



University of Split



**University Department of Professional Studies**

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## **TECHNICAL ENGLISH FOR ICT STUDIES**

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**Split, 2015**

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## COURSE DETAILS

| COURSE TITLE       |  | TECHNICAL ENGLISH                                  |                |  |     |   |   |
|--------------------|--|--|----------------|--|-----|---|---|
| Course code        | SIT016   | Year of study                                      |                |  | 1st |   |   |
| Lecturer           | Ivana Čizmić, senior lecturer  | ECTS (number of credits allocated)                 |                |  | 4   |   |   |
| Associates         | None   | Type of course (number of teaching hours/semester) | L              |  | S   | P | T |
|                    |  |  | 60             |  |     |   |   |
| Course status      | Compulsory   | Percentage of e-learning                           |                |  | 25% |   |   |
| COURSE DESCRIPTION |  |  |                |  |     |   |   |
| Course objectives  | Preparing students to use English language correctly and appropriately at an intermediate to upper-intermediate level in the everyday working environment; all language skills (speaking, listening, reading and writing) are needed.  |  |                |  |     |   |   |
| Prerequisites      | None   |  |                |  |     |   |   |
| Learning outcomes  | <ul style="list-style-type: none"><li>define basic concepts from the areas of information technology e.g. ICT systems, ICT in education, History of ICT, The Internet, Programming and programming languages, Robotics, Computing and ethnics, Social networks etc. (knowledge)</li><li>describe pros and cons of social networks, main types of cybercrime, main features of security on the Internet (understanding)</li><li>understand and use of grammar structures: collocations, Noun compounds and Noun phrases, Multiword verbs, Prefixes, Suffixes, Synonyms and word-building, Passives, Phrasal verbs (usage)</li><li>prepare and give an individual presentation on a chosen topic; prepare and give a group presentation on one of the given topics: Designing an online store, Designing a robot, Designing an intelligent house, Airport security system. (synthesis)</li></ul> |  |                |  |     |   |   |
| Course content     | Week   | Hours  | Type of course | Topic  |     |   |   |
|                    | 1  | 2  | Lectures       | Introductory lesson; What is ICT? – defining ICT, introduction to different aspects of ICT ; Computer quiz       |     |   |   |
|                    |  | 2  | Lectures       | What is inside a PC system?<br><br>Language work: Collocations, Suffixes.  |     |   |   |
|                    | 2  | 2  | Lectures       | ICT in the workplace – impact of ICT on business, the nature of work including teleworking and outsourcing.      |     |   |   |
|                    |  | 2  | Lectures       | Introduction to ICT systems.<br><br>Listening:embedded and general purpose systems, data storage and management. |     |   |   |
|                    | 3  | 2  | Lectures       | Display screens and ergonomics; Grammar: active and passive sentences.   |     |   |   |
|                    |  |  |                | Portfolio 1 – listening: Speech recognition systems.   |     |   |   |
|                    |  | 2  | Lectures       | Devices for the disabled. Computer jargon.   |     |   |   |

|  |    |   |          |  |
|--|----|---|----------|--|
|  |    |   |          | Abbreviations and acronyms.  |
|  | 4  | 2 | Lectures | ICT in education. Computer-assisted learning (CAL).  |
|  |    | 2 | Lectures | The history of ICT (1) – introduction. Synonyms and antonyms.<br><br>Portfolio 2 – reading: Speech generating devices.   |
|  | 5  | 2 | Lectures | The history of ICT (2) – key stages in the development of the computer, development of computer components.  |
|  |    | 2 | Lectures | Overall revision. Video: A brief history of computing – writing notes.<br><br>Portfolio 3 – listening: E-commerce and online banking.                                      |
|  | 6  | 2 | Lectures | Vocabulary – opposites, describing a graph, crossword 5A.<br><br>Reading comprehension: Omnitouch.<br><br>Video: 20 greatest engineering achievements in the 20th century. |
|  |    | 2 | Lectures | The Internet – Internet basics and FAQs. Internet protocols and data transfer.   |
|  | 7  | 2 | Lectures | Web 2.0. and the future of the Internet.<br><br>Video: The history of Internet.  |
|  |    | 2 | Lectures | Software development (1) – development methods and processes. Students' presentations.<br><br>Revision.  |
|  | 8  | 2 | Lectures | Progress test 1  |
|  |    | 2 | Lectures | Software development (2) – waterfall, iterative and prototyping models. Planning the development process. Open source software. Students' presentations.                   |
|  | 9  | 2 | Lectures | Program design and computer languages – steps in programming. Crossword 7A. Students' presentations.   |
|  |    | 2 | Lectures | Robotics – historical overview, types of robots. Video: Asimo. Students' presentations.  |
|  | 10 | 2 | Lectures | Internet security. The history of hacking. Cybercrime.<br><br>Video: Cybercrime animated. Students' presentations.   |
|  |    | 2 | Lectures | Video: Identity theft phishing.<br><br>Group project: Designing an online store, Designing a robot, Designing an intelligent house, Airport security system.               |
|  | 11 | 2 | Lectures | Presenting students' group projects.<br><br>Video: 10 infamous computer hackers.   |
|  |    | 2 | Lectures | Efficiency in computer systems – reliability, security, speed and cost.  |

|                        |   |          |  |  |                             |          |
|------------------------|---|----------|--|--|-----------------------------|----------|
|                        |   |          |  | Students' presentations.   |                             |          |
|                        | 12  | 2        | Lectures   | Human-computer interaction (HCI) – aspects of human sciences and computer sciences, different types of interface.  |                             |          |
|                        |   |          |  | Students' presentations.   |                             |          |
|                        |   | 2        | Lectures   | Revision – crossword 9A. Networks. Phrasal verbs.  |                             |          |
|                        |   |          |  | Students' presentations.   |                             |          |
|                        | 13  | 2        | Lectures   | E-commerce and e-government – types of e-commerce.   |                             |          |
|                        |   |          |  | Students' presentations.   |                             |          |
|                        |   | 2        | Lectures   | Computing and ethics – laws and regulations including copyright.   |                             |          |
|                        |   |          |  | Principles and ethics including privacy and surveillance.  |                             |          |
|                        | 14  | 2        | Lectures   | Social networks – good or evil. The role of hacking.   |                             |          |
|                        |   |          |  | Phrases used to link ideas.  |                             |          |
|                        | 2   | Lectures | ICT in the future – virtual and mirror worlds. Augmented reality.                        |  |                             |          |
|                        |   |          |  |  |                             |          |
| 15                     | 2   | Lectures | Lifelogging – using technological growth curves to predict future development. Revision. |  |                             |          |
|                        |   |          |  |  |                             |          |
|                        | 2   | Lectures | Progress Test 2  |  |                             |          |
|                        |   |          |  |  |                             |          |
| Teaching types:        | <input checked="" type="checkbox"/> lectures<br><br><input type="checkbox"/> seminars and workshops<br><br><input type="checkbox"/> practical work<br><br><input type="checkbox"/> on linecourse (100%)<br><br><input checked="" type="checkbox"/> mixed e-learning<br><br><input type="checkbox"/> on-siteteaching |          |  | <input checked="" type="checkbox"/> individual work<br><br><input checked="" type="checkbox"/> multimedia<br><br><input type="checkbox"/> laboratory work<br><br><input type="checkbox"/> mentorship<br><br><input type="checkbox"/> exercises |                             |          |
| Students' obligations: | <ul style="list-style-type: none"><li>• at least 70% attendance for full-time students and 50% for part-time students is required.</li><li>• self-study, individual work (portfolio assignments, presentations)</li></ul>   |          |  |  |                             |          |
| Continuous assessment: | Class attendance  | 2 ECTS   | Research   | 0,2 ECTS   | Practicals                  |          |
|                        | Experimental work   |          | Assignment   |  | Exercises                   |          |
|                        | Essay   |          | Seminar  | 0,2 ECTS   | Self-study                  | 0,6 ECTS |
|                        | Mid-term exams  | 0,2 ECTS | Oral exam  |  | Office hours and final exam | 0,3 ECTS |

|  |   |  |                    |                    |                       |                |
|--|---|--|--------------------|--------------------|-----------------------|----------------|
|  | Writing exam  |  | Project            | 0,2 ECTS           | Portfolio assignments | 0,3 ECTS       |
| Assessment of students during teaching and on final exam | CONTINUOUS ASSESSMENT   |  |                    |                    |                       |                |
|  | Continuous testing indicators   |  |                    | Performance        | Grade ratio           |                |
|  |   |  |                    | A <sub>i</sub> (%) | k <sub>i</sub> (%)    |                |
|  | Class attendance and participation  |  |                    | 70 - 100           | 10                    |                |
|  | Oral assignments  |  |                    | 50 - 100           | 20                    |                |
|  | Portfolio   |  |                    | 0-100              | 20                    |                |
|  | First mid-term exam   |  |                    | 50-100             | 25                    |                |
|  | Second mid-term exam  |  |                    | 50-100             | 25                    |                |
|  | Students who haven't passed mid-term exams are obliged to take a final exam consisting of portfolio assignments and theory.     |  |                    |                    |                       |                |
|  | FINAL ASSESSMENT  |  |                    |                    |                       |                |
|  | Testing indicators – final exam (first and second exam term)  |  |                    | Performance        | Grade ratio           |                |
|  |   |  |                    | A <sub>i</sub> (%) | k <sub>i</sub> (%)    |                |
|  | Theoretical exam (written)  |  |                    | 50 - 100           | 50                    |                |
|  | Previous activities   |  |                    | 0 - 100            | 50                    |                |
|  | (include all continuous testing indicators)   |  |                    |                    |                       |                |
|  | Testing indicators – makeup exam (third and fourth exam term)   |  |                    | Uspješnost         | Udjel u ocjeni        |                |
|  |   |  |                    | A <sub>i</sub> (%) | k <sub>i</sub> (%)    |                |
|  | Theoretical exam (written)  |  |                    | 50 - 100           | 50                    |                |
|  | Previous activities   |  |                    | 0 - 100            | 50                    |                |
|  | (include all continuous testing indicators)   |  |                    |                    |                       |                |
|  | Final grade (in %) is formed based on all indicators that describe the level of students' activities according to the equation: |  |                    |                    |                       |                |
|  | $Ocjena \ (%) = \sum_{i=1}^N k_i A_i$   |  |                    |                    |                       |                |
|  | k <sub>i</sub> –coefficient for each activity,  |  |                    |                    |                       |                |
|  | A <sub>i</sub> –grade percent for each activity,  |  |                    |                    |                       |                |
|  | N–total number of activities.   |  |                    |                    |                       |                |
|  | PERFORMANCE AND GRADE   |  |                    |                    |                       |                |
|  | Percentage  |  | Criteria           |                    |                       | Grade          |
|  | 50% - 62,4%   |  | basic criteria met |                    |                       | sufficient (2) |

|  |  |   |                                 |
|--|--|---|---------------------------------|
|  | 62,5% - 74,9%  | average performance with some errors        | good (3)                        |
|  | 75% - 87,4%  | above average performance with minor errors | very good (4)                   |
|  | 87,5% - 100%   | outstanding performance                     | outstanding (5)                 |
|  |  |   |                                 |
| Required reading<br>(available in the library and other media) | <b>Title</b>   | <b>Number of samples in the library</b>     | <b>Available in other media</b> |
|  | Fitzgerald, P., McCullagh, M., Tabor, C. (2011) <i>English for ICT Studies in Higher Education Studies</i> . Reading: Garnet Publishing Ltd.   |   |                                 |
| Recommended reading  | <ol style="list-style-type: none"> <li>1. Čizmić, Ivana (2015) <i>Technical English for ICT Studies</i> - skripta, elektronsko izdanje (MOODLE), Sveučilišni studijski odjel za stručne studije, Split.</li> <li>2. Murphy, R. (2004) <i>English Grammar in Use</i>, Cambridge University Press.</li> <li>3. Hornby, A. S. (2007) <i>Oxford Advanced Learner's Dictionary</i>, OUP. Oxford.</li> <li>4. Esteras, S. R. (2008) <i>Infotech – English for computer users</i>. Cambridge: CUP.</li> <li>5. Pyne, S., Tuck, A. (ur.) (1996). <i>Oxford Dictionary of Computing for Learners of English</i>. Oxford: Oxford University Press.</li> <li>6. Kiš, M. (2002) <i>Englesko-hrvatski, hrvatsko-engleski informatički rječnik</i>. Zagreb: Naklada Ljevak.</li> </ol> |   |                                 |
| Quality assurance regarding learning outcomes                  | <ul style="list-style-type: none"> <li>• Class attendance and completion of all assignments (teacher).</li> <li>• Detailed course syllabi revision (teacher).</li> <li>• Regular lesson delivery (controlled by the assistant to the Head of Department for academic programmes and heads of departments and units).</li> <li>• Continuous quality assurance of all parameters of the teaching process in line with Action plans (assistant to the Head for quality assurance).</li> </ul> <p>Conducting student surveys each semester according to „Regulations concerning the procedure of students' evaluation of teaching quality at the University of Split“ (University of Split, Centre for Quality Assurance).</p>   |   |                                 |
| Additional information   | Detailed course syllabus can be found on MOODLE platform. Course syllabi (shorter versions) in Croatian and English are available to the public on the website of the University Department of Professional Studies.   |   |                                 |

## **PART I – Course Book units**

### **Unit 1: What is ICT?**

ICT stands for Information and Communication Technologies. ICT refers to technologies that provide access to information through telecommunications. It is similar to Information Technology (IT), but focuses primarily on communication technologies. This includes the Internet, wireless networks, cell phones, and other communication media.

In the past few decades, information and communication technologies have provided society with a vast array of new communication capabilities. For example, people can communicate in real-time with others in different countries using technologies such as instant messaging, voice over IP (VoIP), and video-conferencing. Social networking websites like Facebook allow users from all over the world to remain in contact and communicate on a regular basis.

Modern information and communication technologies have created a "global village" in which people can communicate with others across the world as if they were living next door. For this reason, ICT is often studied in the context of how modern communication technologies affect society.

#### **The usage of ICT**

##### **At home:**

|   |  |
|---|--|
| computer games                            |  |
| telephones and mobile phones              |  |
| digital TV                                |  |
| downloading films/music from the Internet |  |
| E-mail                                    |  |
| burglar alarms                            |  |



**In education:**

|                                  |  |
|----------------------------------|--|
| computer assisted learning (CAL) |  |
| educational software             |  |
| Internet for research            |  |
| distance learning                |  |
| interactive whiteboards          |  |

**In business and commerce:**

|   |  |
|---|--|
| teleworking/teleconferencing              |  |
| specialized software                      |  |
| Internet advertising / banking / shopping |  |
| EPOS (electronic point of sale)           |  |
| intranet                                  |  |

### In hospitals:

expert systems for medical diagnosis

robot surgery

patient monitoring devices

keeping patients' records

<http://techterms.com/definition/ict>

### Extending skills - Vocabulary

---

#### 1. What can you...

- |             |              |                 |
|-------------|--------------|-----------------|
| a. develop? | d. assemble? | g. program?     |
| b. process? | e. install?  | h. computerize? |
| c. connect? | f. launch?   | i. monitor?     |

#### 2. Use the words from the box to solve the clues.

|           |        |          |             |       |          |
|-----------|--------|----------|-------------|-------|----------|
| hyperlink | launch | gigabyte | millisecond | virus | assemble |
| browser   |        | bug      | menu        |       |          |

- a flaw in the software program
- put something together, e.g. a car
- load and run a program
- you need one of these on your computer to look at the Internet
- a list of options that appears on a computer screen
- a billion bytes
- there are a thousand of these in a second
- a connection between two web pages on the Internet
- A \_\_\_\_\_ can infect your computer and prevent it working properly.

