# INFO-6076

# Web Security

Mark Up Languages

# Agenda

- You are all connected

- Markup Languages

- CSS: Cascading Style Sheets

- WebApp Testing Platforms

- Lab 02 Overview

# The Web

You are all connected

# Internet Users by Country

| # | Country | Internet Users (2016) | Penetration (% of Pop) | Population (2016) | Non-Users (internetless) | Users 1 Year Change (%) | Internet Users 1 Year Change | Population 1 Y Change |
|---|---------|----------------------|------------------------|-------------------|--------------------------|-------------------------|------------------------------|------------------------|
| 1 | China | 721,434,547 | 52.2 % | 1,382,323,332 | 660,888,785 | 2.2 % | 15,520,515 | 0.46 % |
| 2 | India | 462,124,989 | 34.8 % | 1,326,801,576 | 864,676,587 | 30.5 % | 108,010,242 | 1.2 % |
| 3 | U.S. | 286,942,362 | 88.5 % | 324,118,787 | 37,176,425 | 1.1 % | 3,229,955 | 0.73 % |
| 4 | Brazil | 139,111,185 | 66.4 % | 209,567,920 | 70,456,735 | 5.1 % | 6,753,879 | 0.83 % |
| 5 | Japan | 115,111,595 | 91.1 % | 126,323,715 | 11,212,120 | 0.1 % | 117,385 | -0.2 % |
| 6 | Russia | 102,258,256 | 71.3 % | 143,439,832 | 41,181,576 | 0.3 % | 330,067 | -0.01 % |
| 7 | Nigeria | 86,219,965 | 46.1 % | 186,987,563 | 100,767,598 | 5 % | 4,124,967 | 2.63 % |
| 8 | Germany | 71,016,605 | 88 % | 80,682,351 | 9,665,746 | 0.6 % | 447,557 | -0.01 % |
| 9 | U.K. | 60,273,385 | 92.6 % | 65,111,143 | 4,837,758 | 0.9 % | 555,411 | 0.61 % |
| 10 | Mexico | 58,016,997 | 45.1 % | 128,632,004 | 70,615,007 | 2.1 % | 1,182,988 | 1.27 % |
| 11 | France | 55,860,330 | 86.4 % | 64,668,129 | 8,807,799 | 1.4 % | 758,852 | 0.42 % |
| 12 | Indonesia | 53,236,719 | 20.4 % | 260,581,100 | 207,344,381 | 6.5 % | 3,232,544 | 1.17 % |
| 13 | Viet Nam | 49,063,762 | 52 % | 94,444,200 | 45,380,438 | 3.3 % | 1,564,346 | 1.07 % |
| 14 | Turkey | 46,196,720 | 58 % | 79,622,062 | 33,425,342 | 5.1 % | 2,242,750 | 1.22 % |
| 15 | Philippines | 44,478,808 | 43.5 % | 102,250,133 | 57,771,325 | 4.4 % | 1,855,574 | 1.54 % |
| 16 | South Korea | 43,274,132 | 85.7 % | 50,503,933 | 7,229,801 | 1.2 % | 522,375 | 0.42 % |
| 17 | Italy | 39,211,518 | 65.6 % | 59,801,004 | 20,589,486 | 1.7 % | 666,922 | 0.01 % |
| 18 | Iran | 39,149,103 | 48.9 % | 80,043,146 | 40,894,043 | 7.7 % | 2,784,831 | 1.18 % |
| 19 | Spain | 37,865,104 | 82.2 % | 46,064,604 | 8,199,500 | 2.2 % | 805,002 | -0.12 % |
| 20 | Pakistan | 34,342,400 | 17.8 % | 192,826,502 | 158,484,102 | 9.7 % | 3,024,054 | 2.07 % |
| 21 | Canada | 32,120,519 | 88.5 % | 36,286,378 | 4,165,859 | 1.8 % | 559,167 | 0.96 % |

http://www.internetlivestats.com/internet-users-by-country/

# What are these users doing?

http://www.internetlivestats.com

# Mistake?

internet live stats    live    1 second    watch    trends & more    Get our Counters!

