INC281
2020

INC281-Lecture01
Introduction and Basic HTML
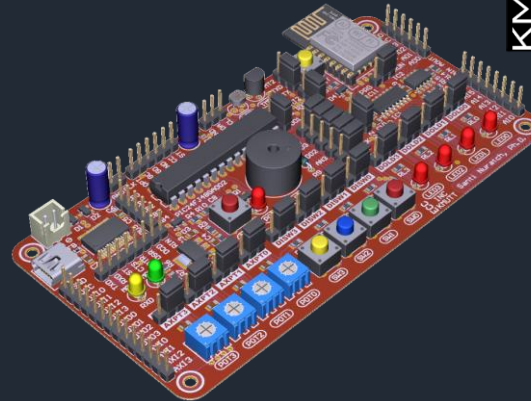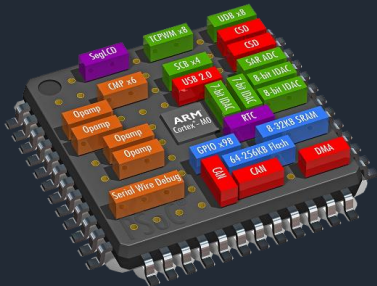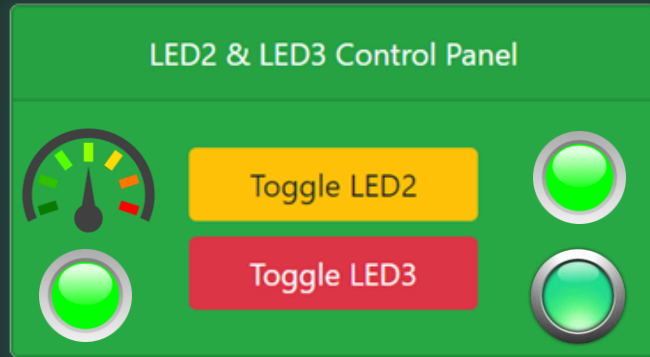
Asst.Prof.Dr.Santi Nuratch

Embedded Computing and Control Lab. @ INC-KMUTT

santi.inc.kmutt@gmail.com

Department of Control System and Instrumentation Engineering, King Mongkut's University of Technology Thonburi, KMUTT

Develop your own IoT applications
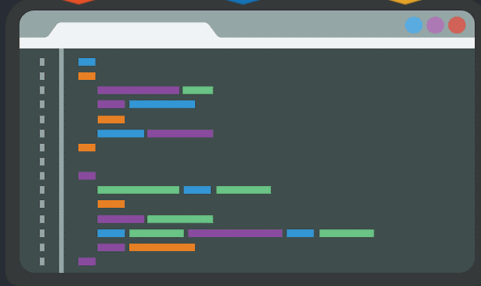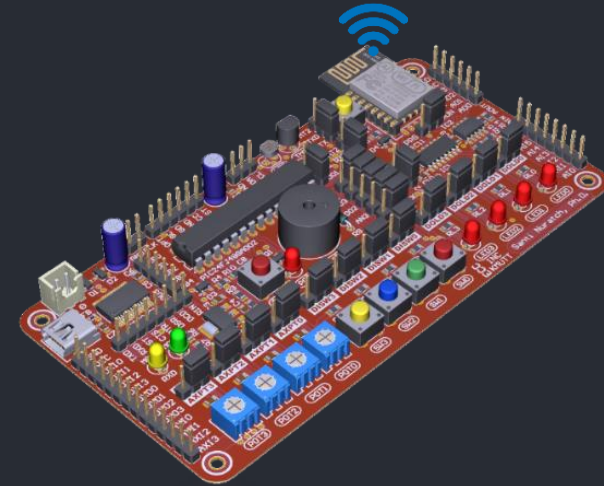

Web-based Application

LED2 & LED3 Control Panel

Toggle LED2

Toggle LED3

Internet

HTTP
WebSockets
MQTT

IoT Device

HTML CSS JS

Develop your own IoT applications

60%

Programming

20%

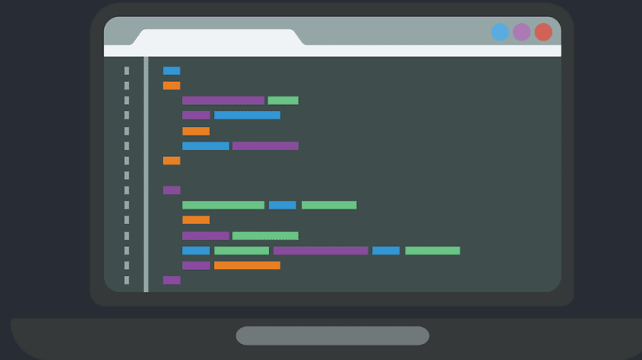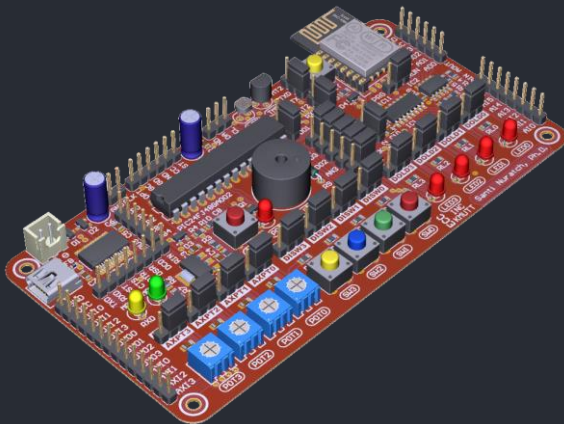**Documents**

20%

Presentation

What is your project?

