Computer Science 1: IT and web
Info1: Informatique et web

coefficient: 2
credit: 3
continuous control weight: 50%
exam weight: 50%

Mrs HamzaCherif Souaad

- **Course program**
  - Introduction to computers (Soft / Hard) and web
  - Number systems
  - Information representation and coding
  - Introduction to programming languages
  - Embedded systems

Computer practical work

- PW 1: Introduction to Microsoft Teams;
- PW 2: Presentation of the main organs of a computer and installation of an operating system on a machine;
- PW 3: Editing texts and writing reports using Microsoft Word;
- PW 4: Manipulating spreadsheets using Microsoft Excel;
- PW 5: Making presentations using Microsoft PowerPoint

Web practical work

- PW 1: Introduction to HTML language;
- PW 2: Displaying Tables and Forms on an HTML page;
- PW 3: Frames;
- PW 4: Modifying styles: CSS;
- PW 5: Creating a static website using HTML and CSS.

Course 1:

Introduction to computers (Soft / Hard) and web

1-Introduction to computers and computings

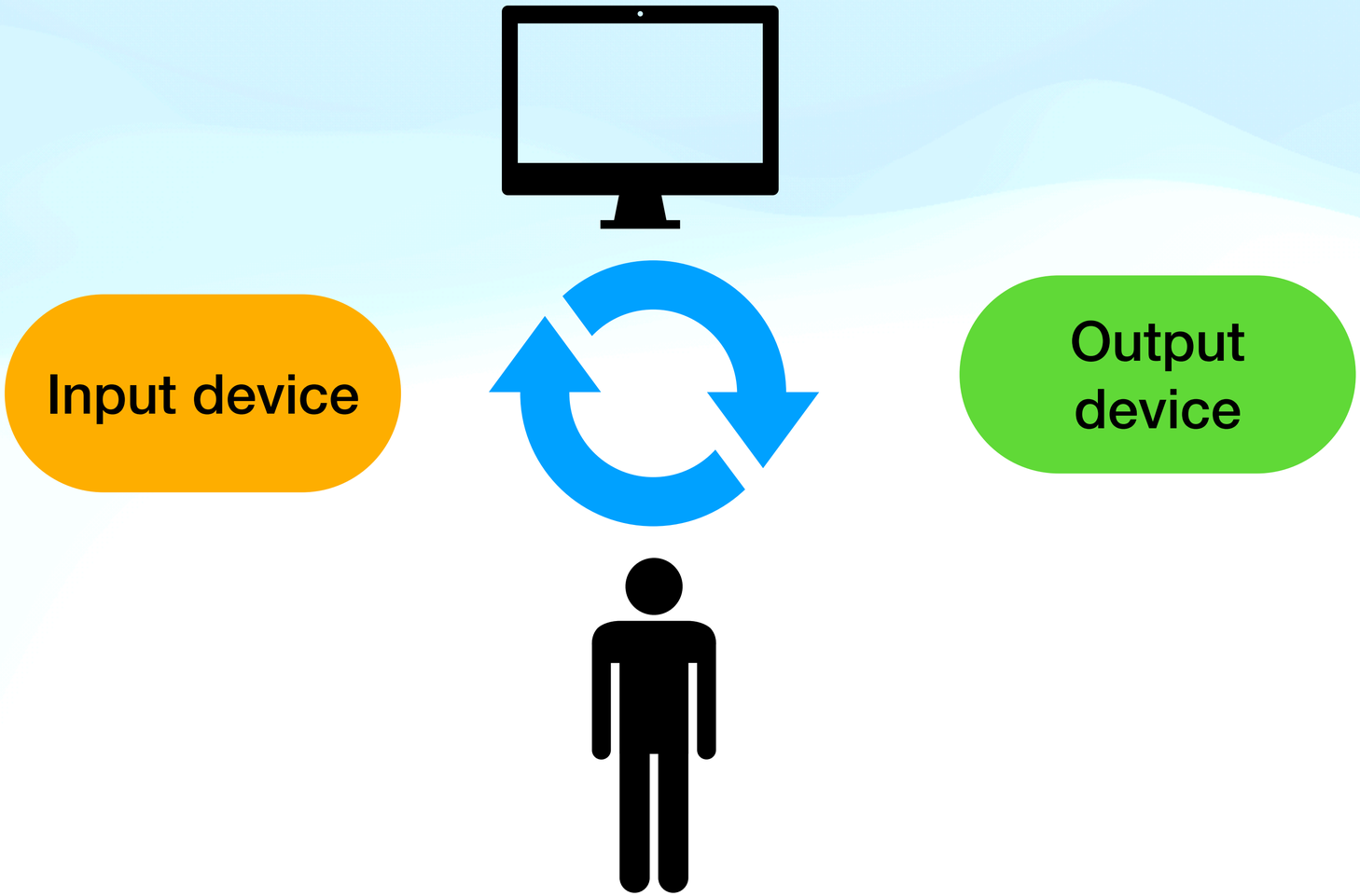
1.1 Computing’s definitions

- Information technology (computing, Computer science) are the study and use of electronic systems and computers for storing, analyzing and utilizing information.
- Computing is the science which deals with the automatic processing of information through the use of machines commonly called "computers".

1.2 Computer's definition (PC or personal computer)

