

People's Democratic Republic of Algeria
Ministry of Higher Education and Scientific Research
Oran Graduate School of Economics



Educational handout

Computer Science 1

For students of 1st year preparatory cycle

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Academic year 2025 / 2026

Summary

General Introduction	10
CHAPTER 1.....	12
FUNDAMENTALS OF COMPUTER SCIENCE.....	12
1.1. Introduction	13
1.2. Computer Science.....	13
1.3. History of Computer Science	13
1.4. The computer.....	15
1.5. Information and Data.....	16
1.6. Information Encoding.....	16
1.6.1. Bit combinations.....	16
1.6.2. Byte.....	16
1.6.3. Word and Double Word	17
1.6.4. Higher storage units.....	17
1.7. Binary coding of information	18
1.7.1. Conversion a decimal number to binary	18
1.7.2. Conversion of a binary number to decimal	19
1.7.3. Conversion of a binary number to octal	19
1.7.4. Conversion of an octal number to binary	20
1.7.5. Conversion of a binary number to hexadecimal	20
1.7.9. Conversion of a decimal number to hexadecimal	21
1.8. Computer system	22
1.8.1. Hardware	22
1.8.1.1. The Central Processing Unit (CPU).....	22
1.8.1.2. Main Computer Peripheral Devices	27

1.8.1.3. Connecting Peripherals to the Central Unit.....	27
1.8.2. The Software Component.....	28
1.8.2.1. Definition	28
1.8.2.2. Types of Software There are two main types of software:	28
1.9. Introduction to Programming	30
1.9.1. Machine Language	30
1.9.2. Assembly Language	30
1.9.3. Programming Language	30
1.9.4. Algorithm	30
1.9.5. Program	30
1.9.6. Programming	30
1.10. Exercises.....	31
1.10.1. Exercise 1	31
1.10.2. Exercise 2	31
1.10.3. Exercise 3	31
1.10.4. Exercise 4	31
1.10.5. Exercise 5	32
1.10.6. Exercise 6 :	33
1.10.8. Exercise 8	33
1.10.9. Exercise 9:	34
1.11. Solution of Exercises	34
1.11.1. Exercise 1	34
1.11.2. Exercise 2	34
1.11.3. Exercise 3	35
1.11.4. Exercise 4	35
1.11.5. Exercise 5	35
1.11.6. Exercise 6	35

1.11.7. Exercise 7	36
1.11.8. Exercise 8	37
1.11.9. Exercise 9	38
1.12. Conclusion.....	38
CHAPTER 2.....	39
SYSTEME D'EXPLOITATION WINDOWS.....	39
2.1. Introduction	40
2.2. User Accounts.....	40
2.3. The Desktop.....	40
2.4. The Start Menu	41
2.5. Description of a Program Window	42
2.6. Moving and Resizing a Window	43
2.7. Changing the File List View.....	44
2.8. Displaying File Extensions.....	45
2.9. Using the Search Function.....	46
2.10. Maintaining and Protecting a Windows Computer	46
2.10.1. Using Antivirus Software	46
2.10.2. Keeping the Operating System Updated	47
2.10.3. Using Strong Passwords	47
2.11. System Optimization: Disk Defragmenter	48
2.11.1. Disk Defragmentation	48
2.12. Exercises.....	48
2.12.2. Exercise 2	49
2.12.3. Exercise 3	49
2.12.4. Exercise 4	49
2.12.5. Exercise 5	50
2.11. Solution of the exercises.....	50

2.11.1. Exercise 1	50
2.11.2. Exercise 2	51
2.11.3. Exercise 3	51
2.11.4. Exercise 4	52
2.11.5. Exercise 5	53
2.12. Conclusion	54
CHAPTER 3.....	55
MICROSOFT WORD.....	55
3.1. Introduction	56
3.2. Starting Microsoft Word.....	56
3.2.1. Launching Microsoft Word	56
3.2.2. The Word Interface.....	56
3.3. Creating and Saving a Document	57
3.3.1 Creating a New Document	57
3.3.2. Saving a Document.....	57
3.4. Entering and Editing Text.....	58
3.4.1 Entering Text	58
3.4.2 Selecting Text	58
3.4.3. Editing Text	58
3.5. Formatting Text	58
3.5.1. Font Formatting	58
3.5.2. Paragraph Formatting	59
3.6. Page Layout	60
3.7. Inserting Elements	60
3.7.1 Inserting Images	60
3.7.2. Inserting Tables	60
3.7.3. Inserting Headers and Footers	61

3.8. Spell Check and Grammar.....	61
3.9. Displaying File Extensions.....	61
3.10. Printing a Document.....	62
3.11. Closing Microsoft Word.....	62
3.12. Exercises.....	63
3.12.1. Exercise 1	63
3.12.2. Exercise 2	65
3.12.3. Exercise 3	67
3.13. Solution of exercises.....	68
3.13.1. Solution of exercise 1	68
3.13.2. Solution of exercise 2	71
3.13.3. Solution of exercise 3	74
3.6. Conclusion.....	77
CHAPTER 4.....	79
MICROSOFT POWER POINT	79
4.1. Definition.....	80
4.2. Starting Microsoft PowerPoint	80
4.3. The PowerPoint Interface	80
4.3.1. Title Bar.....	80
4.3.2. Quick Access Toolbar	81
4.3.3. Ribbon	81
4.3.4. Slides Pane.....	82
4.3.5. Slide Area	82
4.3.6. Notes Pane	82
4.3.7. Status Bar.....	82
4.4. Creating and Managing Slides.....	82
4.4.1. Adding a New Slide.....	83

4.4.2. Deleting a Slide	83
4.4.3. Reordering Slides	83
4.5. Working with Text.....	83
4.5.1. Adding Text.....	83
4.5.2. Formatting Text	84
4.6. Inserting Objects.....	84
4.6.1. Pictures	84
4.6.2. Shapes.....	84
4.6.3. Charts.....	84
4.6.4. Tables	84
4.7. Slide Design and Themes	84
4.7.1. Themes	84
4.7.2. Background Formatting.....	85
4.8. Transitions Between Slides	85
4.9. Animations.....	85
4.10. Slide Show Mode.....	86
4.10.1. Starting the Presentation.....	86
4.10.2. Navigation	86
4.11. Notes and Printing	86
4.11.1. Speaker Notes	86
4.11.2. Printing Options.....	86
4.12. Saving and Exporting	86
4.12.1. Saving	86
4.12.2. Exporting	86
4.13. Good Presentation Practices	86
4.14. Exercises	87
4.14.1. Exercise 1	87

4.14.2. Exercise 2	88
4.15. Solution of exercises.....	90
4.15.1. Solution of exercise 1	90
4.15.2. Solution of exercise 2	94
4.16. Conclusion.....	99
General Conclusion	1011
References	102

List of Figures

Figure 1.1. History of computer science.	15
Figure 1.2. Information processing	15
Figure 1.3. The microprocessor.....	23
Figure 1.4. Random Access Memory	24
Figure 1.5. The motherboard.....	25
Figure 1.6. Read-Only Memory	26
Figure 1.7. Expansion cards	27
Figure 2.1. The Windows Desktop.....	41
Figure 2.2. Description of a Program Window.	43
Figure 2.3. Moving and Resizing a Window	44
Figure 2.4. Displaying file extension	46
Figure 3.1: The Microsoft Word Interface	57
Figure 3.2 : Basic Text Formatting Tools	59
Figure 3.3: Paragraph Formatting Tools in Microsoft Word	59
Figure 3.4: Page Layout Control	60
Figure 3.5: Displaying File Extensions	62
Figure 4.1: PowerPoint Interface	81
Figure 4.2: Creating and Managing Slide.	83

General Introduction

Computer science is the field that investigates the automatic processing of information by machines that can be programmed, mainly computers. It includes a wide variety of concepts, from the theoretical basis to the hardware and software design and use. Knowing the basics of computer science is a must if one wants to understand how the technologies that shape our lives work.

One of the central ideas of the subject is computer architecture, which is the way hardware components for example, the processor, memory, input, and output devices are structured to perform the programs. The computer architecture in question is really a collection of very basic ideas, most importantly the use of binary code to represent the information. In fact, computers operate in the binary system, which is based on two symbols (0 and 1), to encode, store, and process data.

In order to make the students of these binary data easier, other numbering systems are often used as well, mainly octal (base 8) and hexadecimal (base 16). These systems enable one to write a very long sequence of bits much more compactly, thus making it easier to handle information at both the hardware and software levels. In computer science, particularly in areas such as low-level programming, system development, and hardware diagnostics, conversion from one of these systems (binary, octal, hexadecimal) to another is an indispensable skill.

From the student's point of view, operating systems such as Microsoft Windows feature a visually attractive interface with which a user can easily interact with the computer. Office programs like Microsoft Word and PowerPoint are increasingly becoming indispensable tools for the creation of documents, the writing of texts, and the preparation of professional presentations, thus providing examples of how computer science concepts can be implemented in the fields of work and education.

Moreover, file and data management is often tightly connected with the need to be able to easily perform conversions between different formats and units when the case may be of data exchange or system compatibility. Having a good understanding of the theoretical

basics, such as numeral system conversions, can significantly improve one's technological skills and problem-solving abilities in the real world.

This handout, Computer Science, is meant to introduce the reader to the core of the issues related to the technical side of the machine as well as to the software tools that make the machine easy to use in everyday life. Hence, it constitutes the prerequisite necessary for any advanced study or practice in the area of computer science.

CHAPTER 1

FUNDAMENTALS OF COMPUTER SCIENCE

1.1. Introduction

Computer Science is a vibrant area of study that changes quickly and is the foundation of most of the technologies that are shaping our modern world. Essentially, computer science deals with the study of how information is represented, processed, and communicated by computers and computational systems. In this chapter, the basic concepts that serve as the backbone of the discipline are discussed, thus, making a firm ground for going deeper into the subject.

1.2. Computer Science

Informatics is a synonym of the term computer science. It was first used around 1962 and comes from the combination of the word's information and automatic [1], [2]. The choice of words was to indicate the main goal of the field: the automated processing of information. Computer science was one of the answers to man's old ambition to use tools to perform his tasks more efficiently thus, especially with regard to calculating operations that are complex and repetitive, which may be performed strictly manually.

What started as a narrow technical discipline has now become a broad and multidisciplinary field of study which aside from the human aspect of teaching and learning through interaction with computers also includes research and development of new algorithms, data structures, computer architecture, software engineering, artificial intelligence, networks, and information systems. It is about understanding not just the design and operation of computing machines but also the theoretical foundations that govern how information is represented, processed, stored, and transmitted efficiently.

In the current world, computer science is almost indispensable in all spheres of society such as science, engineering, healthcare, education, finance, and communication. It is through the continuous innovation in this field beside the spectacular technological advances which they have led to that the way humans interact with information and technology experienced a paradigm shift.

1.3. History of Computer Science

Computer science was initially developed as a tool to facilitate especially difficult and time-consuming tasks, such as calculations. At first, people used simple devices like the abacus to aid counting and mathematics [3].

During the nineteenth century, Charles Babbage came up with a design for a machine that he called the Analytical Engine. It was the first concept of a computer which could be programmed to perform calculations automatically. Even though the device was not manufactured at that time, Babbage's concepts remained very influential. Ada Lovelace, who collaborated with him, is regarded as the first computer programmer because she actually wrote the first set of instructions for the machine.

The twentieth century witnessed a major milestone towards the construction of actual computers. Alan Turing, a mathematician from Britain [4], came up with a theoretical concept of a computer that is today known as a Turing Machine. His work inspired many scientists and contributes to the understanding of computing capabilities in general. In the period of World War II, gigantic electronic computers such as the ENIAC were developed to aid calculations for the military.

During the 1950s, computer science evolved into a formal discipline. New programming languages such as FORTRAN and COBOL enabled writing computer instructions that the machine could interpret. Consequently, software development for various applications became more and more feasible.

The introduction of the microprocessor in the 1970s gave rise to personal computers, which eventually made computing available even at home and in schools. Languages such as C empowered software development.

The computer networks of the world were brought together through the Internet, which was invented in the 1980s and 1990s. Programming techniques changed thereby leading to the development of more user-friendly software applications.

At present, computer science is integrated into almost all aspects of our lives examples include smartphones, intelligent cars, computer games, and healthcare. It is a tool for us to solve problems, keep in touch, and explore new things.

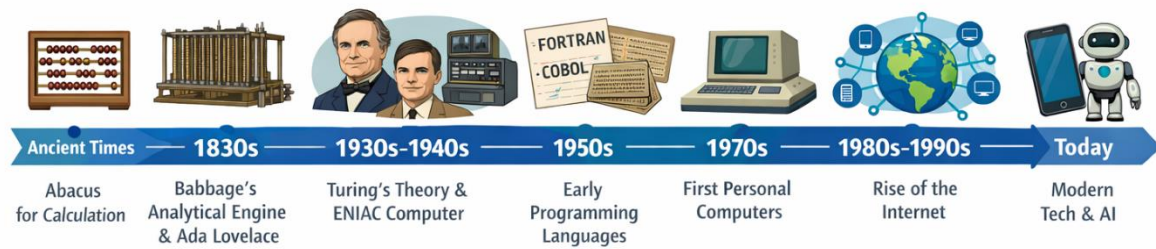


Figure 1.1. History of computer science.

1.4. The computer

A computer is an automatic machine that processes information or data entered or received as input through input devices and delivers results through output devices [1].

The steps of automatic information processing, figure 1.2:

- Receiving information or data as input (for example, students' grades in a computer science course).
- Processing these data (or performing operations) according to a program (instructions), for example calculating the average grade.
- Providing the results as output.

