**Dr. Wittawin Susutti**

wittawin.sus@kmutt.ac.th

# CSS227 WEB PROGRAMMING

## LECTURE 02 HTML AND CSS

# HTML, CSS, and JS

- **HTML**
  - Structure and content of a webpage.
  - Nouns of a webpage.
- **CSS**
  - Style of HTML.
  - Adj. of a webpage.
- **Javascript**
  - Adds logic and interactivity to a page.
  - Verb of a webpage.

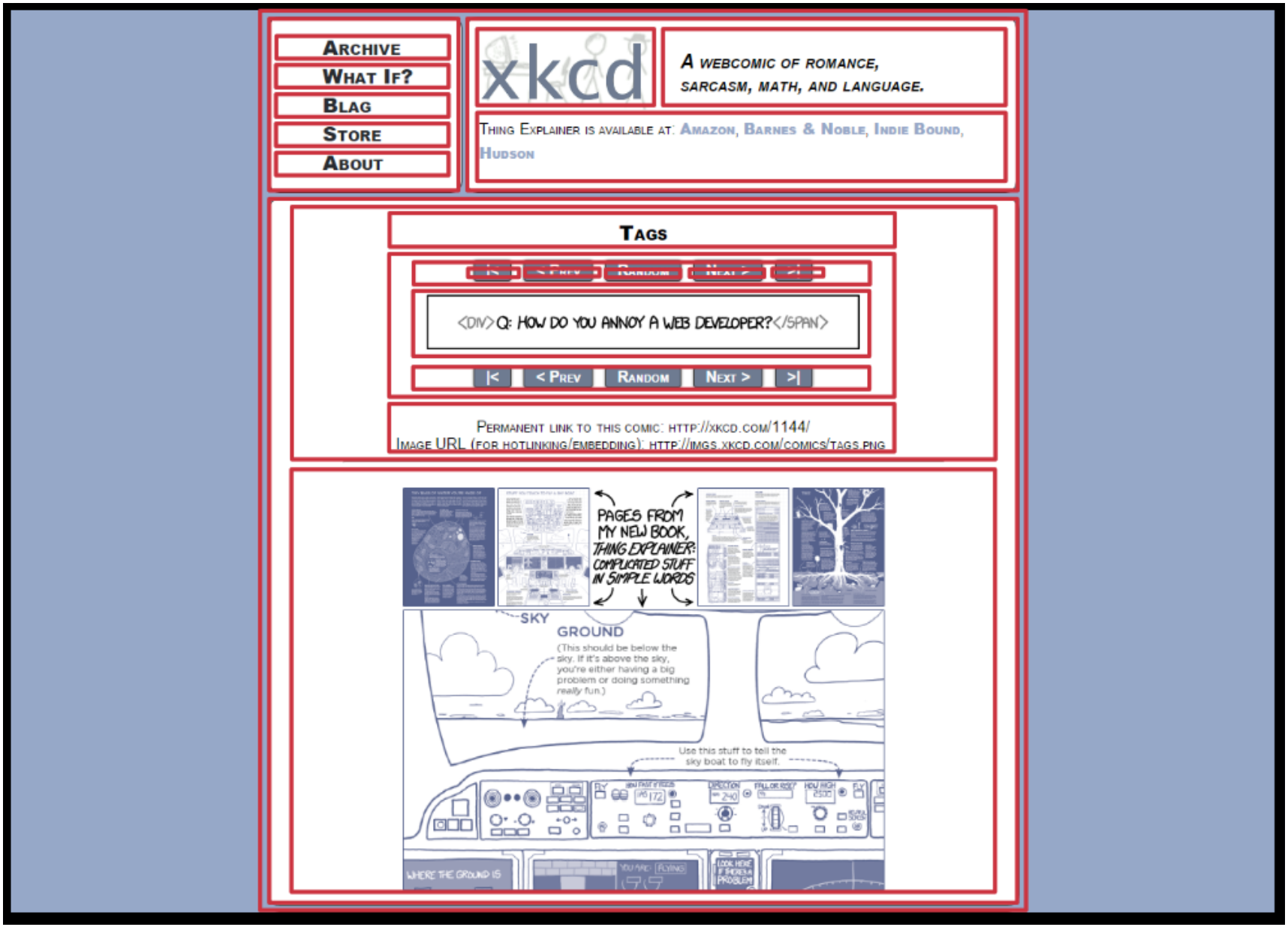

ARCHIVE
WHAT IF?
BLAG
STORE
ABOUT
xkcd
A WEBCOMIC OF ROMANCE, SARCASM, MATH, AND LANGUAGE.
THING EXPLAINER IS AVAILABLE AT: AMAZON, BARNES & NOBLE, INDIE BOUND, HUDSON
TAGS
<DIV>Q: HOW DO YOU ANNOY A WEB DEVELOPER?</SPAN>
|< < PREV RANDOM NEXT > >|
PERMANENT LINK TO THIS COMIC: HTTP://XKCD.COM/1144/
IMAGE URL (FOR HOTLINKING/EMBEDDING): HTTP://IMGS.XKCD.COM/COMICS/TAGS.PNG
PAGES FROM MY NEW BOOK, THING EXPLAINER: COMPLICATED STUFF IN SIMPLE WORDS
SKY
GROUND
(This should be below the sky. If it's above the sky, you're either having a big problem or doing something really fun.)
Use this stuff to tell the sky boat to fly itself.
WHERE THE GROUND IS
YOU ARE: FLYING
LOOK HERE IF THERE'S A PROBLEM

