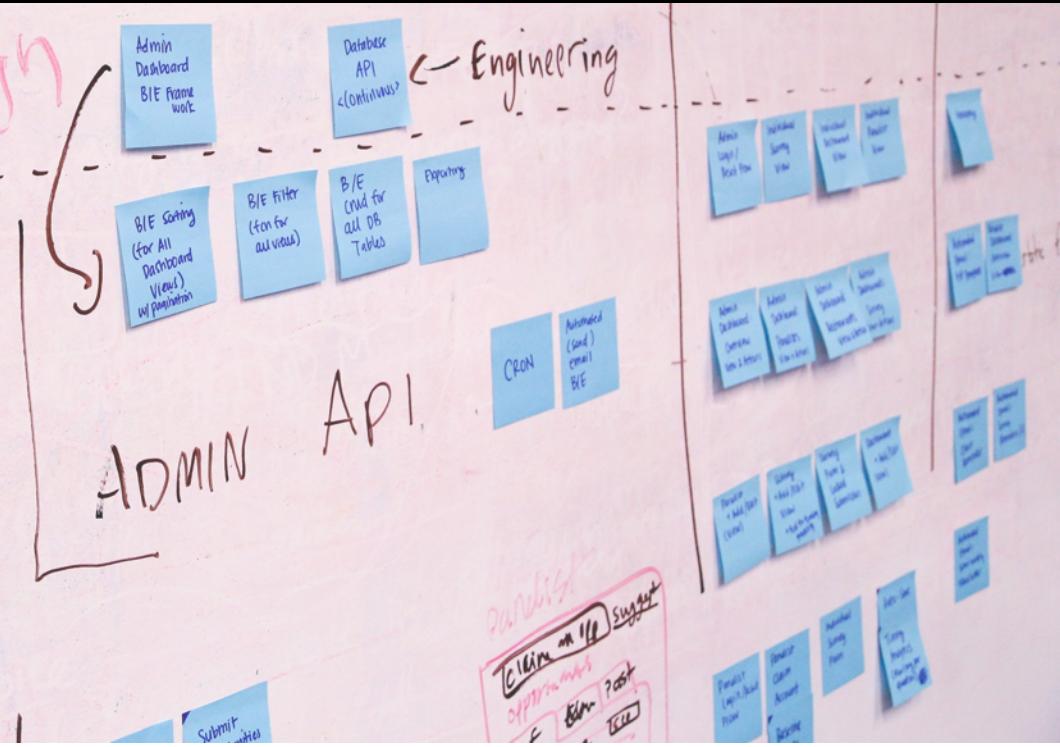


WEEK 5: Design

WEEK 6: Dev

WEEK 7: Dev



# CUHK DATA HACK 2024: WEB DEPLOYMENT USING PYTHON FLASK-PART I

Bernard Suen  
Center for Entrepreneurship  
Chinese University of Hong Kong

# **Software Packages Needed for the Workshop**

Version 1.47 is now available! Read about the new features and fixes from June.

# Code editing. Redefined.

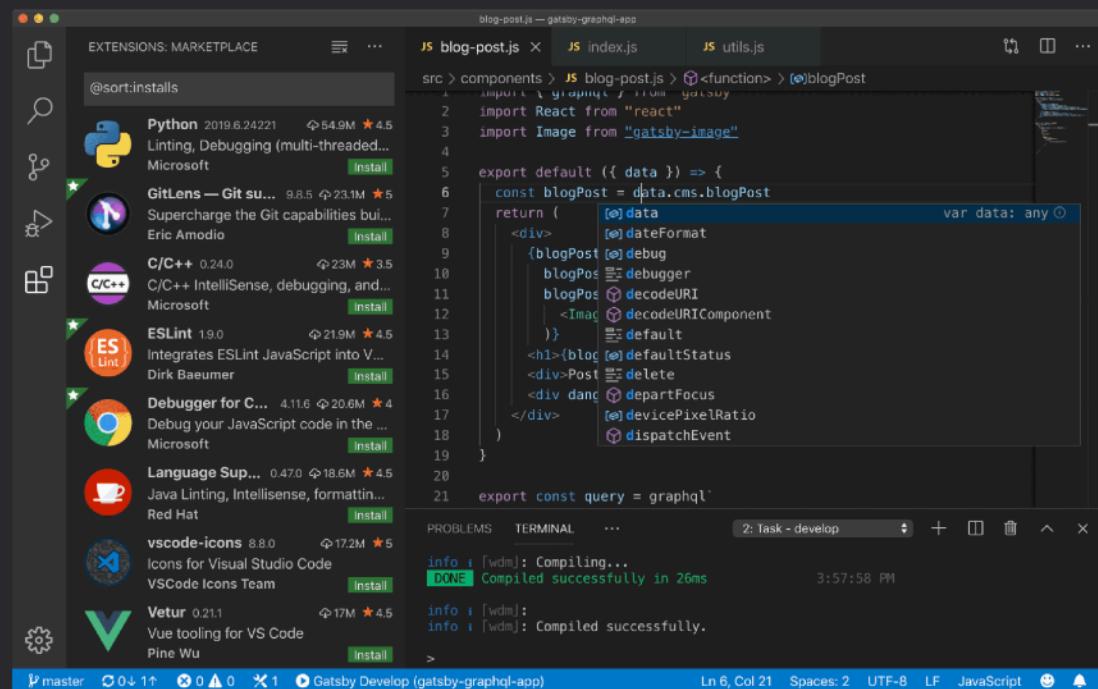
Free. Built on open source. Runs everywhere.

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Stable Build

[Other platforms and Insiders Edition](#)

By using VS Code, you agree to its  
[license](#) and [privacy statement](#).



<https://code.visualstudio.com/>



## Anaconda Distribution

# Free Download

Everything you need to get started in data science on your workstation.

- ✓ Free distribution install
- ✓ Thousands of the most fundamental DS, AI, and ML packages
- ✓ Manage packages and environments from desktop application
- ✓ Deploy across hardware and software platforms



Download



Get Additional Installers



<https://www.anaconda.com/>

Welcome To Colaboratory

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Getting started  

Data science  

Machine learning  

More Resources  

Featured examples 

Welcome to Colab!

(New) Try the Gemini API

- [Generate a Gemini API key](#)
- [Talk to Gemini with the Speech-to-Text API](#)
- [Gemini API: Quickstart with Python](#)
- [Gemini API code sample](#)
- [Compare Gemini with ChatGPT](#)
- [More notebooks](#)

If you're already familiar with Colab, check out this video to learn about interactive tables, the executed code history view, and the command palette.

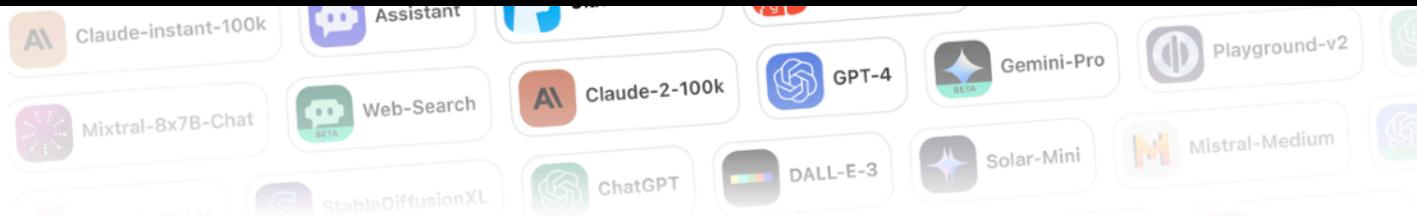


[ ]

What is Colab?

Colab, or "Colaboratory", allows you to write and execute Python in your browser, with

<https://colab.research.google.com/>



**Talk to ChatGPT, GPT-4, Claude 2, DALLE  
3, and millions of others - all on Poe.**

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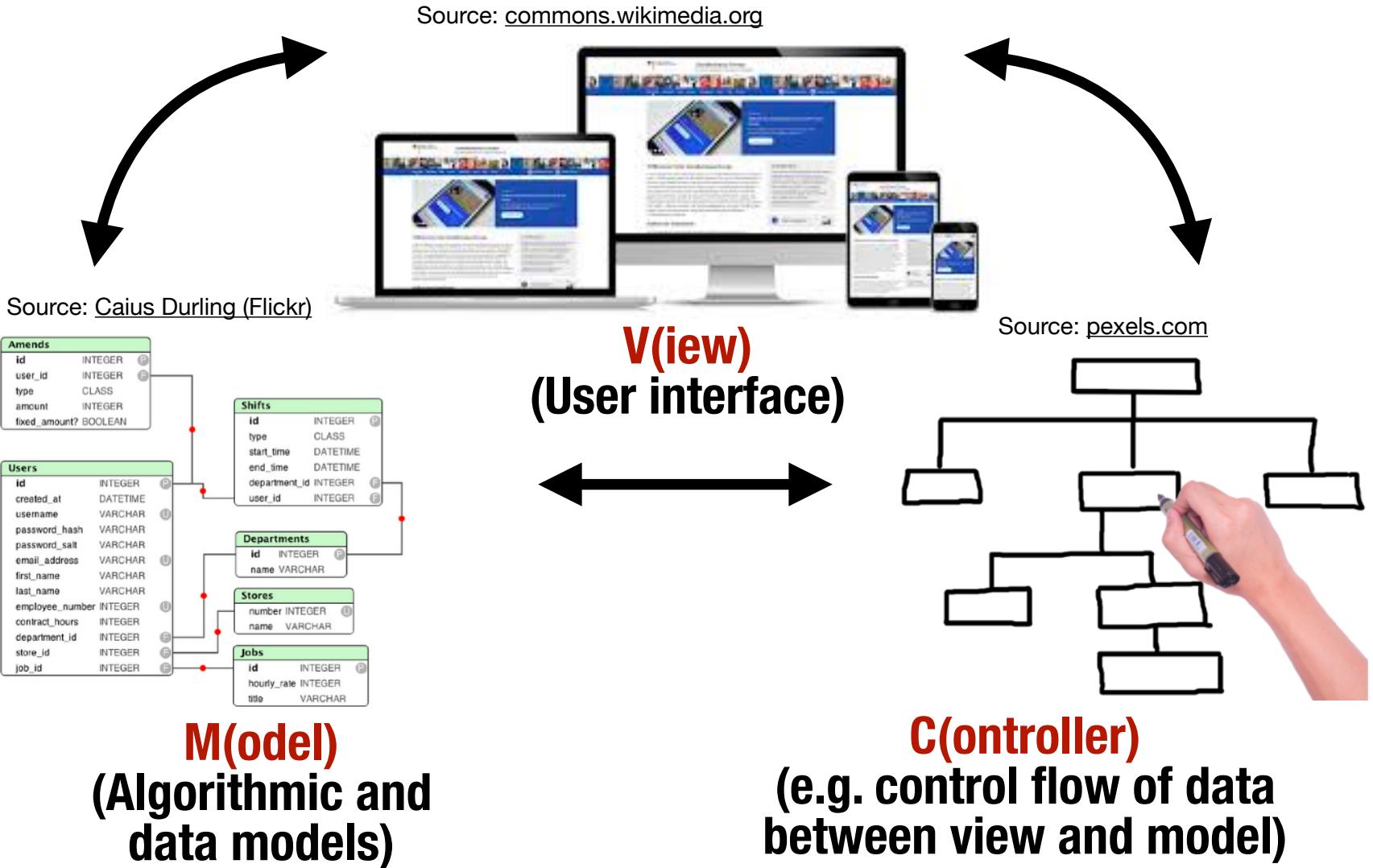
By continuing, you are agreeing to  
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<https://poe.com/>

**Today's agenda.**

1. Web deployment with the **MVC** Model.
2. **HTML/CSS/JS** for developing the **View** component.
3. **Responsive Web** view using the **Bootstrap** library.
4. Python **MVC** web deployment in the **Flask** framework.
5. Running **Flask** application in **JupyterNotebook** or **Google Colab** for application development and testing.

# **Web deployment with the MVC Model Components**



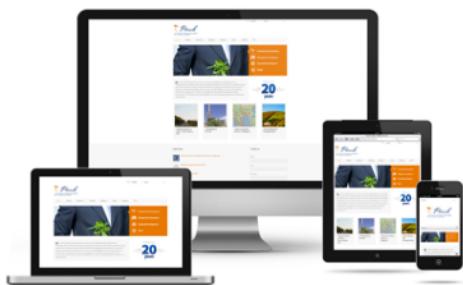
# Browser

Screen Display



# Web Server

User Interface  
e.g. HTML/CSS/JS



```
1 <!DOCTYPE html>
2 <html lang="en">
3   <head>
4     <meta charset="utf-8">
5     <title> A Tiny HTML Document </title>
6     <link href = "styles.css" rel="stylesheet">
7     <script src="scripts.js"></script>
8   </head>
9
10  <body>
11    <p>Let's rock the browser, HTML5 style.</p>
12  </body>
13  </html>
```

## Browser/ Mobile



## Web Server View/ User Interface e.g. HTML/CSS/JS



A screenshot of a web browser displaying a website. A specific section of the page's source code is highlighted in yellow, showing HTML and JavaScript code.

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="utf-8">
<title> A Tiny HTML Document </title>
<link href = "styles.css" rel="stylesheet">
<script src="scripts.js"></script>
</head>

<body>
<p>Let's rock the browser, HTML5 style.</p>
</body>
</html>
```

## App Server Controller/ Algorithmic Model e.g. Python Codes



A screenshot of a terminal window displaying a Python script. The code includes operations like addition, subtraction, multiplication, division, and modulus, along with user input prompts for selecting operations and numbers.