A computer is a machine capable of automatically processing data (information) entered as input (through input devices), on the basis of a program which defines the sequence of operation to perform (instructions) and renders (output devices) results.

1.2 Computer's definition (PC or personal computer)

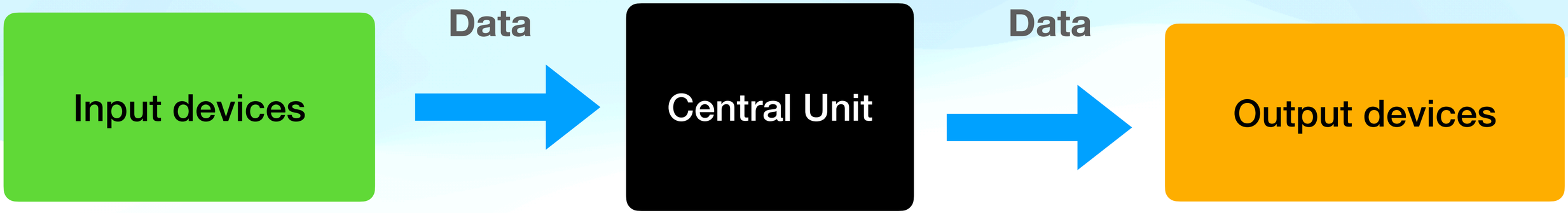


2-Computer’s component: Hardware and Software

2.1 Hardware

- These are the material parts that make up the computer and its accessories, each component has a particular function,
- Computer systems consist of three components : **Central Unit, Input devices and Output devices**. Input devices provide data input to processor, which processes data and generates useful information that’s displayed to the user through output devices.

2.1 Hardware



2.1.1 Central Unit

- It is a box containing all of the internal elements of the PC which is used to save, process and restore data by executing the instructions of the current program

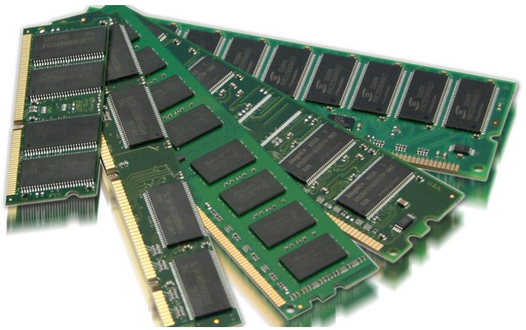
2.1.1 Central Unit

- The most important element in CU are: Motherboard, hard disk, Central Memory(Random Access Memory RAM) Graphic card, (network card, sound card .. etc),

- **Motherboard**
  - A motherboard is the main printed circuit board in a machine’s chassis. It distributes electricity and facilitates communication between and to the central processing unit (CPU), random access memory (RAM), and any other component of the computer’s hardware.