Image: MIT

# HTML

- **HTML (Hypertext Markup Language)**
  - Describes the **content and structure of a webpage**
  - **NOT** a programming language.
  - Made up of building blocks called **elements.**

- Basic HTML page structure →
- Saved in a *filename**.html*** file.
- HTML boilerplate
  - http://htmlshell.com/

```
<!DOCTYPE html>
<html>
  <head>
    <title>title</title>
  </head>
  <body>

  </body>
</html>
```

Metadata that doesn't appear in the viewport of the browser

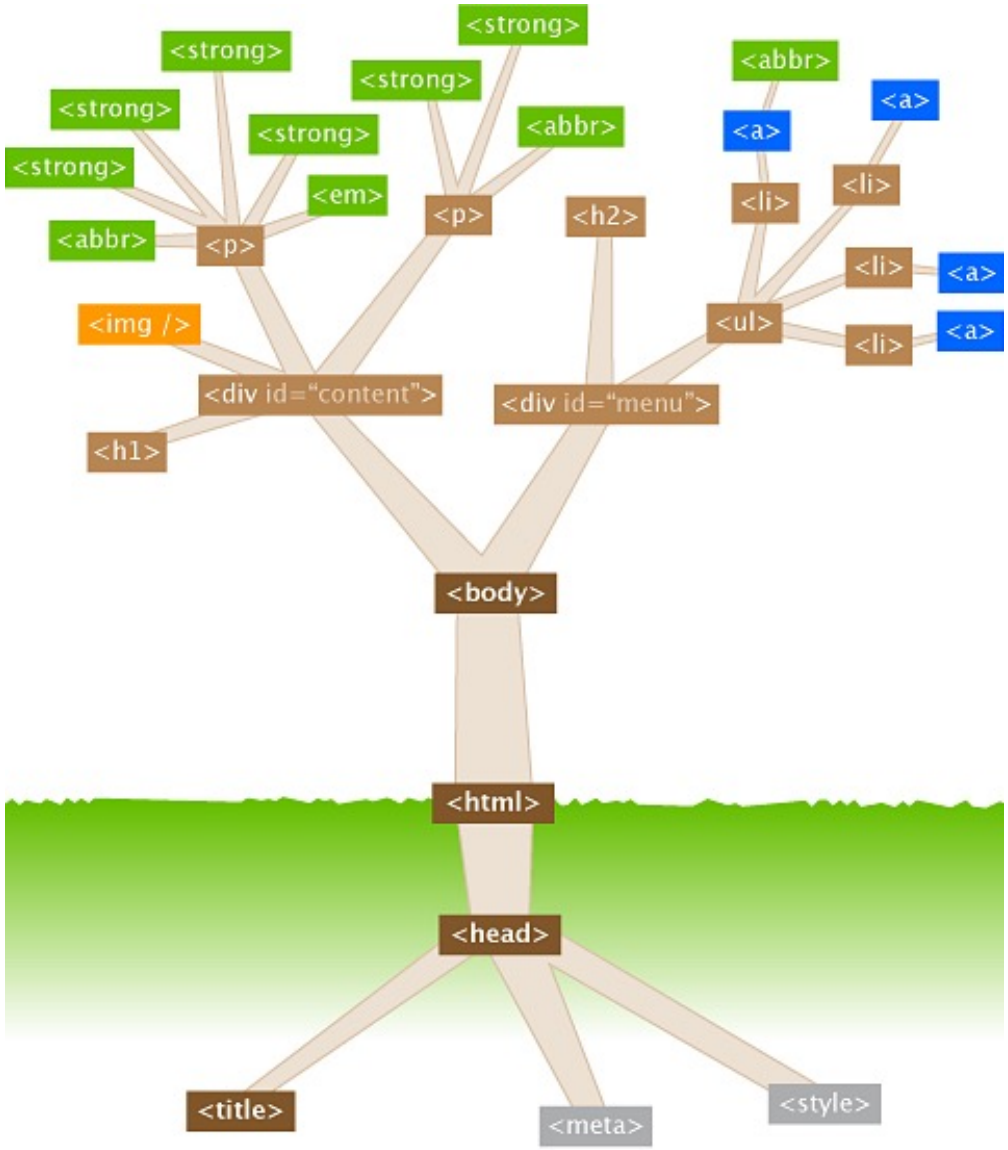
Contents that render in the viewport of the browser

# HTML Structure

- HTML is a tree structure
  - Internal nodes represent structure
  - Leaf nodes represent content
- Specified textually as a tree

```
<node>
    <subnode field='value'>
        Text in a  leaf node
        <leafnode />
    </subnode>
</node>
```

- Maintained internally as a tree (DOM)
- Nodes have names, attributes
- Text may appear at leaves




