WEB programming
Lab 01: HTML

Instructions :

- The aim of these labs is to teach you how to find information on your own. The teacher's role is to support you in this process and guide you to the most relevant resources.
- This tutorial is to be completed alone.
- Before starting each lab activity, you'll need to do some preliminary reading to get started and/or deepen the knowledge you've acquired during the lecture.
- To help you with your practical work, you'll need to conduct research on Mozilla Developer Network (MDN), Stack Overflow, W3Schools or any other relevant ressources.
- ChatGPT can be used to search for errors in your code.
- You can choose between using VSCode, a classic editor (SublimeText or Notepad++) or Codepen.
- The complete Code must be submitted on Moodle before the 2nd Lab

Learning outcomes :

- At the end of this lab activity, you should be able to:
  - Understanding HTML: tags and attributes
  - Embedding content in a Web page
  - Use lists, tables and forms.

Green IT

The aim is to implement an informative website presenting Green IT and some practical tips for web development, as well as a Green IT knowledge test.
This site has 3 web pages:

- Home.html: this page provides information on green IT.
- GreenITSiteWeb.html: this page provides information on the carbon footprint of websites and some practical tips for web development.
- QuizGreenIT.html: this page tests a visitor's knowledge of Green IT.

Part 1: Simple WEB page

N.B.: The entire layout will be decided entirely by the browser, based on the background instructions we provide.

Further reading :

- CM 1 - HTML
- MDN: Introduction to HTML
- MDN: HTML document structure

1. In your working directory, create a new folder called "Lab1" and two subfolders. The first is called "datas", where you'll put the text files you've downloaded from Moodle. The second will be called "html", where we'll create all our html pages.

2. In the "html" subfolder, create the file "**home.html",** respecting the minimal structure of an html file (**html /head/body**).

```
<!DOCTYPE html> <!-- HTML Version 5-->
<html lang="en"> <!-- Specify language for browser-->
  <head> <!-- HTML document header -->
    <title></title> <!-- Tells the browser what title you give your page -->
    <meta charset="UTF-8"> <!-- specifies character encoding to UTF-8-->

  </head><!-- End of header tag -->
  <body><!-- Start of web page code -->

  </body><!-- End of web page code -->
</html><!-- End of document -->
```

3. Give the title "**Green IT - Home**" to the page you've created, using the **<title> </title>** tag in the header (**<head></head>** tag) of the html document. It's under this title that your document will appear in your browser's tab.
4. Exploring the web page :
    a. Open your file in your browser and observe the tab title, then right-click on the web page and choose "examine element" or "view page source code" or ctrl+shift+i. This is the element inspector.

    b. In the element inspector, change the title of your page to "Green computer" and examine the change in the browser, then refresh the page. Note that the change is not saved.

5. In **VSCode** (or in your text editor), open the file **"home.html"** and insert the contents of the file **'data-home_INT.txt'** between the **<body>** and **</body>** tags.
6. Save and refresh your WEB page: not pretty no 😟 so, let's work a bit on the presentation of these different elements 😊
    a. Encapsulate the text "*What is Green IT?*" with **<h1 >** and **</h1 >** tags to make it a level 1 title.
    b. To make level 2 titles, encapsulate the following texts in **<h2>** and **</h2>** tags:
        - "The *main objective* of *Green IT*"
        - *"What impact does digital technology have on the environment?"*
        - *"Energy impact on web development*
    c. To make level 3 titles, encapsulate the following texts in **<h3>** and **</h3>** tags:
        - *"Why do websites have a carbon footprint?"*
        - *"What is the carbon footprint of a web page?"*
    d. Add ** ** and ** ** tags to each of the following paragraphs:
        - *"The concept of digital sobriety or green IT or sustainable IT or eco-IT is a relatively new concept and a new way of thinking."*
        - "*Carbon footprint or the carbon content of a human activity is a measure of the greenhouse gas emissions of anthropogenic origin, i.e. that can be attributed to it. It depends on the emission factors of the inputs linked to this activity, and in particular on the emission factors associated with the energy sources used. The emission factors associated with energy sources correspond mainly to CO2 emissions.*"
    e. Save and test in your browser (just refresh the page with the little arrow at the top left).

Part 2: Enhancing your first WEB page

In this section, we add a few tags to enrich the content of our page: images, links, header, footer, section and div tags.