- **Processor**
  - A processor (also called a microprocessor or CPU for Central Processing Unit) is the heart of the computer, this component was invented by Intel (model 4004) in 1971, it is responsible for processing information and executing instructions, characterizing by its clock speed measured in hertz HZ (speed of execution of instructions).

- **Central memory (Random Access Memory RAM)**
  - Memory comes in the form of electronic components having the capacity to retain and restore information in a temporary (volatile) manner, SDRAM, DDRAM, DDRAM2, etc.



- **Hard disk**
  - The hard drive is the organ of the PC used to store data permanently, even when the PC is turned off, unlike the central memory, which is erased each time the computer is restarted, this is the reason for which we speak of mass memory, its capacity expressed in Giga Byte.

- **Graphic card :**
  - It converts raw digital data into data that can be displayed on a device intended for this purpose (screen, video projector, etc.).

2.1.2 Inputs device

- Organs and devices used to collect information which is then transformed (digitized and binary coded) to be usable by the central unit by being transferred to the central memory…).

2.1.2 Inputs device

- Keyboard: AZERTY(French)/QWERTY(English),

- Optical mouse

- CD/DVD player

- Modem: Adsl, router, Wifi….

2.1.3 outputs device

- These are devices that transmit binary information from the central unit to the outside in a form understandable by the human user.

2.1.3 outputs device

- Screen: cathode ray tube, Tft (flat screen),

- Printer: inkjet, laser,

- CD/DVD burner,

- Loud speaker ,

2.2 Software

- This name refers to the set of programs that allow users to work with a computer.
- A program is a sequence of instructions, written in a programming language, executed by a computer, allowing it to process a problem and return results.
- There are 3 types of software: operating systems, user software, and drivers

2.2.1 Operating system

- The operating system is “system” software that contains all the instructions and information intermediate between the computer hardware and the application software.

2.2.1 Operating system

- Microsoft's Windows family: 

- The Apple Mac Os family: 
- Linux: open source. 

- And others like for smart phones 

2.2.2 User software

- It’s divided into two categories: standard software and specific software.

2.2.2 User software

- **Standard software:**
  - Commercial programs, intended for wide use, Microsoft office: Word, Excel,…..

