Family and Friends 6

Information Technology

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OXFORD

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Activities

Before reading

1 Is information technology important in your life? How often do you . . .

	Every day	Every week	Not very often
1 send emails?	☐	☐	☐
2 look for information on the Internet?	☐	☐	☐
3 take photos with a mobile phone?	☐	☐	☐
4 listen to music on an MP3 player?	☐	☐	☐
5 play computer games?	☐	☐	☐

2 Read these sentences. For each sentence, circle 1 (strongly disagree), 2 (disagree), 3 (not sure), 4 (agree) or 5 (strongly agree).

1 Information technology has made people's lives better in a lot of ways.

1 2 3 4 5

2 In the future people won't have to work hard, because computers will do most of the work.

1 2 3 4 5

3 People are getting fat and lazy, because they spend too much time using computers.

1 2 3 4 5

4 Older people do not need to use information technology – it is for young people.

1 2 3 4 5

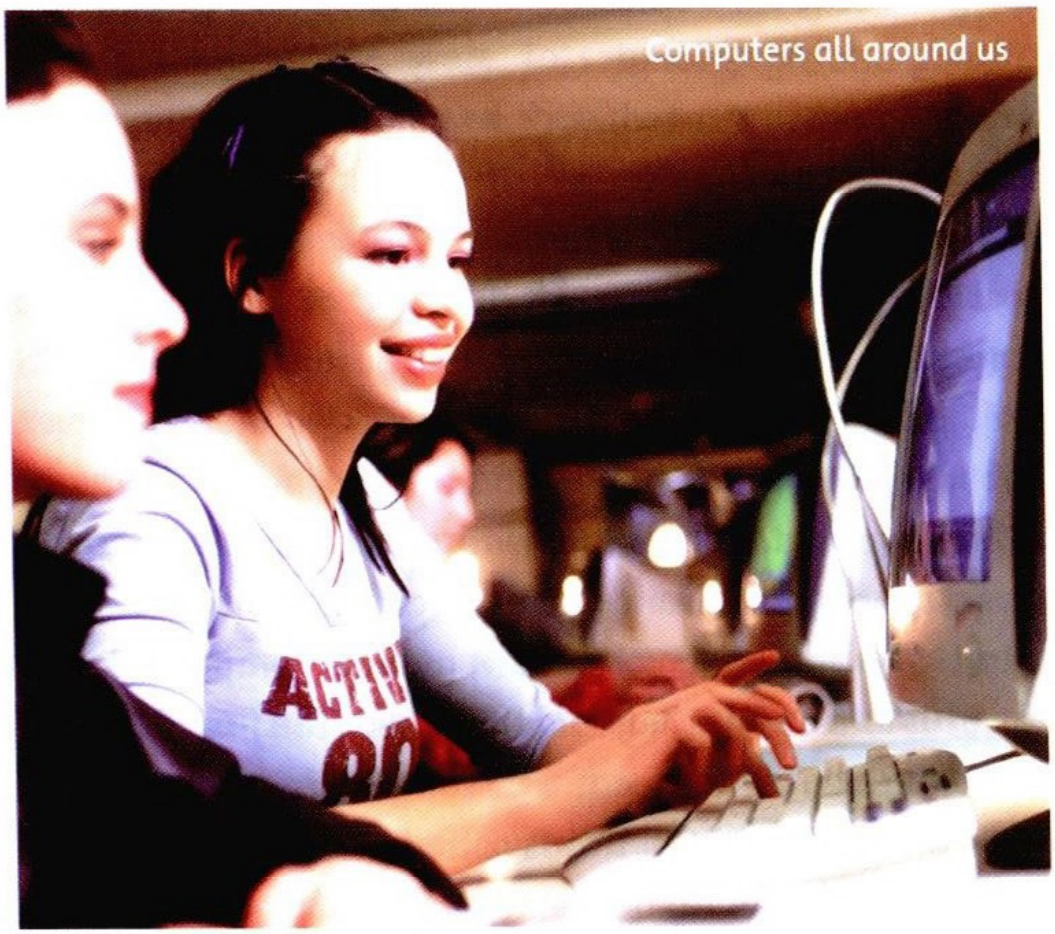
CHAPTER 1 How computers began

Today it is hard to imagine a world without computers. They are everywhere, in homes and offices, and they are in many of the machines we use every day: cars, televisions, radios, washing machines ... But it was very different sixty years ago. When computers were first built in the 1940s and 1950s, they were very difficult to use, and only a few people understood them. They were enormous – each computer was as big as a room! In 1949 the magazine *Popular Mechanics* made this prediction: 'One day computers will be really small; in fact, they will weigh less than 1.5 tonnes.' Now computer chips can be smaller than the full stop at the end of this sentence. Over the past fifty or sixty years computers have changed much more than people thought possible.

prediction saying what you think will happen

weigh to measure how heavy something is

computer chip a small piece which is the thinking centre of a computer



Computers all around us

The word 'computer' used to mean a person, not a machine. In the nineteenth century builders and technicians needed to know the answers to very difficult calculations to help them do their work. They did not have the time to do these calculations themselves, so they bought books of answers. The people who did the calculations and wrote the books were called 'computers'.

In the 1820s a British mathematician called Charles Babbage invented a machine that did very difficult calculations automatically: the Difference Engine. He did not finish building it at the time. But in the late 1980s some technicians from the Science Museum in London built a Difference Engine, which is still in the museum today. It weighs about three tonnes, and it is nearly two metres tall and three metres wide. And it works: in the early 1990s it did a calculation and gave the right answer – thirty-one digits long!

Babbage then started work on another machine, called the Analytical Engine. The Analytical Engine could do more: it had a kind of memory. This meant that it was possible to write programs for it that did more and more difficult calculations. For this reason, the Analytical Engine is often seen as the first real computer. However, Babbage never finished building this machine either!

Babbage's ideas were ahead of their time. Slowly inventors began to build better calculating machines.

In 1957 a company called IBM made a computer called the 610 Auto-Point. They said that it was the first 'personal computer', but it was not like computers today. It was large and cost $55,000! It was called a personal computer, or PC, because it only needed one person to work it.

technician a person who works with machines

calculation using numbers to find out an amount

mathematician a person whose job is working with numbers

invent (*n* **invention**) to make something that did not exist before

automatically without needing a person

museum a place where you can look at old or interesting things

memory the part of a brain or of a machine that remembers things

real not false

company (*plural* **companies**) a group of people all working to make or do something for money

The first computers were too big, heavy and expensive to have in your home. But in the 1960s technicians found a way to make computer chips with thousands of very small transistors on them. An American inventor called Ed Roberts made one of the first PCs, called the Altair 8800. People who bought an Altair 8800 got a box of parts to put together at home to make the PC. It cost less than $400, and Ed Roberts sold 2000 in the first year.

In 1976 Steve Wozniak and Steve Jobs started the Apple Computer Company. In 1977 their second computer, the Apple 2, appeared. It was popular, and the company made $700,000 that year. The next year the company made $7 million! Personal computers had become a part of ordinary people's lives. IBM made their first home computer in 1981, and the *Time* magazine 'Person of the Year' in 1982 was not a person at all – it was the PC.

In the 1980s the market for home computers grew very quickly. There were lots of different computer companies, and many used their own operating systems. But some companies, like Dell and Compaq, made 'IBM-compatible' computers, which meant that they used the same operating system and the same software as an IBM PC. IBM-compatible computers were more successful than the other kinds of PC, and today nearly all PCs are IBM-compatible.

Apple is the only famous computer company which still uses its own operating system. In 1998 it started selling the iMac – a computer that looked very different from other PCs at that time. People chose the iMac because they thought it looked good in their homes. Apple is now also famous for its media players (iPods) and mobile phones (iPhones).

transistor an electronic switch

appear to come and be seen

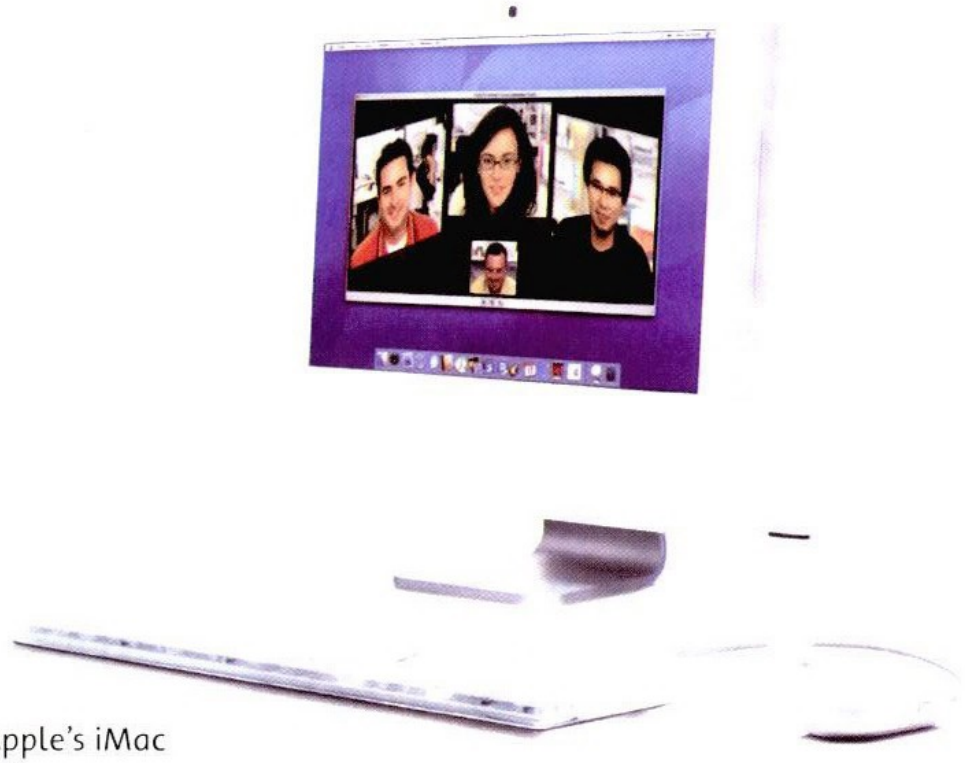
market the people who want to buy something

operating system the software that lets computers understand programs

system a group of things that work together

software computer programs

successful getting or doing what you want



Apple's iMac

As computer chips became smaller during the 1980s, companies began to make laptops. You could put them on your lap so you did not need to have a desk. These were very popular with business people, because they could take information with them when they travelled. With a laptop they could work at home, in hotel rooms and on aeroplanes.

