

Week 1

Introduction to the Web

What to expect from this course

- Being able to create a basic website or application, using current technologies
 - ...without AI! Or, know when the AI is doing a bad job, and how to improve it.
- Knowing what to focus on to create a great user experience
- Knowing what else to explore, and how

Requirements

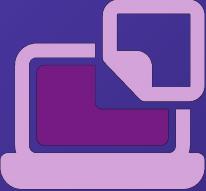
Access to a computer and the internet.

An IDE for Javascript. I recommend [Visual Studio Code](#) or [Cursor](#).

That's it!

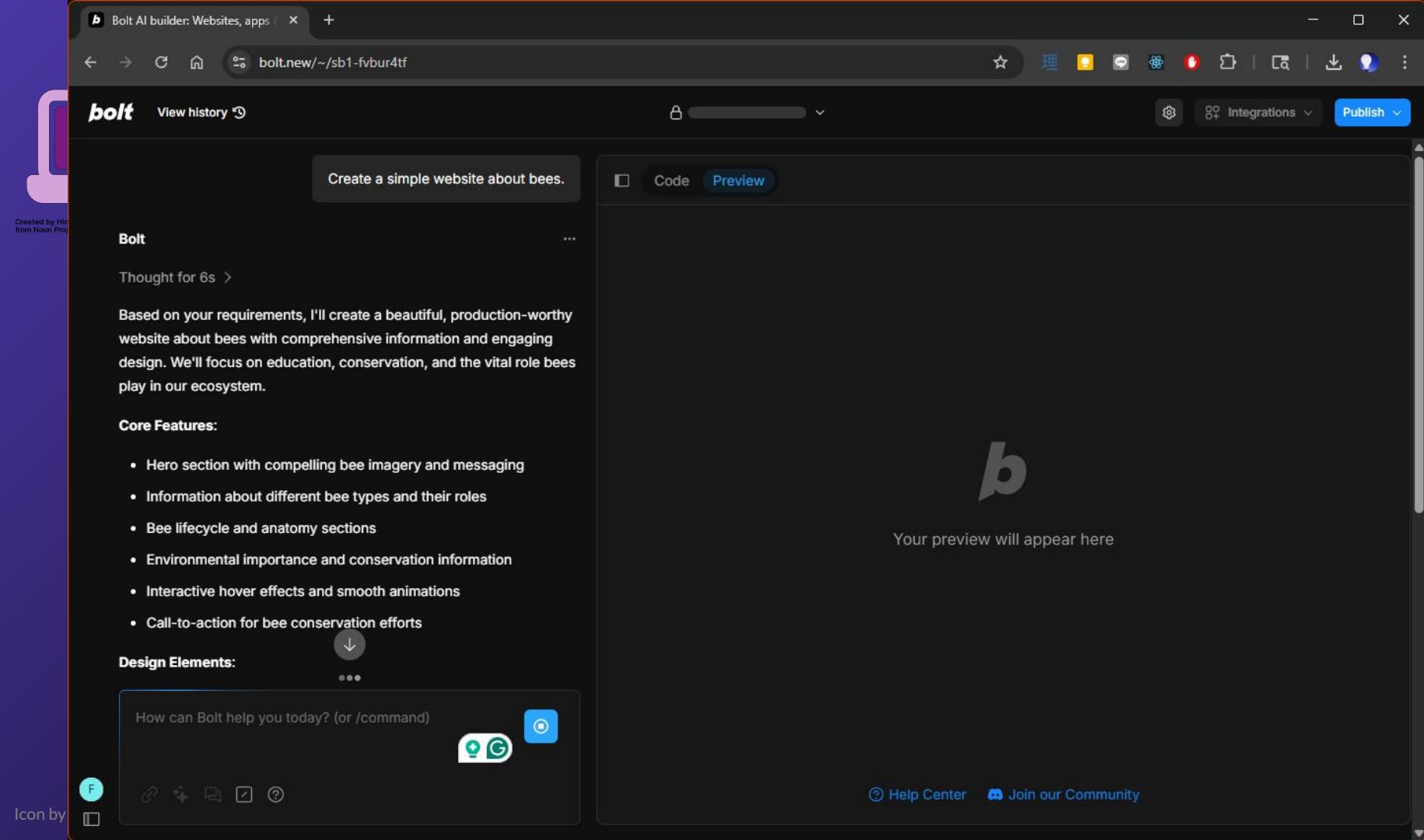
In this lesson:

- Basic concepts: The internet, the web, and how that all works (roughly)
- Intro to web technologies: HTML, CSS, Javascript
- Frontend and backend; intro to APIs
- Exploring Javascript in the browser
- DOM manipulation



But first: let AI do it for you

- Ask an AI to build a website for you.
 - You can try [Claude](#) logging in with your university credentials.
 - Two alternatives are [bolt.new](#) and [Replit](#). Be careful, don't enter any financial information like your credit card numbers, etc.
- Let it work while we continue with our class.
- When it's done, analyze the files it gave you. (We'll come back later to it.)



https://claude.ai/chat/d17d0576-526c-47b7-a7ec-2787883a1df8



理



Creating a Bee Information Website

**FA** Create a simple website about bees.

I'll create a simple, informative website about bees for you. This will include interesting facts, bee types, and their importance to our ecosystem.

Simple Bee Website

Interactive artifact



I've created a colorful and engaging website about bees! The site features:

Key Sections:

- Introduction to what bees are
- Different types of bees (honeybees, bumblebees, solitary bees)
- Why bees are important for pollination and ecosystems
- Fascinating bee facts
- Tips on how to help protect bees

Design Features:

- Warm, honey-inspired color scheme with yellows and oranges
- Animated bee emojis and interactive hover effects
- Responsive design that works on mobile devices
- Honeycomb inspired patterns and gradients

Reply to Claude...



Research

Claude Sonnet 4



All About Bees

*Nature's Tiny Superheroes*

What Are Bees?

Bees are flying insects closely related to wasps and ants. They play a crucial role in pollination and are known for producing honey and beeswax. There are over 20,000 known species of bees worldwide, ranging from tiny solitary bees to large social honeybee colonies.



Types of Bees

What is the web?

- The web is not the Internet
 - But, it is a lot of things...
- If you're using your browser, you're in the web
- Today, the line between "app" and "website" is blurry

The Internet, conceptually

- Just a bunch of computers connected to each other, really.
- They talk the same languages: we call them **protocols**
- Also: they're always connected: the Internet has **resiliency**

A bit of history (I promise this makes sense)