Source: http://watershedcreative.com/

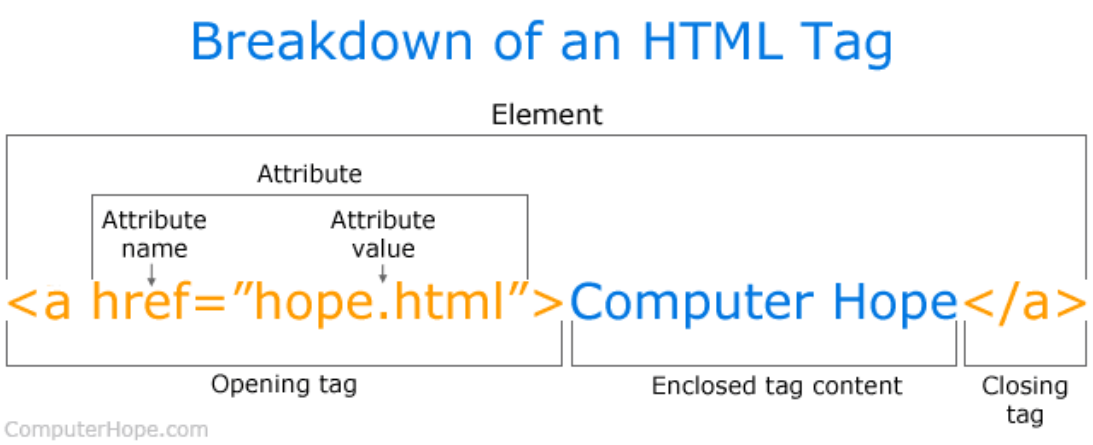
# HTML Components

- Header: basic information about the page
  - Styles (CSS): information on how to display
    - Can be in separate files
  - Scripts (JavaScript)
    - Dynamic interactivity
    - Can be in separate files
- Body: the data to display
  - Description of what should be presented on the page

# Basic HTML Body Components

- Text
- Descriptions of how to display text
  - <*em*>text</*em*>, <*span class='emph'*>text</*span*>
  - Managed by CSS
- Text organization
  - Headers, paragraphs, blocks, tables
- Page layout and organization
  - DIV, LIST, TABLE, FRAME
- Interactive regions
  - Forms: text fields, buttons, …
  - Canvas, SVG regions

# HTML elements




- An element can have attributes (**href="hope.html"**)
- Elements can contain other elements (**p** contains **em** and **img**)

```
<p>
        Hello Kitty is <em>cute</em>
        <img src="kitty.png">
</p>
```

- An element can be self-closing (**img**)

# Some HTML elements

| | |
|---|---|
| Heading<br>`h1, h2, … h6` | `<h1>CSS227</h1>` |
| Paragraph | `<p>Hello Kitty is sexy.</p>` |
| Division container | `<div class="shadowbox">`<br>`  <p>This's a very interesting topic.</p>`<br>`</div>` |
| Inline container | `<p>Some text is <span>red</span></p>` |
| Line break | `This is the first line.<br>`<br>`This is second line.` |
| Image | `<img src="kitty.png">` |
| Link | `<a href="google.com">Go to Google!</a>` |
| Strong (bold) | `<strong>BOLD</strong>` |
| Emphasis (italic) | `Here is <em>italic</em>.` |

# title Element

- The head element contains two types of elements—**meta** and **title**.
- The title element's contained data specifies the label that appears in the browser window's **title bar**.
- Besides providing a label for your browser window's title bar, what's the purpose of the title element?
  - It provides documentation for someone trying to maintain your web page
  - It helps web search engines find your web page

# meta Element

- The meta elements provide **information** about the web page.
- There are many different types of meta elements
  - some you should always include, but most are just optional.
- *The meta element does not have an end tag.*
- Attributes:
  - charset
  - name
  - content

```
<head>
  <meta charset="UTF-8">
  <meta name="description" content="Travelling through Surrey, the
best pubs in Egham">
  <meta name="keywords" content="Egham,Surrey,Pubs, travel">
  <meta name="author" content="Joe Bloggs">
  <meta name="viewport" content="width=device-width, initial-
scale=1.0">
</head>
```