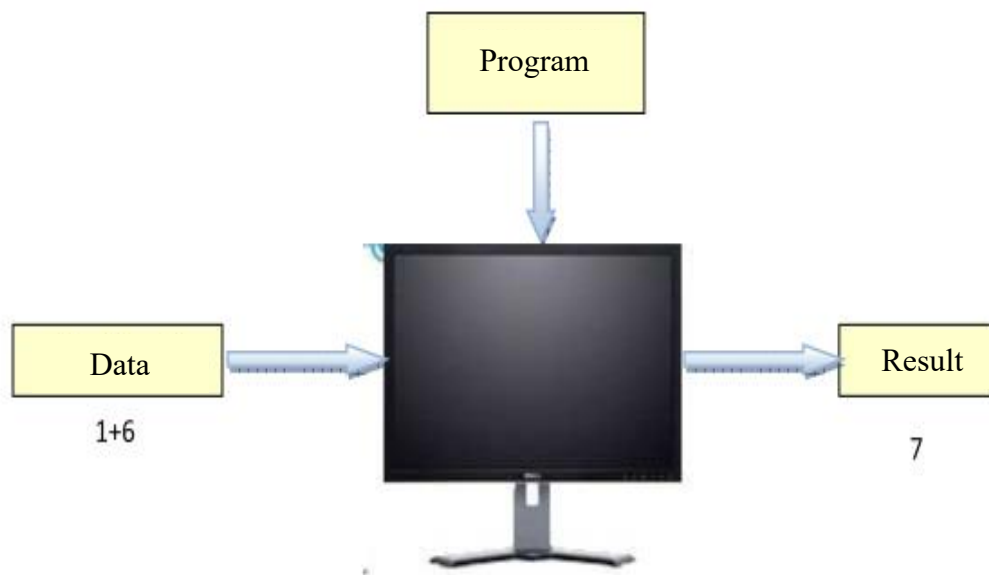


Figure 1.2. Information processing

1.5. Information and Data

Data are facts and figures in their original form and have not been processed or organized yet. They can be numerical, textual, visual, or audio obtained from various sources [5]. As an illustration, a list of student test scores or temperature readings are data.

Information is the result of processing, organizing, or interpreting data to make it meaningful and useful. For instance, finding the average score from the student test scores list thus converting the raw data into information that can be used to assess students' performance.

Data = raw, unprocessed facts

Information = data that has been processed and organized to give meaning

Basically, computers receive data as input and convert it into information by performing various operations, thus assisting people in decision-making or providing them with a better understanding of a situation.

1.6. Information Encoding

The information processed by a computer is represented in the form of binary numbers called bits [6]. A bit, short for binary digit, is the smallest unit of information in computing. It can only have two possible values: 0 or 1.

The binary system operates on these two states which enable encoding any information by combining several bits.

1.6.1. Bit combinations

- With 1 bit, you can represent 2 different values: 0 or 1: $2^1 = 2$ possibilities.
- With 2 bits, you can represent 4 different values: $2^2 = 4$ possibilities.
- With 3 bits, you can represent 8 different values: $2^3 = 8$ possibilities.

Therefore, the more bits can encode a wide range of information.

1.6.2. Byte

A byte is a fundamental storage unit made up of 8 bits.

It is the smallest unit most of the time that is used to encode one character in a computer system (letter, digit, symbol, etc.).

1 byte = 8 bits

1.6.3. Word and Double Word

Depending on the processor architecture, a wider information unit is also used:

A word is an information unit coded on 16 bits.

A double word is coded on 32 bits.

These units allow multiple bits to be processed in a single operation; thus, the data processing is faster.

1.6.4. Higher storage units

To measure data size or memory capacity, larger units based on the byte are used, which rise by 1024 powers:

Unit	Abbreviation	Value in bytes
Kilobyte	KB	1 KB = 1024 bytes = 2^{10}
Megabyte	MB	1 MB = 1024 KB = 2^{20}
Gigabyte	GB	1 GB = 1024 MB = 2^{30}
Terabyte	TB	1 TB = 1024 GB = 2^{40}

These units can quantify both the file size and the capacity of hard disks, USB keys, or RAM.

Other units in computing

Bps (bit per second): It is the unit for data transfer rate. It is often used to describe the speed of modems and internet connection. For example, a 100 Mbps connection can transfer 100 million bits per second.

Hertz (Hz): Frequency unit corresponding to the number of occurrences per second. In computing, it is often used to measure the processor (CPU) speed. For instance, a processor running at 3 GHz (gigahertz) performs 3 billion cycles per second.

1.7. Binary coding of information

To code any kind of information - numbers, words, images, sounds, or schemas - electronic circuits of a computer only use binary information. The binary system is based on only two symbols: 0 and 1, which correspond to the two physical states of an electronic circuit (off or on, low or high current) [6].

This binary representation is the basis of all computer processing.

1.7.1. Conversion a decimal number to binary

To convert a decimal (base 10, that we use in everyday life) number into binary (base 2), one generally uses the method of repeated division by 2:

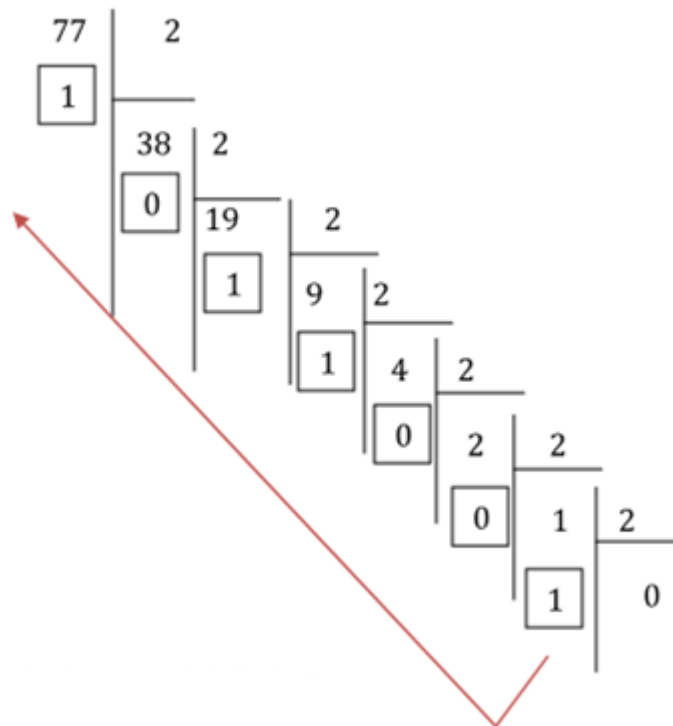
Method:

- Divide the decimal number by 2.
- Write down the remainder (0 or 1).
- Again divide the quotient by 2 and write down the new remainder.
- Repeat until the quotient is 0.

The binary representation is obtained by reading the remainders from bottom to top (from the last to the first).

Example: Convert 77 to binary.

$$(77)_{10} = (1001101)_2$$



1.7.2. Conversion of a binary number to decimal

The inverse conversion, from binary to decimal, is done by expressing each bit as the product of the position of the bit and the corresponding power of 2, and then summing these values.

Example: What is the decimal value of the binary number 10011110₂?

We assign a power of 2 to each bit starting from the right (least significant bit) going to the left (most significant bit):

$$1 \times 2^7 + 0 \times 2^6 + 0 \times 2^5 + 1 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 = 128 + 0 + 0 + 16 + 8 + 4 + 2 + 0 = 158$$

Binary encoding is very efficient for computers, but it is difficult for humans to read and interpret directly, as it results in long strings of 0 and 1. That is why we often use more compact representations (like hexadecimal) or graphical interfaces to manipulate information.

1.7.3. Conversion of a binary number to octal

The octal system is base 8. Each octal digit corresponds exactly to 3 binary bits (since $2^3 = 8$).

Group bits in sets of 3 from right to left, then convert each group to an octal digit.

Example: 101110_2

Groups: 101 110

- $101 \text{ (binary)} = 5 \text{ (octal)}$
- $110 \text{ (binary)} = 6 \text{ (octal)}$

So, $101110_2 = 56_8$

1.7.4. Conversion of an octal number to binary

Convert each octal digit into 3 binary bits.

Example: 73_8

- $7 = 111 \text{ (binary)}$
- $3 = 011 \text{ (binary)}$

So, $73_8 = 111011_2$

1.7.5. Conversion of a binary number to hexadecimal

The hexadecimal system is base 16. Each hex digit corresponds exactly to 4 binary bits (since $2^4 = 16$).

Group bits in sets of 4 from right to left, then convert each group to a hex digit.

Example: 10111011_2

Groups: 1011 1011

- $1011 \text{ (binary)} = B \text{ (hex)}$
- $1011 \text{ (binary)} = B \text{ (hex)}$

So, $10111011_2 = BB_{16}$

1.7.6. Conversion of a hexadecimal number to binary

Convert each hex digit into 4 binary bits.

Example: $3F163F_{16}$

- $3 = 0011 \text{ (binary)}$
- $F = 1111 \text{ (binary)}$

So, $3F_{16} = 00111111_2$

1.7.7. Conversion of a decimal number to octal

Divide the decimal number successively by 8, note the remainders, then read them in reverse order.

Example: $83_{10} = 123_8$

Division	Quotient	Remainder
$83 \div 8$	10	3
$10 \div 8$	1	2
$1 \div 8$	0	1

1.7.8. Conversion of an octal number to decimal

Multiply each octal digit by $8^{\text{positions}}$ and sum the results.

Example: 127_8

$$1 \times 8^2 + 2 \times 8^1 + 7 \times 8^0 = 64 + 16 + 7 = 87_{10}$$

1.7.9. Conversion of a decimal number to hexadecimal

Divide the decimal number successively by 16, note the remainders (using A=10, B=11, ..., F=15), then read them in reverse order.

Example: $254_{10} = FE_{16}$

Division	Quotient	Remainder
$254 \div 16$	15	14 (E)
$15 \div 16$	0	15 (F)

1.7.10. Conversion of a hexadecimal number to decimal

Multiply each hex digit by 16^{position} and sum the results.

Example: $1A3_{16}$

$$1 \times 16^2 + 10 \times 16^1 + 3 \times 16^0 = 256 + 160 + 3 = 419_{10}$$

1.8. Computer system

An automatic information processing system is called a Computer System.

A computer system consists of two parts [7]:

Hardware: This is the set of physical components of a computer.

Software: This includes all the basic and application software that allows the computer to operate.

1.8.1. Hardware

Hardware is the term used to describe all the tangible parts of a computer, whether they are of the internal or external origin. It mainly covers the electrical and electronic circuits, as well as the physical parts that make a computer work [8]. Every piece of hardware performs a particular function, and thus collectively, they carry out computing operations.

These parts are arranged based on a certain architecture that facilitates their connection and working together.

Computer hardware components commonly comprise the elements mentioned below:

1.8.1.1. The Central Processing Unit (CPU)

The CPU is the literal core of the computer, consisting of the primary units responsible for the data processing and controlling functions.

Typically, a desktop computer CPU comes in a separate unit and is placed under or beside the desk.

A laptop CPU is integrated right under the keyboard.

The CPU comprises several main parts:

a) The microprocessor (CPU)

The microprocessor, also identified as the CPU (Central Processing Unit), is considered the brain of the computer. It carries out the executing of instructions, math calculations, logical operations, and oversees all the control of the internal activities.

The CPU is recognizable by its type or brand, e.g., AMD, Intel Pentium 4, Intel Core 2 Duo, Intel Core i7, etc.

Its frequency (measured in GHz, gigahertz) is an indicator of the processor's speed, or how many instructions it can carry out per second, e.g., 2 GHz, 2.6 GHz, 3.2 GHz. In most cases, a higher frequency means a faster processor.

The latest microprocessors have more than one core, allowing them to execute more programs or threads simultaneously (multitasking).



Figure 1.3. The microprocessor

b) Random Access Memory (RAM)

RAM refers to short-term memory used in storing data and programs that are being used at the moment.

It serves as a buffer between the CPU and the permanently stored memory (ROM, hard drive, etc.), thus allowing the processor to quickly access the data it needs.

RAM is considered a volatile memory type since it is emptied when the power is switched off.

It is measured in terms of volume (for example, 1024 MB, 2 GB, 4 GB, 8 GB, etc.), and this capacity determines how much data the computer can process at the same time as well as how fast it will perform those tasks.



Figure 1.4. Random Access Memory

c) The motherboard

The motherboard is the primary printed circuit board that contains and connects all the elements of the computer to each other.

It helps the communication between the processor, RAM, ROM, expansion cards, and external devices.

All these components connect directly to the motherboard through various slots or sockets designed for particular components.

Besides, it has connectors that allow attaching external devices such as mouse, keyboard, monitors, USB drives, etc.

The motherboard makes it possible for information to be exchanged among various parts, thus guaranteeing that the computer's different functions are working in harmony.



Figure 1.5. The motherboard

d) Read-Only Memory (ROM)

ROM refers to a type of memory that stores information even if the power supply is cut off.

It mainly holds the computer's startup programs such as BIOS or firmware.

These software programs facilitate the recognition of hardware components and the launching of the operating system.

Contrary to RAM, ROM is mostly non-volatile and is mainly used for data that is rarely or never changed, thus providing both the stability and security of the stored programs.



Figure 1.6. Read-Only Memory

e) Expansion cards

Expansion cards are physical components or modules that may be implemented into the computer to provide additional features or perform at a higher level.

They are attached or connected to the motherboard through a specific type of slot (PCI, PCIe, etc.).

An average selection of expansion cards may include:

- Wi-Fi network card for wireless internet connection.
- Dedicated graphics card to improve video and gaming performance.
- TV or satellite card to receive television channels.
- Sound card to improve audio quality.

These cards allow the computer to evolve according to the user's specific needs.



Figure 1.7. Expansion cards

1.8.1.2. Main Computer Peripheral Devices

Three types of peripheral devices can be distinguished:

- **Input devices**, which allow data to be entered into the central processing unit.

Examples: Keyboard, mouse, microphone, scanner, etc.

- **Output devices**, which are used to display or produce the results of data processing.

Examples: Monitor, speakers, printer, etc.

- **Input/Output devices**, which perform both input and output functions simultaneously.

Examples: Modem, touchscreen.

- **Storage devices**, which are used to store and save data.

Examples: USB flash drive, CD-ROM, hard disk, etc.

1.8.1.3. Connecting Peripherals to the Central Unit

The microprocessor communicates with the various peripheral devices through ports or ribbon cables. Storage devices are generally connected to the motherboard via ribbon cables.

Input and output devices, on the other hand, are connected to ports using connectors of different shapes.

1.8.2. The Software Component

1.8.2.1. Definition

A computer without software is unable to function. Software is what gives hardware its functionality and intelligence.

Software is a set of programs (a set of instructions) for processing information, containing the procedures and data necessary for an application.

1.8.2.2. Types of Software

There are two main types of software:

a) Operating System

An operating system is a basic software (a set of programs) that ensures communication between the processor, peripheral devices, and the user [1], [9]. It is the first program installed on a computer. It manages hardware resources and other software.