Further reading :

- MDN : Images
- MDN : Links
- MDN: div tag

1- In the folder "Lab1", create a second subfolder "**img**", which will be used to store the images we'll use on the site.
2- Choose an image that relates to the "Green IT" theme (you can also use the image used here) and save it in "img" folder (prefer png or jpeg images).
3- Using the **<img src = "../img/yourimage.extension" alt = "GreenIT_img">** tag, add your image to the top of the web page (still in the body tag).
Note: as the image is in a different sub-folder than the parent folder of the "home.html" page, you need to return to the parent folder (using ../) and specify the "img" folder, then the image file. Test it out!
4- Adjust your image using the weight and width attributes.
5- Link insertion :
    a. At the bottom of the page, add a link for the text " *Find out more?*" to redirect the user to the site: https://greenit.net/ using the **<a>** tag.

b. Encapsulate the added **<img>** tag in an **<a>** tag so that the image redirects visitors to the source when we click on it. Test it out!

6- Add external links for the terms below:
   - "gas emissions": https://en.wikipedia.org/wiki/Greenhouse_gas
   - *"Emission factors:* https://en.wikipedia.org/wiki/Emission_intensity
   - *" CO2 emissions.":* https://en.wikipedia.org/wiki/Greenhouse_gas_emissions

⇨ You'll get the following paragraph with the links you've added.

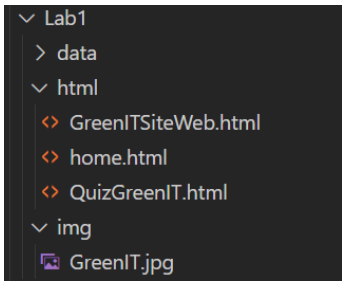
What impact does digital technology have on the environment?

Carbon footprint or the carbon content of a human activity is a measure of the greenhouse gas emissions of anthropogenic origin, i.e. that can be attributed to it. It depends on the emission factors of the inputs linked to this activity, and in particular on the emission factors associated with CO2 emissions.

7- Link to other web pages

a. In the html folder, create 2 new html pages: "GreenITSiteWeb.html" and "QuizGreenIT.html" with a minimal structure (html/head/body).

⇨ You should have a Lab structure equivalent to the image below:



b. Give your pages the following titles:
   - "Green IT & Websites" for the "GreenITSiteWeb.html" page
   - "Green IT - Quiz" for the "QuizGreenIT.html" page

c. In the "home.html" page, following the link containing your image, add a **<nav>** tag (and of course </nav>) in which you'll place three links; one link to each of the pages created using the **<a>** tag.

```
<nav>
    <a href="./home.html">Home</a>
    <a href="./GreenITSiteWeb.html">Green IT & websites</a>
    <a href="./QuizGreenIT.html">Green IT - Quiz </a>
</nav>
```

Note: As pages are located in the same folder, you can either enter the page name followed by the extension, or add "./" at the beginning.

8- Header and footer tags :

a. Insert the **<header>** tag so that it is composed of:
   - The **<a>** tag containing the image.
   - The **<nav>** tag containing links to other pages.