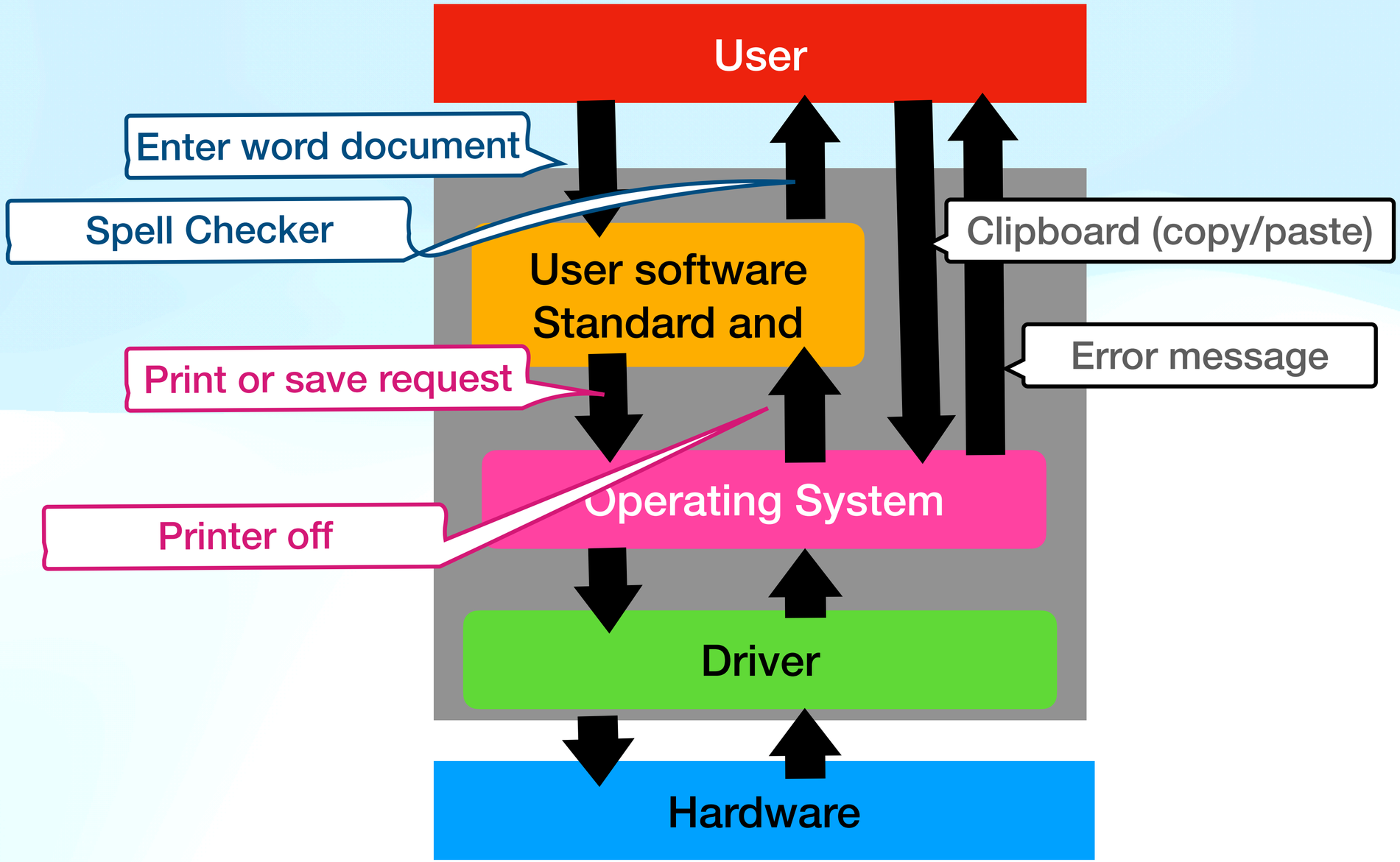
2.2.2 User system

- **Specific software:**
  - Application software or computer application contains instructions and information relating to an automated activity, developed especially for a company, it may be a production or management activity (postal software)..

2.2.3 Driver

- A **driver** is a software component that lets the operating system and a device communicate with each other.

2.2.4 Software hierarchy



3-Internet and the Web

3.1Internet definition

- Network of networks on a global scale which interconnects a large number of international, regional and local networks, all based on common protocols namely TCP/IP (Transmission Control Protocol / Internet Protocol).

3.1 Internet definition

- The Internet is a system of interconnection of machines which constitutes a global computer network, using a set of standardized protocols for data transfer.
- The Internet carries a wide spectrum of information and allows the development of various applications and services such as electronic mail, instant messaging and the World Wide Web.

3.2 historical

- **1969:** appearance of a transmission network, called ARPANET (ARPA network, or ARPA network), a research project by the DARPA department (Defense Advanced Research Projects Agency).
- This involved linking together computers in different research centers.

3.2 historical

- **1971:** The first “real-size” tests involving around fifteen computers at several universities:
  - Stanford Institute,
  - The University of California at Los Angeles, – The University of California at Santa Barbara, – The University of Utah.

3.2 historical

- **1980:** TimBerners-Lee, a researcher at the CERN laboratory in Geneva, developed a hypertext navigation system called Enquire allowing navigation between several sites.
- • **At the end of 1990,** Tim Berners-Lee developed the HTTP protocol (Hyper Text Transfer Protocol), as well as the HTML language (HyperText Markup Language) allowing navigation using hypertext links across networks.
- World Wide Web was born.

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3.3 web Definition

- Part of the Internet that is made up of web pages stored on servers and displayed by clients using applications called navigation
- The World Wide Web (or the Web) literally means the "spider's web covering the world."
- •Hypertext system supported by the Internet network. Hyperlinks are like the threads of a spider's web that connect pages from one site to another.

3.3 web Definition

- By definition, the Internet is a global information system and the Web is ultimately only one of the applications/uses of the Internet in the same way that electronic mail (email) , instant messaging, or file transfer can be.

