application is an instance of a Page class, which has events associated with being made active or inactive (with special rules for handling the inactive state, or being "tombstoned”). For more information see the Execution Model Overview for Windows Phone documentation.

The second part is providing background agents for processing tasks even when the application is not running in the foreground. More information on scheduling periodic tasks or creating resource intensive background tasks can be found in the Background Agents Overview.

DEVICE Capabilities

Although Windows Phone hardware is fairly homogeneous due to the strict guidelines provided by Microsoft, there are still components that are optional and therefore require special considering while coding. Optional hardware capabilities include the camera, compass and gyroscope. There is also a special class of low-memory (256MB) that requires special consideration, or developers can opt-out of low-memory support.

Database

Both iOS and Android include the SQLite database engine that allows for sophisticated data storage that also works cross-platform. Windows Phone 7 did not include a database, while Windows Phone 7.1 and 8 include a local database enginethat can only be queried with LINQ to SQL and does not support Transact-SQL queries. There is an open-source port of SQLite available that can be added to Windows Phone applications to provide familiar Transact-SQL support and cross-platform compatibility.

Security Considerations

Windows Phone applications are run with a restricted set of permissions that isolates them from one another and limits the operations they can perform. Network access must be performed via specific APIs and inter-application communication can only be done via controlled mechanisms. Access to the file-system is also restricted; the Isolated Storage API provides key-value pair storage and the ability to create files and folders in a controlled fashion (refer to the Isolated Storage Overviewfor more information).

An application's access to hardware and operating system features is controlled by the capabilities listed in its manifest file (similar to Android). The manifest must declare the features required by the application, so that users can see and agree to those permissions and also so that the operating system allows access to the APIs. Applications must request access to features like the contacts or appointments data, camera, location, media library and more. See Microsoft's Application Manifest File documentation for additional information.

Task 6: *Answer these questions about the text.*

1. Why an mobile app can be in foreground at one time?
2. What is the 2nd challenge to multitasking on a mobile device?
3. How many categories of mobile devices are usually there? What are they?
4. How is difference between sizes of mobile screen and tablet screen?
5. What do you control multitasking in iOS by?
6. How many components are there to multitasking in android? What are they?
7. How many parts does Multitasking in Windows Phone have? What are they?
8. Which database engine does Android include?

Task 7: *Decide whether the following statements are true (T) or false (F) in relation to the information in the text. lf you think a statement is false, change it to make it true.*

1. There are more than one significant challenge to multitasking on a mobile device.

2. Designing apps for phones and tablets is generally the same.

3. Tablet screen space is less limited than laptop screen.

4. Laptops'memory capacities are limited than mobiles'

5. Windows Phone 7 included SQLite database.

10.4. Speaking

Task 8: *In groups or pairs talk about what you are interested in when you develop a public app and why?*

Task 9*:* *In groups or pairs discuss about some considerations to be aware of developing mobile applications*.

10.5. Writing

Task 10: *Read the text carefully and write a summary of about 100 -150.*

10.4. Language Focus

Subordinate clauses

A subordinate clause (or dependent clause) is a clause that cannot stand alone as a complete sentence because it does not express a complete thought.

Ex: Because she was tired

A subordinate clause always begin with subordinating word, or subordinator. There are different kinds of subordinators. Time subordinators begin a clause that tells *when* something happens (after, before, until, when, while…). Reason subordinators begin a clause that tells *why* something happens (because, since, as). Place subordinators begin a clause that tells *where* something happens or *where* something located (where, wherever)

Types of Subordinate Clause

- *The Adverbial Clause:* An adverb clause is a group of words that work as an adverb in a sentence, answering questions asking “where?”, “when,” “how?” and “why?” They begin with a subordinate conjuction.

Ex: I fished **until the sun went down**.

(The subordinate clause "until the sun went down" modifies the verb "fished." It is an adverbial clause.)

- *The Adjective Clause:* Adjective clauses are groups of words that act as an adjective in a sentence. They have a pronoun (who, that, which) or an adverb (what, where, why) and a verb

Ex: The bull **that charged us** is back in the field.

(The subordinate clause "that charged us" describes "the bull." It is an adjective clause.)

- *The Noun Clause:* A noun clause is a group of words that acts as a noun in a sentence. They begin with relative pronouns like “how,” “which,” “who,” or “what,” combined with a subject and predicate

Ex: **Whoever dislikes the new timings** is more than welcome to leave.

(The subordinate clause "Whoever dislikes the new timings" is the subject of this sentence. It is a noun clause.)

When you attach a subordinate clause in front of a main clause, use a comma, like this:

Because she was tired, Anna left the party early.

When you attach a subordinate clause at the end of a main clause, you will generally use no punctuation, like this:

Anna left the party early because she was tired.

Further Reading

Reading : *Development Process in Embedded Software Development*

Over the past few years, the functional requirements of systems comprised of software have increased extensively, due to the advancement of various technologies used in devices. This trend has led the development of embedded software to also expand in scale in order to meet the ever-growing functional needs. In earlier days, the developers of embedded software did not have to be that conscious about development process to build the software required to be embedded in the final product, since their scope of development was relatively limited. But due to the recent expansion in scale of software development, numerous problems attributable to embedded software or embedded system have come to surface. As a result, more and more attention is given now to improve the development process to address these emerging problems. Current Status of Development Process The following lists the possible causes of various issues arising from the expansion of scale of development and increased complexity of organizations involved in the development that are actually faced in the workplaces where embedded software is developed:

1. Development process is not clearly defined in the organization in charge of development.
2. The development process adopted by the organization is neither full-fledged (some aspects are missing) nor definitive (some parts remain ambiguous).
3. Only a portion of the development process is considered. The activities and tasks necessary to complete the entire development process are not fully covered. These factors, among others, tend to adversely affect the quality of the embedded system.

Purpose of Development Process Guide for Embedded Software

This guidebook intends to improve the current conditions and promote efficient development of highquality embedded software by providing the crucial elements of the development process in an orderly manner. The set of information provided systematically in this guidebook combines the knowledge and expertise accumulated and put into practice by the embedded software developers in Japan with information referenced from relevant international standards (i.e.: ISO/IEC12207, 15288) established under the agreement of global interest groups based on past experiences in software development. Moreover, this guidebook (ESPR Ver.2.0) introduces two additional elements in embedded software development process that have not been discussed in the previous version (ESPR Ver.1.0), which are as follows:

1. Process equivalent to the upstream phase of embedded software (system) development that partly takes into consideration of the system viewed from the standpoint of software to supplement the perception of embedded system as a product;

2. Set of requirements to develop a safe system and basic operations performed safely by the developed system that have been defined from the standpoint of developing an “embedded system that can be used safely and without anxiety”, using reliable source information like international standards on system safety (IEC61508) for reference. This guidebook is intended to serve as a useful reference material for everyone involved in embedded software development.

Features of Development Process Guide for Embedded Software

Outlined below are the main features of “Development Process Guide for Embedded Software”:

Feature 1: Organized description on more specific low-leveled development processes, using the international standards on system development process as the reference;

Feature 2: Organized description on work items that should be carried out in embedded software (system) development and precautions that the developers should watch out for;

Feature 3: Explicit description of inputs and outputs to accomplish individual tasks and concrete explanation of the work contents using expressions that are easy to understand.

TỪ VỰNG

A

acceleration card (n)	card gia tốc
access time (n)	thời gian truy cập
acoustic coupler (n)	bộ nối âm thanh
ADA /'eida/	ngôn ngữ Ada
additive colour (n)	màu bổ sung
Adobe Systems	chương trinh Adobe
algorithm (n)	thuật toán, thuật giải
alias (n)	bí danh
animation	hoạt hình
applets	ứng dụng ký sinh
application generator (n)	một công cụ cho phép các ứng dụng được tạo ra một cách tương tác
application program (n)	chương trình ứng dụng
arithmetic logic unit (ALU) (n)	đơn vị logic số học
arrow keys (n)	phím mũi tên
assembler	chương trình (bộ) dịch hợp ngữ
assembly language (n)	hợp ngữ (ngôn ngữ Assembly)
AT-compatible (adj)	tương thích AT
attachment (n)	file đính kèm
attributes (n)	thuộc tính
authentication	sự thẩm định quyền, sự xác thực
avatar (n)	hình ảnh tượng trưng

B

backbone (n)	mạng xương sống, mạng trục chính

backing store (n)	(vùng, thiết bị) lưu trữ phụ; lưu trữ hỗ trợ
back-up (n)	sao chép dự phòng, sao lưu
bandwidth (n)	dải tần, dài thông, độ rộng dài thông
batch processing (n)	xử lý nhóm, xử lý theo lô
baud (n)	đơn vị đo tốc độ truyền dữ liệu binary
digit (n)	số nhị phân
binary system (n)	hệ nhị phân
bit-mapped display (n)	ánh xạ bít, sự hiển thị được tạo bởi các bít
bookmark (n)	đánh dấu văn bản, dấu sách
boot (v)	khởi động, nạp hệ điều hành
bridge (n)	cầu nối
browser (n)	trình duyệt
bug (n)	lỗi máy tính
bulletin board (n)	bản tin
bus (n)	kênh, tuyến

C

cathode ray tube (n)	ống tia âm cực, đèn hinh
cell (n)	ô, ô nhớ
central processing unit (CPU) (n)	đơn vị xử lí trung tâm
channel (n)	kênh
character (n)	kí tự
chip (n)	chip, mạch tổ hợp
client program (n)	chương trình khách hàng
clipart (n)	hình mẫu
clipboard (n)	bảng ghi tạm, trích giữ, khay
colour palette (n)	bảng màu
command (n)	lệnh
communications port (n)	cổng truyền thông

compact disk (n)	đĩa compact, đĩa CD
compatibility (n)	độ tương thích
compiler (n)	trình biên dịch,' bộ biên dịch
compression (n)	nén dữ liệu
configuration (n)	cấu hình
control unit (CU) (n)	đơn vị điều khiển
cookies (n)	các file nhỏ mã một máy chủ dùng để kiểm soát các trang web được truy cập
co-processor (n)	bộ đồng xử lý

D

data communication system (n) hệ thống truyền thống dữ liệu

data transfer rate (n)	tốc độ truyền dữ liệu
debug (v)	gỡ rối
debugger (n)	chương trình gỡ rối
decryption (n)	sự giải mã
default font (n)	phông mặc định
desk accessory (n)	dụng cụ văn phòng, bảng phụ kiện

desktop publishing (DTP) (n) chế bản điện tử, chế bàn bằng máy vi tinh

dialog box (n)	hộp thoại
directory (n)	thư mục
EPS format	định dạng EPS
execute (v)	thực thi, chạy, xử lý
expansion slots (n)	khe cắm mở rộng

F

fault tolerance (n)	khoảng lỗi sai cho phép
field (n)	trường

file compression (n)	nén file
file server (n)	máy chủ file
firewall (n)	bức tường lửa
firmware (n)	phần mềm thường trú được lưu ở trong ROM, phần mềm có tính chất cố định
flame (n)	thông điệp có tinh chất châm chọc, khiêu khích trên Internet flowchart (n) lưu đồ, biểu đồ thông
flush (adj)	không có sự thụt vào ở đầu dỏng
folder (n)	thư mục
font formats	định dạng phông
format (n)	định dạng
fragmentation (n)	sự phân đoạn tệp, chĩa rời tệp
frames (n)	khung, mành
freeware (n)	phần mềm miễn phỉ
function key (n)	phím chức năng

G

gateway (n)	cổng nối
graphics tablet (n)	bàn vẽ đồ họa
graphical user interface (GUI) (n)	giao diện người sừ dụng đồ họa
graphic package (n)	phần mềm đồ họa

H

hexadecimal system (n)	hệ đếm 16
high-level language (n)	ngôn ngữ cấp cao
home page (n)	1 trang chính (trang khởi đầu) *2* trang khởi động mặc định

host (n)	máy chủ
hyperlink (n)	siêu liên kết
hypermedia (n)	một chương trình (giảng dạy) kết hợp giữa liên kết đa văn bản và đa phương tiện
hypertext (n)	siêu văn bản, văn bản liên kết
hyphenation (n)	sự tách từ dùng dấu gạch nối

I

icon (n)	biểu tượng
image map (n)	ánh xạ ảnh
indentation (n)	sự thụt vào, viết thụt vào
INITs (n)	Trong môi trường Macintosh, đây là một chương trình tiện ích thực hiện trong khi một hệ đang khởi động hoặc khởi động lại, như SuperClock hiển thị ngày và giờ hiện hành của hệ thống trong dải trình đơn, hoặc Adobe Type Manager dùng công nghệ phông chữ hình bao để hiện thị các phông chữ màn hình của Adobe. Chú ý: Giống như các chương trình TSR (termiate-and-stay-resident) trong môi trường IBM, các INIT có thể tranh chấp lẫn nhau và làm đỗ vỡ hệ thống. Nếu hệ thống của bạn chạy có vẻ chập choạng, thì hãy lấy từng INIT một ra khỏi System Folder và khởi động lại hệ thống; bạn có thể xác định được một INIT nào đỏ là thủ phạm.
ink-jet printer (n)	máy in phun mực
input devices (n)	thiết bị nhập dữ liệu
integrated package (n)	gói phần mềm tích hợp

interface (n)	giao diện
internal memory (n)	bộ nhớ trong
internet relay chat (n)	xem Chat (hội thảo thông qua tiếp vận Internet)
internet telephone (n)	điện thoại Internet
internet TV (n)	TV Internet
interpreter (n)	bộ diễn giải
intranet (n)	mạng nội bộ công ty
IP address (n)	địa chỉ giao thức Internet

J

Java (n)	ngôn ngữ Java
joystick (n)	gậy điều khiển,
justification (n)	căn chỉnh

K

kerning (n)	sự co dãn
key pals (n)	bạn trao đổi thư điện tử
keyboard (n)	bàn phím
kilobit (n)	1024 bít thông tin
kilobyte (n)	kilobyte

L

laser printer (n)	máy in laze
lightpen (n)	bút quang
link (n)	liên kết
list server	xem mailing list
load (v)	tải

local area network (LAN) (n)	mạng cục bộ
login (n)	đăng nhập
log on (v)	mở máy, nối máy vào hệ thống
log off (v)	tắt máy
low-level language (n)	ngôn ngữ cấp thấp

M

machine code (n)	mã máy
macro (n)	lệnh macro
mailing list (n)	danh sách địa chỉ thư
mail merging (n)	trộn thư
mainframe (n)	máy tính lớn
main memory (n)	bộ nhớ chính
menu bar (n)	thanh menu
microchip (n)	chip vi xử lý
microprocessor (n)	bộ vi xử lý
mnemonic (n)	chữ viết tắt cho dễ nhớ
modem (n)	bộ điều chế, modem
monitor (n)	màn hình, màn hiển thị
multimedia (n)	đa phương tiện
multitasking (n)	đa nhiệm, xử lý đa nhiệm

N

netiquette (n)	nghi thức mạng
network (n)	mạng
newsgroups (n)	nhóm tin
newsreader (n)	chương trình đọc và gửi tin
node (n)	nút, mắt

O

object language (n) ngôn ngữ đích, ngôn ngữ đối tượng

object-oriented programming (n) lập trình hướng đối tượng

octal system (n) hệ đếm 8

operating system (n) hệ điều hành

optical character recognition (n) nhận dạng ký tự bàng quang học

optical disk (n) đĩa quang

optical fibre cable (n) dây cáp quang

output devices (n) thiết bị đầu ra, thiết bị xuất

P

page description language (n) ngôn ngữ mô tả trang

palmtop (n) máy tính bỏ túi, máy tinh cầm tay

parallel port (n) cổng song song

Pascal ngôn ngữ lập trình Pascal

patterns (n) mẫu ký tự

peripherals (n) thiết bị ngoại vi

phosphor (n) photpho

photosetter (n) thiết bị tạo ảnh

pica (n) 1 pica - 4,33 mm

piracy (n) sự ăn cắp bản quyền

pixel (n) điểm ảnh, phân tử ảnh

platform (n) kiểu hệ thống máy tính, một loại hệ thống máy tính

plot (v) vẽ, dựng (đồ thị)

plotter (n) máy vẽ

plug-ins (n) chương trình đặc biệt để mở rộng tính năng của trình duyệt sao cho có thể xử lý

