CODE IN ONE DAY: HTML & CSS CRASH COURSE

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ABOUT WEB DEVELOPMENT
WHAT IS WEB DEVELOPMENT?

The process of building websites
HOW TO GET STARTED?

Your computer

This image is pure CSS.

A clear mind

Modified from this brilliant codepen by Will Paige
CODE IS NUMBERS, LETTERS AND SYMBOLS

Regardless of what programming language you use, all code can be read in any text editor.

Javascript

close: function () { 
  this.ul.setAttribute(
    this.index = -1;
  $.fire(this.input, "
  
},

Code credit: Lea Verou

C

#include "8cc.h"
static int count_leading
  for (int i = 7; i >
    if ((c & 1 << i
      return 7 - i
    return 8;

Code credit: Rui Ueyama

Assembly

c table segment para
  db 9 dup(' ')
  db 9,10,' ',',12,13
  db 13 dup(' ')
  db 27
  db 4 dup(' ')
  db ',"#$%",39,'
  db 'ABCDEFHIJKLMNOP

Code credit: Happy codings
HTML AND CSS ARE THE FOUNDATION OF THE WEB
BASIC TECHNOLOGY STACK

HTML
For structuring and presenting content

CSS
For formatting the look of the web page

JS
For providing dynamic, interactive capabilities

Data Store
TOOLS WE’LL BE USING

- **Text editor**: Atom (open-source software)
- **Browser**: Chrome (excellent Dev Tools)

*Note that these tools are just that, tools. You can choose to use other text editors and browsers as well. These were chosen because of some conveniences they afford.*
WHAT IS THE INTERNET?

The entire network of networks that connect all the world's devices to each other
GLOBAL SUBMARINE CABLE MAP

From TeleGeography
GLOBAL INTERNET EXCHANGE MAP

From TeleGeography
BIG BANG DATA EXHIBITION @ ARTSCIENCE

Big Bang Data takes you on a journey of exploration through the intricate relationship that we share with data, as well as the meaning and implications of datafication for our future.

About the exhibition
ADVANCED RESEARCH PROJECTS AGENCY (ARPA)

- Set up in 1958 for R&D to expand the frontiers of technology and science
- Computers used to be monoliths which couldn't communicate with each other
- Best and brightest minds in the country came up with the concept of computer networking
PACKET SWITCHING TECHNOLOGY

- Traditional communication networks used analog, circuit switching
- Circuit switching is like an MRT train running on tracks, while packet switching is like cars on the Expressways
PROTOCOLS

- Transmission Control Protocol (TCP) handles breaking up data into packets to be sent and reassembling them at their destination
- Internet Protocol (IP) handles the formatting and addressing of the data packets
- Every device connected to the internet needs a unique IP address
TCP/IP

Transmission of data makes use of 4 layers

Sending

1. Application layer
2. Transport layer
3. Internet layer
4. Link layer

Receiving

1. Application layer
2. Transport layer
3. Internet layer
4. Link layer

Protocols:

Sending:
- Application layer: HTTP, FTP, SMTP etc.
- Transport layer: TCP, UDP
- Internet layer: IPv4, IPv6
- Link layer: MAC, ADP

Receiving:
- Application layer
- Transport layer
- Internet layer
- Link layer
WORLD WIDE WEB

- Invented by Tim Berners-Lee in 1989
- Created the 3 essential technologies that power the World Wide Web:
  1. **Hypertext Transfer Protocol (HTTP)** for retrieving text from other documents via hypertext links
  2. **Uniform Resource Identifier (URI)** which is the unique identifier for every resource on the web
  3. **Hypertext Markup Language (HTML)** for structuring and presenting content on the web
ROBUSTNESS PRINCIPLE

Be conservative in what you do, be liberal in what you accept from others.
- Jon Postel, RFC: 761
IF YOU LIKE READING BOOKS...
CLIENTS AND SERVERS

Clients request resources/services from Servers

Connect -> Request -> Response -> Terminate
FROM SERVER TO YOUR BROWSER

Enter a URL in the address bar

https://www.unicorn.com/rainbow.html

URL consists of the: protocol, server, requested file

Protocol   Server   Path to file
Browser sends request to server and server locates the requested file

https://www.unicorn.com/rainbow.html
Server returns the file to the browser which displays it

Rainbows

The colours of the rainbow are generally said to be red, orange, yellow, green, blue, indigo, and violet.
EVERYTHING IS CONNECTED BY LINKS

A link on a web page is a pre-entered URL. Clicking the link sends a request to the server.