```
# take input from the user
print("Select operation:")
print("1.Add")
print("2.Subtract")
print("3.Multiply")
print("4.Divide")
print("5.Power")
choice = input("Enter choice(1/2/3/4/5):")

num1 = int(input("Enter first number:"))
num2 = int(input("Enter the second number:"))

if choice == '1':
    print(num1, "+", num2, "is", num1+num2)
    print(value, ..., sep=' ', end='\n', file=sys.stdout, flush=True)
```

## File/Database Data Model e.g. CSV, MySQL



A screenshot of a database management system interface showing a table named 'hotpotdata'. The table has columns for res\_name, res\_address, res\_price, res\_foodtype1, res\_res, and res\_dishes. The data shows various restaurant entries with their details.

Filter	Shop1, G/F, Dou...	\$201.400	Filter	2	1.1
1	Daiyweng Rest...	\$201.400	Hot Pot: Guang...	16	2
2	Kan Fung Kith...	\$201.400	Hot Pot: Hong Ko...	16	2
3	Sing Ming Hotp...	\$201.400	Stir Fry: Hot Pot	10	3
4	Victoria Herban...	\$201.400	Hot Pot: Guang...	20	10
5	Yuen Kee 鑫記...	\$201.400	Chiu Chow: Hot Pot	11	0
6	PearlAsia Cuisin...	\$201.400	Hot Pot: Guang...	25	0
7	Shabu Shabu Sh...	\$201.400	Hot Pot: Japanese	21	3
8	新嘉坡	\$201.400	Stir Fry: Hot Pot	100	1
9	Lunch Cartree 飯...	\$201.400	Hot Pot: Hong Ko...	46	0
10	Harmony Chinese...	\$201.400	Hot Pot: Guang...	11	6
11	OneNer Pot - 單鍋...	\$201.400	Hot Pot: Taiwan	10	0
12	Victoria Herban...	\$201.400	Hot Pot: Guang...	15	3
13	百味足食鍋小館...	\$201.400	Stir Fry: Hot Pot	8	2
14	對口子魚頭專賣...	\$201.400	Hot Pot: Guang...	6	3

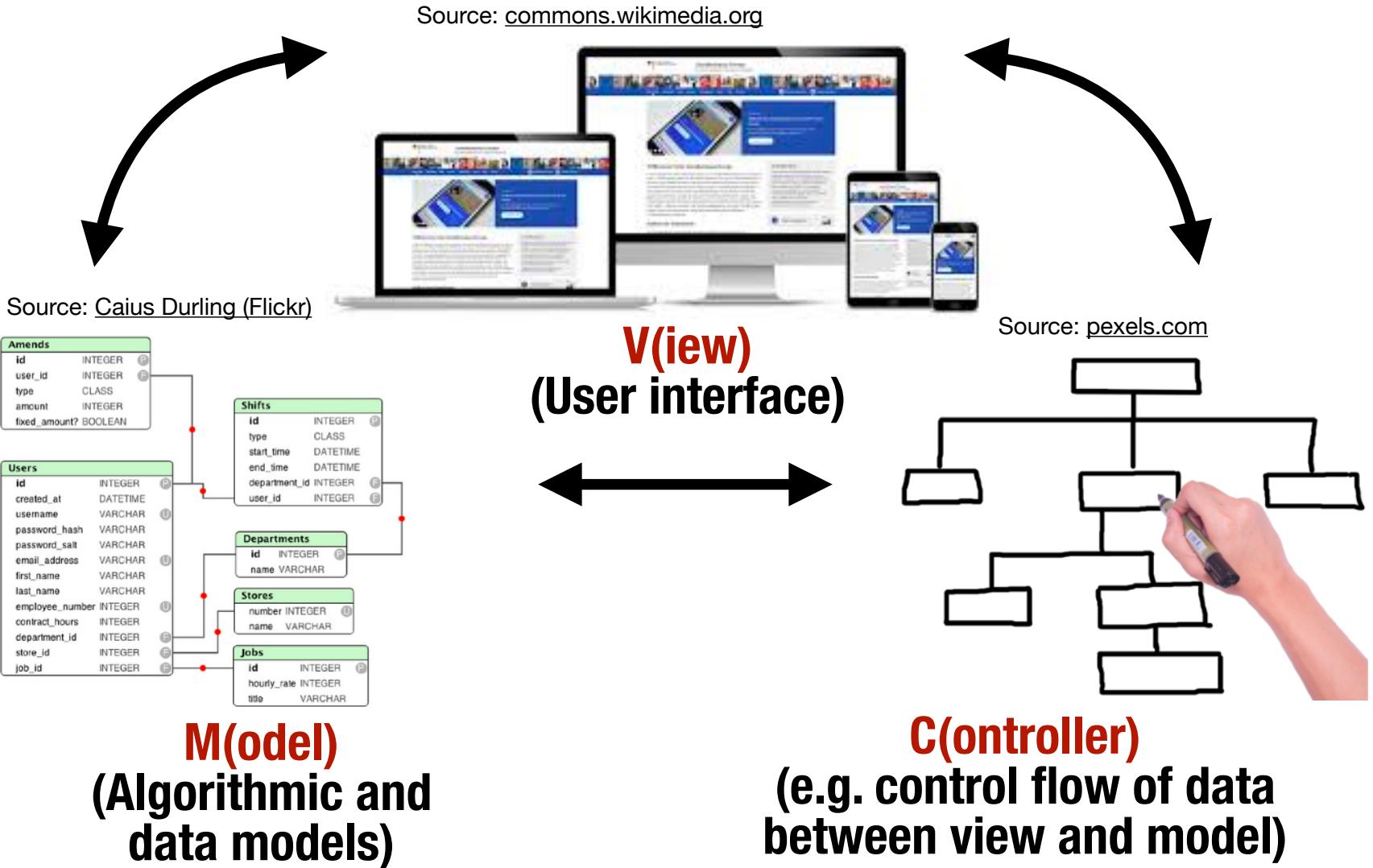
Frontend View

Front-end Codes

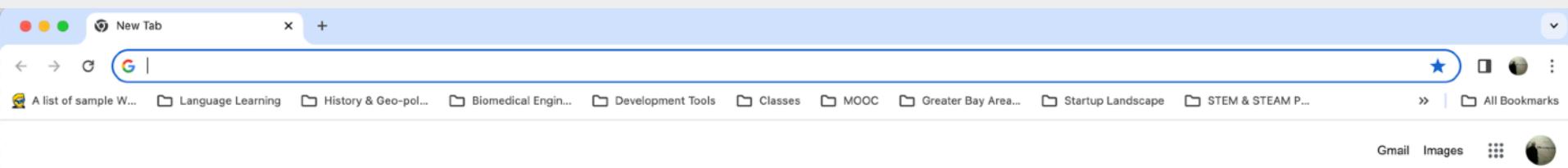
Back-end Codes

Data

# **HTML/CSS/JS** for developing the **View component**



**Inspecting HTML/CSS/JS codes through the  
Chrome browser.**



# Google

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Gmail



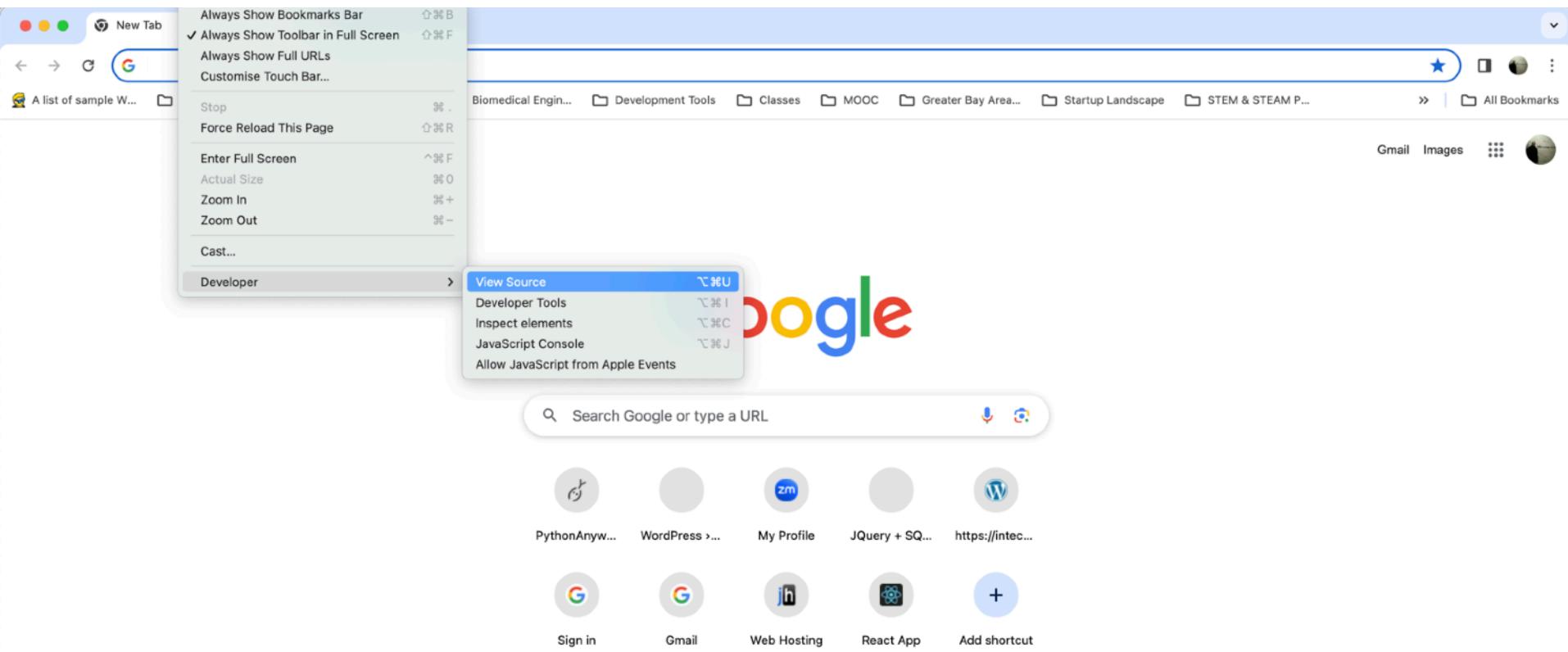
Web Hosting



React App



Add shortcut



```
<!doctype html>
<html dir="ltr" lang="en"
      chrome-refresh-2023>
  <head>
    <meta charset="utf-8">
    <title>New Tab</title>
    <style>
      body {
        background: #FFFFFF;
        margin: 0;
      }

      #backgroundImage {
        border: none;
        height: 100%;
        pointer-events: none;
        position: fixed;
        top: 0;
        visibility: hidden;
        width: 100%;
      }

      [show-background-image] #backgroundImage {
        visibility: visible;
      }
    </style>
  </head>
  <body>
    <iframe id="backgroundImage" src=""></iframe>
    <ntp-app></ntp-app>
    <script type="module" src="new_tab_page.js"></script>
    <link rel="stylesheet" href="chrome://resources/css/text_defaults_md.css">
    <link rel="stylesheet" href="chrome://theme/colors.css?sets=ui,chrome">
    <link rel="stylesheet" href="shared_vars.css">
  </body>
</html>
```



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Gmail Images

Elements > ▲ 179 ✖ 1 ⚙

```
><dom-if style="display: none;"> </dom-if>
<ntp-logo id="logo"> flex
#shadow-root (open)
<!--_html_template_start_-->
<style> :host([hidden]),[hidden]
{display:none!important} </style>
<style include="cr-hidden-style"> </style>
<div id="logo" style="border-style: solid;
display: block;
position: absolute;
top: 50px;
left: 50px;
border-color: coral;
border-width: 10px;
"></div> == $0
```

div#content ntp-logo#logo #shadow-root div#logo

Styles Computed Layout Event Listeners >

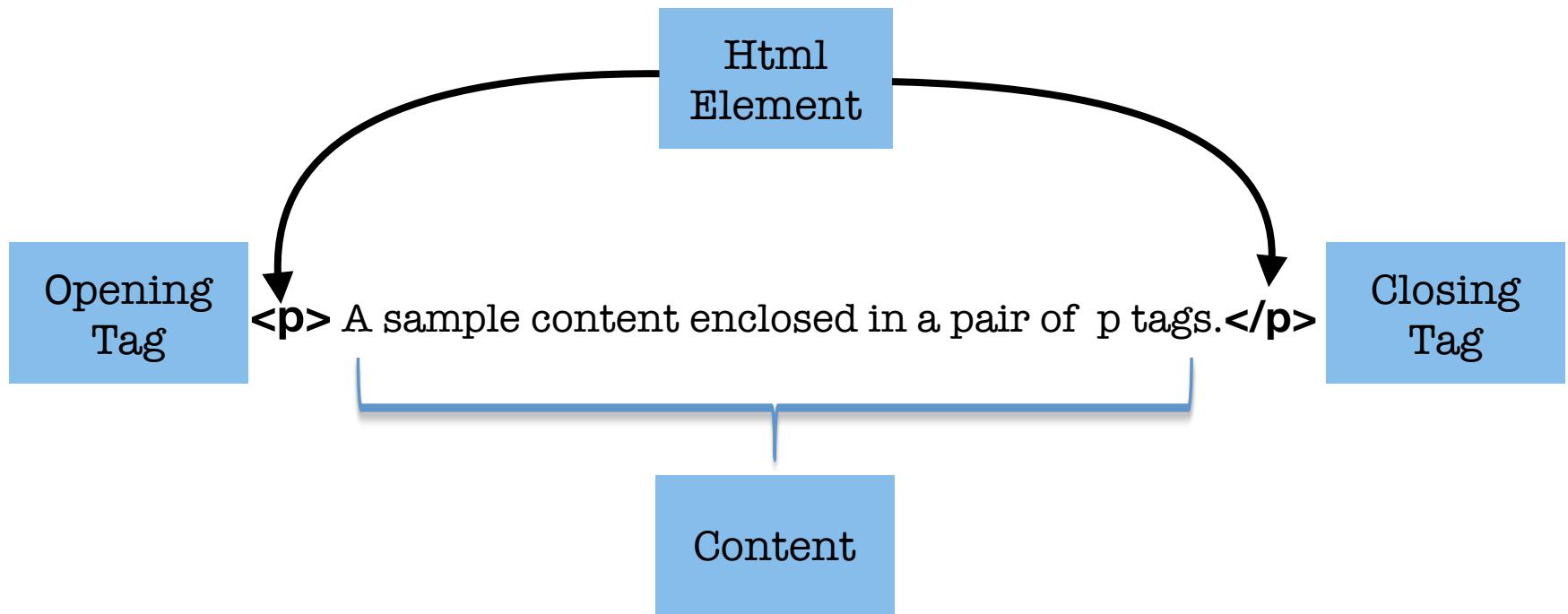
Filter :hov .cls + 🎭

```
element.style {
  border-style: solid;
  display: block;
  position: absolute;
  top: 50px;
  left: 50px;
  border-color: coral;
  border-width: 10px;
}
```

**What does **HTML** stand for in the making  
of a web page?**

**(H)yper (T)ext (M)arkup (L)anguage**

**Markup** is made up of a collection of “**tags**” (special angular brackets **<?>**) used to control the appearance and behaviour of content surrounded by the tags.