	âm thanh, hình ảnh, hoạt hình, hình không gian 3 chiều
point (n)	điểm
pointer (n)	con trỏ
port (n)	cổng
PostScript (n)	ngôn ngữ mô tả trang
primary colours (n)	màu sơ cấp, màu nguyên thủy
primitives (n)	nguyên thủy
printer driver (n)	trình điều khiển máy in
programming (n)	lập trình
protocol (n)	giao thức
proxy (n)	một máy chủ đặc biệt dùng để điều khiển việc lưu thông giữa mạng Internetvà mạng tư nhân

Q

quit (v)	thoát, ra khỏi

R

random access memory (RAM) (n)	bộ nhớ truy cập ngẫu nhiên
RAM cache (n)	bộ nhớ truy cập nhanh
read only memory (ROM) (n)	bộ nhớ chỉ đọc
real time (adj)	thời gian thực
reboot (v)	khởi động lại máy
record (n)	mẩu tin, bản ghi
recording heads (n)	đầu ghi
refresh rate (n)	tốc độ làm tươi lại
register (n)	thanh ghi
resolution (n)	độ phân giải

router (n) bộ dẫn đường

routine (n) thường trình thủ tục

ruler icons (n) các biểu tượng trên thước

S

save /seiv/ (v) lưu

scale (v) co dãn

scanner (n) máy quét

Scrapbook (n) Trong Macintosh, đây là một dụng cụ văn phòng dùng để giữ các hình đồ hoạ hay dùng, như tiêu đề trên đầu thư của công ty chẳng hạn, mà sau đó bạn có thể chèn vào các tài liệu mới khi cần thiết.

screen saver (n) trình tiện ích tiết kiệm màn hình

scroll (v) cuộn

search engine (n) công cụ tìm kiếrn

secondary memory(n) xem backing store.

sector (n) cung, sector

serial port (n) cổng nối tiếp

shareware (n) phần mềm cổ đông, phần mềm tự động

silicon chip (n) chip làm bằng Silicon

single in-line memory modules (SIMMs) (n) môđun nhớ một hàng chân

smileys (n) ký hiệu thư điện từ

snail mail (n) dịch vụ bưu điện (chuyển thư rất chậm)

software (n) phần mềm

source program (n) chương trình nguồn

spell checker (n) bộ kiểm tra chính tà

spooler (n) chương trình Spooler (một chương trình thường nằm trong số những trình tiện ích của hệ điều hành, dùng để hướng các lệnh in cất tạm vào

	một tệp trên đĩa hoặc trong RAM thay vì vào máy in, và sau đó sẽ phát các lệnh in này ra khỏi bộ xử lí trung tâm CPU
spreadsheet (n)	bảng tính
style (n)	kiểu dáng
subroutine (n)	chương trình con, thủ tục phụ

T

tags (n)	các mã dùng trong file HTML để đánh dấu điểm đầu, cuối hoặc vị trí chính xác của một đặc tính đang format hoặc một đường link trên trang
teletext (n)	dịch vụ Teletext - truyền văn bản từ xa
telex (n)	dịch vụ chuyển đổi tự động khi sử dụng thiết bị đồ họa từ xa
Telnet (n)	Trong các máy dựa vào hệ điều hành UNIX và được nối vào mạng Internet, đây là một chương trình cho phép người sử dụng tiến hành thâm nhập vào các máy tính ở xa thông qua các ghép nối TCP/IP
terabyte (n)	1,024 gigabytes,
terminal	đầu cuối, thiết bị cuối
thesaurus (n)	từ điển chuyên biệt

three-dimensional (3-D) (adj) không gian 3 chiều

token (n)	thẻ bài, hiện dạng
track (n)	rãnh ghi
trackball (n)	quả cầu đánh dấu, bóng xoay
transceiver (n)	máy thu phát
transformation (n)	phép biến đỗi, phép chuyển dạng

two-dimensional (2-D) (adj) 2 chiều, không cỏ độ sâu

typeface (n)	kiểu chữ
typeset (v)	sắp chữ

U

UNIX (n)	hệ điều hành UNIX
update (v)	cập nhật
upgrade (v)	nâng cấp
upload (v)	tải lên
Usenet (n)	hệ thống Usenet, mạng người dùng
user-friendly (adj)	thân thiện với người dùng
user interface (n)	giao diện người sử dụng
utility (n)	tiện ich

V

videotext (n)	văn bản video
virtual interface (n)	giao diện ảo
virtual reality (n)	thực tế ảo, hiện thực ảo
virus (n)	virút máy tính

W

Web site (n)	vị trí
web wide area network (WAN) (n)	mạng toàn cục
window (n)	cửa sổ
window-based (adj)	dùng cửa sổ
word processor (n)	bộ xử lý văn bản
word wrap (n)	ngắt từ
workstation (n)	trạm công tác, trạm làm việc

TỪ VỰNG (THAM KHẢO)

A

a clock	đồng hồ đo
Academic	Trừu tượng, không thực tế, học thuật
academics (n)	học thuật, hàn lâm
accelerator (n)	máy gia tốc
accept(v)	chấp nhận, tiếp nhận
access time (n)	thời gian truy cập
accessible (adj)	có thể truy cập
accessories (n)	phụ kiện
account(n)	tài khoản
accumulator (n)	thanh tổng, bộ tích lũy, bộ cộng
acronym	cấu tạo bằng những chữ đầu
activated	kích hoạt
activity	hoạt động
adapt(v)	thích ứng
adapter (n)	bộ điều hợp, bộ thích ứng
adaptive technology (n)	công nghệ thích ứng
adjust (v)	điều chỉnh
administer (v)	quản trị
administrative	thuộc về hành chính
Advantage	lợi thế, điểm mạnh
aerial (n)/antenna	ăngten chảo
affect (v)	tác động, ảnh hưởng
alert (n)	báo động
alleviate (v)	làm giảm bớt, nhẹ bớt
Amount	khối lượng

analogue signal (n)	tín hiệu tương tự
Animation	Tính linh hoạt, sinh động
anti-virus software (n)	phần mềm chống virut
applet (n)	chương trình ứng dụng của Java
Application	Trình ứng dụng, áp dụng
arcs (n)	hình cung
arithmetic logic unit (ALU)	đơn vị số học logic
assembler (n)	bộ dịch hợp ngữ
assembly language (n)	hợp ngữ
attach	gắn, đính kèm
attachment (n) (file)	đính kèm
attention (n)	sự lưu ý, sự chú ý
attribute	quy cho, thuộc tính
audio amplifier (n)	bộ khuếch đại âm thanh
automatic	tự động
automatic cash dispenser (n)	máy rút tiền tự động
availability	có hiệu lực, có giá trị
axis (axes)	trục

B

bandwidth (n)	băng thông
be deleted	bị xoá
be expanded	mở rộng, phát triển
bear(v)	mang, chịu đựng
beneath	ở bên dưới
binary notation (n)	biểu diễn nhị phân
bit-mapped (adj)	ánh xạ bit
blind user (n)	người khiếm thị
block (v)	ngăn chặn, phong tỏa

bold (adj)	tô đậm
bootable (adj)	có thể khởi động
breath control (n)	sự điều khiển bằng hơi thở
bubble-jet printer (n)	máy in phun bọt
buffer (n)	bộ đệm, bộ nhớ trung gian
built-in (adj)	gắn liền
bulletin board system (BBS) (n)	hệ thống bảng tin
button (n)	nút

C

cable	dây cáp
cache (n)	bộ nhớ đệm có tốc độ cao
cache memory	bộ nhớ truy cập nhanh
capacity (n)	dung tích, dung lượng
carry out	thực hiện
cartridge (n)	cuộn, hộp
cathode ray tube (n)	ống tia âm cực, đèn hình
celebrity (n)	danh nhân
cell	ô, ngăn, khối
central processing unit (CPU)	bộ xử lý trung tâm
certain	nhất định
character (n)	ký tự
click (v)	nháy, kích
client	khách hàng (đối tác)
clone (v)	nhái, bắt chước
collaborate (v)	cộng tác
color filter (n)	bộ lọc màu
color palette (n)	bảng màu
column (n)	cột

commercial online service (n) dịch vụ thương mại trực tuyến

compatibility (n)	sự tương thích
compatible (adj)	tương thích
competition	cuộc thi đấu
compilation (n)	sự biên dịch
compiler (n)	trình biên dịch
component	thành phần
compression (n)	nén

computer-aided design (CAD) (n) phần mềm thiết kế và vẽ bằng máy tính

computer-aided engineering (CAE) (n) kỹ nghệ dựa trên máy tính

computer-aided manufacturing software (n) phần mềm sản xuất hỗ trợ bằng máy tính

computerize (n)	máy tính hóa

conferencing software (n) phần mềm hội thảo

configuration (n)	cấu hình
conform	tuân theo một tiêu chuẩn, quy tắc
connect	kết nối với cái gì
consistency (n)	tính kiên định
consummption	sự tiêu tốn

continuous sequence (n) trình tự liên tục

control unit (n)	đơn vị điều khiển
conversion (n)	sự chuyển đổi
convert	chuyển đổi
coordinate	phối hợp
cost-effective (adj)	tiết kiệm, có lợi
crisp (adj)	sinh động
crucial data (n)	dữ liệu quan trọng
current	hiện tại
cursor	con trỏ

D

data transfer rate (n)	tốc độ truyền dữ liệu
database (n)	cơ sở dữ liệu
decompression (n)	giải nén
demanding	đòi hỏi
density (n)	mật độ
designate (v)	chỉ định
desktop	màn hình
desktop publishing (n)	chế bản điện tử
device-independent (adj)	tính độc lập thiết bị
diagram (n)	lược đồ
dialog box (n)	hộp thoại
digital camera	máy quay phim
digitize (v)	số hóa
dimension (n)	chiều
directory (n)	thư mục
disadvantage (n)	nhược điểm
discount (n)	khấu trừ
disk drive	ổ đĩa
dispense	phân phối
display	hiển thị
display adaptor (n)	bộ thích ứng hình ảnh
distinct	riêng, khác biệt
distinguish (v)	phân biệt
do back up	sao lưu lại dữ liệu
dot	điểm
dot-matrix printer (n)	máy in ma trận điểm
double-click (v)	nháy đúp

drag (v)	kéo
drawback (n)	nhược điểm
drive mechanism (n)	cơ cấu 0 đĩa
drug-detecting test (n)	kiểm tra dopping
duplicate (v)	nhân bản, sao y

E

edge	lợi thế, lưỡi (dao), rìa
effective	có hiệu quả, có hiệu lực
electron beam (n)	chùm tia điện từ
electron gun (n)	súng điện tử
eliminate (v)	khử, loại bỏ
email privacy (n)	tính riêng tư của thư tín
emboss (v)	chạm nổi
emit (v)	bức xạ
emitted	phát ra
emphasis (n)	nhấn mạnh, tập trung
emulate (v)	bắt chước
enable	cho phép
encode (v)/ decode	mã hóa/ giải mã
encryption (n)/decryption (n)	mật mã/ giải mật
encyclopedia (n)	bách khoa toàn thư
equation (n)	phương trình
equivalent (adj)	tương đương
erase (v)	tẩy, xóa
evolve (v)	phát triển, tiến hóa
examine	kiểm tra
excessive	quá mức, thái quá
execute (v)	xử lý, thực thi

expansion slot (n)	khe cắm mở rộng
extra	thêm
extract	rút ra

F

facilitate (v)	làm cho dễ dàng, thuận tiện
fax (n)	máy fax
fibre-optic cable (n)	cáp quang
figure (n)	số liệu, con số
file (n)	tệp
financial transaction	giao dịch tài chính
firewall (n)	bức tường lửa
firmware (n)	chương trình cơ sở (phần sụn)
fit(v)	vừa, khít
fixed	cố định
flatbed scanner (n)	máy quét hình phẳng
flexible (adj)	dẻo, linh hoạt
flicker (v)	nhấp nháy
floppy disk (n)	đĩa mềm
folder (n)	thư mục
force	lực, trường
formula (n)	công thức
frequency	tần số
fuel	nhiên liệu
function	chức năng

G

gadget(n)	vật dụng

gateway (n) cổng kết nối

general public license (n) bàn quyền dùng chung (mở)

generally nói chung

generate tạo ra

geometric (adj) thuộc hình học

graphics adaptor (n) bộ thích ứng đồ họa

graphics tablet bảng đồ hoạ

grid khung lưới

H

hacker (n) tin tặc, hắc khách

halftone (n) ảnh bán sắc

hardware phần cứng

high-level language (n) ngôn ngữ lập trình bậc cao

hold (held) giữ

horizontal ngang

hypertext (n) siêu văn bản

hypertext markup language (n) ngôn ngữ soạn thảo siêu văn bản

hyphenation (n) sự tách từ dùng dấu gạch ngang

I

icon (n) biểu tượng

illustration (n) minh họa

image ảnh

image-capture software (n) phần mềm nắm bắt hình ảnh

imagesetter (n) thiết bị tạo ảnh

immediate tức thời

implement (v) thực hiện, chạy, thực thi

imply	gợi ý
include	chứa, bao hàm, bao gồm
indent(n)	sự thụt đầu dòng
index (n)	bảng chỉ mục
industry	công nghiệp, kỹ nghệ
infiltrate (v)	xâm nhập
influential	có ảnh hưởng
ink-jet printer (n)	máy in phun mực
innovative (adj)	cải tổ, tiến hoá
input device (n)	thiết bị đầu vào
install	cài đặt
instead of	thay vì
instruction (n)	lệnh, chì dẫn
instruction register	thanh ghi cấu trúc
integrated circuit (n)	mạch tích hợp, IC
intensity (n)	cường độ
interact (v)	tương tác
internal memory (n)	bộ nhớ trong
internal modem	modem trong
internet protocol (n)	giao thức Internet
internet service provider (n)	nhà cung cấp dịch vụ Internet
interpret	giải thích
interpret (v)	phiên dịch
intersect (v)	giao nhau
interval	khoảng thời gian
intuitive tool (n)	công cụ trực quan
inventory (n)	bảng kiểm kê
invisible	nhìn thấy được
involve	bao hàm

issue (v)	ra (lệnh), phát hành
italic (adj)	in nghiêng

J

Java virtual machine (n)	máy ảo Java
joystick	cần điều khiển

K

keep track of (v)	theo dõi
keyboard	bàn phím

L

laser beam (n)	chùm tia laze
laser printer (n)	máy in laze
launch (v)	khởi động, chạy
layout application (n)	ứng dụng bố cục, trình bày
leap (n)	nhảy, trượt
limitation (n)	hạn chế
line	đường thẳng
liquid-crystal display (n)	màn hình tinh thể lỏng
local area network (LAN) (n)	mạng cục bộ
local bulletin board (n)	bảng tin cục bộ
location (n)	vị trí
logical sequence of statements (n)	trật tự logic của các lệnh
log-in name (n)	tên đăng nhập
look up (v)	tra cứu

M

machine code (n)	mã máy
magnet	từ trường, nam châm
magnetism (n)	từ tính
magnetizable (adj)	(thuộc) từ tính
magneto-optical disk	đĩa quang từ
magnification (n)	phóng đại
mail merge (v)	trộn thư
main memory (n)	bộ nhớ chính
manipulate (v)	vận dụng, chế tác
manufacturing	sự chế tạo, sản xuất
margin (n)	lề
market trend (n)	xu hướng thị trường
mathematical operation	phép tính
measure	đo lường
measurement	sự đo lường
metal detector (n)	thiết bị dò kim loại
microfilm (n)	vi phim
mimic (v)	bắt chước
mix	hỗn hợp
modem (n)	bộ điều chế, modem
module	mô đun
monitor (n)	màn hình
monochrome (n)	đơn sắc
motherboard	bo mạch chủ
multimedia (n)	đa phương tiện
Multitasking	xử lý đa nhiệm
multitasking (adi)	xử lý đa nhiệm

N

Nerve	bộ phận chủ yếu, bộ phần đầu não
nested folder (n)	thư mục lồng nhau
network architecture (n)	kiến trúc mạng
network security (n)	an ninh mạng
newsgroup (n)	nhóm tin, nhóm hội thảo
node(n)	nút
notoriety (n)	sự mang tiếng, tiếng xấu
numerous (adj)	vô số, nhiều

O

object program (n)	chương trình đích
occupy (v)	chiếm
office correspondence (n)	thư tín văn phòng
online (adj)	trực tuyến
online transaction (n)	giao dịch trực tuyến
open source (n)	nguồn mở
optical	quang học
optical drive (n)	đĩa quang
optical technology (n)	công nghệ quang học
optimization (n)	sự tối ưu hóa
output	xuất, đưa ra
overall	toàn bộ