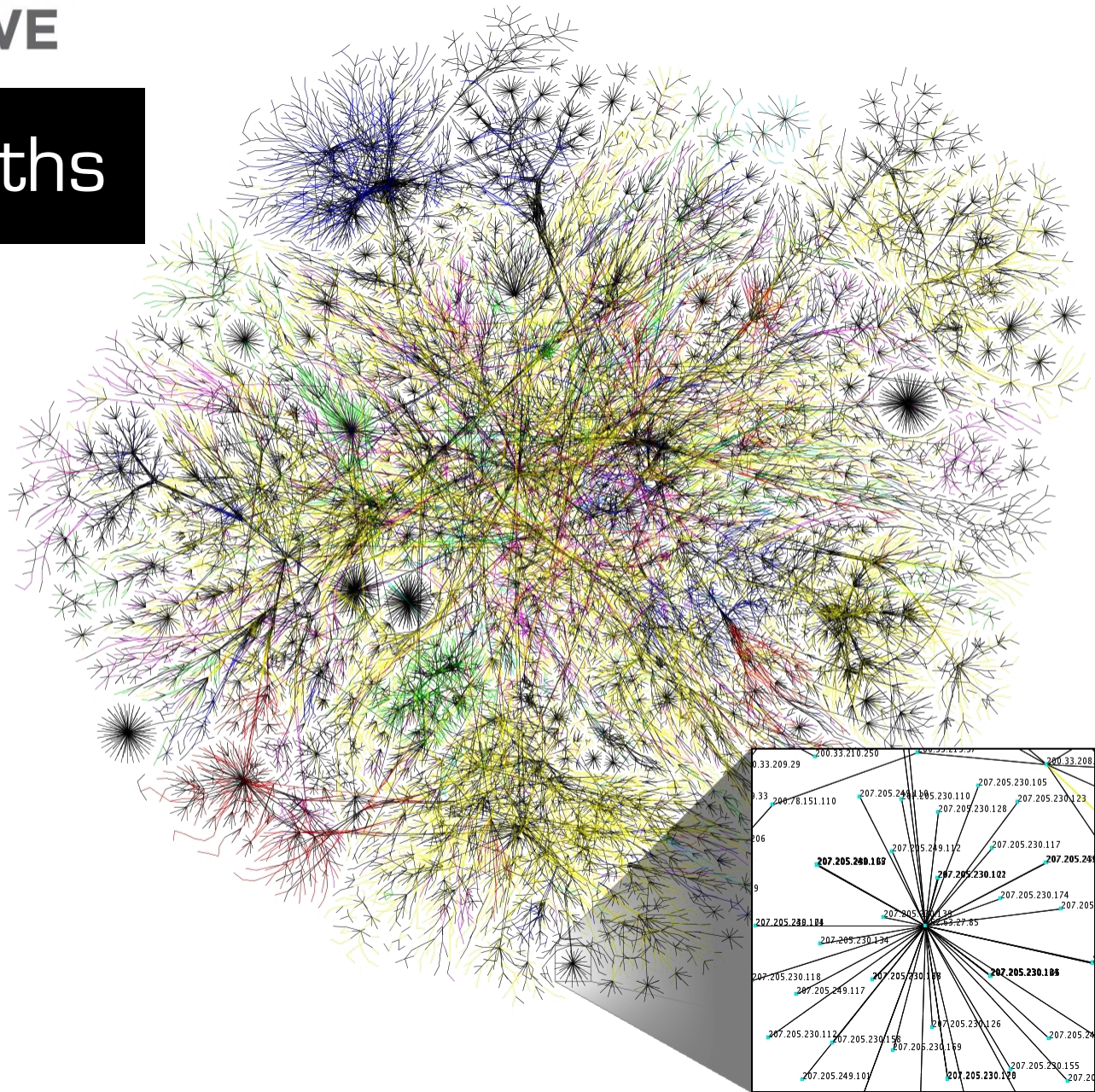Home > Trends and More > Internet Users > Internet Users by Country

# Internet Users by Country (2016)

See also: 2015 Estimate and 2014 Finalized

Database connection failed: Access denied for user 'root'@'localhost' (using password: NO) (1045)

https://www.internetlivestats.com/internet-users-by-country/

# Routing Paths

https://en.wikipedia.org/wiki/Internet_Engineering_Task_Force#/media/File:Internet_map_1024_-_transparent,_inverted.png

# Submarine Cables

http://arstechnica.com/information-technology/2016/05/how-the-internet-works-submarine-cables-data-centres-last-mile

