Slideshow 1

Introduction to the Web

INFO 6150
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What to expect from this course

- Being able to create a basic website or application, using current technologies
- 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.

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

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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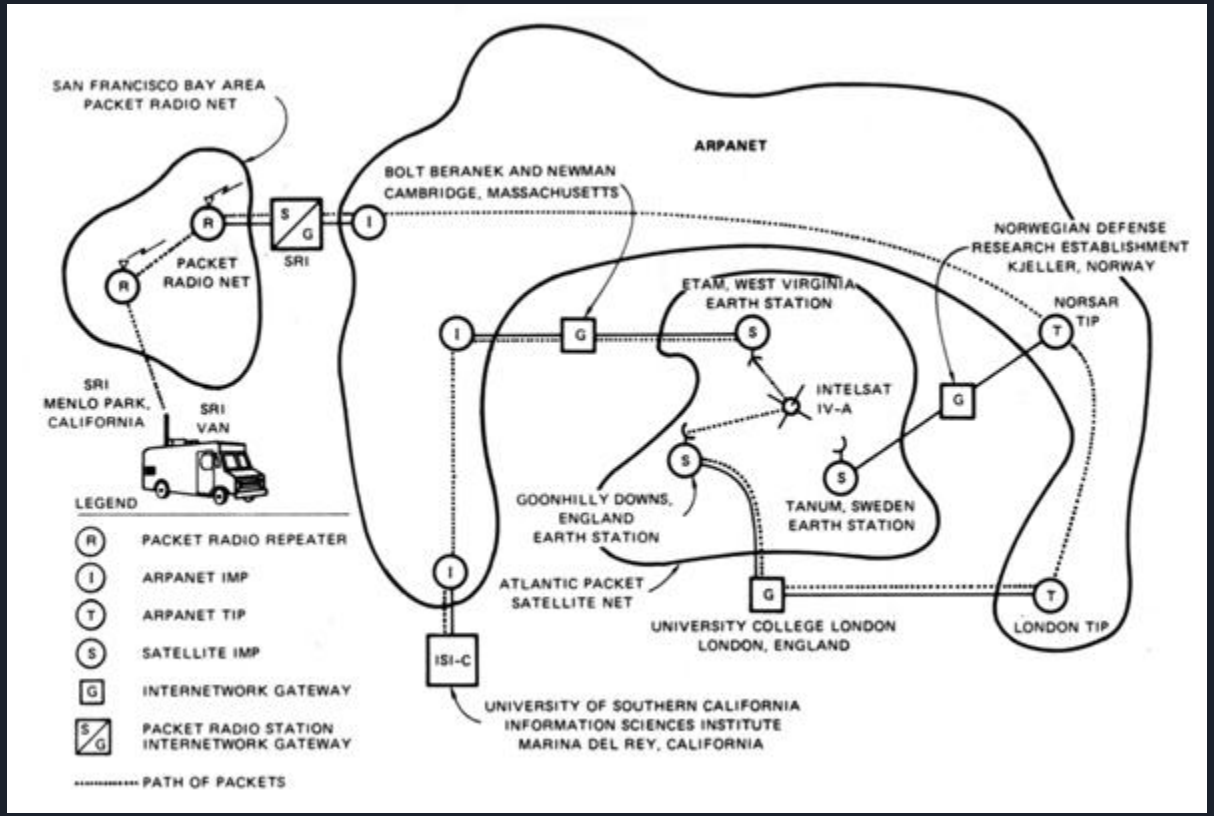
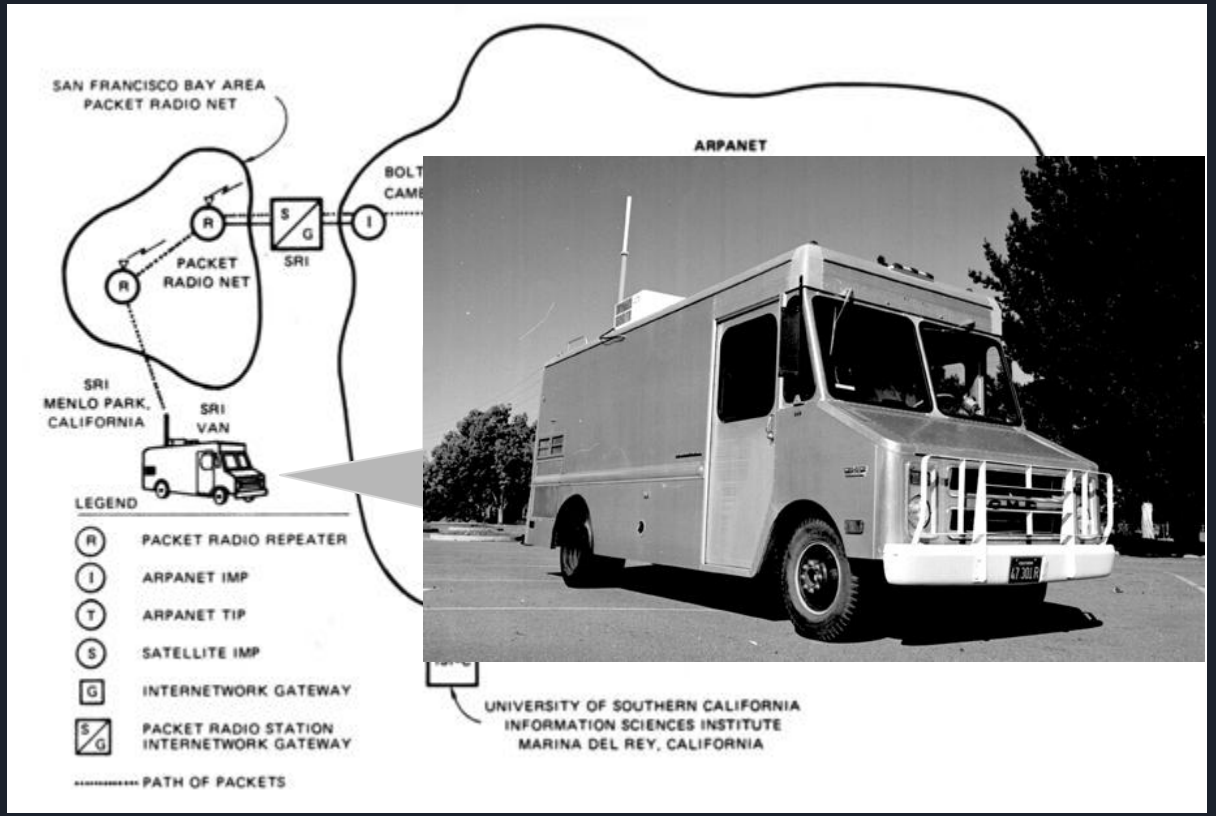
Protocol: language, rules for communication