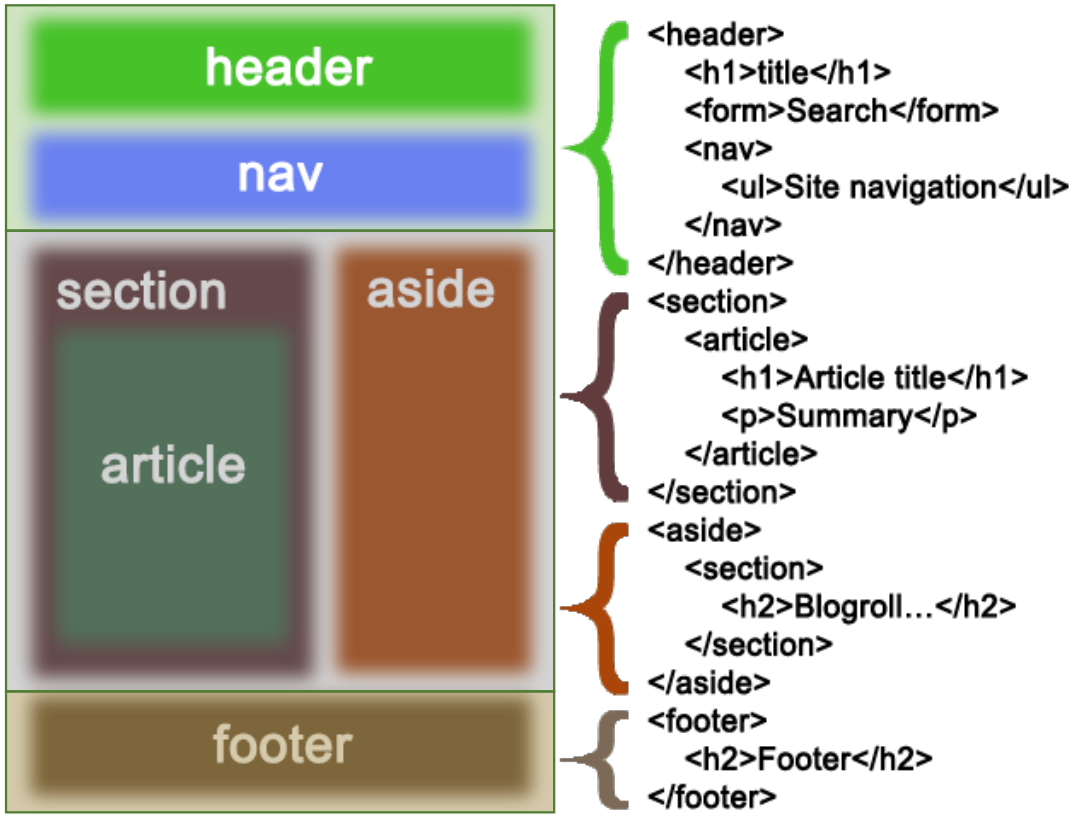
Image:webtrends-optimize.com

# The HTML5 standard

- **Audio and video**—The audio and video elements allow users to play music and video files directly from their browsers without the need of a plug-in.
- **Canvas**—The canvas element provides a drawing area and a set of commands that a web programmer can use to draw two-dimensional shapes and animate them.
- **Drag and drop functionality**—The drag and drop constructs provide the ability to drag elements within a web page.
- **Web storage functionality**—The web storage constructs provide the ability to permanently store data on the browser's computer.
- **Geolocation functionality**—The geolocation constructs provide the ability to locate the browser's computer.

# The HTML5 standard

Structural organization elements




Source:htmlweblearn

# Semantic HTML

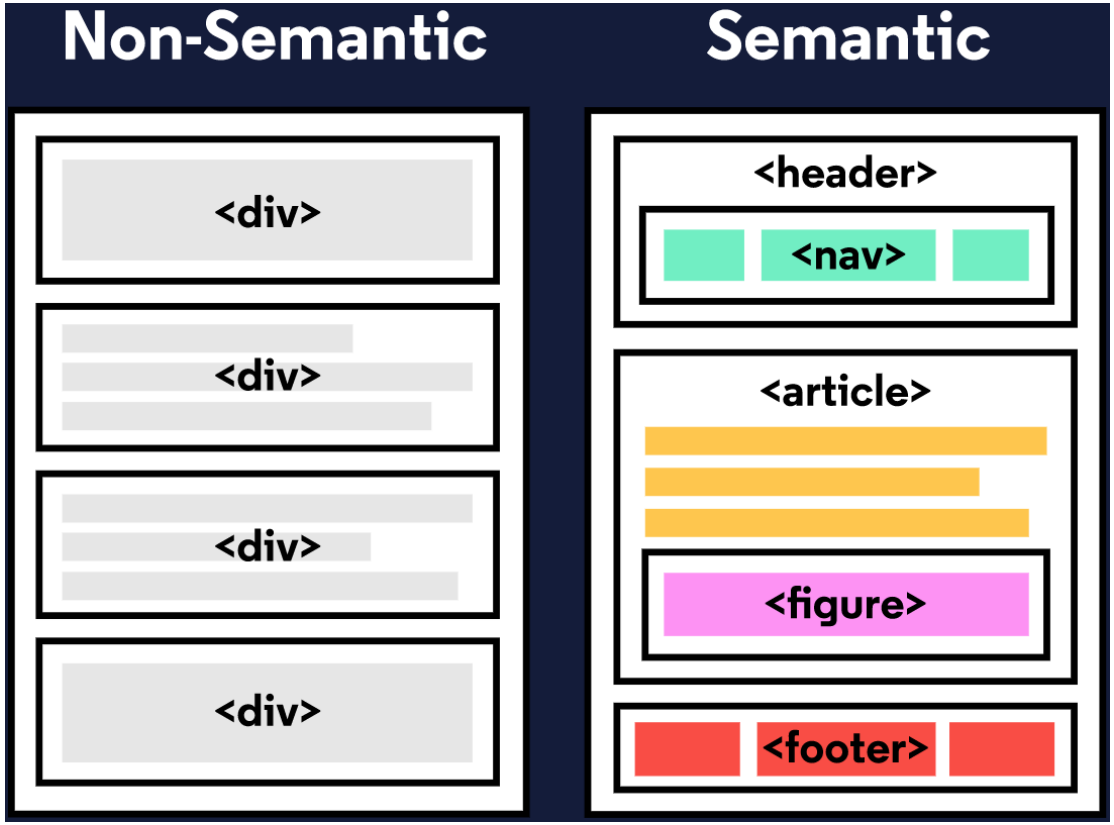
```
<!--Non Semantic HTML-->
<div id="footer">
 <p>this is a footer</p>
</div>

<!--Semantic HTML-->
<footer>
 <p>this is a footer</p>
</footer>
```

?

# Semantic HTML

- When building web pages, we use a **combination** of non-semantic HTML and Semantic HTML.
- The semantic elements provide information about the content between the opening and closing tags.
- By using Semantic HTML, we select HTML elements based on their meaning, not on how they are presented.
- For example, instead of using a ** ** element to contain our header information, we could use a **<header>** element, which is used as a heading section.