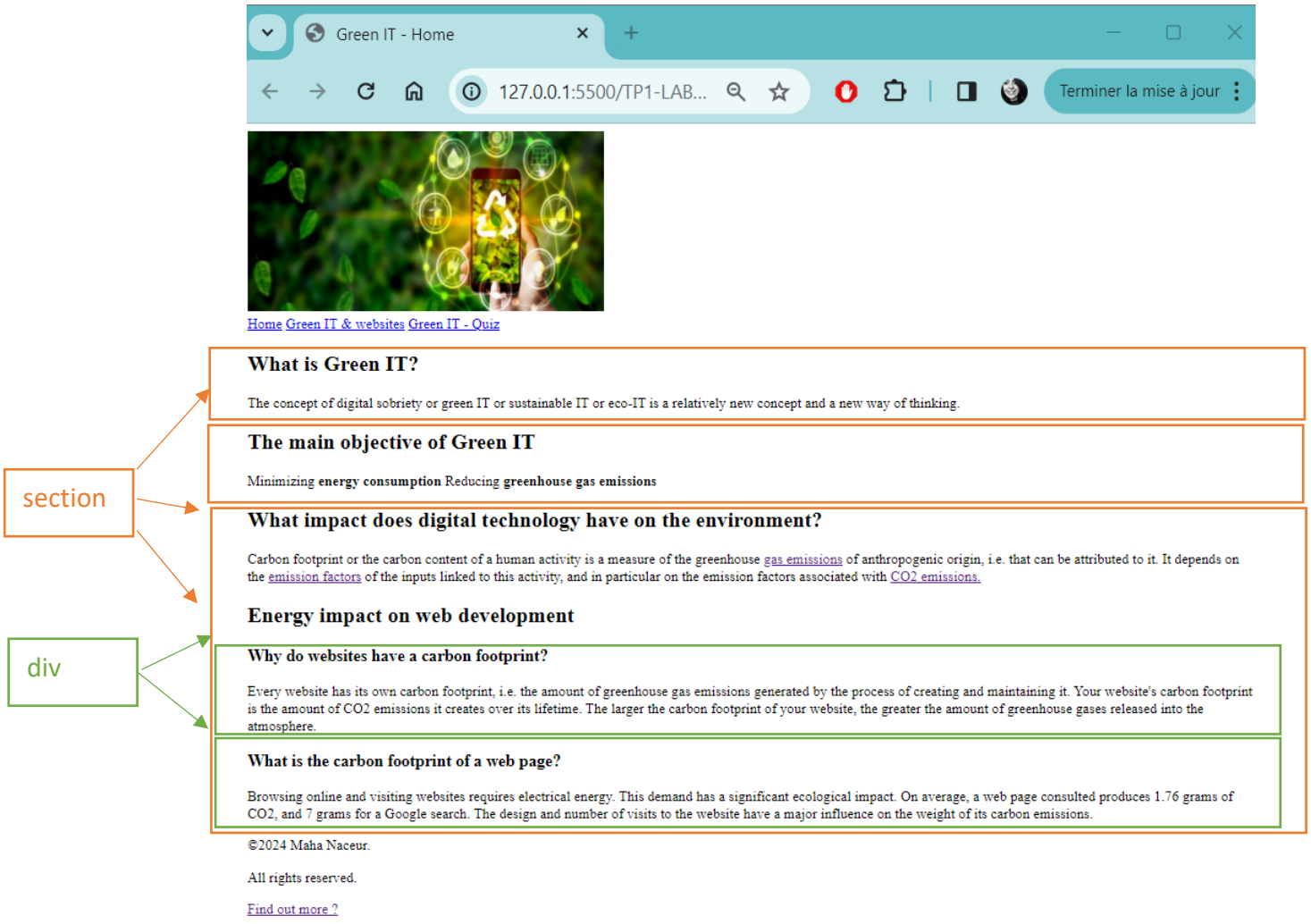
b. Add the **<footer>** tag at the bottom of the document so that it contains the copyright as well as the "find out more?" link.

```
<footer>
    <p>©2024 Maha Naceur.</p>
    <p>All rights reserved.</p>
    <a href="https://greenit.net/">Find out more ?</a>
</footer>
```

c. Make sure that header and footer are the same on all your pages.

9- Section and div tags:

a. Take the "home.html" page and add the **<section>** and ** ** tags as shown in the image below. **Note**: all section tags must have a title of level h1 or less.