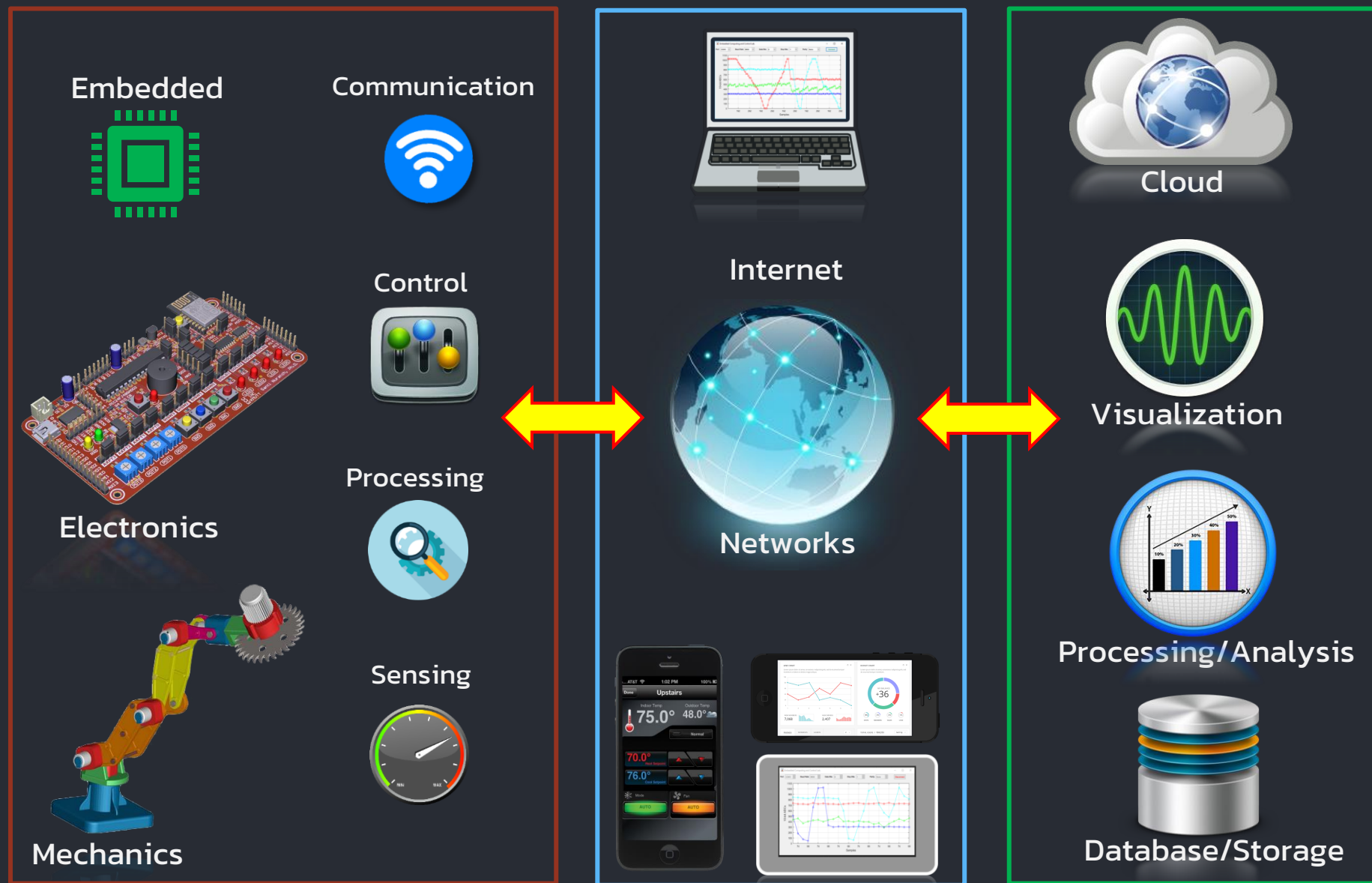## (Design and submit the 1st document next week!)

24 March, 2020

20%

1. Hardware: Block diagram, circuit, description (in-depth details)
2. Software: Graphics User Interface, function description (in-depth details)

IoT Application Components

Embedded

Communication

Control

Processing

Sensing

Electronics

Mechanics

Internet

Networks

Cloud

Visualization

Processing/Analysis

Database/Storage

INC281 focus on the IoT applications

IoT Device

- Electronic Circuits (Sensors/Actuators)
- Microcontroller Circuit & System
- Embedded C Programming

Embedded Programming	
Embedded C	Algorithms
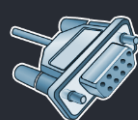
IoT Application

- Web/GUI Design (HTML, CSS)
- JavaScript Programming (ES6)
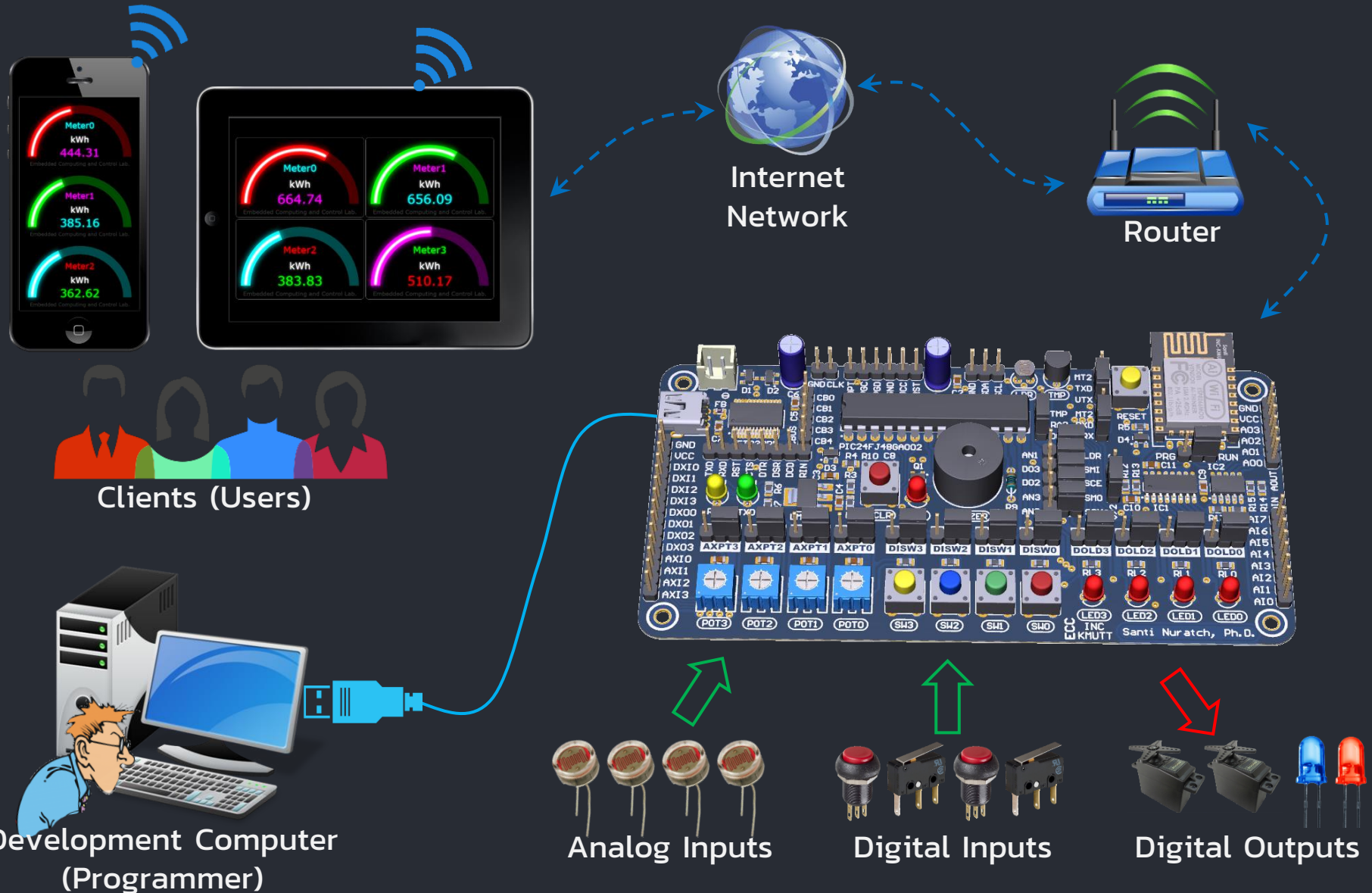- Web-based Control & Data Visualization

Web (Client/Server) Programming		
Web	Node.js	MongoDB

We integrate hardware and Software

Internet Network

Router

Clients (Users)

Development Computer (Programmer)

Analog Inputs

Digital Inputs

Digital Outputs

INC281/2 Learning Topics

This is the second section of the INC281. We focus on the basics of Web-based application development, Web-based programming. Three main parts to be studied in this section.