## Unit 2: ICT in the workplace

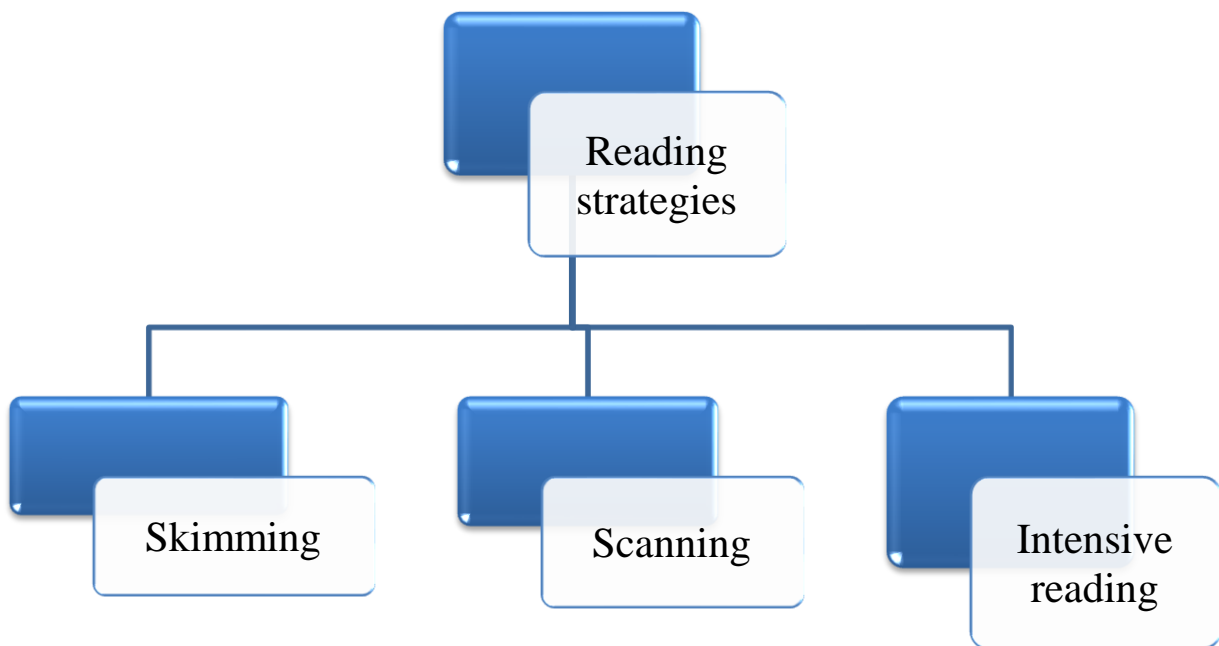
Regarding the roles of ICT in business, the following uses could be mentioned: communication, storage of information, manufacturing, design of new products and assisting with tracking sales. Furthermore, ICT has had an immense impact on work including the need for new work skills and the rise of teleworking and outsourcing.

**Teleworking** – the use of home computers, telephones, etc, to enable a person to work from home while maintaining contact with colleagues, customers, or a central office. Also called: **telecommuting**.

### Extending skills - Reading

---

Developing reading skills is very important especially when it comes to understanding scientific and professional papers packed with technical vocabulary. Reading, together with listening, is a receptive skill whereas speaking and writing are productive skills. There are a number of reading strategies which could help us better understand a text.



**Skimming** – passing over a text quickly to get the main idea of it. Reading strategies used:

- ✓ first and last paragraph
- ✓ titles, subtitles, illustrations
- ✓ first sentence of each paragraph
- ✓ abstract or summary

**Scanning** – reading quickly to find a specific piece of information (eg. finding a specific name, date, statistic, fact)

**Intensive reading**– reading for detail, last stage in the process of reading.

More reading strategies which could be used:

- ✓ previewing
- ✓ predicting
- ✓ guessing from context
- ✓ paraphrasing

**Exercise. Read the following topic sentences and try to predict what each paragraph is about.**

| Topic sentence   | Possible paragraph content   |
|--|--|
| In the past, many people stayed in the same job for their whole life.  | how the situation has changed; new jobs created by ICT   |
| The introduction of modern technology has not caused high unemployment, but it has meant that workers need new skills. | what kind of new skills people need (e.g. computer skills)                                       |
| ICT is not only changing the nature of work, it is also starting to change <i>where</i> that work is done.             | teleworking  |
| Telework has advantages for both employers and employees.  | some advantages of teleworking for employers and employees                                       |
| The same systems that allow people to work from home also allow employers to outsource work to cheaper areas.          | outsourcing both within a country and to other countries where office and salary costs are lower |
| The increasing demand for good ICT skills in the workplace has also had an impact on the world of education.           | use of ICT in schools and universities; ICT courses  |
| How, when and where we work is changing and will continue to change.   | predictions for the future   |

## Unit 3: Introduction to ICT systems

Usage of ICT in everyday life:

- ✓ in the street, e.g. automated teller machines (ATMs), traffic control systems
- ✓ at universities, e.g. self-study centres, interactive whiteboards
- ✓ at home, e.g. TVs, DVD players, burglar alarms
- ✓ in shops, e.g. EPOS systems
- ✓ at work, e.g. PCs, telephones, Internet

Benefits of ICT:

- ✓ saves time
- ✓ is convenient
- ✓ provides more ways for people to enjoy their leisure time
- ✓ saves money

Disadvantages of ICT may include:

- ✓ systems breaking down
- ✓ people having problems with new technologies
- ✓ high costs
- ✓ people being put out of work

### Extending skills - Vocabulary

---

**Prefixes. Study the words in the box. Find the prefix and try to work out the meaning in each case.**

|            |               |        |           |             |
|------------|---------------|--------|-----------|-------------|
| automated  | binary        | embed  | output    | predecessor |
| automation | bidirectional | encode | outsource | preformat   |
| automaton  | biannual      | enable | outline   | preprogram  |

Model answers:

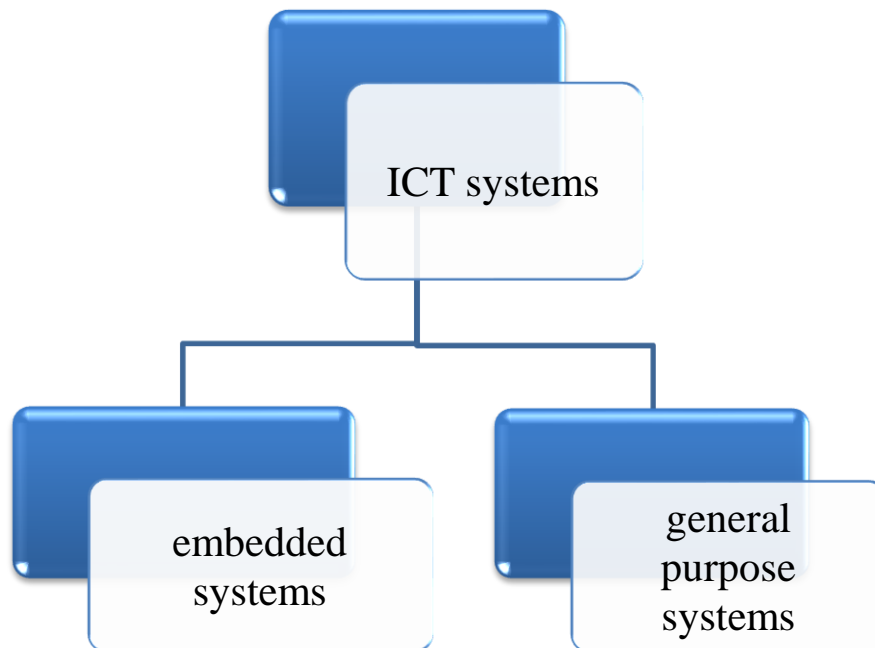
**auto** – self, alone, operating independently

**bi** – two parts or twice

**em/en** – to put into, to cause to be

**out** – on the outside, going out

**pre** – before, earlier than



There are basically two types of ICT systems: **embedded** and **general purpose**. An **embedded system** is one which is fixed inside the device that it controls. They can be found in all sorts of everyday devices, from the automated teller machine outside the bank, to the washing machine and the car. They are special-purpose systems that are pre-programmed to perform specific tasks. There is a big advantage to these embedded systems. They are relatively inexpensive to produce because they are designed to perform a limited set of tasks. In other words, they can only do one task or set of tasks.

**General purpose systems** can be set up to perform different tasks. They include supercomputers, mainframe computers and microcomputers. They can be used for a whole range of things. Users can extend the range in a number of ways. They can reprogram them, upgrade them, add on new hardware or install new software to increase the capabilities of the system.

ICT systems perform **three functions**:

- ✓ information storage and management, e.g. keeping patients' records
- ✓ control, e.g. in the washing machine
- ✓ communication systems – transmit data from one place to another using a range of communication channels including telephone lines, cables and satellite

## Unit 4: ICT in education

There are two aspects of the use of computers in education: their use in **research** and their use in **learning** e.g. in computer-assisted learning (CAL).

There are many abbreviations and acronyms in computing. Acronyms can be pronounced as words, e.g. RAM, CAL, ROM, WIMP whereas abbreviations are pronounced as separate letters such as HTTP, ISP, URL, USB, WWW.

Examples of some acronyms and abbreviations:

**GUI** – graphical user interface

**HTML** – hypertext markup language

**HTTP** – hypertext transfer protocol

**ISP** – Internet service provider

**URL** – uniform resource locator

**USB** – universal serial bus

**WIMP** – windows, icons, menus, pointers

### Extending skills - Reading

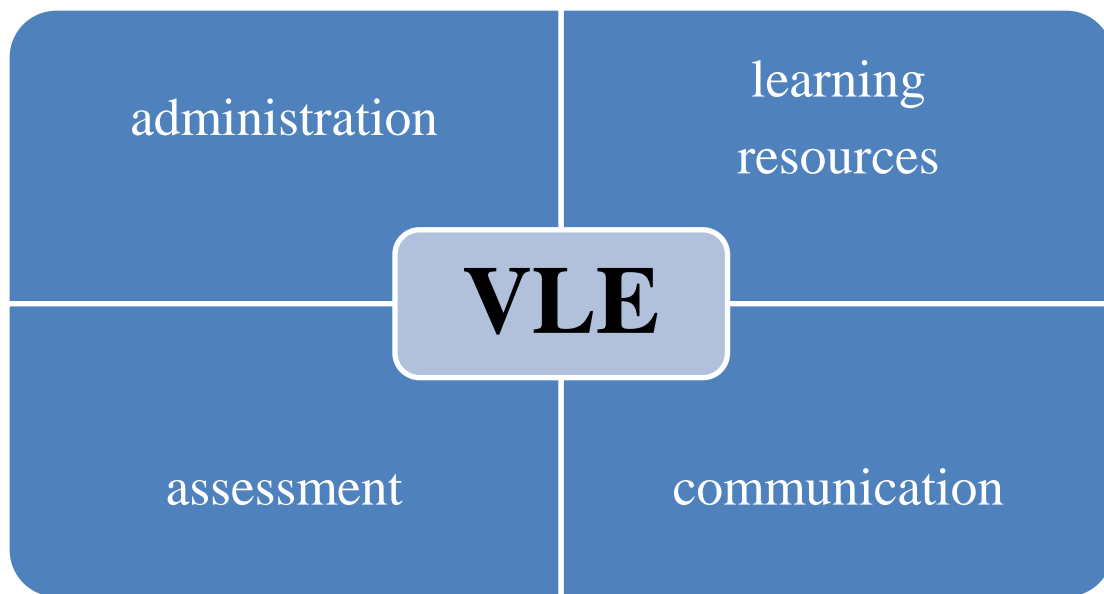
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#### Discussion points.

1. How are computers used in education today?
2. What are the advantages of using computers for learning?

**Computer-assisted learning (CAL)** means using computer technology to help to learn a subject. For some, CAL means using a computer to deliver an entire training programme, an approach known as computer-based training (CBT). For others, CAL means using a computer as part of a learning programme which might also include lectures, textbooks, discussions, etc.

CAL could be used in most theory-based courses and some practical courses, such as programming. However, it wouldn't be suitable for the practical element of many courses, for example where students have to conduct experiments or make something (although computers may be used to prepare for an experiment, e.g. simulating possible results or designing something to be made).



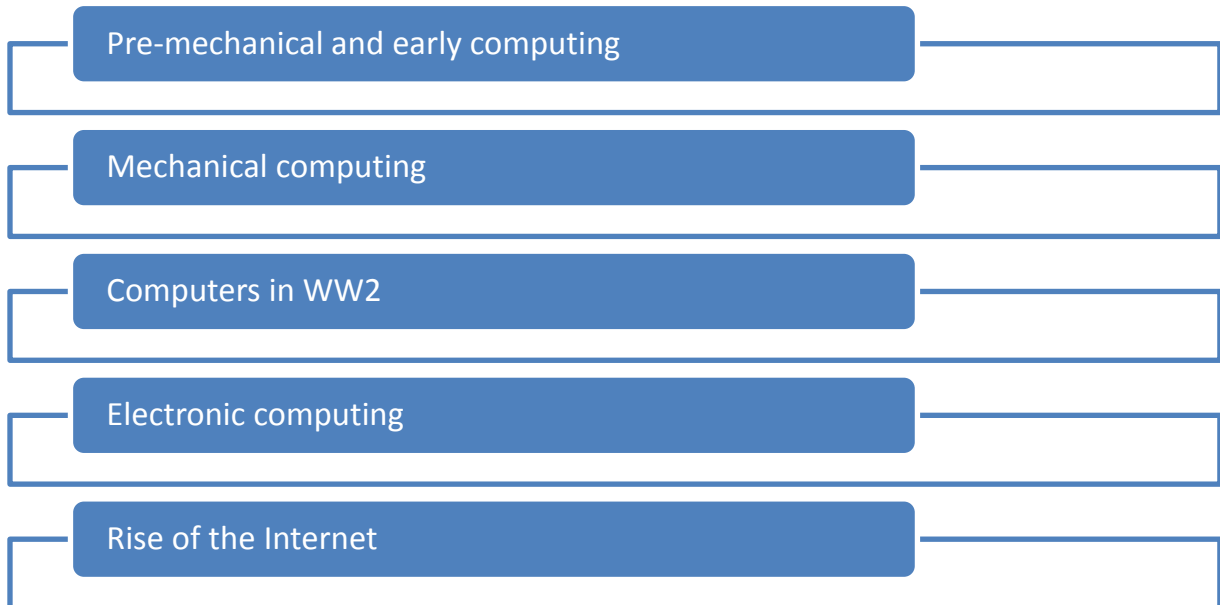
**Virtual learning environment (VLE)** has four main components:

- ✓ administration – record keeping, course information, test results, assignment info
- ✓ assessment – online tests, quizzes, exams
- ✓ communication – blogs, e-mail, chat rooms
- ✓ learning resources – PowerPoint presentations, lectures, course materials



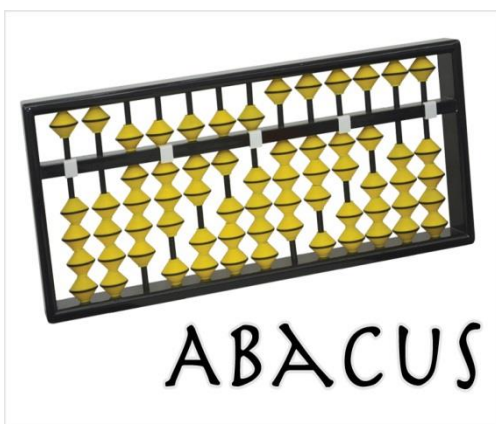
## Unit 5: The history of ICT

Key stages in the development of the modern computer:



### Pre-mechanical and early computing:

- ✓ Usage of 'manual computers' – worked by hand
- ✓ The abacus – 1st manual computer, used as a basic calculator
- ✓ 5 000 years ago – early Babylonians – used simple arithmetic to count and keep a record of their goods
- ✓ 5 beads per line
- ✓ Developed to speed up addition
- ✓ Early 17th century – Napier's Bones
- ✓ Created to speed up multiplication
- ✓ A series of numbers written on narrow strips of material, originally bone



*The abacus*



*Napier's Bones*

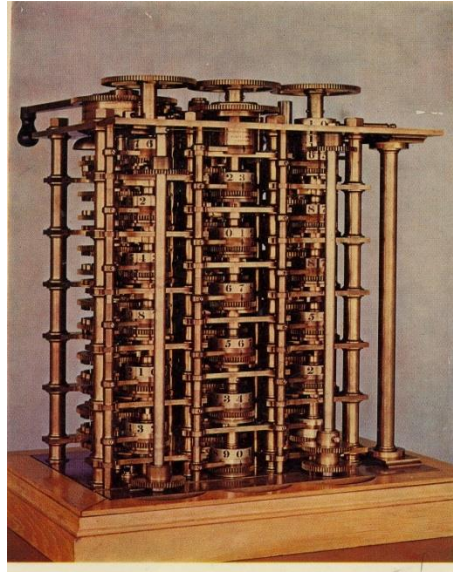
## Mechanical computing:

- ✓ 1st mechanical calculators by Blaise Pascal in France in 1645
- ✓ The Pascaline – a hand-powered adding machine which could add numbers up to 8 figures long
- ✓ Used gears and cogs to transfer the results of one wheel to another; used to calculate taxes



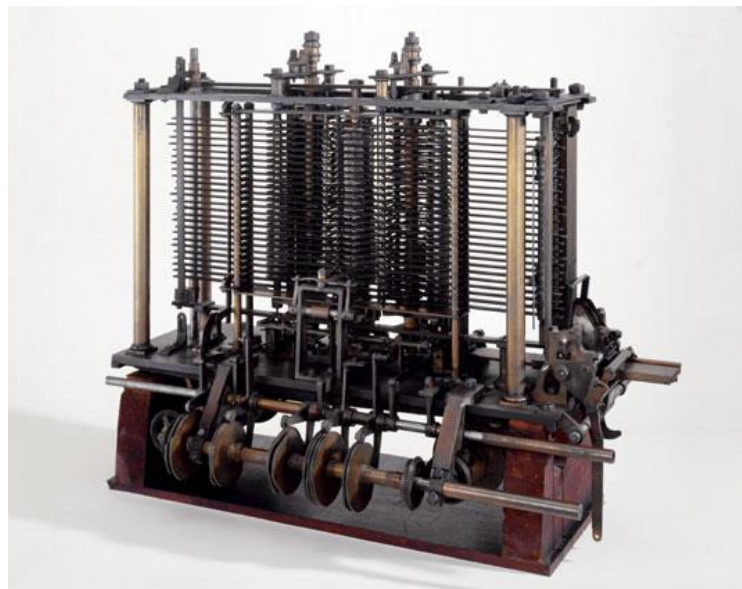
*The Pascaline*

- ✓ The same principle is still used today in electricity and gas meters
- ✓ By the early 19th ct, more and more calculation was required to conduct government, commerce and engineering efficiently. Logarithmic tables, which allowed large numbers to be multiplied and divided using addition and subtraction, were increasingly used to speed up calculations.
- ✓ Charles Babbage, an English mathematician and philosopher, discovered many errors in existing tables and felt that the calculations should be carried out by machine for greater accuracy. He was given money by the British government to design such a machine.
- ✓ The design for this machine, the Difference Engine, was very complex and the engineers making the parts were unable to manufacture them with enough precision to make it work. In addition, the government refused to continue providing the funds to allow him to overcome these barriers and as a result, his Difference Engine was never fully built as he designed it.