Examples:

MS-DOS, Windows (95, 98, 2000, XP, Vista, 7, 8, 10, 11, etc.), UNIX, Linux.

Types of Operating Systems

The most widely used operating system today is Windows. However, others exist such as MS-DOS, Linux, and Unix.

Operating systems can be classified into two main families based on how they interact with the user:

- Text-based operating systems, such as MS-DOS.
- Graphical operating systems, such as Windows and Linux.

Basic Functions of an Operating System:

- Enables the computer to start and establishes communication with the user.
- Manages communication between hardware and software.
- Coordinates the different peripheral devices connected to the computer.
- Organizes disks and files.
- Manages data reading and writing on disks and in memory.
- Displays information on the screen and interprets keyboard input.

b) Application Software

Application software is a set of programs that allows the creation and processing of one or more specific types of files.

The main categories include:

- Word processors: used to create text documents such as Word files (.doc), web pages (.html or .xml), printed documents (.rtf), etc. Examples: Word, Works.
- Spreadsheets: used for managing tables and calculations. They allow the creation of Excel workbooks (.xlsx), web pages (.html or .xml), etc. Examples: Excel, Lotus.
- Web browsers: software designed to browse the World Wide Web and view web pages. Examples: Internet Explorer, Mozilla Firefox, Opera, Google Chrome.
- Multimedia players: software designed to play audio and video files such as (.mp3, .rm, .ram, .mpeg, .wav, .avi, etc.). Examples: RealPlayer, Windows Media Player, VLC Media Player.
- Image processing software: used for editing, modifying images, and creating drawings. Examples: Paint, PhotoFilter, Photoshop.
- Animation creation software: used to create animated images (.gif), flash games (.swf), animated web pages (.htm), etc. Examples: Flash, GIMP, etc.
- Presentation software: used to create slide-based presentations (.pptx, .pps, ...). Example: PowerPoint.
- Video editing software: such as Windows Movie Maker, Meeve, PowerDVD Creator, ...
- Games software.
- Database management software: SQL, Access, Oracle, etc.
- Email and messaging software: allows communication between users. Examples: MSN, Yahoo Messenger, NetMeeting.

- Antivirus software: used to detect and remove malicious programs.
Examples: Avast, AVG, Panda.

1.9. Introduction to Programming

A computer is an automatic machine that processes information using a program (a sequence of instructions).

Since a computer understands only 0 and 1, it cannot be given instructions using a human language. Therefore, programming languages are used.

1.9.1. Machine Language

Machine language is the basic language understood by a computer. It consists of sequences of zeros and ones, i.e., binary. To manipulate machine language, assembly language is required.

1.9.2. Assembly Language

Assembly language is a programming language directly understood by the processor. Programs written in assembly language can achieve very high performance. However, assembly programming is very complex.

1.9.3. Programming Language

A programming language is a set of words, rules, and symbols used to write instructions (programs) intended for a computer. Examples: Basic, Logo, Pascal, C, Python, R language.

1.9.4. Algorithm

An algorithm is a sequence of instructions which, when executed correctly, leads to a specific result.

1.9.5. Program

A computer program is an ordered sequence of instructions written in a language understandable by the machine, allowing it to solve a problem.

1.9.6. Programming

Programming is the process of creating and developing programs intended to be executed by a computer.

1.10. Exercises

1.10.1. Exercise 1

a) Which configuration is the most powerful among the following cases:

1. RAM: (256 MB, 1 GB, 8 GB)
2. Graphics memory: (128 MB, 256 MB, 32 MB)
3. Hard disk: (80 GB, 160 GB)
4. Processor (frequency): 1.5 GHz, 4.5 GHz, 800 MHz

b) Which memory option can store the most data among the following choices:

1. 30 GB b) 80 GB c) 160 GB
2. 128 KB b) 128 GB c) 128 MB
3. 512 MB b) 64 MB c) 1 GB

1.10.2. Exercise 2

Fill in the following blanks:

1. 35 GB = MB = bytes
2. 127 MB = bytes
3. 1024 MB = bytes = bits

1.10.3. Exercise 3

A 3½-inch floppy disk has a storage capacity of 1.44 MB.

1. How many characters can a file contain if its size is equal to the capacity of the floppy disk?
2. How many floppy disks are needed to hold the contents of a CD-ROM with a size of 750 MB?

1.10.4. Exercise 4

1. Which statement best describes computer science ?
 - a) The study of computer hardware only
 - b) The study of algorithms, data, and computer systems

- c) The study of mathematics only
 - d) The use of computers for gaming
2. Which component is considered an output device ?
- a) Keyboard
 - b) Mouse
 - c) Monitor
 - d) Scanner
3. Which of the following is an operating system ?
- a) Microsoft Word
 - b) Google Chrome
 - c) Windows
 - d) PowerPoint
4. Which button is used to close a program window ?
- a) Minimize
 - b) Maximize
 - c) Close
 - d) Restore
5. Which part of the desktop shows the system clock and background programs ?
- a) Start Menu
 - b) Taskbar
 - c) Notification area
 - d) Desktop icons

1.10.5. Exercise 5 : Fill in the Blanks

1. The _____ bar displays the name of the active document and the application.
2. A _____ is a link to a program, folder, or document.
3. The _____ button allows you to open the main Windows menu.
4. A computer processes data using the _____ number system.
5. The smallest unit of data in a computer is the _____.

1.10.6. Exercise 6 : Convert the following numbers to decimal (base 10)

1. $(101101)_2 = (\dots\dots\dots)_{10}$

2. $(572)_8 = (\dots\dots\dots)_{10}$

3. $(3F9)_{16} = (\dots\dots\dots)_{10}$

1.10.7. Exercise 7: Convert the following decimal numbers

1. $(145)_{10} = (\dots\dots\dots)_2$

2. $(392)_{10} = (\dots\dots\dots)_8$

3. $(945)_{10} = (\dots\dots\dots)_{16}$

4. $(15)_{10} = (\dots\dots\dots)_{16}$

1.10.8. Exercise 8: Using conversion tables, give directly the result of the following conversions

1. $(1100110)_2 = (\dots\dots\dots)_8$

2. $(10111101)_2 = (\dots\dots\dots)_{16}$

3. $(75)_8 = (\dots\dots\dots)_2$

4. $(9E)_{16} = (\dots\dots\dots)_2$

Decimal	Binary	Octal	Hexadecimal
0	0000	0	0
1	0001	1	1
2	0010	2	2
3	0011	3	3
4	0100	4	4
5	0101	5	5
6	0110	6	6
7	0111	7	7

8	1000	10	8
9	1001	11	9
10	1010	12	A
11	1011	13	B
12	1100	14	C
13	1101	15	D
14	1110	16	E
15	1111	17	F

1.10.9. Exercise 9:

Fill in the table using the devices below:
monitor, printer, speakers, projector, headphones, keyboard, mouse, joystick, light pen,
microphone, scanner, barcode reader, touch screen, CD/DVD reader, webcam

1.11. Solution of Exercises

1.11.1. Exercise 1

a) Most powerful configuration

1. RAM: 8 GB
2. Graphics memory: 256 MB
3. Hard disk: 160 GB
4. Processor: 4.5 GHz

b) Largest storage capacity

1. 160 GB
2. 128 GB
3. 1 GB

1.11.2. Exercise 2

1. 35 GB = 35 840 MB = 37 580 963 840 bytes
2. 127 MB = 133 169 152 bytes
3. 1024 MB = 1 073 741 824 bytes = 8 589 934 592 bits

1.11.3. Exercise 3

1. 1 509 949 characters
2. 521 floppy disks

1.11.4. Exercise 4

1. b) The study of algorithms, data, and computer systems
2. c) Monitor
3. c) Windows
4. c) Close
5. c) Notification area

1.11.5. Exercise 5

1. Title bar
2. Shortcut
3. Start button
4. Binary
5. Bit

1.11.6. Exercise 6

Convert the following numbers to decimal (base 10)

1. $(10011)_2$

$$\begin{aligned} &= 1 \times 2^4 + 0 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 \\ &= 16 + 2 + 1 = \boxed{19} \end{aligned}$$

$$(10011)_2 = (19)_{10}$$

2. $(336)_8$

$$\begin{aligned} &= 3 \times 8^2 + 3 \times 8^1 + 6 \times 8^0 \\ &= 192 + 24 + 6 = \boxed{222} \end{aligned}$$

$$(336)_8 = (222)_{10}$$

$$3. (7AC)_{16}$$

$$\begin{aligned} &= 7 \times 16^2 + A \times 16^1 + C \times 16^0 \\ &= 7 \times 256 + 10 \times 16 + 12 \times 1 \\ &= 1792 + 160 + 12 = \boxed{1964} \end{aligned}$$

$$(7AC)_{16} = (1964)_{10}$$

1.11.7. Exercise 7

Convert the following decimal numbers

$$1. (234)_{10} \text{ to binary}$$

$$\begin{aligned} 234 &= 128 + 64 + 32 + 8 + 2 \\ &= (11101010)_2 \end{aligned}$$

$$(234)_{10} = (11101010)_2$$

$$2. (186)_{10} \text{ to octal}$$

$$186 \div 8 = 23 \text{ r } 2 \quad 23 \div 8 = 2 \text{ r } 7 \quad 2 \div 8 = 0 \text{ r } 2$$

$$(186)_{10} = (272)_8$$

$$3. (763)_{10} \text{ to hexadecimal}$$

$$763 \div 16 = 47 \text{ r } 11(B) \quad 47 \div 16 = 2 \text{ r } 15(F) \quad 2 \div 16 = 0 \text{ r } 2$$

$$(763)_{10} = (2FB)_{16}$$

$$4. (9)_{10} \text{ to hexadecimal}$$

$$(9)_{10} = (9)_{16}$$

1.11.8. Exercise 8

Conversions using the table

1. $(0011111)_2$ to octal

Group by 3 bits :

$$\begin{aligned} 000 \ 111 \ 1 &\Rightarrow 000 \ 111 \ 001 \\ &= (071)_8 \end{aligned}$$

2. $(10011010)_2$ to hexadecimal

Group by 4 bits:

$$1001 \ 1010 = (9A)_{16}$$

3. $(43)_8$ to binary

$$\begin{aligned} 4 &= 100, \ 3 = 011 \\ &= (100011)_2 \end{aligned}$$

4. $(B0)_{16}$ to binary

$$\begin{aligned} B &= 1011, \ 0 = 0000 \\ &= (10110000)_2 \end{aligned}$$

1.11.9. Exercise 9

Input Devices	Output Devices	Input / Output Devices
Keyboard	Monitor	Touch screen
Mouse	Printer	CD/DVD reader
Joystick	Speakers	
Light pen	Projector	
Microphone	Headphones	
Scanner		
Barcode reader		
Webcam		

1.12. Conclusion

We dealt with the fundamentals of computer science in this chapter, which sets a solid foundation to understand how computers and information systems actually function. We began by with a definition of computer science and an explanation of the importance of computer science, a short overview of the history of computing provides a way of perceiving the evolution of technology.

This chapter also leads into a discussion of what computer systems are and their major components, as well as the various types of computers used to satisfy different purposes. Special attention was given to the concepts of data and information, together with a discussion of the binary system as the basis for representing data in computers. In addition, conversion of numbers in and out of binary, decimal, octal, and hexadecimal was presented as an important skill in understanding computer operation.

CHAPTER 2

SYSTEME D'EXPLOITATION

WINDOWS

2.1. Introduction

Microsoft Windows is among the most popular operating systems globally. It offers a graphical user interface that allows users to interact with the computer easily through windows, icons, menus, and mouse. Windows is the operating system that controls the computer's hardware and software resources, thus allowing users to run applications, organize files and folders, and do their daily work efficiently.

A good knowledge of the Windows operating system is very crucial for beginners because it is the base of effectively using a computer. This chapter covers the major elements of Windows [10], [11], basic functions, file handling, and necessary system utilities that help in safe and efficient computer usage.

2.2. User Accounts

Windows is a multi-user operating system; therefore, several user profiles can be created [12]. This allows multiple people to work on the same computer, each having the ability to customize their own workspace without affecting other users.

There are two types of users:

- Administrator: has full control over the computer.
- Limited user: can use the computer but is not allowed to make system changes.

To create a new user:

Control Panel → User Accounts → Create a new account

2.3. The Desktop

On the desktop, you will find the following elements, Figure 2.1:

- The Start button (1), which opens the main Windows menu.
- The taskbar (2) provides easy access to each active application, represented by a button (in this example, two applications are open).
- The Quick Launch area (3), which allows programs to be started quickly. It usually contains shortcuts to frequently used programs.
- The Notification area (4), which contains the clock (displaying the system time) and icons indicating programs running in the background.

- Shortcut icons (5): a shortcut is a link to another item, such as a program, folder, or document.



Figure 2.1. The Windows Desktop.

2.4. The Start Menu

To display the Windows Start menu, click the Start button or press the Windows key on your keyboard. By default, it contains the following options:

- Programs: displays the list of installed programs.
- Documents: provides access to the My Documents folder and recently opened documents.
- Settings: gives access to the Control Panel, allowing you to configure your working environment (network connections, user management, device management, adding/removing programs, etc.).
- Search: allows searching for files, folders, people (in an address book), or computers on the network.

- Search the Internet: visible in the Search Assistant pane, allows Internet searches.
- Help: provides access to Windows Help and Support.
- Run: allows you to run a program by specifying its executable file.
- Log off: allows you to switch users and/or close the current session.

2.5. Description of a Program Window

Each window contains the following elements, Figure 2.2:

- Title bar (1): displays the name of the active document (here, *Document* because it has not yet been saved) followed by the application name (here, WordPad).

This bar also includes:

- Minimize button (a): reduces the window to a button on the taskbar.
- Maximize button (b): displays the window in full screen or restores it to its previous size.
- Close button (c): closes the window and exits the application.
- System menu icon (left side): clicking this icon opens a menu containing options to manage the window (resize, move, etc.). This menu is rarely used today, as these actions can be performed more easily with the mouse.
- Menu bar (2): contains the application menus; the Help or ? menu provides access to application help.
- Toolbar (3): contains tools that allow quick access to common operations.
- Scroll bars and arrows (4): allow scrolling through the window content. They appear only when necessary.