60% — Programming
20% — Documents
20% — Presentation

15% **1. HTML** (Hypertext Markup Language)
15% **2. CSS** (Cascading Style Sheet)
30% **3. JavaScript**

HTML is the markup language that we use to structure and give meaning to our web content, for example defining paragraphs, headings, and data tables, or embedding images and videos in the page.

```
<html><head><title>INC281</title></head><body><h1>Welcome to Web Programming</h1></body></html>
```

CSS is a language of style rules that we use to apply styling to our HTML content, for example setting background colors and fonts, and laying out our content in multiple columns.

```
body{background-color: red; color: red; font-family: Helvetica; text-align: center; padding: 3px 10px;}
```

JavaScript is a scripting language that enables you to create dynamically updating content, control multimedia, animate images, and pretty much everything else.

```
let h1 = document.querySelector("h1"); h1.addEventListener("click", ()=>{h1.textContent="Hello INC281"});
```

Code Editor and Extension

We use the VSCode and Live Server to develop our applications. Also, a Web browser, e.g., Google Chrome or Mozilla Firefox, is required.
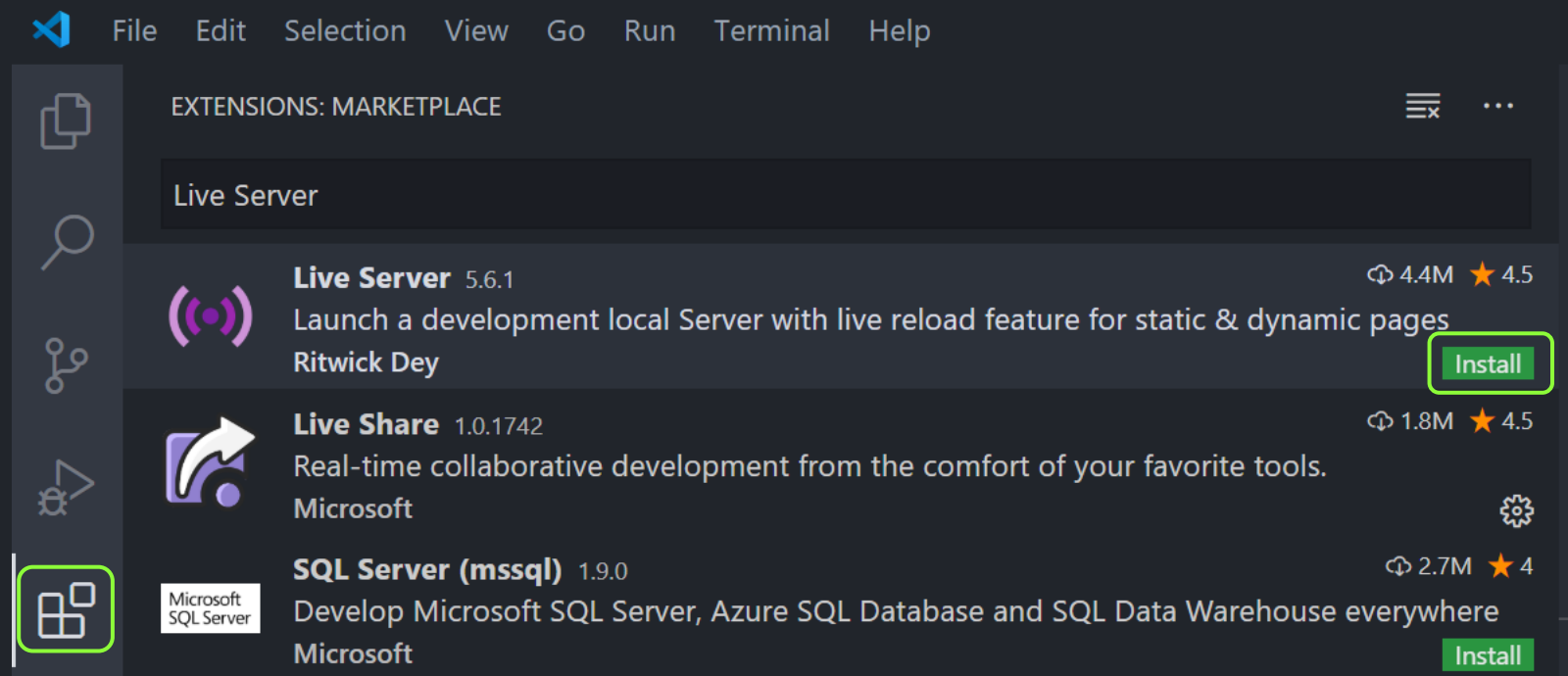
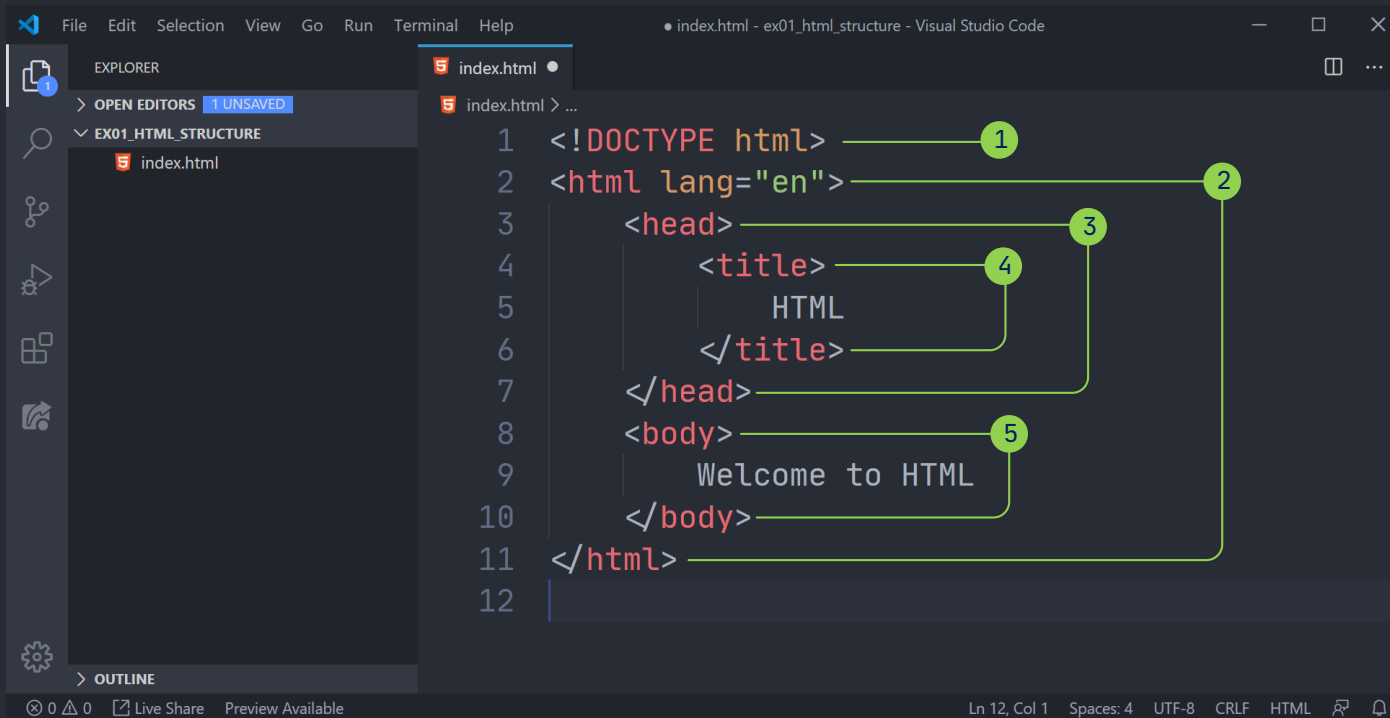1. Download and install the VSCode