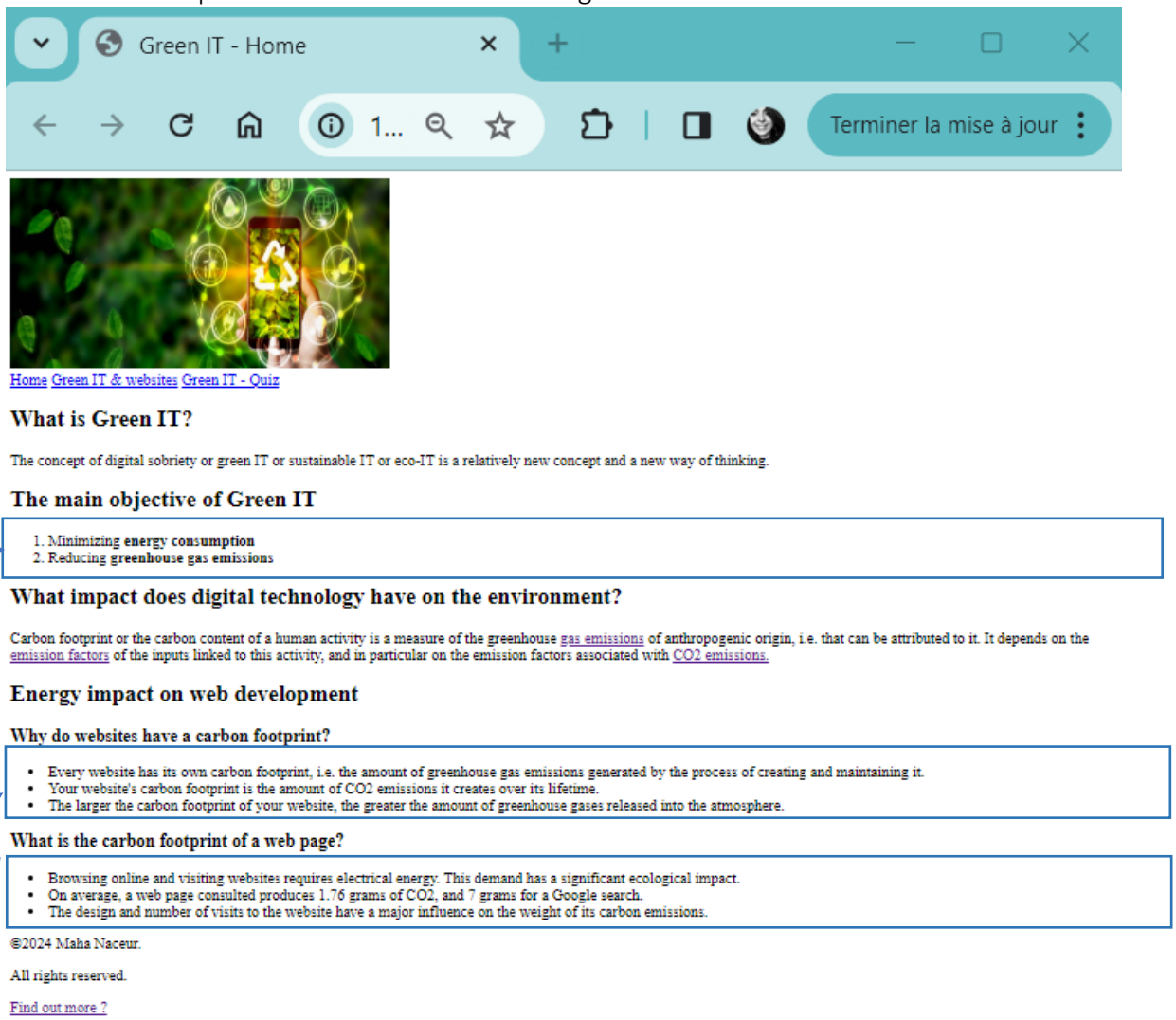
Part 3: Better structuring with lists!

In this section, we'll structure texts using unordered/ordered lists.

Further reading :