Because today's computer chips work so fast, modern PCs can copy and keep music, films and a lot of information, and they can even understand spoken language. A modern laptop is much faster than the very large and expensive computers from the 1970s. For many people laptops are now part of ordinary life.

lap your knees, when you are sitting down

copy to make something that is the same as something else

CHAPTER 2 **Bill Gates and Microsoft**

PCs are a very important part of life today, but in the 1970s most people did not know very much about them. One of the first people to see the future of the PC was Bill Gates; because of this, he is now one of the richest people in the world.

Bill Gates was born in Seattle, USA, in 1955. He began to study computer programming at school, when he was thirteen. Later he went to Harvard University. While he was a student there, he and a friend, Paul Allen, wrote a computer program for the new personal computer, the Altair 8800. They showed it to Ed Roberts, the man who had invented this machine. Ed Roberts liked the software and agreed to use it. Gates and Allen started their own company – Microsoft.

Microsoft's first big success came in 1981. Apple PCs were already very popular, and so the computer company IBM decided to start building their own PCs. They asked Bill Gates to write an operating system for their PCs, and he wrote MS-DOS. It was not very easy to use, but it was still a big success.

In 1984 Apple made a new computer called a Macintosh. Bill Gates and Microsoft helped to write the operating system for this computer. It was much easier to use than MS-DOS, because there were pictures that showed you what to do instead of difficult instructions. Later Microsoft made their own operating system which used pictures – they called it Windows. Windows became the most successful piece of software in the history of computing. By 1986 Bill Gates was a billionaire at the age of just thirty-one.

programming writing codes that computers understand

university (*plural* **universities**) you study here after you leave school

success when something happens the way you want it to

instructions information about how to do something

history things that happened in the past

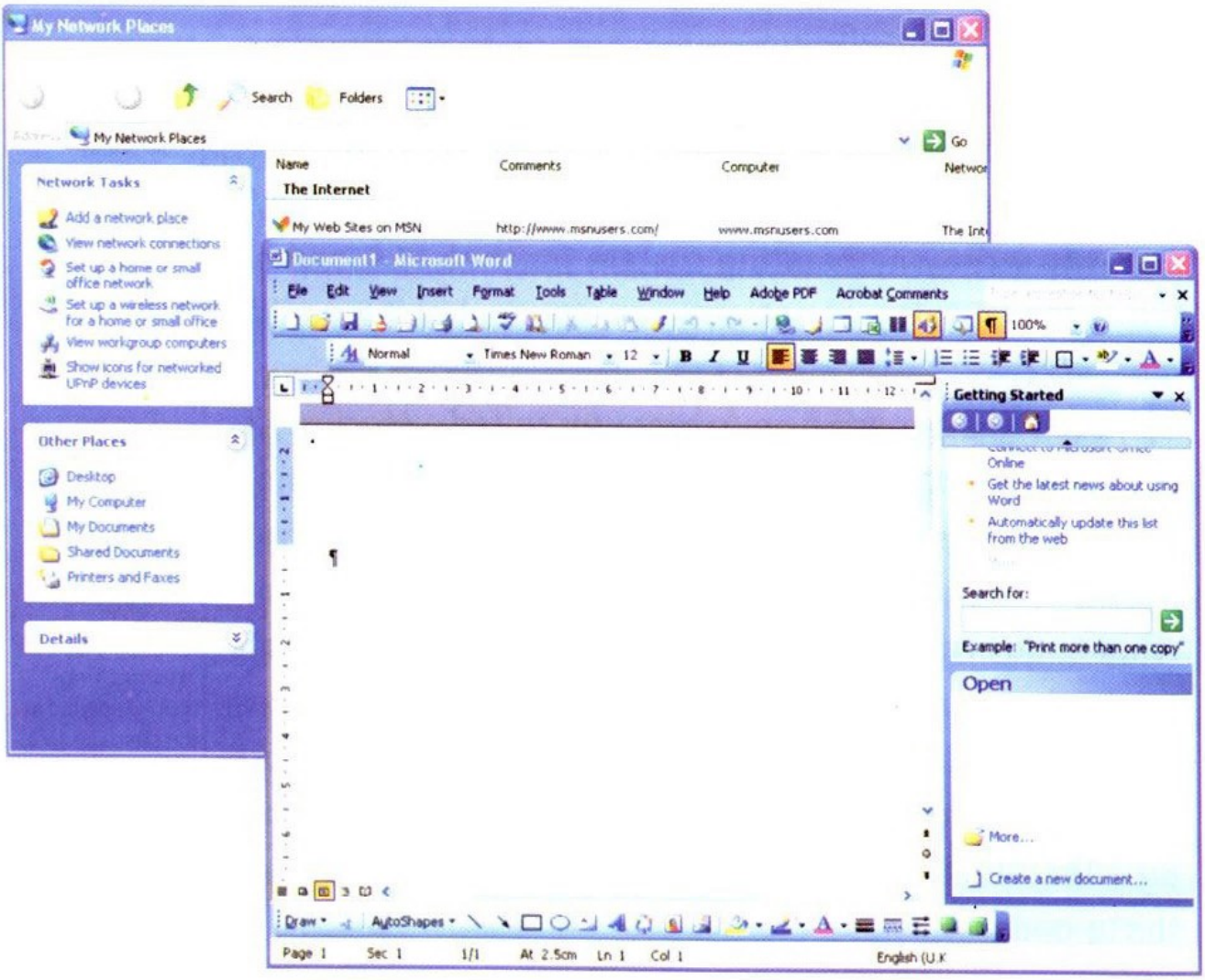
billionaire someone who has at least a thousand million pounds or dollars

power (*n*) (*adj* powerful) being able to control people or things

judge the person in court who decides how to punish somebody

In the 1990s Microsoft became even larger. In 1995 the new operating system (Windows 95) included a piece of software that let people use the Internet. Soon millions of people were paying Microsoft $20 a month to use the Internet.

Most PCs use the Windows operating system, so people usually buy Microsoft software too. It is difficult for small software companies to make people know about their programs. Many people are unhappy about Microsoft, because they think the company is too big and powerful. In 2001 judges in the USA decided that Microsoft had to share information about its operating system and software with other companies.



Bill Gates

Since the 1990s the Internet has given people a chance to find out about other kinds of software. Some programmers do not want money for their software – they just want to share ideas with other computer programmers. They call this kind of software 'shareware'. However, a lot of people are happy to pay money for the software which they use at home and in the office, so the future of Microsoft and other software companies is probably safe.

Bill Gates has been one of the richest people in the world for about twenty years. In 2000 he and his wife started a charity called the Bill and Melinda Gates Foundation. The Foundation spends more than $1.5 billion a year helping the poorest people in the USA and around the world. It pays for work to fight against diseases like malaria. It also helps schools and colleges. Since 2000 it has also given $250 million to libraries across the USA to help them to buy new computers.

share to let other people use something that is yours

foundation a number of people working together to help other people

college you study here after you leave school

Activities

1 Complete the sentences with these words.

Apple **Bill Gates** **Charles Babbage** **Windows** **Ed Roberts**

1 Charles Babbage invented the Difference Engine in the 1820s.

2 _____ invented the Altair 8800, one of the first PCs.

3 _____ started the company Microsoft with a friend.

4 _____ made a computer called a Macintosh.

5 Most PCs now use the _____ operating system.

2 Choose the correct answer.

1 At first the word 'computer' meant a . . .

a ☐ book b ☑ person c ☐ machine

2 The machine invented by Charles Babbage in the 1820s weighs about three . . .

a ☐ grams b ☐ kilos c ☐ tonnes

3 IBM made their first personal computer in . . .

a ☐ 1957 b ☐ 1981 c ☐ 1998

4 Computer chips have thousands of small . . . on them.

a ☐ transistors b ☐ calculations c ☐ technicians

5 A small computer you can carry around with you is a . . .

a ☐ desktop b ☐ laptop c ☐ soft-top

6 Computers use programs that people write for them, called . . .

a ☐ hardware b ☐ shareware c ☐ software

3 Rewrite these words from Chapters 1 and 2. Then complete each sentence with one word.

1 ummeus m useum
2 tssyme s _____
3 mmeroy m _____
4 pworelfu p _____
5 erhsa s _____
6 cpyo c _____
7 djgue j _____

a IBM-compatible computers use the same operating _____.
b Charles Babbage's Difference Engine is in the Science Museum in London.
c Don't _____ my homework! The teacher will see that it's the same.
d Microsoft is a very big and _____ company.
e A person in court who decides how to punish others is called a _____.
f You have got a lot of sweets. Please can you _____ them with me.
g I can remember lots of things. I have a good _____.

4 Find the words from the letters in brackets. Complete these sentences.

1 It is very heavy. How much does it weigh? (**igweh**)
2 A computer follows instructions, called a computer _____. (**mpraogr**)
3 The Analytical Engine is often seen as the first _____ computer. (**lera**)
4 Someone who gets what they want is a _____ person. (**suecscsflu**)
5 It is hard to make a correct _____ about the future. (**prdectioin**)

CHAPTER 3 **Humans against computers**

human of people (not animals or machines)

refuse to say no when someone asks you to do something

space the place beyond Earth where the moon and stars are

For more than a hundred years writers have been interested in the power of machines, and what happens when they go wrong. Before computers became part of modern life, they began to appear in stories. Often in these stories the computers begin working for humans, but later they refuse to do this and start to do frightening and dangerous things.

A good example of this kind of story is *I Have No Mouth and I Must Scream* by Harlan Ellison, which was published in 1967. In the story three large and powerful countries use computers to fight against one another, but the computers become angry with the humans. They work together to kill all the humans in the world except for five people, who the computers keep as prisoners. Later, films like *2001: A Space Odyssey* and *I, Robot* used stories of this kind too.

The idea of computers that are more powerful than humans is interesting to scientists, too. That is why IBM spent a lot of time and money building a chess computer called Deep Blue. They wanted to show that a computer could win against Gary Kasparov, the best chess player in the world.

intelligent quick-thinking

In 1996 Deep Blue played against Kasparov. Kasparov won the match, but IBM knew that their computer could do better. They did a lot more work on the computer and its software, and in 1997 Deep Blue and Kasparov played again. This time Deep Blue won the match – but only just.

