Sultan Moulay Slimane University

Higher School of Technology. Beni Mellal

English Module(First Year/Fall Semester

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Notes on Computer History

The computer as we know it today had its beginning with a 19th century English mathematics professor named Charles Babbage. He designed the Analytical Engine and it was this design that the basic framework of the computers of today are based on.

Generally speaking, computers can be classified into three generations. Each generation lasted for a certain period of time, and each gave us either a new and improved computer or an improvement to the existing computer.

First generation: 1937 – 1946 - In 1937 the first electronic digital computer was built by Dr. John V. Atanasoff and Clifford Berry. It was called the Atanasoff-Berry Computer (ABC). In 1943 an electronic computer named the Colossus was built for the military. Other developments continued until in 1946 the first general– purpose digital computer, the Electronic Numerical Integrator and Computer (ENIAC) was built. It is said that this computer weighed 30 tons, and had 18,000 vacuum tubes which was used for processing. When this computer was turned on for the first time lights dimmed in sections of Philadelphia. Computers of this generation could only perform single task, and they had no operating system.

Second generation: 1947 – 1962 - This generation of computers used transistors instead of vacuum tubes which were more reliable. In 1951 the first computer for commercial use was introduced to the public; the Universal Automatic Computer (UNIVAC 1). In 1953 the International Business Machine (IBM) 650 and 700 series computers made their mark in the computer world. During this generation of computers over 100 computer programming languages were developed, computers had memory and operating systems. Storage media such as tape and disk were in use also were printers for output.

Third generation: 1963 - present - The invention of integrated circuit brought us the third generation of computers. With this invention computers became smaller, more powerful more reliable and they are able to run many different programs at the same time. In1980 Microsoft Disk Operating System (MS-Dos) was born and in 1981 IBM introduced the personal computer (PC) for home and office use. Three years later Apple gave us the Macintosh computer with its icon driven interface and the 90s gave us Windows operating system.

As a result of the various improvements to the development of the computer, we have seen the computer being used in all areas of life. It is a very useful tool that will continue to experience new development as time passes.

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Computer Basics

A computer is an electronic machine that accepts data, stores and processes them into information. The computer is able to work because there are instructions in its memory directing it.

The parts of the computer that you can see and touch, such as the keyboard, monitor and the mouse are called hardware. The instructions that direct the computer are called software or computer program.

Data which is raw facts that you the user enter into the computer is called input. This includes; words, numbers, sound and pictures. When the data is entered into the computer, the computer processes the data to produce information which is output. For example, you enter 2+2 into the computer as data, the computer processes it and the result is 4 which is information.

Computers are usually categorized into three general categories:

1.**Supercomputer** – The fastest, largest, most powerful and most expensive computer.

2.**Mainframe Computer** – This is a little smaller and less powerful than the supercomputer, but, like the supercomputer it is also expensive.

3.**Personal Computer** (PC)- This is the computer that most people use in their daily lives. This computer is much smaller, less powerful and less expensive than the supercomputer and the mainframe computer. There are two main types of personal computers. Macintosh (Macs) and the PC compatibles (PC). The main differences between the two are the operating systems and the processor they use. This category of computer has two additional types of computers. These are mobile computer and handheld computer. The most popular type of mobile computer is the notebook or laptop computer, and the handheld computer is a very small PC that you can hold in your hand.

It is important to note that, any computer; regardless of its size has an input device, output device and a system unit.

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Computer hardware

You learned earlier that a computer has electronic and mechanical parts known as hardware. Hardware also includes input devices, output devices, system unit, storage devices and communication devices. Without these components we would not be able to use the computer.

Input Devices - An input device is any hardware component that allows you the user to enter data into the computer.

There are many input devices. Six of the most widely used input devices are:

1. A keyboard -- You use the keyboard to type letters, numbers,and symbols into the computer.

2. A Mouse --The mouse is a pointing device that has a pointer

that changes into different shapes as you use the mouse.

You click the mouse by pressing and releasing the button.

This action allows you to enter data when using a mouse.