# Why use Semantic HTML?

- **Accessibility**
  - Semantic HTML makes webpages accessible for mobile devices and for people with disabilities as well.
  - This is because screen readers and browsers can interpret the code better.
- **SEO**
  - It improves the website SEO, or ***Search Engine Optimization***, which is the process of increasing the number of people that visit your webpage.
  - With better SEO, search engines are better able to identify the content of your website and weight the most important content appropriately.
- **Easy to Understand**
  - Semantic HTML also makes the website's source code easier to read for other web developers.

# Header

- A **<header>** is a container usually for either navigational links or introductory content containing **<h1>** to **<h6>** headings.
- By using a **<header>** tag, the code becomes easier to read.
- It is much easier to identify what is inside of the **<h1>**'s parent tags, as opposed to a ** ** tag which would provide no details as to what was inside of the tag.

```
<html>
  <body>
    <div>
      <h1>Navigational Links</h1>
      <div>
        <ul>
          <li><a href="#home">Home</a></li>
          <li><a href="#posts">Posts</a></li>
          <li><a href="#contact">Contact</a></li>
        </ul>
      </div>
    </div>
  </body>
</html>
```

```
<html>
  <body>
    <header>
      <h1>Navigational Links</h1>
      <div>
        <ul>
          <li><a href="#home">Home</a></li>
          <li><a href="#posts">Posts</a></li>
          <li><a href="#contact">Contact</a></li>
        </ul>
      </div>
    </header>
  </body>
</html>
```

# Nav

- A **<nav>** is used to define a block of navigation links such as menus and tables of contents.
- It is important to note that **<nav>** can be used inside of the **<header>** element but can also be used on its own.
- By using **<nav>** to label the navigation links, it will be easier for web browsers and screen readers to read the code.

```
<html>
  <body>
    <header>
      <h1>Navigational Links</h1>
      <div>
        <ul>
          <li><a href="#home">Home</a></li>
          <li><a href="#posts">Posts</a></li>
          <li><a href="#contact">Contact</a></li>
        </ul>
      </div>
    </header>
  </body>
</html>
```

```
<html>
  <body>
    <header>
      <h1>Navigational Links</h1>
      <nav>
        <ul>
          <li><a href="#home">Home</a></li>
          <li><a href="#posts">Posts</a></li>
          <li><a href="#contact">Contact</a></li>
        </ul>
      </nav>
    </header>
  </body>
</html>
```

# Main and Footer

- Two more structural elements are **<main>** and **<footer>**.
- The element **<main>** is used to encapsulate the dominant content within a webpage.
- This tag is separate from the **<footer>** and the **<nav>** of a web page since these elements don’t contain the principal content.
- By using **<main>** as opposed to a ** ** element, screen readers and web browsers are better able to identify that whatever is inside of the tag is the bulk of the content.

# Main and Footer

- The content at the bottom of the subject information is known as the footer, indicated by the **<footer>** element.
- The footer contains information such as:
  - Contact information
  - Copyright information
  - Terms of use
  - Site Map
  - Reference to top of page links
- The **<footer>** tag is separate from the **<main>** element and typically located at the bottom of the content.

# Article and Section

- **<section>** defines elements in a document, such as chapters, headings, or any other area of the document with the same theme.
- For example, content with the same theme such as articles about something can go under a single **<section>**.
- A website's home page could be split into sections for the introduction, news items, and contact information.
- The **<article>** element holds content that makes sense on its own.
- **<article>** can hold content such as articles, blogs, comments, magazines, etc.
- An **<article>** tag would help someone using a screen reader understand where the article content begins and ends.

# The Aside Element

- The **<aside>** element is used to mark additional information that can enhance another element but isn't required in order to understand the main content.
- This element can be used alongside other elements such as **<article>** or **<section>**.
- Some common uses of the **<aside>** element are for:
  - Bibliographies
  - Endnotes
  - Comments
  - Pull quotes
  - Editorial sidebars
  - Additional information

```
<article>
  <p>The first World Series was played between
Pittsburgh and Boston in 1903 and was a nine-game
series.</p>
</article>
<aside>
  <p>
   Babe Ruth once stated, "Heroes get remembered, but
legends never die."
  </p>
</aside>
```

# Figure and Figcaption

- **<figure>** is an element used to encapsulate media such as an image, illustration, diagram, code snippet, etc, which is referenced in the main flow of the document.
- It's possible to add a caption to the image by using **<figcaption>**.
- **<figcaption>** is an element used to describe the media in the **<figure>** tag.
- Usually, **<figcaption>** will go inside **<figure>.**
- This is useful for grouping an image with a caption.

```
<figure>
  <img src="overwatch.jpg">
  <figcaption>This picture shows characters from
Overwatch.</figcaption>
</figure>
```

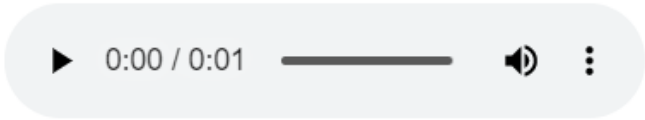
# Audio and Attributes

- The <audio> element is used to embed audio content into a document.
- Like <video>, <audio> uses src to link the audio source.

```
<audio>
  <source src="iAmAnAudioFile.mp3" type="audio/mp3">
</audio>
```

- Specifying the type is recommended as it helps the browser identify more easily and determine if that type of audio file is supported by the browser.
- Attributes provide additional information about an element.