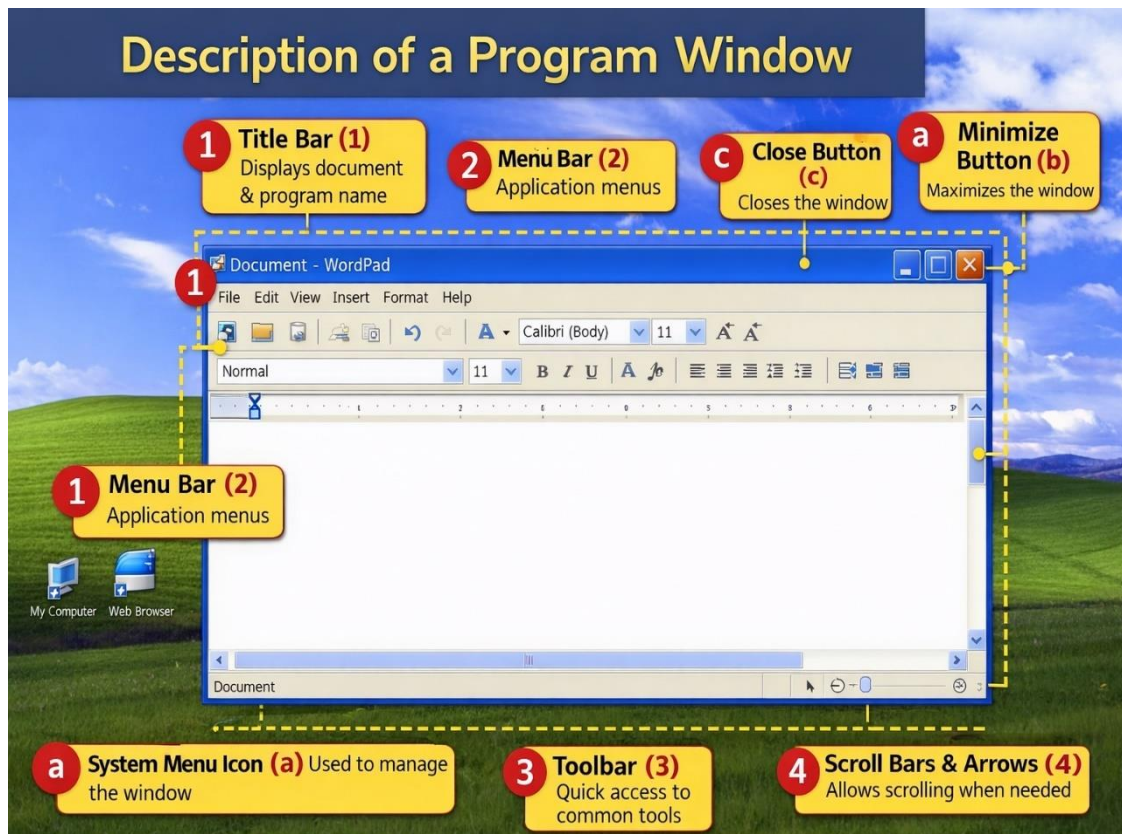


Figure 2.2. Description of a Program Window.

2.6. Moving and Resizing a Window

After launching an application, the window may occupy the entire screen (full screen mode). Otherwise, the desktop is visible in the background. If the window is inconvenient, it can be moved or resized, Figure 2.3.

- To move a window, click and hold the left mouse button on the title bar, drag the window to the desired position, then release the mouse button.
- To resize a window, point to one of its borders. The mouse pointer changes to a double-headed arrow. Click and drag to adjust the size, then release.
- To resize both width and height simultaneously, point to one of the window corners. The lower-right corner is the easiest to use.

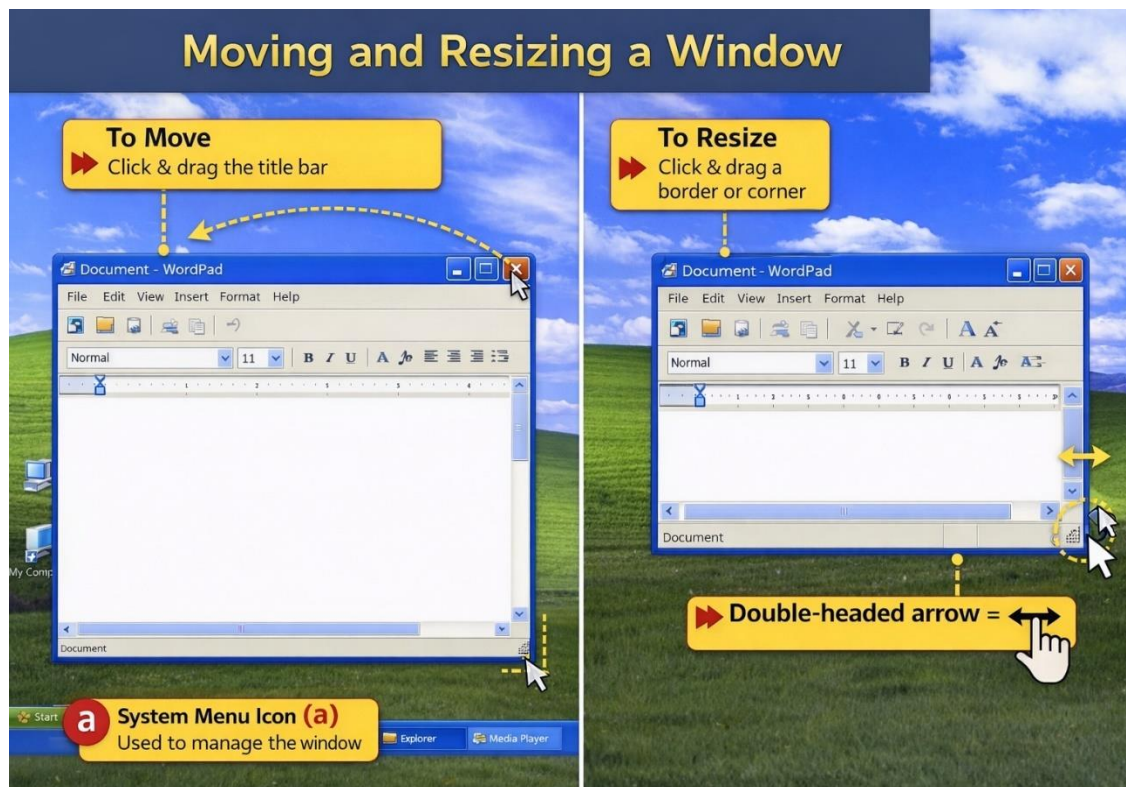


Figure 2.3. Moving and Resizing a Window

2.7. Changing the File List View

The right part of the window contains the file list. Its appearance can be changed using the following options:

- Large Icons / Small Icons: display only the icon and name of each file.
- Thumbnails: display miniature previews of files when possible (especially images).
- List: displays icons and file names arranged in a list, sorted alphabetically by default.
- Details: displays file names in a column along with size, type, and date/time of last modification.

Details View

- File information is displayed in columns:
- File name: the icon depends on the file type. The file extension (three characters after the name) also indicates its type and is hidden by default.

- File size: expressed in kilobytes (KB).
- File type: depends on the application used to create the file.
- Date modified: shows the date and time of the last modification.

2.8. Displaying File Extensions

A file extension is the part of the file name that comes after the dot (.).

Examples:

Before (extensions hidden):

- Report
- Photo
- Music

After (extensions displayed):

- Report.docx
- Photo.jpg
- Music.mp3

By default, extensions of known file types are hidden. It is recommended to display them to better identify file types, Figure 2.4.

Tools → Folder Options → View tab

Uncheck Hide extensions for known file types

A known file is a file recognized by Windows and associated with a specific program.

Why Display File Extensions?

Displaying file extensions helps to:

- **Identify the real type of a file,**
- **Avoid opening malicious files disguised as documents,**
- **Better manage files and folders,**
- **Improve understanding of file formats.**

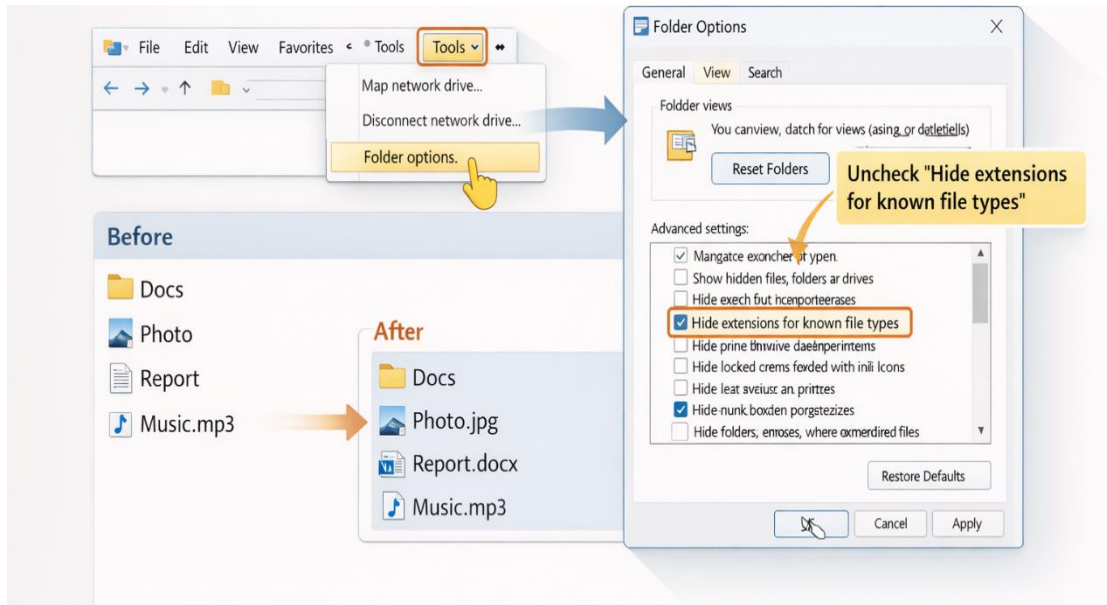


Figure 2.4. Displaying file extension

2.9. Using the Search Function

To work with files, it is essential to know where they are stored. If you cannot find a file, you can search for it across all folders on your hard drive.

- If the active window is a folder window, display the Search pane.
- Otherwise, click Start → Search → Files and Folders.

There are two search criteria:

- Search for a file when you know its name.
- Search for a file by specifying a word contained in the file.

2.10. Maintaining and Protecting a Windows Computer

Maintaining and protecting your Windows computer is essential to that your computer works or functions effectively.

2.10.1. Using Antivirus Software

Antivirus programs detect, prevent, and remove malicious software (malware) such as viruses, worms, trojans, ransomware, and spyware.

Malware can corrupt files, steal personal information, slow down your computer, or even render it unusable.

How to use antivirus software ?

- Install a reputable antivirus program (e.g., Windows Defender, Avast, Norton).
- Keep the antivirus software up to date to recognize the latest threats.
- Schedule regular system scans (daily or weekly) to detect and eliminate threats.
- Respond immediately to any alerts or warnings from the antivirus.

2.10.2. Keeping the Operating System Updated

Updates fix security vulnerabilities, patch bugs, improve performance, and add new features.

How to update Windows?

- Go to Settings > Update & Security > Windows Update.
- Click Check for updates and install any available updates.
- Enable automatic updates to ensure your system stays current.

2.10.3. Using Strong Passwords

Strong passwords protect your accounts and computer from unauthorized access.

Tips for creating strong passwords:

- Use at least 8–12 characters.
- Mix uppercase and lowercase letters, numbers, and special characters.
- Avoid common words, names, or easily guessable information.
- Use unique passwords for different accounts.
- Consider using a password manager to store and generate secure passwords.

2.10.4. Backing Up Your Data

To protect against data loss caused by hardware failure, accidental deletion, malware attacks, or theft.

Backup methods:

- External drives: Copy important files to USB drives, external hard disks, or SSDs.
- Cloud storage: Use services like OneDrive, Google Drive, or Dropbox to automatically sync files.
- Backup software: Use built-in Windows Backup and Restore or third-party tools to schedule full system backups.

2.11. System Optimization: Disk Defragmenter**2.11.1. Disk Defragmentation**

Over time, files on your hard drive become fragmented, stored in non-contiguous sectors, slowing down data access.

Defragmentation reorganizes files so that related pieces are stored closer together, improving read/write speeds and system responsiveness.

How to defragment in Windows ?

Open Defragment and Optimize Drives tool (search in the Start menu).

- Select your hard drive and click Optimize.
- For SSDs, Windows automatically runs a TRIM operation instead of defragmentation.

When to defragment ?

Run defragmentation periodically, especially on traditional HDDs. It is not needed for SSDs.

2.12. Exercises**2.12.1. Exercise 1**

Determine if is True or False:

1. A window can be moved by dragging the title bar.
2. The maximize button reduces the window to the taskbar.

3. File extensions help identify the type of a file.
4. The desktop is part of the computer hardware.
5. Scroll bars appear only when the content does not fit in the window.

2.12.2. Exercise 2

Give Short Answer Questions:

1. What is the role of the taskbar in Windows ?
2. What is the difference between minimizing and closing a window ?
3. Define a shortcut.
4. Why is it useful to display file extensions ?
5. What happens when you resize a window ?

2.12.3. Exercise 3

1. Create a new folder on the desktop and rename it.
2. Open a program and maximize its window.
3. Resize the window to make it smaller.
4. Move the window to another position on the screen.
5. Close the program properly.

2.12.4. Exercise 4

1. Create a folder named Projects_2026 on your system. Inside it, create two subfolders named Docs and Media.
2. Rename the folder Docs to Documents.
3. Make a copy of the Media folder inside Documents and rename it to Media_Backup.
4. Write the absolute path to access the Media_Backup folder.
5. Move a file named report.docx from Documents to Media_Backup.
6. Delete the file old_notes.txt from the Documents folder.

7. Restore the deleted file old_notes.txt from the Recycle Bin (or Trash).
8. On your desktop, create a shortcut (or alias) to the Projects_2026 folder.
9. Use the search feature to find a file named summary.xlsx anywhere on your system.
10. Search for all PDF files stored in the Documents folder.

2.12.5. Exercise 5

1. Check if your computer has an antivirus program installed and whether it is up to date. Write down its name and version.
2. Create a strong password for your user account or change the existing one. Write down guidelines for creating a strong password.
3. Check for the latest updates for your operating system and install any pending updates.
4. Open the Security Center (or equivalent) on your computer and list the current status of: firewall, antivirus, and malware protection.
5. Make a backup of your important files to an external storage device or a cloud backup service. Describe the method you used.
6. Run the Disk Defragmenter (or optimization tool) and note the before and after disk performance or fragmentation level.