*Babbage's Difference Engine (1833)*

- ✓ Babbage has been credited with inventing the first machine recognized as a modern computer, and so he is called the father of the computer.
- ✓ He also designed an Analytical Engine, a type of mechanical computer which would use punched cards to input programs to the machine and which would be powered by steam. It was also never built. Despite that, it had programs written for it by a woman called Ada Lovelace, recognized as the world's first programmer and honoured by having a programming language, Ada, named after her in 1983.



*Babbage's Analytical Engine (1834 – 1871)*

- ✓ Babbage was also a cryptographer who worked for the British government. He broke or decoded a number of codes which had been considered unbreakable up until then, giving the British government considerable advantages in diplomacy and war.
- ✓ By the end of the 19th ct, many of these principles were still being used in the tabulating machine which used punched cards to process data from the US Census
- ✓ In 1801 – Joseph-Marie Jacquard developed a weaving machine or loom – controlled by a set of cards with holes in them – these cards introduced the principle of programmability
- ✓ Punched cards were used for more than 150 years



*Weaving machine by Jacquard Loom*

### **Computers in WW2:**

- ✓ Alan Turing, an English scientist and mathematician, who devised a machine which could break German codes so that the English could read German military messages, the machine known as Colossus was built using electronic valves and relays in order to perform calculations and to store some of the data while it was being processed.
- ✓ It was the 1<sup>st</sup> computer to do so and because of this, it is regarded as the first electronic computer. Punched tape was used to input data and was a very fast way of doing so.
- ✓ Once the 1<sup>st</sup> Colossus proved successful, a number of others followed, and by the end of the war, 10 were in operation.
- ✓ By modern standards, Colossus machines were very large and slow, but by allowing the British to read German military communications, the impact which they had on the war was enormous.





*Alan Turing's Colossus (1943)*

### **Electronic computing:**

- ✓ After WW2 – power of computing was turned towards business and administrative problems
- ✓ UNIVAC – 1<sup>st</sup> American commercial computer, 1<sup>st</sup> computer to be specifically designed for business rather than scientific purposes
- ✓ Calculations were performed using vacuum tubes and reading from magnetic tapes.
- ✓ UNIVAC used 5200 vacuum tubes, it could perform around 2000 operations per second.
- ✓ This technology was limited by cost, size and energy consumption in terms of how big computers could get.



*Vacuum tubes*

- ✓ In 1947 the transistor was invented by Shockley, Bardeen and Brattain. Transistors could be made much more quickly and cheaply using a very simple and widely available ingredient, sand. Silicon, which is obtained from sand, is the material from which all modern electronic components are made. Transistors consumed very little power and were very small compared to vacuum tubes.
- ✓ Computers containing transistors could be smaller and still deliver as much, or more, processing power.
- ✓ Electronic computers used transistors instead of valves – the beginning of modern era of computing



*The first transistor (1947)*

## Unit 6: The Internet

### What is the Internet?

The **Internet** is an **International** computer **Net**work made up of thousands of networks linked together. It is a "network of networks" that consists of millions of private and public, academic, business, and government networks of local to global scope that are linked by copper wires, fiber-optic cables, wireless connections, and other technologies.

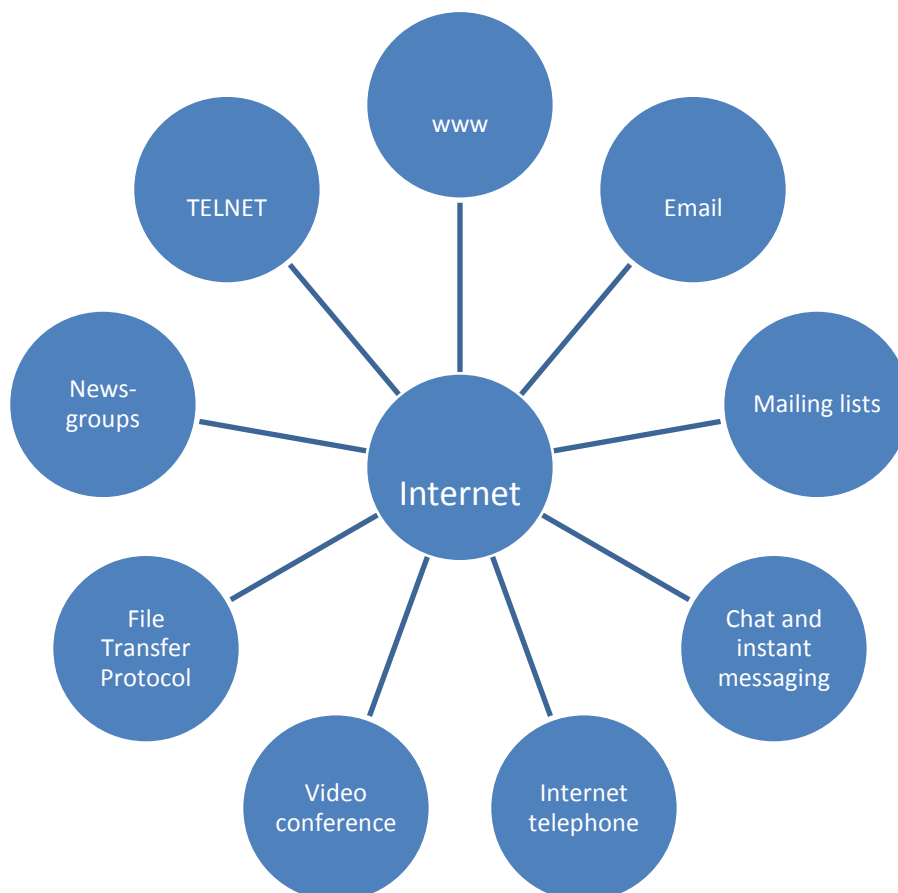
### Getting connected

In order to use the Internet you need:

a computer + the right connection software + a modem to connect your computer to a telephone line, and then access your **ISP** (Internet Service Provider).

### Components of the Internet

The Internet consists of many systems that offer different facilities to users.



**WWW**, the **World Wide Web**, = a collection of files or pages containing links to other documents on the Net.

**Chat** and **instant messaging** used for real-time conversations.

**Internet telephone**, a system that lets people make voice calls via the Internet.

**Video conference**, and internet telephone, are based on IRC (Internet relay chat) protocols. A system that allows the transmission of video and audio signals in real time so the participants can exchange data, talk and see one another on the screen.

**File Transfer Protocol (FTP)**, used to transfer files between computers.

**Newsgroups**, the public discussion areas which make up a system called 'Usenet'. The contents of the newsgroups are contributed by people who send articles (messages) or respond to articles.

**TELNET**, a program that is used to log directly into remote computer systems. Online databases and library catalogues can be accessed by this program.

### Extending skills - Vocabulary

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The terms "Internet" and "World Wide Web" are often used in every-day speech without much distinction. However,

the Internet  $\neq$  the World Wide Web

The Internet is a global data communications system. It is a hardware and software infrastructure that provides connectivity between computers. In contrast, the Web is one of the services communicated via the Internet. It is a collection of interconnected documents and other resources.



## A brief history of the Internet

### 1961

In July *Leonard Kleinrock* (MIT) publishes the first paper on **packet switching theory**, which forms the basis for the creation of the Internet. **Packet switching** is a network communications method that splits data traffic (digital representations of text, sound, or video data) into chunks, called **packets**, that are then routed over a shared network.

### 1964

Data transmission begins in practice in Finland.

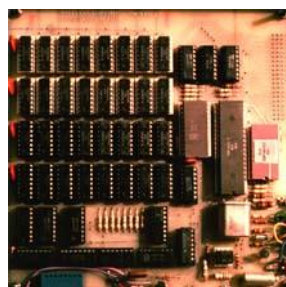
### 1967

The United States Department of Defence Advanced Research Projects Agency (**DARPA**) launches the **ARPANET** project to design a distributed computer network. The ARPANET network is set up, creating the basis for the Internet.

### 1970s

There search on the ARPANET is carried out in the USA. This produces TCP/IP, the basis of the Internet.

Microcomputers begin to be popular, initially mostly in the form of kits intended for enthusiasts and industry. In 1977, the ready-made **Apple**, Commodore **PET** and Tandy **TRS-80** microcomputers came onto the mass market, launching the microcomputer revolution. Even though these computers usually had a serial communications port, mostly so they could be used as terminals, or for printers, linking of microcomputers to computer networks had to wait until the 1980s.



*The Finnish Telmac-1800 microcomputer, sold as an assembly kit (Photo and computer: Harri K. Salminen).*

## 1980s

The Internet was still considered to be a temporary system designed for the research world. The ISO (International Standards Organization) proposed the competing **OSI** (Open Systems Interconnection) model. OSI was particularly backed by telecom organisations. They had built **X.25** packet-switching networks, with monitoring and billing implemented to suit their own purposes. The Internet relied on routers owned by the users. The only thing bought from the telecom organisations was leased telecommunication links.

## 1982

The Commodore 64 is launched.

## 1984

The Apple Macintosh is released.

## 1986

Cisco Systems, a small company with four workers in Silicon Valley, California, delivers its first Internet routers.

## 1990

Tim Berners-Lee's updated proposal, 'World Wide Web: Proposal for a HyperText Project' is approved by CERN. The Web is born.

## Extending skills - Vocabulary

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**Exercise 1. Vocabulary. The Net. Complete the sentences with a term from the list.**

|                  |                 |               |                 |
|------------------|-----------------|---------------|-----------------|
| <b>modem</b>     | <b>password</b> | <b>online</b> | <b>download</b> |
| <b>hyperlink</b> | <b>Telnet</b>   | <b>Web</b>    | <b>protocol</b> |

1. When you are connected to the Internet, you are described as being \_\_\_\_\_.
2. A \_\_\_\_\_ is a piece of text or an image that, when selected, takes you to other Internet sites.
3. The Internet is based on a \_\_\_\_\_ called TCP/IP.
4. You need a \_\_\_\_\_ to convert computer data into a form that can be transmitted over the phone lines.
5. Users have to enter the log-in name and a \_\_\_\_\_ to gain access to the Net.
6. FTP software allows you to \_\_\_\_\_ files from the Net to your computer.
7. The World Wide Web is known as the \_\_\_\_\_.
8. To 'log on' to a remote computer you need to run a \_\_\_\_\_ program.

**Exercise 2. Read the above text carefully and decide whether the following sentences are true (T) or false (F). If they are false, correct them.**

1. The Internet and the World Wide Web are synonyms. \_\_\_\_\_
2. Computers need to use the same protocol (TCP/IP) to communicate with each other. \_\_\_\_\_
3. The Web was born in 1980s. \_\_\_\_\_
4. Emails are used for real-time messaging. \_\_\_\_\_
5. The subject is a part that describes the content of an email. \_\_\_\_\_

**Exercise 3. Vocabulary. Find the words that match these definitions.**

1. a file that has been included as part of an email message \_\_\_\_\_
2. the part of the email address that identifies the user of the service \_\_\_\_\_
3. the part of the email where you write the information about the address and subject \_\_\_\_\_
4. a program that enables a computer to function as a terminal working from a remote computer \_\_\_\_\_
5. a system that enables people make voice calls via the Internet \_\_\_\_\_

**Exercise 4. Which Internet utility (1 to 7) would you use to do each of these tasks (a to g)?**

- |                      |  |
|----------------------|--|
| 1. Email             | a. send a message to another person via the Internet                                   |
| 2. Web browser       | b. transfer files from the Internet to your hard disk                                  |
| 3. Newsreader        | c. have a live conversation (usually typed) on the Internet                            |
| 4. IRC/chat program  | d. connect to a remote computer by entering certain instructions and run program on it |
| 5. FTP software      | e. take part in public discussion areas, called newsgroups                             |
| 6. Videoconferencing | f. fetch and view Web pages on the Internet  |
| 7. Telnet            | g. participate in live conversations, using text, audio and video.                     |

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_ 5. \_\_\_\_\_ 6. \_\_\_\_\_ 7. \_\_\_\_\_

<http://en.wikipedia.org/wiki/Internet>

<http://www.nic.funet.fi/index/FUNET/history/internet/en/etusivu-en.html>

### Exercise 5. Vocabulary. Study the words in the box.

|             |               |           |               |
|-------------|---------------|-----------|---------------|
| development | revolutionary | hypertext | interactivity |
| indexing    | asynchronous  | refresh   | reload        |

1. What is each base word and its ICT meaning?
2. How does the affix change the part of speech?
3. What is the possible meaning in the text?

| Word          | Base and meaning   | Effect of affix  | Meaning in text  |
|---------------|--|--|--|
| development   | develop (v) – to improve something by expanding, enlarging or refining | -ment – changes to noun form                           | improvements   |
| revolutionary | revolution (n) – a huge change which happens in a short time           | -ary – adjective ending                                | change which happens due to major developments                     |
| hypertext     | text (n) – written word  | hyper- - above, higher than normal                     | text marked up to allow greater flexibility                        |
| interactivity | interactive (adj) – involving user in exchange of information          | -ity – changes to noun                                 | interaction between user and website                               |
| indexing      | index (n) – list/collection of information                             | -ing – gerund ending; the process of creating an index | index enabling web pages to be visible to search engines           |
| asynchronous  | synchronous (adj) – at the same time                                   | a- makes the meaning                                   | enables web page to be refreshed without reloading page completely |
| refresh       | fresh (adj) – new  | re-do something again                                  | to reload a web page   |
| reload        | load (v) – to put something on a carrier, or on a system               | re- do something again                                 | to open a web page again   |

## Additional: The Web

The **World Wide Web** (commonly shortened to **the Web**, **WWW**) is a network of **hypertext** documents accessed via the Internet. It works by using text that contains links, **hyperlinks** to other documents. **Web pages** are files stored in computers, which act as **servers**. Your computer, the **client**, uses a special program to access and download web pages that is called a **web browser**. **Websites** are groups of pages located on the Web, maintained by a **webmaster**, the manager of a website.

The Web can be used for:

- Looking up information on publications
- Online shopping or **cybershopping** or **e-commerce**
- Investigating staff or research at universities
- Downloading pictures, games or other files etc.

Since the Web enables you to access all sorts of interactive multimedia information, it has become a real **information highway**.

The World Wide Web was created in 1989 by the British scientist Tim Berners-Lee, working at the European Organization for Nuclear Research (CERN) in Geneva, Switzerland, and released in 1992. Since then, Berners-Lee has played an active role in guiding the development of Web standards (such as the markup languages in which Web pages are composed).