P

page layout(n)	trình bày trang (mi trang)
parameter (n)	tham số
particular stage	thời điểm cụ thể

pass through vượt qua

password (n) mật khẩu

perform thực hiện

peripheral device (n) thiết bị ngoại vi

photosetter (n) thiết bị tạo ảnh

physical structure (n) kết cấu vật thể

pie chart (n) biểu đồ hình tròn

pixel (n) điểm ảnh

platform (n) một kiểu hệ thống máy tính (nền)

plotter printer (n) máy vẽ

point to point protocol (n) giao thức điểm đến điểm

polarizing filter (n) bộ lọc cực

polish (n) bóng bẩy

polygon (n) hình đa giác

pop-up (adj) bật lên

pop-up menu (n) bảng chọn bật ra

PostScript (n) ngôn ngữ đặc tả văn bản

precise chính xác, tỉ mỉ, rõ ràng

preliminary draft (n) bản in thử, bản nháp đầu

presentation package (n) gói phần mềm thuyết trình

primary color (n) màu chính, màu nguyên thủy

primitive (adj) nguyên thủy, ban sơ

problem-oriented (adj) hướng vấn đề

procedure (n) thủ tục

process (v) xử lý

productivity (n) năng suất

professional (adj) chuyên nghiệp

proficient (adj) thành thạo

program counter bộ đếm chương trình

proof reading (n)	đọc sửa
proof(v)	kiểm chứng
propagate (v)	lan truyền, truyền bá
protocol (n)	giao thức, nghi thức
provive	cung cấp cho ai cái gì
pull-down menu (n)	menu thả xuống
pulse (n)	xung

R

RAM (Random access memory) bộ nhớ truy cập ngẫu nhiên

rate	tỷ lệ
real time (n)	thời gian thực
reality (n)	thực tế, thực tiễn
record	ghi
record (n)	bàn ghi, mẩu tin
recreation (n)	tái tạo
rectangle (n)	hình chữ nhật
refresh (v)	làm tươi lại
register (n)	thanh ghi
relay chat (n)	hội thảo trực tuyến
release (v)	thả
rely on	dựa vào
removable	tháo rời được
removable (adj)	mang tính di động, có thể tháo rời
representation (n)	diễn đạt, biểu thị
resolution (n)	độ phân giải
retouch (n)	tô màu
retrieve (v)	truy lục, tìm kiếm
rewritable drive (n)	ổ ghi

rigid (adj) cứng
ROM (Read only memory) bộ nhớ chỉ đọc
rotate (v) quay
routines (n) chương trình con
row (n) hang

S

satellite (n) vệ tinh
Scale Đĩa cân, theo tỷ lệ, địa vị
scanner (n) máy quét
scanning area (n) vùng quét
scroll-bar (n) thanh cuộn
seal (v) gắn, bọc
Search and Replace tìm kiếm và thay thế
sector (n) cung
security (n) an ninh
seek time (n) thời gian tìm kiếm
self-calibrate (v) tự chỉnh
sensate (v) cảm nhận
sequence of instructions (n) dãy lệnh
sequential (adj) trình tự
series of dots chuỗi điểm
server (n) máy chủ
service bureaux (n) văn phòng phục vụ
shareware (n) phần mềm cổ đông
sharp (adj) sắc nét, nhọn
simultaneously (adv) một cách đồng thời
single in-line memory module (SIMM) (n) môđun nhớ một hàng chân
single prompt (n) dấu nhắc đơn

sophisticate làm thiết bị tinh vi, làm giả

source language statements (n) câu lệnh bàng ngôn ngữ nguồn

source program (n) chương trình nguồn

specialize (v) chuyên về

specified lý thuyết, chỉ định(v)

speech-synthesis system (n) hệ thống tổng hợp tiếng nói

spell checker (n) chương trình kiểm tra lồi chính tả

spin (v) quay tròn

split (v) chia, tách

spreadsheet(n) bảng tính

stable (adj) ổn định

stand for thay thế cho, viết tắt của

stereo synthesizer (n) bộ tổng hợp âm

stimulate (v) kích thích

storage device (n) thiết bị lưu trữ

stretch (v) kéo căng

subject to (adj) phụ thuộc vào

subroutine (n) chương trình con

sub-scripted (adj) chi số dưới

substitute (v) thay thế

succession (n) chuỗi, liên tục

suitable thích hợp

supercomputer (n) siêu máy tính

super-scripted (adj) chỉ số trên

supervise giám sát, quản lý

surf(v) lướt

synchronize sự đồng bộ

system command (n) lệnh hệ thống

T

table (n) bảng
tedium (adj) nhạt nhẽo, chán ngắt
teleconferencing (n) hội thảo từ xa
telemarketer (n) nhân viên tiếp thị qua điện thoại
telephone line (n) đường dây điện thoại
teletext (n) truyền văn bản từ
thermal printer (n) máy in nhiệt
thesaurus (n) từ điển chuyên biệt
thread (n) chuỗi, mạch, dòng
three-dimensional (adj) (không gian) ba chiều
three-dimensional graphics (n) đồ họa 3 chiều
timing system (n) hệ thống tính giờ
token (n) mã thông báo
touchscreen màn hình cảm ứng
track (n) rãnh ghi
transaction (n) giao dịch
transceiver (n) máy thu phát
transfer chuyển
transmission control protocol (n) giao thức điều khiến truyền thông
transmit (v) truyền
treat (v) xử lý, đối xử
typeface (n) kiểu chữ

U

underline (adj) gạch chân
unscrupulous (adj) không đắn đo
updated (adj) cập nhật

upload (v)/download đăng tải/ tải xuống

user interface (n) giao diện người dùng

user-defined (adj) (do) người dùng định nghĩa

user-friendly(adj) thân thiện với người dùng

utility (n) tiện ích

V

vast (adj) lớn, khổng lồ

vectorial format (n) định dạng vectơ

verbalize (v) âm thanh hóa

version (n) phiên bản

video graphics array (VGA) bộ điều hợp VGA

videoconferencing (n) hội thảo video

view (n) xem, quan sát

virtual (adj) mang tính ảo

virtual reality (n) hiện thực ảo

visual (adj) trực quan

vital (adj) thiết yếu

voice recognition technology (n)công nghệ nhận dạng giọng nói

voice-recognition (n) nhận dạng tiếng nói

W

warranty (n) bảo hành

Web browser (n) trình duyệt Web

wide area network (WAN) mạng toàn cầu

width (n) độ rộng

wireless smart phone (n) điện thoại thông minh không dây

workstation (n) máy trạm, trạm làm việc

GLOSSARY

A

access connect to, or get (information) from, a system or a database

access request a user request for data from a database

accumulator a register that holds the results of operations performed by the arithmetic portion of the CPU

acoustic coupler a device that converts the digital data of the computer into a sound signal that can be understood and transmitted by a telephone network. The connection is usually made by placing the handset of a telephone into rubber cups containing a microphone and a loudspeaker.

adaptor board a circuit board put in a spare slot in a microcomputer to control tin external device

A/D converter analog-to-digital converter: an electronic circuit that changes analog signals to digital signals

address a location within the memory of a computer

address bus a signal route within a computer dedicated to sending address information. I llis may be a subset of the system bus.

address register a register which stores an address in memory

algorithm a prescribed set of well-defined rules or instructions for the solution to a problem

alphanumeric used to describe data that contains numbers and letters

analog describing a smoothly varying signal that has no discontinuities

analogue *see* analog **analyst** someone responsible for understanding a problem in a business environment and designing a computer system to solve it

android a mobile robot whose structure approximately resembles that of a human

ANSI /'aenzi/ American National Standards Institute: an industry-supported standards organization founded in 1918 that establishes US industrial standards and their correspondence to those established by the International Standards Organization (ISO)

anti-glare shield a protective screen over the front of a computer screen to reduce the amount of reflected light

APL a programming language: originally devised as a mathematical notation and later turned into a language

application(s) program a program written in a high-level language, designed to perform a specific function such as calculate a company's payroll

application software applications programs (i.c. programs that directly meet the needs of the computer user). In contrast, systems software (part of the operating system), although essential, does not, directly meet any specific user needs.

arithmetic-logic unit the component of the CPU which performs the actual arithmetic and logic functions asked for by a program

arithmetic unit *see* arithmetic-logic unit

artificial intelligence the discipline concerned with the building of computer programs that perform tasks requiring intelligence when done by humans

ASCII. American standard code for information interchange: a standard character encoding scheme introduced in 1963. It is a 7-bit code allowing 128 different bit patterns or characters.

assembler a program that takes as Input a program written in assembly language and translates it into machine code

assembly language a human-readable representation of machine-code programs

assignment statement a fundamental statement of most programming languages that assigns a new value to variables

asynchronous describing a form of computer control timing in which a specific operation is begun as soon as a signal is received to indicate that the preceding operation has been completed

AT-compatible describing a computer which can run the same software as the IBM PC model A T

audio board a computer expansion board that allows sound to be recorded and played back by the computer

audio note in multimedia, a digitized audio message that carl be attached to text or graphics

auto-kerning a wordprocessing feature that automatically adjusts the space between the characters of a typeface to give the best-looking lit

automate use automatic equipment and machines to perform an activity previously done by people

automaton a machine capable of operating independently, such as a clothes drier

auto numbering a feature that automatically numbers diagrams, paragraphs, etc., in a document

B

background describing processing which does not involve computer-user interaction. Such processes use spare computer resources to perform low-priority tasks.

backing storage *see* secondary memory

backup *a* copy of a piece of data or a program taken in case something happens to the data or to I he disk on which the original data is stored

bandwidth the difference between the lowest and highest frequency ill a group of frequencies

bar code a machine- readable printed code that consists of parallel bars of varied width and spacing, usually used to code goods

bar code scanner a scanning device that can read bar codes as input

BASIC beginners' all-purpose symbolic instruction code: a programming language developed in the mid-1960s to exploit the capability (new at that time) of the interactive use of a computer from a terminal

batch program a program that runs without any terminal or user interaction. Typically such programs perform large scale updates, produce reports, or handle housekeeping functions. A high priority batch job may be run in foreground.

BCPL/.bi: a programming language used for systems programming

binary adder the portion of the arithmetic-logic unit which performs binary addition and subtraction

binary arithmetic arithmetic done to the base 2 using only 0 mid 1 as its basic digits

binary number a number (0 or 1) used in binary arithmetic

bistable an electronic circuit whose output can have one of two stable states, i.e. on or off

bit binary digit, holding the value 0 or 1: the smallest unit of information in a computer system

bit-mapped describing the image displayed on a computer screen whereby each pixel corresponds to one or more bits in memory

BIX Byte Information Exchange: an online service

block a physical group of records on a tape or disk. A number of blocks form a file. Records arc blocked together to improve throughput.

Boolean algebra an algebra closely related to logic ill which the symbols do not represent arithmetic quantities

boot reload the operating system of a computer

broadcast a messagerouting algorithm in which a message is transmitted to all nodes in a network

bug an error in a program

bulletin board a teleconferencing system that allows users to read messages left by previous users on a variety of topics. All users can see all messages, unlike e-mail where the message is private.

bus a signal route within a computer to which several items may be connected so that signals may be passed bet ween them

bus network a network topology which is non-cyclic, with all nodes connected.

byte a character consisting of 8 binary digits or bits

C

C++ a programming language combining tile power of object- oriented programming with the efficiency and notational convenience of C

cabling the wiring used to carry the signals for a network

CAL Computer Assisted Learning: one of several terms used to describe the use of computers in training and education

CALL Computer Assisted Language Learning: the use of computers in the teaching of languages

capacity the amount of free unused space left on a disk

CBT computer-based training: *see* CAL

CD-ROM the predominant form of ROM optical disk. Bot h disk and drive arc based on the product used for commercial music systems. The disk is 120mm in diameter, single-sided, and holds up to 60Mb of data.

cell a location in a spreadsheet capable of holding text, numeric data, or a formula

central processing unit the principal operating part of a computer, consisting of the arithmetic unit and the control unit

channel a specialized processor that consists of an information route and associated circuitry to control in put./output operations. More than one I/O device may be attached to a channel for fast accessing and updating of information.

check point a point in a series of programs at which a backup is taken, and the point at which the scries of programs will he restarted

chip *see* microchip **circuit** a combination of electrical devices and conductors that form a conducting path

circuit board a board containing integrated circuits which make up the processor, memory, and electronic controls for the peripheral equipment of microcomputers

click press the button on a mouse to initiate some action or mark a point on t he screen

clipboard see portable computer

clock an electronic device that generates a repetitive scries of pulses, used to control and synchronize the internal workings of a computer

cluster controller a device that controls a num her of similar peripheral devices such as terminals and links them up to the rnạin computer

coaxial cable a type of network cable consisting of two wires, one of which is contained totally within the other

COBOL common business- oriented language: a high-level language designed for commercial business use

code the representation of information data in symbolic language or in a secret fashion

cold-boot load the operating system of a computer from 'cold' (i.e. when the computer has to be switched on first)

command-based a computer system which interacts with the user by commands entered at a prompt on the screen. *See.* command line interface.

COMMAND.COM the main part of DOS

command line interface a method of interaction with a computer whereby the user types specific commands in order to achieve his requirements. This is generally regarded as not very user-friendly, although it is often t he most efficient way of communicating with the computer.

comment a program text included for the benefit of t he human reader and ignored by the compiler

compile interpret a source program or a list of instructions in symbolic language

compiler a program which converts source programs into machine code. Each high-level language has its own compiler.

compound document an electronic document which may contain text, photographs, spreadsheets, audio, or graphics

compress in multimedia, to force digitized data into a smaller space for handling by the system

CompuServe an online service

computational psychology a discipline lying across the border of artificial intelligence and psychology concerned with building computer models of human cognitive processes. It is based on an analogy bei ween the human mind and computer programs.

computer put simply, a system that is capable of carrying out a sequence of operations in a dist inctly and explicitly defined manner

computer centre a place where there is a central computer facility usually containing mainframes

computer game an interactive game played against a computer

computerize provide a computer to do the work for something

computer language *see* programming language

conceptual schema the logical design of a database

conference a computer- based system enabling users to participate in a joint activity despite being separated in space or time

configuration the particular hardware elements and how they arc interconnected in a computer system or network

consultant a (computer) expert brought in to give advice

control bus a signal route within a computer dedicated to the sending of control signals

control flow construct a syntactic form in a programming language to express the flow of control. Common structures arc ‘if... then... else...’, ‘while... do...’, ‘repeat... until...’, and ‘case’.

control function a function performed by the control unit of a computer co-ordinating the internal functions and passing commands to the processor

control signal an electronic signal sending a control message to another part of the computer or to a robot

control unit one of the two main components of the CPU. It transmits co-ordinating control signals and commands to the computer.

counter a component of the control unit which selects instructions one at a time from memory

CPU central processing unit

crash / a severe failure of a computer system that causes the hardware or software to be restarted

cursor a symbol on a computer screen that indicates the active position, e.g. the position at which the next character to be entered will be displayed

cut and paste a word-processing or desktop publishing software feature which allows the user to mark a piece of text and then move it to a different location, not necessarily in the same document

cyborg an android with organic structures. Cyborgs have some physiological structures similar to human beings.