2.11. Solution of the exercises

2.11.1. Exercise 1

1. True
2. False
3. True
4. False
5. True

2.11.2. Exercise 2

1. It allows access to running applications and system tools.
2. Minimizing hides the window on the taskbar, while closing ends the program.
3. A shortcut is a link to a program, folder, or document.
4. To identify file types more easily.
5. It changes the size of the window.

2.11.3. Exercise 3

1. Create a new folder on the desktop and rename it
 - Right-click on an empty area of the desktop.
 - Select New → Folder.
 - A new folder appears with the name *New Folder*.
 - Type the new name (for example: *My Documents*).
 - Press Enter.
2. Open a program and maximize its window
 - Click the Start button.
 - Select a program (for example: Notepad or WordPad).
 - When the program opens, click the Maximize button (□) at the top-right corner of the window.
3. Resize the window to make it smaller
 - Click the Restore Down button (between Minimize and Close) if the window is maximized.
 - Move the mouse pointer to one edge of the window.
 - When the pointer becomes a double-headed arrow, click and drag inward.
 - Release the mouse button to confirm the new size.

4. Move the window to another position on the screen
 - Place the mouse pointer on the Title bar of the window.
 - Click and hold the left mouse button.
 - Drag the window to the desired position on the screen.
 - Release the mouse button.
5. Close the program properly
 - Click the Close button (X) at the top-right corner of the window.

2.11.4. Exercise 4

1. Create folder and subfolders
 - Create folder Projects_2026 (e.g., in Documents or Desktop).
 - Inside it, create subfolders Docs and Media.

In Windows Explorer: Right-click → New → Folder → name it.

2. Rename folder
 - Rename Docs to Documents: Right-click on Docs → Rename → type Documents.
3. Copy folder
 - Copy Media folder into Documents and rename copy Media_Backup: Right-click Media → Copy → Open Documents → Paste → Rename to Media_Backup.
4. Write absolute path
 - Example:
C:\Users\YourName\Documents\Projects_2026\Documents\Media_Backup
5. Move file
 - Move report.docx from Documents to Media_Backup: Drag and drop or right-click → Cut → Go to Media_Backup → Paste.
6. Delete file

- Delete old_notes.txt from Documents: Right-click file → Delete (moves to Recycle Bin).

7. Restore deleted file

- Open Recycle Bin → find old_notes.txt → Right-click → Restore.

8. Create shortcut

- On Desktop: Right-click → New → Shortcut → Browse to Projects_2026 folder → Next → Finish.

9. Search for file

- Use Windows search bar: type summary.xlsx → wait for results → locate file.

10. Search for all PDF files

- In Documents folder, search: *.pdf → lists all PDF files.

2.11.5. Exercise 5

1. Check antivirus

- Open antivirus software or Windows Security → check name and version (e.g., Windows Defender, Avast, Norton).

2. Create/change password

- Use Windows Settings → Accounts → Sign-in options → Change password.
- Guidelines: at least 8 characters, mix of uppercase, lowercase, numbers, symbols, no dictionary words.

3. Update OS

- Open Windows Update → Check for updates → Install if any are available.

4. Check Security Center status

- Firewall: On
- Antivirus: Active
- Malware protection: Enabled

5. Backup files

- Copy important files to USB drive or use cloud services like OneDrive, Google Drive, Dropbox.
- For example, drag files to USB or upload to cloud.

6. Run Disk Defragmenter

- Open Defragment and Optimize Drives → Select disk → Optimize → Note fragmentation percentage before and after.

2.12. Conclusion

In this chapter, we have learned about the basic elements and services of the Windows operating system, a widely popular platform used by many people all over the world. In a Windows operating system, user management is done by multi-user accounts. The desktop with a taskbar, start button, and shortcut icons is a functional area that allows easy access to files and programs.

We also explained the concept of program windows and how to handle them effectively, including resizing and moving them, which is critical for working on the computer effectively and efficiently. Methods used in the handling of files and folders like creation, renaming, copying, and searching for files were also covered to ensure systematic storage of data by the user.

Finally, the chapter explained the important practices for maintaining a Windows computer, which included the use of antivirus protection, updates, secure passwords, backups, and system optimizers such as the Disk Defragmenter.

CHAPTER 3

MICROSOFT WORD

3.1. Introduction

Microsoft Word is software developed by Microsoft that is part of the Office suite, and it allows users to manage documents by creating, editing, and formatting them. Indeed, it can be used to create letters, reports, CVs, and books. The formatting options are numerous: users can choose fonts, change colors, adjust spacing and margins, and align text as they wish. All of this helps produce clean, clear, and well-organized documents.

Files are generally saved in the .docx format, which was introduced in more recent versions. This format is better compressed, more secure, and more compatible with other software. Word can also open older .doc files and allows exporting documents to formats such as PDF, RTF, or plain text, which makes sharing easier.

Word also offers additional tools, such as spelling and grammar checking, which help quickly identify errors. Automatic formatting saves time, and templates are very useful when users do not want to start from scratch. Users can add tables, insert images, create headers, footers, and page numbers. All of this reduces errors and improves productivity.

3.2. Starting Microsoft Word

Microsoft Word is a word-processing application used to create, edit, and format documents [12], [13], [14], [15].

3.2.1. Launching Microsoft Word

Microsoft Word can be opened in several ways:

- From the Start Menu → All Programs → Microsoft Office → Word,
- By typing Word in the Windows search bar and pressing Enter,
- By double-clicking an existing .docx file.

3.2.2. The Word Interface

When Word opens, it displays a Blank Document or a template. The main parts of the interface are:

- Title Bar: Displays the document name and the program name,
- Quick Access Toolbar: Contains frequently used commands (Save, Undo, Redo),

- Ribbon: Contains tabs (Home, Insert, Layout, etc.) with groups of commands,
- Document Area: The white area where you type and edit text.
- Status Bar: Shows page number, word count, language, and zoom level.

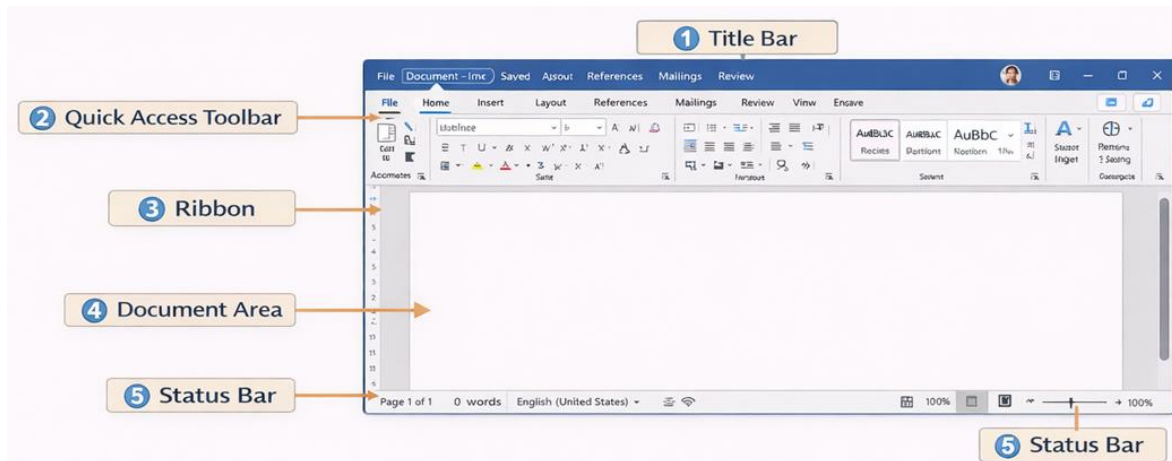


Figure 3.1: The Microsoft Word Interface

3.3. Creating and Saving a Document

3.3.1 Creating a New Document

- Click File → New,
- Choose Blank Document,
- Or use the shortcut Ctrl + N.

3.3.2. Saving a Document

The steps to follow to save a document are:

- Click File → Save As,
- Choose a location (Documents, Desktop, USB drive),
- Type a file name,
- Click Save.

Shortcut: Ctrl + S

3.4. Entering and Editing Text

3.4.1 Entering Text

- Click anywhere in the document area,
- Start typing using the keyboard,
- Press Enter to move to a new line.

3.4.2 Selecting Text

Selecting text allows to modify it.

- Click and drag the mouse to select text,
- Double-click to select a word,
- Triple-click to select a paragraph,
- Ctrl + A selects the entire document.

3.4.3. Editing Text

- Delete key removes text to the right,
- Backspace removes text to the left,
- Ctrl + Z: Undo last action,
- Ctrl + Y: Redo last action.

3.5. Formatting Text

Formatting improves the appearance of text.

3.5.1. Font Formatting

Font formatting is used to change how text looks, such as its font, size, style, and color, Figure 3.2.

- Change font size,
- Change font type (Arial, Times New Roman, etc.),
- Make text Bold (Ctrl + B), *Italic* (Ctrl + I), or Underline (Ctrl + U),
- Change text color.

3.5.2. Paragraph Formatting

Paragraph formatting allows you to organize and present text clearly and professionally by adjusting alignment, spacing, indentation, and using bullets or numbering to structure content effectively, see Figure 3.3.

- Align text: Left, Center, Right, Justify,
- Adjust line spacing,
- Add bullets or numbering,
- Increase or decrease indentation.

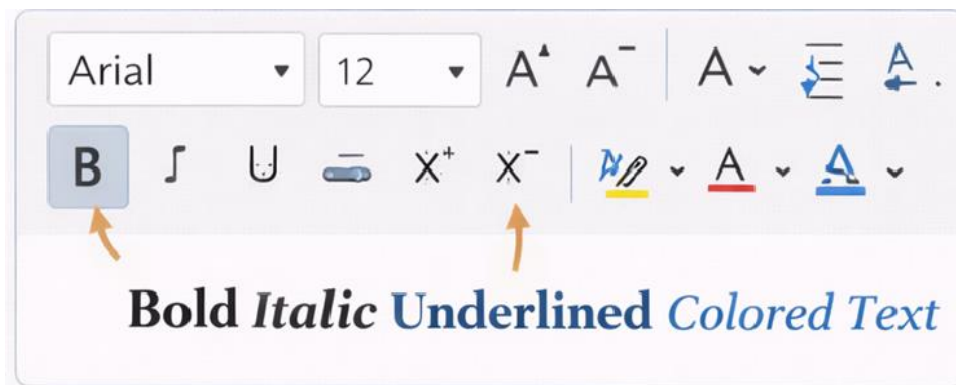


Figure 3.2 : Basic Text Formatting Tools

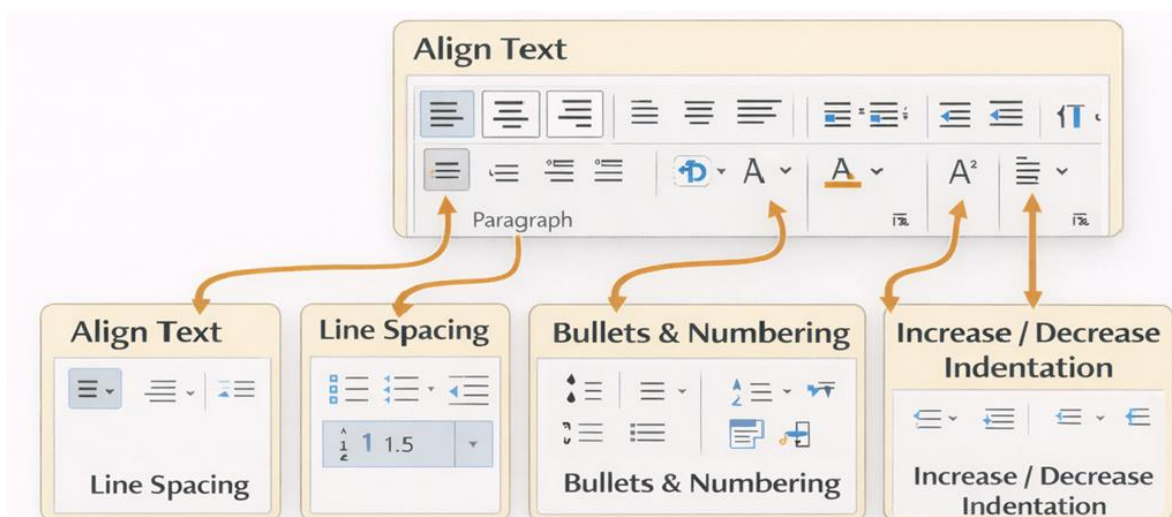


Figure 3.3: Paragraph Formatting Tools in Microsoft Word

3.6. Page Layout

Page layout controls how the document appears on paper.

- Set Margins,
- Choose Orientation (Portrait or Landscape),
- Set Paper Size,
- Add page breaks.

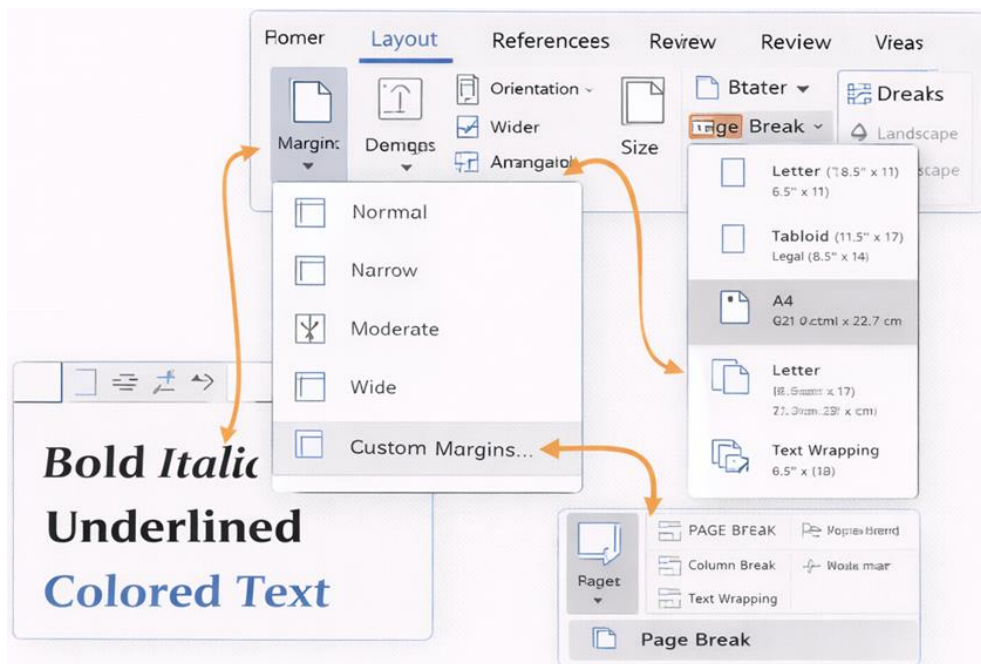


Figure 3.4: Page Layout Control

3.7. Inserting Elements

3.7.1 Inserting Images

- Click Insert → Pictures,
- Choose an image from the computer,
- Resize and move the image as needed.