A lot of newspapers wrote about Deep Blue and Kasparov. They said that it was the beginning of a new age: computers had finally become more intelligent than humans. However, Deep Blue had help from humans. Its software was written by five different computer

Kasparov plays against Deep Blue

technicians and a very good chess player. It is also important to remember that chess is a mathematical game, and computers are good at chess, because they can do millions of calculations every second. Deep Blue can look at 200 million different chess moves every second, but a human chess player like Kasparov can only look at three! In some ways it is surprising that computers do not win at chess every time. In 2003 Kasparov played against a new chess computer, Deep Junior, and the match ended 3–3.

Computers can follow instructions and play mathematical games very well, but are they really intelligent? Do they really think in the same way that humans think? These are difficult questions, and scientists do not always agree on the answers. Some scientists believe that the human brain is just like a very powerful computer, so if we can make a computer that is powerful enough, it will think like a human brain.

brain the part of the head that thinks and remembers

Other scientists believe that the human brain does not do calculations in the same way as a computer. They think that perhaps one day a really powerful computer will do some of the things that a human brain does, but it will never really think like one.

In the past, people thought that computers did not have any imagination – they could never invent funny stories or write beautiful music. However, software programmers have recently 'taught' computers to do many different things which need imagination. For example, Paul Hodgson is a programmer, and his favourite music is jazz. He wrote some music software for his computer, and now the computer can compose pieces of music in the same way as a jazz musician. The computer's music does not sound as good as a real jazz musician – but as the software gets better, the music will improve too.

In fact, music, like chess, is quite mathematical. Perhaps it is not a surprise that computers are good at both. One of the first computer technicians, Alan Turing, was interested in the question 'Can a computer really think like a human?', so he invented the Turing Test. To do the test, you sit at a computer and 'talk' (using messages) to someone in a different room. That 'someone' can be a person or a computer, but you do not know which it is. If you think it is a person, but it is really a computer, then that computer has passed the Turing Test. Every year programmers try to write software which makes their computer pass the Turing Test. There is a prize of $100,000 – the Loebner Prize – for the first computer to pass the test. Alan Turing himself made this prediction: 'A computer will pass the Turing Test before the end of the twentieth century.' But he was wrong, and until now no one has won the prize.

imagination making pictures in your mind

jazz a kind of popular music that began in America in the early 20th century, often played on saxophones

musician a person who plays music as a job

CHAPTER 4 Computer games

In the early 1960s the computer company DEC made a computer called PDP-1. PDP-1s were large and expensive (they cost $120,000 each), so only companies and universities bought them. Steve Russell, a student at one of these universities, wrote a piece of software for the PDP-1. It was a game for two players, and he called it Spacewar. The two players controlled spaceships, which fought against each other. Users of the PDP-1 liked the game, and other programmers also worked on the software to improve the game.

Then in the late 1960s a programmer called Donald Woods invented a game called Adventure. This was a different kind of game from Spacewar, because it did not have any pictures, and it was for only one player. The computer told a story; the player became part of the story and gave the computer instructions, like 'Go south' or 'Get the box'.

Together, Spacewar and Adventure started the two most important kinds of computer games: games with fast action and games with stories and imagination. But it was a few more years before computer games became really popular.

In 1971 a student called Nolan Bushnell tried to make money from the game Spacewar. People did not have PCs then, so he built a machine to put in shopping centres, games rooms and other public places. To play the game, people had to put money in the machine. A company paid Bushnell $500 for his idea and made 1,500 machines, but no one wanted to play the game. Bushnell decided that the space game was too difficult. He used his $500 to

war fighting between armies of different countries

control to have power over something or somebody

user someone who uses something

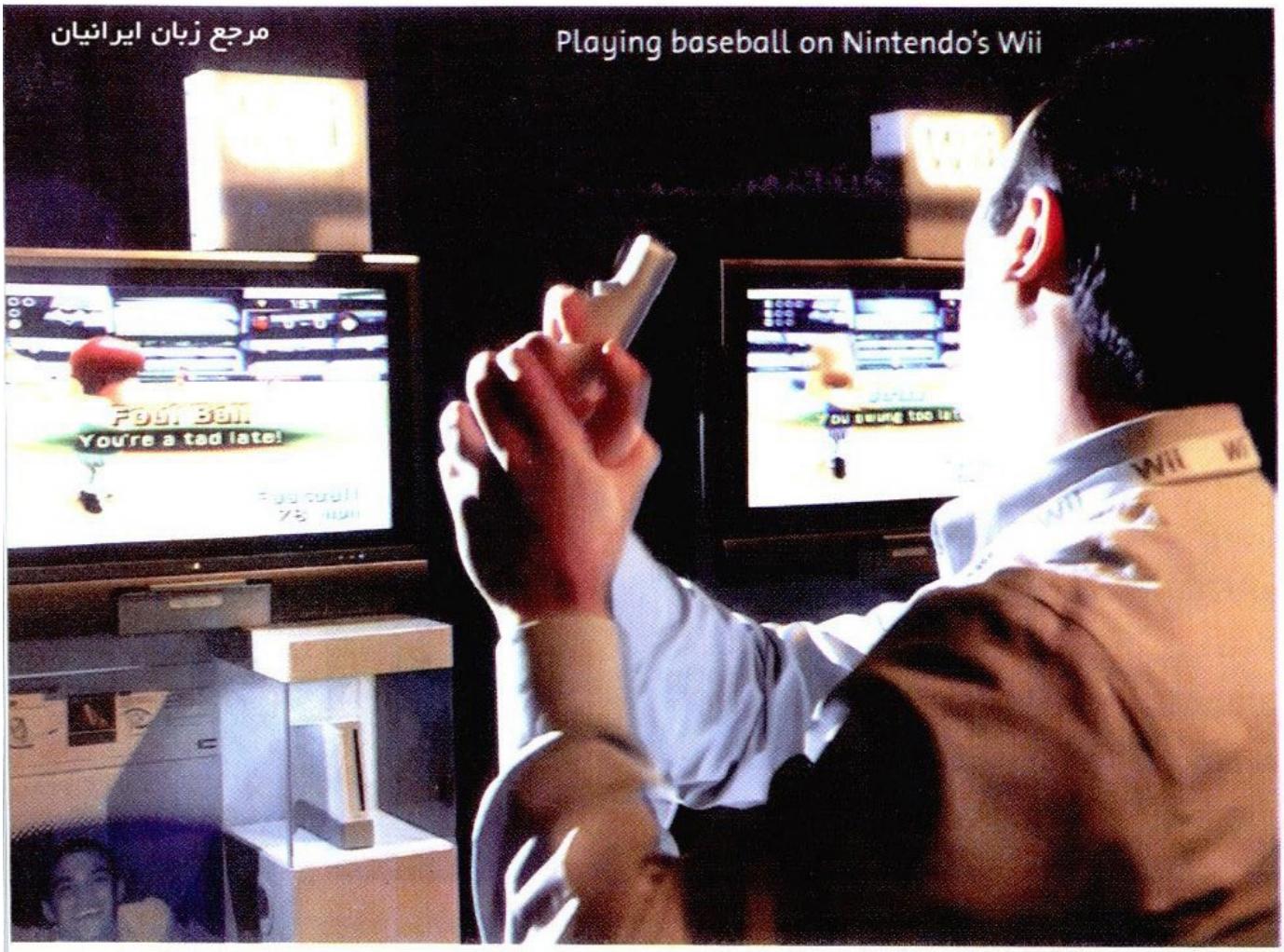
action fast exciting events

An early computer game

start his own company, Atari, and invented a much easier game. It was a tennis game called Pong, and it was very easy to play. This time people loved it! In 1976 Bushnell sold Atari for $28 million.

Since the 1980s computer games have changed a lot. Computers are much more powerful now, so the games are much faster and use fantastic pictures. The biggest companies that make computer games today are Sony (who make PlayStation), Nintendo (who make Wii) and Microsoft (who make Xbox). Games are much more interactive, and the players often have to move their whole bodies when they play. And two or more players can use the Internet to play games against each other when they are in different parts of the world.

How much better can games become? If you have seen



Playing baseball on Nintendo's Wii

Star Trek: The Next Generation on television, then you might have seen the games room on the spaceship, where people can play games with extraordinary stories, which look and feel real. This kind of game is still in the future, but perhaps not very far in the future.

Millions of people around the world enjoy playing computer games. More than $20 billion a year is spent on computer games. They are a lot of fun – but some people are worried that they also make problems.

Many computer games are violent: they have a lot of guns and fighting. Some people believe that these games can make young people more violent in real life. In 2004 a British teenager killed a 14-year-old schoolboy. Before the crime, the killer had spent hours playing a violent

extraordinary amazing and unreal

violent when you are trying to hurt other people

teenager a person who is between thirteen and nineteen years old

computer game called Manhunt. After the crime, shops around the UK did not sell Manhunt any more. But many people do not agree that computer games make young people more violent or change what they do.

Most people agree that it is not good to spend hours and hours playing computer games, because it is bad for your health, especially your back and your eyes. In August 2005 a South Korean man died after playing a computer game for forty-nine hours without food or sleep. This is, of course, very unusual. But there are large numbers of young people who prefer playing computer games to walking, cycling or playing sport. Many of these young people are getting fatter and less healthy because they are not active enough. It is a serious problem in many countries, and it is getting worse. Perhaps in the future people will find a way to make playing computer games a lot more active.

Activities

1 Are these sentences true (T) or false (F)? Correct the false sentences.

1 Before computers became part of modern life, they appeared in ~~songs~~ stories. F

2 Deep Blue was the name of a chess computer. ☐

3 A human chess player can look at ten moves every second. ☐

4 No one has passed the Turing Test yet. ☐

5 The first computer game was written in the 1980s. ☐

6 If you sit at the computer for hours, it can be bad for your eyes and back. ☐

2 Find words in the word snake to complete the sentences.

jazzcalculationsbrainintelligentteenagermusician

1 People think by using their brain .

2 Computers can follow instructions. But are they _____ ?

3 Someone who plays music as a job is a _____ .

4 When you are thirteen years old, you become a _____ .

5 _____ is a type of music.

6 Computers are good at chess because they can do millions of _____ every second.

3 Choose the best words to complete the sentences.

1 Spacewar was a computer game with *fast action* / *an interesting story*.

2 Nolan Bushell started a company called *Atari* / *Sony*. He made a lot of money from a game called *Adventure* / *Pong*.