# Internet Cables

**Georgia**

⚠ This article is more than **8 years old**

## Georgian woman cuts off web access to whole of Armenia

**Entire country loses internet for five hours after woman, 75, slices through cable while scavenging for copper**

**Tom Parfitt** *in Moscow*

Wed 6 Apr 2011 20.12 BST

f 🐦 ✉   935 | 161
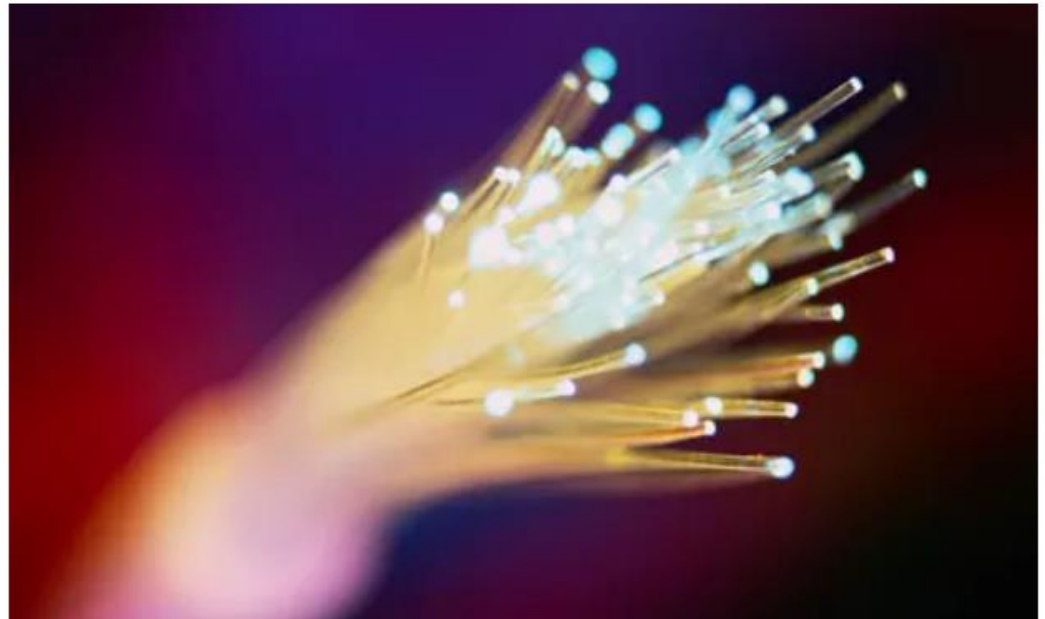
# Internet Cables



telegraph.co.uk/news/worldnews/europe/georgia/8442056/Woman-who-cut-internet-to-Georgia-and-Armenia-had-never-...

Privacy and cookies | Jobs | Dating | Offers | Shop | Puzzles | Investor     Log in ▼ | Register ▼ | Subscribe

# The Telegraph

Search - enhanced by Google

Saturday 07 September 2019

Home  Video  News  **World**  Sport  Business  Money  Comment  Culture  Travel  Life  Women  Fashion  Luxury  Tech  Film

USA | Asia | China | **Europe** | Middle East | Australasia | Africa | South America | Central Asia | KCL Big Question | Expat

France | Francois Hollande | Germany | Angela Merkel | Russia | Vladimir Putin | Greece | Spain | Italy

HOME » NEWS » WORLD NEWS » EUROPE » GEORGIA

## Woman who cut internet to Georgia and Armenia 'had never heard of web'

A 75-year-old woman arrested for single-handedly cutting off the internet in Georgia and Armenia has tearfully insisted she is innocent and had never heard of the internet.

**Europe news»**

- France news
- German news
- Italy news
- Spanish news
- Russian news
- European Union

**Georgia**
News »   World News »
Europe »   Armenia »
Internet »

**In Georgia**

The James Bond house in Tbilisi

**Latest Video»**

Disabled great-grandfather denied stairlift and forced to crawl

Elderly wombat rescued after being attacked

Hayastan Shakarian has been arrested for single-handedly cutting off the Internet in Georgia and Armenia on March 28   Photo: AFP

10

# IP Addresses

- Currently we use IPv4 on the web
  - Uses 32 bits
  - Example: 107.222.178.122
- The future is IPv6
  - Uses 128 bits
  - Example: 2001:0db8:85a3:0000:0000:8a2e:0370:7334
- IPv6 can encompass the Internet of Things (IoT)

https://en.wikipedia.org/wiki/IPv4_address_exhaustion

# Internet of Things ( IoT )

- Connecting everyday items, devices, objects, etc. to a network so that they can communicate and send data to other devices on the network

- Cars communicating with each other on the road... Houseplants letting you know through email that they need water... Your fridge telling you to buy more milk, Alexa telling you the news & weather... etc.