2. Install the Live Server extension

3. Download and install the Google Chrome or Mozilla Firefox

Create a new Project

1) Create a new directory (folder), "ex01_html_structure.html"
2) Run the VSCode and open the created directory
3) Create a webpage file, "index.html" and add the lines of code

1 The <!DOCTYPE> type declaration must be the very first thing in your HTML document

2 Declares the webpage to be written in HTML

3 Delimits the webpage's head

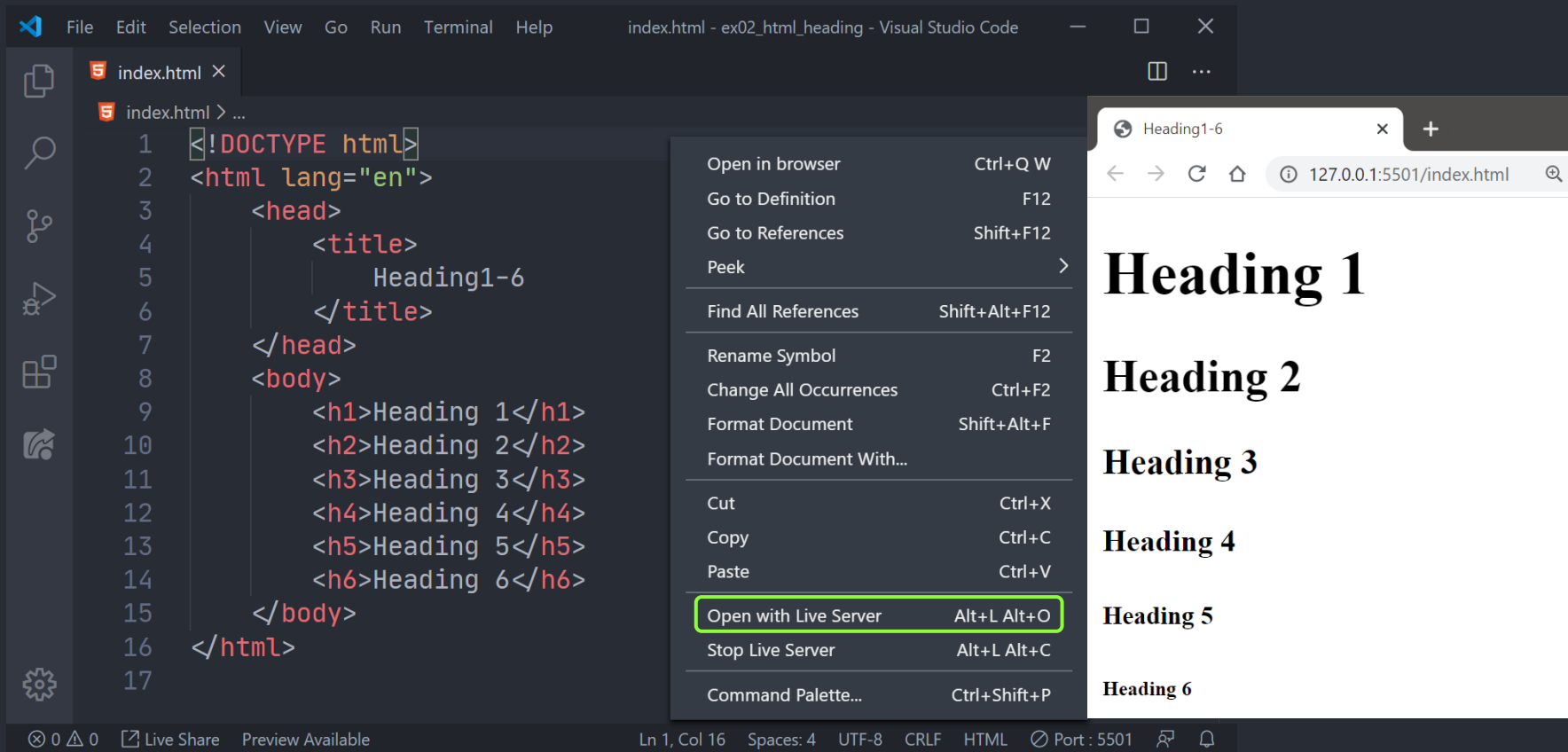4 Defines the webpage's title

5 Delimits the webpage body

Check the result on the Web browser

1) Save the code (CRTL+S)
2) Right-Click on the HTML code and choose the "Open with Live Server"
3) Check the result on the web browser
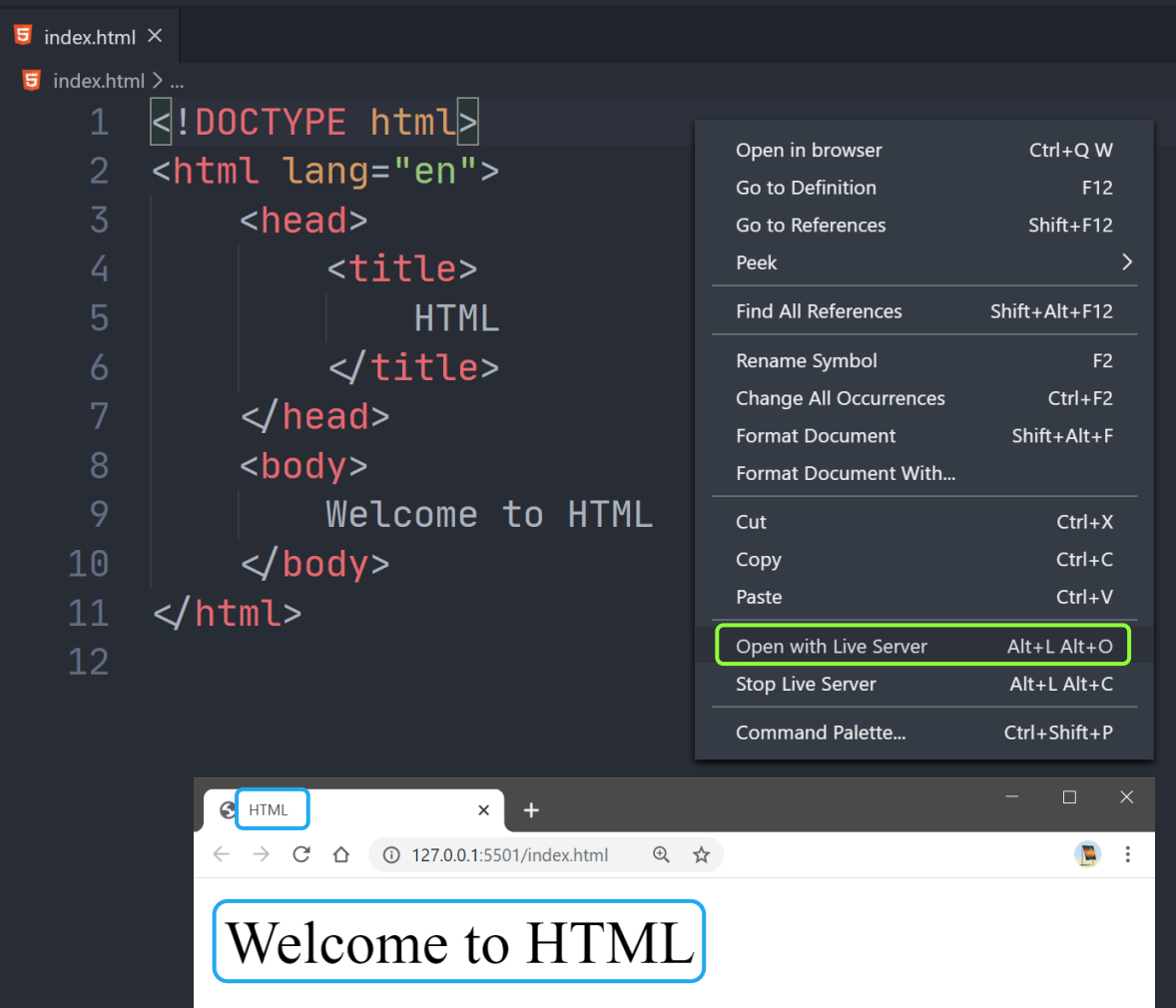
HTML Heading (h1 to h6)