3.7.2. Inserting Tables

- Click Insertion → Table,
- Select number of rows and columns,

- Tables are used to organize data clearly.

3.7.3. Inserting Headers and Footers

Headers and footers appear on every page.

- Used for titles, page numbers, dates,
- Insert via Insert → Header / Footer.

3.8. Spell Check and Grammar

Microsoft Word automatically checks spelling and grammar.

- Errors appear underlined (red or blue),
- Right-click on the word to see suggestions,
- You can also use Review → Spelling & Grammar.

3.9. Displaying File Extensions

By default, file extensions are hidden. To show them:

- Open File Explorer,
- Click View → Options,
- Go to View tab
- Uncheck Hide extensions for known file types,
- Click OK.

This helps identify real file types and avoid fake files.

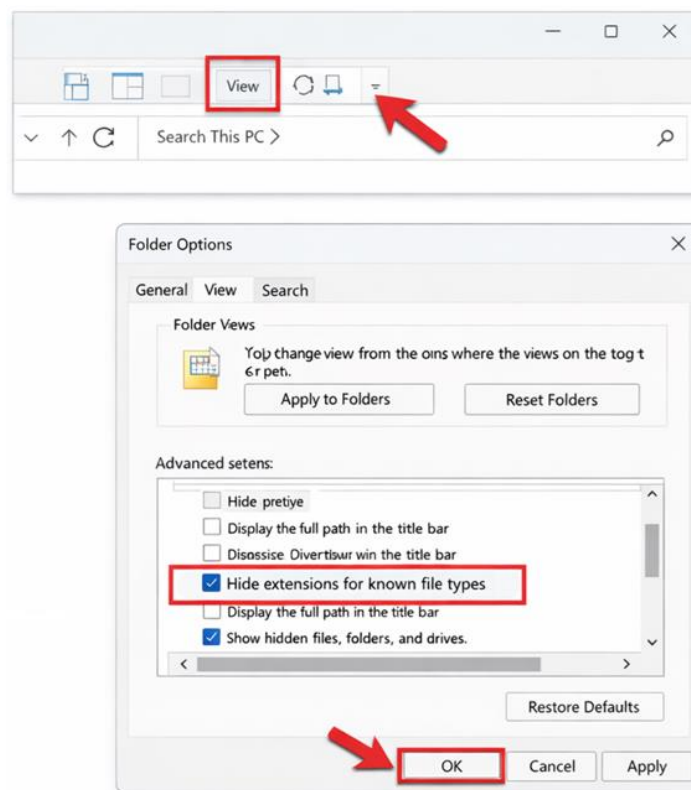


Figure 3.5: Displaying File Extensions

3.10. Printing a Document

To print a document, we can attend the following steps:

- Click File → Print,
- Choose printer,
- Select pages and number of copies,
- Click Print.

3.11. Closing Microsoft Word

- Click the Close (X) button,
- Or press Alt + F4,
- Always save your work before closing.

3.12. Exercises

3.12.1. Exercise 1

Economics is the art of managing a household well, of managing a person's assets, and by extension, of managing a country. More generally, economics is a social science that studies the production, allocation, distribution, and consumption of a society's wealth. The general principle underlying economics, particularly for limited or scarce resources, is profitability. It consists of consuming a minimum of resources to achieve a maximum of profits.

The definition of economics is not consensual. Its scope and content vary depending on the authors and schools of thought.

Questions:

1. Open a new Word document.
2. Save your file on the desktop under the name Economy.
3. Type the text above.
4. Use the spell checker to correct any mistakes.
5. Modify the formatting (font: Times New Roman, size 11, not bold).
6. Select the second sentence of the text and delete it.
7. Undo the last operation.
8. Select the third sentence of the text and move it to the end of the second paragraph.
9. Select the second sentence of the text and copy it to the end of the text.
10. Undo the previous two operations.
11. Justify the text.
12. Set the line spacing to 1.5.
13. Set paragraph spacing to 6 pt.
14. In the same file, type the following text:

Fields of investigation in economics:

- The production, distribution, and consumption of goods and services;

- The material means of human existence;
- Exchange systems regardless of their structures;
- The allocation of scarce resources.

a) Apply a numbered list to the points listed.

b) Undo the operation, then apply a bulleted list.

15. Reproduce the following table representing the main indicators of the Algerian economy and insert the title.

LE PRODUIT INTERIEUR BRUT (PIB en valeur)				
PIB	En Monnaie National	Milliards DA	18 575,8	20 259,0
PIB	En Dollars US	Milliards US \$	167,4	173,7
TAUX DE CROISSANCE (En volume)		%		
PIB			1,3	1,4
PIB HH			2,1	3,3
PIB HA			1,3	0,9
PIB HH HA			2,2	3,0

16. Reproduce this equation at the end of the file:

$$f(x) = \frac{\sqrt[3]{(x^2 - 3)(\sqrt{x} + 2)^2}}{\sum_{i=1,400} 2n_i (x^3 - n_i^3)}$$

17. Apply the following page layout: left margin 3 cm, top margin 3 cm, bottom margin 3 cm, right margin 2 cm.

18. Add a header and a footer.

19. Insert an image.

20. Insert the title “Economics” using WordArt.

3.12.2. Exercise 2

Part 1: Creating the Document

1. Create a new folder named “tp-word-econ” in the D: directory.
2. Open Microsoft Word and save the document as economic-growth.docx in D:\tp-word-econ.
3. Type the following text without any formatting:

Economic Growth

1 Introduction

Economic growth is the increase in the production of goods and services in an economy over a period of time. It is an important indicator of a country’s economic health and prosperity.

2 Factors Influencing Economic Growth

2.1 Capital Accumulation

Capital accumulation refers to the growth of physical assets like machinery, buildings, and infrastructure that contribute to production.

2.2 Labor Force

The size and quality of the labor force, including education and skills, play a vital role in economic growth.

2.3 Technology and Innovation

Technological advancements lead to higher productivity and new industries, fostering economic expansion.

3 Measuring Economic Growth

Economic growth is typically measured by the increase in Gross Domestic Product (GDP), which represents the total value of all goods and services produced in a country.

4 Conclusion

Sustainable economic growth improves living standards and provides resources for public services. Policymakers focus on enhancing the factors that promote long-term growth.

Part 2: Formatting

1. Center the main title “Economic Growth”, set the font size to 20 and color to dark blue.

2. Format the body text with:

- Font: Times New Roman
- Size: 12
- Color: black
- Alignment: Justified
- Line spacing: 1.5

3. Apply Heading 1 style to main sections and Heading 2 style to subsections.

4. Insert a SmartArt diagram illustrating the factors influencing economic growth.

5. Bold and italicize important terms like *GDP*, *capital accumulation*, and *technology*.

Part 3: Lists and Tables

A) In section 2, add the following bullet and numbered lists:

Factors influencing economic growth include:

- Capital accumulation
- Labor force
- Technology and innovation

Steps to measure economic growth:

1. Calculate GDP for the current year.
2. Calculate GDP for the previous year.
3. Compute the percentage change.

B) At the end of section 3, insert the following table:

Year	GDP (in billion USD)	Growth Rate (%)
2020	1500	-
2021	1650	10
2022	1750	6.06

Part 4: Finalization

1. Use the spell checker to correct any mistakes.
2. Add page numbers at the bottom center of each page.
3. Insert a header with Higher School of Economics and a footer with your name.
4. Insert a Table of Contents at the beginning of the document.

3.12.3. Exercise 3

1. Open Microsoft Word and create a new document.
2. Save the document on the desktop as: Student_Table
3. Insert a table with 4 columns and 5 rows.
4. In the first row, type the following headings:
 - Student Name
 - Subject
 - Score
 - Grade
5. Fill the table with any sample data.
6. Apply a Table Style of your choice.
7. Center the text in the Score and Grade columns.
8. Adjust column widths so that the table fits the page properly.
9. Add one row at the bottom of the table.
10. In the last row, merge the first two cells and type:
Average Score
11. Insert a formula to calculate the average of the scores.
12. Insert the title: Student Performance Report
13. Apply the Heading 1 style to the title.
14. Change the title color to dark blue.
15. Set the page orientation to Landscape.
16. Insert a header containing the document title.
17. Insert a footer with page numbers (centered).

3.13. Solution of exercises

3.13.1. Solution of exercise 1

1. Open a new Word document

- Click Start → Microsoft Word
- Choose Blank Document

2. Save your file on the desktop under the name *Economy*

- Click File → Save As → Desktop
- File name: Economy
- Click Save

(The file will be saved as *Economy.docx*)

3. Type the given text

4. Use the spell checker

- Click Review → Spelling & Grammar
- Correct any spelling or grammar mistakes suggested by Word

5. Modify the formatting

- Select the entire text (Ctrl + A)
- Font: Times New Roman
- Size: 11
- Make sure Bold is disabled

6. Delete the second sentence

- Select the sentence:

More generally, economics is a social science that studies...

- Press Delete

7. Undo the last operation

- Press Ctrl + Z

(The deleted sentence reappears)

8. Move the third sentence to the end of the second paragraph

- Select the sentence:

The general principle underlying economics...

- Cut it (Ctrl + X)
- Place the cursor at the end of the second paragraph
- Paste it (Ctrl + V)

9. Copy the second sentence to the end of the text

- Select the second sentence
- Copy (Ctrl + C)
- Place the cursor at the end of the text
- Paste (Ctrl + V)

10. Undo the previous two operations

- Press Ctrl + Z twice

(The text returns to its original structure)

11. Justify the text

- Select all text
- Click Home → Justify

(or press Ctrl + J)

12. Set line spacing to 1.5

- Select the text
- Click Home → Line and Paragraph Spacing → 1.5

13. Set paragraph spacing to 6 pt

- Select the text
- Click Layout → Spacing
- Set After = 6 pt

14. Type the text at the end of the document:

a) Apply a numbered list

- Select the four points
- Click Home → Numbering

b) Undo and apply a bulleted list

- Press Ctrl + Z
- Click Home → Bullets

15. Reproduce the table and insert the title

a. Type the table title (centered):

Main Indicators of the Algerian Economy

b. Click Insert → Table

c. Create the table with the same structure and data as provided

d. Fill in all rows and columns correctly

16. Reproduce the equation

- Click Insert → Equation
- Type the given equation exactly as required
- Place it at the end of the document

17. Apply page layout settings

- Click Layout → Margins → Custom Margins
- Set:
 - Left: 3 cm
 - Top: 3 cm
 - Bottom: 3 cm
 - Right: 2 cm
- Click OK

18. Add a header and footer

- Click Insert → Header

- Type the required header text
- Click Insert → Footer
- Type the footer text (e.g., your name or page number)

19. Insert an image

- Click Insert → Pictures
- Choose an image from your computer
- Resize and position it properly in the document

20. Insert the title “Economics” using WordArt

- Click Insert → WordArt
- Choose a style
- Type Economics
- Place it at the beginning of the document

3.13.2. Solution of exercise 2

Part 1: Creating the Document

1. Folder creation:

Consist to create a folder named tp-word-econ in your D: drive.

2. Document saving:

Open Microsoft Word, create a new document, and save it as economic-growth.docx inside D:\tp-word-econ.

3. Typing text:

The text should be typed exactly as provided, without formatting in this step.

Part 2: Formatting

1. Title formatting:

- Select the main title “Economic Growth”.
- Center align it (use the center alignment button or shortcut).
- Set font size to 20 pt.

- Change the font color to dark blue (choose a suitable dark blue from font color options).

2. Body text formatting:

- Select all the body text excluding the title.
- Set font to Times New Roman.
- Set font size to 12 pt.
- Set font color to black.
- Set alignment to Justify (so text is aligned evenly on both sides).
- Set line spacing to 1.5 lines (in Paragraph settings).

3. Heading styles:

- Select the main sections like “1 Introduction”, “2 Factors Influencing Economic Growth”, etc., and apply the Heading 1 style.
- Select subsections like “2.1 Capital Accumulation”, “2.2 Labor Force”, etc., and apply the Heading 2 style. This will format them consistently and allow easy creation of the table of contents.

4. Insert SmartArt diagram:

- Go to the Insert tab > SmartArt > choose a diagram type (e.g., “List” or “Cycle”).
- Create a diagram to represent factors influencing economic growth: Capital accumulation, Labor force, Technology and innovation.
- Place it in section 2 appropriately.

5. Text emphasis:

- Find important terms such as *GDP*, *capital accumulation*, *technology*, and format them by making the text bold and *italic*.
- This highlights key concepts for readers.

Part 3: Lists and Tables

A) Lists

- Insert a bulleted list for the factors in section 2:
 - Capital accumulation
 - Labor force
 - Technology and innovation
- Insert a numbered list for the steps to measure economic growth:
 1. Calculate GDP for the current year.
 2. Calculate GDP for the previous year.
 3. Compute the percentage change.

B) Table

- Insert a table with 3 columns and 4 rows at the end of section 3.
- Fill the cells with the provided data:

Year	GDP (in billion USD)	Growth Rate (%)
2020	1500	-
2021	1650	10
2022	1750	6.06

- Format the table to have visible borders and centered text in header row.

Part 4: Finalization

1. Spell checking:
 - Use the Review tab > Spelling & Grammar to check for any typos or mistakes.
 - Correct any issues found before finalizing.

2. Page numbers:

- Go to Insert > Page Number > choose “Bottom of Page” and center alignment.