# Markup Languages

Markup Languages

# Viewing HTML Source

The big three browsers all allow you to view the HTML being used to generate the page

- Internet Explorer / Microsoft Edge
  - Right mouse click ->  "View source"
- Google Chrome
  - Right mouse click -> "View page source"
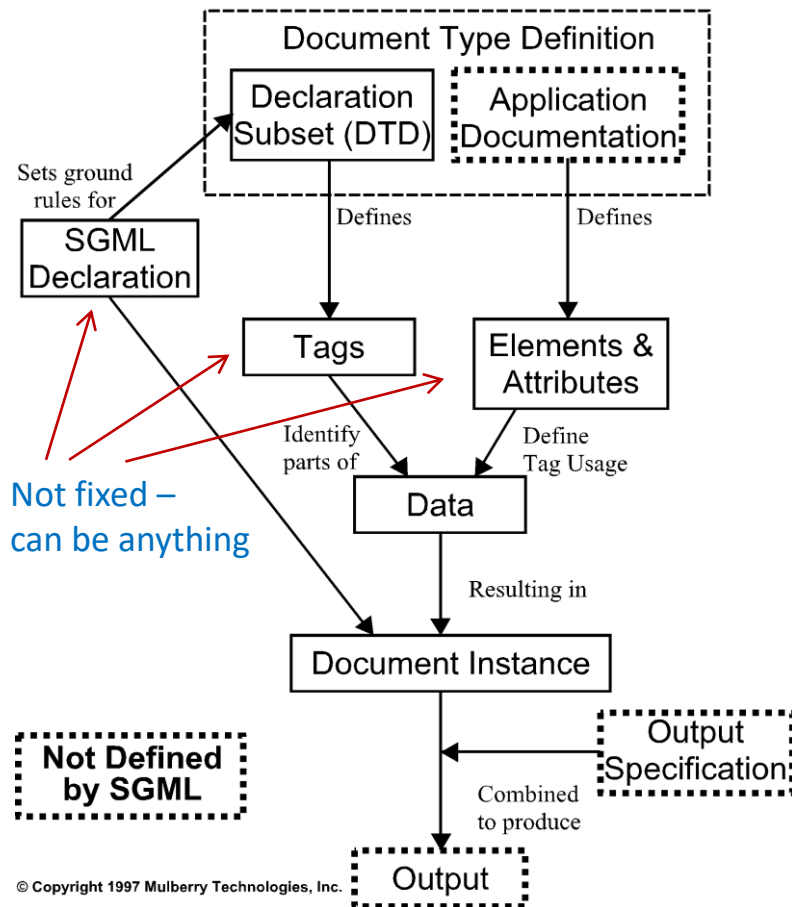- Firefox
  - Right mouse click -> "View Page Source"

# Developer Tools

Most browsers include **developer tools** that give you more detailed information about the webpage:

- Internet Explorer / Microsoft Edge
  - "F12 developer tools" under Tools menu
- Google Chrome
  - "Developer tools" under tools in the main menu dropdown
  - Right mouse click -> "Inspect element"
- Firefox
  - "Web Developer" under main Firefox dropdown
  - Right mouse click -> "Inspect Element"
  - Install Firebug  (we'll do it in one of the labs)

## SGML Document Components



Document Type Definition
- Declaration Subset (DTD)
- Application Documentation

Sets ground rules for → SGML Declaration

Defines → Tags

Defines → Elements & Attributes

Identify parts of → Data

Define Tag Usage

Not fixed – can be anything

Resulting in → Document Instance

Not Defined by SGML

Output Specification

Combined to produce → Output

© Copyright 1997 Mulberry Technologies, Inc.

Before HTML companies used SGML:
Standard Generalized Markup Language
A standard for specifying a markup language or tag set

SGML generalizes and supports a wide range of markup languages :
Wiki-like syntaxes  {{cite book}}
RTF-like bracketed languages : {\rtfl\ansi{\fonttbl\....}
HTML-like matching-tag languages: <b>Bold Text</b>
.. and much more