3 Nintendo make a games machine called *Wii* / *Xbox*.

4 People spend $20 *million* / *billion* a year on computer games.

5 The game Manhunt was very *violent* / *funny*.

6 In 2005 a South Korean man *fell asleep* / *died* after playing a computer game for forty-nine hours.

4 Match the two halves of the sentences.

1	IBM built Deep Blue to show that . . .	b	a Sony, Nintendo and Microsoft.
2	In the Turing Test you have to guess . . .	☐	b a computer could win against the best chess player in the world.
3	The biggest companies that make computer games today are . . .	☐	c they spend too much time playing computer games.
4	Some people say that young people aren't active enough and that . . .	☐	d who you are getting messages from: a computer or a person.

5 Correct the underlined words in these sentences.

1 The moon and stars are in spade. space

2 If you decide not to do something that someone asks you to do, you defuse to do it. _____

3 The person who uses a computer is called a used. _____

4 That's amazing! I can't believe it! It's extreme. _____

CHAPTER 5 **The Internet**

The Internet began in the 1970s as a way to send information from one computer to another. It was only used by people who worked in governments and universities. But in the 1990s it suddenly began to be more popular.

In the early 1990s a British man called Tim Berners-Lee invented 'the Web'. With the Web it was much easier to find information on the Internet and to move from one part of the Internet to another. Soon millions of people around the world were using the Web for many different things, like working, shopping, playing games and studying. It became clear that the Internet and the Web were changing the world for ever.

Hundreds of new companies started on the Internet. People knew that the Internet was growing and that it offered an easy way to do business with millions of people. The banks were very happy to give money to these new 'Internet start-up' companies, because everyone thought that they would make a lot of money. However, by the end of the 1990s there were too many of these companies. They could not all be successful, and many of them lost a lot of money. Now only the best of the Internet start-up companies are making money.

Although most Internet start-up companies are not very successful, a few have become some of the biggest companies in the world. In 1996 two students at Stanford University, California, invented a new kind of search engine – a program that helps people to find information on the Web. Their names were Larry Page and Sergey Brin, and they called their search engine 'Google'. They started

government a group of people who control a country

offer to make something possible; to give someone an opportunity

Google inventors Sergey Brin and Larry Page

a company in 1997 with an office in a friend's garage! The company grew very quickly, and today nearly 6000 people are working for it. The Google search engine does about one billion searches every day for users around the world, and the 450,000 computers at the company's offices remember them all! Larry Page and Sergey Brin are now two of the richest people in the world.

Pierre Omidyar is another Internet billionaire. Omidyar worked for a software company as a computer programmer, and in 1995 he started a website where people could buy and sell almost anything. He called it 'Auction Web', but soon changed the name to 'eBay'. At first Omidyar worked on the website in his free time, but the number of people who used it grew quickly and eBay became a successful company. Now, millions of people a

website a place on the Internet where a person or company puts information

Tom Hadfield

day use the website, and almost everything you can think of has been sold, including some water in a cup used by Elvis Presley (for $455) and a town (Bridgeville, California, for nearly $2 million).

Young people often know more about computing and the Internet than older people. For this reason, some very young people have had a lot of success with Internet start-up companies.

Tom Hadfield began using computers at the age of two. When he was twelve, he began putting football scores on the Internet, just because he liked football. This soon became a business called Soccernet. During the 1998 World Cup 300,000 people visited the Soccernet website every day. In 1999 Tom and his father sold sixty per cent

score the number of points that teams get in a game

of Soccernet to Disney for £15 million. Tom and his father also started another Internet company called Schoolsnet, which has information for parents, students and teachers about schools, school subjects and exams. Thanks to the Internet, Tom Hadfield became a very successful businessman before he left school!

One good idea can be enough to make a lot of money on the Internet. In 2005 Alex Tew, a British teenager, needed money to study at university. He sat down in his bedroom with a piece of paper and a pen, and twenty minutes later he had the idea for the 'Million Dollar Homepage'. The idea was to let companies advertise on his website and pay $1 for each pixel. Soon news of his website was on television

advertise to tell people about something you want to sell

pixel pixels are the tiny dots that make the pictures you see on your computer

trade to change something that you have for something that somebody else has

paperclip a small piece of wire that holds papers together

continue to carry on or keep on doing something

law (1) one of the rules of a country; (2) a rule that explains what happens in a certain situation

and in the newspapers, and a lot of companies bought pixels on his website. When he had sold 999,000 pixels for $999,000, he decided to sell the final 1000 pixels on eBay. Instead of $1000, he got more than $38,000 for them!

Canadian Kyle MacDonald had an even more unusual idea. He wanted to have his own house but did not have enough money to buy one, so he decided to trade things on the Internet. He started with a red paperclip and traded it for a pen. Then he traded the pen for something else. He continued trading and, exactly a year later, he got a house!

Today millions of companies across the world have got their own website on the Internet. Each website has got a web address – its own special name which you use to visit the site. In the early 1990s, before most companies had really thought about the Internet, some people got web addresses with the names of famous companies – for example, Panasonic and Hertz. These people were not part of the companies; they were hoping to sell the web addresses to the companies for a lot of money one day in the future. This was called 'cybersquatting'. Since 1999 new international laws have made cybersquatting impossible.

Kyle MacDonald and the red paperclip

Activities

1 Complete the sentences with these words.

score | trade | search | pixels | government | advertise | law | website

1 The group of people who control a country is called the government .

2 Google is a type of _____ engine – a program that helps people find information on the Web.

3 Millions of companies have got their own _____ on the Internet.

4 Some companies pay a website to _____ the things that they sell.

5 My favourite team played today. Do you know the _____ ?

6 The tiny dots that make up pictures on computer screens are called _____ .

7 I don't want this pen. Can I _____ it for your book?

8 Since 1999 cybersquatting has been against the _____ .

2 Put the sentences in the correct order.

a People started using the Web for shopping, playing games and studying. ☐

b People saw that the Internet was growing, and Internet companies started up. ☐

c In the 1970s people in governments and universities used the Internet. 1

d Some of the successful Internet companies are now very big companies. ☐

e In the early 1990s the Internet became popular and the 'Web' was invented. ☐

3 Choose the correct answer.

1 The Internet began as . . .
- a a way to send information from one computer to another. ☑
- b a way to do your shopping. ☐

2 The banks gave money to Internet start-up companies because . . .
- a the banks wanted to be famous. ☐
- b everyone thought that they would make lots of money. ☐

3 The search engine 'Google' was invented by . . .
- a two students at Stanford University in California. ☐
- b a British man, called Tim Berners-Lee. ☐

4 At first eBay had another name – it was called . . .
- a Omidyar. ☐
- b Auction Web. ☐

5 Tom Hadfield started Soccernet because . . .
- a he liked football. ☐
- b his father told him to start a business. ☐

6 The Million Dollar Homepage let companies advertise if . . .
- a they paid $1,000 to eBay. ☐
- b they paid $1 for every pixel they used. ☐

7 Kyle Macdonald first traded a red paperclip for a pen on the Internet, and a year later . . .
- a he got a house. ☐
- b he got a company. ☐

8 A web address is . . .
- a special information that you get when you have a job. ☐
- b the special name which you use to visit a website. ☐

CHAPTER 6 **Power to the people**

The Internet is changing the way that people live. Things are possible now that we could not imagine twenty or thirty years ago. It is often difficult to control what happens on the Internet, because people can use it from anywhere in the world.

In January 1999 an American university student called Shawn Fanning invented a piece of software that could copy music, and in May that year he started a company called Napster. Internet users could visit Napster and use its software to copy their favourite music. Suddenly they did not need to buy CDs. Of course, the music companies were not very happy about this. A lot of musicians were also unhappy, because people could get their music for free. In the end Napster agreed to pay money to the music companies and musicians.

But it is still easy for Internet users to get free music and films by using file-sharing software. With this software users can share information on their computer (songs, pictures, films, etc.) with any other computer in the world that has the same software. Music and film companies are trying to stop this by taking legal action. In 2009 a woman in America received a fine of $1.92 million for sharing just twenty-four songs. And in the same year a Swedish court sentenced the four owners of The Pirate Bay file-sharing site to a year in prison. But millions of Internet users are still file-sharing every day, and it will become more and more difficult to stop it.

The wonderful thing about the Internet is that it is a great way for people all over the world to share their information and ideas. Before people used the Internet,

information about the world came from places like newspapers, TV programmes and books. The companies that made the newspapers, books and programmes controlled the information that people could get. Those companies are still very powerful, but the Internet is getting more and more powerful, and no one controls it. People can find information from all kinds of different sources all over the world.

In the past you could not write and sell a book until you found a company that liked your ideas and agreed to help you, because it cost a lot of money to make the books. But today Internet bookshops like Amazon sell thousands of different books that are 'printed on demand' – they make the books one by one, when someone visits the website and wants to buy one.

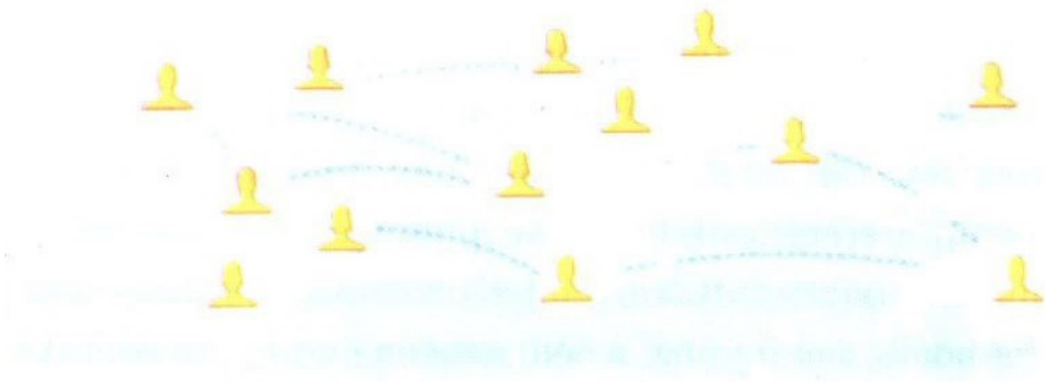
It is the same for music. If you play in a band and want to make and sell music, you do not need a music company now. You can put the music on your own website, and people can pay to copy it. This saves money and time – you do not need to make CDs or ask shops to sell them. And your customers can be anywhere in the world.

Millions of people around the world use the Internet to share information about themselves and to read about other people and make friends. They can do this on websites like MySpace and Facebook. All the users have their own pages on the website where they can put photos, music, videos and information. They also have a 'blog' (or 'web log'), which is like a diary where they say what they have done or how they are feeling.