D

data information that has been prepared, often in a particular format, for a specific purpose. The term is used in computing to distinguish information from program instructions.

databank *see* database **database** a file or group of files structured in such a way as to satisfy t he needs of various users and accessed using the facilities of a database management system

database management system a software system designed to handle multiple requests for data access while at the same time maintaining the integrity of the data

data bus a bus dedicated to sending data between different parts of a computer

data frame one of a number of predefined slices into which data may be broken for transmission

data-manipulation language a sublanguage of a database language providing facilities for storing, retrieving, updating, and deleting dal a records

data processing the handling or manipulating of information called data which is specially prepared to be understood by the computer

DBMS database management system

debug remove bugs from a program

DEC Digital Equipment Corporation

decision support system (computerized) system designed to aid managers in day-to-day operational decisions

declaration statement the element of the program that introduces an entity, giving it a name and establishing its properties

dedicated / used exclusively for something

delete key the key on a keyboard which, when the cursor is placed over a character, deletes it

desktop publishing the use of a computer system to perform many of the functions of a printing shop, including page layout and design, choice of fonts, and the inclusion of illustrations. The output may be sent to a printer or to a high quality typesetter.

detonator a device used to set off another process or event

device a piece of hardware that is attached to a computer and is not part of the main central processor (CPU)

device control the use of control charact ers to cont rol external devices

dialling up using a modem to connect a terminal or PC to a remote computer

digit a number which has only one character: 0. 1.2, 3. 4, 5, 6. 7. 8. or 9

digital the use of discrete digits to represent arithmetic numbers

digital signal a wave form or signal whose voltage at any particular time will be at any one of a group of discrete values (generally a t wo- level signal)

digital transmission the sending of digital signals along a communications link

digitize convert analog signals to digital representation

digitized sound sound waves that have been converted into a series of bit strings for digital representation

DIP document image-processing

directory *see* disk directory

diska storage device in the form of a circular magnetic plate in which the information is stored via magnetic encoding

disk directory an index to the contents of a disk

disk drive a device which is capable of t ransmitting magnetic impulses representing data from the disk to the computer memory and vice versa

disk error a detected (or otherwise) error in the way that data is stored on the surface of a magnetic disk. Such errors are usually detected when reading from or writing to the disk.

diskette *see* floppy disk

display *see* VDU

distributed (computer) system the organization of processing whereby each process is free to process local data. The processes exchange information with each other over a network.

document produce the material that serves to describe a program and make it more readily understandable

document image-processing a system which takes scanned images of documents and stores them on computer lor access, rather than filing the paper copies of the document

document processing the machine-processing, reading, sorting, etc., of documents that are generally readable both by humans and computers, e.g. bank cheques

DOS disk operating system: the generic term for the operating system developed for IBM PCs and their clones

download send programs or data from a central computer to a remote terminal or PC

DR/DOS Digital Research disk operating system

DTP desktop publishing

dump in a system handling large numbers of users' Illes stored on magnetic disk, to take a periodic record of the state of the disks that are made on magnetic tape, in order to protect against accidental overwriting or mechanical failure of the disks

E

EBCDIC extended binary coded decimal interchange code: a proprietary IBM character encoding scheme based on eight bits allowing 256 characters

electronic circuit a combination of electrical devices and semiconductors that form a conducting path

electronic mail messages sent between users of computer systems, where the system is used to hold and transport messages. Sender and receiver need not be online al the same time.

electronic publishing the publishing of text in an electronic format

e-mail electronic mail

ergonomic describing something which is designed to take into account the human who is to use it

execute run a program in a computer

expansion the addition of extra facilities or features

expansion board a printed circuit board that may be inserted into a computer to give it extra functionality

expansion slot a spare space on the system board of a computer to which expansion boards can be fitted

expert system a system built for problem solving which tries to emulate the skills of a human expert. The result of study in the Held of artificial intelligence.

external schema a user's permitted view of data in a database

facsimile machine a machine which will provide electronic transmission of documents over telephone lines

fault-tolerant of a computer system, having the ability to recover from an error without crashing

fax facsimile machine, the output from a facsimile machine

fax board an adaptor board which can be put into a computer and linked to a telephone line to replicate the functions of a facsimile machine directly from the computer

FDD floppy disk drive

feature facility provided by an application

fibre optics data transmission using cable made of optical fibres instead of copper wire

field an item of data consisting of a number of characters or bytes to form a number, a name, or an address

firmware system software (part of the operating system) that is held in ROM

file information held on disk or tape in order for it to exist beyond the time of execution of a program. Files may hold data, programs, text, or any other information.

file encryption a security method whereby an algorithm is used to scramble the data before it is written to disk to prevent unauthorized users reading the data directly from the disk

fixed-format record a record whose data items are fixed in nature, in contrast to records whose layout may change according to the data being held

flicker on a screen, the rapid increase and decrease of brightness

floppy (disk) a flexible magnetic disk which can be removed from the computer. The two most common sizes are 3-jnch and 5-inch.

flowchart a diagram or a sequence of steps which represent the solution to a problem. Arrows are used to show the sequence of events.

footprint the amount of desk or floor space taken up by a computer

foreground describing high-priority processing involving interaction with the user, in an environment that allows background tasks

format prepare a disk for use by a computer whereby the structure of the pattern of information t o be held on the disk is written to the disk surface

FORTRAN (77) formula translation: a programming language widely used for scientific compulation. The '77' defines the year in which the official standard (to which the language conforms) was issued

frame-grabber a device for capturing a still video image and converting it into a digital form that can be viewed on a computer screen. By capturing a sequence of still images, it can effectively create a moving picture

free-format describing data whose structure is not pre-defined

full-motion video captured and digitized video images displayed on a computer screen giving the viewer the impression of watching a television picture.

functional language a programming language whose programs consist t ypically of sets of unordered equations that characterize funct ions and values. The values that are characterized by the equations include the desired results, and these values are calculated bv executing the program,

function register a register used to control the processing of a function

gateway a device that links two networks in a way that is usually visible to the network users (as opposed to a bridge which is not visible). Gateways may deal with differences of protocol and naming convention when converting between the two networks.

grammar check software that attempts to correct the grammar of a piece of text, or offer advice on its structure

graphical (user) interface a style of interaction between the user and the computer involving a graphics screen, icons, and some form of pointing device such as a mouse. *See* command line interface *and* window.

graphics a non- character based method of displaying information on a screen, usually used for displaying pictures. The basic unit from which the display is built up is the pixel

grid used for touch-screen and pen-based computers. Voltage is sent across the glass in horizontal and vertical lines forming a grid.

GUI graphical user interface

hacker a person who attempts to breach the security of a computer system by access from a remote point. This may be lor amusement or for a more sinister purpose.

hard disk a fixed disk inside a computer which may not be removed

hardware the computer equipment and its peripherals

hardware interrupt *see* interrupt

HDD hard disk drive

high-level language a language in which each instruction represents several machine code instructions, making the notation more easily readable by the programmer

home-shopping service an online service that allows one to purchase items by placing an order over t he network, usually by credit card

I

IAL international algebraic language: former name for ALGOL

IBM international Business Machines

IBM-compatibility describing computers that conform to the hardware specification of the IBM PC and will ru n all the hardware that an IBM PC will run

icon a visual symbol or picture used in a menu to represent a program or a file. The program is usually initiated by using a mouse and clicking the mouse's button when the cursor is over the icon.

image compression a technique for reducing the amount of space that, a graphics image will take to store in computer storage

index a set of links that can be used to locate records in a data file

index generation the facility to automatically generate a sorted alphabetical index for a document

infected of a computer, being inhabited by a computer virus

infector something that transmits a computer virus

inference engine within the context of expert systems, the part of the expert system that operates on the knowledge base and produces inferences

information technology any form of technology, incorporating computing, telecommunications, electronics, and broadcasting, used by people to handle information

inference tree the structure of a set of inferences which show how a conclusion was reached

information separators control characters used to delimit the boundaries of pieces of information

Information Services Manager the head of the computer department

information system a computer-based system with the defining characteristic that, it provides information to users in one or more organizations

ink jet printer a printer that produces an image by squirting a fine jet of ink onto specially absorbent paper

input the information which is presented to the computer

input put information to a computer for storage or processing

input device any device that allows data to be passed into the computer

input-output the part of a computer system or the activity that is primarily dedicated to the passing of data into or out of the central processing unit

input port the socket into which an input device may be plugged on a computer

input tagging a feature of word-processing software that allows text to be pre-coded with tags so that the correct format can be applied automatically part of a computer program which tells the computer what to do at that stage

integrated circuit an implementation of a particular electronic-circuit function in which all the individual devices required to realize the function are fabricated on a single chip of semiconductor

interactive describing a syst em or a mode of working in which there is a direct response to the user's instructions as they are input

interactive video a computerized video system used for learning or play, in which the user interacts with the video.

interface a common boundary between two systems, devices, or programs

interface cable the logic cable between the computer and a device. Signals and data are passed over this link.

interlaced video in narrow-band PAL systems, a method of transmitting all 625 lines of a single TV image in a fiftieth of a second, whereby each frame of the image is split into two fields 01' 312.5 lines

internal memory memory held within the CPU. The main storage or primary memory of the computer.

internal modem a modem which can be fitted inside a computer rather than a separate piece of equipment

internal schema the way that the data is physically held in a database

internal storage *see* internal memory

Internet an informal shared public network linking UNIX and other computers world-wide using the Internet protocol (IP)

interrupt a signal to the processor that a higher priority event has occurred and must be serviced, causing the current sequence of events to be temporarily suspended

I/O input/output

I/O device any device that allows input or output to a computer

IP Internet protocol

ISDN Integrated Services Digital Network: a concept developed by PTTs providing one network to transmit all forms of signal traffic, e.g. voice and data over the same lines

ISO International Standards Organisation

IT information technology

J

joy stick an input device used in computer games for controlling the cursor or some other symbol in its movement around a screen

junction box a box attached to a network which attaches a device to the network

K

K kilobyte: unit of measure of memory or disk space in thousands of bytes. 1 kilobyte is 1024 bytes.

keyboard an input device like a typewriter for entering characters. The depression of a key causes a signal to be transmitted to the computer.

keyboard lock a security method whereby the screen is cleared and the keyboard is locked after a pre-set period of inactivity to prevent

a unique number generated to identify a record

knowledge base within the context of expert systems, a collection of knowledge that has been formalized into the appropriate representation with which to perform reasoning, usually a set of rules about the subject

L

LAN local area network

laptop *see* portable computer

laser printer a nonimpact printer in which the paper is charged electrostatically with an image of the whole page to be printed. This attracts dry ink powder which is then baked on Io the paper.

LaserWriter a laser printer manufactured by Apple Corporation

LCD liquid crystal display

linkage editor a systems program which fetches required systems routines and links them to the application program object module

liquid crystal display one type of technology that is used to produce flat monochrome computer screens. Such screens do not have their own internal illumination.

LISP list processing: a programming language designed for the manipulation of noil-numeric data. It is commonly used in artificial intelligence research.

load module the program which is directly executable by the computer

local area network a network linking a number of nodes in the same area, limited usually to a building or sites up to a kilometre apart

logical operation an operation on logical values producing a Boolean result of true or false

logical record the collection of data in a database relating to one subject

logical unit see arithmetic logic unit

LOGO a programming language developed for use in teaching young children

log on identify oneself to a computer system in order to gain access to it

loop a sequence of instructions that is repeated until a certain condition is reached

low-level language a language such as assembly language in which each instruction has one corresponding instruction in machine code

M

Mac Apple Macintosh computer

machine code the code actually executed by the computer, not easily readable by the programmer

machine translation the use of computers to translate natural languages

magnetic card reader a device for reading the data held on the magnetic strip on a card such as a credit card

magnetic tape a strip of plastic coated with magnetic oxide used to store information sequentially. Tapes may be hundreds of feet long.

mail analyst someone who is responsible for directing mail, which has been scanned using a Dll' system, to the correct recipient

mail mergea software feature which allows the user to read in a file of names and addresses and create 'personalized' letters lor mail shots

mainframe (computer) a large computer which requires a special environment for temperature and humidity in order to run it. This is in contrast to minicomputer or microcomputer.

main storage *see* internal memory

management information a (computerized) system for providing information to management

maths function a software feature which allows simple mathematical functions to be carried out (such as totalling columns)

Mb megabyte

megabyte one million bytes: unit of measure for the amount of memory or disk storage on a computer

megaflop a million floating point instructions per second. Floating point notation is a representation of real numbers that allows both very large and small numbers to be conveniently represented. A floating point instruction is an arithmetic operation on two floating point numbers.

memory a device or medium that can retain information for later retrieval. It is usually used to refer to the internal storage of a computer that can be directly addressed by operating instructions.

memory board a circuit, board which contains additional memory for a computer

menu-driven describing a program that obtains input by displaying a list of options (the menu} from which the user indicates his choice

message-base posting another form of e-mail

MHz MegaHertz: a measure of the speed of a computer's CPU. In millions it measures the number of processing cycles performed by the CPU.

micro *see* microcomputer

microchip a semiconductor device used to build the hardware of a computer

microcomputer a computer whose CPU is a microprocessor semiconductor chip

microprocessor a semiconductor chip that forms the central processor of a computer

Microsoft a computer software company

minicomputer originally a computer contained within a single equipment cabinet. Compared with mainframes they are usually smaller and slower, rhe word is no longer used very specifically since the advent of microcomputers.

Minitel a French online system originally provided by the PIT to provide access to French telephone directories. The service has been expanded since its original introduction.

modem modulator and demodulator: a device that converts the digital bit stream used by the computer into an analog signal suitable for transmission over a telephone line (modulat ion), and then converts it back to digital (demodulation)

monitor *see* VDU

monochrome IBI describing a screen with a single-colour display

mouse a device used to point at a location on a computer screen. It is moved around by hand on a flat surface; The movements on the surface correspond to movements on the screen. The mouse has one or more buttons to initiate an action on the screen.

MPC multimedia personal computer: Microsoft's minimum specifications for hardware to be used for multimedia purposes

MS/ Microsoft disk operating system

MT machine translation

multimedia an application of computer technology that allows tile capture, manipulation, and presentation of different types of data. e.g. text, graphics, video, animation, sound, etc.

multiple rulers to define margins and tab settings

multiplexor a device that merges information from several communications channels into one channel. It is a two-way device and is also used to separate out the combined signal into the individual channels.

multiprogramming *see* multi-tasking

multi-sync monitor /.mAlti sitjk .niDmtaịr)/ [14] a video monitor that can synchronize a range of video devices to a common time-base

multi-tasking used of computers capable of running more than one program at the same time, although on most only one program has control and is executing at any given moment

multi-user describing computer systems which allow access by more than one user Sim ultancously

N

NCR National Cash Register now a computer company

network a system which connects up a number of computers and communications devices to enable messages and data to be passed between those devices

network-compatible describing software that can be run on a network with shared tiles rat her than as a stand alone piece of PC software

network traffic the data transmitted around a network

node cither a point in a network where communications lines are interconnected, or where a workstation or a mainframe computer is attached

notation a system of symbols

notebook *see* portable computer

numeric describing data which only contains numbers

O

object module *see* object program

object-oriented describing a computer architecture in which all processes, files, I/O operations, etc., are represented as objects (i.c. data structures in memory that may be manipulated by hardware and software). The IBM System 38 is an example of an object-oriented architecture system.

object program the result of convert ing source code into machine code using a compiler

OCR optical character recognition: a process in which a machine scans, recognizes, and encodes information printed or typed ill alphanumeric characters

off-line describing any part of a computer system which operates independently of the central processing unit

online service a public database or bulletin board which can be accessed over a computer or telephone network

operating environment the hardware and operating system being used

operating system the set of programs that jointly control the system resources and the processes using those resources on a computer

operator someone responsible for running a computer (usually a mainframe) *see* relational operator

optical character reader a device which scans, recognizes, and encodes information printed or typed in alphanumeric characters

OS an operating system for IBM PCs

outliner a writing aid to enable the structure of a document to be worked out in advance and used as a guide when writing the detailed document

output ther esult of performing arithmetic and logical operations on data. It can be displayed on screen or transmitted by the computer

output transmit processed data to a physical medium such as a printer or disk drive

output device a device which transmits or displays processed data, e.g. a printer, disk drive, or VDU screen

output port /the socket into which an out put device may be plugged

P

package *see* software package

paint software software that allows the user to create graphics images using techniques that emulate painting and drawing

PAL the European standard for television and video systems requiring a vertical refresh rate of 50kHz

palmtop *see* portable computer

parallel describing the transfer of data across the interface by having one connection per bit of a data word. e.g. for 8 bits there would be 8 connections in parallel. The control signals are also carried on individual connections ill parallel.

parameter information which is passed to a program subroutine

parse analyse the syntax of an input string

PASCAL a programming language designed as a tool to assist the teaching of programming as a systematic discipline

password a method of security in which the user has to enter a unique character string before gaining access to a computer system

PC personal computer

PDP a DEC minicomputer

pen-based computer a computer which uses a pointing device like a pen as an input device

performance the speed of a computer or computer system

peripheral an input or output device attached to a computer

peripheral bus the communications link to which peripherals are attached

physical record the collection of data transferred as a unit

pirate use software that has been copied in breach of copyright

pixel an individual dot on a computer screen. The computer controls the colour and brightness of each pixel.