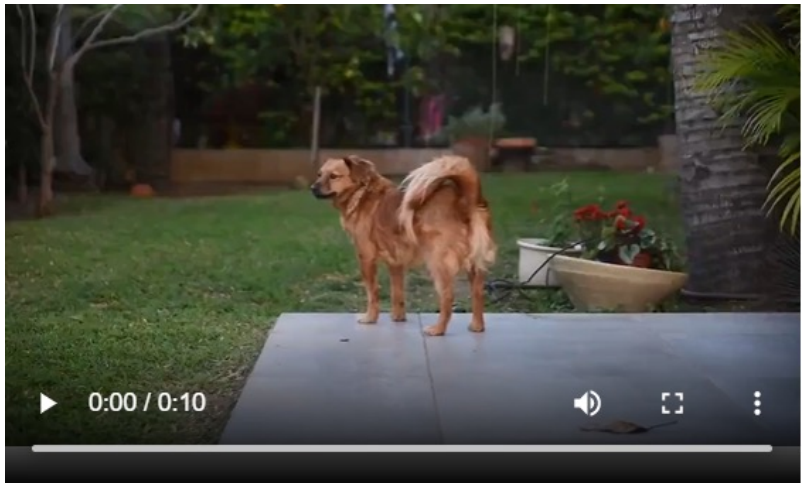
```
<audio autoplay controls>
```



# Video and Embed

- By using a **<video>** element, we can add videos to our website.
- The **<video>** element makes it clear that a developer is attempting to display a video to the user.
- The **<embed>** tag can embed any media content including videos, audio files, and gifs from an external source.

```
<video src="coding.mp4" controls>Video not
supported</video>
```



# Three Pillars for Good Web Design

**Responsive Design**

- Build a website that works beautifully across all screen sizes and all devices.

**Maintainable and Scalable code**

- More important for the developer than for the user of the website.
- Writing maintainable and scalable code means
  - Clean
  - Easy to understand
  - Supports future growth
  - Reusable

**Web Performance**

- Making a website or app faster and to make it smaller.

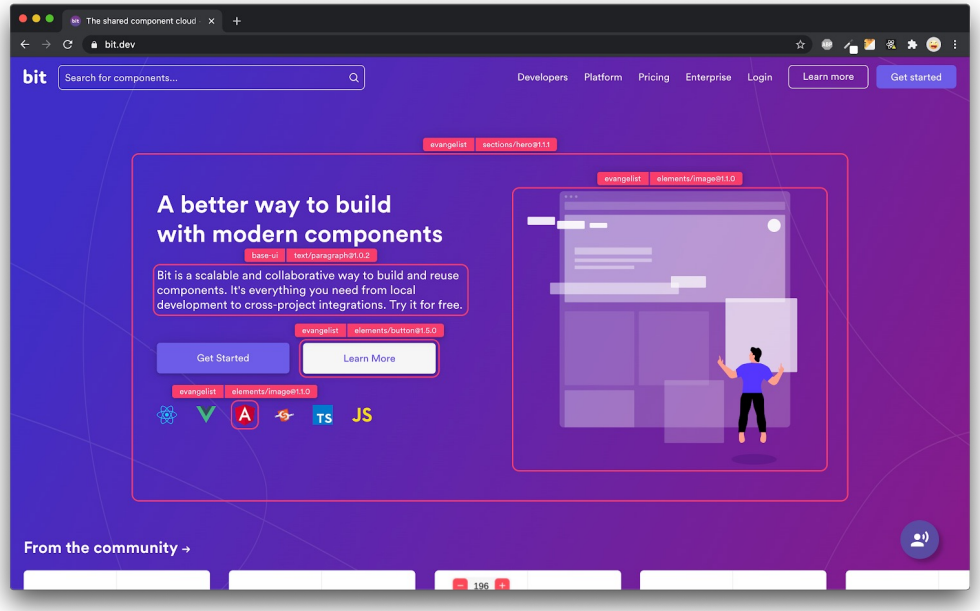
# Web design mindset

- Design your webpage layout before coding.
- Write your layout in HTML and CSS with a consistance structure.
- Create your logical architecture for your HTML and CSS files.

# Component driven design

- The concept of building websites out of ready-made elements (components), which are designed and programmed segments to be used as building blocks for your website.

- **Key benefits**
  - Faster development
  - Simpler maintenance
  - Better reusability
  - Better Testing
  - Shorter learning curves
  - Better modeling of the system



# BEM – Block Element Modifier

- **Block**
  - A standalone entity that is meaningful on its own.
- **Element (__)**
  - Parts of a block and have no standalone meaning.
  - Any element is semantically tied to its block.
- **Modifier (--)**
  - Flags on blocks or elements.
  - Use them to change appearance, behavior or state.

HTML

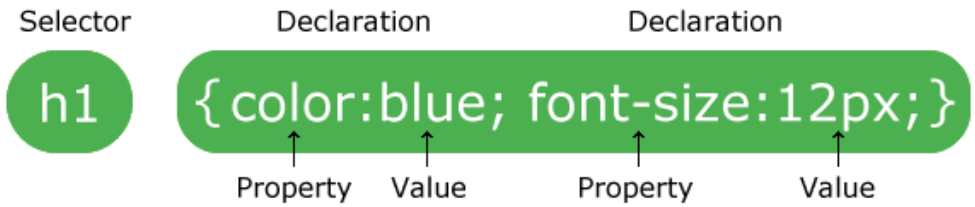
```
<form class="form form--theme-xmas form--simple">
  <input class="form__input" type="text" />
  <input
    class="form__submit form__submit--disabled"
    type="submit" />
</form>
```

CSS

```
.form { }
.form--theme-xmas { }
.form--simple { }
.form__input { }
.form__submit { }
.form__submit--disabled { }
```

# CSS

- **CSS: Cascading Style Sheets**
- Describes the **appearance** and **layout** of a web page
- Composed of CSS rules, which define sets of styles
- CSS Syntax




- Saved in a *filename**.css*** file.