```
<!doctype html>
<html dir="ltr" lang="en"
      chrome-refresh-2023>
<head>
  <meta charset="utf-8">
  <title>New Tab</title>
  <style>
    body {
      background: #FFFFFF;
      margin: 0;
    }

    #backgroundImage {
      border: none;
      height: 100%;
      pointer-events: none;
      position: fixed;
      top: 0;
      visibility: hidden;
      width: 100%;
    }

    [show-background-image] #backgroundImage {
      visibility: visible;
    }
  </style>
</head>
<body>
  <iframe id="backgroundImage" src=""></iframe>
  <ntp-app></ntp-app>
  <script type="module" src="new_tab_page.js"></script>
  <link rel="stylesheet" href="chrome://resources/css/text_defaults_md.css">
  <link rel="stylesheet" href="chrome://theme/colors.css?sets=ui,chrome">
  <link rel="stylesheet" href="shared_vars.css">
</body>
</html>
```

**<style> tag and .css file contain CSS properties.**

**<script> tag and .js file contain Javascript commands.**



## Sustainability in college education

New Chung Chi College Head's global vision for student experiences

<https://www.cuhk.edu.hk/english/index.html>

HIGHLIGHTS



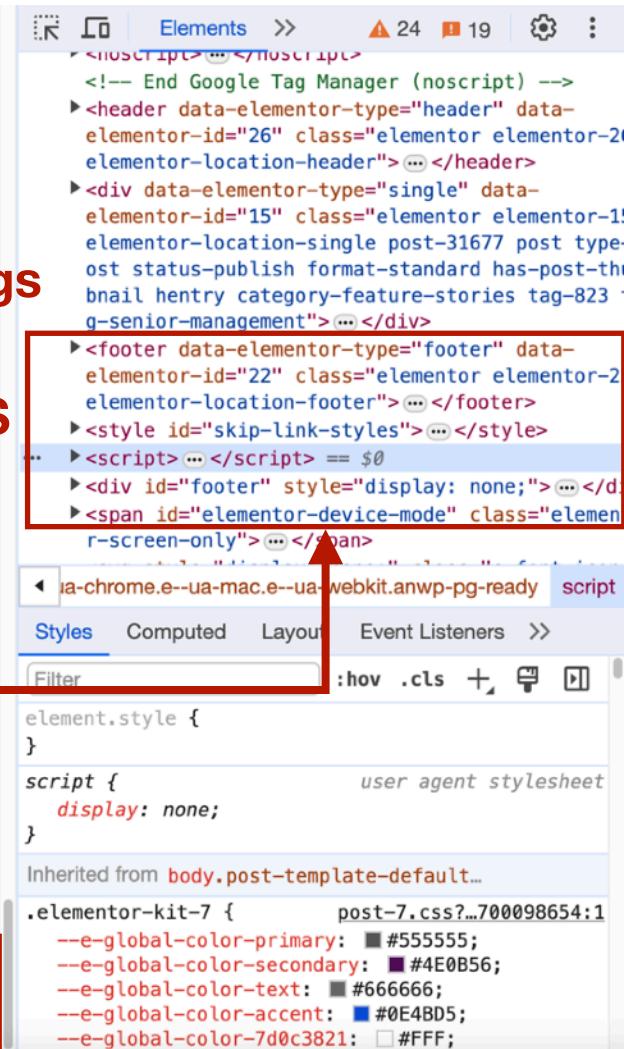
Professor Kwan sang to raise funds for Chung Chi last year. For that, she practised singing months in advance.

The college is steering "Project E", which involves redeveloping staff quarters near the MTR entrance to CUHK into two buildings to be used as staff and student accommodation, an activity centre for alumni and a digital culture and art creativity centre by 2027.

HK\$31 million has already been raised and the architectural design has recently been confirmed. Professor Kwan says the college will work hard to raise the rest of the HK\$180 million needed to complete the project. "We will have a piazza to connect the University's entrance to the new buildings, and that space will welcome not just Chung Chi students, but all CUHK members and become a new hub of the University."

By Joyce Ng

Photos: main photo by LCT; others by courtesy of Professor Kwan



**<...> HTML tags**

**<footer>**

**<style> - CSS**

**<script> - JS**

The screenshot shows the browser's developer tools with the 'Elements' tab selected. A red box highlights the footer element in the DOM tree. An arrow points from this highlighted element to the 'script' block in the CSS panel, which contains the CSS rule `display: none;`. The CSS panel also lists other styles like `element.style {}` and `script {}`.

```
<!DOCTYPE html>
<html>
<head>
    <!-- End Google Tag Manager (noscript) -->
    <header data-elementor-type="header" data-elementor-id="26" class="elementor elementor-26 elementor-location-header">...</header>
    <div data-elementor-type="single" data-elementor-id="15" class="elementor elementor-15 elementor-location-single post-31677 post type-post status-publish format-standard has-post-thumbnal hentry category-feature-stories tag-823 tag-senior-management">...</div>
    <footer data-elementor-type="footer" data-elementor-id="22" class="elementor elementor-22 elementor-location-footer">...</footer>
    <style id="skip-link-styles">...</style>
    ...<br/>
    <script>...</script> == $0
    <div id="footer" style="display: none;">...</div>
    <span id="elementor-device-mode" class="elementor-device-mode r-screen-only">...</span>
</div>
</body>
</html>
```

Styles Computed Layout Event Listeners >>

Filter :hover .cls + □ □

element.style {}  
script {} user agent stylesheet  
Inherited from body.post-template-default...  
.elementor-kit-7 { post-7.css?...700098654:1  
--e-global-color-primary: #555555;  
--e-global-color-secondary: #4E0B56;  
--e-global-color-text: #666666;  
--e-global-color-accent: #0E4BD5;  
--e-global-color-7d0c3821: #FFF;



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繁 简

Search...

HIGHLIGHTS

div.elementor-widget-wrap.elementor-element-populated 295.2x136



Elements >> ▲ 20 🔍 15 ⚙

```
<div class="elementor-container elementor-column-gap-default"> flex
  <div class="elementor-column elementor-top-column elementor-element elementor-element-7d51d60" data-id="7d51d60" data-element_type="column"> flex
    ...
    <div class="elementor-widget-wrap elementor-element-populated"> flex == $0
      <div class="elementor-element elementor-element-91f7a66 focus_logo elementor-widget elementor-widget-theme-site-logo elementor-widget-image" data-id="91f7a66" data-element_type="widget" id="focus_logo" data-widget_type="theme-site-logo.default">
        <div class="elementor-widget-container">
          <style>...</style>
        </div>
      </div>
    </div>
  </div>
</div>
```

div.elementor-widget-wrap.elementor-element-populated

Styles Computed Layout Event Listeners >>

Filter :hov .cls + 🎭

```
element.style { }
}
.elementor-26 post-26.css...700098655:1
.elementor-element.elementor-element-7d51d60.elementor-column.elementor-element[data-element_type="column"] > .elementor-widget-wrap.elementor-element-populated {
```

<https://www.cuhk.edu.hk/english/index.html>

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## HIGHLIGHTS

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Elements >> ▲ 20 ■ 15 ⚙

```
<div class="elementor-container elementor-column-gap-default"> flex
  <div class="elementor-column elementor-top-column elementor-element elementor-element-7d51d60" data-id="7d51d60" data-element_type="column"> flex
    ...
    <div class="elementor-widget-wrap elementor-element-populated" style="display: block; background: lavender; height: 80px; position: absolute; top: 200px; left: 200px;"> => $0
      <div class="elementor-element elementor-element-91f7a66 focus_logo elementor-widget elementor-widget-theme-site-logo elementor-widget-image" data-id="91f7a66">
        div.elementor-widget-wrap.elementor-element-populated
          Styles Computed Layout Event Listeners >>
          Filter :hov .cls + □
          element.style {
            display: block;
            background: ► lavender;
            height: 80px;
            position: absolute;
            top: 200px;
            left: 200px;
          }
```

<https://www.cuhk.edu.hk/english/index.html>

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HIGHLIGHTS

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CUHK 走進中大  
CUHK In Focus

Sustainability in college education

VC'S MESSAGE

Elements > 20 15 ⚙

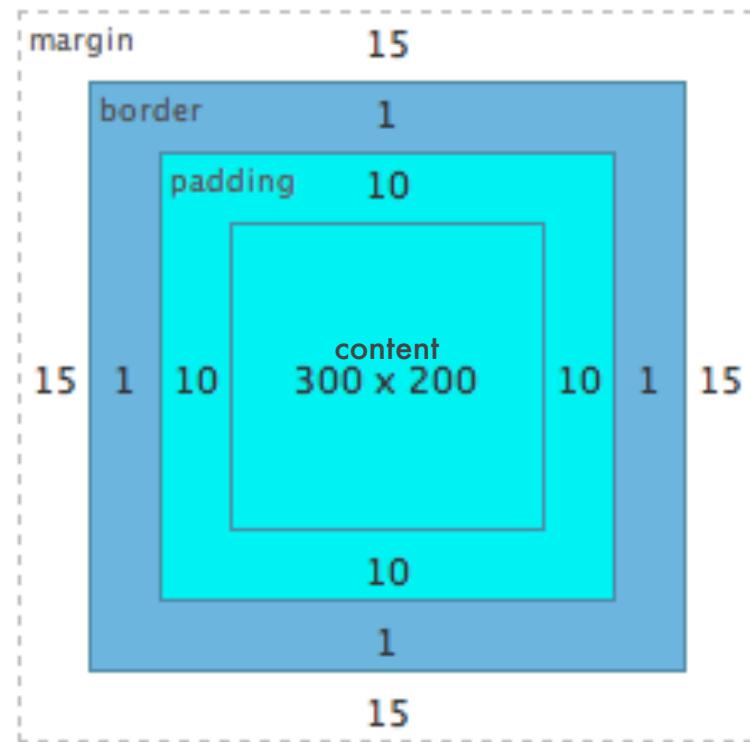
```
<div class="elementor-container elementor-column-gap-default" flex>
  <div class="elementor-column elementor-col-25 elementor-top-column elementor-element elementor-element-7d51d60" data-id="7d51d60" data-element_type="column"> flex
    ...
    <div class="elementor-widget-wrap elementor-element-populated" style="display: block; background: lavender; height: 80px; position: absolute; top: 200px; left: 200px;">
      " > == $0
      <div class="elementor-element elementor-element-91f7a66 focus_logo elementor-widget elementor-widget-site-logo elementor-widget-image" data-id="91f7a66" data-element_type="image">
        ...
        <div.elementor-widget-wrap.elementor-element-populated>
```

Styles Computed Layout Event Listeners >

position 200  
margin -  
border -  
padding 10  
10 275.203x60 10 -200  
10  
- - - -144

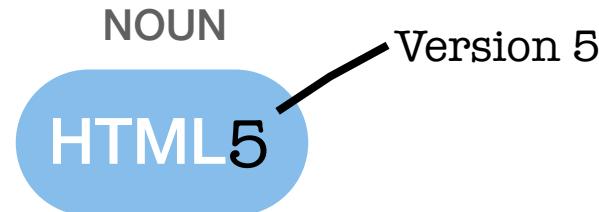
<https://www.cuhk.edu.hk/english/index.html>

# The Box Model



## Exceptions - Self-closing Elements

- <br>
- <img>
- <meta>
- <wbr>
- <embed>
- <input>
- <param>
- <hr>
- <link>
- <source>

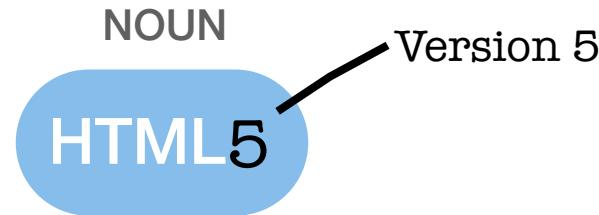


<html>, <head>, <title>, <meta>, <style>, <script>, <body>, <header>, <img>, <footer>, <nav>, <main>, <section>, <aside>, <p>, <br>, <a>, <ol>, <ul>, <li>, <table>, <div>, <span>, <form>

24 most common tags in total

Tag **Elements**  
Has  
properties

(e.g. color, background-color, position, font-family, font-size, font-style, display, width, margin, border, padding)



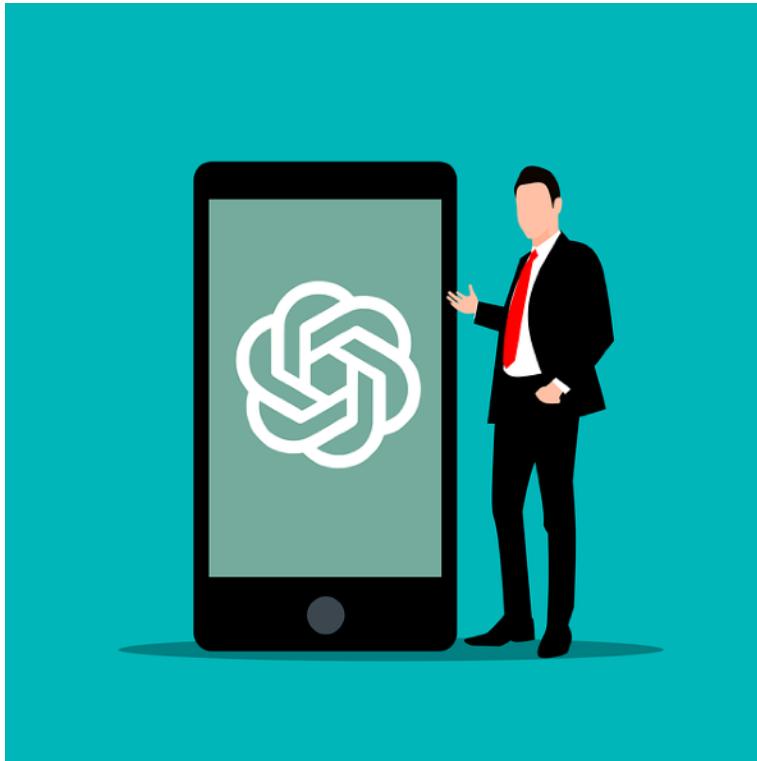
<html>, <head>  
<main>, <secti  
24 most common tags in 2021

ter>, <nav>,  
>,<form>

## Too many tags to remember! Is there an **easier way?**

Tag **Elements**  
Has  
properties

(e.g. color, background-color, position, font-family, font-size, font-style, display, width, margin, border, padding)



Can we let **Generative AI**  
**(e.g. ChatGPT)** generate  
the codes for us.?



Assistant

Operated by @poe

Your audience is an elementary school student and you are his teacher trying to show him the basic skeleton of a HTML page. Please create the most basic HTML page.

html

Copy