PL/I programming language I. A programming language developed by the LIS IBM users' group, implementing the best features of COBOL, FORTRAN, and ALGOL.

platform a generic term for different types of computer system (e.g. PC, Mac. workstation, etc.)

plotter an output device for translating information from a computer into pictorial or graphical form on paper or a similar medium

plug-(and-play) compatibility the ability to connect one manufacturer's hardware directly to another manufacturer's hardware

port a connection point that allows I/O devices to be connected to the internal bus of a microprocessor

portable describing programs which can run on a variety ol hardware or under a variet y of operating systems

portable (computer) the generic term for any microcomputer that is designed to be carried around the largest type of computer designed to be carried around. It must be connected to the mains electricity supply. Other smaher types include laptops, notebooks, clipboards, and palmtops (or personal organizers). These have an internal power source.

primary memory *see* internal memory

printer an output device which cha nges output data into printed form

printout / the printed pages which are output from a computer

print-to-tape device a device which allows computer-generated images to be recorded to video for play-back on a TV monitor

processing the performing of arithmetic or logical operations on information which has been input to a computer

processor *see* CPU

program a list of instructions which are used by the computer to perform the user's requirements

programmer someone who writers computer programs

programming the act of writing a computer program

programming language a notation for the precise description of computer programs

proprietary describing a protocol or standard developed and owned by a particular manufacturer

protocol an agreement that covers the procedures used to exchange information between cooperating entities

PTT Postal, Telegraph, and Telephone Administration, the national government communications organization of many countries

public database a database which is accessible over a public network

Q

query a request for information from a database

R

radiation screen a screen placed in front of a VDLÍ to protect a user from possibly harmful radiation from the screen

RAM random-access memory: this is memory which can be read and written to. The basic element is a single cell capable of storing one bit of information. Each cell has a unique address in memory and so can be accessed in random order.

raw data data which has not been interpreted

real-time program a program that interacts with t he users in such a way that, the timing of the interaction is significant. This is usually because the input corresponds to some movement in the physical world and the output has to relate to the same movement.

record a collection of data handled together in movements to and from storage. Files held in storage are frequently treated as sequences of records.

refresh rate see vertical refresh rate

register a group of devices that are used to store information within a computer for high-speed access. Some registers may be used as counters.

relational operator a symbol representing an operation that compares two values and returns a truth value. Operators include ‘greater than...', ‘equal to...', and ‘less than...’.

remote device a device connected over a WAN

repetitive-strain injury a medical condition apparently caused by using a keyboard in an inappropriate position. The symptoms are that the muscles in the lower arm and fingers may seize up.

response the elapsed time between an action bv a computer system and the receipt of some lorm of response from the system

ring network a network constructed as a loop of unidirectional links between nodes

robot a programmable device consisting of mechanical manipulators and sensory organs. The main goal of robotics research is to provide the robot with an artificial eye and to use visual percept ion to guide a mechanical arm in a flexible manner.

robotics a discipline (lying across the border between artificial intelligence and mechanical engineering) which is concerned with building robots

ROM read-only memory: this is memory used for storage of data that cannot ever be modified. The memory contents arc permanently built into the device when it is manufactured.

RS/6000 a model of IBM computer which is UNIX based

RSI repetitive-strain injury

S

satellite in communications technology, a man-made device in orbit round the Earth used to relay back telephone messages or radio and TV signals from another part of the Earth

scan a scanned image

scan process a document through a scanner

scan converter a device for converting the vertical refresh rate of video signals (50 kHz) to the vertical refresh rate of 60kHz or more used by computer systems

scanner an input device which reads images on paper using a photoelectric cell and produces a computer graphic file as output. The image scanned may be a bar code, a picture, or a piece of text.

scan rate *see* vertical refresh rate

scramble jumble up a string so that, it can only be read after decoding

screen the part of a visual display unit on which the program, data, and graphics may be seen

secondary memory storage space which is outside the main memory of the computer. It can be in the form of either sequential tapes or random-access disks.

security reporting feature of a security system which reports, to an administrator, attempted breaches 1.0 the security of a system

security system a system which controls access to a computer and maintains the security of that, computer

semiconductor a material whose electrical conductivity increases with temperature and is intermediate between metals and insulators

sensor an electronic device to detect movement

sequence control register a register which controls the sequence in which operations are performed by the computer

sequential device a device such as a magnetic tape drive which permits information to be written to or read from ill a fixed sequence only

serial describing the transfer of data one bit at a l ime. Control signals are also passed in sequence with the data.

service technician an engineer who repairs computers

session a period during which two computers are linked

shared-line describing the use of a telephone line to transmit more than one set of data at a time

shield] *see* virus shield

shield protect

signal lines cables over which a computer control signal and data may be passed

signature *set'* virus signature

sign off log olf a computer system

sign up log on to a computer system

silicon a noil-metallic element with semiconductor characteristics

Silicon Valley area of California where there are many computer technology companies

slot *see* expansion slot

Smalltalk an object- oriented language, an object-oriented environment, and a library of objects first developed at the Xerox Palo Alto Research Centre

smart card a card containing a microchip which can be used to store large amounts of in formation

software a general term for any computer programfs)

software base the collection of applications written for a particular hardware and software environment

software developer someone who writes software

software house a company that specializes in writing application software

software package /a series of programs written for a generic application, e.g. a payroll package, which can be adapted by the user to meet individual needs

source file *see* source program

source program the original high-level language program which has to be converted to machine code before it may be executed

spell check dictionary a list of correctly spelt words used by word-processing software to validate the spelling in a document

spooling the process of storing output temporarily on disk or tape until it is ready to be printed

spreadsheet a program that manipulates tables consisting of rows and columns of cells and displays them on a screen. The value in a numerical cell is cither typed in or is calculated from values in other cells. Each time the value of a cell is changed the values of dependent cells are recalculated.

SQL structured query language

standard a publicly available definition of a hardware or software component resulting from national, international, or industry agreement

star network a simple network topology with all links connected directly to a single central node

statement terminator a special character which indicates the end of a statement in a program ming langu a gc

string a sequence of bytes

structured programming a method of programming development that makes extensive use of abstraction in order to factorize the problem and give increased confidence that the resulting program is correct

structured query language a high-level language for writing routines to query relational databases. Originally developed by IBM in J 973, it is now an ANSI standard.

style sheet a wordprocessing software feature that ensures a uniform style within a document

stylus an electronic I/O device 1 hat is used to draw or write on the screen

subprogram] a small program called by another program to perform a specific function

support group a group of staff who are specialists ill a particular piece of software

switched network a network topology' in which a central switching device is used to connect devices directly

synchronous taking place at precisely the same time involving a type of computer control whereby sequential events take place at fixed times

synchronous orbit satellite a satellite that orbits the Earth at a controlled speed so that it maintains its position in relation to the Earth

system board the main circuit board of a computer containing the microprocessor chip. Other devices will be attached to tills board.

systems analysis the activity performed by an analyst

systems analyst *see* analyst

systems manager a person responsible for the management and administration of a computer system

systems program a program written fora particular type of hardware. Examples are operating systems and compilers. They are usually provided by the manufacturer.

systems routine utility programs provided by the computer operating system. These might be used for converting numerical data into different formats, or performing operations on dates.

systems software *see* systems program

T

table used to refer to data held in a database in a conceptual schema which is a flat two-dimensional table

table of contents a word-processing software feature which can automatically generate a table of contents for a document

tag a code used in word processing or DTP to denote a feature of a document, such as bold type, the start of a paragraph, or an index word

tape drive a device on which a magnetic tape is mounted in order that information may be transmitted from the tape to the memory of the computer or vice versa

template a pre-shaped pattern used as a guide

terminal a VDU screen and keyboard used to interact with a computer, usually with no computing capacity of its own

test suite a set of sentences or phrases in a given language designed to test the effectiveness of a machine translation system

token a unique sequence of bits granting permission to a user to send on a network

trackball an upside down mouse, ft consists of a ball supported on bearings so that it is free to rotate in any

V

VDU visual display unit: the screen of a computer terminal or PC

vertical refresh rate the number of times per second t hat an image is written on a TV or computer screen, measured in kiloHerz

VGA video graphics array: a standard for colour monitors developed by IBM for their PS/2 range of PCs

virtual reality an attempt to create an artificial world within a computer In which the user can (apparently) move about. This is usually achieved by the user wearing a helmet which covers the eves and ears and sends visual and oral signals to the user. Special gloves allow the user to manipulate computer-generated items.

virtual storage when disks arc connected to a computer and used as an extension of internal memory in order to j ncrcase the capacity of primary storage

virus / a self-replicating program, usually designed to damage the system on which it lands

virus checking program a program that is used to detect the presence of a virus in memory or on disk

virus scanner a program that detects viruses which have already infected a computer

virus shield a program that detects viruses as they attempt to infect the computer

virus signature the particular features of each computer virus

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ANSWER KEY

UNIT 1: PERSONAL COMPUTING

1.1. Start- up

Task 1:

1.

a. mouse b. stylus c. usb d. magnetic card reader

2. Match a name of the computer with the correct description.

1d 2e 3b 4c 5a

1.2. Listening

Task 2: Students listen to people describing their jobs and match the jobs to the speakers' pictures.

1. software developer
2. helpdesk supervisor
3. project manager
4. support technician
5. database administrator
6. systems analyst

Task 3: Students listen again and complete verb-noun collocations describing the duties and tasks that the people mention.

1. a team
2. a problem
3. for
4. after
5. software
6. the problem/a problem/ problems
7. databases
8. databases
9. specifications

Task 4:

Students now listen to an IT worker (Robert) talking to his new manager about his job. Ask them to listen and guess which person is the manager. During this initial gist listening, they simply check their prediction and decide what Robert's job title might be.

Robert is a support technician. (Similar job titles, such as technician or support staff would also be acceptable.)

Ask students to look at the sentences with tick boxes. They then listen again and tick the items that happen regularly (‘usually happen') in *Robert's work routine.*

1. Robert generally checks emails./Generally, Robert checks emails.
2. Robert usually has emails waiting for him.
3. Robert normally visits people at their desks./Normally, Robert visits people at their desks.
4. Sales people occasionally have problems./ Occasionally, sales people have problems.
5. From time to time, Robert attends meetings./Robert attends meetings from time to time.
6. Robert hardly ever visits other companies.

1.3. Reading 1

Task 5: Before reading the text on the following page, match each word with the correct definition:

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

Task 6 (students’answer)

Task 7 (students’answer)

Task 8: *Answer the questions about the text.*

1. There were 4 mainframes IBM think which were possible to sell in 1952.
2. Over 70,000,000 PCs have been sold in the world.
3. Xerox Corporation
4. Apple
5. Users type in commands to perform a function
6. Digital Research disk operating system.
7. c
8. Microsoft in washing-machines and cars; books may not be published in paper form; information available world-wide.

Task 9: *Look back the text and find words that have a similar meaning to:*

1. world wide
2. challenged
3. mistakes
4. funded
5. purchase
6. initial
7. endorsement
8. ungraded

1.4. Writing

Task 10 (students'answer)

1.5. Speaking

Task 11 (students'answer)

Task 12:

In pairs or small groups, students look at some signs and work out the rules they express. At this stage they would not be expected to express them in a sophisticated way - imperatives are fine - though it's likely that many students will have encountered the language of rules before.

Suggested answers

no drinks near the computer

no mobile phones/Don't use mobile phones here.
switch off the monitor.

1.6. Reading 2: The processor

Task 13: *Read the following passage about the structure of the processor and fill in the gaps using the words below.*

1. system board	6. input or output devices
2. microprocessor	7. clock
3. conductive	8. accumulators
4. bus	9. registers
5. adapter boards	

Task 14: *Use the information in the reading passage and the diagram to help you match the terms below with the appropriate explanation or definition.*

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

Task 15:

1. channel	6. mouse	11.address bus
2. icon	7. control unit	12. accumulator
3. joystick	8. megabyte	
4. output	9. database	
5. firmware	10. Window	

1.7. Reading 3

Task 16:

1. provider, suppliers
2. manufacturers
3. production facilities computing
4. products

5. cloud

6. clients

7. launch

Task 17:

1. IBGroup
2. IBGroup, Digital World
3. Futachiba
4. Digital World
5. IBGroup

1.8. Language focus

Exercise 1: *(students' answers)*

Exercise 2: Using the line reference given, look back the 1.3. Reading 1 in Unit 1, and find the reference for the words in italics.

1. PCs
2. Xerox Corporation
3. The operating system developed for Apple's computers
4. The first IBM PC
5. Command-based operating system
6. Digital Research
7. The original IBM PC minimum of 16K of memory.

Further Reading (students 'answers)

UNIT 2: Portable computers and operating system

Portable computers

2.1. Start-up

Task 1: *(Students' answers)*

2.2. Reading 1

Task 2: *Before reading the text, match these words with their definitions:*

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

Task 3: *(Students' answer)*

Task 4: *Decide whether the following statements are true (T) or false (F) in relation to the information in the text. lf you think a statement is false, change it to make it true.*

1F 2F 3T 4T 5F 6T 7F 8F

Task 5: *Use the information in the text to complete the following dialogue in your own words.*

1. B. No, bigger than an actual clipboard
2. B. No, it has a stylus
3. B. You print directly on the screen
4. B. When the tip does not touch the screen.
5. B. The recognition software identifies the letter and numbers
6. B. Yes, you draw a line through it
7. B. Not yet, but they will be soon

Task 6: *Using the line references given, look back in the text and find words or phrases that have a similar meaning to:*

1. figure out
5. smoothing out

2. marketed	6. crooked
	7. errant
3. coordinates	8. flick
4. connect	9. quirks

Task 7: *Choose the correct word to complete each sentence. You may have to change some words slightly.*

1. a. electronic	b. electronically	c. electronics
2. a. technological	b. technologies	c.technologically
3. a. identifies	b. identify	c. identifying
4. a. computerization	b. compute	c. computation

2.3. Listening

Task 8:

1 E   2 A   3 B   4 F   5 D   6 C   7 G

Task 9:

a date/the install date

Task10:

1. Just select 'Manage'.
2. Just right-click where it says 'Disk 0'.
3. Can you scroll up to the top?
4. Choose 'Properties' from the menu.
5. Choose the 'Details' tab.
6 .Select 'Install date'.

2.4. Writing

Task 11: *(students' answer)*

Task 12: *(students' answer)*

2.5. Speaking

Task 13: *(students' answer)*

2.6. Reading 2: Operating systems

Task 14: *(students' answer)*

Task 15: chua co dap an

Task 16:

A typical operating system will:

1. monitor
2. monitor
3. diagnose
4. format
5. monitor
6. execute/monitor
7. diagnose
8. execute

Task 17:

Match these common DOS command with the appropriate explanation.

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

WORD-PLAY

Task 18:

1. palmtop	6. grid
2. stylus	7. interrupt
3. delete	8. template

4. clipboard	9. pixel
5. data	

Task 19:

6. During the process, the computer will restart by itself several times.

7. Near the end of the process, you can partition the hard drives.

3. In the BIOS, set the first boot drive to DVD. Then reboot again.

8. At the end of the process, the operating system will ask for the product key, time, date, network type and details for user accounts.

2. First, put the installation DVD into the optical drive. Then, reboot the computer while you press the ‘F2' key. The BIOS will now start.

4. This time, the computer will boot from the DVD and installation will begin.

1. Before you start, back up everything.

5. Near the start of the process, it will ask you to agree to the licence terms.

Task 20: Students use the context of the steps in Task 19 to find words there that match the definitions.

1. restart	2. partition	3. BIOS
4. boot drive	5. product key	6. user account
7 reboot	8. process	9 back up
10 licence term		

2.7. Language focus

Exercise 1: Students' answer

Exercise 2: Fill in the gaps with the correct prefix from the following list.

1. mono	5. semi
2. sub	6. multi
3. mega	7. dec
4. de	8. inter

Further reading:

Exercise 1: Main idea 3. Mainframes are three types, and neither 1 nor 2 nor 4 express this idea.

Exercise 2:

1. F - A mainframe is a large computer system requiring a special room.
2.T

3. T

4. F - Both analog and digital computers are large computers.

5. T

6. F - The digital computer does its calculations one step at a time.

7. F - The analog computer continuously works out calculations.

8.T

9. T
10. F - There will be great developments in computer technology in the future.

UNIT 3: Online service and Computer configuration

Online services

3.1. Start-up

Task 1: *Students' answers*

3.2. Reading 1

Task 2: 1T 2T 3F 4T 5F 6F 7F 8F

Task 3:

1. particular	5. better
2. favourite	6. correspond
3. advantages	7. interlink
4. unique	8. Continue

3.3. Listening

Task 4:

Yes, the IT specialist solves his problem. He likes the fact that he can see all his bookmarks now.