Rainbows

The colours of the rainbow are generally said to be red, orange, yellow, green, blue, indigo, and violet.

If you’ve never seen a rainbow before, you’re missing out. Check out our gallery of rainbows.
The server sends the requested file back to the browser, which replaces the current page with the new file.
ABSOLUTE VS. RELATIVE LINKS

Absolute paths ask for a file from a **specific** location, which includes the protocol and server.

```
<a href="http://www.unicorn.com/gallery.html">Gallery</a>
```

Relative paths ask for a file without specifying a server.

```
<a href="gallery.html">Gallery</a>
```

The browser will hence assume you're referring to the same server as the page you're on.
CREATE YOUR FIRST PROJECT
BASIS FOLDER STRUCTURE

1. Create a new folder, name it whatever you want
2. Create a file called index.html and another file called styles.css
CONTENT-FIRST DESIGN

To build the right design for any project, you have to know what the content is before you start designing.

Content encompasses a range of media, from images to video, and most importantly, well-written copy.

Form should follow function, and for most websites, function is driven by content.
WHY IS CONTENT SO IMPORTANT?

Content-first design helps you to:

• Build out a sensible information architecture.
• Design to optimise your content.
• Create consistency across the site.
• Avoid endless rounds of re-work.
HYPERTEXT MARK-UP LANGUAGE (HTML)
HYPERTEXT MARK-UP LANGUAGE (HTML)

- **Structures** the document and tells browsers what a certain element's function is
- Content is "marked-up" using tags
- Tags usually (but not always) come in pairs,

  ```html
  <p>This is an example of a paragraph element</p>
  ```

- The opening tag, closing tag and everything in between is a **HTML element**
STRUCTURE OF HTML DOCUMENT

```html
<!DOCTYPE html>
<html>
  <head>
    <title>Example page</title>
  </head>
  <body>
    <h1>Hello world</h1>
  </body>
</html>
```
DOCUMENT TYPE ELEMENT

```
<!DOCTYPE html>
```

- Appears just above the `<html>` tag
- Tells the browser to render the HTML in **standards** mode
- Let's validation software know which version of HTML to validate against
- Advised to use the **HTML5 doctype**
<html> ELEMENT

<html lang="en">
// HTML code for web page
</html>

- Represents the root of an HTML document
- Encouraged to specify a language attribute
- Language attribute aids speech synthesis (screen readers), translation tools and other language-related functionality
**<head> Element**

- Contains instructions for the browser and meta data for the website
- Title and description are what shows up on search engine results
- Stylesheets are also declared here
**<body> Element**

- Represents the **main content** of the document
- Should only be one `<body>` element on a web page
FORMATTING YOUR WEB PAGE

- `<address>`
- `<article>`
- `<footer>`
- `<header>`
- `<h1>`
- `<h2>`
- `<h3>`
- `<h4>`
- `<h5>`
- `<h6>`
- `<hgroup>`
- `<nav>`
- `<section>`
- `<dd>`
- `<div>`
- `<dl>`
- `<dt>`
- `<figcaption>`
- `<figure>`
- `<hr>`
- `<li>`
- `<main>`
- `<ol>`
- `<p>`
- `<pre>`

- `<ul>`
- `<caption>`
- `<col>`
- `<colgroup>`
- `<table>`
- `<tbody>`
- `<td>`
- `<tfoot>`
- `<th>`
- `<thead>`
- `<tr>`
- `<button>`
- `<datalist>`
- `<fieldset>`
- `<form>`
- `<input>`
- `<keygen>`
- `<label>`
- `<legend>`
- `<meter>`
- `<optgroup>`
- `<option>`
- `<output>`
- `<progress>`
- `<select>`