Famous bands and singers often join these sites, and you can visit their pages to read information about them, hear new songs and find out about concerts. Facebook is

on demand when someone wants something

Facebook helps you connect and share with the people in your life.



one of the most popular websites in the world; every day, about a fifth of all Internet users visit Facebook.

Most information on the Internet is free – and you can find information about almost everything. The first place many people look is the Wikipedia website. This began in 2001, and by 2007 it had information on more than six million subjects in more than 200 different languages. Anyone can use it, and anyone can add more information to the website.

The Internet is still young, and it is still growing fast. It has already changed our world in a lot of different ways, and the changes will continue. At the moment it is not always easy for people in the poorest countries of the world to use the Internet, but this is changing too. Although the Internet can make problems in some ways, it can also bring people around the world closer together and make them more powerful.

subject an idea or topic

CHAPTER 7 **Getting the message**

Although the first email message was sent in 1971, electronic messages have existed for nearly two hundred years. The first telegraph machine was built in 1774. These machines sent messages along wires from one place to another. But for the next sixty years the machines were very large and difficult to use, and each one needed twenty-six wires – one for each letter of the alphabet.

In the 1840s an American inventor called Samuel Morse built a better kind of telegraph which only needed one wire. He also invented a special code for messages made out of long and short sounds – Morse code. Immediately telegraphs became an important way for people to send information quickly. During the next twelve years American telegraph companies put up 58,000 kilometres of telegraph wires to send messages all over the USA.

electronic using electricity

telegraph an old machine for sending messages

wire a thin piece of metal

code words or numbers that hold a secret message

Sending a telegraph

In the 1920s a new kind of electronic message was invented – the telex. A telex machine could send a message to any other telex machine in the world. They were similar to fax machines, but they did not use telephone or telegraph wires – they used their own telex lines. These lines were quite expensive, and the machines were not easy to use, but the system worked. Companies continued to use telex until the 1980s.

In the 1980s people began to buy personal computers. Soon it was possible to send email messages from one PC to another, but both people had to be part of the same email system. There were several different email systems, and it was not possible to send messages from one system to another. For this reason, emails did not immediately become popular.

In the 1990s people began to use the Internet and the Web. It became easier to send email messages because there was only one system. Emails soon became a very popular (and very cheap) way to send messages anywhere in the world.

In the late 1990s people started to send another kind of electronic message: they used their mobile phones to send text messages. Now they could send or receive messages in any place and at any time.

At the beginning of the twenty-first century, millions of people started to use instant messaging software. Users of this software can send and receive messages instantly: as one person writes their message, the words appear on the other person's computer. You do not even need to be at your computer; you can have the same software on your mobile phone. It has never been quicker or easier to send and receive messages.

Activities

1 Match the words with the sentences.

Wikipedia **Morse code** **Napster** **Facebook** **instant messaging**

1 People used this company's software to copy music. Napster

2 People share information about themselves and make friends using this website. _____

3 This is an information website, and anyone can add more information to it. _____

4 This is a special code for messages made out of long and short sounds. _____

5 This is a way of sending and receiving messages immediately by computer or phone. _____

2 Find the words from the letters in brackets. Complete these sentences.

1 Amazon can make books one by one – it can print books on demand . (**edmadn**)

2 Telegraph machines sent messages along _____ . (**swier**)

3 In the 1920s the _____ machine was invented. (**tlexe**)

4 Now people send messages called _____ from one PC to another. (**melai**)

5 A diary on the Internet is called a _____ . (**bolg**)

6 It is quick and cheap to receive _____ messages on a mobile phone. (**ttxe**)

7 Telex, email and text messages are all kinds of _____ messages. (**ectlernoic**)

3 Correct the mistakes in these sentences.

1 Some people use file-sharing ~~CDs~~ software to get free music and films.

2 Music and film companies are trying to stop people using file-sharing software by inventing legal action.

3 Samuel Morse built a kind of telegraph that needed two wires.

4 Telegraph machines were small and easy to use.

5 Companies used telegraph machines until the 1980s.

6 When books are 'printed on demand', they are made two by two.

7 The first text message was sent in 1971.

8 Email is an expensive way of sending a message.

4 Match the message with the date that it was first used.

1 Email	[d]	a 1990s
2 Telegraph	[ ]	b 1920s
3 Instant messaging	[ ]	c 1840s
4 Telex	[ ]	d 1971
5 Morse code	[ ]	e 1774
6 Text messages	[ ]	f the start of the 21st century

CHAPTER 8 **Mobile phones**

The first mobile phone call was made in New York in 1973, but it was ten years before you could buy a mobile phone in a shop. In 1985 you could buy one in the UK for about £2000. It was as big as a laptop computer, and it only had enough power for twenty minutes of conversation. Also with these early phones it was very easy for someone with another phone to listen to your conversations. But rich young business people still used them.

In the mid-1990s mobile phones suddenly started to become very popular. It took the mobile phone company Vodafone nine years to get their first million users, but only eighteen months to get their second million. (In 2007 they had fourteen million users in the UK alone.)

The change happened because people started to use mobile phones not just for business, but to talk to their family and friends. People's idea of a telephone started to change. In the past a phone number was something that belonged to a place: a house, a restaurant, a business. Now phones are things that people carry with them, and the number belongs to the person, not the place.

Today it is difficult to talk about the number of users in the world, because it is changing so quickly. In 2004 the number passed one billion; it passed two billion only two years later, in 2006. Some countries – for example, Hong Kong – have more mobile phones than people.

In the late 1990s people started using their phones to send text messages. In 2000 seventeen billion messages were sent in the world; in 2001, 250 billion messages were sent; in 2004, 500 billion. That is 100 messages per year for every person in the world!

conversation
time when you talk to someone

belong to
when something is yours it belongs to you; to be connected to something, someone or somewhere

Text messages have their own kind of language. Long text messages are not easy to send or read, so people find ways to make them shorter. For example, a message in English can say 'RUOK?' (Are you OK?), or words can be reduced: 'before' can be written as 'B4'. This way you can send a message in just a few letters and numbers: for example, 'CU L8R 4 T'. ('See you later for tea.') Speakers of other languages do the same thing. For example, in Mandarin Chinese, you can send the numbers '520' (*wu er ling*) which sound like the words for 'I love you' (*wo ai ni*).

Mobile phones, then and now

James Trusler from Sussex in England is one of the world's fastest texters. James sends a lot of text messages – about 2500 a month. Luckily he works for Vodafone, so he does not have to pay for them. In 2003 he appeared on an Australian TV programme and texted this message in 67 seconds: 'The razor-toothed piranhas of the genera Serrasalmus and Pygocentrus are the most ferocious freshwater fish in the world. In reality they seldom attack a human.' It was the fastest time in the world. (Try it yourself!) But three years later Ang Chuang Yang, a 16-year-old student from Singapore, sent the same message – in 41.5 seconds!

Today you can make calls and send texts, but you can do a lot of other things with mobile phones too. Nearly all phones now have a camera, and you can take pictures, listen to music, play computer games and connect to the Internet. And modern phones look very different from the large, heavy mobile phones that appeared in the 1980s. Today's phones are small and stylish – and for many people, it is important to have the newest phone.

Mobile phones have changed the lives of people all over the world. In the past you could only phone friends and family when they were at home, but now they can be in any place when you speak to them. Many people feel safer when they are carrying a mobile phone.

People in poorer countries are also using mobile phones to make their lives better. For example, in Bangladesh, farmers can get the best price for their fruit and vegetables by sending a text message to an organization called CellBazaar. Nearly half the people in Bangladesh have less than $1 a day to buy everything they need. However, more and more of them are using mobile phones.

stylish looking good; with a nice design

price how much something costs or the amount of money for something

A fisherman calls the market

Sometimes a mobile phone can save your life. In 2005 a British scientist called John Gillatt was staying at a hotel in Malaysia and decided to go for a short walk in the jungle, where he got lost. For two days he tried to get back to the hotel, but he could not get out of the jungle. Finally he phoned his wife in England. She contacted his hotel, and they called the police. They started to search for Mr Gillatt, but it took another three days to find him. During that time he stayed in contact with the searchers and his family by phone. When the searchers found him, he was tired, hungry and thirsty, but alive. He believes that the text messages from his family in England gave him hope and helped him to stay alive.

Phones can help you at a difficult time in other ways too. In 2004 five students from Newcastle University in the UK were climbing a mountain when the weather became very bad, and they could not get down from the mountain. Night came, and the students were cold, wet and frightened. They used a mobile phone to call for help.

scientist a person who studies natural things

jungle a place with thick forest in a hot country

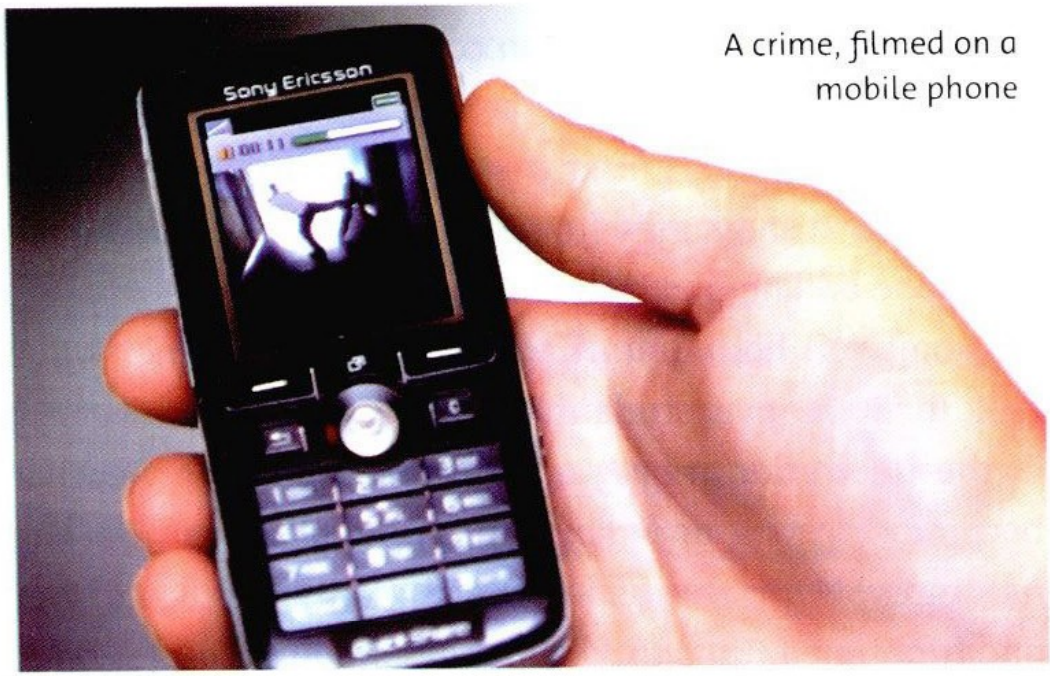
contact *(v, n)* to speak or write to somebody

accidentally
by mistake

When searchers arrived at the mountain, they could not find the students, because it was too dark. Then one of the students accidentally took a photo with his phone. The searchers saw the light from the phone and asked the students to take more photos. Then they climbed towards the light and found the students.