```
<!DOCTYPE html>
<html>
  <head>
    <title>My First Web Page</title>
  </head>
  <body>
    <h1>Hello, World!</h1>
    <p>Welcome to my first web page.</p>
  </body>
</html>
```

## The skeleton of a standard **HTML** page.



Source: [O'Reilly](#)

*The minimal structure of an HTML document.*

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset= “utf-8”>
    <title>Title here </title>
  </head>

  <body>
    <h1>This is a heading. </h1>
    <p> This is a paragraph. </p>
    <p> This is a paragraph. </p>
  </body>
</html>
```

} Page content

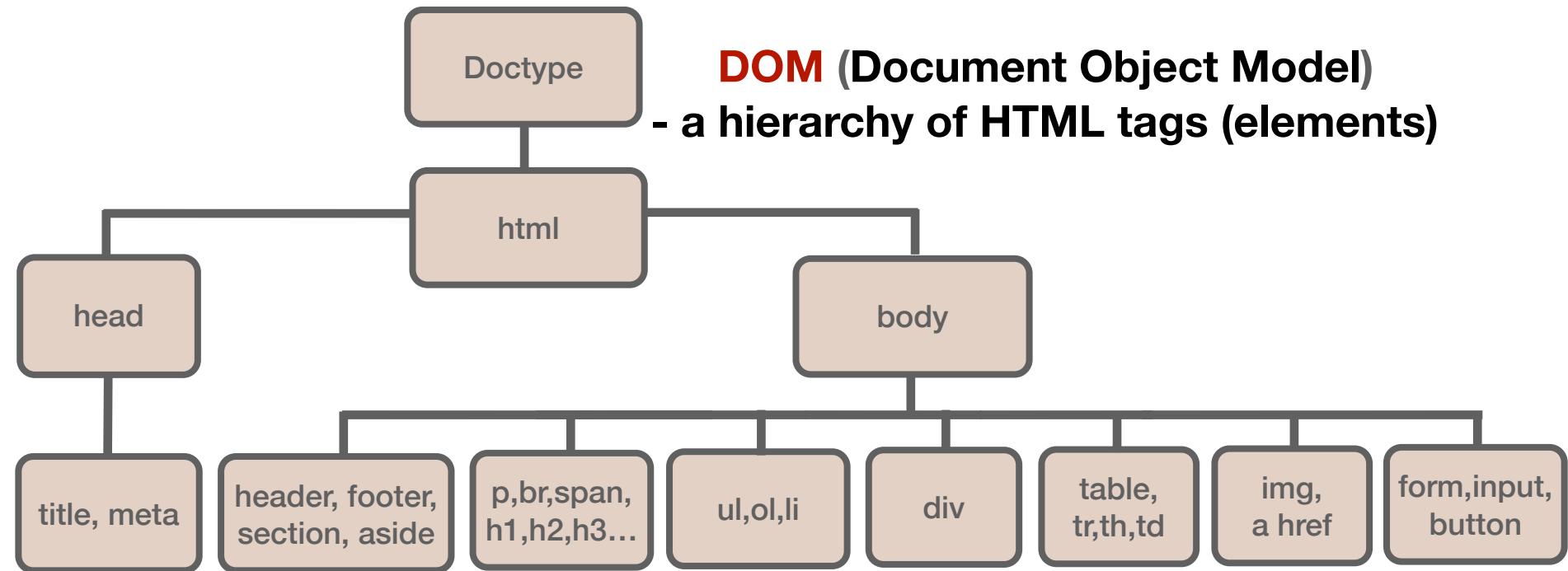
```
<!DOCTYPE html>
<html>
  <head>
    <meta charset= "utf-8">
    <title> Title here </title>
  </head>

  <body>
    <h1>This is a heading. </h1>
    <p> This is a paragraph. </p>
    <p> This is a paragraph. </p>
  </body>
</html>
```

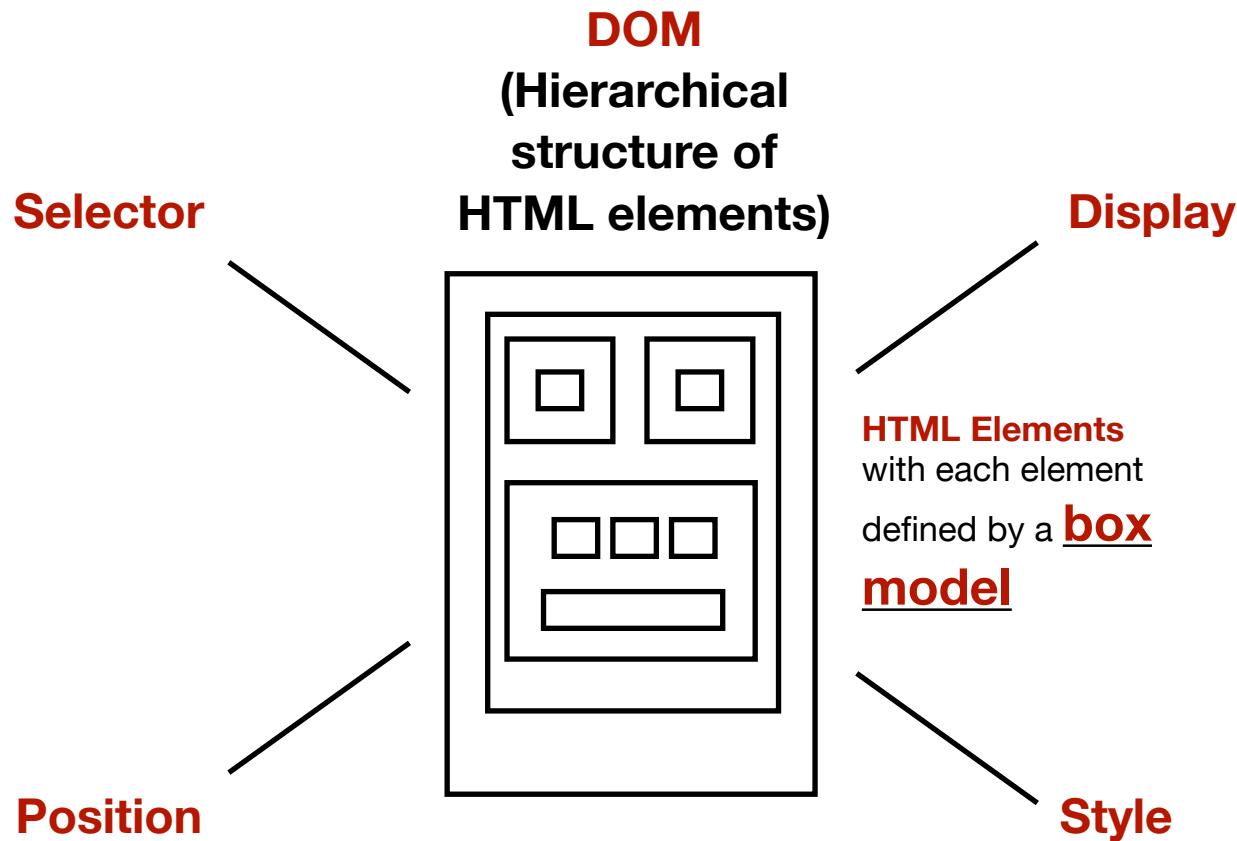
Page content

## **DOM (Document Object Model)**

**- a hierarchy of HTML tags (elements)**



**Organise the “**tags**” in designing HTML page layout with the **DOM** structure.**



**Understanding the Box model display  
property using the <DIV class='class  
name'> tag.**



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ABOUT CUHK ADMISSIONS COLLEGES FACULTIES TEACHING & LEARNING RESEARCH & IMPACT CAMPUS

## 香港中文大學60周年 CUHK 60th anniversary

Elements    Console    Sources    Performance insights    Network    Performance    Memory    Application    Security    Lighthouse    >    x 7    x 9    Settings    More

<div id="body-frame" style="min-height: 261px;">

  > <header class="full-col">...</header>

  > <nav class="navbar">...</nav>

  <!-- /div -->

  <!--/header-->

  <main>

    <section id="feature-container" class="full-col">

      <div id="feature" class="slide" data-ride="carousel"> == \$0

        <!-- Wrapper for slides -->

        <div class="carousel-inner" role="listbox">

          <ol class="carousel-indicators">...</ol>

          <div class="item">...</div>

    </section>

  </main>

  </div>

  <!-- /body-frame -->

  </div>

  <!-- /body -->

  <!-- /html -->

Styles    Computed    Layout    Event Listeners    >

Filter :hover .cls + ↻

element.style {

}

#feature {

background-color: #FFF;

margin-bottom: 30px;

border-style: solid;

border-width: 10px;

border-color: red;

}

homepage.css?202308:12



Assistant

Operated by  @poe

In the following HTML page, create a class selector for the h1 tag and call it 'title' and give the 'title' class a background color of red and a black color border with the width of 5 px.

html

 Copy

```
<!DOCTYPE html>
<html>
<head>
    <title>My First Web Page</title>
    <style>
        .title {
            background-color: red;
            border: 5px solid black;
        }
    </style>
</head>
<body>
    <h1 class="title">Hello, World!</h1>
    <p>Welcome to my first web page.</p>
</body>
</html>
```

**How can we display the HTML  
codes as web page?**

## Browser/ Mobile



## Web Server View/ User Interface e.g. HTML/CSS/JS



A screenshot of a web browser displaying a website. A specific section of the HTML code is highlighted in yellow:

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="utf-8">
<title> A Tiny HTML Document </title>
<link href = "styles.css" rel="stylesheet">
<script src="scripts.js"></script>
</head>

<body>
<p>Let's rock the browser, HTML5 style.</p>
</body>
</html>
```

## App Server Controller/ Algorithmic Model e.g. Python Codes



A screenshot of a terminal window displaying Python code. A specific section of the code is highlighted in yellow:

```
# take input from the user
print("Select operation:")
print("1.Add")
print("2.Subtract")
print("3.Multiply")
print("4.Divide")
print("5.Power")
choice = input("Enter choice(1/2/3/4/5):")

num1 = int(input("Enter first number:"))
num2 = int(input("Enter the second number:"))