3. A Scanner -- This input device copies from paper into your computer.

4 . A Microphone -- The microphone is usually used for voice input into the computer.

5. A Digital Camer -- The digital camera allows you to take pictures that you can input into your computer.

6. A PC Video Camera -- The PC video camera allows you take both video and still images that you can input onto your computer.

Output Devices: An output device is any hardware component that gives information to the user.

Three commonly used output devices are as follow:

1. A Monitor -- This output device displays your information on a screen,

2. A Printer -- This output device prints information on paper.

This type of printed output is called a hard copy

3.A Speaker -- Sound is the type of output you will get from a speaker.

The other main computer hardware we need to examine is the system unit

COMPUTER SOFTWARE

The computer will not work without software. Software also call programs are the instructions that tell the computer what to do and how o do it. The two main categories of software are system software and application software. The system software also called the operating system (OS) actually runs the computer. This software controls all the operations of the computer and its devices. All computers use system software and without the system software the application software will not work. The most common OS on a PC is the Windows operating system and for the Mac computer it would be the Mac operating system.

Application software is a program that allows users to a specific task on the computer. There are a number of different types of application software available to do many of the tasks we do daily. Four examples of common application software and what they are used for are:

Word Processing Application: One word processing program is Microsoft Word. This program allows you to type letters, assignments and do any other written activity on the computer.

Spreadsheet Application: Microsoft Excel is an example of a spreadsheet program. One can use this program to create charts and do calculations.

E-mail Application: Outlook Express is an e-mail program that allows you to receive and send e-mails.

Internet Application: Internet Explorer is a program that allows you to get connected to the Internet and look at Web sites like the one you are reading now.

It is important to note that when you buy a computer the computer comes with the operating system and some software already installed. You may have to buy more software and install them on the computer. Install means to load the software onto the hard disk of the computer so that you can run or use the software.

Like any other equipment the computer needs to be cared for; let us discuss how we should go about caring for our computer.

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Characteristics of Computers

Speed

The computer was invented as a high-speed calculator. This has led to many scientific projects which were previously impossible. The control of the moon landing would not have been feasible without computers, and neither would today's more scientific approach to weather prediction. If we want tomorrow's forecast today (and not in six months time) meteorologists can use the computer to perform quickly the necessary calculations and analyses. When making flight reservations we want to know well in advance of take-off that a seat will be available - if it is not, then we have time to make other arrangements. The ability to get answers fast enough so that one has time to take action on them (or to make alternative plans, as in the case of airline reservations) makes real-time computing possible.

Electrical pulses travel at incredible speeds and, because the computer is electronic, its internal speed is virtually instantaneous. We do not talk in terms of seconds or even milliseconds. Our units of speed are the microsecond (millionths), the nanosecond (thousand0millionths) and latterly even the picosecond (million-millionths). A powerful computer is capable of adding together two 18-digit number in 300 to 400 nanoseconds.

Consider two examples from non-numerical environments. The manual indexing of the complete works of Thomas Aquinas (approximately 13 million words) would have taken 50 scholars about 40 years to accomplish. With the aid of a computer a few scholars did it in less than one year. Fingerprint identification, in time to catch a criminal before he flees the country, would be impossible without computers. The first example enables us to enjoy knowledge that would otherwise be unobtainable within our own lifetime. In the second example, the police gain time in which to act.

Storage

The speed with which computers can process large quantities of information has led to the generation of new information on a vast scale, in other words, the computer has compounded the information 'explosion'. How can people cope with it? We can't, but computers can. But where do they keep it all?

As a human acquires new knowledge, the brain subconsciously selects what it feels to be important and worth retaining in its memory, and relegates unimportant details to the back of the mind or just forgets them. In computers, the internal memory of the CPU is only large enough to retain a certain amount of information. It is therefore, impossible to store inside the computer the records, for example, of every Premium Bond and the names and address of their owners. All of this data is stored outside of the memory of the CPU, on auxiliary or secondary storage devices. Small sections of the total data can be accessed very quickly by the CPU and brought into the main, internal memory, as and when required for processing.