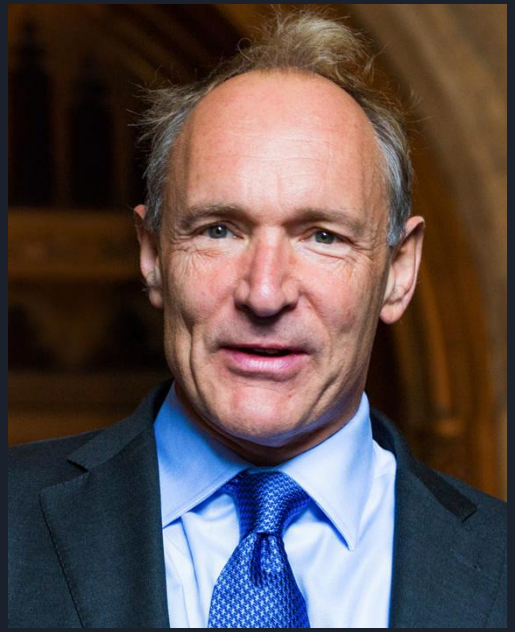
The first “internetwork” connection (diagram from Wikipedia).



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.

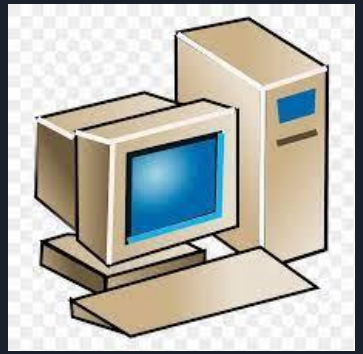


But what is the Web, then?

- 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



www.wikipedia.org

The client/server model

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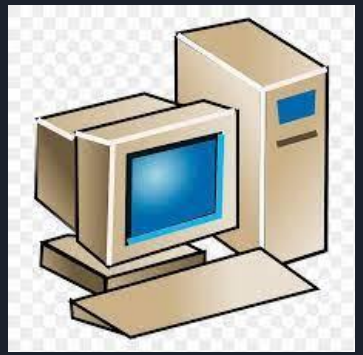
GET /index.html



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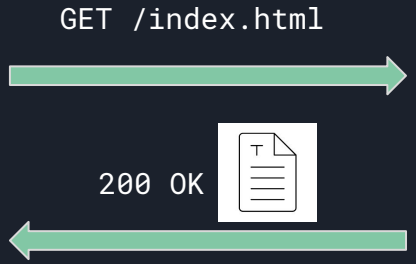

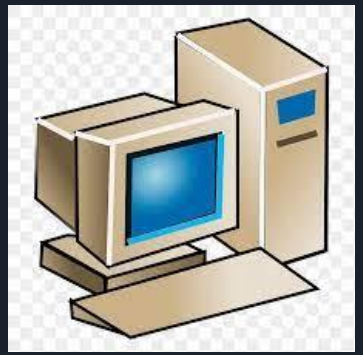

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The HTTP protocol

- 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”

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Snoop your browser’s HTTP calls!

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.