if choice == '1':
    print(num1, "+", num2, "=", num1+num2)
    print(value, ..., sep=' ', end='\n', file=sys.stdout, flush=False)
```

## File/Database Data Model e.g. CSV, MySQL



A screenshot of a MySQL database interface showing a table named 'hotpotdata'. The table has columns: res\_name, res\_address, res\_price, res\_foodtype1, res\_res, and res\_dishes. The data is as follows:

Filter	Shop1, G/F, Dou...	\$201.400	Filter	2	1.1
	Ken Fung Kie... -	\$201.400		0	1.1
	Sing Ming HotP... -	\$201.400	Str.Fry Hot Pot	10	1.1
	Victoria Hotpo... -	\$201.400	Hot Pot: Guang... -	20	1.1
	Yuen Kee 鑫記...	\$201.400	Gho Chow: Hot Pot	11	1.1
	PearlAsia Cuisi...	\$201.400	Hot Pot: Guang... -	25	1.1
	Shabu Shabu Sh...	\$201.400	Hot Pot: Japanese	21	1.1
	新嘉坡	\$201.400	Str.Fry Hot Pot	100	1.1
	Lunch Cartree 飯...	\$201.400	Hot Pot: Hong Ko...	46	0
	Nomony Chinese ...	\$201.400	Hot Pot: Guang... -	11	1.1
	OneNest Pte - 電...	\$201.400	Hot Pot: Taiwan...	10	1.1
	Victoria Hotpo... -	\$201.400	Hot Pot: Guang... -	15	1.1
	百味足食港式小...	\$201.400	Str.Fry: Hot Pot	8	1.1
	Shop28, 27, G/F...	\$201.400	Hot Pot: Guang... -	3	1.1

Frontend View

Front-end Codes

Back-end Codes

Data

**Browser (e.g. Chrome) translates HTML/  
CSS/JS into web pages that ordinary  
people can understand.**

**We need a `code editor` to create  
HTML/CSS/JS files.**

Version 1.47 is now available! Read about the new features and fixes from June.

# Code editing. Redefined.

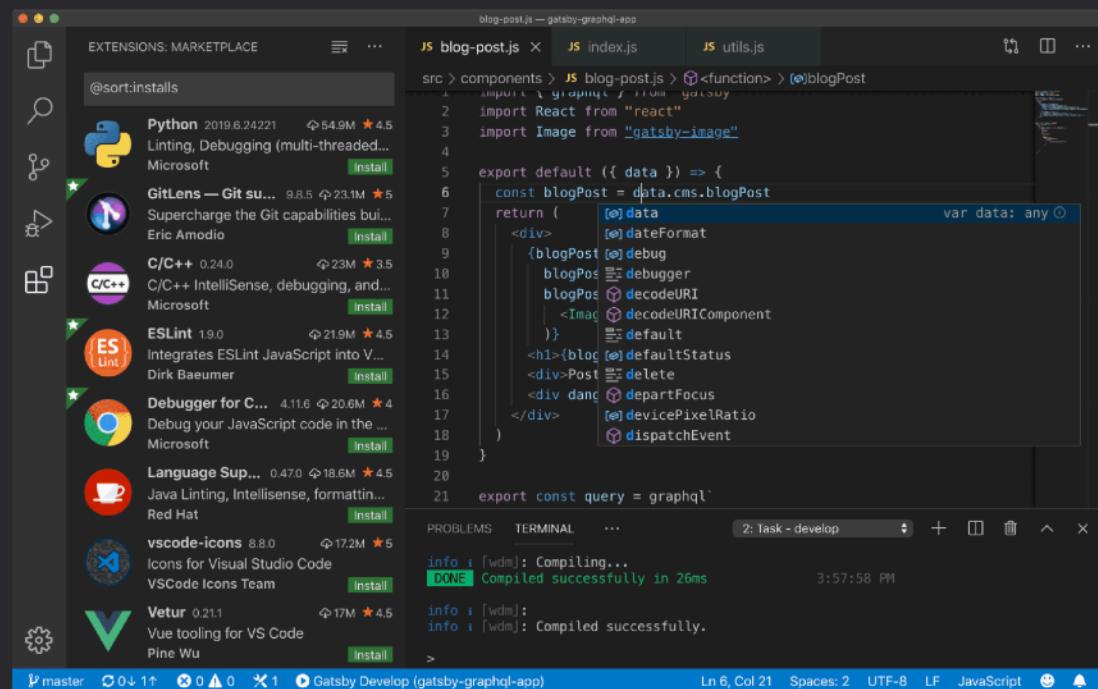
Free. Built on open source. Runs everywhere.

[Download for Mac](#)

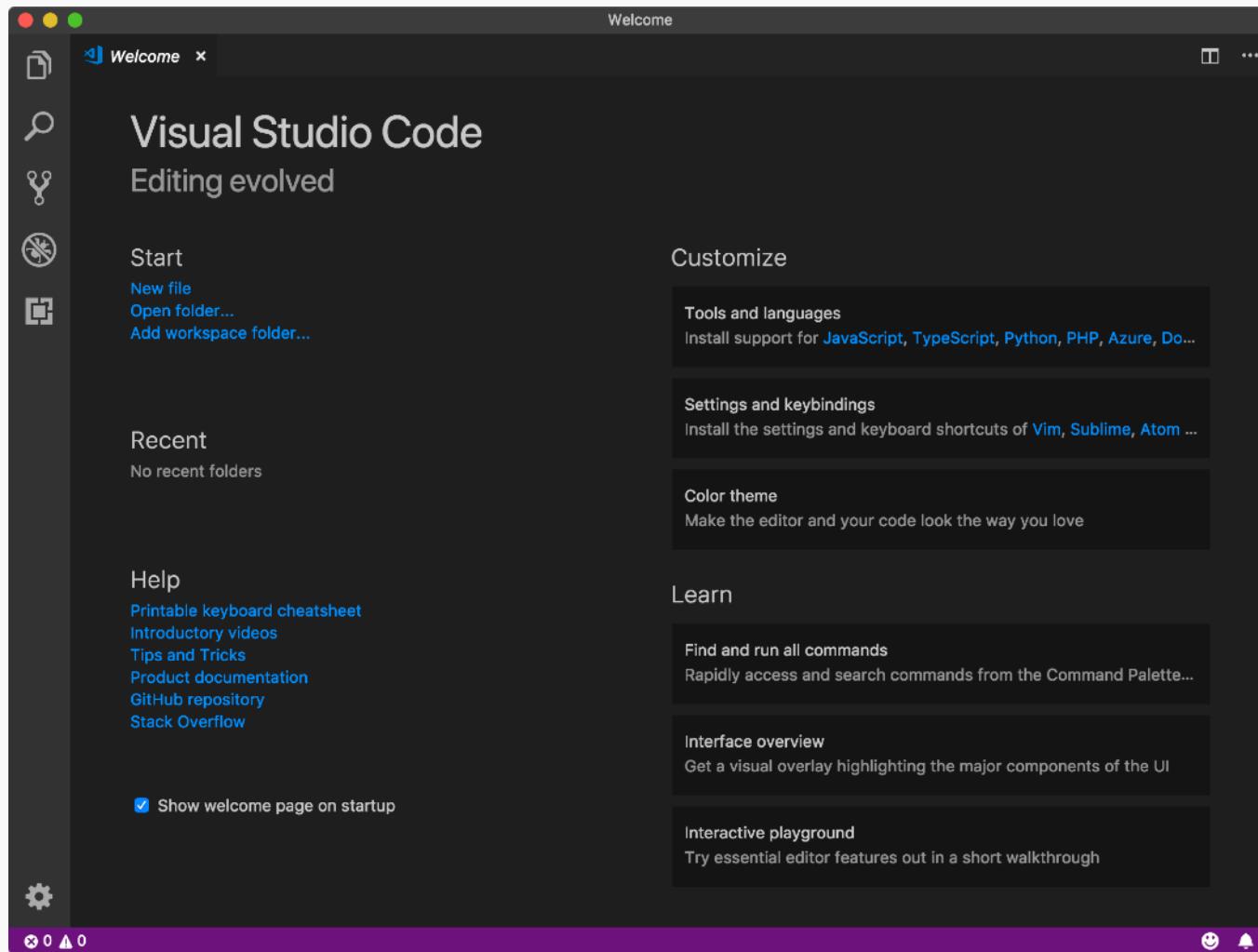
Stable Build

[Other platforms and Insiders Edition](#)

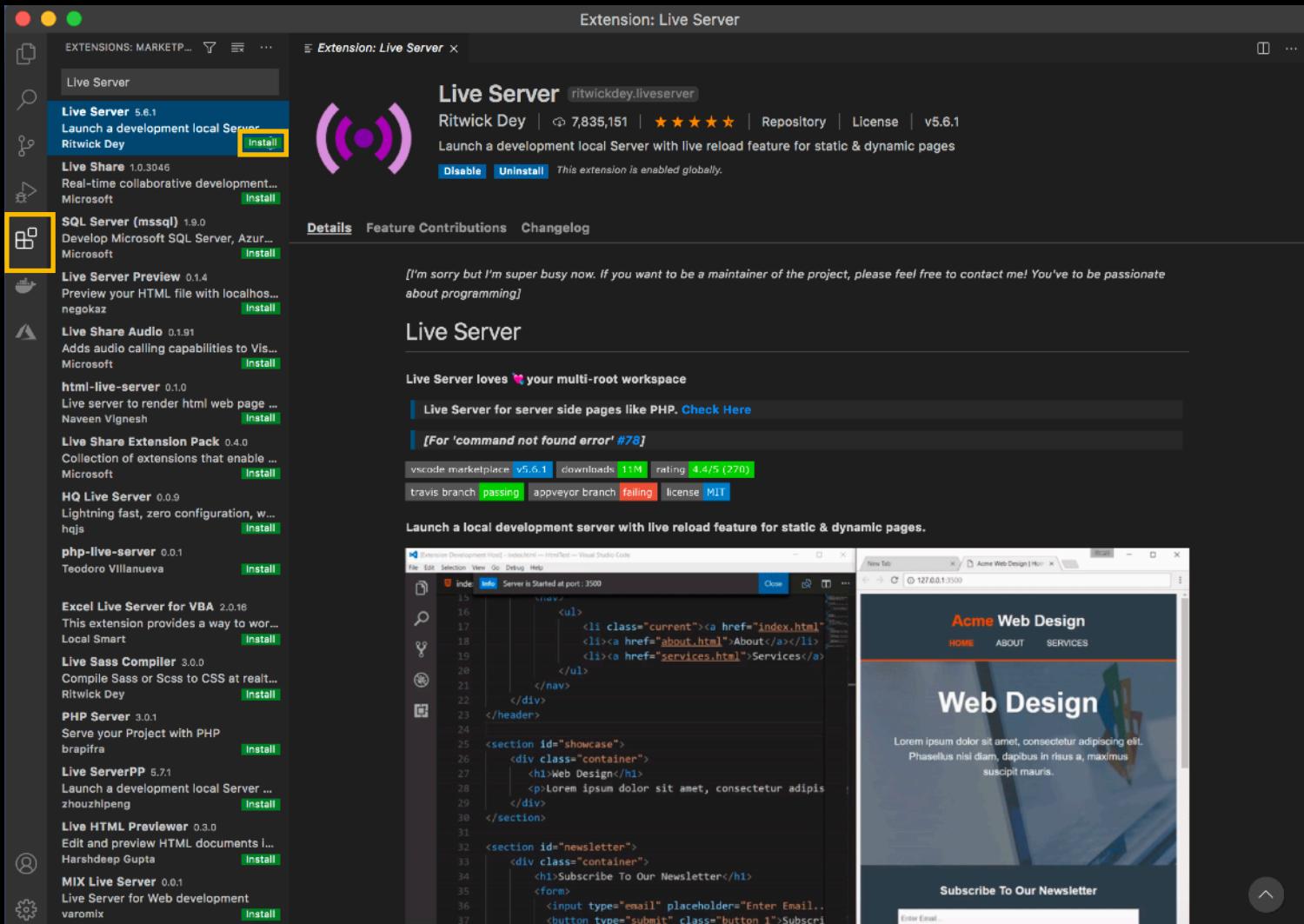
By using VS Code, you agree to its  
[license](#) and [privacy statement](#).

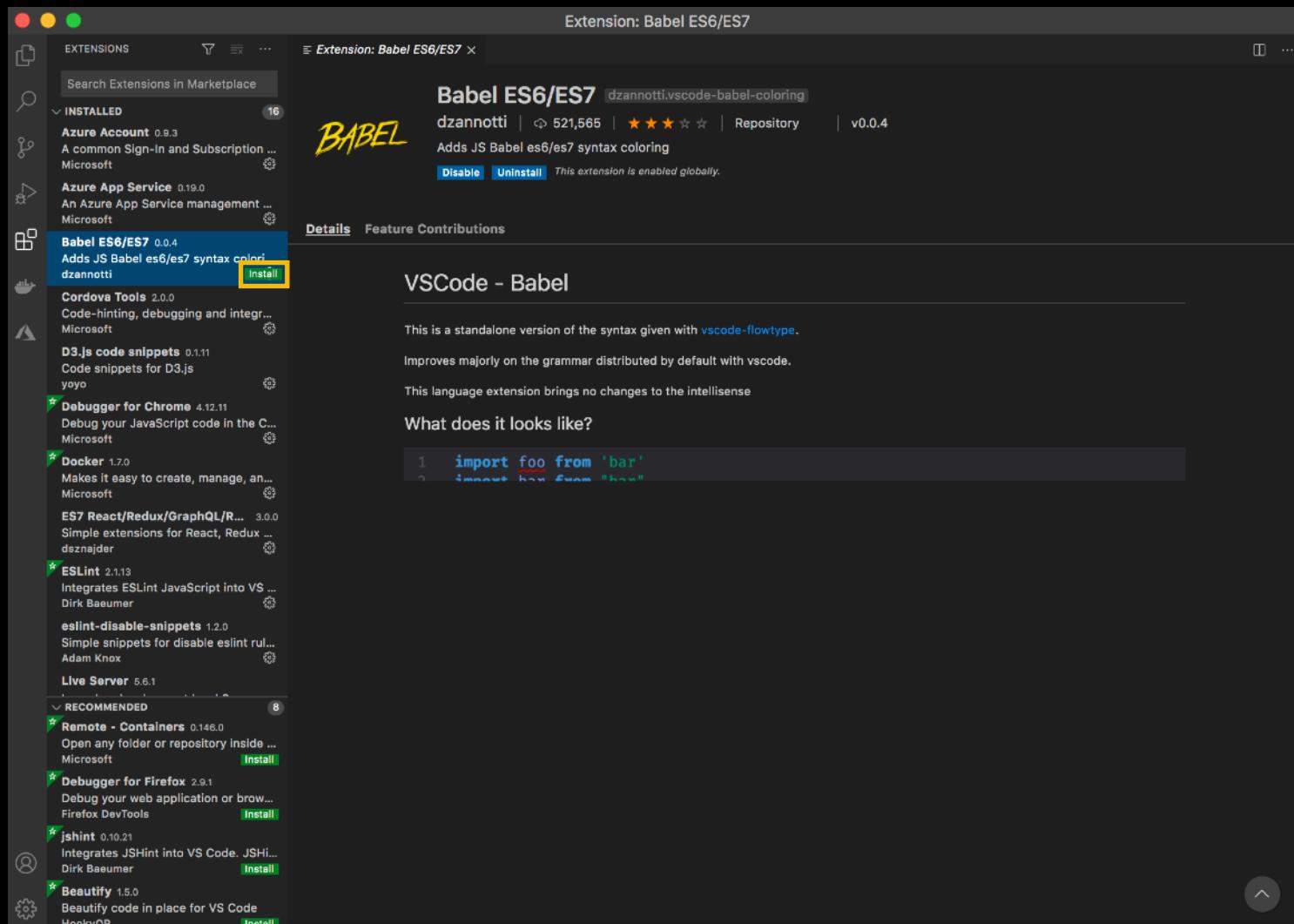


<https://code.visualstudio.com/>



# **Adding plugins.**







**Exercise time:  
\_\_ minutes**

HTML Basics

Assistant

Certainly! Here's an updated version of the `<style>` tag:

```
html
<!DOCTYPE html>
<html>
<head>
  <title>My First Web Page</title>
  <style>
    .title {
      background-color: red;
      border: 5px solid black;
    }
  </style>
</head>
<body>
  <h1 class="title">Hello, World!</h1>
  <p>Welcome to my first web page.</p>
</body>
</html>
```

In this example, we've added a `<style>` block directly within the `<head>` section of the HTML document. This allows the CSS styles to be applied to the entire page.

Share

EXPLORER

OPEN EDITORS

DATAHACK

example01.html 3

example01.html > ...