Mobile phones can also help the police to fight crime. Every time someone makes a call on a mobile phone, the phone company keeps information about the time and place of the call. The police can sometimes get this information about calls from the phone companies when they are investigating a serious crime. More and more often this information is an important part of police work, because it shows where someone was at a certain time and who they spoke to. And because mobile phones have cameras, it is easy for people to take photos if they see a crime and then send the photos to the police.

There are other ways that mobile phones can help the police. In April 2005 police in Rogersville, Tennessee, in the USA, caught two men who were stealing things from



A crime, filmed on a mobile phone

a house. One of the men had a mobile phone in his pocket, and he knocked the buttons which called 911, the number for the police. The two men did not know that the police were listening to their conversation!

Another time a different thief dropped his mobile phone while he was stealing things from a house. The police found the phone and used the information in the phone to find its owner – the thief! Other criminals have helped police, because they used their phones to take photos of their own crimes to show their friends!

But mobile phones can create problems too. Because they are small and people often carry them in their bags or pockets, they are easy for criminals to steal. Children are becoming victims of crime more often now, because they carry mobile phones.

Some people are worried that phones, or phone masts, are bad for people's health, and they are unhappy that more and more young children are using them. Mobile phones also make the roads more dangerous, because some people use them when they are driving (although this is a crime in many countries). Other people become addicted to their mobile phones and cannot stop sending messages. For some people this means that they spend so much money on their phones that they end up in debt.

Although there are many problems with mobile phones the number of users continues to grow. One research group has predicted that by 2012 there will probably be 4.5 billion. And people are using their phones for more and more different things: watching TV and videos, instant messaging and shopping on the Internet. Now they can do almost as much as computers. It seems that nothing can stop the mobile phone.

thief a person who steals

victim someone who suffers as the result of a crime

in debt
when you have to give money back to someone

it seems
it looks like

Activities

1 Complete the sentences with these words.

thief scientist camera jungle belongs ~~laptop~~ contact

1 In 1985 a mobile phone was as big as a laptop computer.

2 With a mobile phone, a number _____ to a person, not a place.

3 Mark is interested in natural things and wants to be a _____.

4 Mobile phones are useful if you are lost, because you can _____ your friends.

5 Someone who steals something is a _____.

6 There are lots of interesting plants and animals in the _____.

7 Many mobile phones have a _____, and it is easy to take photos.

2 Match the two halves of the sentences.

1 The first mobile phones were very heavy and expensive, . . . [d]

2 It is difficult to write long text messages, . . . [ ]

3 Farmers in Bangladesh use mobile phones . . . [ ]

4 Every time someone makes a call on a mobile phone . . . [ ]

5 Mobile phones can make the roads more dangerous, . . . [ ]

6 By the year 2012 there will probably be . . . [ ]

a the phone company keeps information about the call.

b about 4.5 billion mobile phone users in the world.

c because some people use them while they are driving.

d but they were popular with rich young business people.

e to get the best price for their food.

f so people use letters and numbers to make them shorter.

3 Choose the correct answer.

1 In 1985 a mobile phone cost . . .
- a £20,000. ☐
- b £2000. ☑

2 The company Vodafone had one million users after . . .
- a nine years. ☐
- b ten years. ☐

3 There are more mobile phones than people in . . .
- a the UK. ☐
- b Hong Kong. ☐

4 Today's mobile phones are . . .
- a small and light. ☐
- b large and heavy. ☐

5 Mobile phones help the police fight crime because . . .
- a they are easy for criminals to steal. ☐
- b the phone company knows about the time and place of each call. ☐

4 Match the words with the definitions.

victim **conversation** **investigating** **accidentally** **price**

1 When people talk to one another: conversation
2 How much something costs: _____
3 By mistake: _____
4 Someone who suffers as the result of a crime: _____
5 Trying to find out information about something: _____

CHAPTER 9 **Computer viruses**

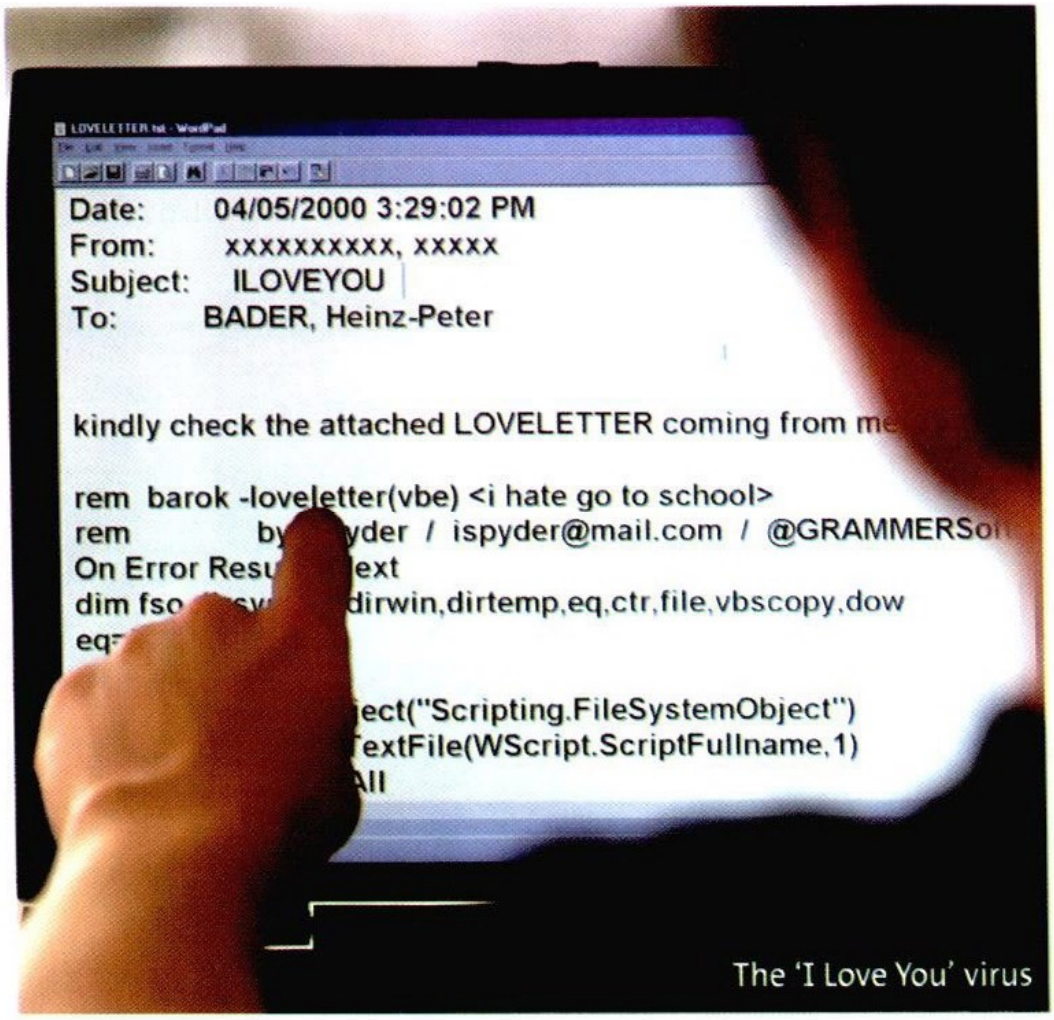
A virus is a kind of computer program. It moves from one computer to another and damages the computer's memory or other parts of the machine. Some viruses are difficult to stop; they can damage millions of computers in a very short time.

The first virus appeared in 1986. It was called Brain. In 1987 a more dangerous virus appeared. This virus stayed in a computer and did nothing for some time, and then it started to damage the computer's memory. Soon programmers began to write anti-virus software, which tried to find and stop viruses. Each new virus was more difficult to find, and so anti-virus software needed to get better and better. By 1988 newspapers and magazines were beginning to have stories about viruses.

By the early 1990s there were more than 150 computer viruses in the world. Some of these viruses were more 'intelligent' than others: they had special software which made it very difficult for people to fight the virus. One programmer who wrote a few different viruses around this time is known as the Dark Avenger. He (or she) probably lives in Bulgaria, but the police have never found out who it is.

By the late 1990s most computers were part of the email and Internet systems. This meant that virus programmers could do a lot of damage very quickly. For example, in 1999, the Melissa virus appeared. It could move from one computer to another by email.