In order to **surf** or **navigate** the Web, **access and retrieve** web pages or websites, you need a computer with an Internet connection and a web browser. After you **have launched** it, you must type the website address or **URL(Uniform Resource Locator)** which may look like this:

<http://www.cambridge.org/elt/infotech3ed/study/weblinks/unit21.htm>

**http://** indicates the type of **protocol** that the server and browser will use to communicate. In this case, it is **Hypertext Transfer Protocol**.

**www.** shows that it is a resource on the **World Wide Web**.

**cambridge.org** is the **domain name** of the web server that hosts the website.

**elt/infotech3ed/study/weblinks** is the **path**, the place where a web page is located. In this case, it comes to English language teaching.

**unit21.htm** is the **filename** or name of a single web page.

**Exercise 1. Vocabulary. Find word(s) that match these definitions.**

1. The WWW is also called the i \_\_\_\_\_ h \_\_\_\_\_.
2. A h \_\_\_\_\_ is a link in a web page.
3. The first page of a website is the h \_\_\_\_\_ page.
4. The manager of a web page is its w \_\_\_\_\_.
5. The place where a web page is located is called the p \_\_\_\_\_.

**Exercise 2. Complete these instructions about how to navigate with the words in the box.**

|                      |                   |                |                    |
|----------------------|-------------------|----------------|--------------------|
| <b>client</b>        | <b>web page</b>   | <b>surf</b>    | <b>web browser</b> |
| <b>search engine</b> | <b>web server</b> | <b>website</b> | <b>URL</b>         |

1. Start up your computer and connect to the Internet.
2. Open your \_\_\_\_\_.
3. Type the \_\_\_\_\_ to access a website.
4. Your web browser sends the request to the correct \_\_\_\_\_.
5. The server looks for the document and sends it to the \_\_\_\_\_ computer.
6. Your web browser displays the selected \_\_\_\_\_ on the screen.
7. From the home page of the \_\_\_\_\_ you can \_\_\_\_\_ to other pages by clicking on hyperlinks.
8. If you want to find more websites, use a \_\_\_\_\_.

**Exercise 3. Steps for buying online. Put the following steps in the correct order.**

- a. Put the items you want to buy into a virtual shopping cart.
- b. Confirm the order and log out.
- c. Enter your personal data – you may have to log in with a username and a password if you have an account with them.
- d. Enter a site dedicated to e-commerce and browse their products.

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_

## Language work 1: Collocations

**Collocations** are word combinations or set phrases that are very common in English. Here are some examples:

- verb + noun:            **display data**                      **store information**
- verb + particle:        **plug into a USB port**
- adverb + adjective:    **fully compatible software**                      **highly addictive game**
- adjective + noun:      **instant messaging**

**Exercise 1. Match the words from the left (1-6) with the words on the right (a-f) to make collocations.**

- |             |                |
|-------------|----------------|
| 1. transfer | a. chat rooms  |
| 2. enter    | b. photos      |
| 3. visit    | c. information |
| 4. retrieve | d. a pin       |
| 5. virtual  | e. money       |
| 6. upload   | f. reality     |

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_ 5. \_\_\_\_\_ 6. \_\_\_\_\_

**In pairs, make sentences using the collocations above.**

1. \_\_\_\_\_.
2. \_\_\_\_\_.
3. \_\_\_\_\_.
4. \_\_\_\_\_.
5. \_\_\_\_\_.
6. \_\_\_\_\_.

## Language work 2: The prefixes *e-* and *cyber-*

The **e-** prefix stands for **electronic** and is used for activities that take place on computers or online. Some examples are:

**e-commerce, e-book, e-card, e-learning.**

The **cyber-** prefix stands for **cybernetics** and is used to describe things related to computer networks. Some examples are:

**cybercafé, cyberspace, cybercrime.**

**Exercise 2. Answer the following questions.**

1. Have you ever sent or received an e-card? If you have, what was the occasion?
2. Have you ever been to a cybercafé and used a computer with Internet access for a fee?
3. Have you ever downloaded an e-book? What was it about?
4. Name some examples of cybercrime.

[http://en.wikipedia.org/wiki/World Wide Web](http://en.wikipedia.org/wiki/World_Wide_Web)



## Unit 7: Software development

There are many different stages in the development of software. The whole process is known as *project management*. The stages are:

- ✓ defining the problem – it includes requirements analysis (defining user requirements), agreeing design specifications, system design and building working prototypes for the client,
- ✓ scheduling – planning of software production, poor planning causes project failure,
- ✓ producing the software – it involves choosing a model for development, allocating resources such as programmers and computing facilities, controlling the quality of what is produced,
- ✓ documenting the program,
- ✓ troubleshooting any problems with the program.

Computer software is also known as *code* because it is written in specialized languages by trained programmers. Apart from knowing how to write code, programmers have to know what they are writing it for, in other words, the functional specifications of the program. Once this is known, decisions on system design can be made. In this case, system design considerations will include the choice of operating system or platform it will run on, the type of back end or database technology which will be used and what technical standards will be used by the front end. And then, once the system design decisions have been made, resource and scheduling issues will need to be considered.



*MITS Infotech Software Development Process*

[http://www.mitsinfotech.com/customized\\_application.htm](http://www.mitsinfotech.com/customized_application.htm)

## Models used for developing software

There are four main models:

- ✓ **waterfall model** – each stage directly follows the other, each stage is dependent on the results which flow on from the previous stage, particularly useful for simple problems which can be clearly defined
- ✓ **iterative model** – it adds functionality in stages to software, examples of this type of software are things like end-user applications or operating system versions, the first iteration usually provides the core functionality for the program, and each successive increment adds new functionality and fixes anything that hasn't worked properly in the previous iteration
- ✓ **prototyping model** – since it sometimes happens that clients are not totally sure what they want the software to do, it is important that they have an opportunity to see a model before it is fully developed (mock-up model), it is suitable for projects which are relatively small, such as website development, the disadvantage could be the fact that the design process can take much longer than with other models
- ✓ **spiral model** – it combines elements of the waterfall and prototyping models i.e. the overall project is broken down into stages as in the waterfall model, it is particularly good for large, expensive and complicated projects.

## Open source and proprietary software

**Open source** generally refers to any computer software or program whose source code is made freely available for use, modification and distribution. The Linux operating system and Apache web server are two well-known open source programs. **Proprietary software** is the exclusive copyrighted property of the developers or publishers. Almost all commercial software is proprietary, with restricted use. Some well-known examples are Microsoft Windows, Adobe Flash Player and iTunes.

## Extending skills - Vocabulary

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**Complete the sentences with the most suitable word.**

1. It is important to ensure that a statement of \_\_\_\_\_ is agreed with the client before any work starts.
2. The \_\_\_\_\_ model allows clients to see a product before it is fully developed.
3. The code in \_\_\_\_\_ software is not made publicly available.
4. An \_\_\_\_\_ process involves repetition.
5. In web development, a database is often referred to as a \_\_\_\_\_.
6. A \_\_\_\_\_ - \_\_\_\_\_ is a type of prototype.
7. Sorting out problems with the finished product is called \_\_\_\_\_.
8. The \_\_\_\_\_ model is particularly good for large projects.
9. In planning a project, many \_\_\_\_\_ have to be taken into account, as these may affect the timescale.

## Unit 8: Efficiency in computer systems

There are various factors which need to be taken into account in making computer systems efficient. These are reliability, security, speed, support requirements, overall cost. It could be said that computer performance is characterized by the amount of useful work accomplished by a computer system or computer network compared to the time and resources used. High computer performance may involve one or more of the following:

- ✓ short response time for a given piece of work
- ✓ high rate of processing work
- ✓ low utilization of computing resources
- ✓ high availability of the computing system or application
- ✓ fast data compression and decompression
- ✓ high bandwidth
- ✓ short data transmission time

### Extending skills - Vocabulary

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**Exercise 1. Study the two lists of verbs in the box. Match the verbs with similar meanings. Make nouns from the verbs if possible.**

| 1              | 2               |
|----------------|-----------------|
| cluster        | interrupt       |
| consume        | guarantee       |
| convert        | contribute (to) |
| disrupt        | reduce          |
| distribute     | include         |
| drive down     | group           |
| ensure         | transform       |
| incorporate    | balance, share  |
| mask           | assess          |
| measure        | use             |
| play a role in | hide            |

Model answers:

| Verb           | Noun          | Verb            | Noun              |
|----------------|---------------|-----------------|-------------------|
| cluster        | cluster       | group           | group             |
| consume        | consumption   | use             | use               |
| convert        | conversion    | transform       | transformation    |
| disrupt        | disruption    | interrupt       | interruption      |
| distribute     | distribution  | 1.balance       | 1.balance         |
|                |               | 2.share         | 2.share           |
| drive down     | /             | reduce          | reduction         |
| ensure         | /             | guarantee       | guarantee         |
| incorporate    | incorporation | include         | inclusion         |
| mask           | mask          | hide            | /                 |
| measure        | measurement   | assess          | assessment        |
| play a role in | /             | contribute (to) | contribution (to) |

**Exercise 2. Study the table. Match each word or phrase with its meaning.**

,

| Word/phrase                          | Meaning  |
|--------------------------------------|--|
| ‘out-of-the-box’                     | where physical components can be added or removed without shutting down the system                                   |
| data integrity                       | ensuring that devices operate efficiently whether they are idle, operating at lower usage levels or at full capacity |
| energy proportionality               | circuits on the computer’s motherboard providing the voltages required by the microchips                             |
| ‘hot swapping’                       | systems supplying power with built in storage capacity so that during a power outage servers can keep running        |
| uninterruptible power supplies (UPS) | equipment provided by the manufacturer without modification  |
| voltage regulator circuitry          | ensuring that data is not corrupted  |

## Unit 9: Human-computer interaction (HCI)

The purpose of human-computer interaction (HCI) as a field of study is to optimize the performance of humans and computers together as a system. There are two different components of HCI – the human sciences and the computer sciences. There are three important areas where human sciences can contribute to HCI. The first important point is that the human sciences can be used to build models of the ways in which humans interact with their environment i.e. how an individual interacts with the world in general and with computers in particular. Its aim is to help system designers in developing the most effective interactions between users and systems. The second major point in relation to the role of cognitive psychology in HCI is connected with the understanding how human cognition works. The Model Human Processor (MHP) identifies three separate systems – perceptual, cognitive and motor systems. Thirdly, models of human interaction can provide very effective ways of approaching the design of interfaces and of ensuring their quality. Used in an appropriate way, they can improve the usability of systems and considerably enhance the user experience. To conclude, human sciences are made up of cognitive psychology, social disciplines and organizational knowledge. The techniques used improve usability.

Computer sciences, as opposed to the human sciences, can make contributions to tools and processes in HCI. The main focus of the computer sciences models of HCI is on how the system can become more effective within existing system constraints. Choosing the best combination of hardware and software for input and output devices is important if designers are to achieve this. The speed with which feedback takes place is also very important, as it can affect the user's perception of the responsiveness of the device, and the ease of interactivity with the system.

### Extending skills - Vocabulary

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**Complete the sentences with the most suitable word or provide the most suitable word for given definitions.**

1. How easy it is to use something. \_\_\_\_\_
2. Design of equipment to reduce user fatigue, discomfort and injury. \_\_\_\_\_
3. The use of a new idea or method. \_\_\_\_\_
4. An objective which an individual or system is trying to achieve. \_\_\_\_\_
5. A specific area within which a goal is to be achieved. \_\_\_\_\_
6. Relating to the mind. \_\_\_\_\_
7. Something which restricts the ability to perform or carry out a task. \_\_\_\_\_
8. Connected with thinking or conscious mental processes. \_\_\_\_\_
9. A path through which signals can pass. \_\_\_\_\_

## Unit 10: E-commerce and e-government

E-commerce or electronic commerce is the buying and selling of goods and services, or the transmitting of funds or data i.e. it refers to commercial transactions which take place over an electronic network, primarily the Internet. There are many different forms:

- ✓ **business to business (B2B)** – transactions between companies
- ✓ **business to consumers (B2C)** – transactions between companies and individual consumers; *bricks and mortar* shops are being replaced by *virtual storefronts* on the Internet
- ✓ **consumers to consumers (C2C)** – transactions between individual consumers e.g. using online auction sites such as eBay
- ✓ **business to government (B2G)** – governments use e-tendering for procurement and non-commercial transactions such as providing government information and submitting government forms

*Bricks and mortar* shops refer to shops or companies which have a physical presence and offer face-to-face consumer experiences  $\neq$  *virtual storefronts*.



<http://www.clocksoftsolutions.com/e-commerce/>

Before buying things online, a few basic precautions should be taken:

- ✓ read all product information clearly
- ✓ check whether you can cancel the purchase
- ✓ keep a printout of your order
- ✓ do not give private information that is not directly required for your transaction
- ✓ only give your credit card number to suppliers that you know and trust
- ✓ make sure the website is secure

Online services have some advantages and disadvantages. Here are some examples:

|   | <b>Advantages</b>   | <b>Disadvantages</b>   |
|---|---|--|
| <b>e-tickets</b>  | very easy to complete transactions online; easy to change details; no need to go to travel agents | can be charges to consumer for e-ticket; additional fees at airport for printing; may be difficult for people with limited literacy and ICT skills |
| <b>using web for marketing and promotion</b>                          | savings on marketing can be passed on to consumer in form of lower prices                         | requires customer to be aware of website in order to visit the site  |
| <b>selling additional services such as accommodation and car hire</b> | convenient for consumers to look in one place; can provide special deals                          | does not provide opportunity for comparison with other prices and services   |

**Exercise 1.Steps for buying online. Put the following steps in the correct order.**

- e. Put the items you want to buy into a virtual shopping cart.
- f. Confirm the order and log out.
- g. Enter your personal data – you may have to log in with a username and a password if you have an account with them.
- h. Enter a site dedicated to e-commerce and browse their products.

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_

## Unit 11: Computing and ethics

There are several ethical issues in computing that have to be taken into consideration such as privacy and private data collection, security, intellectual property rights, accessibility, censorship and filtering, robotics and artificial intelligence, and others. Internet privacy is one of the issues that has emerged since the evolution of the World Wide Web. Millions of internet users often expose personal information on the internet. Other important issues are fraud and identity theft. Also, some companies violate their users' right to privacy.

Security has long been a topic of ethical debate where, for example, hacking, cyberstalking and online harassment play an important role. When it comes to accuracy, it is difficult to verify the authenticity of information shared online.



<https://darkpsychology.co/ipredator-probability-inventory-cyberstalking/>

Intellectual property rights comprise issues like software piracy, copyright infringement, digital divide which is connected to the freedom of information. This refers to the unequal socio-economic divide between those who have access to digital and information technology such as cyberspace and those who have limited or no access at all. This gap of access between countries or regions of the world is called the global digital divide.

In terms of robotics and artificial intelligence, ethical concerns are related to military drones, spy robots, driverless trains and cars, medical robots etc. The question is whether they can be autonomous enough and exhibit ethical behaviour, how well they can function outside linear, predefined scenarios.

Another issue related to the topic is **cyberethics** which can be defined as the study of ethics pertaining to computers, encompassing user behaviour and what computers are programmed to do and how this affects individuals and society. In order to introduce a set of standards to guide and instruct people in the ethical use of computers, the **Ten Commandments of Computer Ethics** were created in 1992 by the Computer Ethics Institute.



The Ten Commandments are as follows:

1. Do not use a computer to trouble others.
2. Do not interfere with other people's computer work.
3. Do not snoop and sneak around in other people's computer files.
4. Do not use a computer to steal information.
5. Do not use a computer to bear false witness.
6. Do not copy or use proprietary software for which you have not paid.
7. Do not use other people's computer resources without authorization or proper compensation.
8. Do not appropriate other people's intellectual output.
9. Do think about the social consequences of the program you are writing or the system you are designing.
10. Do always use a computer in ways that ensure consideration and respect for your fellow humans.

[http://en.wikipedia.org/wiki/Ten\\_Commandments\\_of\\_Computer\\_Ethics](http://en.wikipedia.org/wiki/Ten_Commandments_of_Computer_Ethics)

<http://en.wikipedia.org/wiki/Cyberethics>

### Extending skills - Vocabulary

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**Exercise 1. Study the terms in the box and explain their meanings.**

|                            |                          |                           |
|----------------------------|--------------------------|---------------------------|
| black hat hacker           | known software exploit   | technical legal breach    |
| password protection policy | internet safety guidance | secure equipment disposal |

Model answers:

**Black hat hacker** – a hacker who gains access to systems for personal gain or in order to damage them

**Known software exploit** – a known flaw in a piece of software which allows hackers to take control of it

**Technical legal breach** – where the law is broken, but the breach is very minor and the case is extremely unlikely to be taken to court

**Password protection policy** – a policy which sets out how strong passwords can be generated and when they should be changed

**Internet safety guidance** – guidance for avoiding malicious websites, phishing and other types of Internet dangers

**Secure equipment disposal** – how to get rid of old equipment in a way which does not compromise security; particularly important for old data disks and other forms of storage

**Exercise 2. Study the words in the box. Match the words in columns 1 and 2 to make phrases.**

| 1           | 2           |
|-------------|-------------|
| client      | testing     |
| data        | system      |
| legal       | access      |
| penetration | protection  |
| privacy     | outcome     |
| reverse     | legislation |
| root        | exploit     |
| successful  | engineering |
| target      | consent     |
| unpatched   | situation   |

### **Additional: Cybercrime**

The Internet provides a wide variety of opportunities for communication and development, but unfortunately it also has its dark side. **Internet security** involves the protection of a computers internet account and files from intrusion of an outside user. Basic security measures involve protection by well selected passwords, change of file permissions and back up of computers data.