```
1 <!DOCTYPE html>
2 <html>
3   <head>
4     <title>My First Web Page</title>
5     <style>
6       .title {
7         background-color: red;
8         border: 5px solid black;
9       }
10    </style>
11  </head>
12  <body>
13    <h1 class="title">Hello, World!</h1>
14    <p>Welcome to my first web page.</p>
15  </body>
16</html>
17
```

OUTLINE

TIMELINE

PWABUILDER STUDIO

Spaces: 4    UTF-8    LF    HTML    Port : 5501    Prettier

Talk to Assistant

# The Grammar of HTML Elements

- Open with **<> tag** (e.g. `<p>`).
- End with **</> tag** (e.g. `</p>`).
- Element **content is everything between** the start and end tags.
- Some elements have empty content and no end tag (e.g. `<br>`).
- The elements are represented through the **box model** organised in a hierarchical structure (i.e. **DOM**).
- Most elements have **properties** that can be further enhanced through **CSS**.

**What does CSS stand for?**

**(C)ascading (S)tyle (S)heet**

**CSS Demonstration:**

**[https://www.w3schools.com/css/css\\_intro.asp](https://www.w3schools.com/css/css_intro.asp)**

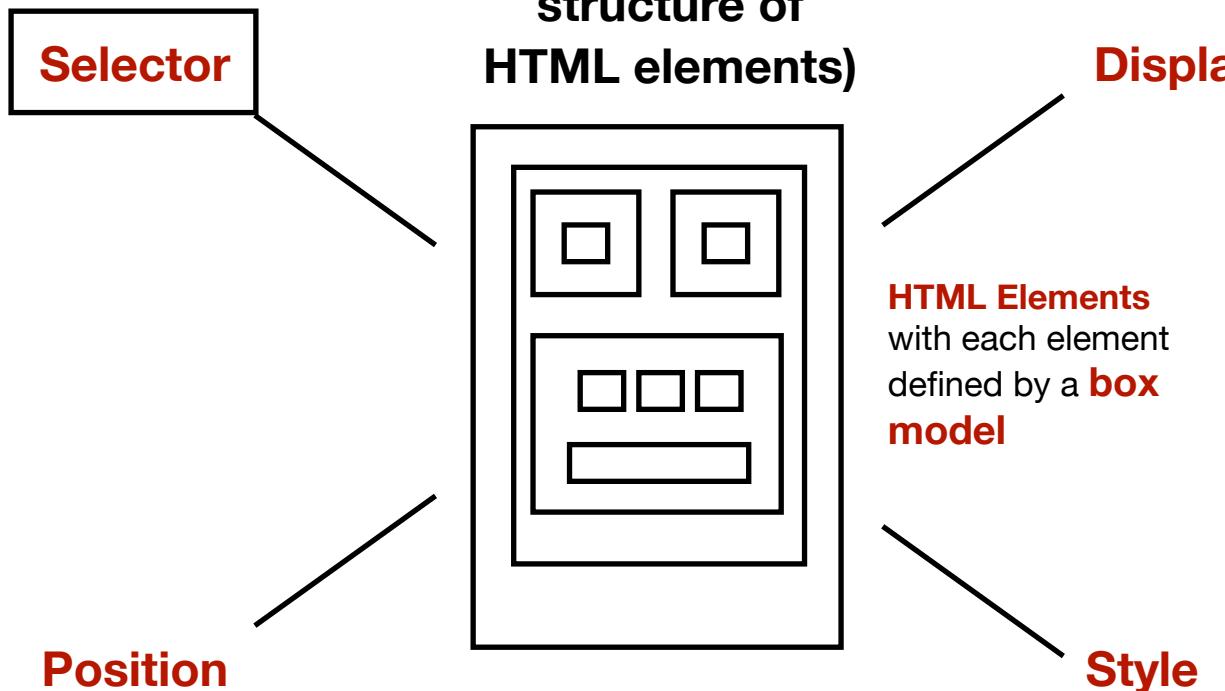
# CSS Demo - One HTML Page - Multiple Styles!

Here we will show one HTML page displayed with four different stylesheets. Click on the "Stylesheet 1", "Stylesheet 2", "Stylesheet 3", "Stylesheet 4" links below to see the different styles:

The screenshot shows a web page titled "CSS Demo - One HTML Page - Multiple Styles!". The page features a green header bar with the text "Welcome to My Homepage" and "Use the menu to select different Stylesheets". To the left, there is a sidebar menu with five options: "Stylesheet 1" (highlighted in green), "Stylesheet 2", "Stylesheet 3", "Stylesheet 4", and "No Stylesheet". The main content area contains large, bold text: "Same Page Different Stylesheets". Below this, there is descriptive text explaining the purpose of the demo: "This is a demonstration of how different stylesheets can change the layout of your HTML page. You can change the layout of this page by selecting different stylesheets in the menu, or by selecting one of the following links: [Stylesheet1](#), [Stylesheet2](#), [Stylesheet3](#), [Stylesheet4](#)".

[https://www.w3schools.com/css/css\\_intro.asp](https://www.w3schools.com/css/css_intro.asp)

# **DOM** (Hierarchical structure of HTML elements)

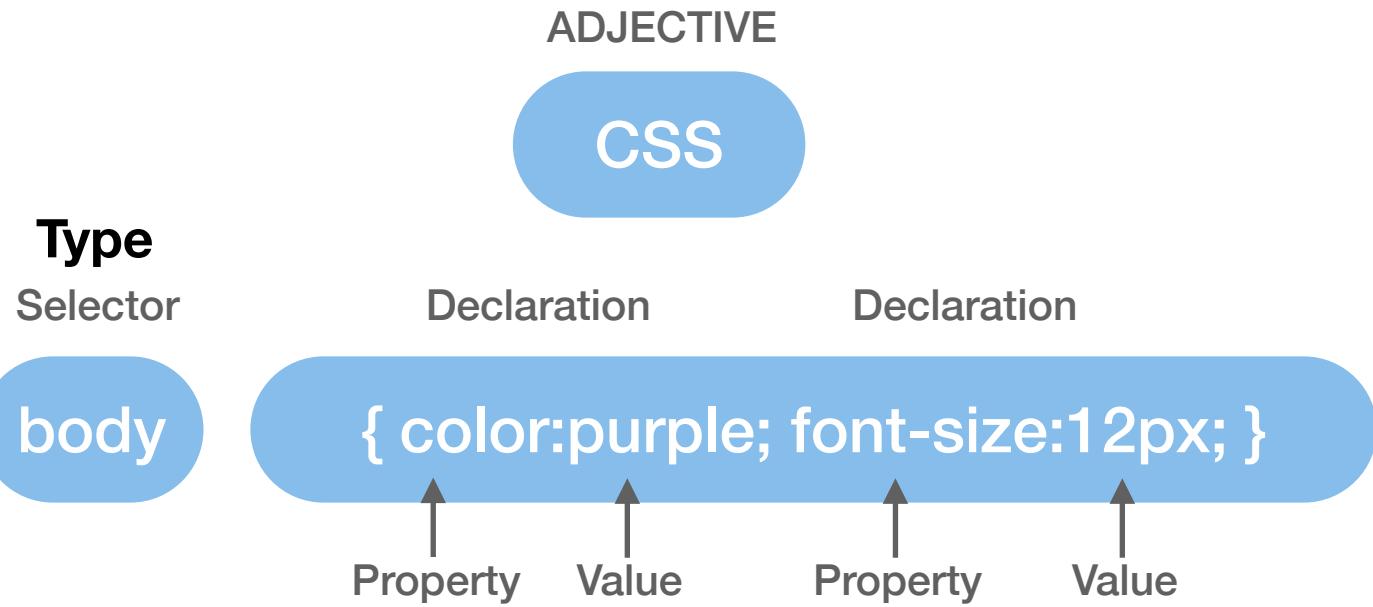


## **MOST IMPORTANT LESSON TO REMEMBER IN CSS:**

To **style** a HTML element, you need to have a way to access it. In CSS, this is done through the **SELECTOR**.

There are two types of selector: **Type** and **Custom**. The **Type** selector use standard HTML element name as the selector.

Once an element is selected, it can be styled by changing the **values** of its **properties**.



**Custom** (e.g. **class** or **id**)  
Selector

ADJECTIVE

CSS

Declaration

Declaration

.title

#rec

{ color:blue; font-size:12px; }

class

id

Property

Value

Property

Value

**Use pre-built responsive web view  
components with the Bootstrap  
library for quick deployment.**

New in v5.2 CSS variables, responsive offcanvas, new utilities, and more!



# Build fast, responsive sites with Bootstrap

Powerful, extensible, and feature-packed frontend toolkit. Build and customize with Sass, utilize prebuilt grid system and components, and bring projects to life with powerful JavaScript plugins.

\$ npm i bootstrap@5.2.2



 Read the docs

Currently v5.2.2 · [Download](#) · [v4.6.x docs](#) · [All releases](#)



Couchbase Capella DBaaS: Get the power of SQL with the flexibility of JSON  
ads via Carbon

<https://getbootstrap.com/>

## Getting started

### Introduction

Download  
Contents  
Browsers & devices  
JavaScript  
Webpack  
Parcel  
Vite  
Accessibility  
RFS  
RTL  
Contribute

## Customize

Overview  
Sass  
Options  
Color  
Components  
CSS variables  
Optimize

## Layout

Breakpoints  
Containers  
Grid  
Columns  
Gutters  
Utilities  
Z-index  
CSS Grid

# Get started with Bootstrap

[View on GitHub](#)

Bootstrap is a powerful, feature-packed frontend toolkit. Build anything—from prototype to production—in minutes.

## Quick start

Get started by including Bootstrap's production-ready CSS and JavaScript via CDN without the need for any build steps. See it in practice with this [Bootstrap CodePen demo](#).

1. Create a new `index.html` file in your project root. Include the `<meta name="viewport">` tag as well for proper responsive behavior in mobile devices.

```
<!doctype html>
<html lang="en">
  <head>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <title>Bootstrap demo</title>
  </head>
  <body>
    <h1>Hello, world!</h1>
  </body>
</html>
```

2. Include Bootstrap's CSS and JS. Place the `<link>` tag in the `<head>` for our CSS, and the `<script>` tag for our JavaScript bundle (including Popper for positioning dropdowns, poppers, and tooltips) before the closing `</body>`. Learn more about our [CDN links](#).

```
<!doctype html>
<html lang="en">
  <head>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <title>Bootstrap demo</title>
    <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.3/dist/css/bootstrap.min.css" rel="stylesheet">
  </head>
  <body>
```

## On this page

Quick start  
CDN links  
Next steps  
JS components  
Important globals  
HTML5 doctype  
Responsive meta tag  
Box-sizing  
Reboot  
Community

<https://getbootstrap.com/docs/5.2/getting-started/introduction/>

# **Bootstrap Examples, Components, and Icons**



# Examples

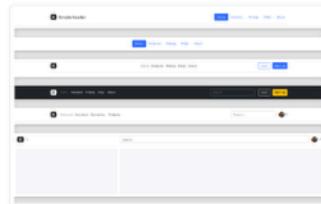
Quickly get a project started with any of our examples ranging from using parts of the framework to custom components and layouts.

[Download examples](#)[Download source code](#)

Your new development career awaits. Check out the latest listings.  
ads via Carbon

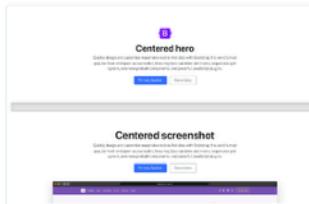
## Snippets

Common patterns for building sites and apps that build on existing components and utilities with custom CSS and more.



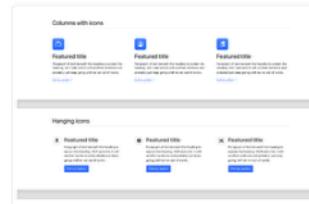
### Headers

Display your branding, navigation, search, and more with these header components



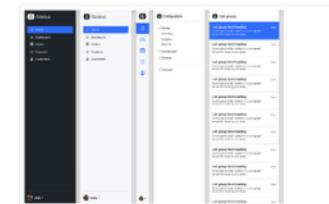
### Heroes

Set the stage on your homepage with heroes that feature clear calls to action.



### Features

Explain the features, benefits, or other details in your marketing content.



### Sidebars

Common navigation patterns ideal for offcanvas or multi-column layouts.

## Custom Components

Brand new components and templates to help folks quickly get started with Bootstrap and demonstrate best practices for adding onto the framework.



<https://getbootstrap.com/docs/5.2/examples/>



## Example headline.

Some representative placeholder content for the first slide of the carousel.

[Sign up today](#)



Heading

Some representative placeholder content for the three columns of text below the carousel. This is the first column.

[View details »](#)



Heading

Another exciting bit of representative placeholder content. This time, we've moved on to the second column.

[View details »](#)



## Example headline.

Some representative placeholder content for the first slide of the carousel.

[Sign up today](#)



Heading

Some representative placeholder content for the three columns of text below the carousel. This is the first column.

[View details »](#)



<https://getbootstrap.com/docs/5.2/examples/carousel/>

# Accordion

[View on GitHub](#)

Build vertically collapsing accordions in combination with our Collapse JavaScript plugin.



Your new development career awaits. Check out the latest listings.  
ads via Carbon

## How it works

The accordion uses `collapse` internally to make it collapsible. To render an accordion that's expanded, add the `.open` class on the `.accordion`.

The animation effect of this component is dependent on the `prefers-reduced-motion` media query. See the [reduced motion section of our accessibility documentation](#).

## Example

Click the accordions below to expand/collapse the accordion content.

### Accordion Item #1



This is the first item's accordion body. It is shown by default, until the collapse plugin adds the appropriate classes that we use to style each element. These classes control the overall appearance, as well as the showing and hiding via CSS transitions. You can modify any of this with custom CSS or overriding our default variables. It's also worth noting that just about any HTML can go within the `.accordion-body`, though the transition does limit overflow.

<https://getbootstrap.com/docs/5.2/components/>

## On this page

[How it works](#)  
[Example](#)  
[Flush](#)  
[Always open](#)  
[Accessibility](#)  
[CSS](#)  
[Variables](#)  
[Sass variables](#)

# **Popular Components**

- a. Container
- b. Navbar/Navs
- c. Icons
- d. Grid/Row/Column
- e. Images
- f. Buttons/Alerts
- g. Form
- h. Panel/Wells/Jumbotron
- i. Carousel/Collapse
- j. Scrollspy/Offcanvas
- k. Table
- l. Pagination
- m. Badges/List Group/Cards
- n. Modal/Tooltip/Toast/Popover

<https://www.w3schools.com/bootstrap5/index.php>

## Bootstrap 5 Tutorial

### BS5 HOME

[BS5 Get Started](#)[BS5 Containers](#)[BS5 Grid Basic](#)[BS5 Typography](#)[BS5 Colors](#)[BS5 Tables](#)[BS5 Images](#)[BS5 Jumbotron](#)[BS5 Alerts](#)[BS5 Buttons](#)[BS5 Button Groups](#)[BS5 Badges](#)[BS5 Progress Bars](#)[BS5 Spinners](#)[BS5 Pagination](#)[BS5 List Groups](#)[BS5 Cards](#)[BS5 Dropdowns](#)[BS5 Collapse](#)[BS5 Navs](#)[BS5 Navbar](#)[BS5 Carousel](#)[BS5 Modal](#)[BS5 Tooltip](#)[BS5 Popover](#)[BS5 Toast](#)[BS5 Scrollspy](#)[BS5 Offcanvas](#)

This tutorial contains hundreds of Bootstrap 5 examples.

With our online editor, you can edit the code, and click on a button to view the result.

### Bootstrap 5 Example

## My First Bootstrap Page

Resize this responsive page to see the effect!

### Column 1

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris...

### Column 2

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris...

### Column 3

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris...

[Try it Yourself »](#)

<https://www.w3schools.com/bootstrap5/index.php>