3. Header and footer:

- Insert a header:
 - Go to Insert > Header, and type *National Economics Institute*.
- Insert a footer:
 - Go to Insert > Footer, and type your name.

4. Table of Contents:

- Place the cursor at the very beginning of the document (before the main title).
- Go to References > Table of Contents > select an automatic style.
- This will generate a Table of contents based on Heading 1 and Heading 2 styles.

3.13.3. Solution of exercise 3

1. Open Microsoft Word and create a new document

- Click the Start menu.
- Open Microsoft Word.
- Click Blank Document.
- A new empty document appears.

2. Save the document on the desktop as: Student_Table

- Click File → Save As.
- Choose Desktop.
- In the File name field, type:
- Student_Table

- Click Save.

3. Insert a table with 4 columns and 5 rows

- Click the Insert tab.
- Click Table.
- Select 4 columns × 5 rows.
- The table is inserted into the document.

4. In the first row, type the following headings

- Click in the first row of the table.
- Type the headings as follows:

Column 1: Student Name

Column 2: Subject

Column 3: Test

Column 4: Grade

5. Fill the table with any sample data

Enter sample data in rows 2 to 5, for example:

Student Name	Subject	Test	Grade
Ali	Math	15	13
Sara	Economic	18	15
Omar	English	14	15
Lina	Computer Science	16	14.5

6. Apply a Table Style of your choice

- Click anywhere inside the table.
- Go to Table Design.
- Choose a style from the Table Styles gallery.
- The table format is applied automatically.

7. Center the text in the Test and Grade columns

- Select the Test column.
- Hold Ctrl and select the Grade column.

- Go to Home → Center Alignment.
- Text in both columns is centered.

8. Adjust column widths so that the table fits the page properly

- Click inside the table.
- Drag the column borders using the mouse

OR

- Go to Layout → AutoFit → AutoFit to Window.

9. Add one row at the bottom of the table

- Click in the last row of the table.
- Go to Layout → Insert Below.
- A new row appears at the bottom.

10. In the last row, merge the first two cells and type: Average Test

- Select the first two cells of the last row.
- Click Layout → Merge Cells.
- Type: Average Test.

11. Insert a formula to calculate the average of the tests

- Click in the Test cell of the last row.
- Go to Layout → Formula.
- In the formula box, type:
- =AVERAGE(ABOVE)
- Click OK.

Word calculates the average test automatically.

12. Insert the title: Student Performance Report

- Place the cursor above the table.
- Type: Student Performance Report

13. Apply the Heading 1 style to the title

- Select the title text.
- Go to Home → Styles.
- Click Heading 1.

14. Change the title color to dark blue

- Select the title.
- Click Font Color in the Home tab.
- Choose Dark Blue.

15. Set the page orientation to Landscape

- Go to Layout.
- Click Orientation → Landscape.
- The page changes to landscape mode.

16. Insert a header containing the document title

- Go to Insert → Header.
- Choose a simple header style.
- Type: Student Performance Report.
- Click Close Header and Footer.

17. Insert a footer with page numbers (centered)

- Go to Insert → Footer.
- Choose a footer style.
- Click Page Number → Bottom of Page → Center.
- Page numbers appear centered at the bottom.

3.6. Conclusion

The word processing software Microsoft Word provides users with advanced features to create professional documents which professionals use for their work. This chapter presents the Word interface together with its basic text input system and its primary formatting tools which enable users to create clear informational displays.

It presents how to format text and paragraphs, create and manage tables, insert images, headers, footers, and page numbers, and apply page layout settings such as margins and orientation. The document uses styles and lists and WordArt to achieve document consistency through better readability while which spell check and formulas provide users with accurate yet efficient document creation capabilities.

Users who master these basic features will be able to create documents which maintain proper organization and visual appeal and complete accuracy for their educational work and professional tasks and personal use. Microsoft Word functions as a necessary tool which supports effective writing throughout all forms of written work.

CHAPTER 4

MICROSOFT POWER POINT

4.1. Definition

Microsoft PowerPoint is presentation software which Microsoft developed as part of its Microsoft Office product line. It allows users to create presentations made up of slides. Each slide can contain text, images, charts, tables, audio, video, and animations.

PowerPoint is widely used in:

Educational institutions for lessons and lectures and student presentations

Businesses use it for their meetings and reporting and project proposal needs

PowerPoint files are saved with the extension .pptx.

4.2. Starting Microsoft PowerPoint

To start PowerPoint:

- Click on the Start menu, then select Microsoft PowerPoint, or
- Double-click an existing PowerPoint file.

When PowerPoint opens, it shows:

- A Blank Presentation, which is an empty file,
- Or templates, which are pre-designed presentations.

Templates help save time and ensure a professional appearance.

4.3. The PowerPoint Interface

The PowerPoint interface has been made simple and intuitive to help users efficiently create and manage presentations [12], [16], [17], [18]. Through it, one can get all the tools necessary to design slides, insert content, apply visual effects, and control slide shows, see figure 4.1. Knowing the various components of the PowerPoint interface becomes an essential part of those who work quickly and effectively with presentations. It contains:

4.3.1. Title Bar

The Title Bar is located at the top of the window. It displays:

- The name of the presentation,
- The name of the program (Microsoft PowerPoint).

4.3.2. Quick Access Toolbar

This small toolbar is located at the top-left corner. It contains frequently used commands such as:

- Save
- Undo
- Redo

Users can customize it by adding more commands.

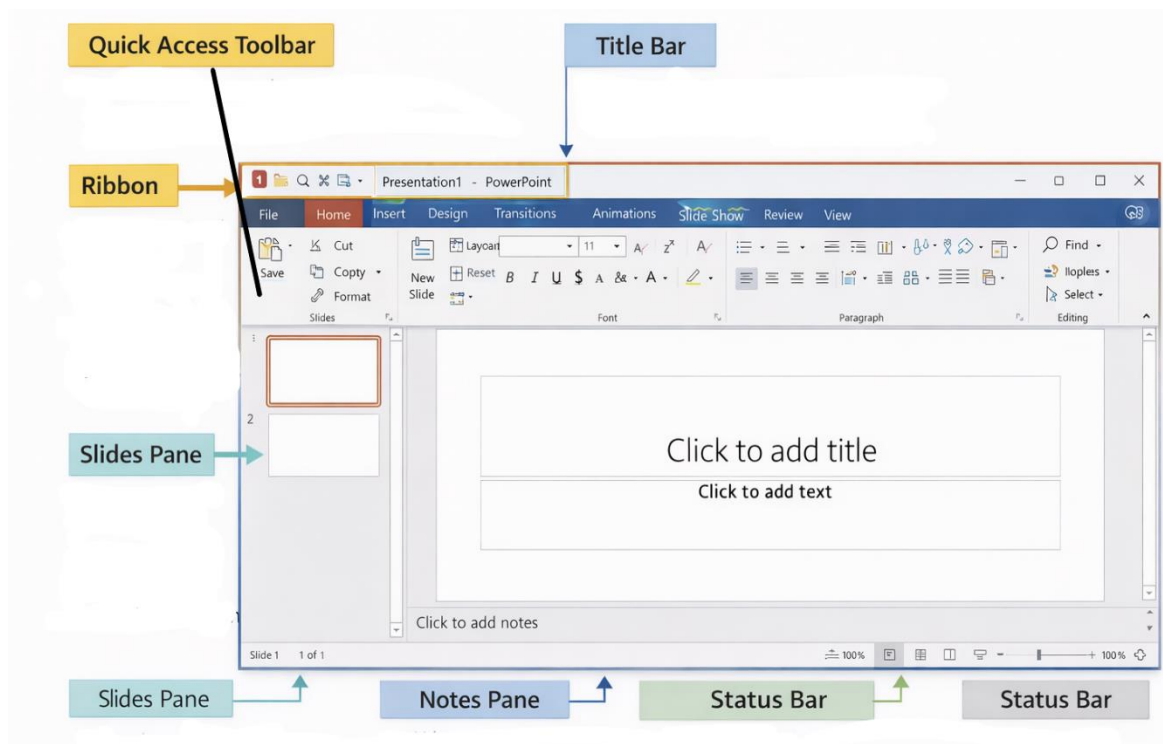


Figure 4.1: PowerPoint Interface

4.3.3. Ribbon

The Ribbon is the main command area. It is divided into tabs, each containing related tools:

- Home: Text formatting, slide layout, clipboard tools.
- Insert: Add pictures, tables, charts, shapes, audio, and video.
- Design: Themes and background styles.
- Transitions: Effects between slides.

- Animations: Motion effects for objects.
- Slide Show: Presentation controls.
- Review: Spell check and comments.
- View: Different views of the presentation.

4.3.4. Slides Pane

This pane appears on the left side. It shows thumbnails of all slides, allowing you to:

- Navigate between slides,
- Reorder slides,
- Delete slides easily.

4.3.5. Slide Area

This is the central area of the screen. It is where you:

- Type text,
- Insert images and objects,
- Design the content of each slide.

4.3.6. Notes Pane

Located below the slide area. It is used to write speaker notes, which help the presenter remember key points during the presentation.

4.3.7. Status Bar

Located at the bottom of the window. It displays:

- Slide number,
- View options,
- Zoom controls.

4.4. Creating and Managing Slides

Creating and managing slides in Microsoft PowerPoint helps organize information clearly and logically. Users can add, delete, and rearrange slides using predefined layouts to present content effectively, see figure 4.2. Proper slide management improves the flow and professionalism of the presentation.

4.4.1. Adding a New Slide

To add a slide:

- Go to Home → New Slide
- Choose a slide layout (Title Slide, Title and Content, Two Content, etc.)

Layouts define where text and objects will appear.

4.4.2. Deleting a Slide

- Select the slide thumbnail,
- Press the Delete key.

4.4.3. Reordering Slides

- Click and drag a slide thumbnail to a new position.

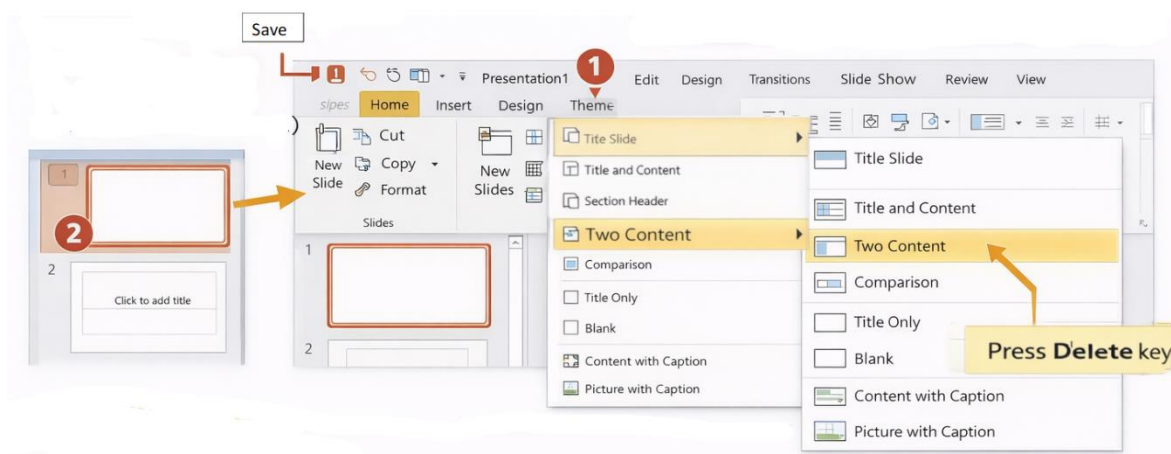


Figure 4.2: Creating and Managing Slide.

4.5. Working with Text

Working with Text is a fundamental feature in Microsoft PowerPoint that allows users to present information clearly and effectively on slides. It involves adding text to slides and formatting it properly to improve readability and visual appeal.

4.5.1. Adding Text

Text can be added by:

- Clicking inside a text placeholder,
- Or inserting a Text Box (Insert → Text Box).

4.5.2. Formatting Text

You can modify text by:

- Changing font type,
- Changing font size,
- Applying Bold, Italic, Underline,
- Changing text color,
- Aligning text,
- Adding bullets or numbering.

Formatting improves readability and visual clarity.

4.6. Inserting Objects

4.6.1. Pictures

- Insert → Pictures → From device

Pictures make slides more attractive and informative.

4.6.2. Shapes

- Insert → Shapes

Shapes are used for diagrams, arrows, and flowcharts.

4.6.3. Charts

- Insert → Chart

Charts are used to represent data visually (bar, pie, line, etc.).

4.6.4. Tables

- Insert → Table

Tables organize information into rows and columns.

4.7. Slide Design and Themes

4.7.1. Themes

Themes are pre-designed styles that control:

- Colors,

- Fonts,
- Backgrounds.

To apply a theme:

- Design → Choose a theme.

4.7.2. Background Formatting

The slide background can be customized by:

- Applying colors,
- Adding images,
- Using gradients.

4.8. Transitions Between Slides

Transitions are visual effects that occur when moving from one slide to another.

To apply:

- Select a slide,
- Go to Transitions,
- Choose an effect,
- Set duration and sound if needed.

4.9. Animations

Animations apply to objects within a slide.

Steps:

1. Select the object,
2. Go to Animations,
3. Choose an animation effect,
4. Adjust timing using the Animation Pane.

Animations should be used moderately.

4.10. Slide Show Mode

4.10.1. Starting the Presentation

- Press F5 to start from the beginning,
- Press Shift + F5 to start from the current slide.

4.10.2. Navigation

- Click the mouse or use arrow keys,
- Press Esc to exit.

4.11. Notes and Printing

4.11.1. Speaker Notes

Speaker notes help the presenter remember key ideas without displaying them to the audience.

4.11.2. Printing Options

It is possible to print:

- Slides,
- Notes pages,
- Handouts (multiple slides per page).

4.12. Saving and Exporting

4.12.1. Saving

- File → Save or Save As,
- Choose file location and name.

4.12.2. Exporting

You can export presentations as:

- PDF,
- Video.

4.13. Good Presentation Practices

- Keep slides simple,

- Use short bullet points,
- Use readable fonts,
- Avoid excessive animations,
- Use images to support content.

4.14. Exercises

4.14.1. Exercise 1

1. Launch the presentation software MS PowerPoint.
2. Save your presentation in the following location: MyDocuments\Eco\Sheet4.
3. Create the following 4 slides:

Slide 1 :

Main Internet services or functions • Access to information sites via the World Wide Web (WWW). • Electronic mail (Email). • File transfer (FTP function).