1) Create a new directory (folder), "exO2_html_heading"
2) Run the VSCode and open the created directory
3) Create a webpage file, "index.html" and add the lines of code
4) Save the file, run the "Live Server" and check the result in the web browser
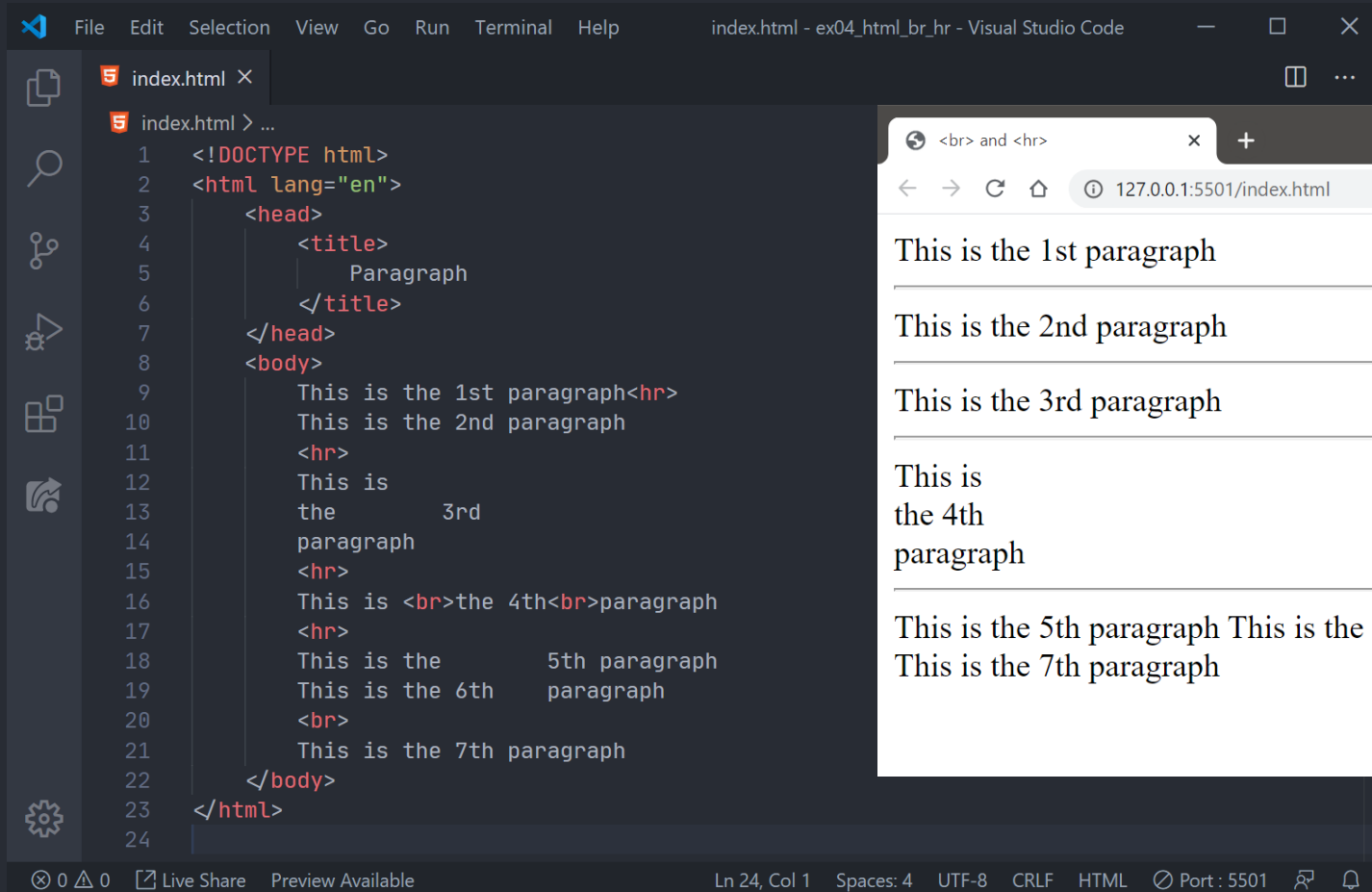
HTML Line Break and Horizontal Rules

1) Create a new directory (folder), "ex04_html_br_hr"
2) Run the VSCode and open the created directory
3) Create a webpage file, "index.html" and add the lines of code
4) Save the file, run the "Live Server" and check the result in the web browser

HTML Formatting

1) Create a new directory (folder), "ex05_html_formatting"
2) Run the VSCode and open the created directory
3) Create a webpage file, "index.html" and add the lines of code
4) Save the file, run the "Live Server" and check the result in the web browser

HTML Lists

1) Create a new directory (folder), "ex06_html_lists"
2) Run the VSCode and open the created directory
3) Create a webpage file, "index.html" and add the lines of code
4) Save the file, run the "Live Server" and check the result in the web browser

```html
<!DOCTYPE html>
<html lang="en">
    <head>
        <title>
            Lists
        </title>
    </head>
    <body>
        <h2>Unordered List</h2>
        <ul>
            <li>Coffee</li>
            <li>Tea</li>
            <li>Milk</li>
        </ul>

        <h2>Ordered List</h2>
        <ol>
            <li>Coffee</li>
            <li>Tea</li>
            <li>Milk</li>
        </ol>
    </body>
</html>
```