Task 5:

1. finding the search bar
2. opening a tab
3. finding menus

Task 6: *Make these words negative by adding the appropriate prefix from those given below. The first one has been done for you: in- im- un- dis-*

1. *in*frequently
2. disloyal
3. disadvantages
4. unspecific
5. *dis/un*like
6. unreal
7. improbably
8. unavailable

Task 7: *Match each or expression in the first column with a synonym in the second column.*

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

3.4. Speaking

Task 8: *Student's answer*

3.5. Writing

Task 9: *Student's answer*

3.6. Reading 2:

Task 10:

1. central processing unit
2. hardware
3. software
4. input
5. output
6. peripheral devices
7. monitor
8. floppy disk
9. port

3.7. Reading 3

Task 11 :

1T 2T 3F 4T 5F 6T 7F 8T

3.8. Language focus

(students'answer)

Further reading : *(students'answer)*

UNIT 4: Programming and languages

4.1. Start-up

Task 1:

The introductory questions for this section allow those with little experience of programming to begin to talk about the topic. Those with more experience could discuss a different set of questions depending on experience, such as:

1. Which programming languages have you heard of?
2. What programming have you done before?
3. Which language(s) did you use?
4. Which programming language do you prefer? Why?

Task 2:

Here students look at a basic example of programming code and explanations of two key terms: programming instruction (which can also be called command or simply instruction) and variable. Line of code is also mentioned but this should be quite straightforward. Students read the explanations and, in pairs, answer the comprehension questions. If you think that your students already know vary, then pointing out the connection with variable will be useful.

Note that cout is pronounced as the letter c followed by out (/si:/ + out).

If students have difficulty understanding what is going on here, write this on the board: a = 7 b = 3

x = a + b Then ask: What is x? The answer is 10. Then adjust the values of a and b and get students to tell you what x becomes.

1. The constants are 3 and 2.
2. x becomes 5 (a is 3 and b is 2; c is a + b, i.e. c is 3 + 2, which is 5.

4.2. Listening

Task 3:

Explain to students that the next section of code is part of a program that controls a robot from a mobile phone. Pressing different keys on the number pad makes the robot move forward, backward, or turn left or right. Ask students to look at the code (which is in the C programming language). Tell them they do not need to understand it yet but they will hear two programmers talking about it and will have to identify features while listening. Elicit from students that g_Turn, g_Move and key_Press are variables.

While listening, students write numbers in the boxes below the code to indicate the order they hear these variables mentioned.

1. g_Move
2. g_Turn
3. key_Press

Students complete the sentences to indicate what happens when the variables have certain values, then listen again to check their answers.

Task 4:

1. doesn't move
2. doesn't turn

3.x

Task 5:

They are talking about the four lines beginning with 'if'.

Students can either listen again or write down the keys that correspond to the robot's direction of travel as indicated in the diagrams (as per the instructions in the Course Book), or write the answers without listening and, if necessary, check their answers while listening. Make sure they understand that the arrow in 1 points forward and the one in 3 points backward.

1 a 2 d 3 f 4 s

Task 6:

a. C b. JAVA c. PASCAL

4.3. Reading 1

Task 7:

1. source program
2. machine code
3. applications program
4. object program, program module
5. compiler
6. linkage editor
7. load module

Task 8:

1. Is COBOL used scientific purposes?
2. Why was C developed in the 1970s?
3. What do you call a program written in a high level language designed to perform a specific task?
4. Which part of the system software converts the source code to machine code?
5. What does the linkage editor do?
6. Are software packages only so9ld by the hardware manufacturer?

Task 9:

Language	Developed	Function	Characteristic
FORTRAN	1954	Scientific and mathematical problems	Algebraic formuler and English phrases
COBOL	1959	Commercial purposes	English statements
ALGOL	1960	mathematical and scientific purposes	Originally called International Algebraic language
PL/I	1964	Data processing and scientific applications	combines features of COBOL and ALGOL
BASIC	1965	General-purpose language	Simple, developed for students
C	1970s	to support Unix operating system	Highly portable
APL	1962		
PASCAL	1971		

Task 10:

Possible answers:

1. Paragraph 9,10
2. Paragraph 10
3. Paragraph 1
4. Paragraph 10
5. Paragraph 8

Task 11:

1. *they* => computers
2. *it* => source program
3. *it* => a program written in one of these high-level language designed to do a specific type of work.
4. *Them* => These programs
5. *that* => compiler
6. *which* => a true system program
7. *They* => software package
8. *which* => magnetic tapes or disks

Task 12:

1. converted (paragraph 1) = transformed
2. give the responsibility to (paragraph 9) = commission
3. brings (paragraph 11) = fetches
4. are compatible with (paragraph 11) = conform to
5. matches (paragraph 12) = correspond to

Task 13:

1. a. instructor b. instructed c. instruction
2. a. compiler b. compiles c. compiled
3. a. resulting b. results

4. a. specific b. specific/specified c. specifications

C language

4.4. Reading 2

Task 14:

1. main

2. comment

3. declaration

4. three

5. four and five
6. braces
7. terminator
8. Compile/syntax
9. variable
10. type declaration

Task 15: *Find the words in the text which mean:*

1. brackets (paragraph 2) = braces
2. not fixed (paragraph 2) = variable
3. systematically (paragraph 2) = scan
4. recognized (paragraph 3) = identified
5. completed (paragraph 3) = terminated
6. starting (paragraph 4) = initial

Task 16:

C symbol	**Meaning**
= =	equal to
<	(1) less than
(2) < =	equal to or less than
>	(3) greater than
>=	(4) equal to or greater than
!=	(5) not equal to

4.5. Writing

Task 17: *Using the completed table above, write sentences to illustrate the following*

1. a! = b = a is not equal to b

2. a > b = a is greater than b

3. a <= b = a is equal to or less than b

4. a >= b = a is equal to or greater than b

5. a < b = a is less than b

6. a = = b = a is equal to b

4.6. Speaking

Task 18: *Students' answers*

Word-play

Task 19:

1f - high level language

2h – machine code

3j – systems routines

4e – object module

5g – linkage editor

6c – magnetic tape

7b – binary arithmetic

8a – declaration statement

9i - Comment line

10d – relational operator

4.7. Language focus: Organizing information

Exercise 1: Practice finding the main idea, major details, and minor details by completing the block diagram after reading the following paragraph.

The computer has changed the production of copy in the newspaper industry. There are three steps involved in the process: input, correction, and output. First, the computer numbers each story, counts words, and gives a listing of the length of each story, Then, a page is made up, advertisements are placed in, the copy is shifted or deleted, and corrections are made.)Finally, the computer hyphenates words, and the result of all this is a newspaper page.

<table>
<tr><td>Main idea</td><td colspan="3">The computer has changed the production of copy in the newspaper industry</td></tr>
<tr><td>Major details</td><td colspan="3">There are three steps involved in the process, input, correction, and output</td></tr>
<tr><td>Minor details</td><td>The computer numbers each story, counts words, and gives a listing of the length of each story</td><td>A page is made up, advertisements are placed in , the copy is shifted or deleted, and corrected</td><td>The computer hyphenates words, and the result is newspaper page.</td></tr>
</table>

Exercise 2:

.

<table>
<tr><td>Main idea</td><td colspan="3">Railway companies use large computer systems to control ticket reservations and to give immediate information on the status of their trains</td></tr>
<tr><td>Major details</td><td colspan="2">Terminals for ticket reservations</td><td>Used for variety of jobs</td></tr>
<tr><td>Minor details</td><td>The passenger’s name, type of accommodation, and</td><td>Thousands of calls for reservations,</td><td>Rapidity: cancelled tickets can be sold anywhere in the</td></tr>
</table>

	the train schedule put in memory	space, arrivals, and departures,	system just a few seconds later.
	Train schedules, planning, freight and cargo loading, meal planning, personnel availability, accounting, and stock control.		

FUTHER READING: Students' answers

UNIT 5: Computer software and hardware

5.1. Start-up

Task 1: *Students' answers*

5.2. Reading 1

Task 2: *Students' answers*

Task 3:

1a 2b 3a 4b 5b

Task 4: *Students' answers*

Task 5:

1. penetrate (paragraph 1) = cut through
2. changing (paragraph 1) = shifting
3. win, survive (paragraph 2) = prevail
4. buyers (paragraph 3) = purchasers
5. understand (paragraph 4) = read
6. flexible (paragraph 5) =versatile
7. too big/complex to manage (paragraph 5) = overwhelming
8. achieve (paragraph 5) =accomplish
9. go beyond (paragraph 6) = exceed
10. information about a product/service (paragraph 7) = feedback

5.3. Writing

Task 6: *Student's answer*

5.4. Speaking

Task 7: *Student's answer*

5.5. Listening

Task 8:

Students listen to a systems administrator asking a technician about the status of the company's computer systems. On this first listening, in order to build confidence with it, students are asked just two questions.

No, it isn't. There are several departments.

Task 9:

On this second listening, students complete a table listing tasks, some of which appeared in Activity 1. The table has columns to be ticked to indicate whether the task worked fine, a problem was found or whether it was not mentioned. Students are also asked whether there were any big problems. Before listening, give them time to read the table. They can check their answers by looking at the audio script on page 75.

1. Worked fine
2. Not mentioned
3. Worked fine
4. Problem found
5. Worked fine
6. Problem found
7. Problem found

No, there weren't any big problems.

Task 10:

Ask students, before they listen, to familiarise themselves with the delivery slip. They can practise saying the specifications with correct stress and with the correct way of saying the numbers. Then tell students that Dingle Digital got the order wrong and delivered computers with incorrect specifications. They then listen to a conversation between two people working at Wood Publishing and mark the mistakes on the delivery slip.

Laptops

- 1 x 390 GB SDD 1 x 500 GB SDD
- 8 GB dual-channel DDR3 ... 16 GB dual¬

channel DDR3 ...

- ...WLED 1920 x 1080 screen ... WLED 1366 x 768 screen

Desktops

- Entel 3.4 GHz quad-core CPU Entel 3.4 GHz eight-core CPU
- 1 x Eastern Digital 2 TB ... 2 x Eastern Digital 1 TB ...
- 4 x USB ports 8 x USB ports

A good follow-up question is: Why doesn't the IT manager want to complain about incorrect screen resolution? (It's better than the one they ordered.) If your students have some IT knowledge, you could also ask: What is an advantage of having two 1 GB drives compared with one 2 GB drive? (Users can back up internally to the second hard drive. Some software runs faster if the program is on one drive but the data on another.).

5.6. Reading 2: Computer hardware

Task 11: *(students' answers)*

Task 12:

In pairs, students now decide whether some listed items are internal, external (peripheral) and/or storage devices. Some will be one of these and others will fit into all of these categories. Some are likely to have come up in Activity 1. This is mostly review of Book 1. If your students have not completed that book, it may be necessary to pre-teach some of the vocabulary.

1.P, S	2. I, P, S	3. P	4. I, P, S
5. P	6. I, P, S	7. P	8. I
9. P	10. I	11. P	12. P

Task 13:

1. Computer hardware is the physical part of a computer. Computer hardware is what you can physically touch. Hardware components are easy to recognize, such as the computer case, keyboard, mouse, and monitor. It also includes all parts inside the computer case such as motherboard, video card, hard disk drive, and many others

2. Computer hardware is the physical part of a computer, as distinguished from the computer software which executes or runs on the hardware. The hardware of a computer is infrequently changed, while software and data are modified frequently. Computer software, on the other hand, is not something you can touch. Software is a set of instructions for a computer to perform specific operations. The term soft refers to readily created, modified, or erased. These are unlike the physical components within the computer which are hard. Some hardware components are easy to recognize, such as the computer case, keyboard, mouse, and monitor. It also includes all parts inside the computer case such as motherboard, video card, hard disk drive, and many others. Computer hardware is what you can physically touch.

3. The mother board includes many components such as: central processing unit (CPU), random access memory (RAM), firmware, and internal and external buses.

4. The Central Processing Unit is a machine that can execute computer programs. It is sometimes referred to as the brain of the computer.

5. RAM is a set of integrated circuits that allow the stored data to be accessed in any order (why it is called random).

6. Firmware is loaded from the Read only memory (ROM) run from the Basic Input-Output System (BIOS). It is a computer program that is embedded in a hardware device, for example a microcontroller. As it name suggests, firmware is somewhere between hardware and software.

7. Three. They are CD, DVD and floppy disk.

8. CDs

9. Because they have limited storage capacities

Task14:

1T 2T 3NI 4F 5T 6F 7NI 8F 9T

Task 15: *Student's answer*

Further Reading: Students' answers

UNIT 6: Computer networks

6.1. Start-up

Task 1:

For students with little IT knowledge, the discussion questions provide a lead-in to the topic as they relate networking concepts to real life. More knowledgeable students could also suggest other networks in everyday life, such as cash registers and credit card machines in supermarkets, and mobile phones.

Task 2:

1. LAN: This provides the ability for a group of computers to communicate directly within a relatively restricted area, usually within one building. It does not require the use of public telephone lines.

2. WAN: This provide the ability for computers to communicate over large distances using public telephone lines. These may international. WAN may be used to connect a number of LANs.

3. A distributed system is the one in which the processing is spread over a number of computers connected by a network. The network is used to pass information and control the processed.

6.2. Reading 1

Task 3:

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

Task 4:

a. Paragraph 2

b. Paragraph 3

c. Paragraph 5

d. Paragraph 1

e. Paragraph 4

Task 5:

1. Protocol
2. Distinction
3. Distributed
4. Workstations
5. Screen handling
6. queries
7. parses
8. LANs
9. synchronous
10. fibreoptic
11. environment

Task 6:

1. unclear (paragraph 1) = blurred
2. place (paragraph 2) = locality
3. carry out (paragraph 3) = perform
4. cost (paragraph 4) = price
5. world-wide (paragraph 5) = global

Task 7:

1. disparate (paragraph 1) >< localized
2. conflict (v) (paragraph 1) >< cooperate
3. preventing (paragraph 1) >< enabling
4. tiny (paragraph 1) >< vast
5. increase (paragraph 1) >< reduce

6.3. Writing

Task 8: *Student's answer*

6.4. Listening

Task 9:

Before students listen, ask what jobs the people in the photograph might have. If they suggest sales person, discuss alternative words or abbreviations for this job, such as sales representative, as here, sales rep and rep. Check also that students remember what connecting, plug into and secure/security from the previous unit mean. Wi-fi is also mentioned; as this is a trademark used around the world, it may be familiar to students already.

Students then listen and answer general questions on the conversation.

1. not very secure
2. very secure
3. as easy as the current system

Task 10:

Students listen more closely this time, and take notes about the three items listed. They could compare their notes in pairs and then listen a third time to check and expand their notes to practice using relative clauses. Less confident students could read the audio script on page 74.

Suggested answers

1. A dongle is a device that plugs into laptop computers. You can send data through the mobile phone system with it.
2. Wi-fi is a type of network that doesn't use cables.
3. A VPN is a type of network that is very secure.

6.5. Reading 2

Task 11:

e. ring b. star c. bus/ethernet d. switch

Task 12:

1. What is central switch used for?
2. Can data move in more than one direction?
3. Can more than one device send information at any moment?

4. How do devices know that the massage is for them?

5. What happens when a sending device detects another's transmission?

Task 13:

1. Ring

2. Bus/star/switched

3. Bus

4. Star

5. Ring

7. Bus/ star/ switch

6.5. Speaking

Task 14: *student's answer*

Word-play

Task 15: *Use the clues below to solve the crossword puzzle.*

Across	Down
1. user interface	2. Synchronous
5. Install	3. area network
7. broadcast	4. Expansion
9. local	6.WAN
10. switched	8. Star

6.6. Language focus

Exercise 1: Link each action (1-10) with a suitable consequence (a-j).