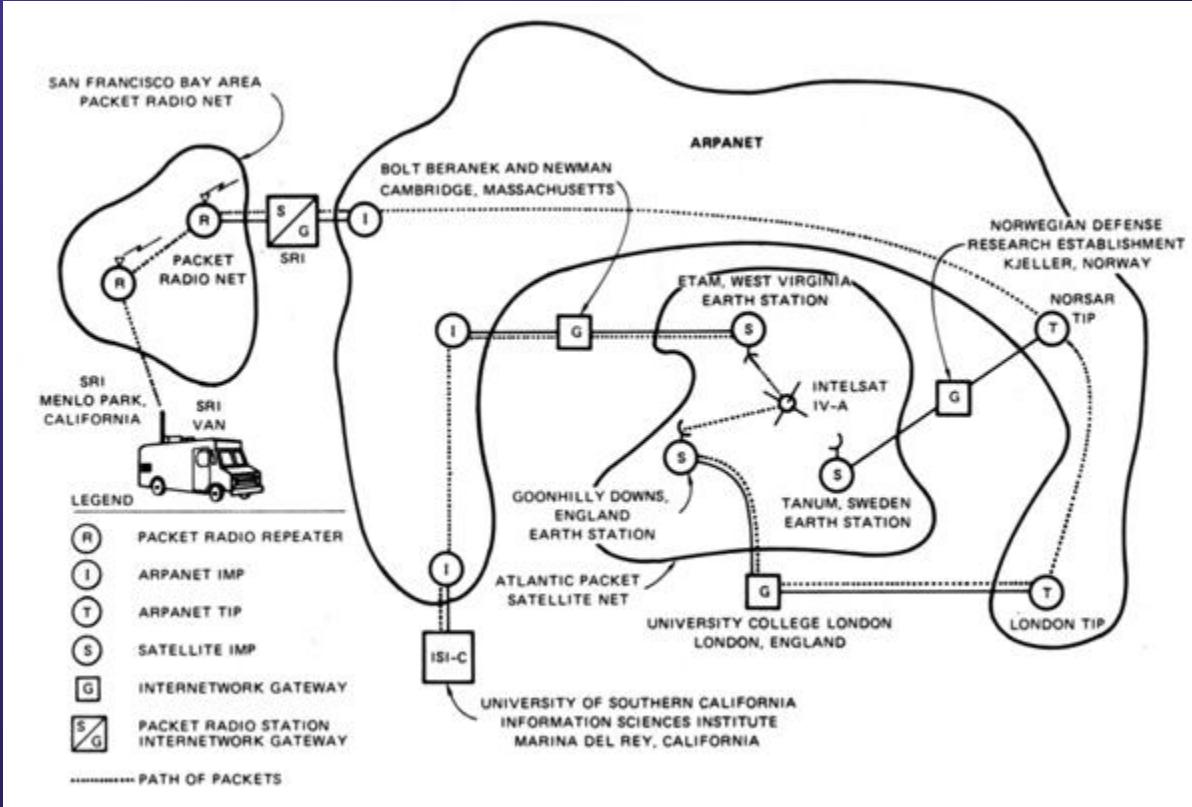
- It all started with the military... and for good reason (late 60's)
- Bay Area was there almost from the start
 - Almost. UCLA was first!
- TCP/IP: joining different networks (1973)
 - Standard way to interconnect networks that are all different
 - These protocols are still in use today

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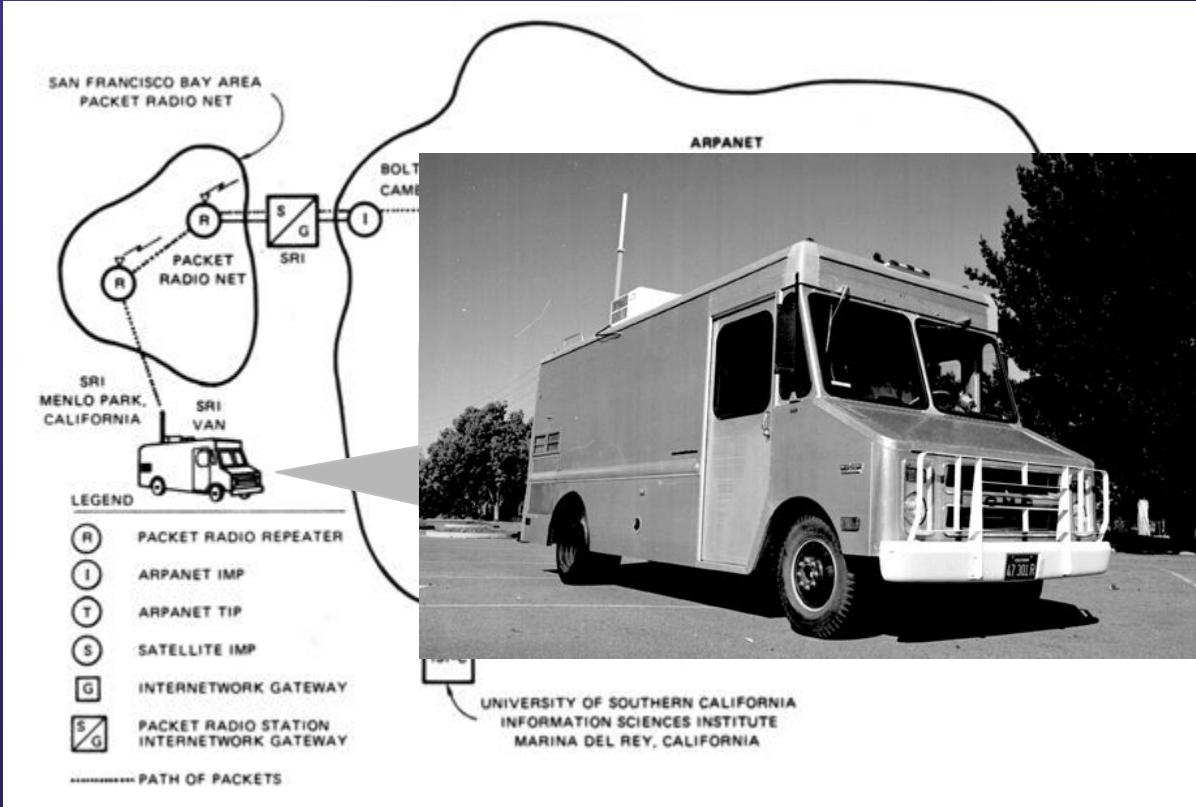
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Protocol: language, rules
for communication