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Wikipedia

wikipedia.org

The Sunday Mass |... | Google Keep | Read JavaScript All... | ファイル - SkyDrive | Learn to Code by D... | Collective Health | All Bookmarks

WIKIPEDIA

The Free Encyclopedia

English
6 715 000+ articles

Español
1 892 000+ artículos

日本語
1 387 000+ 記事

Русский
1 938 000+ статей

Deutsch
2 836 000+ Artikel

Français
2 553 000+ articles

Italiano
1 826 000+ voci

中文
1 377 000+ 条目 / 條目

Português
1 109 000+ artigos

العربية
1 217 000+ مقالة

EN

Read Wikipedia in your language

We'll be quick:

If Wikipedia has given you $3 worth of knowledge this year, take a minute to donate.

Donate now

Elements | Console | Recorder | Network | 1 | 1

Preserve log | Disable cache | No throttling

Invert | Hide data URLs | Hide extension URLs

All | Fetch/XHR | JS | CSS | Img | Media | Font | Doc | WS | Wasm | Manifest | Other

Blocked response cookies | Blocked requests | 3rd-party requests

50 ms | 100 ms | 150 ms | 200 ms | 250 ms | 300 ms | 350 ms | 400 ms

Name	Status	Type	Initiator	Size	Time	Waterfall
www.wikipedia.org	304	docu...	Other	781 B	16 ms	
Wikipedia-logo-v2.png	200	png	(index):24	(me...	0 ms	
index-6852360a56.js	200	script	(index):854	(me...	0 ms	
gt-ie9-ce3fe8e88d.js	200	script	(index):856	(me...	0 ms	
sprite-8bb90067.svg	200	svg+...	(index):878	(me...	0 ms	
Wikinews-logo_sister....	200	png	(index):878	(me...	0 ms	
inter_Inter-Bold.woff	200	font	www.wikip...	143 kB	37 ms	
inter_Inter-Regular.woff	200	font	www.wikip...	135 kB	37 ms	
content.css	200	fetch	content.js:1	175 kB	21 ms	
content.js	200	script	import-co...	119 kB	8 ms	
sessions.bugsnag.com	(bloc...	xhr	content.js:1	0 B	7 ms	
wikipedia.ico	200	vnd....	Other	(disk...	15 ms	
actions-639cd34d.js	200	script	content.js:1	102 kB	18 ms	
helpers-10be1fb3.js	200	script	content.js:2	4.1 kB	29 ms	
globalStyles-22fbf6ab...	200	script	content.js:3	150 kB	23 ms	

15 requests | 829 kB transferred | 1.0 MB resources | Finish: 371 ms | DOMContentLoaded: 96 ms | Load:

Console | What's New | Issues

Highlights from the Chrome 118 update

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”.

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

- 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!

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from Noun Project

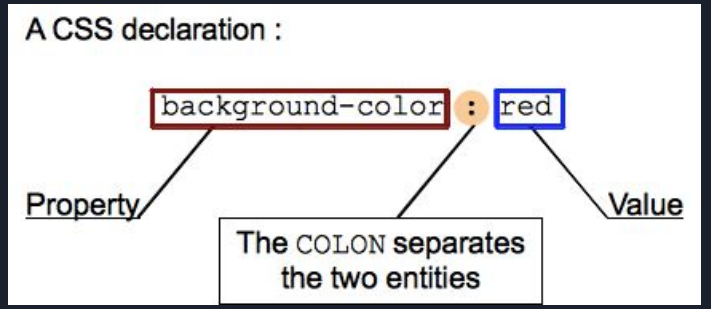
Keep exploring HTML:

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 <ul> or <ol>; use <li>).
- Add an image downloaded from the web (use <img>).
- Try marking some text with or and see what happens.
- Use headers (<h1>, <h2>...).

CSS

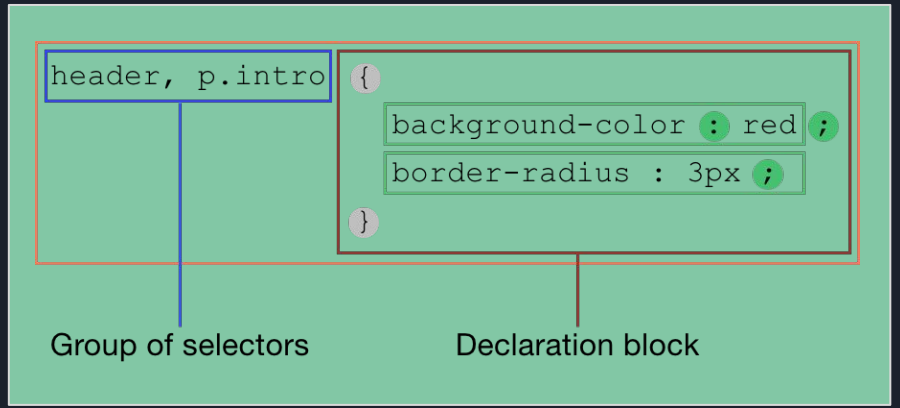
CSS stands for “Cascading Style Sheets”. It uses declarations to tell the browser what each HTML element should look like.



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" />
```

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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.

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Javascript on the web

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

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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.

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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