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

Example: *If you place a floppy disk near a magnet, you will destroy the data.*

Exercise 2: possible answer

1. Your data in RAM will be lost if you store your data in RAM

2. In a ring topology if one of the cable breaks, the whole net work will fail.

3. If you input the wrong password, you won’t be able to access to the network.

4. If your monitor is too bright, it may damage your eyes.

5. The network won’t be affected if you remove one of the computers from the bus topology.

UNIT 7: Computer viruses and Computer security

7.1. Start-up

Task 1: *Student's answer*

Task 2 + 3: There are a variety of security measures that can be used to protect hardware (the physical components of a computer system) and software (programs and data) including:

1. Controlling physical access to hardware and software.

2. Backing up data and programs (storing a copy of files on a storage device to keep them safe).

3. Implementing network controls such as:

a using passwords (a secret code used to control access to a network system) b installing a firewall (a combination of hardware and software used to control the data going into and out of a network. It is used to prevent unauthorised access to the network by hackers).

c encrypting data (protecting data by putting it in a form only authorised users can understand)

d installing a callback system (a system that automatically disconnects a telephone line after receiving a call and then dials the telephone number of the system that made the call, to reconnect the line. It is used in remote access systems to make sure that connections can only be made from permitted telephone numbers).

e using signature verification or biometric security devices (security devices that measure some aspect of a living being e.g. a fingerprint reader or an eye scanner).

4 Separating and rotating the computing functions carried out by employees and carrying out periodic audits of the system i.e. observing and recording events on the network systematically.

5. Protecting against natural disasters by installing uninterruptible power supplies (battery backup systems that automatically provide power to a computer when the normal electricity source fails) and surge protectors (electronic devices that protect equipment from damage due to a sudden surge in a power supply).

6. Protecting against viruses by using antivirus programs (computer programs or sets of programs used to detect, identify and remove viruses from a computer system) and ensuring that all software is free of viruses before it is installed. Particular care must be taken when using public domain software (free software) and shareware (software that is free to try out but must be paid for if it is used after the trial period).

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

An anti-virus program is a program that checks files for virus coding instructions inside another program and can be used for removing any virus coding instructions detected A backup program is a program that stores a copy of data on a storage device to keep it safe. There are different kinds of backup, including:

a Incremental backup which copies all the selected files that have been created or changed since the last full, differential or incremental backup. These files are identified by the fact that their archive bit would be on. The archive bit is a digital bit stored with a file indicating if the file has been backed up since it was last edited. The archive bit is switched off when the file is backed up using a full or incremental backup.

b Differential backup which copies all the files created or modified since the last full backup. The archive bit is not set to 'off' by a differential backup.

c Full backup which copies all the selected files on a system, whether or not they have been edited or backed up before.

A series of incremental backups and a full backup, or the most recent differential backup and a full backup, is known as a backup set.

Reading in Information Technology often involves graphics and tables like this one rather than traditional linked text. This task provides practice in scanning a table which contains a considerable amount of condensed data for specific detail. Do this individually, then compare in pairs.

Key 1 and 2

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

7.2. Reading 1

Task 4:

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

Task 5: *(students' answers)*

Task 6:

1T 2F 3F 4NI 5NI

Task 7: *Answer the questions about the text.*

1. A computer virus is a form of malicious software that piggybacks onto legitimate application code in order to spread and reproduce itself.
2. In the early time, pre internet days, viruses often spread from computer to computer via infected floppy disk. Today, viruses spread via internet.
3. There are various types of viruses.
4. No, it isn't
5. Antivirus software is the most widely known product in the category of malware protection products.

Task 8: *Look back the text decide what the italic words refer to.*

1. it => biological
2. they => files
3. they => vectors
4. itself => virus
5. which => trojans

Task 9: *Using the paragraph reference given, look back the text and find words or phrases with similar meaning to:*

1. reproduces (paragraph 1) = replicates
2. infect (paragraph 1) = spread to
3. changing (paragraph 2) = altering
4. immediately (paragraph 6) = instantly
5. complain (paragraph 7) = grumble

7.3. Listening

Task 10:

The focus now moves back to social networking, more specifically, enterprise social networking. By picking up on points that students made in Activity 3, explain that enterprise social networking is a type of social networking system designed specifically for the workplace. Depending on your students' knowledge of IT and the world of business, you may be able to elicit from them some examples and their features and capabilities.

Students now listen to a company's general manager talking to an IT officer about replacing the company's current but rather limited enterprise social networking system. For this first listening, students answer a gist question.

Easy. Most of the requested features are common.

Task 11:

Before this second listening, which is for a more detailed understanding, go through the features of enterprise social networking systems listed in the table. Students have to tick the appropriate column in a table to indicate whether each is in the current system or is a new feature that the manager wants in the new system.

Current system: 1,2, 3, 6

New system: 4, 5, 7, 8

7.4. Reading 2: Computer security

Task 12:

1. Computer security basically is the protection of computer systems and information from harm, theft, and unauthorized use. It is the process of preventing and detecting unauthorized use of your computer system.
2. They are confidentiality, integrity, availability and authentication

3. Computer security threats are possible dangers that can possibly hamper the normal functioning of your computer.
4. Information security is securing information from unauthorized access, modification & deletion. Computer Security means securing a standalone machine by keeping it updated and patched. Cybersecurity is defined as protecting computer systems, which communicate over the computer networks.
5. Viruses, Computer worm, Phishing, Botnet, Rootkit and Key logger

6. Speaking

Task 13: *Student's answer*

7.4. Writing

Task 14: *Student's answer*

7.5. Language focus

- Listing

Exercise 1:

1. first 5. Another

2. then 6. next

3. Thirdly 7. Finally

4. Next

Exercise 2:

1. first 5. then

2. next 6. the next

3. then 7. lastly

4. also

•Cause and effect

Exercise 1: Read the following sentences and underline the part which expresses the *cause*.

1. <u>Because a modem can be used for inter-computer communication</u>, many people can now do their office work on their computer at home and transfer the files to a computer at the office.

2. Many people do not explore new software <u>because they are comfortable with what they already have.</u>

3. When robots malfunction, it is usually <u>due to mistakes in the programming or the design.</u>

4. <u>Laser printers can be quite expensive</u> and are therefore often shared through networks.

5. <u>Voice-recognition systems are becoming more sophisticated</u>. Thus, keyboards may be unnecessary in the future.

Exercise 2: Read the following sentences and underline the part which expresses the *effect/result*

1. Computers can remove many of the routine and boring tasks from our lives, <u>thereby leaving us with more time for interesting and creative work.</u>

2. Because there are many different types of printers, <u>you must analyse your needs before making a purchase.</u>

3. Since anyone can consult your files on a computer, <u>it is a good idea to protect sensitive files with a password.</u>

4. Fax boards are available to plug into your computer, <u>so you do not have to buy a fax machine.</u>

5. <u>Computers have been reduced in both size and cost</u> as a result of advances in design and technology.

Further reading: (students' answers)

UNIT 8: Computer applications

8.1. Start-up

Task 1: Try to answer these questions (Student's answer)

8.2. Reading 1

Task 2: *Using the paragraph references given, look back the text and find the words with a similar meaning to:*

1. whole (paragraph 1) =entire
2. usually(paragraph 2) = normally
3. acceptable (paragraph 3) = valid
4. seem (paragraph 6) = appear
5. believable (paragraph 7) = credible
6. decreasing (paragraph 8) = reducing
7. spreading (paragraph 10) = proliferating
8. ready (paragraph 10) = ripe

Now find the words that mean the opposite of:

9. danger (paragraph 1) > < safety
10. destroy (paragraph 4) > < create
11. rare (paragraph 4) > < plentiful
12. separate (paragraph 5) > < combine
13. minor (paragraph 7) > < major
14. less than (paragraph 8) > < upward
15. enjoyment (paragraph 9) > < suffering
16. aggravate (paragraph 9) > < alleriate

8.3. Listening

Task 3:

This recording, in which two technicians have a conversation, introduces some slightly technical information about video conferencing. The gist question asks which two types of video conferencing systems the woman talks about.

dedicated systems and desktop systems

Task 4:

Put students in pairs and ask them to attempt to complete the glossary. Then play the recording again to allow them to check their answers, and/or ask them to check against the audio script on page 77. Make sure they understand the meaning of location before doing this.

1. dedicated system
2. remote control
3. MCU
4. (data) compression

Task 5:

To practise identifying conditionals and relating them to meaning, students listen to five people talking about video conferencing. They decide whether the situation being talked about is likely (first conditional) or hypothetical/ unlikely (second conditional).

1. likely
2. unlikely
3. unlikely
4. likely
5. unlikely

8.4. Reading 2: Computer in medicine

Task 6:

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

Task 7:

Possible answer

1. X-ray and scan technology, inventory control, patient details, billing rates, treatment statistics, drug records, bed records, staff records, ect.

2. A database management system

3. Its function is to manage multi-user databases – to handle requests for access data from users, manage record locking for multi-user access, provide database integrity recovery in the event of system failure, and split data structures from the program accessing the data (very important for system maintenance, as it allows the data structure to be easily changed without necessarily having to modify all programs accessing the data)

Task 8:

4 – 2 – 3 – 6 – 1 – 5

Task 9: *student's answer*

Task 10: *Choose the correct word to complete each sentence. You may have to change the form of the word.*

1. a. consider	2. a. applicants	3. a. explanatory
b. considerable	b. applicable	b. explanation
c. consideration	c. applying	c. explain
d. considerably	d. applications	d. explained

4.a. dependably	5. a. connectivity
a. dependence	b. connections
b. dependable	c. connector
c. depend	d. connected

8.5. Speaking

Task 11: *Student's answer*

8.6. Writing

Task 12: *Student's answer*

Word Play

Task 13:

Across:

1. virtual	6. reality
2. external	7. machine
3. schema	8. in batch
4. internal	9. Multi-user
5. instrument	10. compressing
11.image	

Down:

12.transmitter

8.7. Language focus

Exercise 1:

1. are registered	5. is contacted
2. is evaluated	6. is arranged
3. is allocated	7. are dealt with
4. is required	8. be supplied

Exercise 2:

1. is called	5. are transformed
2. is used	6. are performed
3. are passed on	7. is opened
4. is stored	8. is stored/ is generated/ is written

Exercise 3:

1.was founded	5. were set up
2. was developed	6. was built
3. was made	7. were launched
4. were sold	8. was reversed/ was taken

Unit 9: Overview of mobile and embedded software engineering

9.1. Start up

Task 1:

1. Name these mobile apps.

a. facebook

b. Grab

c. google map

d. gmail

e. web browser

f. calculator

g. calendar

2. Fill a name of mobile app in the correct description

a. gmail

b. google map

c. grab

d. calendar

e. web browser

f. facebook

g.calculator

9.2. Reading 1

Task 2: *Student's answer*

Task 3:

The term "app" is a shortening of the term "application software"

1. What does the term "app" refer for?

A mobile app is a software application designed to run on mobile devices such as smartphones and tablet computers.

2. What is mobile app?

Apps that are not preinstalled are usually available through distribution platforms called app stores

3. What are app stores?

They began appearing in 2008 and are typically operated by the owner of themobile operating system

4. Who operate the app stores?

For apps with a price, generally a percentage, 20-30%, goes to the distribution provider (such as iTunes), and the rest goes to the producer of the app

5. How much does the producer usually get for an expensive app?

The term "app" is a shortening of the term "application software". It has become very popular, and in 2010 was listed as "Word of the Year" by the American Dialect Society.

6. What did the American Dialect Society call as “Word of the Year” in 2010?

In 2009, technology columnist David Pogue said that newer smartphones could be nicknamed "app phones" to distinguish them from earlier less-sophisticated smartphones

7. Why can newer smartphone be nicknamed as “app phone”?

However, public demand and the availability of developer tools drove rapid expansion into other categories

8. Why were later mobile apps offerd for other categories?

Market research firm Gartner predicted that 102 billion apps would be downloaded in 2013 (91% of them free), which would generate $26 billion in the US, up 44.4% on 2012's US$18 billion.[10] By Q2 2015, the Google Play and Apple stores alone generated $5 billion

9. How many apps were Market research firm Gartner predicted to be downloaded free in 2013?

while over 529,000 jobs have been created in 28 EU states due to the growth of the app market

10. According to the text, how many jobs have been created in 28 EU states due to the growth of the app market?

Task 4: *Look back the text and find words that have a similar meaning to:*

1. undesired
2. in contrast to
3. called
4. apps with a price
5. is a shortening of
6. rapid
7. prevalent

Task 5: *Decide whether the following statements are true (T) or false (F) in relation to the information in the text. lf you think a statement is false, change it to make it true*.

1. T
2. F (Some apps are free, while others must be bought)
3. T
4. F (The explosion in number and variety of apps made discovery a challenge.
5. F (in Q2 2015).

9.3. Reading 2

Task 6: *Answer the questions about the text.*

For 16-bit systems, most OS products do not support TCP/IP networking directly. For this reason, Micro/sys developed the Embedded Netsock system, which is stored in flash with our RUN.EXE firmware

1. Because most OS products don’t support TCP/IP networking directly.
Micro/sys developed the Embedded Netsock system, which is stored in flash with our
RUN.EXE firmware. In simplistic terms, Embedded Netsock extends the on-board BIOS to be able to directly manage a very limited subset of TCP/IP networking with no third party products. Therefore, no OS needs to be installed, as a single .EXE file that has included the NETSOCK.H include file can be executed directly by the computer's on-board firmware
2. Because a single .exe file that has included the netsock.h include file can be executed directly by the computer’s on-board firmware.
If you are using a 32-bit OS, it is most advisable to use the TCP/IP network stack that is supplied with that OS. This provides the maximum amount of integration, and therefore the least amount of work
3. Using the TCP/IP network stack that is supplied with that OS.
Once the edit, compile, link, and optionally locate, cycle is done, you need to have a debug strategy
4. It’s a debug strategy.
5. Borland C++ Versions 2.1 through 5.0; Microsoft C/C++ Versions 5.1, 6.0, and 7.0; Microsoft Visual C++ Version 1.52

Task 7:

1. F (For 16-bit systems, most OS products do not support TCP/IP networking directly)
In simplistic terms, Embedded Netsock extends the on-board BIOS to be able to directly manage a very limited subset of TCP/IP networking with no third party products
2. F (Embedded Netsock can directly manage a very limited subset of TCP/IP networking with no third party products)

If you are using a 32-bit OS, it is most advisable to use the TCP/IP network stack that is supplied with that OS

3. F (You should use the TCP/IP network stack with a 32-bit OS.)

At the very lowest level, you can always embed debug printout messages into your source code, and have it tell you what it's up to

4. T

Micro/sys supports Microsoft C/C++ Versions 6.0, for use during the development of systems incorporating Micro/sys embedded PCs

5. T

UNIT 10: DEVELOPMENT OF SOFTWARE FOR MOBILE DEVICES

10.1. Start up

Task 1: *Student's answer*

10.2. Reading 1

Task 2: *Student's answer*

Task 3: *Answer these questions about the text.*

1. How many major phases are there in the lifecycle of mobile development? What are they?

Five, they are inception, design, development, stabilization and deployment.

2. What are you interested in when you develop a public app?

Competitive advantage; Infrastructure integration; Value; and Form/mobility

3. How do fundamental questions play a role in developing app?

They help to creat a successful app.

4. Why should you define actors and use cases when you creat an app?

Because it can help with designing the functionality of an app?

5. What are actors within an app?

They are roles and are often users.

6. Which tools may you use to design UX?

Balsamiq, Mockingbird, Visio, or just plain ol' pen and paper. UX Mockups

7. What is switching between sections different from iOS and Android?

iOS uses a tabbar at the bottom of the screen while Android uses a tabbar at the top of the screen

8. Which graphic designer portfolios may you find at websites?

Behance.com and Dribbble.com

9. What do you do in the Stabilization phase?

We work out the bugs in the app.

10. How many ways of distribution does the text mention? What are they?

Three: Apple App Store; In-House Deployment; Ad-Hoc Deployment

Task 4: *Look back the text and find words that have a similar meaning to:*

1. consists of - contains (paragraph 1)
2. phase - stage (paragraph 4)
3. building - creating (paragraph 2)
4. cost a lot - be expensive (paragraph 3)
5. bugs - errors (paragraph 5)

Task 5: *Decide whether the following statements are true (T) or false (F) in relation to the information in the text. lf you think a statement is false, change it to make it true*.

1. F (The lifecycle of mobile development is largely no different than the Software Development Lifecycle (SDLC) for web or desktop applications)

The lifecycle of mobile development is exactly similar to the Software Development Lifecycle (SDLC) for web or desktop applications

2. T

Phases in the lifecycle of mobile development may be done insequently

3. F (Use cases are typically actions or intents.)

Use cases are users within an app.

4. T

According to the text two use cases Creat a Task and Share a Task in task tracking app are different.