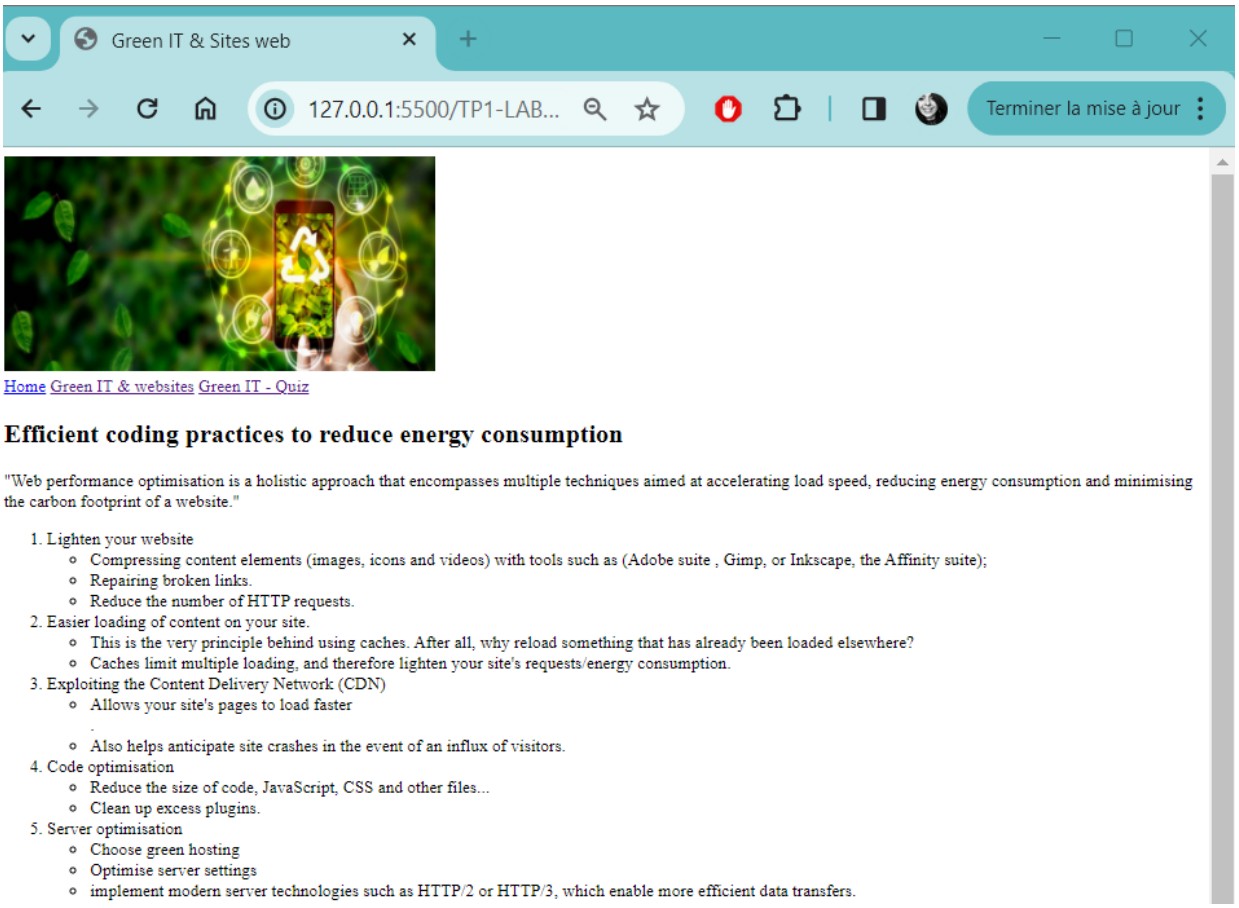
- MDN : lists

1- Some parts of the "home.html" page have not yet been formatted. Use the **<ul>** and **<ol>** tags to obtain a result equivalent to that shown in the figure below.



2- Open the "GreenITSiteWeb.html" page and the "data-GgreenITSiteWeb.txt" file. After the header, add a new section in which you insert:
   a. An h1 tag
   b. A paragraph (the quotation)
   c. An **<ol>** list containing an **<ul>** list

   ⇨ As shown below :



Part 4: Tables

Further reading :

- MDN<table> element

1- Still in the "GreenITSitesWeb.html" file, add a new **<section>** tag and insert the **<table>** tag with the following structure:

Effective coding practices		
	Practice	**Example**
Optimising the algorithm	Choose algorithms with reduced complexity to minimise unnecessary operations.	Instead of using a linear search to find an element in an unsorted list, sort the list once and then use a binary search.
Minimising CPU operations	Avoid unnecessary loops that consume CPU cycles.	Instead of using a loop to wait for an event, it's better to use an asynchronous wait function.
Memory optimisation	Reduce memory usage by avoiding excessive dynamic allocations.	Use static arrays instead of dynamic lists to store fixed-size data.
Processor power management	Use sleep mechanisms to reduce CPU power consumption when it is idle.	In a mobile application, configure timers to put the CPU to sleep when not in use.
I/O optimisation	Reduce disk I/O by caching frequently used data in memory.	Cache frequently used database queries to avoid costly disk accesses.
Use of caching	Minimise accesses to main memory by taking advantage of processor caches.	Use search algorithms that exploit the principle of locality to maximise cache utilisation.
Minimising network requests	Reduce the number of network requests by grouping operations and minimising unnecessary data transfers.	Use batch requests to group multiple data read/write operations into a single request.

2- In the **< head >** tag, at the top of the "GreenITSitesWeb.html" page, add the **<style>** tag containing style for our table elements.

```
<style>
            table, td, caption {
                border: 1px solid #333;
            }
            caption{
                color : red;
                font-size: large;
            }
            thead, tfoot {
                background-color: #333;
                color: #fff;
            }
</style>
```