- `<details>`
- `<dialog>`
- `<menu>`
- `<menuitem>`
- `<summary>`
- `<abbr>`
- `<b>`
- `<bdi>`
- `<bdo>`
- `<br>`
- `<cite>`
- `<code>`
- `<data>`
- `<dfn>`
- `<em>`
- `<i>`
- `<kbd>`
- `<mark>`
- `<q>`
- `<rp>`
- `<rt>`
- `<rtc>`
- `<ruby>`
- `<s>`
- `<samp>`

- `<small>`
- `<span>`
- `<strong>`
- `<sub>`
- `<sup>`
- `<time>`
- `<u>`
- `<var>`
- `<wbr>`
- `<area>`
- `<audio>`
- `<map>`
- `<track>`
- `<video>`
- `<embed>`
- `<object>`
- `<param>`
- `<source>`
- `<canvas>`
- `<noscript>`
- `<script>`
- `<del>`
- `<ins>`
BASIC HTML5 TEMPLATE

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="utf-8">
    <title>title</title>
    <meta name="description" content="A short description of your website">
    <meta name="author" content="Your name">
    <link rel="stylesheet" href="styles.css">
</head>
<body>
    <!-- page content -->
    <script src="script.js"></script>
</body>
</html>
```
TOP TO BOTTOM, LEFT TO RIGHT

- Web pages are made up of rectangular boxes
- These boxes are placed from top to bottom, left to right
BLOCK-LEVEL ELEMENTS

Block-level elements take up the entire width of the container.

RAINBOWS

A rainbow is a meteorological phenomenon that is caused by reflection, refraction and dispersion of light in water droplets resulting in a spectrum of light appearing in the sky.

COLOURS

- Red
- Orange
- Yellow
- Green
- Blue
- Indigo
- Violet

The block-level tags shown in this example are h1, h2, p, ul and li.

You can refer to the full list of block-level elements here.
INLINE-LEVEL ELEMENTS

If an element is NOT block-level, it is inline.

Accordingly, [the Munsell colour system](https://en.wikipedia.org/wiki/Munsell_color_system) (a 20th-century system for numerically describing colours, based on equal steps for human visual perception) distinguishes 100 hues.

Commonly used inline-level tags include `a`, `input`, `label`, `img` and so on.

Full list of inline-level elements available [here](https://www.w3schools.com/html/).
CASCADING STYLE SHEETS (CSS)
CASCADING STYLE SHEETS (CSS)

• Tells the browser how to **display** a certain element
• Follows the general ruleset:
  1. Select the HTML element to be styled
  2. Specify the properties of the element to be styled
  3. Give the values we want each property to have
STRUCTURE OF A CSS RULE

```
selector {
    property1: value;
    property2: value;
    property3: value;
}
```

- The **selector** identifies which HTML elements the rule will be applied to
- The **curly braces** contain the property-value pairs, separated with semi-colons
- The **properties** define the style of the selected element
- The **values** are dependent on the property, and indicate the value of the properties to be set
TYPES OF CSS SELECTORS

- **Element**: matches all the elements of that name on the page

  ```css
p {}
  ```

- **Class**: matches all the elements with the specified class attribute, e.g. `<div class="example">`

  ```css
  .example {}
  ```

- **ID**: matches the element with the specified id attribute, e.g. `<div id="example">