Credit: w3schools

# Linking CSS in HTML

- **Inline** - by using the style attribute in HTML elements

```
<h1 style="color:blue;">This is a Blue Heading</h1>
```

- **External** - by using an external CSS file and add a link in <head> section

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

- **Internal** - by using a <style> tag in the <head> section

```
<head>
 <style>
   body {background-color: powderblue;}
   h1   {color: blue;}
   p    {color: red;}
 </style>
</head>
```

# Absolute and Relative paths

- **Absolute path** - provide the full website address.
  - ***always*** include the domain name of the website.
  - must use if link to a location on another website.

- **Relative path** – provide file path or folder
  - only point to a file or a file path.
  - easy when you change your domain name.

**Relative Paths**
index.html
/graphics/image.png
/articles/webpage.html
**Absolute Paths**
http://www.mysite.com
http://www.mysite.com/graphics/image.png
http://www.mysite.com/articles/webpage.html

# Some CSS properties

There are over 500 CSS properties!

| | |
|---|---|
| Font face | `font-family: Helvetica;` |
| Font color | `color: gray;` |
| Background color | `background-color: red;` |
| Border | `border: 3px solid green;` |
| Text alignment | `text-align: center;` |

# Main ways to define CSS colors:

**140 predefined names (list)**

```
color: black;
```

**Hex values**

```
color: #00ff00;
color: #0f0;
color: #00ff0080;
```

**rgb() and rgba()**

```
color: rgb(34, 12, 64);
color: rgba(0, 0, 0, 0.5);
```

- The "a" stands for **alpha channel** and is a **transparency** value

http://colours.neilorangepeel.com/

https://htmlcolorcodes.com/

# CSS Selectors

## The element Selector

```
p {
  text-align: center;
  color: red;
}
```

## The class Selector

```
.class {
  text-align: center;
  color: red;
}
```

## The id Selector

```
#id1 {
  text-align: center;
  color: red;
}
```

## Grouping Selector

```
h1 {
  text-align: center;
  color: red;
}
p {
  text-align: center;
  color: red;
}
```

```
h1, p {
  text-align: center;
  color: red;
}
```

# CSS Selectors

## Class

- Can use the same class on multiple elements
- Can use multiple classes on the same element

## ID

- Each element can have only one ID
- Each page can have only one element with that ID

# CSS Selectors: Classes and Ids

- There are 3 basic types of CSS selectors:

| | | |
|---|---|---|
| **Element selector** | **p** | All **<p>** elements |
| **ID selector** | **#abc** | element with **id="abc"** |
| **Class selector** | **.abc** | elements with **class="abc"** |

```
<h1 id = “title”>Course</h1>
<em class = “subject”>CSS227</em> Web programming.<br>
<em class = “subject”>CSS241</em> Numerical Computation.<br>
<em>Total 2 courses</em>
```

# More on class and id

- **class** and **id** are special HTML attributes
  - **class**
    - used on 1 or more elements
    - identifies a **collection** of elements
  - **Id**
    - used on exactly 1 element per page;
    - identifies **one unique** element

- Multiple classes

```
<span class="subject new">CSS</span>
```

- Often used with span and div to create generic elements:
  - e.g., **`<span class="highlight">`** is like creating a "highlight" element

# More on selectors

| Syntax | Example | Example described |
|---|---|---|
| *element.className* | `p.abc` | `<p>` elements with abc class |
| *selector selector* | `div strong` | `<strong>` elements that are descendants of a `<div>` |
| *selector, selector* | `h2, div` | `<h2>` elements and `<div>`s |

# Selector summary

| Example | Description |
|---|---|
| `p` | All **<p>** elements |
| `.abc` | All elements with the **abc class**, i.e., **class="abc"** |
| `#abc` | Element with the **abc id**, i.e., **id="abc"** |
| `p.abc` | **<p>** elements with **abc class** |
| `p#abc` | **<p>** element with **abc id** (**p** is redundant) |
| `div strong` | **** elements that are **descendants** (inside) of a ** ** |
| `h2, div` | **<h2>** elements and ** ** |
| `*` | All elements |
| `h2 + h3` | **<h2>** elements adjacent to **<h3>** |

# Grouping selectors

- **2 Common bugs:**
  - `p.abc` **vs** `p .abc`
  - `p .abc` **vs** `p, .abc`

- A <p> element with the **abc** class **vs**
  An element with the **abc** class that descends from **<p>**

- An element with the **abc** class that descends from **<p>** **vs**
  All **<p>** elements ***and*** all elements with the **abc** class

# Colliding styles

- When styles collide, there are following these rules:
  1. !important (Bad for maintenance)
  2. The most specific rule
  3. Source order

```
div strong { color: red; }
strong { color: blue; }

<div>
  <strong>What color am I?</strong>
</div>
```

- Specificity precedence rules (details):
  - Inline styles are the most specific. (Not a good practice)
  - Ids are more specific than classes.
  - Classes are more specific than element names.
  - Style rules that directly target elements are more specific than style rules that are inherited.
  - The universal selector (*) has no specificity value.

# Colliding styles

```
strong { color: red; }
strong { color: blue; }

<div>
    <strong>What color am I?</strong>
</div>
```

- If elements have the same specificity, **the later rule wins**.