The internal memory (in CPU) is built up in 1 K or K modules, where K equals 1024 storage locations. Babbage's Analytical Engine would have been capable of holding 1000 numbers, each of 50 digits. Computers come in many sizes. Many small micro-computers have an 8 K

or 16 K store whilst 'super computers', such as the CDS CYBER 205 may have up to 1024 K stores (i.e. 1024 * 1024 locations).

Accuracy

In spite of misleading newspaper headlines, the computer's accuracy is consistently high. Errors in the machinery can occur but, due to increased efficiency in error-detecting techniques, these seldom lead to false results. Almost without exception, the errors in computing are due to human rather than to technological weaknesses, i.e. to imprecise thinking by the program, or to inaccurate data, or to poorly designed systems.

Versatility

Computers seem capable of performing almost any task, provided that the task can be reduced to series of logical steps. For example, a task such as preparing a payroll or controlling the flow of traffic can be broken down into a logical sequence of operations, whereas comparing the tones of a turner with a Vermeer cannot. Yet the computer itself has only limited ability and, in the final analysis, actually performs only four basic operations:

It exchanges information with the outside world via I/O devices,

It transfers data internally within the CUP,

It performs the basic arithmetical operations,

It performs operations of comparison.

In one sense, then, the computer is not versatile because it is limited to four basic functions. Yet, because so many daily activities can be reduced to an interplay between these functions, it appears that computers are highly ingenious. Programming is the craft or reducing a given problem into an interplay between these few operations.

Automation

A computer is much more than an adding machine, calculator or check-out till, all of which require human operators to press the necessary keys for the operations to be performed. Once a program is in the computer's memory, the individual instructions are then transferred, one after the other, to the control unit for execution. The CPU follows these instructions until it meets a last instruction which says 'stop program execution'. When Babbage claimed that his Analytical Engine would be automatic, he meant that once the process had begun, it would continue without the need for human intervention until completion.

Diligence

Being a machine, a computer does not suffer from the human traits of tiredness and lack of concentration. If 3 million calculations have to be performed, it will perform the 3 millionth with exactly the same accuracy and speed as the first. This factory may cause those whose jobs are highly repetitive to regard the computer as a threat. But to those who rely on a continuous standard of output, e.g., quality control in the refining of oil and other chemical processes, the computer will be seen as a considerable help.

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Computer databases

Database, also called electronic database, any collection of data, or information, that is specially organized for rapid search and retrieval by a computer. Databases are structured to facilitate the storage, retrieval, modification, and deletion of data in conjunction with various

data-processing operations. A database management system (DBMS) extracts information from the database in response to queries..

A database is stored as a file or a set of files on magnetic disk or tape, optical disk, or some other secondary storage device. The information in these files may be broken down into records, each of which consists of one or more fields. Fields are the basic units of data storage, and each field typically contains information pertaining to one aspect or attribute of the entity described by the database. Records are also organized into tables that include information about relationships between its various fields. Although *database* is applied loosely to any collection of information in computer files, a database in the strict sense provides cross-referencing capabilities. Using keywords and various sorting commands, users can rapidly search, rearrange, group, and select the fields in many records to retrieve or create reports on particular aggregates of data.

Database records and files must be organized to allow retrieval of the information. Queries are the main way users retrieve database information. The power of a DBMS comes from its ability to define new relationships from the basic ones given by the tables and to use them to get responses to queries. Typically, the user provides a string of characters, and the computer searches the database for a corresponding sequence and provides the source materials in which those characters appear; a user can request, for example, all records in which the contents of the field for a person's last name is the word *Smith*.

The many users of a large database must be able to manipulate the information within it quickly at any given time. Moreover, large business and other organizations tend to build up many independent files containing related and even overlapping data, and their data-processing activities often require the linking of data from several files. Several different

types of DBMS have been developed to support these requirements: flat, hierarchical, network, relational, and object-oriented.