The first “internetwork” connection (diagram from [Wikipedia](#)).



The first “internetwork” connection (diagram and photo from [Wikipedia](#)).

1989: Here comes the Web!

- Sir Tim Berners-Lee wanted hyperlinked documents
- ...and created the first website
- And the rest is history.
 - The internet opens to the public in 1991.
 - The web starts being in general use in 1994.

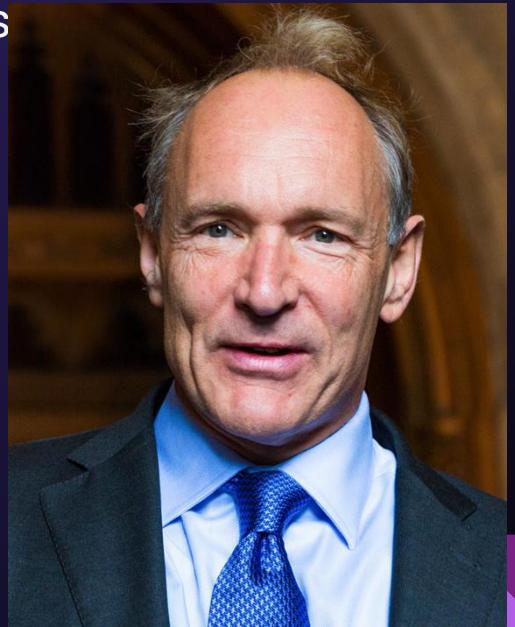


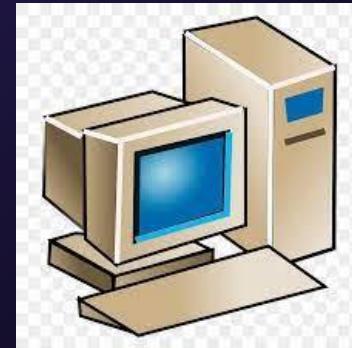
Photo from Wikipedia. CC BY-SA 4.0

But what is the Web, then?

- What Berners-Lee created was:
 - A **language**: HTML
 - A **protocol**: HTTP
 - A **client program**: the first browser
 - A **server program**: the first web server

The client/server model

- Server: has data; can operate on it
- Client: wants data, asks the server for it

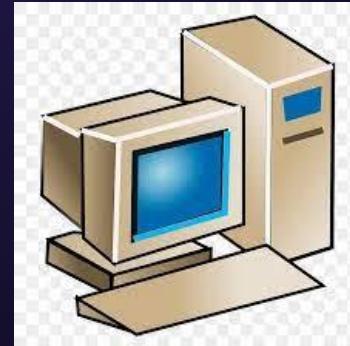
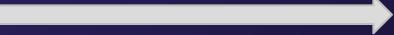