  ```css
  #example {}
  ```
DESCENDENT SELECTORS

Used to select tags that are children of other tags

- 4 large eggs
- 1/4 cup milk
- 2 tsp. butter

1. BEAT eggs, milk, salt and pepper in medium bowl until blended.
2. HEAT butter in large nonstick skillet over medium heat until hot. POUR IN egg mixture. As eggs begin to set, GENTLY PULL the eggs across the pan with a spatula, forming large soft curds.
3. CONTINUE cooking – pulling, lifting and folding eggs – until thickened and no visible liquid egg remains. Do not stir constantly. REMOVE from heat. SERVE immediately.

Selector list is read from right-to-left, with the left-most being the parent.
**PSEUDO-SELECTORS**

Applies to selectors when certain conditions occur

- Link 1
- Link 2
- Link 3

There are many other pseudo-selectors you can use as well. The full list is available [here](#).
THE BOX MODEL

The model is made up of four boxes, from inside to outside:

- Content
- Padding
- Border
- Margin

*The box model, visualised*
WHEN TO USE MARGIN

Margin controls the space between elements.

RAINBOWS
A rainbow is a meteorological phenomenon that is caused by reflection, refraction and dispersion of light.

COLOURS
- Red
- Orange
- Yellow

RAINBOWS
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WHEN TO USE PADDING

Padding controls the size of the box without adjusting the size of the content within it.

RAINBOWS

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COLOURS

- Red
- Orange
- Yellow
WHERE TO WRITE YOUR STYLES

Browsers will pick up your CSS if they are between a <style> tags which is a child of the <head> tag.

```html
<!DOCTYPE html>
<html lang="en">
<head>
<style type="text/css">
  h1 {
    font-size: 2rem;
  }
  a {
    text-decoration: none;
  }
  a:hover {
    text-decoration: underline;
    color: darkred;
  }
</style>
</head>
```
USE A SEPARATE CSS FILE

As your site grows, you'll have many more styles, so it's better to move them all into a separate file.

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <link type="text/css" rel="stylesheet" href="main.css">
</head>
```

In this example, we are using `main.css` but you can name the file anything. This file will hold all your CSS and be linked in the `<head>` of every page.
CSS SPECIFICITY

0-∞

Inline styles

0-∞

IDs

0-∞

Classes, attributes and pseudo-classes

0-∞

Elements and pseudo-elements

ul {
  // CSS properties
}

0, 0, 0, 1

.class-1 .class-2 p {
  // CSS properties
}

0, 0, 2, 1

#id-1 .class-3 div {
  // CSS properties
}

0, 1, 1, 1
GENERAL GUIDELINES FOR WRITING CSS

- Declare your styles from lowest specificity then move up
- Keep your specificity as low as possible
- Name your classes sensibly
- Never style IDs
- Don't write inline styles
USING IMAGES
TYPES OF IMAGES

- Content images
  - contain relevant information
  - help the user understand the content

- Background images
  - decorative in nature
  - contribute to the overall look and feel of the site
CONTENT IMAGES

Content images are created using the `<img>` tag

```
<img src="path/to/image" alt="Description of the image">
```

- Doesn't need a closing tag.
- Requires a `<src>` attribute to tell the browser where to find the image file
- Requires an `<alt>` attribute which describes the image or its purpose
BACKGROUND IMAGES

Background images are set via CSS

There are several properties related to backgrounds:

```
background-image: none
default
background-position: 0% 0%
background-size: auto auto
default
background-repeat: repeat
default
background-origin: padding-box
background-clip: border-box
background-attachment: scroll
default
background-color: transparent
default
```

background is one of many CSS properties that can be written in shorthand.
SETTING BACKGROUND IMAGES

background-image can use relative or absolute paths

It's advisable to set a background-color as a fallback for the background image

This is a div with a background image
BACKGROUND-POSITION

This is used to set the position of the image

```css
div {
    background-color: #170104;
    background-image: url('img/back);
    background-position: center center;
}
```

Position has been set to center center

```css
div {
    background-color: #170104;
    background-image: url('img/back');
    background-position: left bottom;
}
```

Position has been set to left bottom
BACKGROUND-REPEAT

Used for tiling patterned backgrounds

Takes the following values:

- `repeat-x`: tiles the image horizontally
- `repeat-y`: tiles the image vertically
- `no-repeat`: don't tile or repeat anything

```css
div {
    background-color: #EBEBEB;
    background-image: url('img/sativa.jpg');
    background-repeat: repeat;
}
```
BROWSER DEVELOPER TOOLS
WHAT ARE DEVTOOLS?

Every modern browser has a powerful suite of developer tools.