**Crackers** or **black-hat hackers** (the phrase is often used figuratively, especially in computing slang) are computer criminals who specialise in unauthorized remote break-ins via a communication networks such as the Internet. They use technology to perform a variety of crimes: they may create and distribute computer viruses, Internet worms and deliver spam.

There are also **white-hat hackers** who debug or fix security problems.

A **firewall** is a software program that has the ability to block any unauthorised ports on the computer. Each computer user should install such a program designed to prevent spyware from gaining access to the internal network.

## Types of cybercrime:



**Piracy** – the illegal copying and distribution of copyrighted software, information, music and video files

**Plagiarism** - the unauthorized use or close imitation of the language and thoughts of another author and the representation of them as one's own original work

**Scam** – email fraud to obtain money or valuables

**Malware (malicious software)** – software created to destroy the computer data. These are the main types:

- **Trojan horses** - a computer program. The program claims to do one thing (it may claim to be a game) but instead does damage when you run it (it may erase your hard disk). Trojan horses have no way to replicate automatically.
- **Worms** – self-copying programs that have the capacity to move from one computer to another without human help by exploiting security holes in computer networks. They don't need to be attached to a document.
- **Viruses**- programs which are able to log into the personal files on a computer it has affected and as a result, can end up removing all of them. It can have serious side effects on a computers system.
- **Spyware** - programs which pretend to do one thing, but in reality snoops out your personal data, or can end up damaging it. These types conceal their identity or true intentions and are usually quite hard to detect.

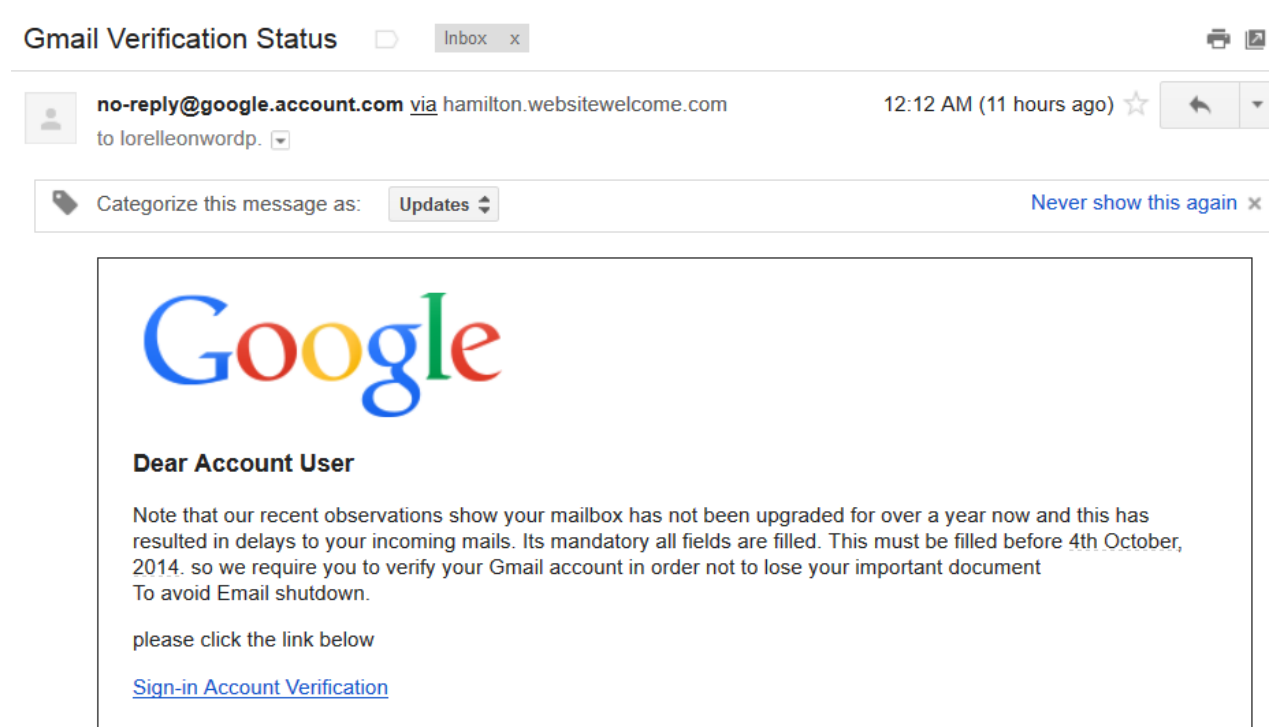
**Phishing** – bank fraud to get banking information such as passwords of Internet bank accounts or credit cards details. Phishing happens over email. Users get "legitimate look" email from a foreign source.

Phishing mail is usually cloaked as an official email. The sender is attempting to trick the recipient into revealing confidential information.

Another way of phishing is sending hyperlinks over Instant messaging and it often directs users to enter details at a fake website whose looks is almost the same like the legitimate one.

Phishing is a continual threat that keeps growing to this day. The risk grows even larger in social media such as Facebook, Twitter, and Myspace etc.

Example of a phishing site:



**IP spoofing** – making one computer look like another in order to gain unauthorized access

**Cyberstalking** – online harassment or abuse, mainly in chat rooms or newsgroups. Cyberbullying has become increasingly common, especially among teenagers.

## **Prevention of cybercrime**

### *1. Securing information*

#### *Keep shared information at a minimum*

It's important to keep shared information at a minimum so that cyber stalker cannot identify information provided by the user himself. Social networks often ask for personal info such as address, phone number, birthday, etc. It is best not to put those types of information onto these websites.

#### *Passwords*

Passwords are created to prevent people from unauthorized access into personal info. Common way that passwords may be compromised is through repeated guessing. Strong password should contain at least 10 characters, upper and lower letters, numbers and symbols. It is also recommended to regularly change password.

#### *PINs*

A PIN may consist of at least 4 digits. Birthdays, birth-years, repeating numbers and banking PINs should not be used as PINs for your internet accounts.

### *2. Security software*

Antivirus/Internet security software should be used to prevent desktop from various malware and viruses. Without the help of the antivirus software, it is impossible to detect and remove a virus.

### *3. Firewalls*

Firewall is a program that monitors and controls incoming and outgoing internet traffic. It is important to keep the firewall running at all times. Firewalls come pre-installed into most operating systems. Users can control which programs can communicate with the network.

### *4. Keep programs/OS up to date*

Operating system and programs should be up-to-date to prevent viruses from taking advantage of exploits that may have been already patched with updates.

### *5. Parental control*

A good way of reducing the possibility to access offensive content is setting up parental controls. They allow users and parents to place filters on their computers.

Content filters limit age-appropriate content and specified types of content that may user dislike. Software based parental controls can provide a more in depth solutions specific to each device it is installed on. These controls can provide logs, keystrokes, and can limit what children see online and the length of time they have Internet access for each day.

## *6. Public computers*

Public computers may be physically accessed by anyone within range of the computer. Logging into banking accounts from public computers should be avoided. It's recommended to clear cookies and clear browsing data when signing out.

### **Third Party Programs**

#### *1. Antivirus and anti-malware programs*

Antivirus software is a computer software used to prevent, find and remove malicious software. Antivirus software is sometimes known as anti-malware software.

Most popular antivirus programs today are Antivirus Protection & Internet Security by Kaspersky Lab, NOD32 Antivirus by ESET, Bit Defender Antivirus as well as Norton antivirus. Most popular anti-malware program is Malwarebytes' Anti-Malware.

Antivirus and anti-malware programs should update their definitions whenever update is available. User does not have to run manual scan because most programs scan computer at least once a week.

#### *2. Ad and pop-up blockers*

Pop ups can lead to malicious software's download page. Most web browsers have internal pop-up blockers but it's recommended to install plug-ins such as Ad Away.

#### *3. Password managers*

People often tend to forget their account passwords.

Password managers are programs that help to organize passwords for internet accounts. They encrypt password data, and they usually autofill user and password data onto proper website.

**Exercise 1. Identify the Internet crimes sentences (1-6) refer to. Choose from the box.**

|             |             |               |                 |                     |                      |
|-------------|-------------|---------------|-----------------|---------------------|----------------------|
| <b>scam</b> | <b>worm</b> | <b>piracy</b> | <b>phishing</b> | <b>Trojan horse</b> | <b>cyberstalking</b> |
|-------------|-------------|---------------|-----------------|---------------------|----------------------|

1. Crackers try to find a way to copy the latest game or computer program. \_\_\_\_\_
2. Many people would probably open an email they believe to be from their bank and happily send off all their security details. \_\_\_\_\_
3. This software's danger is hidden behind an attractive appearance. That's why it often comes with good-looking photos of celebrities. \_\_\_\_\_
4. There is a particular danger in Internet commerce and emails. Many people have been deceived because they believed they had been offered a special gift or a certain amount of money. \_\_\_\_\_
5. 'Mylife' spreads by sending infected mails and is also able to infect websites. \_\_\_\_\_
6. Since millions of children spend time in Internet chat rooms talking to strangers, they could be abused by sexual predators. \_\_\_\_\_

**Exercise 2. Fill in the gaps in these security tips with words from the box.**

|                            |                 |                  |                |
|----------------------------|-----------------|------------------|----------------|
| <b>digital certificate</b> | <b>malware</b>  | <b>virus</b>     | <b>scanner</b> |
| <b>spyware</b>             | <b>firewall</b> | <b>antivirus</b> |                |

1. If your computer caught a \_\_\_\_\_, don't panic! Always remember to use an \_\_\_\_\_ program, for example, a virus \_\_\_\_\_.
2. Malicious software or \_\_\_\_\_ can be easily avoided by following some basic rules.
3. An electronic identity card or \_\_\_\_\_ should be provided for each Internet user who likes cybershopping.
4. To prevent crackers from breaking into your network and obtaining your data, install a \_\_\_\_\_. It will protect you from \_\_\_\_\_.

**Exercise 3. Vocabulary review: Security. Solve the clues with the most appropriate word(s).**

1. An e-mail address consists of a u \_\_\_\_\_ (or nickname) followed by an @.
2. A private network within a single organization is often called i \_\_\_\_\_.
3. Internet s \_\_\_\_\_ is crucial when sending credit card numbers or confidential information.
4. It's well known that v \_\_\_\_\_ can enter a PC through files from disks or from the Net.
5. A company network is protected from unauthorized users by a special program called a 'f \_\_\_\_\_'.
6. An 18-year-old h \_\_\_\_\_ has been arrested in connection with virus propagation.

## Unit 12: ICT in the future

Technology has progressed at a rapid rate during the last 100 years, more than any other period in history. The 20<sup>th</sup> century began with the infancy of airplanes, automobiles and radio. It ended with computers, spaceships, cell phones, wireless internet and virtual worlds.

Many of the technological advances we are seeing today will shape our daily life in the future – the way we relax, interact, communicate and conduct business. ICT will continue to advance, empower and transform every aspect of our life. Some of the emerging technologies and trends are:

- ✓ haptics technology (it takes advantage of the user's sense of touch)
- ✓ voice and tone recognition
- ✓ eye tracking technology
- ✓ brain wave sensing (it enables the control of technology functions by the brain)
- ✓ virtual worlds

<http://www.ichoosetechnology.com.au/home/what-is-ict/ict-in-the-future>

<http://computer.howstuffworks.com/virus.htm>

[http://en.wikipedia.org/wiki/Internet\\_security](http://en.wikipedia.org/wiki/Internet_security)

### Part II: Additional texts

#### Additional: New technologies

**Nanotechnology**, the science of creating and using materials or devices at molecular and atomic sizes, is going to represent a new technological revolution. These devices are measured in **nanometres**, which is equal to one billionth of a metre.

**Nanobots**, robots formed from molecules or molecular components, will be used in medicine to control and diagnose diseases. For example, they will be injected and will move through blood vessels destroying cholesterol molecules or cancer.

**Nanocomputers**, molecule-sized computers, may have the power of 100 workstations but only be the size of a grain of sand. There will be two main types of molecular computers:

- **Quantum computers**, based on quantum mechanics, may be millions of times faster than current computers. They will be so fast because they will be able to examine all possible answers to a query at the same time. This capability is made possible by qbits, **quantum bits**, which can be 0 or 1, or something in between, simultaneously.
- **DNA computers** will use **DNA biochips** to perform the same functions as silicon microchips do today but at a much faster speed.

The relationship between people and computers will be closer.

- Computers will be **embedded** or hidden in a variety of items. For example, we'll have **wearable computers** that will be embedded in a belt or a piece of jewellery.



- ICT devices will be mobile and multimedia: we'll watch **mobile TV** programmes on our phones which will also access the Internet.
- There will be **gesture interfaces** based on facial-hand recognition systems.
- Computer chips can be injected under the skin: **RFID, radio-frequency identification tags**, might be used to track or identify people or to store information.
- By the year 2040 there might be **intelligent robots**, machines that will be able to think creatively.

### Extending skills - Vocabulary

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**Exercise 1. Read these extracts and replace the words in *italics* with the words from the above text.**

1. A molecular computer that works biochemically is a *computer of this type*. It computes using enzymes that cause chain reactions. \_\_\_\_\_
2. Data in a *computer of this type* is processed by exploiting the strange qualities of quantum physics; the building blocks of computation are not transistors but caged atoms or qbits. \_\_\_\_\_
3. *It* has the potential to revolutionize the way we live, from creating miniaturized electronic gadgets to delivering medicines to specific places within the human body.  
\_\_\_\_\_
4. The government plans to fund a study examining the feasibility of *molecule-sized robotic devices* that would position atoms to build complex substances and products.  
\_\_\_\_\_
5. Scientists at an Israeli institute have developed a *very small one* – so small that a trillion of its kind fit into a test tube. \_\_\_\_\_

**Exercise 2. Match the terms with their definitions.**

- |                   |   |
|-------------------|---|
| 1. quantum bits   | a. a microchip made with organic materials                |
| 2. DNA biochip    | b. the device or program used to interact with a computer |
| 3. embedded       | c. subatomic particles used in quantum computers          |
| 4. user interface | d. fixed, integrated                                      |

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_

## Additional: Nanotechnology



<http://nanotechsizematters.yolasite.com/applications.php>

## What is Nanotechnology?

Nanoscience and nanotechnology are studies and application of things on nanoscale which is one billionth of a meter. It is used in various areas in our life such as: engineering, physics, biology, science, medicine etc.

## How and when did it all start?

Nanoscience as we know it today is quite new but nano materials have been in use for several hundred years. Artists in middle age used gold and silver particles to create more brighter and unique colors to paint windows in churches. The microscopes needed to see things at the nanoscale were invented about 30 years ago. They are called Electron Microscopes. Scientists and engineers are trying to find wide variety of ways to improve properties of material such as higher strength, higher flexibility, lighter weight, increased control of light spectrum, better electrical conductors, greater chemical reactivity and much more.

## Electron microscope

The electron microscope is a type of microscope that uses a beam of electrons to create an image of the specimen. It is capable of much higher magnifications and has a greater resolving power than a light microscope, allowing it to see much smaller objects in finer detail. The wavelength of an electron can be up to 100,000 times shorter than that of visible light photons. A transmission electron microscope can achieve better than 50 picometers resolution and magnifications of up to about 10,000,000 times while most light microscopes are limited to about 200 nanometers resolution and useful magnifications below 2000x.

## Material behavior on nanoscale

Behavior of materials on nanoscale is different because it has more area for reaction. The more we lower the scale the more area there is to react and those reactions depend on type of material we are observing. Few examples: powdered sugar dissolves faster than cube sugar. Big parts of aluminium are not very reactive to fire but nanoparticles are so reactive that they are used in rocket fuel.

Light also reacts differently on nanoscale. Usually white light contains all colours but when we go down on nanoscale, white light only bounces certain colour back. Gold reflects different colours depending on the size we are observing. It starts looking red, pink, purple, blue and when it is too small to reflect any light it becomes invisible.