Unordered List

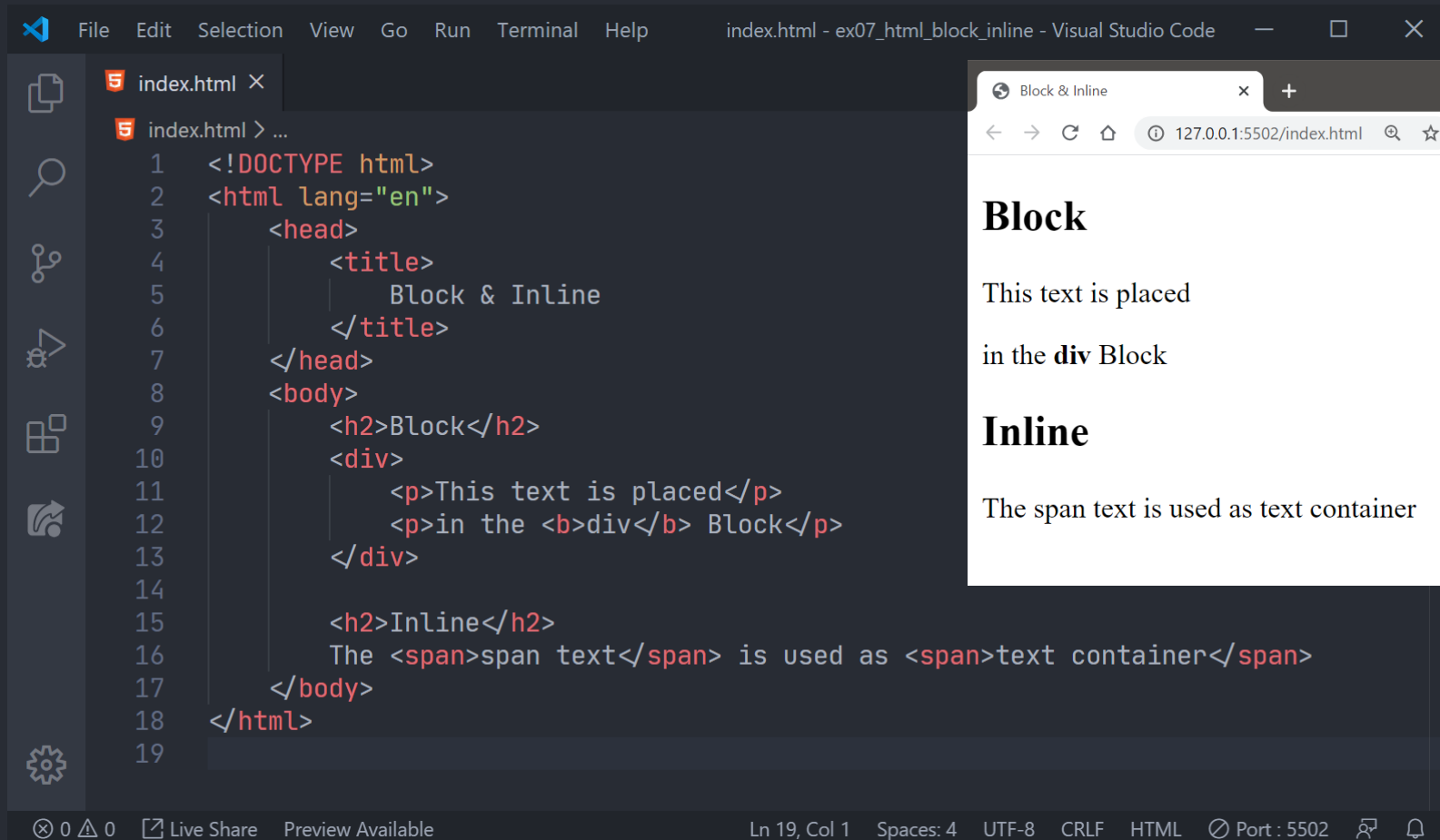- Coffee
- Tea
- Milk

Ordered List

1. Coffee
2. Tea
3. Milk

HTML Block and Inline Elements

1) Create a new directory (folder), "exO7_html_block_inline"
2) Run the VSCode and open the created directory
3) Create a webpage file, "index.html" and add the lines of code
4) Save the file, run the "Live Server" and check the result in the web browser

File   Edit   Selection   View   Go   Run   Terminal   Help   index.html - ex07_html_block_inline - Visual Studio Code

index.html ✕

index.html > ...

```html
1   <!DOCTYPE html>
2   <html lang="en">
3       <head>
4           <title>
5               Block & Inline
6           </title>
7       </head>
8       <body>
9           <h2>Block</h2>
10          <div>
11              <p>This text is placed</p>
12              <p>in the <b>div</b> Block</p>
13          </div>
14
15          <h2>Inline</h2>
16          The <span>span text</span> is used as <span>text container</span>
17      </body>
18  </html>
19
```
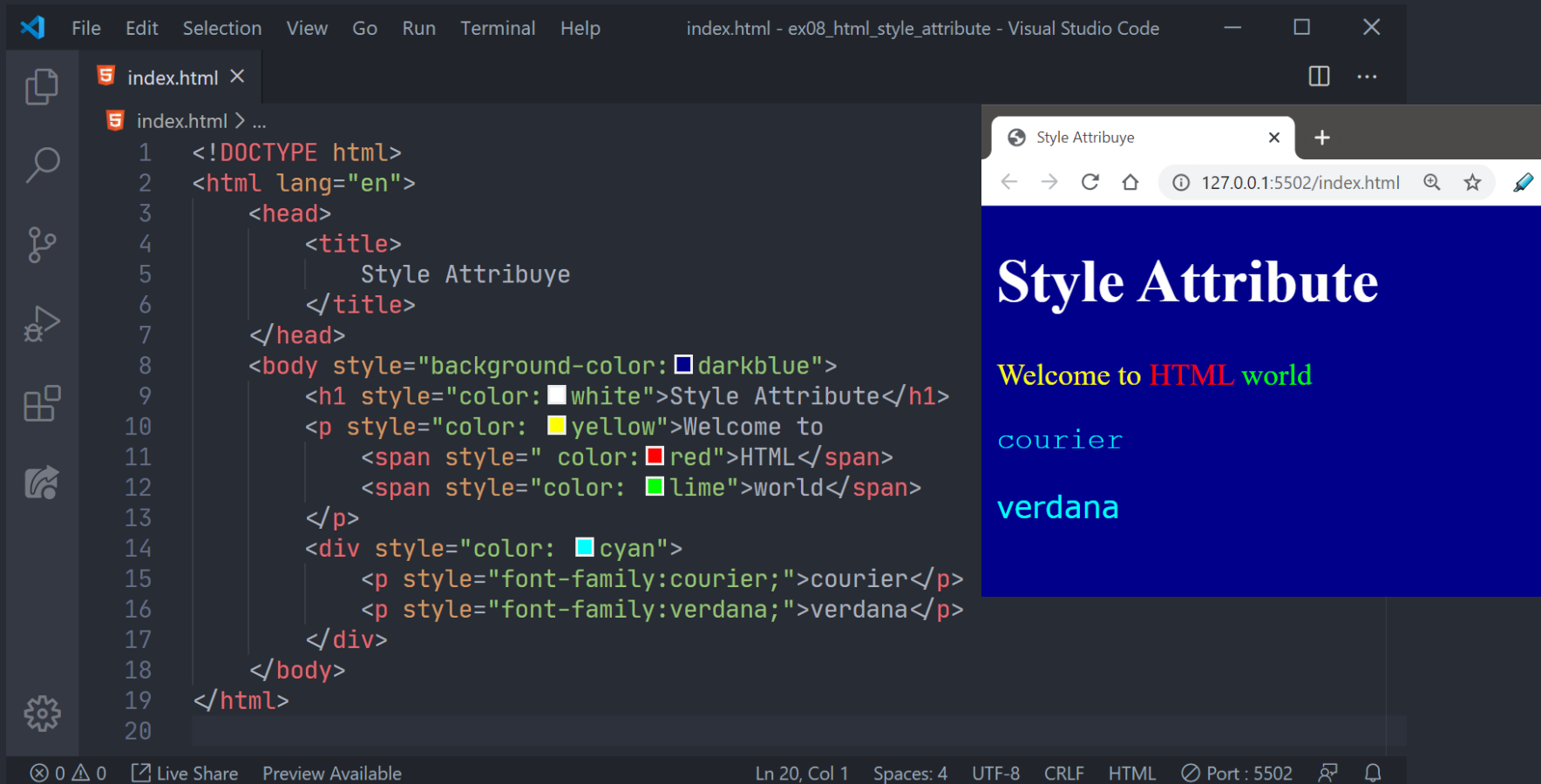
Block & Inline   127.0.0.1:5502/index.html