- Inspect currently loaded HTML, CSS and Javascript
- Check which assets were loaded
- See how long it took for your assets to load
- Provides details for each HTTP request/response
- And a lot more...
HOW TO USE DEVTOOLS?

- Keyboard shortcut
  - Windows: Ctrl + Shift + I
  - Mac: Option + Command + I

- Menu bar
  - Firefox: Tools > Web Developer > Toggle Tools
  - Chrome: View > Developer > Developer Tools
  - Safari: Develop > Show Web Inspector
  - Opera: Developer > Web Inspector

- Context menu
  - Right-click on an element in the browser and select Inspect
THE WEB IS FLUID

CONTENT IS LIKE WATER

"You put water into a cup it becomes the cup. You put water into a bottle it becomes the bottle. You put it in a teapot, it becomes the teapot."

Josh Clark (originally Bruce Lee) - Seven deadly mobile myths
Illustration by Stephanie Walter

Image by Stephanie Walter
BROWSERS ARE RESPONSIVE BY DEFAULT

Our problems with websites are self-created

Satirical but true example

"The control which designers know in the print medium, and often desire in the web medium, is simply a function of the limitation of the printed page."
- John Allsop, A Dao of Web Design (2000)
MEDIA QUERIES

Tell the browser to display the site’s content in a particular way when certain conditions are true.

Basic syntax as follows:

```css
@media <media-type> (<media-feature>);
```

- **media-type**: e.g. screen, print
- **media-feature**: e.g. width, height
MOBILE-FIRST MEDIA QUERIES

- Default styles are for small screen sizes
- Add styles as the screen size gets bigger
- Can chain additional media features
WEB ACCESSIBILITY
SEMANTICS AND ACCESSIBILITY

- To make the web easier to use and access, and available to everyone
- Encompasses all disabilities, including visual, auditory, physical, speech, cognitive and neurological disabilities
- Benefits people *without* disabilities as well
- Accessible websites benefit from search engine optimisation (SEO)
BASIC ACCESSIBILITY CHECKLIST (1/2)

- Page title: To adequately and briefly describe the content of the page
- Image text alternatives: To make visual information accessible
- Headings: To provide meaningful hierarchy for facilitation of navigation
- Contrast ratio: To have sufficient luminance contrast ratio, for people with different requirements
- Resize text: To ensure visibility and usability as text size increases
BASIC ACCESSIBILITY CHECKLIST (2/2)

- **Keyboard access & visual focus:** To provide full functionality through a keyboard, and visible focus with logical order
- **Forms, labels & errors:** To have proper labels, keyboard access, clear instructions, and effective error handling
- **Multimedia alternatives:** To have alternative formats for audio and visual impaired

Visit Web Accessibility Initiative (WAI) to understand more about this important aspect of the web
DEPLOYING YOUR WEBSITE
WEB HOSTING

Renting server space for your website

Shared hosting, Dedicated hosting, VPS (Virtual Private Server)

Managed vs Unmanaged
DOMAIN NAME REGISTRATION

Domain names map to your server's IP address
Provides a human-readable name for your site
Top-level domains, e.g. .com, .io, .org, .edu
Register domain names with a domain name registrar
GETTING YOUR SITE ONLINE

Upload the files onto your server, Git or FTP

Servers usually run on Linux

Type of hosting determines level of control

Must be running a HTTP server, Apache or Nginx
FREE OPTIONS FOR STATIC SITES

BitBalloon, Pancake, Forge

GitLab Pages, GitHub Pages

Surge, Pubstorm
TO FIND OUT MORE...

- Dash (online course)
- Codeacademy (online course)
- Bento (online resources)
- Mozilla Developer Network (MDN) (website)
- HTML & CSS: Design and Build Web Sites by Jon Duckett (book)
- Designing with Web Standards by Jeffrey Zeldman (book)
SIGN UP FOR GA COURSES

- Web Development Immersive (full-time)
- Front-end development (part-time)
- Javascript development (part-time)
- Back-end development (part-time)
- Various classes and workshops
THE END

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