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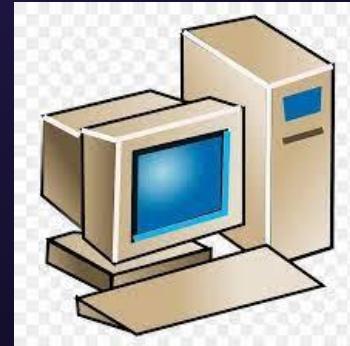
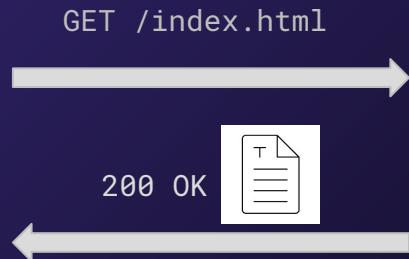


GET /index.html



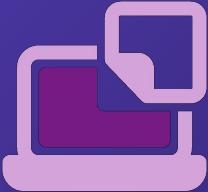
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The HTTP protocol

- Allows servers and clients to send, receive, and otherwise work with HTML and other files
- GET /index.html is an HTTP “request”; 200 OK is a “response”



Snoop your browser's HTTP calls!

Created by HideMaru
from Noun Project

You will need Google Chrome for this.

- Open a new, blank window or tab.
- Click on the three dots at the top right of the window to open the menu.
- Select “More tools”; in the submenu select “Developer Tools”. A panel will open at the bottom of your window.
- In that panel, look for the “Network” tab and click on it. You may need to make the panel bigger to find it.
- Now, with the Network panel open, go to www.wikipedia.org. Observe how the Network tab of the Developer Tools fills with rows of data.

WIKIPEDIA

The Free Encyclopedia

English
6 715 000+ articles

日本語
1 387 000+記事

Deutsch
2 836 000+ Artikel

Italiano
1 826 000+ voci

Português
1 109 000+ artigos

Español
1 892 000+ artículos

Русский
1 938 000+ статей

Français
2 553 000+ articles

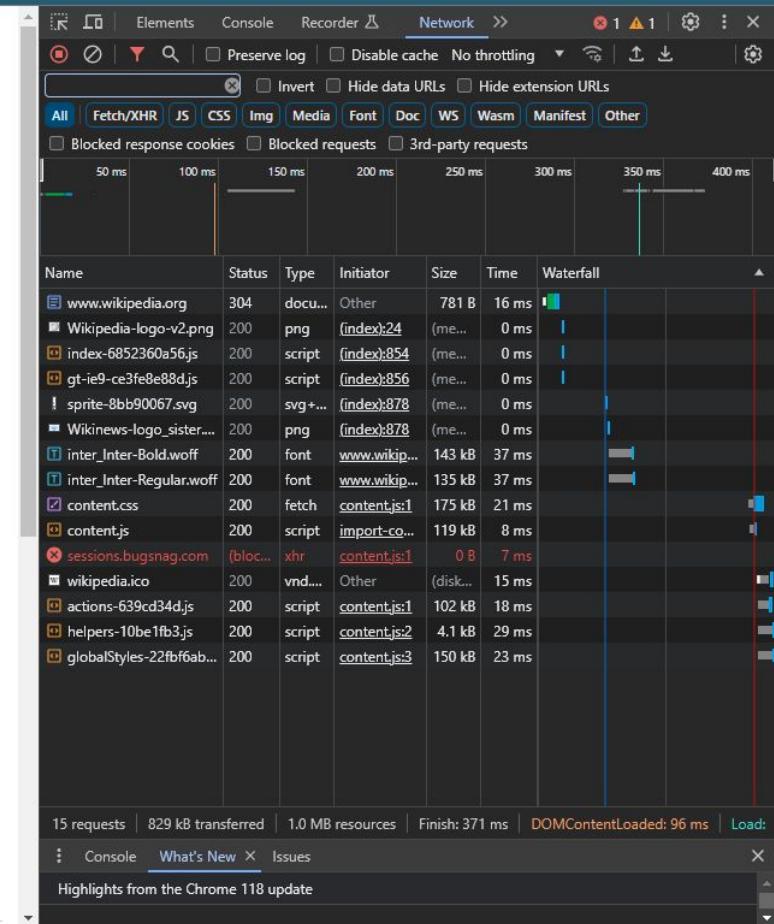
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The languages of the web

- **HTML** (HyperText Markup Language) defines the **content**: that is, what is on the page.
- **CSS** (Cascading Style Sheets) defines the **look and feel**: how the content should be rendered.
- **JavaScript** provides **interactivity**: that is, any functionality beyond “writing on a page”.