## Nanotechnology benefits

### Applications of Nanotechnology in day to day life....

- Information Technology**
  - Smaller, faster, more energy efficient and powerful computing and other IT-based systems
- Energy**
  - More efficient and cost effective technologies for energy production
    - Solar cells
    - Fuel cells
    - Batteries
    - Bio fuels
- Medicine**
  - Cancer treatment
  - Bone treatment
  - Drug delivery
  - Drug development
  - Medical tools
  - Diagnostic tests
  - Imaging
- Consumer Goods**
  - Foods and beverages
    - Advanced packaging materials, sensors, and lab-on-chips for food quality testing
  - Appliances and textiles
    - Stain proof, water proof and wrinkle free textiles

<http://www.slideshare.net/sumitpramanik007/nanotechnology-baseddrugdeliveryppt>

By observing nature on nanoscale scientists came up with new materials and techniques that can greatly improve our everyday life. They are using the fact that it is possible to make your own new materials on nanoscale with different structure. This allows them to make best use of each material on specific field by modifying it just for that use.

## **Everyday benefits**

There are already over 800 everyday products that rely on nanoscale materials and processes:

- Nanoscale additives in polymer composite materials give them special traits such as lighter weight but at the same time those materials are more durable and resilient. This allows easier use of items like baseball bats, tennis rackets, motorcycle helmets, automobile bumpers, luggage etc. They are also added in cloth to make them resistible to wrinkles.
- Nanoscale thin films on eyeglasses make them more resistible to environment effects such as scratches, fog, water, heat and cold. They also gain ability of self cleaning and antireflection which greatly helps in products such as computer and television screens, cameras, mobile phones and glass in general.
- Nanoscale materials in cosmetic products make them a lot more beneficial for health, cleaning and absorbing. They are better in detoxification and protecting skin. Those materials are used in sunscreens, skin creams, shampoos and even make-up.
- Nano-engineered materials are also used in food industry. They increase vitamins and nutritious value, improve taste, help in fight with cholesterol and keeping food fresh by adding antibodies to packages. Some also have plastic packaging that can warn against spoiled food and to detect salmonella, pesticides, and other contaminants on food. There are also nanosize powders that can be added in food or taken as supplements which our bodies absorb more easily.
- Oil recovery technique involves injecting water into the rock pores where oil is located. This displaces the oil and forces it out. Infusing the water with nanoparticles that can plug the passages between the rock pores. This method is intended to make the water take narrower paths into the pores that contain oil and force the oil out.
- Nano-engineered materials in automotive products help with lower gas consumption, reduced friction of tires on surface, higher power batteries, less exhausting gasses and many more.
- Nano-engineered household products such as stain removers; environmental sensors, alert systems, air purifiers and filters; antibacterial cleansers help in keeping home clean and healthy.

## **Benefits in electronics and Information Technology area**

Nanotechnology is already in use in many computing, communications, and other electronics applications to provide faster, smaller, and more portable systems that can manage and store larger and larger amounts of information.

- Nanoscale transistors which are faster and more powerful, and in the same time they use less energy. Those transistors take a lot less space and by that microchips are able to hold more of them to increase performance even more.

- Magnetic random access memory (MRAM) is memory with nanoscale magnetic tunnels with allow extremely fast flow of data. In case of system shut down or crash this memory will save information.
- OLED screens are used on many new TVs, laptops, phones and cellphones and cameras. They have great benefits such as less power consumption, more flexible screens, more detailed colours, sharper display...
- Wires containing carbon nanotubes to have much lower resistance than the high-tension wires currently used in the electric grid and by that reducing transmission power loss.
- Nano thin scales are used to make smart phones and computers that are bendable and like that can be bent around wrists like watches. They are covered in nanoscale thin gold layers which increase flexibility and make them more resilient to any kinds of damage.
- Other computing and electronic products include: Flash memory chips for iPod nano, hearing aids for deaf people with greater response time, antibacterial protection for computer mouse, keyboard and cell phone, inks for printer, more realistic video games.

### **Benefits in sustainable energy area**

Many scientists are looking for ways to develop clean, affordable and renewable energy sources. Those sources have to supply energy with less harm to environment then current sources. Goal is to produce more efficient sources overall.

- Prototype solar panels with nanotechnology are more efficient than standard designs in converting sunlight to electricity. This suggests greater use of solar panels in near future since they are environment friendly and less expensive. Nanostructured solar cells are cheaper to manufacture and easier to install, since they can use print-like manufacturing processes and can be made in flexible rolls rather than discrete panels.
- Nano-bioengineering is aiming to enable conversion of more bio degradable things into fuels such as: wood, grass, corn and many other plants. This will lower bad gas effects to environment.
- Nanotechnology is used to make batteries that are less flammable, charge quicker, more efficient, lighter weight and hold electrical charge longer. Batteries like this help environment greatly because we use less of them and they are easier to recycle.
- Various nanoscience-based options are being used to convert waste heat many electrical and mechanical appliances such as computers, automobiles, even homes to usable electrical power.
- Windmills with blades made of carbon nanotubes that are longer, stronger, and lighter-weight than other blades to increase the amount of electricity that windmills can generate.

### **Benefits in medicine**

- Nanotechnology has been used in the early diagnosis of cancer and brain damage. Nanoscaled particles can be implanted inside brain, which search for damaged or problematic tissue and give more information to doctors.

- There are predictions that in the near future nanosize robots will be used in blood flow to detect and destroy harmful cells. Those robots will be smaller than red cells in human blood.
- Gold nanoparticles can be used to detect early-stage Alzheimer's disease.

### Fun Facts

- A sheet of newspaper is about 100,000 nanometers thick.
- On a scale, if a marble were a nanometer, then one meter would be the size of the Earth.
- A male beard grows 5 nanometers every second.
- Geckos stick to trees and birds navigate using nanoscale particles.
- Size of DNA is 2 nanometers

## Language work: Future forms

Future can be expressed by using different tenses.

### ➤ **Future simple** (will / won't + verb)

- ✓ to make predictions when you don't have present evidence that something will happen

*People will vote in elections online.*

- ✓ to describe a decision made at the moment of speaking, often to make an offer

*I'll help you with the books.*

- ✓ to talk about actions that will inevitably happen

*Next month I will be 30.*

- ✓ to talk about hopes, promises, fears

*Electronic money will probably be more secure.*

### ➤ **Going to future** (be going to + verb)

- ✓ to describe future intentions (not as definite as firm plans)

*The company is going to open a new office in Rome.*

### ➤ **Future continuous** (will be + -ing form of the verb)

- ✓ to talk about actions in progress at a stated future time

*This time next Saturday I'll be skiing.*

- **Future perfect** (will have + past participle)  
✓ to talk about actions finished at a stated future time

*By the end of June I will have finished my exams.*

**Exercise 1. Put the following verbs in the correct future form. In some sentences more than one answer will be possible.**

1. Please don't call tonight. I \_\_\_\_\_ (take part) in a video conference from eight to nine o'clock.
2. He says he \_\_\_\_\_ (not finish) the report by Monday.
3. The technician \_\_\_\_\_ (repair) the computer by next Friday.
4. Some day, we \_\_\_\_\_ (talk to) our PC naturally, like a friend.
5. In a few years' time students \_\_\_\_\_ (use) handheld and wearable computers in class.

<http://www.nano.gov/nanotech-101/what/definition>

<http://www.nano.gov/you/nanotechnology-benefits>

[http://en.wikipedia.org/wiki/Electron\\_microscope](http://en.wikipedia.org/wiki/Electron_microscope)

<http://listverse.com/2014/12/01/10-unconventional-uses-of-nanotechnology/>

## Additional: Web design



The intent of web design is to create a website (a collection of electronic files residing on one or more web servers) that presents content (including interactive features or interfaces) to the end user in the form of web pages once requested. Such elements as text, forms, and bit-mapped images (JPEGs, PNGs) can be placed on the page using HTML, XHTML, or XML tags. Displaying more complex media (vector graphics, animations, videos, sounds) usually requires plug-ins such as Flash, QuickTime. In computing, a **plug-in** refers to the additional software that enables the web browser to support the new content in the form of multimedia files.

It is important to note the difference between a website and a web page. A **website** is a collection of information about a particular topic or subject. Designing a website is defined as the arrangement and creation of web pages that in turn make up a website. A **web page** consists of information for which the website is developed. A website might be compared to a book, where each page of the book is a web page.

To build a website you could learn how to write **HTML tags**, the coded instructions that form web pages, or else use an **HTML editor** or **WYSIWYG (What You see Is What You Get)** application that converts a visual layout into HTML code. A simpler option is to use a **web template** provided by a **web-based site builder**, where you just fill in the information you want on the page.





<http://catseyemarcom.com/blog/web-design-101/>

## Basic elements

Some of the basic elements that can be found on a web page are:

- **Text**
- **Links** – connections from text or graphics on the current web page to different parts of the same page, to other web pages or websites, or to external files
- **Graphics** – pictures created with formats such as JPEG (Joint Photographic Experts Group) and GIF (Graphical Interchange Format)
- **Tables**
- **Frames** – subdivisions of a web page allowing the display of different HTML documents on the same page.

Web pages can also include **multimedia files**: animations, audio and video files. Sounds can be recorded with different audio formats like MIDI, WAV and MP3. Web pages can also be interactive by using **Java applets**, specific applications using different programming languages.



<http://www.plauditdesign.com/web-design-minneapolis.html>

## **HISTORY**

### **THE RAPID GROWTH OF WEB DESIGN -PAST TO PRESENT**

#### **EARLY 1990'S**

In 1991 the very first website was published by Tim Berners-Lee. The internet consisted mainly of text based sites with no sign of visual considerations such as typography and imagery. Lightweight websites were built and optimised for the current internet speeds which were dial-up.

#### **MID 1990'S**

Visual hit counters started to appear in an attempt to show authority. Free page builders such as geocities and angelfire made it simpler for novice computer users to build their very own website.

#### **LATE 1990'S**

Flash introduced new elements of web design such as combining virtual graphics with interaction. The late 1990's saw the beginning of visitor focused web design. Structure, navigation, appearance and usability all became important areas.

#### **EARLY 2000'S**

Although CSS(cascading style sheets) had been around since the late 90s, it became popular in 2000. CSS allowed designers to separate website content from design/styling and increase flexibility in website layout. Links began to be attached to images and not just text.

#### **MID 2000'S**

Website designers were beginning to use advanced navigation, drop down menus and web forms, all thanks to javascript's popular rise in the mid 2000's. The mid 2000's also saw the collaborative movement of the semantic web. This aimed at allowing machines to understand web pages just as well as humans.

#### **LATE 2000'S**

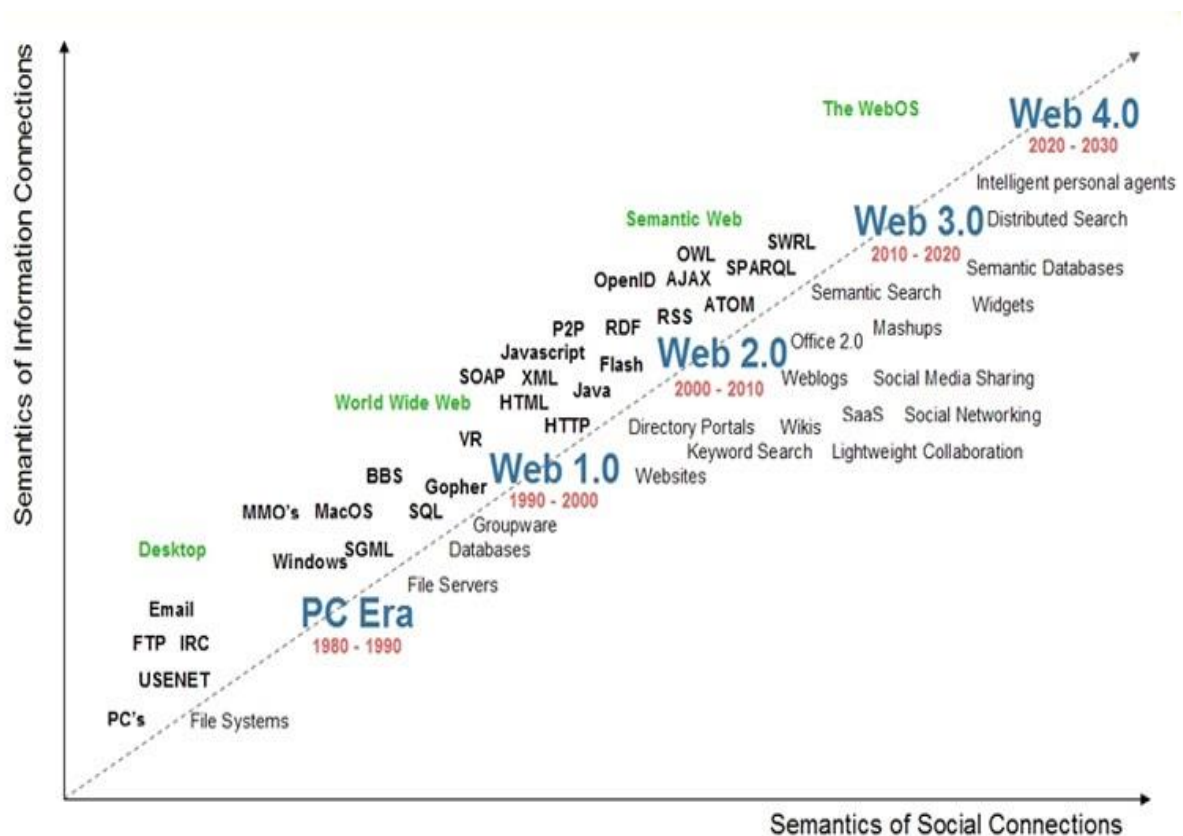
The term web 2.0 was coined which saw web designers take a turn towards interactive content and web applications by utilising javascript and xml (known as ajax). Web designers used interactive content to help users view new content without having to reload the page. Html 5 gains mainstream popularity over flash. SEO(search engine optimization) was now an extremely important part for a web designer to take into consideration.

## THE MOBILE WEB

In 2008, mobile access to the internet exceeded desktop access for the first time. Many businesses looked towards creating a condensed 'mobile' version of their site. Web designers focused on tall and skinny designs rather than short and wide.

## TODAY

Two decades on from the very first website and web design has come a long way. Good web design is now seen as an irreplaceable part of every marketing strategy. RWD (responsive web design) has recently soared in popularity, aiming to provide users with an optimal viewing experience on any device which does away with the need to build a separate 'mobile' site.

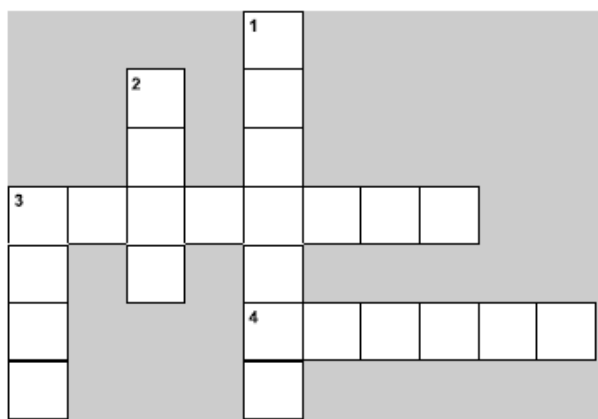


**Exercise 1. Match the sentence beginnings with the correct endings.**

- |                                    |   |
|------------------------------------|---|
| 1. A plug-in is                    | a. let you interact with information on the screen. |
| 2. Multimedia file can be included | b. usually needed to enjoy audio and video files.   |
| 3. Java applets                    | c. are some of the common audio formats.            |
| 4. MIDI, WAV and MP3               | d. in web pages.                                    |

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_

**Exercise 2. Solve the clues and complete the crossword.**



**Across**

3. You just have to fill it in to create a web page.
4. You can make a web page using an HTML \_\_\_\_\_.

**Down**

1. Templates are found in a web-based site \_\_\_\_\_.
2. The language used to make web pages is called \_\_\_\_\_.
3. The instructions in HTML are called \_\_\_\_\_.

**Exercise 3. Speaking. Answer the following questions.**

1. What do you use the Web for?
2. What is your favourite search engine? Why?
3. Do you know how to use the HTML language?
4. Have you ever used a web editor to create web pages?
5. What sort of web pages would you like to make?