Block

This text is placed

in the **div** Block

Inline

The span text is used as text container

⊗ 0 ⚠ 0   Live Share   Preview Available   Ln 19, Col 1   Spaces: 4   UTF-8   CRLF   HTML   ⊘ Port : 5502

HTML Style Attribute

1) Create a new directory (folder), "ex08_html_style_attribute"
2) Run the VSCode and open the created directory
3) Create a webpage file, "index.html" and add the lines of code
4) Save the file, run the "Live Server" and check the result in the web browser

HTML <style> tag

1) Create a new directory (folder), "ex09_html_style_tag"
2) Run the VSCode and open the created directory
3) Create a webpage file, "index.html" and add the lines of code
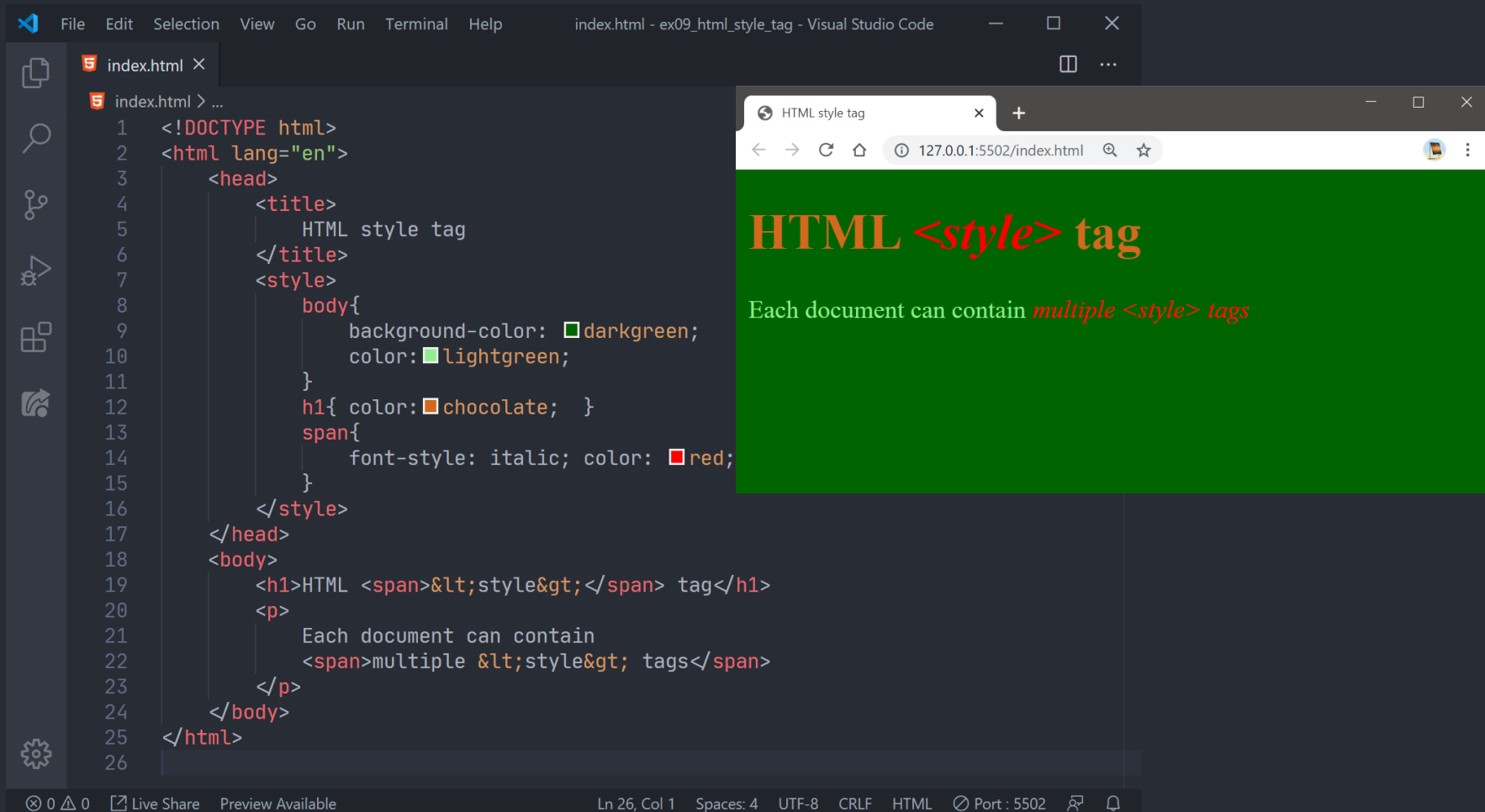4) Save the file, run the "Live Server" and check the result in the web browser

```html
<!DOCTYPE html>
<html lang="en">
    <head>
        <title>
            HTML style tag
        </title>
        <style>
            body{
                background-color: darkgreen;
                color: lightgreen;
            }
            h1{ color: chocolate;  }
            span{
                font-style: italic; color: red;
            }
        </style>
    </head>
    <body>
        <h1>HTML <span>&lt;style&gt;</span> tag</h1>
        <p>
            Each document can contain
            <span>multiple &lt;style&gt; tags</span>
        </p>
    </body>
</html>
```