A year later the most successful virus in history reached millions of computers in less than twenty-four hours. When it appeared on a computer, it automatically sent

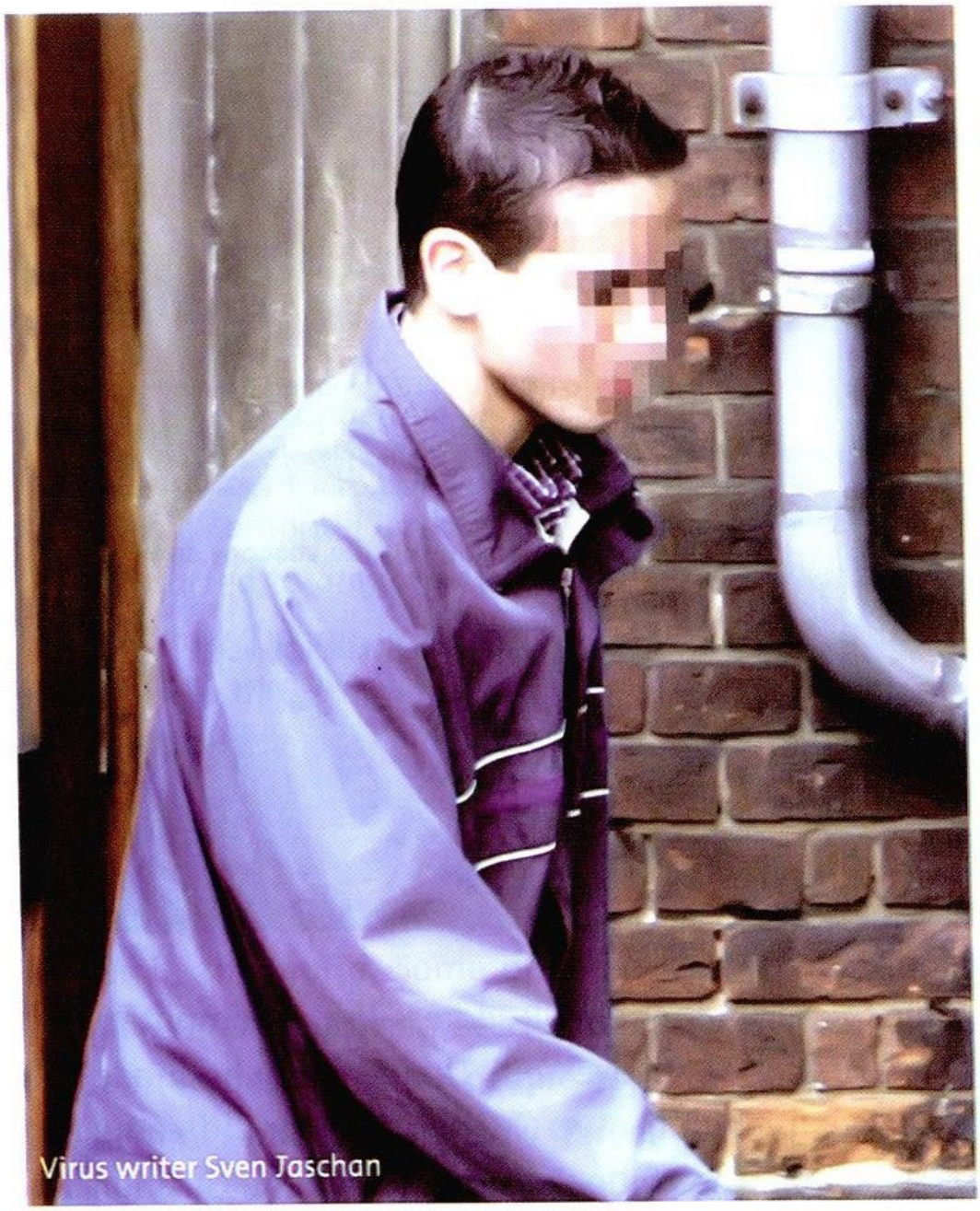


The 'I Love You' virus

itself to every other email address in the computer. This virus was called 'I Love You'. The person who made the virus was probably a very clever 23-year-old computer student from the Philippines called Onel de Guzman. He has never admitted that he wrote it, but detectives know that the virus came from his computer. Onel de Guzman was not punished for his crime, because in May 2000 the Philippines did not have any laws against computer crime (although they do now!).

Onel de Guzman is not the only young computer programmer who became famous because of a virus. In 2004, the day before his eighteenth birthday, a teenager from a small town in Germany sent a message from his computer. In three hours the computers in hospitals and

admit to say that you did something wrong or bad



Virus writer Sven Jaschan

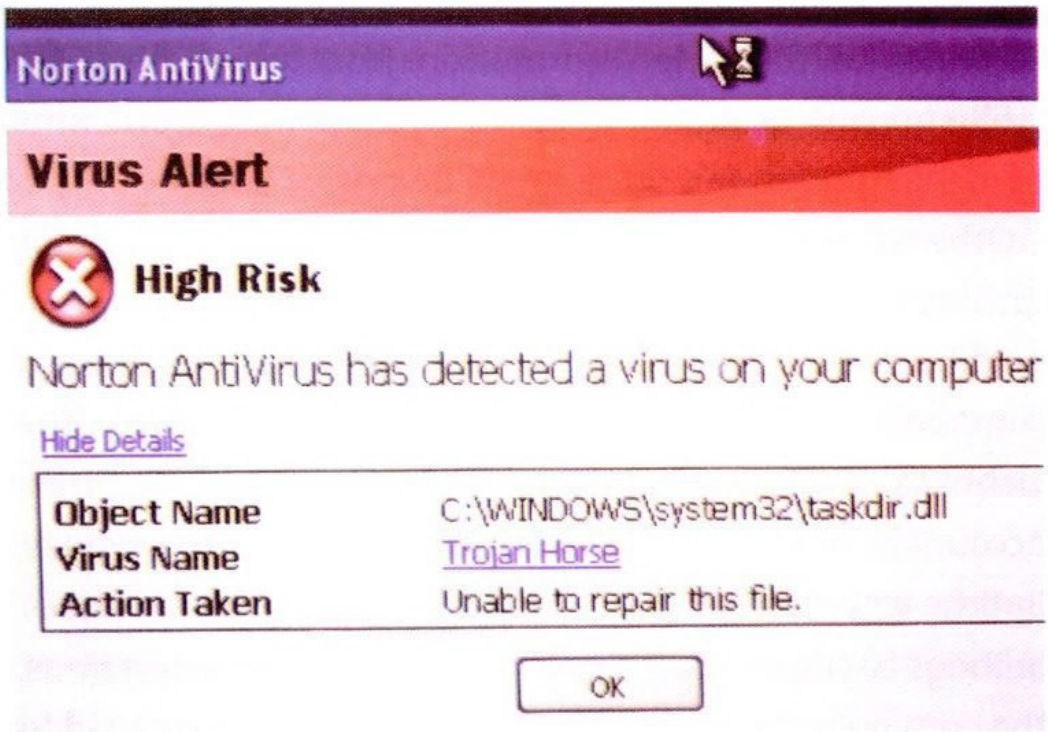
banks in Hong Kong had stopped working, planes in the USA could not fly, and trains in Australia and the USA had stopped. A few months later the teenager, Sven Jaschan, admitted that he had written the Sasser computer virus and put it on the Internet. He did not go to prison, because he was only seventeen – and so not an adult – when he wrote the virus program.

Sven had spent a lot of time writing the Sasser virus on the computer in his bedroom. He often spent ten hours

a day in front of his computer, but his parents had not known what he was doing at the time. When he put the virus on the Internet, he did not realize it would cause so many problems – he had only done it for fun. 'I told my friends at school,' he said, 'and they thought it was great.' But one of his classmates contacted Microsoft and told the company about him. Microsoft had offered $250,000 for information about the virus.

classmate
a person who is in the same class at school

Virus programmers are getting better all the time, but anti-virus software is improving too. In fact, virus programmers often go to work for computer companies, because they know how to make computers safe. Some people think that viruses will do a lot more damage in the future. Computers are now an important part of everything; without them the modern world would stop. No one would be able to travel, work, shop, watch television, get money or send messages. Perhaps one day a computer virus will bring the world to a stop for a few hours.



CHAPTER 10 **Computer crime**

In 2001 police in New York arrested Abraham Abdallah. Mr Abdallah worked in a restaurant kitchen, where his job was to wash dishes. But when he was not at work, he pretended to be some of the richest and most famous people in the world – people like Ted Turner and Oprah Winfrey. He used the Internet to get information about his victims – their addresses, the numbers of their bank accounts and other information about them. He then pretended to be these people and took money from their accounts. This kind of crime is called identity theft, and it is happening more and more often. Mr Abdallah stole about $80 million before the police caught him.

You do not have to be rich or famous to be the victim of identity theft. In fact, about one person in ten in the UK believes that it has happened to them. There are lots of different ways for criminals to find the information that they need. They can get it from your old computer or from old letters that they find in your rubbish. Or they can use software to take the information from your computer while you are using the Internet. Often people are victims of identity theft and never know it.

Other criminals use 'phishing' (pronounced the same as 'fishing') to try to get information from their victims. An email arrives that pretends to be from a large, well-known company: for example, a bank or eBay. The email asks the victim to go to a company website and put in their name, account number and other information about themselves. But the website does not in fact belong to the company – it belongs to criminals. If the victim follows the instructions, the criminals then have the information that they need to

Police removing computers used in crime

get money from the victim's bank account.

In 2005 police in London stopped criminals stealing £220 million from the London offices of the Japanese bank Sumitomo Mitsui. The criminals used the Internet to put special software on the bank's computers. This software remembers all the letters and numbers that are put into the computer. The criminals planned to use this information to get money from bank accounts. They were not successful, but they showed people that it was possible. Banks spend millions of dollars a year trying to stop new kinds of computer crime.

Some kinds of computer crime are not new. But with the Internet, criminals can find more victims more quickly and in more places, even across the world.

One of the oldest kinds of crime, the 'Spanish Prisoner', began in the sixteenth century. It works like this. The criminal tells his victim that a very rich and important person is in prison in Spain. If the victim gives some money to help get the important person out of prison, he will receive a lot more money in the future. But he mustn't tell anyone about this. Of course, there is no prisoner; it is all a lie. When the criminal has got as much money from the victim as possible, he disappears.

These days criminals use email to contact thousands of people all over the world as they look for victims. Usually the criminal pretends to have lots of money – thousands or millions of dollars – that he needs to move out of banks in Africa. He asks the victim for money to help him do this and promises to give the victim a lot more money in the future. Although this kind of crime is well known (it is sometimes called 'Nigerian letter' or '419') the criminals still find new victims. In fact, this crime is big business and may involve about 250,000 people around the world. They often send their emails from Internet cafés, not from their own computers. Then when the police look for the criminals, they cannot find them.