**Exercise 4. According to your computing knowledge, decide whether the following design tips (or guidelines) are *True* (T) or *False* (F).**

1. Plan your website carefully. \_\_\_\_\_
2. Insert photos or animations just to make the pages look attractive. \_\_\_\_\_
3. Place a large number of graphics on your pages. \_\_\_\_\_
4. Use very bright colours. \_\_\_\_\_
5. Put a lot of links on one page. \_\_\_\_\_
6. Check that all the links on you Web pages are correct. \_\_\_\_\_
7. Once they are published, update your pages regularly. \_\_\_\_\_

[http://en.wikipedia.org/wiki/Web\\_design](http://en.wikipedia.org/wiki/Web_design)

## **Additional: Program design and computer languages**

### **Programming – basic terms**

**Programming** – the process of writing a program using a computer language.

**A program** – a set of instructions which a computer uses to do a specific task.

**Machine code** – the only language a PC can directly execute. It consists of 1s and 0s.

**Assembly languages** – symbolic languages that are easy to understand. They use abbreviations such as ADD, SUB, MPY to represent instructions.

**An assembler** – software used to translate the program into machine code.

|  |
|--|
| Machine code + assembly languages = <b>low-level languages</b> |
|--|

**High-level languages** – closer to human languages

**A compiler** – software used to translate the original code into a lower-level language or machine code so that the CPU can understand it.

**Examples of high-level languages:**

- **FORTRAN** – used for scientific and mathematical applications
- **COBOL** – popular for business applications
- **BASIC** – used as a teaching language; **Visual BASIC** – used to create Windows applications
- **C** – used to write system software, graphics and commercial programs
- **JAVA** – designed to run on the Web
- **HTML** – the code used to create Web pages
- **VoiceXML** – makes Internet content accessible via speech recognition and phone

### Exercise 1. Match the terms (1-7) with their definitions (a-g).

- |                        |  |
|------------------------|--|
| 1. programming         | a. basic language which consists of binary codes                   |
| 2. machine code        | b. programming language such as C, Java or Visual BASIC            |
| 3. assembly language   | c. writing computer programs                                       |
| 4. high-level language | d. low-level language translated into machine code by an assembler |
| 5. Java applet         | e. software which converts a source program into machine code      |
| 6. compiler            | f. language used to create and format documents for the Web        |
| 7. markup language     | g. small self-contained program written in Java                    |

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_ 5. \_\_\_\_\_ 6. \_\_\_\_\_ 7. \_\_\_\_\_

### Exercise 2. Vocabulary. Word building. Look at the groups of words and complete the sentences with the correct word.

| compile | compiler | compilation |
|---------|----------|-------------|
|---------|----------|-------------|

- Translation into machine code or \_\_\_\_\_ is needed by the programs written in a high-level language.
- A \_\_\_\_\_ generates several low-level instructions for each source language statement.
- Programmers need to \_\_\_\_\_ their programs to create an object program and diagnose possible errors.

| program | programmers | programming | programmable |
|---------|-------------|-------------|--------------|
|---------|-------------|-------------|--------------|

- A flowchart, a plan of the program, is made by most computer \_\_\_\_\_.
- A set of instructions that tells the computers what to do is called a computer \_\_\_\_\_.
- Converting an algorithm into a sequence of instructions in a programming language is called \_\_\_\_\_.

| bug | debug | debugger | debugging |
|-----|-------|----------|-----------|
|-----|-------|----------|-----------|

- New programs need \_\_\_\_\_ to make them work properly.
- A \_\_\_\_\_ refers to any error or malfunction of a computer program.
- The best compilers usually include an integrated \_\_\_\_\_ which detects syntax errors.

## **Additional: Jobs in ICT**

Most ICT (Information and Communications Technologies)-related jobs have developed to meet the need to analyze, design, develop, manage or support computer software, hardware or networks.

A **project manager** controls all the people involved in the different stages of development of a computer project, i.e. analysts, programmers, support specialists etc.

**Exercise 1. Introduction. Work in groups. List some computing jobs you know. Compare your list with other students in the class.**

**Exercise 2. Discussion. Which of the jobs listed below would you like to make your career? Give your reasons.**

### **Jobs in computing regarding different stages of development of a computer project**

- **ANALYZE**
  - ✓ **database analysts** – in charge of the research and development of databases
  - ✓ **network analysts** – study the network requirements and recommend the most suitable type of network
  - ✓ **systems analysts** – decide what ICT system will cater for the requirements of a specific institution
- **DESIGN AND DEVELOP**
  - ✓ **web designers (webmasters)** – create and maintain web pages and web applications for websites
  - ✓ **desktop publisher** – create publications, websites, books, advertisements and more. Job titles include print and web designers, art or creative directors, production artists, digital illustrators, photo retouchers.
  - ✓ **software engineers** – plan, design and test computer programs
  - ✓ **hardware engineers** – design and develop ICT devices
  - ✓ **security specialists**- specialize in the design of software and hardware to protect information from malware: viruses, spyware etc.
- **MANAGE**
  - ✓ **network or computer systems administrators** – install and maintain networks
  - ✓ **database administrators** – manage the accuracy and efficiency of databases
- **SUPPORT**
  - ✓ **computer operators** – control computer data processing
  - ✓ **help desk technicians** – in charge of troubleshooting, the solution of technical problems
  - ✓ **computer training instructors (trainers)** – teach people how to use hardware and software
  - ✓ **technical writers** – write the instructions for ICT systems.



## **Applying for a job**

Needed documents:

- curriculum vitae
- a letter of application
- other documents on request

## **A model Curriculum vitae**

### **CURRICULUM VITAE**

#### **PERSONAL DETAILS**

|                          |                        |
|--------------------------|------------------------|
| Name:                    | Marko Ivić             |
| Date and Place of Birth: | 3 February 1972, Split |
| Address:                 | Vukovarska 150         |
| Tel.no.(home):           | +385 21 111 222        |
| Mobile:                  | +385 98 11 22 33       |
| E-mail:                  | mivic@oss.unist.hr     |
| Marital status:          | single (or married)    |

#### **EDUCATION**

|              |   |
|--------------|---|
| 09/2006-2010 | University of Split, Department of Professional Studies |
|              | Course of study: Information Technology                 |
|              | Specialist area: Programming                            |

2002-2006

Technical High School in Split

## **WORK EXPERIENCE**

06/2000 – 01/2005

Adriatica.net – web designer

01/2005 – present

Hypo Alpe Adria bank – system analyst

## **COMPUTING KNOWLEDGE (IT SKILLS)**

- knowledge of 3D graphics and animations
- programming in following programme languages: C, VB.NET, C++
- knowledge of the majority software packages: MS Office, Corel Draw, Photo Shop, Auto Cad
- Web design – knowledge of internet protocols and technologies (HTML, Java script), knowledge of design and most popular web design tools (Photoshop, Dreamweaver, Flash)
- Graphic design – knowledge of most popular DTP tools (Photoshop, CorelDraw, Freehand, QuarkXPress), knowledge of prepress and printing techniques.
- Conceptual knowledge of video and sound

## **OTHER SKILLS AND EXPERIENCES**

- fluent English – written and spoken
- holder of a valid driver's licence –B category
- capability of self-studying
- tendency to team work, responsibility, quick thinking in situations under pressure

## **REFEREES**

Ivan Marković, lecturer, Faculty of

Electrical Engineering and Computing

## **WORK**

John Gardner, IT manager, Adriatica.net

## A letter of application

Marko Ivić

Vukovarska 150

21 000 Split

Tel:

Mob:

E-mail: [mivic@oss.unist.hr](mailto:mivic@oss.unist.hr)

VIPnet d.o.o.

Vrtni put 1

10 000 Zagreb

Split, 10 May 2015

Subject: **A LETTER OF APPLICATION FOR THE POSITION OF IT MANAGER**

On 5 May 2015 I saw an advertisement on [www.moj-posao.net](http://www.moj-posao.net) in which VIPnet is searching for an IT manager situated in Split.

Since I graduated from The University of Split, Department of Professional Studies on 14 July 2010 and therefore gained the qualifications of a graduate programmer, I think I could use my knowledge at your company in the best possible way.

I have more than two years of work experience doing different kinds of jobs and I also meet all conditions stated in the ad.

Along with this letter of application, you will find my curriculum vitae as well as a copy of my diploma enclosed.

I truly hope that you will be interested in this letter.

I look forward to hearing from you.

Sincerely yours

Marko Ivić

## **Job ads**

### **First advertisement**

<http://www.topitconsultant.com/Appointment.aspx?ID=11156&QueryID=383077>

#### **Data Analyst, Financial Services- London**

Our client is a global business and IT management consulting firm. At present they are recruiting for a Data Analyst to join their Financial Services practice. Specifically they are looking for Data Analysts to work within their delivery teams on large scale, complex data warehousing and business intelligence projects.

The role will involve taking on a range of roles throughout the development cycle, from gathering and cataloguing data requirements, profiling data content of source systems, specifying new data structure requirements, developing data models and determining the transformation rules between systems. The role requires individuals who are comfortable working closely with business representatives, source system experts and Data Warehouse development teams.

#### **Requirements**

- Proven experience working on data warehousing, BI (business intelligence) or MI (management information) projects.
- Exposure to some of the following technologies: ETL tools (Informatica Powercenter, Ab Initio, Teradata, SAS (not necessarily the analytics), Oracle Warehouse Builder, Ascential), Name/address matching (e.g. Trillium), Data profiling (Avellino, Datanomic, etc).
- Candidates may come from a Business Analysis background with a focus on data and process modelling or may come from a technical background with a focus on databases, data modelling, data quality, data warehousing, BI, MI and/or data migration.
- Experience of data quality concepts, and data validation and cleansing techniques related to ensuring the accuracy, completeness and usability of data sources.
- Capital markets, retail banking or insurance industry knowledge

#### **Benefits**

All employees receive core benefits, for example 25 days' annual leave. An allowance is also received to spend on your choice from a range of flexible benefits:

- pension plan
- private medical insurance
- life assurance
- permanent health insurance

As you are promoted you will benefit from additional benefits or an increased flexible benefit allowance. Employees are also able to participate in an employee share purchase scheme.

To apply please send an application by email to: [Mike@druid-group.com](mailto:Mike@druid-group.com). Please quote reference number TITC/DA/0908

### **Second advertisement**

**Zagrebačka banka**

**Gundulićeva 26**

**21 000 Split**

Zagrebačka banka, *The Bank of Zagreb*, has opened the position for the full-time job of **Computer Network Support Person**.

Essential requirements:

- diploma in computing or telecommunications engineering
- good communications skills
- deductive ability for analysing faults
- able to work quickly under pressure.

Desirable requirements:

- interest in technology to keep up with new developments.

If you are interested in working in a highly competitive company, please send your CV, a letter of application and a copy of your diploma to Mr Goran Perković, Head of the Human Resources Department by 15 December 2008.

### **Third advertisement**

#### **Information Technology Engineers**

Extremely competitive salaries.

If you would like to hear about outstanding opportunities in Europe to work in the expanding area of personal communication systems, write to:

#### **Euroengineer Ltd**

Austin Street

Norwich

NJ2 1BL

Enclose your CV and the names of two referees. Applicants should have a degree or equivalent in information technology or a related discipline. A good command of foreign languages would be an advantage.

### **Fourth advertisement**

#### **Web / Graphic Designer**

Offline Solutions is an international risk consultancy that provides specialized transportation and logistic supply chain security services to clients worldwide. We are establishing a Representative Office in Split, Croatia to support both our Africa and Middle East-based clients, as well as explore business development and market opportunities in the Balkans. We are currently seeking a qualified and motivated individual to assist us with graphic design, marketing and online business development. The position is based in Split, Croatia.

#### **Duties:**

- Assist Representative Office with company branding and marketing initiatives
- Logo design

- Report layout design and formatting
- Assist with developing Powerpoint presentations
- Supporting web-development initiatives

### **Qualifications:**

- Solid command of Adobe Photoshop, Illustrator, Powerpoint, etc.
- Excellent artistic visions and design talent
- Strong academic credentials

Qualified candidates please send an updated CV in Word format in English not later than November 22nd via application link.

Please include e-mail and phone number in your CV. Only short-listed candidates will be contacted. The anticipated start date is 01 December 2015.

**Exercise 3. Writing. Choose one of the above job advertisements that sounds most interesting to you and write your CV and a letter of application according to the given examples.**

### **Language work I: Present perfect simple**

**Form:** have/has + past participle

**Use – to talk about:**

- completed actions connected to the present

*I **have repaired** the computer.*

- personal experiences

*I **have never been** to Paris.*

- states that started in the past and continue to the present

*I **’ve been** a software developer since 2000.*

- past actions in a time up to now where we put emphasis on the quantity or number (how many?)

*She **has failed** three subjects.*

**Time adverbials:** ever, never, since, for, already, yet, just.



## Language work II: Present perfect continuous

**Form:** have / has been + present participle

**Use – to talk about:**

- actions which started in the past and are still happening

*I've **been surfing** the Net for two hours.*

- past action or situations in progress, with emphasis on duration (how long?)

*She's **been writing** emails all morning.*

**Exercise 4. Put the verbs into the present perfect simple or the present perfect continuous.**

1. They (work) \_\_\_\_\_ on the project all day.
2. How many emails (you write) \_\_\_\_\_ today?
3. She (be) \_\_\_\_\_ an IT manager since last year.
4. I (lose) \_\_\_\_\_ my USB.
5. They (design) \_\_\_\_\_ a web page for three hours.

**Exercise 5. Make questions using these prompts. In pairs, ask and answer the questions.**

1. ever / chat online?
2. ever / apply for a job?
3. ever / do a job you dislike?
4. how long / study Information technology?
5. how many emails / write today?

<http://www.nextstepmagazine.com/nextstep/articlePage1.aspx?artId=2484&categoryId=4>

## **Additional: Communication systems**

<http://en.wikipedia.org/wiki/Category:Telecommunications>

**Telecommunications** is the extension of communication over a distance. It includes radio, television, telephony, satellite, data communication and computer networking.

Telecommunications ➡ **teleworking, call centres, telemarketing**

<http://www.webopedia.com/TERM/t/teleworking.html>

**Teleworking** - also known as telecommuting. To use information technology and telecommunications to replace work-related travel. Teleworking allows employees work at home or at a local telework centre one or more days per week using communication tools, such as phone, fax, modem, Internet teleconferencing, e-mail or IM, to perform work duties from a remote location. The term telework is the term favoured in Europe and other countries while telecommute is used more often in the U.S and Canada.

[http://en.wikipedia.org/wiki/Call\\_centre](http://en.wikipedia.org/wiki/Call_centre)

**Call centres** - a centralized office used for the purpose of receiving and transmitting a large volume of requests by telephone. A call centre is operated by a company to administer incoming product support or information inquiries from consumers. Outgoing calls for telemarketing, product services, and debt collection are also made. In addition to a call centre, collective handling of letters, faxes, live chat, and emails at one location is known as a **contact centre**.

**Telemarketing** – the process of selling goods and services over the phone.

## Language work: The passive

**The passive** = verb *to be* + past participle of the main verb

The passive is used:

- In technical writing

*The BlackBerry **is primarily known** for its ability to send and receive email.*

### Present simple passive

*A call centre **is operated** by a company to administer incoming product support or information inquiries from consumers.*

### Present continuous passive

*Her computer **is being repaired** at the moment.*

### Past simple passive

*Analytical engine **was invented** in 19th century by Charles Babbage.*

### Past continuous passive

*Reports **were being written** for two hours yesterday morning.*

### Present perfect passive

*The spelling **has been checked**.*

### Future simple passive

*Anti-hacking legislation **will be introduced** in the EU next year.*

## Modal verbs in the passive

*Networks **can be connected** via satellite.*

**Exercise 1. Complete these sentences with a suitable passive form of the verbs in brackets.**

1. All computer languages (must translate) \_\_\_\_\_ into binary commands.
2. In the near future, the Internet and other IT devices (introduce) \_\_\_\_\_ into cars.
3. Delphi (often use) \_\_\_\_\_ for general purpose programs.
4. C (develop) \_\_\_\_\_ in the 1970s to support the UNIX operating system.
5. These microchips (make) \_\_\_\_\_ in Japan.
6. Sorry about the mess – the machines (replace) \_\_\_\_\_.
7. A serious error (just find) \_\_\_\_\_ in this program.

**Exercise 2. Complete the text with the correct passive form.**

### How chips are made

The CPU is a microprocessor chip. Most processors (make) \_\_\_\_\_ of silicon which (can obtain) \_\_\_\_\_ from beach sand and works well because it's a semiconductor of electricity.

Large crystals of high-quality silicon (make) \_\_\_\_\_ by manufacturers and then each crystal (cut) \_\_\_\_\_ into slices less than a millimetre thick. These slices, called wafers, (treat) \_\_\_\_\_ with chemicals, gases and light before they (cut) \_\_\_\_\_ into individual chips.