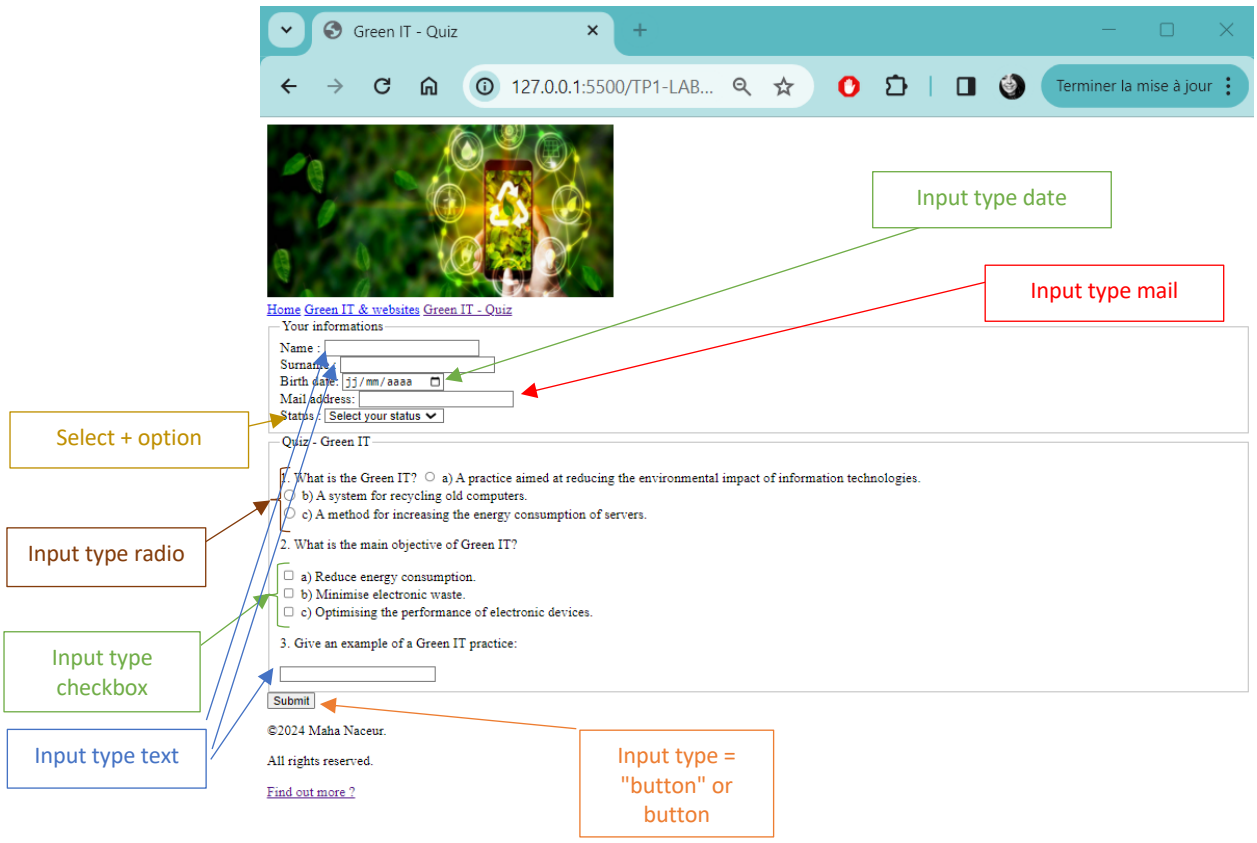
⇨ Here, we've used the tag selectors to add a 1px thick black solid border to the table and the individual cells.

Part 5: The <form> tag

Further reading :

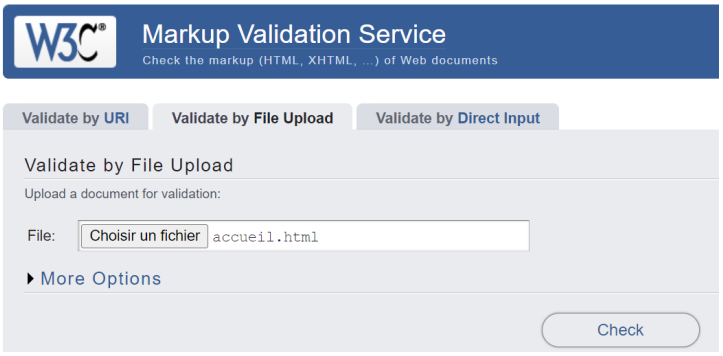
- MDN: HTML forms
- My first HTML form
- MDN: <input> tag
- MDN: <select> tag
- MDN: <fieldset> tag

In this section, we focus on the "QuizGreenIT.html" page. This page will allow visitors to test their knowledge of Green-IT.



W3C validation

Type the address http://validator.w3.org/ into a new browser tab and validate your html pages using the "file upload" method. If your documents contain errors, please correct them.



On your own!

Add a new page "about.html" showing :

1- Your first and last names and your group
2- A brief description of you
3- A link to the 3 pages created during TP and, of course, a link to this new page in each of the pages created.