Slide 2 :

Access to information sites in mode (WWW).	
(Word Wide Web) is a distributed information system based on hypertext documents.	image place

Slide 3 :

Electronic mail (Email)	
A service that enables the exchange of electronic messages or documents between users of local and long-distance networks (notably the Internet).	image place

4. At the beginning of this presentation, add a slide containing a title and a subtitle:

- a. Title: "Internet Services"
 Subtitle: "This presentation is prepared by [First Name Last Name], 1st Year"
 - b. Insert images of your choice into slides 3 and 4.
 - c. Apply a theme of your choice to your presentation.
 - d. Insert a text box in the first slide with the text "Click here". The content of this text box will serve as a hyperlink to the second slide.
5. Apply the following animations to the objects on your slides:
- a. Titles: "Entrance Effect" → "Blinds"
 - b. Text: "Entrance Effect" → "Checkerboard"
 - c. Images: "Emphasis Effect" → "Spin"
6. Apply a Wipe transition to all slides in your presentation.
7. Preview your work.

4.14.2. Exercise 2

Part 1: Creating the Presentation

1. Create a new folder named "tp-pp-[your-name]" in the D: drive. Launch Microsoft PowerPoint and save the file as basic-economics.pptx in: D:\tp-pp-[your-name].
2. The objective is to create a presentation about Basic Economics Concepts containing 8 slides.
3. Analyze the PowerPoint interface and identify its main elements (Title Bar, Ribbon, Slides Pane, Slide Area, Status Bar).
4. On the first slide:
 - Title: Introduction to Economics
 - Subtitle: Prepared by [First Name Last Name], 1st Year
5. Choose a theme suitable for an academic presentation. Check font type, size, and alignment of titles and body text.

6. Insert a second slide titled “Outline” and add an unordered list of the presentation sections.
7. Insert a third slide titled “What Is Economics?” and write a short paragraph defining economics.
8. On the fourth slide titled “Branches of Economics”, insert:
 - A bulleted list (Microeconomics, Macroeconomics, International Economics)
 - A SmartArt diagram to represent the branches.
9. Insert a fifth slide titled “Economic Resources” and add:
 - An ordered list (Land, Labor, Capital, Entrepreneurship)
 - One relevant image.
10. On the sixth slide titled “Supply and Demand”, insert:
 - A table with 3 columns and 4 rows
 - Merge the first row to create a table title
 - Format headers in bold and apply colors.
11. Insert a seventh slide titled “Market Types”, then:
 - Add two images side by side (e.g., perfect competition and monopoly)
 - Insert short captions under each image.
12. Finish with a slide titled “Conclusion” containing:
 - A boxed paragraph summarizing the importance of economics
 - A different background color and contrasting text color.
13. Run your presentation using Slide Show → From Beginning or F5.

Part 2: Animations

1. Apply animations on the Branches of Economics slide so that elements appear sequentially.
2. Experiment with the following options:
 - On Click

- With Previous
- After Previous
- Duration
- Delay

Part 3: Transitions

1. Apply a transition effect to slides 2 and 3:
2. Remove the transition from slide 3.

Part 4: Other Options

1. Insert slide numbers.
2. Add a footer with your full name.
3. Create hyperlinks from each item in the Outline slide to its corresponding slide.
4. Add a comment to the slide titled *Supply and Demand*.
5. Using Slide Master:
 - Change all titles to Times New Roman
 - Set title color to dark green.
6. Save the presentation as a PDF file.
7. Protect the presentation with a password.

4.15. Solution of exercises

4.15.1. Solution of exercise 1

1. Launch the presentation software MS PowerPoint

- Click on the Start menu.
- Type PowerPoint in the search bar.
- Click Microsoft PowerPoint to open the software.

2. Save your presentation in the following location:

MyDocuments\Eco\Sheet4

- Click File → Save As.
- Select Documents (MyDocuments).
- Open the folder Eco (create it if it does not exist).
- In the file name field, type Sheet4.
- Click Save.

3. Create the following 4 slides

- Click Home → New Slide until you have 4 slides.
- Use appropriate layouts such as Title and Content.

4. At the beginning of this presentation, add a slide containing a title and a subtitle

- Click on Slide 1 in the Slides Pane.
- Go to Home → New Slide.
- Choose the Title Slide layout.
- This slide becomes the new Slide 1.

a. Enter the title and subtitle

- In the Title box, type: Internet Services
- In the Subtitle box, type:
This presentation is prepared by [First Name Last Name], 1st Year

b. Insert images of your choice into slides 3 and 4

- Click on Slide 3 in the slide thumbnails (left side).
- Go to the Insert tab.
- Click Pictures → choose This Device (or Online Pictures).
- Select an image related to the Internet (e.g., WWW, email, network).
- Click Insert and resize the image if needed.
- Repeat the same steps for Slide 4, choosing another suitable image.

c. Apply a theme of your choice to your presentation

- Click on any slide.
- Go to the Design tab.
- Choose a theme from the available themes (e.g., *Office*, *Facet*, *Ion*).
- Click on the theme → it is automatically applied to all slides.

d. Insert a text box in the first slide and create a hyperlink to Slide 2

- Click on Slide 1.
- Go to Insert → Text Box.
- Draw the text box on the slide.
- Type the text: Click here
- Select the text Click here.
- Right-click → choose Link (or Insert → Link).
- In the dialog box, select Place in This Document.
- Choose Slide 2.
- Click OK.

Slide contents

Slide 2: Main Internet Services or Functions

Layout: Title and Content

Title: Main Internet Services or Functions

Content:

- Access to information sites via the World Wide Web (WWW)
- Electronic mail (Email)
- File transfer (FTP function)

Slide 3: Access to Information Sites (WWW)

Layout: Title and Content

Title:

Access to Information Sites (WWW)

Content:

The World Wide Web (WWW) is a distributed information system based on hypertext documents.

It allows users to access information through websites using a web browser.

Image:

- Go to Insert → Pictures
- Choose an image related to the World Wide Web
- Insert the image in the content area.

Slide 4: Internet Services Illustration

Layout: Two Content or Picture with Caption

Title: Internet Services Illustration

Text:

Internet services help users communicate, share information, and access online resources efficiently.

Image:

- Insert an image representing email, file transfer, or internet network

5. Apply animations

a) Titles

- Select each slide title.
- Go to Animations → Add Animation → Entrance → Blinds

b) Text

- Select text paragraphs or bullet points.
- Go to Animations → Add Animation → Entrance → Checkerboard

c) Images

- Select each image.
- Go to Animations → Add Animation → Emphasis → Spin

6. Apply transitions

- Click on any slide.
- Go to Transitions tab.
- Choose Wipe.

- Click Apply to All.

7. Preview your presentation

- Go to Slide Show → From Beginning
or
- Press F5 on the keyboard.
- Check:
 - Animations
 - Transitions
 - Hyperlink functionality

4.15.2. Solution of exercise 2

Part 1: Creating the Presentation

1. Create a new folder named “tp-pp-[your-name]” in the D: drive. Open File Explorer.

- Go to This PC → D: drive.
- Right-click → New → Folder.
- Rename the folder: tp-pp-[your-name]
- Open Microsoft PowerPoint.
- Click File → Save As → Browse.
- Navigate to D:\tp-pp-[your-name].
- File name: basic-economics.pptx
- Click Save.

2. The presentation must contain exactly 8 slides:

1. Title slide
2. Outline
3. What Is Economics?
4. Branches of Economics
5. Economic Resources
6. Supply and Demand
7. Market Types

8. Conclusion

3.

- Title Bar: Displays the presentation name and PowerPoint.
- Ribbon: Contains tabs (Home, Insert, Design, Animations, etc.).
- Slides Pane: Shows slide thumbnails on the left.
- Slide Area: Central area where slide content is created.
- Status Bar: Displays slide number, view buttons, and zoom tools.

4. On the first slide:

- Insert a Title Slide.
- Click in the title placeholder and type:
Introduction to Economics
- Click in the subtitle placeholder and type:
Prepared by [First Name Last Name], 1st Year

5. Choose a theme suitable for an academic presentation. Check font type, size, and alignment of titles and body text.

- Go to Design tab.
- Choose a simple academic theme (e.g., Office, Facet, or Ion).
- Ensure:
 - Titles are centered and larger than body text.
 - Body text is readable and well aligned.

6. Insert a second slide titled “Outline” and add an unordered list of the presentation sections.

- Click Home → New Slide → Title and Content.
- Title: Outline
- Insert an unordered list:
 - What Is Economics?
 - Branches of Economics
 - Economic Resources
 - Supply and Demand

- Market Types
- Conclusion

7. Insert a third slide titled “What Is Economics?” and write a short paragraph defining economics.

- Insert a new Title and Content slide.
- Title: What Is Economics?
- Text example:

Economics is a social science that studies how individuals and societies use limited resources to satisfy unlimited needs.

8. On the fourth slide titled “Branches of Economics”, insert:

- Insert a new slide.
- Title: Branches of Economics
- Bulleted list:
 - Microeconomics
 - Macroeconomics
 - International Economics
- Go to Insert → SmartArt → Relationship or Hierarchy.
- Add the three branches in the diagram.

9. Insert a fifth slide titled “Economic Resources” and add:

- Insert a new slide.
- Title: Economic Resources
- Ordered list:
 1. Land
 2. Labor
 3. Capital
 4. Entrepreneurship
- Insert an image via Insert → Pictures.
- Resize and position it properly.

10. On the sixth slide titled “Supply and Demand”, insert:

- Insert a new slide.
- Title: Supply and Demand
- Go to Insert → Table → 3 columns × 4 rows.
- Select first row → Layout → Merge Cells.
- Type table title: Supply and Demand Overview
- Format column headers in bold and apply background color.

11. Insert a seventh slide titled “Market Types”, then:

- Insert a new slide.
- Title: Market Types
- Insert two images (Perfect Competition / Monopoly).
- Place them side by side.
- Add text boxes below each image for captions.

12. Finish with a slide titled “Conclusion” containing:

- Insert a new slide.
- Title: Conclusion
- Insert a Text Box and type a summary paragraph.
- Add a shape around the text.
- Change background color via Design → Format Background.
- Use contrasting text color.

13. Run your presentation using Slide Show → From Beginning or F5.

- Press F5 or
- Click Slide Show → From Beginning
- Check animations, transitions, layout, and readability.

Part 2: Animations

1. Apply animations on the Branches of Economics slide so that elements appear sequentially.

- Select each list item and SmartArt element.
- Go to Animations → Add Animation → Entrance.
- Use On Click so elements appear one after another.

2. Experiment with animation options.

- On Click: Element appears when clicked.
- With Previous: Appears at the same time as previous animation.
- After Previous: Appears automatically after previous.
- Duration: Controls animation speed.
- Delay: Adds waiting time before animation starts.

Part 3: Transitions

1. Apply a transition effect to slides 2 and 3.

- Select Slide 2.
- Go to Transitions.
- Choose a transition (e.g., Fade).
- Preview it.
- Repeat for Slide 3.

2. Remove the transition from slide 3.

- Select Slide 3.
- Go to Transitions → None.

Part 4: Other Options

1. Insert slide numbers.

- Insert → Slide Number → Apply to All

2. Add a footer with your full name.

- Insert → Header & Footer
- Type your full name → Apply to All

3. Create hyperlinks from each item in the Outline slide to its corresponding slide.

- Select outline text.
- Insert → Link → Place in This Document
- Choose the correct slide.

4. Add a comment to the slide titled “Supply and Demand”.

- Select the slide.
- Review → New Comment
- Type your comment.

5. Using Slide Master:

- View → Slide Master
- Change all titles to Times New Roman
- Set title color to dark green
- Close Slide Master.

6. Save the presentation as a PDF file.

- File → Save As → PDF
- Click Save.

7. Protect the presentation with a password.

- File → Info → Protect Presentation → Encrypt with Password
- Enter and confirm password.

4.16. Conclusion

Microsoft PowerPoint is an incredibly capable and popular software for presentations, which has become an integral part of effective communication. It helps users to arrange their thoughts in a clear way and convey their message visually and methodically. Knowing how to create slides, format text and features, design backgrounds, use transitions and animations, allows one to make presentations of high-quality and attractive.

PowerPoint finds its application in a variety of sectors such as education, business, and research where the necessity of delivering clear and convincing presentations is a common factor. It is very helpful to the user and also the audience if one uses the layouts, visuals, and animation effects in an appropriate manner. If one decides to use PowerPoint wisely, it is no longer just a tool for creating slides but it can help you tell the story and persuade the audience.

To sum up, having proficient PowerPoint abilities provides the user with the means to share ideas coherently, improve public speaking, and present information with assurance in academic as well as professional settings.

General Conclusion

Reading the fundamentals of computer science provide insight into a rich, complex subject with interacting evolutionary principles, ideas and techniques that allow one to push for effective information processing. We have learned that computer science is not only the use of computers but a wide ranging discipline, from theoretical approach to practical application onward to deep understanding of hardware devices. Through the study of computer architecture, we were able to figure out how the physical parts, such as the processor, memory, and input/output devices, work together to execute instructions and manipulate data. The hardware organization at its core is based on the binary representation of information, which is a necessary support that guarantees compatibility, accuracy, and speed of operations. The learning of numeral systems, mainly conversions between binary, octal, and hexadecimal, made us realize how these representations are indispensable for reading, programming, and troubleshooting computer systems.

We have not limited ourselves to technical concepts only, but we have also talked about software ecosystems that greatly depend on operating systems such as Windows, which are the user-machine interface, and on office software like Word and PowerPoint, that are good examples of the practical and everyday application of computer science concepts. These devices make technology available, simple, and handy in different settings, from creating a document to presenting an idea. Knowing the fundamentals in great detail is very important as they are the basis for all the upcoming innovations and developments in computer science. It not only helps better control of the current technologies but also positions one as a hardware and software system designer or improver who can play an active role.

This handout, in fact, is just an introduction to a more in-depth study of numerous computer science branches. Being skilled in the basics outlined here is a mandatory move to handle these areas with the right spirit and effectiveness. Therefore, computer science, by its capacity to convert information into knowledge and action, is a crucial element of today's society. This handout is an attempt to equip the student with the conceptual and practical means needed to move in this complicated and always changing universe and to become a knowledgeable and competent member of the field.

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