# Inheritance

- Some CSS styles are inherited from parent to child.

Instead of selecting all elements individually:

```
a, h1, p, strong {
 font-family: Helvetica;
}
```

You can style the parent and
the children will inherit the styles.

```
body {
 font-family: Helvetica;
}
```

You can override this style via specificity:

```
h1, h2 {
 font-family: Consolas;
}
```

- Not all CSS properties are inherited.

# User agent styles

- The browser has its own default styles.
- Browser loads its own default stylesheet on every webpage.

# CSS pseudo-classes

- **pseudo-classes**: special keywords you can append to selectors, specifying a *state* or *property* of the selector

| Syntax | Explanation |
|---|---|
| **a** | All anchor tags (links) in all states |
| **a:visited** | A visited link |
| **a:link** | An unvisited link |
| **a:hover** | The style when you hover over a link |
| **a:active** | The style when you have "activated" a link (downclick) |

# CSS Pseudo-elements

- A CSS pseudo-element is used to style specified parts of an element.
- For example, it can be used to:
  - Style the first letter, or line, of an element
  - Insert content before, or after, the content of an element

```
selector::pseudo-element {
  property: value;
}
```

- All CSS Pseudo Elements

| Selector | Example | Description |
|---|---|---|
| ::after | p::after | Insert something after the content of each <p> element |
| ::before | p::before | Insert something before the content of each <p> element |
| ::first-letter | p::first-letter | Selects the first letter of each <p> element |
| ::first-line | p::first-line | Selects the first line of each <p> element |
| ::selection | p::selection | Selects the portion of an element that is selected by a user |

# CSS

- Background
  - background-color
  - background-image
- Border
  - border-color
  - border-width
  - border-style
  - border

# CSS: Text and font

- font-family
- font-size
  - px
  - cm
  - em
  - rem
- font-weight
- line-height
- text-align
- text decoration

CSS fonts
https://www.cssfontstack.com/
Lorem ipsum
http://www.catipsum.com/
https://www.webfx.com/tools/lorem-ipsum-generator/

Google font
https://fonts.google.com/

# Lab 1 objectives

**Part 1:**

- Write HTML documents
- Write tags with attributes
- Given an image or webpage, write the corresponding HTML

**Part 2:**

- Write CSS files
- Write CSS selectors with specificity

# List tag

- **`<ol>`: The Ordered List element**

```
<ol>
  <li>Iron man</li>
  <li>Captain america</li>
  <li>Thor</li>
  <li>Hulk</li>
  <li>Black widow</li>
  <li>Hawkeye</li>
</ol>
```

- **`<ul>`: The Unordered List element**

```
<ul>
  <li>Iron man</li>
  <li>Captain america</li>
  <li>Thor</li>
  <li>Hulk</li>
  <li>Black widow</li>
  <li>Hawkeye</li>
</ul>
```

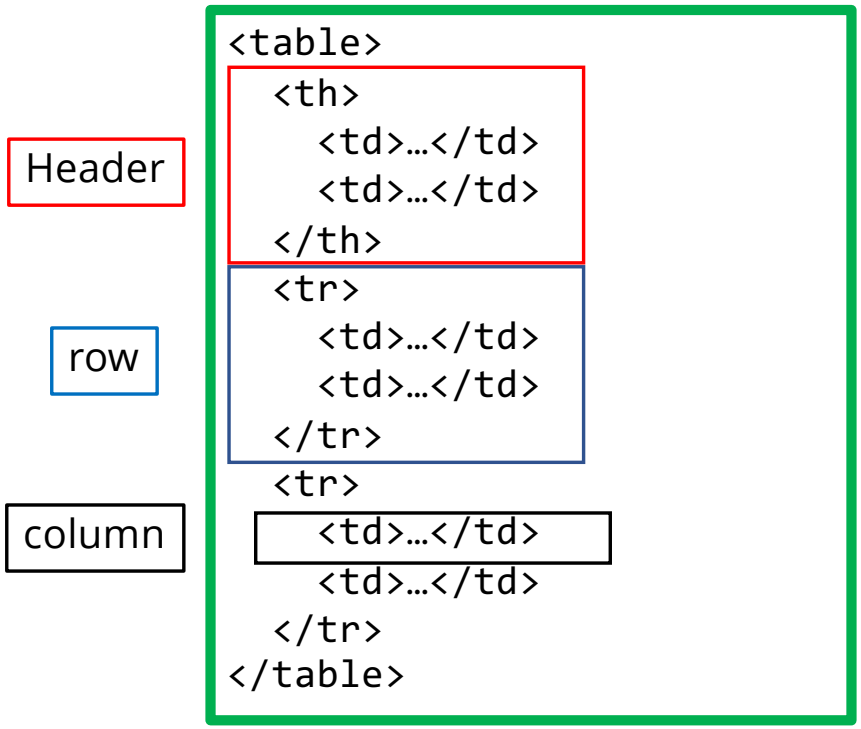
# <img>: The Image Embed element

- Main attribute
  - src
  - alt
  - height
  - width

```
<img src="Hello_kitty_character_portait.png"
alt="Hello kitty with blue bg." height="100px">
```

# HTML Table

- **<table>: The Table element**



# <form> tag

- <form> tag
  - action
  - method
- <input> tag
  - type – text, color, radio, password, and more types here!
  - placeholder
  - name
- <button> tag
- <label>
- Validation