HTML id and class

1) Create a new directory (folder), "ex10_html_id_class"
2) Run the VSCode and open the created directory
3) Create a webpage file, "index.html" and add the lines of code
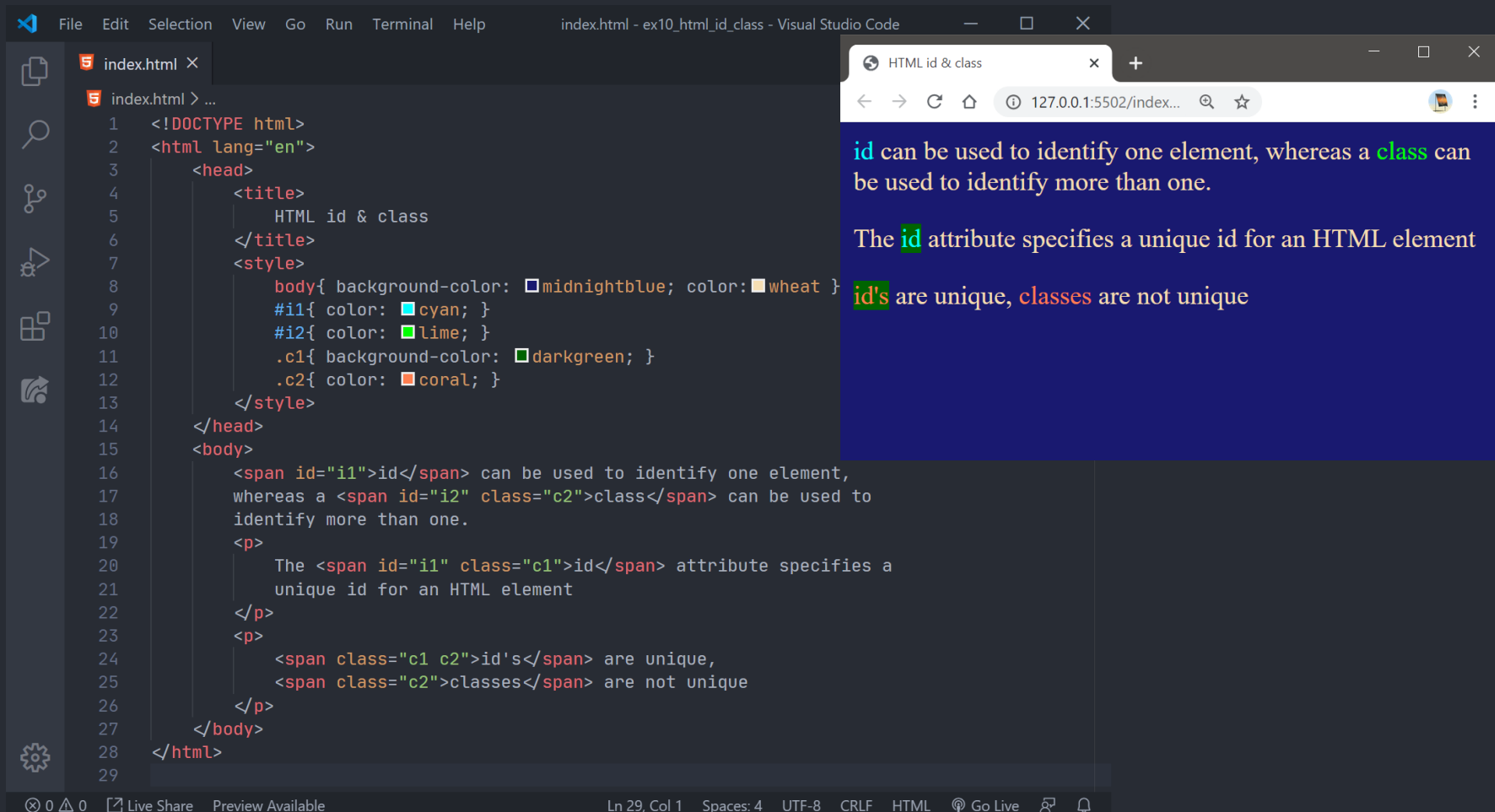4) Save the file, run the "Live Server" and check the result in the web browser

```html
<!DOCTYPE html>
<html lang="en">
    <head>
        <title>
            HTML id & class
        </title>
        <style>
            body{ background-color: midnightblue; color: wheat }
            #i1{ color: cyan; }
            #i2{ color: lime; }
            .c1{ background-color: darkgreen; }
            .c2{ color: coral; }
        </style>
    </head>
    <body>
        <span id="i1">id</span> can be used to identify one element,
        whereas a <span id="i2" class="c2">class</span> can be used to
        identify more than one.
        <p>
            The <span id="i1" class="c1">id</span> attribute specifies a
            unique id for an HTML element
        </p>
        <p>
            <span class="c1 c2">id's</span> are unique,
            <span class="c2">classes</span> are not unique
        </p>
    </body>
</html>
```

Browser output:

id can be used to identify one element, whereas a class can be used to identify more than one.

The id attribute specifies a unique id for an HTML element

id's are unique, classes are not unique

w3schools.com

the best place to learn basic of web development

KMUTT

w3schools.com

w3schools.com

THE WORLD'S LARGEST WEB DEVELOPER SITE

TUTORIALS ▾ **REFERENCES** ▾ **EXAMPLES** ▾ **EXERCISES** ▾

HTML and CSS

Learn HTML
Learn CSS
Learn Bootstrap
Learn W3.CSS
Learn Colors
Learn Icons
Learn Graphics
Learn How To
Learn Sass

JavaScript

Learn JavaScript
Learn jQuery
Learn React
Learn AngularJS
Learn JSON
Learn AJAX
Learn W3.JS

Server Side

Learn SQL
Learn PHP
Learn ASP
Learn Node.js
Learn Raspberry Pi

Programming

Learn Python
Learn Java
Learn C++

HTML

The language for building web pages

[LEARN HTML] [HTML REFERENCE]

HTML Example:

```
<!DOCTYPE html>
<html>
<title>HTML Tutorial</title>
<body>

<h1>This is a heading</h1>
<p>This is a paragraph.</p>

</body>
</html>
```

Try it Yourself »

CSS Example:
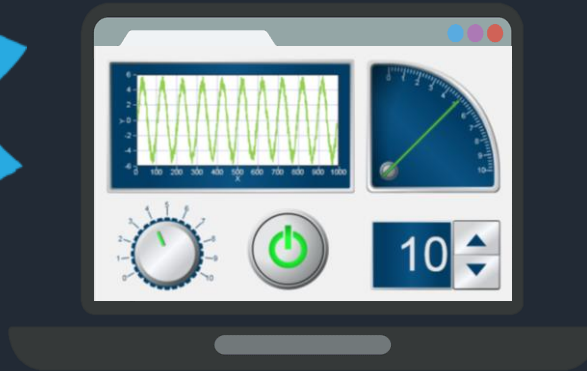
```
body {
  background-color: lightblue;
}

h1 {
  color: white;
  text-align: center;
}
```
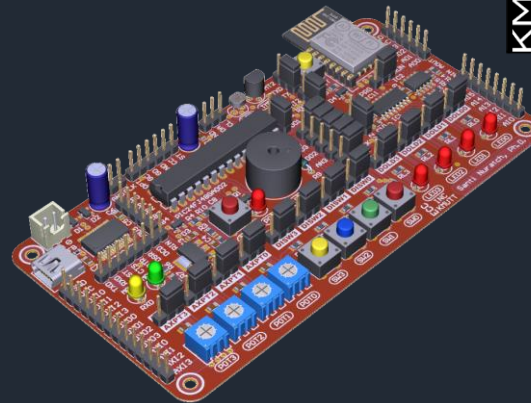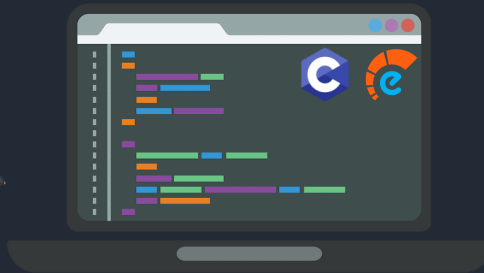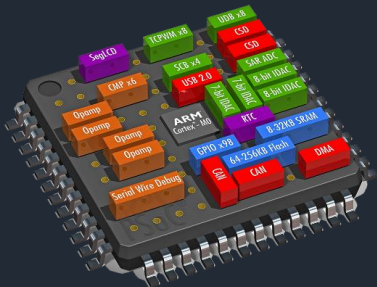
CSS

The language for styling web pages

[LEARN CSS] [CSS REFERENCE]

THANK YOU!

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Department of Control System and Instrumentation Engineering,
King Mongkut's University of Technology Thonburi, **KMUTT**

We Make Computers do More