3.3 web Definition

- More precisely, the Web is the service which allows you to consult information from the Internet in the form of pages put online on sites and consultable using a Web browser.
- In summary, the Internet is the structure and the Web is what circulates on it.

3.4 website Definition

- A website is a set of web pages that are linked together and accessible through a web browser. It is usually built with programming languages such as HTML, CSS, JavaScript and PHP. A website can contain information, images, videos, files, applications and much more.

3.5 Internet Browser Definition

- The Internet browser is software that allows you to view Internet sites, download files and perform searches. Microsoft Edge is the default browser for Windows, but there are others like Firefox, Google Chrome, Opera, and Safari, each with their own features.

3.6 HTML

- **HTML** stands for "**HyperText Markup Language**", is a markup language designed to recreate and represent the content of a web page and its structure. Other technologies are used with HTML to describe the presentation of a page (CSS) and/or its interactive features (JavaScript).

3.6 HTML

- “**Hypertext**” refers to the links that connect web pages to each other, whether within the same website or between different websites. Links are a fundamental aspect of the web.

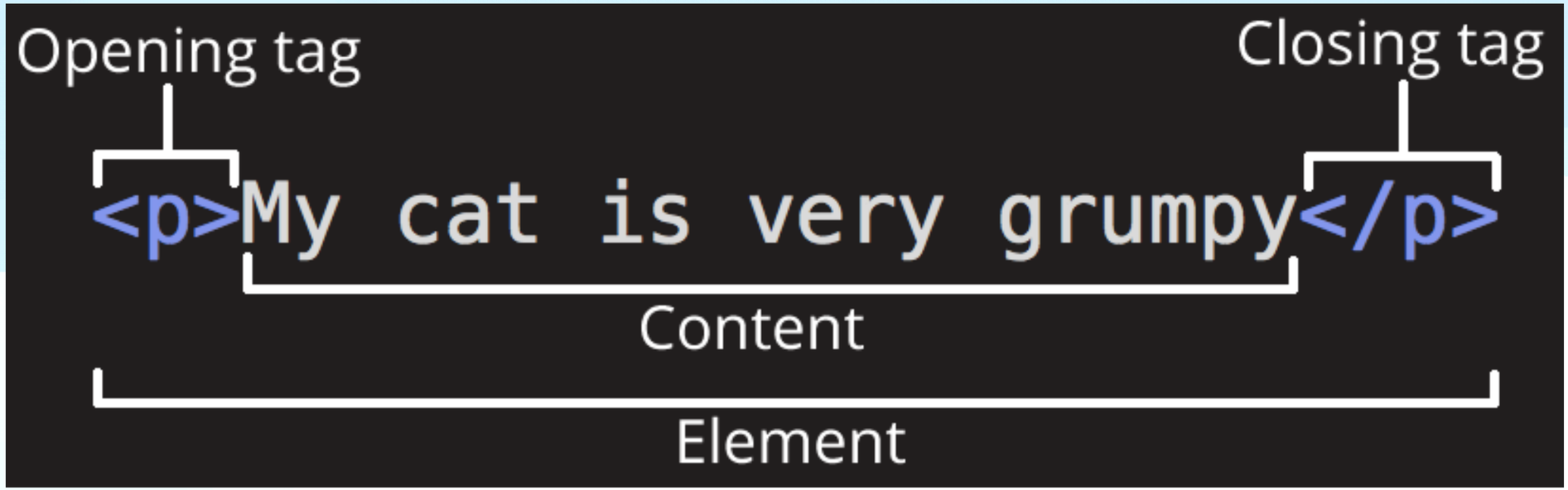
3.6 HTML

- HTML uses "tags" to annotate text, images, and other content for display in a web browser.
- HTML markup includes special “elements” such as <head>, <title>, <body>, <header>, <footer>, <article>, <section>, <p>, , , <img>, <aside>, <audio>, <canvas>, <datalist>, <details>, <embed>, <nav>, <output>, <progress>, <video>, <ul>, < ol>, <li> and many others.