Early systems were arranged sequentially (i.e., alphabetically, numerically, or chronologically); the development of direct-access storage devices made possible random access to data via indexes. In flat databases, records are organized according to a simple list of entities; many simple databases for personal computers are flat in structure. The records in hierarchical databases are organized in a treelike structure, with each level of records branching off into a set of smaller categories. Unlike hierarchical databases, which provide single links between sets of records at different levels, network databases create multiple linkages between sets by placing links, or pointers, to one set of records in another; the speed and versatility of network databases have led to their wide use within businesses and in e-commerce. Relational databases are used where associations between files or records cannot be expressed by links; a simple flat list becomes one row of a table, or "relation," and multiple relations can be mathematically associated to yield desired information. Various iterations of SQL (Structured Query Language) are widely employed in DBMS for relational databases. Object-oriented databases store and manipulate more complex data structures, called "objects," which are organized into hierarchical classes that may inherit properties from classes higher in the chain; this database structure is the most flexible and adaptable.

The information in many databases consists of natural-language texts of documents; number-oriented databases primarily contain information such as statistics, tables, financial data, and raw scientific and technical data. Small databases can be maintained on personal-computer systems and may be used by individuals at home. These and larger databases have become increasingly important in business life, in part because they are now commonly designed to be integrated with other office software, including spreadsheet programs.

Typical commercial database applications include airline reservations, production management functions, medical records in hospitals, and legal records of insurance companies. The largest databases are usually maintained by governmental agencies, business organizations, and universities. These databases may contain texts of such materials as abstracts, reports, legal statutes, wire services, newspapers and journals, encyclopaedias, and catalogs of various kinds. Reference databases contain bibliographies or indexes that serve as guides to the location of information in books, periodicals, and other published literature. Thousands of these publicly accessible databases now exist, covering topics ranging from law, medicine, and engineering to news and current events, games, classified advertisements, and instructional courses.

Increasingly, formerly separate databases are being combined electronically into larger collections known as data warehouses. Businesses and government agencies then employ "data mining" software to analyze multiple aspects of the data for various patterns. For example, a government agency might flag for human investigation a company or individual that purchased a suspicious quantity of certain equipment or materials, even though the purchases were spread around the country or through various subsidiaries.

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Computer Network

A **computer network** or **data network** is a telecommunications network which allows computers to exchange data. In computer networks, networked computing devices exchange data with each other using a data link. The connections between nodes are established using either cable media or wireless media. The best-known computer network is the Internet.

Network computer devices that originate, route and terminate the data are called network nodes. Nodes can include hosts such as personal computers, phones, servers as well as networking hardware. Two such devices can be said to be networked together when one device is able to exchange information with the other device, whether or not they have a direct connection to each other.

Computer networks differ in the transmission medium used to carry their signals, communications protocols to organize network traffic, the network's size, topology and organizational intent.

Computer networks support an enormous number of applications and services such as access to the World Wide Web, digital video, digital audio, shared use of application and storage servers, printers, and fax machines, and use of email and instant messaging applications as well as many others. In most cases, application-specific communications protocols are layered (i.e. carried as payload) over other more general communications protocols.

Computer network glossary

*In communication networks, a **node** (Latin *nodus*, 'knot') is either a connection point, a redistribution point (e.g. data communications equipment), or a communication endpoint (e.g. data terminal equipment).

*A **network host** is a computer or other device connected to a computer network. A network host may offer information resources, services, and applications to users or other nodes on the network.

*In computing, a **server** is a computer program or a device that provides functionality for other programs or devices, called "clients". This architecture is called the client–server model, and a single overall computation is distributed across multiple processes or devices.[1] Servers can provide various functionalities, often called "services", such as sharing data or resources among multiple clients, or performing computation for a client. A single server can serve multiple clients, and a single client can use multiple servers. A client process may run on the same device or may connect over a network to a server on a different device. Typical servers are database servers, file servers, mail servers, print servers, web servers, game servers, and application servers.

***Networking hardware**, also known as **network equipment** or **computer networking devices**, are physical devices which are required for communication and interaction between devices on a computer network. Specifically, they mediate data in a computer network.[1] Units which are the last receiver or generate data are called hosts or data terminal equipment.

*In telecommunications, a **communication protocol** is a system of rules that allow two or more entities of a communications system to transmit information via any kind of variation of a physical quantity