```
Result Size: 1656 x 365 Get your own website

<body>
<div class="container-fluid p-5 bg-primary text-white text-center">
  <h1>My First Bootstrap Page</h1>
  <p>Resize this responsive page to see the effect!</p>
</div>

<div class="container mt-5">
  <div class="row">
    <div class="col-sm-4">
      <h3>Column 1</h3>
      <p>Lorem ipsum dolor sit amet, consectetur adipisicing elit...</p>
      <p>Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris...</p>
    </div>
    <div class="col-sm-4">
      <h3>Column 2</h3>
      <p>Lorem ipsum dolor sit amet, consectetur adipisicing elit...</p>
      <p>Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris...</p>
    </div>
    <div class="col-sm-4">
      <h3>Column 3</h3>
    </div>
  </div>
</div>
```

# My First Bootstrap Page

Resize this responsive page to see the effect!

## Column 1

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris...

## Column 2

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris...

## Column 3

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris...

## Bootstrap 5 Tutorial

BS5 HOME

BS5 Get Started

BS5 Containers

BS5 Grid Basic

BS5 Typography

BS5 Colors

BS5 Tables

BS5 Images

BS5 Jumbotron

BS5 Alerts

BS5 Buttons

BS5 Button Groups

BS5 Badges

BS5 Progress Bars

BS5 Spinners

BS5 Pagination

BS5 List Groups

**BS5 Cards**

BS5 Dropdowns

BS5 Collapse

BS5 Navs

BS5 Navbar

BS5 Carousel

BS5 Modal

## Cards

A card in Bootstrap 5 is a bordered box with some padding around its content. It includes options for headers, footers, content, colors, etc.



John Doe

Some example text some example text. John Doe is an architect and engineer

[See Profile](#)

[https://www.w3schools.com/bootstrap5/bootstrap\\_cards.php](https://www.w3schools.com/bootstrap5/bootstrap_cards.php)

**No-code screen layout composition  
through the web using  
layoutit.com(Bootstrap 4 only).**

[+ GRID SYSTEM](#) [?](#)  

12	<a href="#">drag</a>
6 6	<a href="#">drag</a>
8 4	<a href="#">drag</a>
4 4 4	<a href="#">drag</a>
2 6 4	<a href="#">drag</a>

[+ BASE CSS](#) [?](#)  
[+ COMPONENTS](#) [?](#)  
[+ JAVASCRIPT](#) [?](#)

Check out  
our new  
product



## Hello, world!

This is a template for a simple marketing or informational website. It includes a large callout called the hero unit and three supporting pieces of content. Use it as a starting point to create something more unique.

[Learn more](#)

Using [Bootstrap 4.0.0](#)

<https://www.layoutit.com/build>

# **Bootstrap 4 and Bootstrap 5**

## **CDN linkages.**



Search from 6,074 libraries on cdnjs

Home / Libraries / twitter-bootstrap / 4.6.2

## twitter-bootstrap

The most popular front-end framework for developing responsive, mobile first projects on the web.

★ 167k GitHub npm package 🛡 0 known vulnerabilities

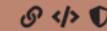
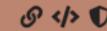
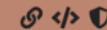
MIT licensed <http://getbootstrap.com/>

Tags: css, less, mobile-first, responsive, front-end, framework, web, twitter, bootstrap

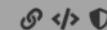
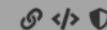
Version **4.6.2** Asset Type All

Some files are hidden, click to show all files

<https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/4.6.2/js/bootstrap.min.js>



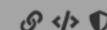
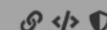
<https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/4.6.2/css/bootstrap-grid.min.css>



<https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/4.6.2/css/bootstrap-reboot.min.css>



<https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/4.6.2/css/bootstrap.min.css>



<https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/4.6.2/js/bootstrap.bundle.min.js>



<https://cdnjs.com/libraries/twitter-bootstrap/4.6.2>

## twitter-bootstrap

The most popular front-end framework for developing responsive, mobile first projects on the web.

★ 160k  GitHub  package  0 vulnerabilities

MIT licensed <http://getbootstrap.com/>

Tags: css, less, mobile-first, responsive, front-end, framework, web, twitter, bootstrap

Version **5.2.2**

Asset Type **All**

Some files are hidden, click to show all files

<https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/5.2.2/js/bootstrap.min.js>

<https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/5.2.2/css/bootstrap-grid.min.css>

<https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/5.2.2/css/bootstrap-grid rtl.min.css>

<https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/5.2.2/css/bootstrap-reboot.min.css>

<https://cdnjs.cloudflare.com/ajax/libs/twitter-bootstrap/5.2.2/css/bootstrap-reboot rtl.min.css>

<https://cdnjs.com/libraries/twitter-bootstrap/5.2.2>

# Use CDN link to access remote CSS and JS libraries for Bootstrap 5.5.2.



Search from 6,074 libraries on cdn

Home / Libraries / jquery

## jquery JavaScript library for DOM operations

★ 58k GitHub npm package 0 known vulnerabilities

MIT licensed <http://jquery.com/>

Tags: jquery, library, ajax, framework, toolkit, popular

Version 3.7.1

Asset Type All

<https://cdnjs.cloudflare.com/ajax/libs/jquery/3.7.1/jquery.min.js>

🔗 ↻ ⚡

<https://cdnjs.cloudflare.com/ajax/libs/jquery/3.7.1/jquery.js>

🔗 ↻ ⚡

<https://cdnjs.cloudflare.com/ajax/libs/jquery/3.7.1/jquery.min.map>

🔗

<https://cdnjs.cloudflare.com/ajax/libs/jquery/3.7.1/jquery.slim.js>

🔗 ↻ ⚡

<https://cdnjs.cloudflare.com/ajax/libs/jquery/3.7.1/jquery.slim.min.js>

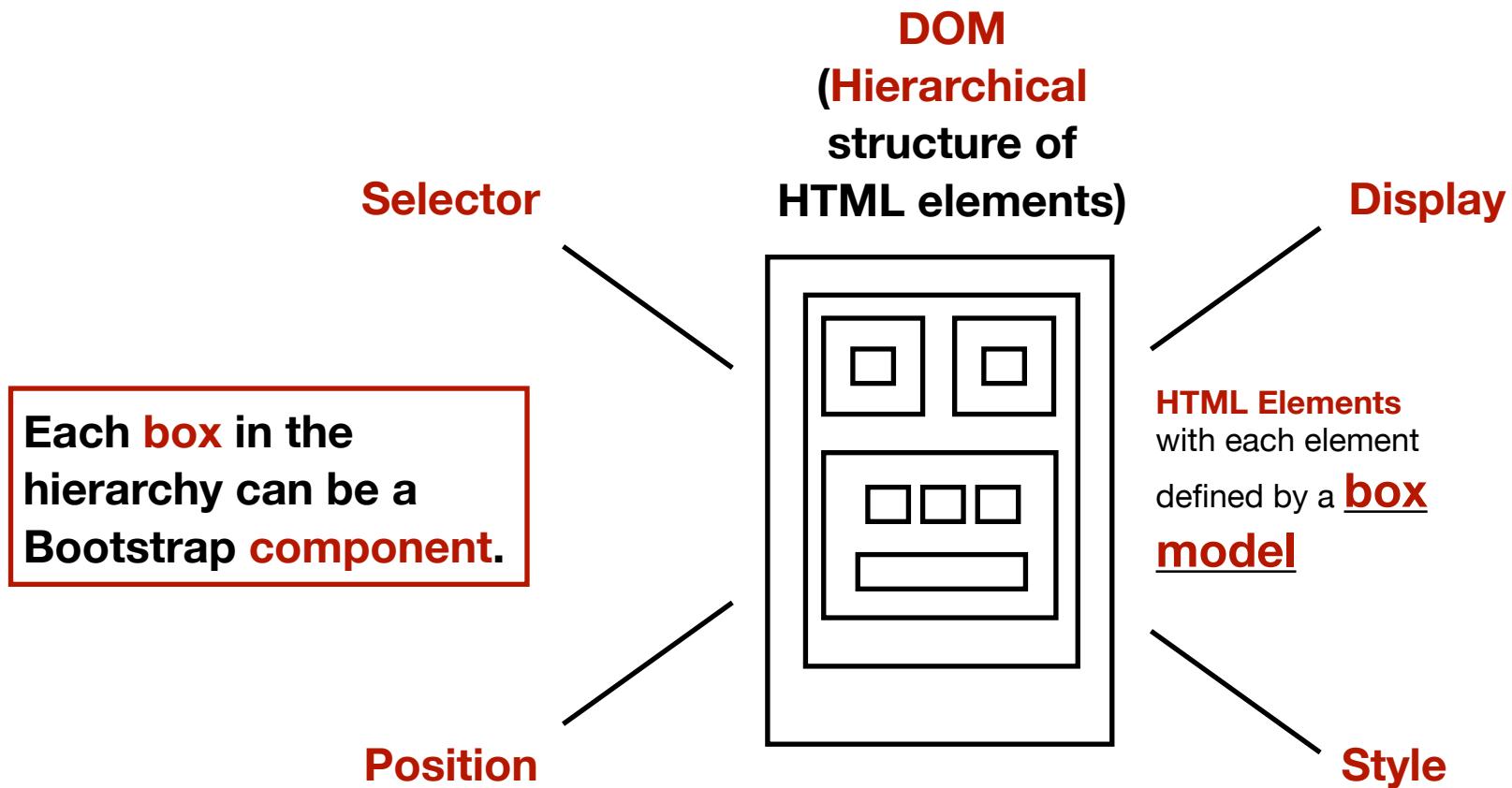
🔗 ↻ ⚡

<https://cdnjs.cloudflare.com/ajax/libs/jquery/3.7.1/jquery.slim.min.map>

🔗

# <https://cdnjs.com/libraries/jquery>

Use CDN link to access remote JS libraries for jQuery 3.7.1.



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Free image by mac231

<https://pixabay.com/>



**Exercise time:  
\_\_ minutes**

# **Bootstrap 4.**

[+ GRID SYSTEM](#)[+ BASE CSS](#)[+ COMPONENTS](#)

Button Group



Dropdowns



Navs



Breadcrumb



Pagination



Label



Badge



Jumbotron



Page Header



Text



Thumbnails



Progress Bar



Media Object



List group



Cards

[+ JAVASCRIPT](#)

Check out  
our new  
product



## Hello, world!

This is a template for a simple marketing or informational website. It includes a large callout called the hero unit and three supporting pieces of content. Use it as a starting point to create something more unique.

[Learn more](#)**Card title**

Cras justo odio, dapibus ac facilisis in, egestas eget quam.

**Card title**

Cras justo odio, dapibus ac facilisis in, egestas eget quam.

**Card title**

Cras justo odio, dapibus ac facilisis in, egestas eget quam.



## Heading

Donec id elit non mi porta gravida at eget metus. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum nibh, ut fermentum massa justo sit amet risus. Etiam porta sem malesuada magna mollis euismod. Donec sed odio dui.

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# Hello, world!

This is a template for a simple marketing or informational website. It includes a large callout called the hero unit and three supporting pieces of content. Use it as a starting point to create something more unique.

[Learn more](#)



Card title

Cras justo odio, dapibus ac facilisis in, egestas eget quam. Donec id elit non mi porta gravida at eget metus. Nullam id dolor id nibh ultricies vehicula ut id elit.

[Action](#) [Action](#)



Card title

Cras justo odio, dapibus ac facilisis in, egestas eget quam. Donec id elit non mi porta gravida at eget metus. Nullam id dolor id nibh ultricies vehicula ut id elit.

[Action](#) [Action](#)



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[Action](#) [Action](#)

## Heading

Donec id elit non mi porta gravida at eget metus. Fusce dapibus, tellus ac cursus commodo, tortor mauris condimentum nibh, ut fermentum massa justo sit amet risus. Etiam porta sem malesuada magna mollis euismod. Donec sed odio dui.

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**Bootstrap 5.**

## Bootstrap 5 Tutorial

### BS5 HOME

[BS5 Get Started](#)[BS5 Containers](#)[BS5 Grid Basic](#)[BS5 Typography](#)[BS5 Colors](#)[BS5 Tables](#)[BS5 Images](#)[BS5 Jumbotron](#)[BS5 Alerts](#)[BS5 Buttons](#)[BS5 Button Groups](#)[BS5 Badges](#)[BS5 Progress Bars](#)[BS5 Spinners](#)[BS5 Pagination](#)[BS5 List Groups](#)[BS5 Cards](#)[BS5 Dropdowns](#)[BS5 Collapse](#)[BS5 Navs](#)[BS5 Navbar](#)[BS5 Carousel](#)[BS5 Modal](#)[BS5 Tooltip](#)[BS5 Popover](#)[BS5 Toast](#)[BS5 Scrollspy](#)[BS5 Offcanvas](#)

This tutorial contains hundreds of Bootstrap 5 examples.

With our online editor, you can edit the code, and click on a button to view the result.

### Bootstrap 5 Example

## My First Bootstrap Page

Resize this responsive page to see the effect!

### Column 1

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris...

### Column 2

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris...

### Column 3

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris...

[Try it Yourself »](#)

<https://www.w3schools.com/bootstrap5/index.php>

# My First Bootstrap Page

Resize this responsive page to see the effect!

## Column 1

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

Ut enim ad minim veniam, quis nostrud exercitation  
ullamco laboris...

## Column 2

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

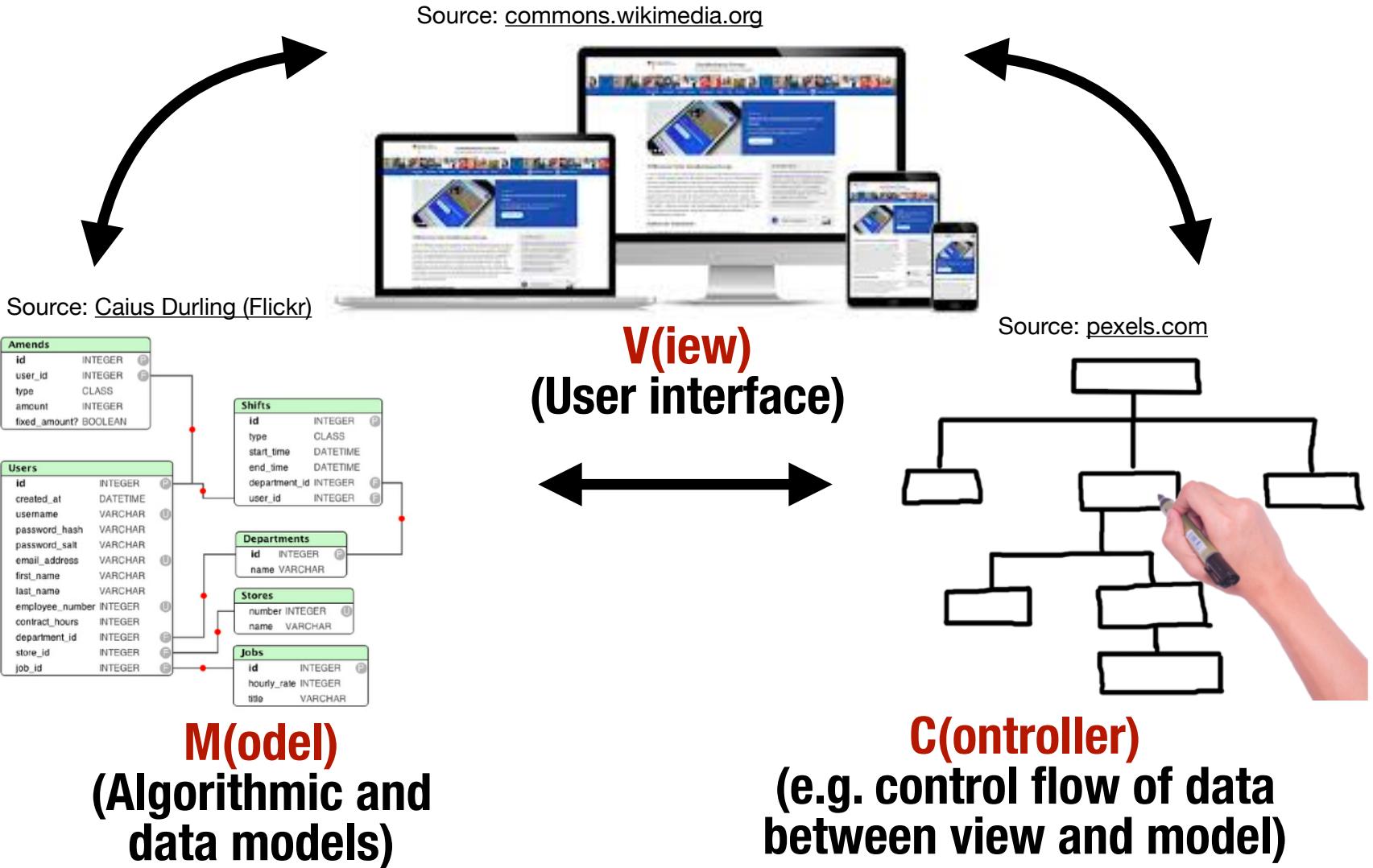
Ut enim ad minim veniam, quis nostrud exercitation  
ullamco laboris...

## Column 3

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

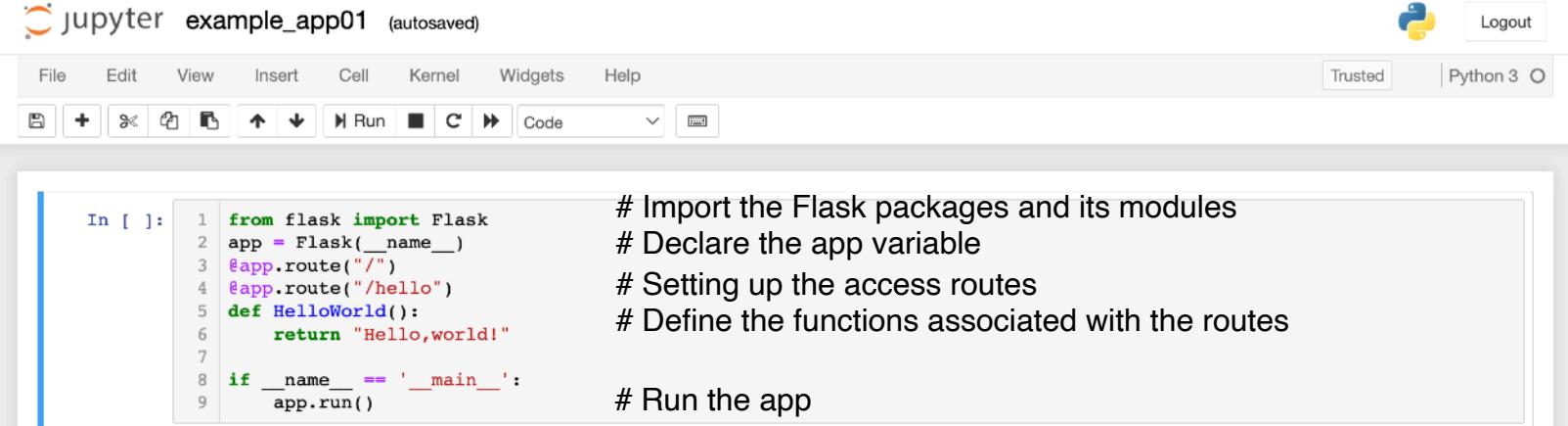
Ut enim ad minim veniam, quis nostrud exercitation  
ullamco laboris...

# **Python MVC web deployment in the Flask framework**



**The Flask framework has the Model (M),  
View (V), and Controller (C) components  
for easy web development.**

# **Flask development in Jupyter Notebook/Google Colab**



The screenshot shows a Jupyter Notebook interface with the title "jupyter example\_app01 (autosaved)". The top bar includes a Python logo icon, "Logout" button, "Trusted" status, and "Python 3" kernel selection. The toolbar below has icons for file operations like Open, Save, Run, and Cell Types. The main area shows a code cell labeled "In [ ]:" containing the following Python code:

```
In [ ]: 1 from flask import Flask
2 app = Flask(__name__)
3 @app.route("/")
4 @app.route("/hello")
5 def HelloWorld():
6     return "Hello,world!"
7
8 if __name__ == '__main__':
9     app.run()# Import the Flask packages and its modules
# Declare the app variable
# Setting up the access routes
# Define the functions associated with the routes
# Run the app
```

**The `@app.route` perform the Controller (C) function dispatching URL request (e.g. /hello) to a Python function (i.e. `def`)**

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Select items to perform actions on them.

[Upload](#) [New](#)

<input type="checkbox"/>	0		/ jupyter notebooks / workshop / datahack	Name	Last Modified	File size
			..		seconds ago	
<input type="checkbox"/>			static		7 minutes ago	
<input type="checkbox"/>			templates		7 minutes ago	
<input type="checkbox"/>			example_app01.ipynb	Running	seconds ago	2 kB



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Type ▾ People ▾ Modified ▾

Name	Owner	Last modified	File size	⋮
templates	me	1:17 AM	—	
static	me	1:17 AM	—	
datahack01.ipynb	me	1:19 AM	1 KB	

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Trash

Storage (81% full)

12.21 GB of 15 GB used

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The screenshot shows a Jupyter Notebook interface with the following details:

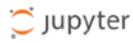
- Title Bar:** CO datahack01.ipynb
- File Menu:** File Edit View Insert Runtime Tools Help All changes saved
- Toolbar:** Comment Share RAM Disk
- Left Sidebar:** Files, Search, {x}, Copy, Paste, Disk
- Code Editor:** + Code + Text. The code is as follows:

```
if __name__ == '__main__':
    app.run()

* Serving Flask app '__main__'
* Debug mode: off
INFO:werkzeug:WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5000
INFO:werkzeug:Press CTRL+C to quit
```
- Bottom Status Bar:** Executing (1m 46s) <cell line: 8> > run() > run\_simple() > serve\_forever() > serve\_forever() > select()



**Exercise time:  
\_\_ minutes**

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Select items to perform actions on them.

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<input type="checkbox"/>	Name	Last Modified	File size
<input type="checkbox"/>	..	seconds ago	
<input type="checkbox"/>	static	2 hours ago	
<input type="checkbox"/>	templates	6 minutes ago	
<input type="checkbox"/>	example01.ipynb	Running 4 minutes ago	1.08 kB
<input type="checkbox"/>	example02.ipynb	Running 3 minutes ago	1.9 kB
...			

The screenshot shows a Jupyter Notebook interface. At the top, there's a menu bar with File, Edit, View, Insert, Cell, Kernel, Widgets, and Help. To the right of the menu is a status bar showing "Trusted" and "Python 3 (ipykernel)". Below the menu is a toolbar with various icons for file operations like Open, Save, and Run.

In the main area, there's a code cell labeled "In [ \* ]:" containing Python code to set up a Flask application. The code defines routes for "/" and "/hello" and runs the app if it's the main module. The output shows the server starting and two log entries indicating requests were handled.

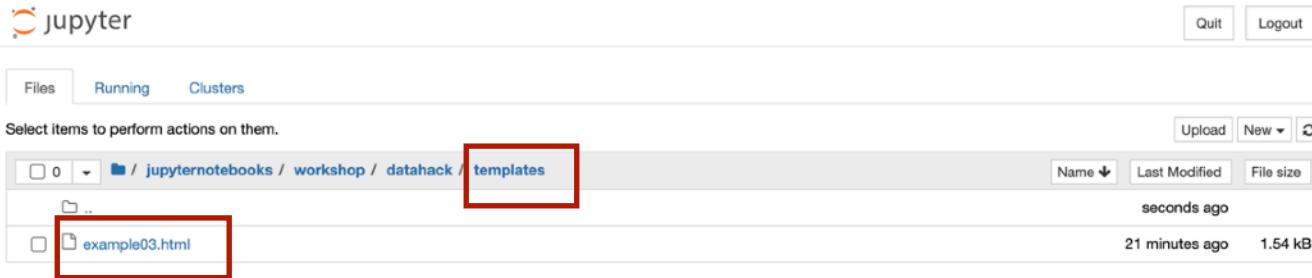
```
In [*]: 1 from flask import Flask, render_template
2 app = Flask(__name__)
3 @app.route("/")
4 @app.route("/hello")
5 def home():
6     return render_template('example03.html')
7
8 if __name__ == '__main__':
9     app.run()

* Serving Flask app '_main_' (lazy loading)
* Environment: production
  WARNING: This is a development server. Do not use it in a production deployment.
  Use a production WSGI server instead.
* Debug mode: off

WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
127.0.0.1 - - [23/Feb/2024 02:22:25] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [23/Feb/2024 02:22:39] "GET / HTTP/1.1" 200 -
```

Below the code cell, there's another input cell labeled "In [ ]:" with the number "1" next to it.

**The render\_template system perform the command View (V) function.**



The `render_template` system performs the `View (V)` function. All the `HTML` files acting as display templates are stored in the `templates` folder.



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Name	Owner	Last modified	File size	⋮
templates	me	1:17 AM me	—	⋮
static	me	1:17 AM me	—	⋮
datahack02.ipynb	me	2:19 AM me	1 KB	⋮
datahack01.ipynb	me	2:15 AM me	1 KB	⋮

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Trash

Storage (81% full)

12.21 GB of 15 GB used

Get more storage

CO datahack02.ipynb ☆

File Edit View Insert Runtime Tools Help All changes saved

+ Code + Text

RAM Disk

Comment Share

{x}

{} {x}

Code

Cell Kernel Help

```
from flask import Flask, render_template
app = Flask(__name__)
@app.route("/")
@app.route("/hello")
def home():
    return render_template('example03.html')

if __name__ == '__main__':
    app.run()

* Serving Flask app '__main__'
* Debug mode: off
INFO:werkzeug:WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5000
INFO:werkzeug:Press CTRL+C to quit
```

# My First Bootstrap Page

Resize this responsive page to see the effect!

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Ut enim ad minim veniam, quis nostrud exercitation  
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## Column 3

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ullamco laboris...

**Morning agenda.**

1. Deploy Jupyter Notebook to **PythonAnywhere** cloud service platform.
2. Website **design** and **navigation control** in Flask.
3. Perform **looping** and **conditional** operations using the Flask **Jinja2** template with Bootstrap components.
4. Use Python **lists/dictionaries**, Pandas **dataframes**, and Numpy **arrays** for structuring data in Flask.
5. Store data in **CSV**, **SQL**, and **No-SQL** databases and display results using **Bootstrap** visual components.

**Afternoon agenda.**

1. After training, testing, and evaluating the model, save it as a **Pickle** or **Keras** file for later deployment in a **Flask** web app on the **PythonAnywhere** platform.
2. Create **HTML form** in **Bootstrap** and place it in **HTML template** page for capturing data input.
3. Introduction to **data visualisation** using **Python Matplotlib** and **Seaborn** libraries.
4. Convert **Jupyter/Colab Notebook** into **HTML page** to be embedded in **Flask Bootstrap** templates.
5. Embed **Matplotlib** and **Seaborn** charts in **Flask Bootstrap** templates for publishing result.

**Thanks for joining me today!**