## Additional: Networks

A **network** is a collection of computers connected to each other. The network allows computers to communicate with each other and share resources and information.

Networks may be classified according to a wide variety of characteristics. A general overview of some types and categories will be provided and the basic components of a network will be presented here.

**Network can be classified** according to:

➤ **Geographical area**

- ✓ **LAN (Local Area Network)** – covering a small physical area
- ✓ **WAN (Wide Area Network)** – covering a broad area
- ✓ **MAN (Metropolitan Area Network)** – covering a city
- ✓ **PAN (Personal Area Network)** – including a laptop, a mobile phone and a PDA

➤ **Architecture**

- ✓ **Peer-to-peer** – all the computers share files and peripherals without a separate server computer.
- ✓ **Client-server** – computer plays the role of a server and stores and distributes information to the other nodes or *clients*.

➤ **Topology**

- ✓ **Bus network** - a network in which all the computers are connected via a shared communications line, called a bus.
- ✓ **Star network** - one of the most common computer network topologies. In its simplest form, a star network consists of one central switch, hub or computer, which acts as a connection point to transmit messages.
- ✓ **Ring network** - a network topology in which each node connects to exactly two other nodes, forming a circular pathway for signals - a ring.

**LANs** are usually placed in the same building. They can be built with two main types of architecture, peer-to-peer or client-server. Computers in a LAN need to use the same **protocol** or standard of communication.

A **router**, a device that forwards data packets, is needed to link a LAN to another network, e.g. to the Net.

Most networks are linked with cables or wires but new **Wi-Fi, wireless fidelity**, technologies allow the creation of **WLANs**, where cables or wires are replaced by radio waves. To build a WLAN you need **access points**, radio-based receiver-transmitters that are connected to the wired LAN, and **wireless adapters** installed in your computer to link it to the network.

**Hotspots** are WLANs available for public use in places like airports and hotels, but sometimes the service is also available outdoors (e.g. university campuses, squares, etc.).

**WANs** have no geographical limit and may connect computers or LANs on opposite sides of the world. They are usually linked through telephone lines, fibre-optic cables or satellites. The main transmission paths within a WAN are high-speed lines called **backbones**.

**Wireless WANs** use mobile telephone networks. The largest WAN in existence is the Internet.

### Extending skills - Vocabulary

---

**Exercise 1. Match the technical terms (1-5) with the explanations (a-e).**

|                         |  |
|-------------------------|--|
| 1. LAN                  | a. the hardware that emits and receives signals in a computer network    |
| 2. network architecture | b. a network contained in a relatively small area                        |
| 3. nodes                | c. the arrangement of nodes in a communication system                    |
| 4. protocol             | d. a set of rules that allows the exchange of information over a network |
| 5. transceiver          | e. computer devices interconnected in a network                          |

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_ 5. \_\_\_\_\_

**Exercise 2. True and false sentences. Mark the sentences as true (T) or false (F).**

1. LANs link computers and other devices that are placed far apart. \_\_\_\_\_
2. In a peer-to-peer architecture, all the workstations have the same capabilities. \_\_\_\_\_
3. Routers are used to link two computers. \_\_\_\_\_
4. The Internet is an example of a LAN. \_\_\_\_\_
5. Wireless WANs use mobile telephone networks as linking devices. \_\_\_\_\_

**Exercise 3. Vocabulary. Use the words in the box to complete the sentences.**

|             |                     |               |                  |
|-------------|---------------------|---------------|------------------|
| <b>LAN</b>  | <b>nodes</b>        | <b>hub</b>    | <b>backbones</b> |
| <b>WLAN</b> | <b>peer-to-peer</b> | <b>server</b> |                  |

1. All the PCs on a \_\_\_\_\_ are connected to one \_\_\_\_\_, which is a powerful PC with a large hard disk that can be shared by everyone.
2. The style of \_\_\_\_\_ networking permits each user to share resources such as printers.
3. The star is a topology for a computer network in which one computer occupies the central part and the remaining \_\_\_\_\_ are linked solely to it.
4. At present Wi-Fi systems transmit data at much more than 100 times the rate of a dial-up modem, making it an ideal technology for linking computers to one another and to the Net in a \_\_\_\_\_.
5. All of the fibre-optic \_\_\_\_\_ of the United States, Canada and Latin America cross Panama

6. A \_\_\_\_\_ joins multiple computers (or other network devices) together to form a single network segment, where all computers can communicate directly with each other.

**Exercise 4. Choose the correct word in each of the following.**

1. The speed with which a modem can process data is measured in \_\_\_\_\_.  
a) bandwidth                      b) bits per second (bps)                      c) signal
2. Cables consisting of several copper wires each with a shield are known as \_\_\_\_\_ cables.  
a) twisted pair                      b) optical fibre                      c) power cables
3. Computers that are connected together within one building form a \_\_\_\_\_.  
a) WAN                      b) ISP                      c) LAN
4. If you transfer a file from a remote computer to your computer, you \_\_\_\_\_.  
a) download                      b) upload                      c) run
5. To send out information is to \_\_\_\_\_.  
a) signal                      b) packet                      c) transmit
6. A document containing information and graphics that can be accessed on the Internet is \_\_\_\_\_.  
a) a website                      b) a web page                      c) the World Wide Web

**Exercise 5. Here is a list of instructions for someone wanting to set up a small network. Put the instructions in the correct order.**

- a) Make wiring and layout plans for your network.
- b) Hook up the network cables by connecting everything to the hub.
- c) Check that each computer has an IP address and give it a name.
- d) If you're installing a small network, twisted pair will be adequate. However, in order to span greater distances and to minimize magnetic and electrical interference, use fibre optic cable.
- e) Decide on the type of network you want to install. To enable you to transfer large amount of data, choose FAST Ethernet.
- f) Install network adapters in the computers.
- g) Add an Internet gateway to your network to set up a shared Internet connection.
- h) Install driver software for the adapter driver and install client software to share printers and files.
- i) Check which protocols are installed and add any other protocols you require.



- j) Get the hardware you need: an Ethernet adapter card for each computer that doesn't have an Ethernet port, a hub if you've got more than two computers, cables and wall jacks.

**Exercise 6. Complete the words in the following sentences by adding the prefix *inter-*, *intra-*, *trans-*, *com-*, *con-*, *up-* or *down-*.**

1. Last month computer \_\_\_\_\_ time cost the company over €10,000 in lost production.
2. The computers in the production department have now been successfully \_\_\_\_\_ connected with those in the planning department.
3. Once you have completed payment details the data will be \_\_\_\_\_ mitted via a secure link.
4. We cannot network these computers because the systems are not \_\_\_\_\_ patible.
5. Many companies distribute internal documents on their own \_\_\_\_\_ net.
6. Once the home page has been completed, we'll be ready to \_\_\_\_\_ load the site.
7. Cables are being laid throughout the building as the network requires physical \_\_\_\_\_ nections.
8. Using the network he was able to \_\_\_\_\_ bine the data from different reports.

### Language work: Phrasal verbs

Phrasal verbs are common in conversational English. They are made up of two words: a verb and a preposition. For example:

*This is the procedure to **wake up** the system. → **wake up** = start or initiate*

### Extending skills - Vocabulary

---

**Exercise 1. Match each phrasal verb below with its correct definition.**

| Phrasal verb | Definition   |
|--------------|--|
| 1. back up   | a. to enter a symbol or instruction at the end of a computing session to close all files and break the channel between the user's terminal and the main computer |
| 2. key in    | b. to allow a machine to stand idle for a time after switching on, to reach optimum operating conditions   |
| 3. log off   | c. to switch on or apply a voltage to an electrical device   |
| 4. plug in   | d. to make a copy of a file or data or disk  |
| 5. power up  | e. to configure/define/start an application or system  |
| 6. set up    | f. to enter text or commands via a keyboard  |
| 7. warm up   | g. to make an electrical connection by pushing a plug into a socket  |

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_ 5. \_\_\_\_\_ 6. \_\_\_\_\_ 7. \_\_\_\_\_

**Exercise 2. Each of the sentences below should contain a phrasal verb. Complete the sentences by choosing the correct verbs and prepositions from the two boxes. Sometimes you have to change the form of the verb.**

| verbs |       |      |      |     |
|-------|-------|------|------|-----|
| break | round | shut | turn | log |
| warm  |       |      |      |     |

| prepositions |    |      |      |    |
|--------------|----|------|------|----|
| down         | on | down | down | up |
| on           |    |      |      |    |

1. My computer's \_\_\_\_\_ again! I need a new machine.

2. The precise amount is 2.5341, but we can \_\_\_\_\_ it \_\_\_\_\_ to 2.5.

3. You have to give your password in order to \_\_\_\_\_ to the system.

4. Your printout will arrive in a couple of minutes: the laser's still \_\_\_\_\_.

5. Pushing the big red button on the front \_\_\_\_\_ the CPU \_\_\_\_\_.

6. When we found the virus, the first thing we did was to \_\_\_\_\_ the entire system.

[http://en.wikipedia.org/wiki/Computer\\_network](http://en.wikipedia.org/wiki/Computer_network)

<http://compnetworking.about.com/>, <http://www.howstuffworks.com/home-network.htm>

## Additional: Robotics

### Etymology

**Robotics** is the engineering science and technology of robots, and their design, manufacture, application and structural disposition. Robotics is connected with electronics, mechanics, and software. The word "robot" was used for the first time in public by Czech writer Karel Čapek in his play R.U.R. (Rossum's Universal Robots), published in 1920. The term "robotics" was coined by Isaac Asimov in his 1941 science fiction shortstory "Liar!"

### Short historical overview

During the history different people thought about artificial intelligence which would be able to take some human capabilities like walking, moving with hands etc. In the first century Greek scientist Heron of Alexandria described 100 machines and automata in his work *Pneumatica and Automata*. He described a coin – operated machine, a steam – powered engine etc.

At the end of 15th century, Leonardo da Vinci made designs for humanoid robots. In 18th century Jacques de Vaucanson constructed mechanical duck which was able to eat, flap its wings and excrete. At the end of 19th century Nikola Tesla demonstrated first radio – controlled robot boat. In 1930s first humanoid robot, known as Elektro and made by Westinghouse Electric Corporation, was presented to public. In 1942 Isaac Asimov formulated the Three Laws of Robotics. *The Three Laws of Robotics* are as follows:

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey any orders given to it by human beings, except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

In 1948 Norbert Wiener formulated the principles of cybernetics, the basis of practical robotics. In 1961 George Devol made Unimate – first installed industrial robot and in 1975 Victor Scheinman made programmable universal manipulation arm named PUMA.

### What is a robot made of?

Actuators are like the "muscles" of a robot, the parts which convert stored energy into movement. By far the most popular actuators are electric motors that spin a wheel or gear, and linear actuators that control industrial robots in factories.

Current robotic and prosthetic hands receive far less tactile information than the human hand. Recent research has developed a tactile sensor array that mimics the mechanical properties and touch receptors of human fingertips.

Computer vision systems rely on image sensors which detect electromagnetic radiation which is typically in the form of either visible light or infra – red light. The sensors are designed using solid – state physics. The process by which light propagates and reflects off surfaces is explained using optics. Sophisticated image sensors even require quantum mechanics to provide a complete understanding of the image formation process.

Robots which must work in the real world require some way to manipulate objects: pick up, modify, destroy, or otherwise have an effect. Thus the „hands“ of a robot are often referred to as end effectors, while the arm is referred to as a manipulator.

For simplicity, most mobile robots have four wheels. However, some researchers have tried to create more complex wheeled robots, with only one or two wheels. These can have certain advantages such as greater efficiency, reduced parts, and allow a robot to navigate in tight places that a four wheeled robot would not be able to.

Walking is a difficult and dynamic problem to solve. Several robots have been made which can walk reliably on two legs. None have yet been made which are as robust as a human. Many other robots have been built that walk on more than two legs, due to these robots being significantly easier to construct.

A significant percentage of robots in commission today are either human controlled, or operate in a static environment. There is an increasing interest in robots that can operate autonomously in a dynamic environment. These robots require some combination of navigation hardware and software in order to traverse their environment. In particular unforeseen events can cause problems or collisions. Some highly advanced robots as ASIMO, EveR-1, Meinü robot have particularly good robot navigation hardware and software.

## **Types of robots**

There are several different kinds of robots which mostly differ in their application, but we can generally divide them into three fields.

### **Mobile robot**

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Mobile robots have the capability to move around in their environment and are not fixed to one physical location. An example of a mobile robot that is in common use today is the *automated guided vehicle* or *automatic guided vehicle* (AGV). An AGV is a mobile robot that follows markers or wires in the floor, or uses vision or lasers. Mobile robots are also found in industry, military and security environments. They also appear as consumer products, for entertainment or to perform certain tasks like vacuum cleaning. Mobile robots are the focus of a great deal of current research and almost every major university has one or more labs that focus on mobile robot research.

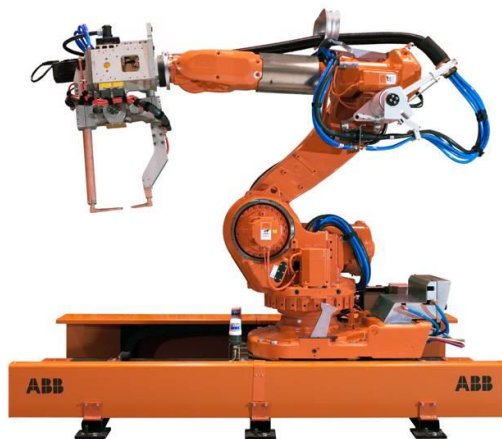


<http://spectrum.ieee.org/automaton/robotics/robotics-hardware/robotics-trends-for-2012>

### Industrial robots (manipulating)

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Industrial robots usually consist of a jointed arm (multi-linked manipulator) and end effector that is attached to a fixed surface. One of the most common type of end effector is a gripper assembly. They are defined as an automatically controlled, reprogrammable, multipurpose manipulator. It can be either fixed or mobile for use in industrial application.



<http://www.linksic.isy.liu.se/?page=industrialrobotics-2>

### Service robot

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The term "service robot" is less well-defined. It could be defined as "a robot which operates semi- or fully- autonomously to perform services useful to the well-being of humans and equipment, excluding manufacturing operations." Modern robots are usually used in tightly controlled environments such as on assembly lines because they have difficulty responding to unexpected interference. Because of this, most humans rarely encounter robots. However, domestic robots for cleaning and maintenance are increasingly common in and around homes in developed countries.



<http://www.can-cia.org/index.php?id=1330>

## **Designing a robot**

Constructing a robot is a lengthy process which requires knowledge of several fields of science, so it usually isn't done by a single man.

### 1. Defining a problem

- identifying the purpose of a construction
- identifying specific requirements

You need to determine what problem you are trying to solve before you attempt to design and build a robot.

### 2. Researching and Designing

- gathering information
- identifying specific details of the design which must be satisfied
- identifying possible and alternative design solutions
- planning and designing an appropriate structure which includes drawings

You decide how a robot will move, manipulate objects, be powered and „sense“ its surrounding. You also decide on robot's shape, size, durability, which materials to use, and potential effects of any new design (factors like health and safety factors, noise, smell, pollution, etc.)

### 3. Creating a Prototype

- testing the design
- troubleshooting the design

Creating a prototype using logo, solving design problems, taking notes and pictures, and generally improving your robot to optimal quality before deciding on a specific design. Second and third step are essential in creating a robot you wanted.

#### 4. Building your Robot

Finally constructing a robot by your design.

#### 5. Programming and Testing your Robot

Now it is time to program your robot. You can achieve basic intelligence in your robot by using only relays, potentiometers, bump switches and some discrete components. You can also add sensors or more sophisticated control elements like microprocessor. Once you've programmed your robot, you need to test to see if it performs what it's supposed to.

#### 6. Evaluating your Robot

- evaluate the design
- evaluate the planning process

Advances in this field are achieved every day so progress is constant and hard to keep track of. We can only wonder what the future brings.

#### **Example from Croatia**

Robotical system ROKI is made for assisting in surgical operations. Croatia started to develop robotics in medicine with this project which is financed by Croatian Institute for Technology, University of Zadar. Project team consists of 11 scientists who had to define and make a project idea. Projecting, producing and final examinations are made in Croatian high technology company HSTEC.

Highly sophisticated robotic equipment helps surgeons in operations giving the picture of operation field with a special camera. With a special designed robotic hand, ROKI holds surgical equipment, even human heart, which is under operation. ROKI works under preprogrammed routines and joystick on command board. Touch screen on command board allows easy work with four rotational axes and one linear axis. Also, there is the possibility of voice commanding. During the operation, robotical system records operation video and sends it in Data Base.

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