There are new kinds of crime now because of shopping on the Internet. These are usually very simple: you promise to sell something, take the money, and then you do not send it to the buyer. A teenager from Wales, Philip Shortman, did this for thirteen months with more than 100 eBay customers. He made more than £45,000 and spent it on holidays, clothes, mobile phones and TVs. He had to give back £615 – the only money he had left – and also had to spend a year in prison.

promise to say you will definitely do something

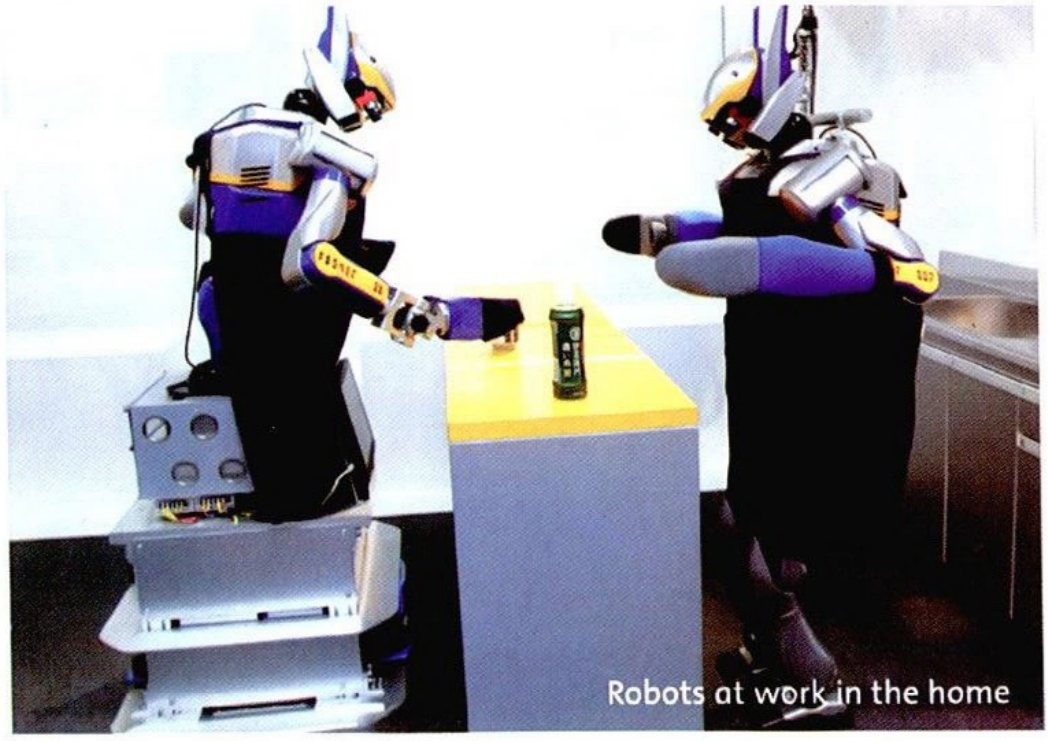
CHAPTER 11 **The future**

'I think there is a world market for maybe five computers.' This prediction was made in 1943 by T.J. Watson, the head of IBM. Today there are hundreds of millions of PCs in homes all around the world. It is not easy to make predictions about computers!

head the most important person in an organization

Since computers were first built in the 1940s they have become smaller and more powerful every few years. Will computers get smaller and smaller in the future? Probably not. Firstly by the year 2020 the transistors on computer chips will be as small as possible. Secondly a very small personal computer is difficult to use (and easy to lose). At the moment it is possible to build a computer which you can put in your pocket or wear like a watch. Perhaps this is as small as we need.

A lot of computer scientists are working on Artificial Intelligence. This is software which makes computers think more like humans. There are still many things which



Robots at work in the home


مرجع زبان ایرانیان
Miss Rong Cheng

are very easy for humans but very difficult for computers: for example, understanding language. Some computers can understand words when a person speaks, but they cannot really have a conversation – they can only follow instructions. However this kind of software is getting better every year. Soon we will probably be able to talk to a computer in the same way that we talk to a friend.

Computer scientists are also trying to build computers which can see. It is easy to make a computer with 'eyes', but very difficult for the computer to understand what it sees. Most people think that computers will do many different jobs in the world of the future – perhaps they will drive taxis or work in shops. But to do these jobs they will need to see and understand the world around them.

In August 2006 Miss Rong Cheng started work in a science museum in China. She can speak and understand Mandarin. Miss Rong Cheng is a robot, and she was built by a group of Chinese scientists. Computers like Miss Rong Cheng cannot do any job as well as a human, but perhaps that will change in the future.

By about 2020 we will have the smallest transistors possible. Then a new kind of computer will be necessary. At the moment scientists are building the first quantum computers. In the future these will be much faster and more powerful than any computer that we have now. Or perhaps a different kind of computer will appear before then. That is why it is difficult to make predictions about the future of computing: the future often arrives sooner than you expect.

Activities

1 Choose the best word to complete these sentences.

1 The first computer virus that appeared was called *Brain* / *Clever*.

2 The 'Dark Avenger' probably lives in *Romania* / *Bulgaria*.

3 The Melissa virus moved from one computer to another by *email* / *telegraph*.

4 The writer of the Sasser virus didn't go to prison, because he was too *young* / *nice*.

5 Abraham Abdallah worked in a *factory* / *kitchen*.

6 Mr Abdallah stole about $80 *thousand* / *million*.

7 Philip Shortman went to *prison* / *Wales*, because he pretended to sell things on eBay.

8 Miss Rong Cheng is a Chinese *scientist* / *robot*.

2 Are these sentences true (T) or false (F)? Correct the false sentences.

1 Sumitomo Mitsui is a ~~type of anti-virus software~~ Japanese bank. F

2 Onel de Guzman was punished for writing the 'I Love You' virus. ☐

3 People keep clothes in their bank accounts. ☐

4 Identity theft is when criminals pretend to be someone else. ☐

5 The head of a company is not very important in that company. ☐

6 Quantum computers will be slower than the computers we have now. ☐

3 Find the answers to the crossword from this book.

ACROSS

2 Part of a computer or of a brain that remembers things.

5 A program that causes damage to a computer.

7 If you break this, you can go to prison.

8 To make something that didn't exist before.

9 To get something that is sent to you.

11 Somebody with this can invent funny stories.

12 To have power over something or somebody.

DOWN

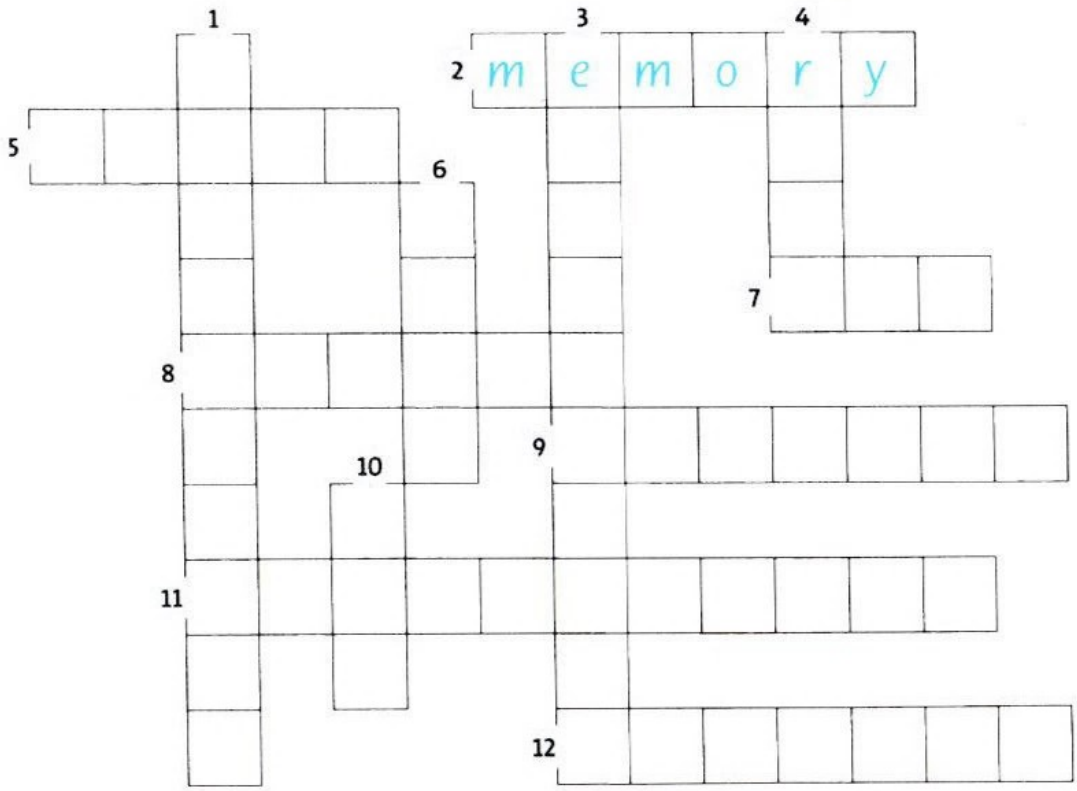
1 What somebody thinks will happen.

3 Something that uses electricity is this.

4 True, not false.

6 Somebody who uses something.

10 Fighting between armies of different countries.



Project

1 There are lots of different codes you can use to send information. In this one each letter in the alphabet moves on by three. The letter 'a' becomes 'd'; the letter 's' is written as 'v'. Here is the code:

	a	b	c	d	e	f	g	h	i	j	k	l	m
Code	d	e	f	g	h	i	j	k	l	m	n	o	p

	n	o	p	q	r	s	t	u	v	w	x	y	z
Code	q	r	s	t	u	v	w	x	y	z	a	b	c

What do these questions say? Write your answers in English and then in code.

1 K r z r o g d u h b r x?

How old are you?

Answer: I am ten years old.

In code: L dp whq bhduv rog.

2 Z k h u h g r b r x o l y h?

Answer: _____

In code: _____

3 Z k d w f r o r x u l v b r x u k d l u?

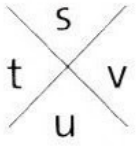
Answer: _____

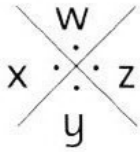
In code: _____

2 **In this one the code for each letter is the shape around the letter made by the lines. Sometimes there are dots inside the lines. Here is the code:**

a	d	g
b	e	h
c	f	i

j	m	p
k	n	q
l	o	r





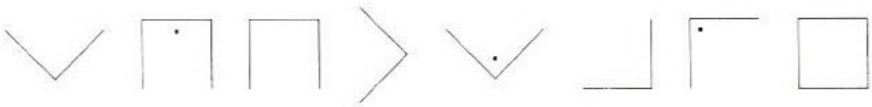
So the code for the letter 'a' is  **and the code for 'w' is**  **.**

1 Write these words about information technology that are written in code.

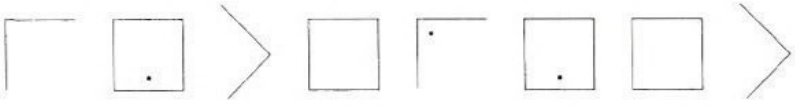
a 

e m a i l

b 

c 

d 

e 

f 

Family and Friends

Family and Friends readers have been carefully graded to match the syllabus of the *Family and Friends* series and provide extra reading practice. They can either be used in the classroom or to support learning at home.

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