Let's check on the AI's work

- Check out the file or files that the AI tool gave you.
- Identify the HTML, CSS and JavaScript in them. Where are they? What do they seem to be doing?

HTML

The main unit is the **element**, represented by **tags**.

Tags can open and close, and contain other tags.

Tags can have attributes to specify details.

Tags (elements) give **meaning** and **structure** to the page.

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="UTF-8" />
    <title>A title</title>
  </head>
  <body>
    Some text
  </body>
</html>
```



Create your first page

Created by HideMaru
from Noun Project

- Copy the example text in Notepad (Windows),TextEdit (Mac), or any other simple text editor.
- Save the file in plain text mode as “index.html” on your desktop.
 - If using TextEdit, select “ Web Page (.html)” as the file format.
- Double-click on the file. It should open in your default browser.

You just created a web page!



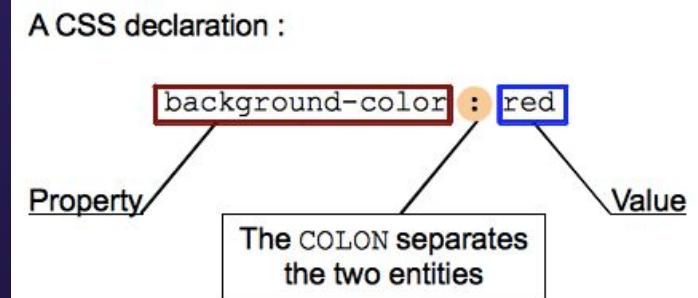
Keep exploring HTML:

Explore other common tags here: <https://learnxinyminutes.com/docs/html/> and continue adding content to your page. Try any (or all) of the following:

- Write a self-introduction in a few paragraphs (use `<p>`).
- Write a list of hobbies (use `` or ``; use ``).
- Add an image downloaded from the web (use ``).
- Try marking some text with `` or `` and see what happens.
- Use headers (`<h1>`, `<h2>`...).

CSS

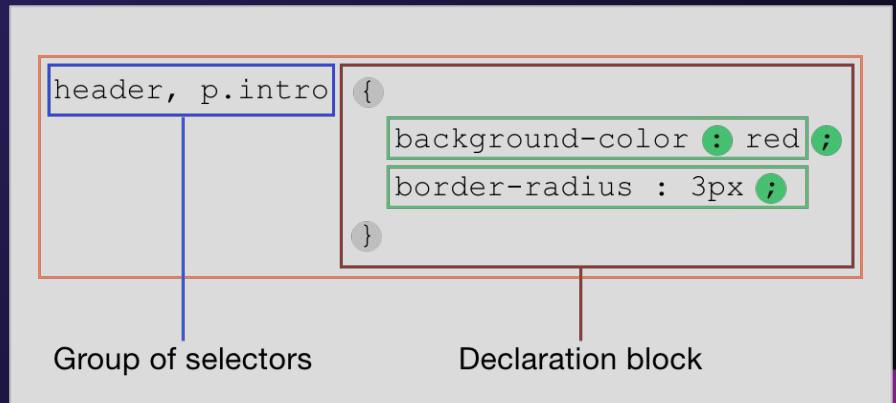
CSS stands for “Cascading Style Sheets”. It uses **declarations** to tell the browser what each HTML **element** should look like.



CSS

Each declaration contains a **property** and a **value**.

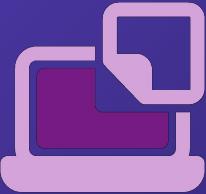
Declarations go inside **blocks** - curly braces {} . Before each block, we specify **selectors**, which refer to HTML elements.



CSS

In an HTML page, use the `<link>` tag inside `<head>` to link it to a CSS file:

```
<link rel="stylesheet" href="style.css" />
```



Created by HideMaru
from Noun Project

Add CSS to your page

- Create a new file called “style.css” in the same folder as your HTML file and add the following:

```
h1 {  
    color: blue;  
}
```

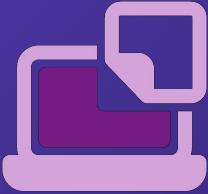
- Link the CSS file to the HTML file, using <link>.
- Make sure you have a <h1> tag in your HTML, such as:

```
<h1>  
    This should be blue  
</h1>
```

- Save both files, then reload your webpage in your browser. Your header should show up in blue letters.

Javascript on the web

- A full fledged programming language
- Used to be much smaller
- Runs in your browser, but also everywhere else



Created by HideMaru
from Noun Project

Add Javascript to your page

- Add a `<script>` tag to the `<head>` of your page, as follows:

```
<!-- import the webpage's javascript file -->  
<script src="script.js" defer></script>
```

- Create a new file called “script.js” in the same folder as the other two files.
- Add the following to your Javascript file:

```
console.log("Hello, world!");
```

- Reload the HTML page in your browser.
- Open the Developer Tools panel in your browser, then click on the “Console” tab. You should see the message “Hello, world!” there.

Front end and Back end

- Frontend: what happens in the **client** program (the browser)
 - What we just talked about
- Backend: what happens in **server** programs
 - Not just a web server. Many programs (services) collaborate for big applications
 - Can be written in many languages

Web APIs

API: how two programs communicate; or: how a programming interface is structured

Web APIs

- **Front-end (Client-side) Web APIs:** The standard libraries available within the browser for Javascript to manipulate a page, and the browser itself.
- **Back-end (Server-side) Web APIs:** The protocols for communication between a Javascript program running in a browser and a back-end program, running on a server.

Common Server-side APIs

- **REST** - uses HTML over HTTP; vanilla web. The most robust and popular. Standard
- **SOAP** - uses XML. Useful for very big, secure applications. Also standard
- **GraphQL** - a query language on top of HTTP; fast, but not standard-based
- **gRPC** - call functions remotely; binary data. Open source. Oh so complex

Exploring Javascript

- Run it in the browser!
- Interacts with the web page through the DOM (Document Object Model)
 - A model created when the page loads
 - HTML elements are represented by nodes



Javascript and the DOM

Created by HideMaru
from Noun Project

Open the web page you've been working on. Ensure it has an `<h1>` tag.

- Edit your `script.js` file, adding:

```
const header = document.querySelector("h1");
header.textContent = "Dynamic content!";
```

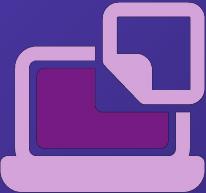
- Save the file.
- Reload the web page in your browser.

What happened?

- document is a global object; represents the page
- querySelector grabs the node we want
- textContent represents the, er, text content of the node (the element); we can modify it

Time for some live practice!

- window.alert and window.prompt
- Constants and variables
- Data types
- Some operators and comparators
- The “if” control statement



Challenge time!

Put the above in practice:

- Create a page for a product of your choice.
- The page must ask for a user's age. If the user is underage, the page should display a message telling them to not enter the page.
 - Research how to use `Number.parseInt()` to convert a string to a number.
- Make sure to describe the product and add images.
 - Research how to use the `` tag.
- Add colors to the text and background.

GitHub

- Git is a versioning system
 - Allows control over versions of a project
 - Improves team collaboration
 - Never again save a “project-final-final-REAL-05.doc”
- GitHub is a provider for Git
 - The most popular
 - Free accounts
 - Owned by Microsoft (so, you know, stable)

Git concepts

- Repository (or repo): used to store a project
- Branches: separate, coexisting “copies” of a project
 - Main branch: the project “original”
 - Create branches to work on a feature
- Commits: make changes to branches
 - Use them to “save” your work
 - **Never commit directly to your main branch**
- Pull requests: requests to update the main branch with the contents of another branch
 - Review process



Follow the tutorial:

- Create your own free GitHub account here: <https://github.com/>
- Follow this tutorial to create a repository, a branch, a commit, and a pull request:
<https://docs.github.com/en/get-started/quickstart/hello-world>