5. F (Windows Phone uses the Panorama view)

Windows Phone uses a tabbar at the bottom of the screen to switch between sections.

6. F (The development phase usually starts very early)

The development phase usually starts quite lately.

10.3. Reading 2

Task 6: *Answer these questions about the text.*

1. Why an mobile app can be in foreground at one time?

Because screen of mobile is often limited.

2. What is the 2nd challenge to multitasking on a mobile device?

Battery power can be eaten quickly.

3. How many categories of mobile devices are usually there? What are they?

Two: phones and tablets

4. How is difference between sizes of mobile screen and tablet screen?

Mobile screen is often smaller than tablet screen.

5. What do you control multitasking in iOS by?

Conforming a number of rules and behaviors when another app comes to the foreground.

6. How many components are there to multitasking in android? What are they?

Two: the activity lifecycle and the use of Services

7. How many parts does Multitasking in Windows Phone have? What are they?

Two: the lifecycle for pages and applications; background processes

8. Which database engine does Android include?

SQLite

Task 7: *Decide whether the following statements are true (T) or false (F)* in relation to the information in the text. lf you think a statement is false, change it to make it true.

1. T

There are more than one significant challenge to multitasking on a mobile device

2. F (Designing apps for phones and tablets can be very different.)

Designing apps for phones and tablets is generally the same.

3. T

Tablet screen space is less limited than laptop screen.

4. F (mobiles'memory capacities are limited than laptops')

laptops'memory capacities are limited than mobiles'

5. F (Windows Phone 7 did not include a database)

Windows Phone 7 included SQLite database.

AUDIO SCRIPT

Unit 1: Personal Computing

Task 2 (track 02)

1. Hi there. I’m Maria. I have a great job. I write software for the company’s computers.

2. Hi. I’m Ahmed. I supervise a team of technical support people. When our customers have a problem, we help them to get things working again.

3. Hello. Freddy here. I work for XBM Technology. I’m responsible for our IT projects. I have to plan projects and make sure they’re finished on time, and also that they don’t cost too much money! It’s a very stressful job!

4. My name’s Hana. Hi! I look after all the computers in the company’s offices. I set up new computers, install software and generally keep everything working. And if someone has trouble with their computer, it's me who has to diagnose the problem and fix it. Oh, my job title: I’m a support technician.

5. Hi! My name’s Timothy but most people just call me Tim. In my job, I design databases, then develop them and later maintain them.

6. Hello. I’m Sophie. 1 have a very interesting job. When a company wants US to write software for them, I visit them and find out exactly what they need. Then I write specifications for the software. Our software developers then write the software to match the specifications. My job title is systems analyst.

Task 4 (track 03)

A: Hi, Robert. Just to help me understand what you do, could you tell me about your daily routine?

B: Well, every day is different. But generally, I arrive at work at about 8.30, go straight to my desk and check my emails. I usually have a few of them. I reply to as many as I can but by nine, when most of the office staff arrive, my phone generally starts ringing.

A: So how do you actually help people?

B: Hmm ... it depends. I normally by to visit people at their desk but occasionally, problems come in from sales people while they are out visiting customers - problems with their laptop, for instance. Then I have to solve the problem on the phone or by remote access. This isn’t very common though.

A: And what else do you do?

B: Well, from time to time, I have to attend meetings with managers and talk about our IT systems. And a few times every year, 1 speak to visitors who are selling equipment we might want to buy. 1 hardly ever go out to visit them though - just once when I went to the local computer shop for a cable because we couldn’t wait for delivery...

Unit 2: Portable computers and the operating system

Task 8 (track 07)

OK, see the large thing with silver-coloured edges, near the middle - well, just above the middle? That's the CPU socket, where the CPU, the central processor unit, goes. Now, can you see the long orange and white slots to the right of the CPU? There's a white one, an orange one, then another white one and another orange one. They're for the memory - for the DIMM memory modules. Now look at the bottom of the board. See the green and orange slots of different lengths? These are where the graphics card and things like that go. Now, looking at the left-hand side: this is where the connectors are. The lower ones, nearer the bottom, are the audio sockets, for the sound. And above them is the Ethernet connector, where you plug the network cable in. And higher up are some USB ports, for connecting your peripherals - you know, things like your keyboard and printer. And the hard drives and Blu-ray drive? They plug into the SATA sockets - they're the orange things in the bottom right-hand corner. See the five of them?

Task 9 (track 10)

A: OK, so first, can you see 'Computer' in the left-hand pane?

B: Er... mm ... no, I don't think so.

A: OK, can you scroll up to the top?

B: Ah, yes. I can see it now.

A: Now, right-click on that and a menu will appear.

B: OK.

A: Just select 'Manage'. There may be a short wait but a box should appear. Can you see it yet?

B: Mm ... not yet. Ah, yes! There it is.

A: Can you see where it says ‘Storage’, in the left-hand pane?

B: Yep.

A: Just to the left of that is a little box with a plus sign. Click on that.

B: Um ... yep, got it!

A: And a new icon will appear, labelled ‘Disk management’. Click on that and a list of your drives will appear in the centre pane. How many are there?

B: There are two: ‘Disk 0’ and ‘Disk r.

A: I see. Now, just right-click where it says ‘Disk 0’ and choose ‘Properties’ from the menu. Then, from the box that appears, choose the ‘Details’ tab. Then you’ll see a drop-down menu.

B: Yep, got it.

A: In that drop-down menu, select ‘Install date’.

B: Um ... just a moment while I look for it...

A: It’s about half way down. You’ll probably have to scroll down a bit.

B: Ah, yes. Here it is.

A: OK, thanks. What date does it say?

B: 7 December 2011.

A: OK. Thanks very much.

Unit 3: Online service and computer configuration

Task 4 (track 12)

A: Hi, is that the IT Department?

B: Yes. Can I help you?

A: Er... yes. I'm having trouble with the new browser we're using on our PCs.

B: OK, what's the problem?

A: Well, the old one had a box for searching.

B: The search bar? Yep, this one has it too but it's the same place that you type the web address into.

A: Ah, you mean that one that starts with 'http'?

B: Yep, that's it.

A: OK, let me try it. I need to open a new tab first. I knew how to do

Unit 4: Programming and language

Task 3 (track 38)

Now, to begin with, there are two main variables, called g_Move and g_Turrt. The first one, g_Moue, tells the robot which way to go: back, forward or stay still. If g_Move is zero, the robot doesn't move.

B: OK.

A: The second variable, g-Turn, tells it to turn left, turn right or not to turn.

B: 1 see. So, if g_Tum is zero, it doesn't turn?

A: That's right. Now, look at the first line of the code, here. It sets g Moue and g-Tum to zero.

B: Telling it not to move and not to turn?

A: That's right.

B: I see. And the next line?

A: See this variable here, key-Press'! This has the value of the key pressed on the phone. So, if you press 'a' on the phone, for example, key-Press has the value a.

B: And if I press the 'x' key on the phone, key-Press takes the value X?

A: Yep, you've got it.

Task 5 (track 39)

A: Now, let's look at the if statements. See the four of them here?

B: Yep.

A: Now, the first one looks at key_Press. If key-Press is 'a', then g_Moue becomes 1.

B: In other words, pressing 'a' on the mobile phone means that g_Move takes the value of 1?

A: That's correct. And later in the program, we'll see that if g_Move is 1, the robot moves forwards a step.

B: 1 see! So, looking at the next line, if you press ‘f ’ on the phone, g_Move becomes 2 and the robot moves forwards 2 steps?

A: Well, the first bit’s right, yes. G_Move becomes 2. But 2 actually makes the robot move back a step.

B: Mm ... I see. So, for the next one, if you press ‘s’, 1 can see lhatg_7u/T? becomes 1 ... but does that make the robot turn right or left?

A: It turns left.

B: So, pressing ‘d’ makes it turn right.

A: That’s correct.

A: OK, let’s have a quick look at the Gantt chart. What’s our schedule?

B: Well, the systems analysts are finishing their tasks at the end of week 3, so your team is scheduled to start coding in week 4. Then the second milestone, being ready for alpha testing, is due in week 9.

A: So... we have five weeks to do the coding?

B: Yep, that’s right. And then the alpha testing is due to finish at the end of week 10, so you’re scheduled to deal with the feedback from that in week 11.

A: And we have two weeks to do that... and then, according to the chart, we start again in week 16, after the alpha testing. Hmm ... we only have a week after the beta testing? That doesn’t sound very long!

B: You’re right. That’s rather short. I think there’s a mistake; the beta testing should only last two weeks, not three. So you should have two weeks to deal with the feedback. 1’11 change the chart. Two weeks for beta testing and two weeks after that for you to do the debugging.

A: OK. That’s better. Thanks very much!

B: That's OK. We should still be able to finish the project before week 18.

Unit 5: Software and hardware

Task 8 (track 19)

Oh, yes, I was going to walk you through our client database. It's quite simple and it has the usual objects - tables, forms and reports. Now, here's the table for the client companies. It looks like a spreadsheet, doesn't it? Each record in the table is like a row on a spreadsheet. It has several fields - like cells in a spreadsheet. This one has the customer ID and information about the person who we contact at the company: given name, family name, job title, email address, you know, things like that. We give each customer a customer ID so that each record is unique - everyone has a different customer ID. Because it's unique, we can use it as the primary key.

Now, um ... there's another table here, the table for orders. We give each order a unique order number - that becomes the primary key for that table. And we have fields for item, number of items ordered, cost and so on.

Next, we have the forms, which make it easy to put information into a table. This one's for adding a new customer or updating customers' details.

And we have a few reports already prepared for printing. Here's one of them, the yearly report for total sales. We can also retrieve a record, of course, if we just want to look at one record. And if we want to combine information from more than one table, we can query the database. Is that making sense? Any questions so far?

A: Hey, Kevin. How's everything been?

B: Pretty good, l think. No major problems.

A: How did the upgrade to the accounting software go?

B: Quite smoothly, actually. We deployed it OK. I think most people didn't notice!

A: And the backups?

B: They're al) running smoothly. In the Design Department, one of the computers had a disk crash, so I put in a new one and recovered the data from backup. That was fine. It was up and running again in a couple of hours.

A: And the new staff members?

B: All good. I set their permissions on the system and showed them around the network.

A: And the steps we were going to take to improve security? B: Yep, the marketing team now have read-only access to the accounts data. And I locked them out of some areas completely.

A: And did you check the logs?

B: Well, I did but there was something that looked a bit strange. Let's check that out later?

A: Sure. And were there any other problems?

B: Just the usual small things -1 had to reset a couple of passwords that people forgot and sort out a problem with someone who thought his password wasn't working. The usual thing - he'd just left his 'Caps Lock' on!

A: Great! Let's hope today goes as smoothly!

Task 10 (track 09)

A = Assistant; M = Manager)

A: The shipment just arrived!

M: Great! Let's check everything's here. OK. I've got the order form here.

A: And here's the delivery slip from the shipment.

M: Right. Let's see if they match. What's first on yours?

A: Five laptops, each with a 2.73-gigahertz dual-core processor.

M: OK, that's fine.

A: And 390-gigabyte drives.

M: Ah! We ordered 500-gigabyte drives. Oh dear! How much memory do they have?

A: Eight gigabytes.

M: That's no good. We ordered 16. How about the video card?

A: Ladeon 3850. One gigabyte.

M: Well, at least they got that one right. And the screen resolution?

A: 15.6-inch, 1920 X 1080.

M: Hmm ... Should be 1366 X 768.1 won't complain about that though.

A: And four USB ports, no OS, one year warranty.

M: Yep, that bit's fine. How about the desktops? There should be ten of those?

A: Yep, that's what this says as well. And, er... yep, ten boxes.

M: And they should be 3.4 gigahertz and with eight cores.

A: Well, they're 3.4 gigahertz all right but they seem to be quad-cores.

M: Ouch!

A: All with two-terabyte hard drives.

M: You mean each has two drives, one terabyte each?

A: Nope, they each have one drive, two terabytes.

M: Oh dear! Still not what we ordered. We really need the two separate internal drives. How about the graphics card?

A: Two gigabytes.

M: That's OK.

A: And the optical drive is a 6 X Blu-ray drive.

M: Good.

A: And there are four USB ports and a wi-fi card.

M: Well, they got the optical drive and the wi-fi card right but we asked for eight USB ports! Oh dear! I'll call Dingle straight

Unit 6: Network

Task 9+10 (track 15)

A: And how are your sales team connecting to the internet nowadays when they're visiting clients?

B: Um ... they just log in in the normal way. They have dongles that plug into their laptops. With those, they can send data through the mobile phone system. Or they can use a wireless connection.

A: Hmm ... that doesn't sound very secure.

B: What do you mean? They all have passwords.

A: Well, after the data leaves the computer, there are many ways for people to read it if they try hard enough.

B: Yeah, but that's not very common, is it?

A: Actually, you'd be surprised! It's happened to many of my clients.

B: Oh dear! What can we do?

A: Well, what I recommend is a VPN - a virtual private network, which is a very secure system that's easy to use. Your team will be able to log in from anywhere.

B: Sounds great! Is it difficult to use?

A: Not at all. Your sales team will log in as normal; they can use the same dongle or wi-fi networks as now. The system will encrypt your data - in other words, it will change your data so that no one else can read it; only your company's computers. Even the government won't be able to read it! You don't have to worry about security at all!

Unit 7: Computer virus and Security

Task 10 (track 31)

A: So, I think it's time to update our enterprise social networking system. I think we need a few more features - not just the chat and forums in our current system. And our staff are using the current one less and less nowadays. I'll tell you what we want - could you try to find something for US?

B: Yes, sure. No problem.

A: Great. Now for one thing, our staff are spending more time than before with emails. We need to help them be more productive with their time. One thing they ask for is to be able to access documents easily.

B: Actually, we have document management in our current system. It's not very easy to use, though, and I don't think many people know about it.

A: Ah, we need to tell people then! But can we add comments next to each document? Then people wouldn't have to send so many emails and everyone who uses the documents would be able to see the comments. We're doing more and more work with overseas departments nowadays, so this would be very useful.

B: Sure, we can get that. Comment features are normal in most new systems now.

A: And more people are working from home, so they need to access information there. Also, people need access while they are visiting customers.

B: Most systems have Android and Mac iOS clients for mobile phones nowadays, so that should be OK.

A: And security is becoming more and more important all the time. Can you make sure the new system is secure?

B: Yep, I can do that. We have some security features at the moment but they're not very good. We should get better ones: most current systems support encryption, for example.
A: And it would be great to be able to 'talk' to systems - you know, give them voice commands, voice recognition. Then they should be easier to use. That feature seems to be getting popular.
B: You mean speech-to-text capability? Sure, I'll look out for a system that has that. Or we could just use speech recognition software.

Unit 8: Computer application

Task 3 (track 32)

A: So, tel) me what you've found out about video conferencing systems. What is there?

B: Well, there are two kinds: one kind is a dedicated system and the other is a desktop system. Um ... dedicated systems usually have their special room with its own hardware -1 mean, the room would have a set of high-definition monitors, a video camera for each participant with remote controls and things like that.

A: I see. And the other kind?

B: Desktop systems are much simpler - we can use an ordinary PC, add some hardware and that's it. But the quality usually isn't as good.

A: Sounds more flexible though.

B: Yes, and cheaper as well.

A: Do we need anything else?

B: Well, an MCU might be useful.

A: What's that?

B: A multipoint control unit. With it, we can hold a video conference between three different locations - or more than three.

A: That sounds useful! If we had one of those now, we could connect to our Tokyo, Dubai and Paris offices! Now, how about bandwidth? Do these systems use a lot of bandwidth? I guess high-definition video would use a lot.

B: Yes, that can be a problem. But most systems use compression, which means they use a lot less bandwidth. Compression techniques are getting better all the time, so that's very helpful.

A: OK. Thanks very much for explaining all that! If we had a video conferencing system, we would save in other areas. Let’s have a look at a few systems and compare costs, and get one as soon as possible.

Task 5 (track 33)

1 If we buy a video conferencing system, we’ll save a lot of money on travel costs. The boss will be happy with that!

2 If we rented a video conferencing room, it would be much cheaper than buying one but we’d still have to travel to go to it.

3 If we bought a video conferencing solution, we’d have to build another room at the back of our premises! That would be very expensive!

4 If we buy a video conferencing system, we'll have to think carefully about security.

5 If we upgraded our system to high-definition, we’d have to get a much faster internet connection. And it would increase the bandwidth!