3.6 HTML

- In HTML, tags are case insensitive and can be written in lowercase, uppercase or even a mixture of the two. In other words, the <title> tag could very well be written as <Title>, <TiTle> or in another way.

3.7 Anatomy of an HTML element



3.7 Anatomy of an HTML element

- **The opening tag:** This consists of the name of the element (in this case, p), wrapped in opening and closing angle brackets. This states where the element begins or starts to take effect
- **The closing tag:** This is the same as the opening tag, except that it includes a *forward slash* before the element name. This states where the element ends. Failing to add a closing tag is one of the standard beginner errors and can lead to strange results.

3.7 Anatomy of an HTML element

- **The content:** This is the content of the element, which in this case, is just text.
- **The element:** The opening tag, the closing tag, and the content together comprise the element.

3.8 Anatomy of an HTML document

```
<!doctype html>
<html lang="en-US">
  <head>
    <meta charset="utf-8" />
    <meta name="viewport" content="width=device-width" />
    <title>My test page</title>
  </head>
  <body>
    <img src="images/firefox-icon.png" alt="My test image" />
  </body>
</html>
```

3.8 Anatomy of an HTML document

- **<!DOCTYPE html>** : It is a required preamble. In the mists of time, when HTML was young (around 1991/92), doctypes were meant to act as links to a set of rules that the HTML page had to follow to be considered good HTML, which could mean automatic error checking and other useful things. However, these days, they don't do much and are basically just needed to make sure your document behaves correctly.

3.8 Anatomy of an HTML document

- **<html></html>:** This element wraps all the content on the entire page and is sometimes known as the root element. It also includes the lang attribute, setting the primary language of the document.

3.8 Anatomy of an HTML document

- **<head></head>** : this element acts as a container for all the stuff you want to include on the HTML page that isn't the content you are showing to your page's viewers. This includes things like keywords and a page description that you want to appear in search results, CSS to style our content, character set declarations, and more.

3.8 Anatomy of an HTML document

- **<meta charset="utf-8">** : this element sets the character set your document should use to UTF-8 which includes most characters from the vast majority of written languages. Essentially, it can now handle any textual content you might put on it. There is no reason not to set this, and it can help avoid some problems later on.

3.8 Anatomy of an HTML document

- **<meta name="viewport" content=« width=device-width »>:** this viewport element ensures the page renders at the width of viewport, preventing mobile browsers from rendering pages wider than the viewport and then shrinking them down.

3.8 Anatomy of an HTML document

- **<title></title>** : this sets the title of your page, which is the title that appears in the browser tab the page is loaded in. It is also used to describe the page when you bookmark/favorite it.
- **<body></body>** : this contains all the content that you want to show to web users when they visit your page, whether that's text, images, videos, games, playable audio tracks, or whatever else.

4-Use’s area

4 User’s area

- Computer science is a multidisciplinary science (touches all sectors of modern life).
- Each specialty (medicine, industry, education, administration, etc.) uses IT according to its needs.

4 User’s area

- **Automatic:** control devices such as the autopilot (DCS distributed control system LNG responsible for controlling the valves, pumps and motors of the complex).`
- **Modeling and simulation:** instead of carrying out a full-scale experiment, simply create a mathematical model and run it on a computer (dangerous or expensive chemical experiment on PC).

4 User’s area

- **Industrial computing:** use in industrial production lines (control of robots in the automobile industry).
- **Instrumentation:** collection of information from sensors (thermometers, densimeters and pressure detectors).
- **Telecommunications:** transmission of information (networks and internet).

4. User’s area

- **Misuse:** Malware (virus): malicious software that installs and acts without the user's knowledge: theft of information, falsification, identity theft (Trojan horse).
- When you run an infected program, you allow the virus to run.

4. User’s area

- The computer is today the most important, vital, complex, complete, omnipresent, versatile machine.
- The most recent technological revolutions find their source in IT: automation, robotics, electronic mail, Smartphone, Internet, Multimedia, etc.
- It has infiltrated everywhere: home automation, tools, household appliances, embedded computing, automobiles, finance, etc.