First Oxford English Dictionary, 1990

# HTML: HyperText Markup Language

## HTML Document Components



Document Type Definition

Declaration Subset (DTD)  |  Application Documentation

Sets ground rules for

SGML Declaration

Defines  Defines

Tags  |  Elements & Attributes

Identify parts of  |  Define Tag Usage

Data

Resulting in

Not Defined by HTML

Fixed in HTML

Document Instance

Output Specification

Combined to produce

Output

© Copyright 1997 Mulberry Technologies, Inc.
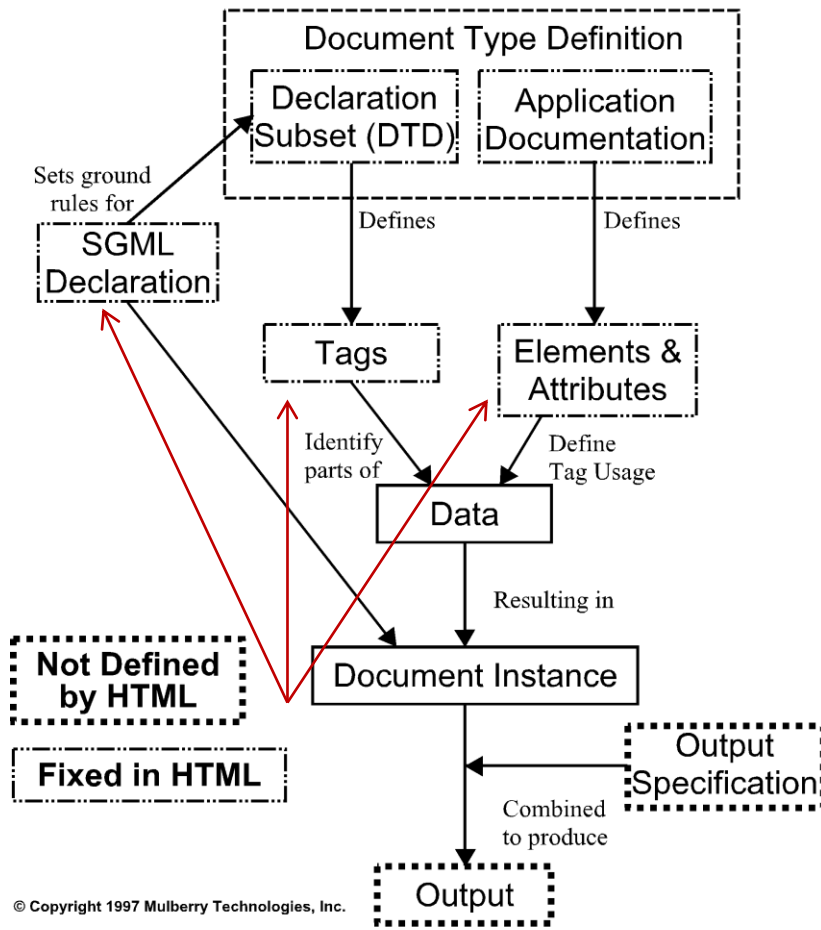
Tim Berners-Lee learned about SGML from co-workers at CERN, used SGML syntax to create HTML

1992: HTML 1.0, Tim Berners-Lee original proposal ƒ

1993: HTML+, some physical layout.

1994: HTML 2.0, standard with best features.

1995: Non-standard Netscape features.

1996: Competing Netscape and Explorer features.

1996: HTML 3.2, the Browser Wars end.

1997: HTML 4.0, style sheets are introduced.

1999: HTML 4.01, we have a winner!

2000: XHTML 1.0, an XML version of HTML 4.01.

2001: XHTML 1.1, modularization introduced.

2002: XHTML 2.0, simplified and generalized.

2008:  HTML 5, first draft proposed

2012: HTML 5 finalized

# W3C and Web Standards

## W3C – **W**orld **W**ide **W**eb Consortium

http://www.w3.org/Consortium/facts.html

Develops recommendations and prototype technologies related to the **W**ord **W**ide **W**eb

Produces specifications, called Recommendations, in an effort to standardize web technologies

W3C tries to enforce compatibility and agreement among industry members in the adoption of new standards defined by the W3C

Examples of W3C/IETF Standards: **HTML**, **XML**, **XHTML**, **CGI**, **DOM**, etc.

# HTML: HyperText Markup Language

HTML Key Features: **Based on SGML**. Simple and structured design principles.

HTML describes the logical structure of a document.
Browsers are free to interpret tags differently (see previous slide – Output Specification!)
Browsers (Internet Explorer, FireFox, Chrome, etc.) must adhere to W3C Standards

Overall structure of an HTML document:

The most basic HTML webpage contains:
- Tags (not displayed by the browser)
- Text

```
<!DOCTYPE html>
<html>
        <head>
                <title>The Title of the Document</title>
                <meta ..... / >
                <link .... />
                <script>.....</script>
        </head>
        <body>
        Hello World!
        </body>
</html>
```

HTML is a lightweight file format:
Size of file containing just **Hello World!** text:

| | |
|---|---|
| **HTML** | 28 bytes |
| **PDF** | 4,915 bytes |
| **Postscript** | 11,274 bytes |
| **MS Word** | 19,456 bytes |

# HTML4: Flavors

**HTML 4** comes in three "flavors": **strict**, **transitional**, and **frameset**.

**HTML 4.01 Strict**
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01//EN"
"http://www.w3.org/TR/html4/strict.dtd">

**HTML 4.01 Transitional**
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

**HTML 4.01 Frameset**
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Frameset//EN"
"http://www.w3.org/TR/html4/frameset.dtd">

Strict excludes the presentation attributes that should be part of cascading style sheets (CSS).

Elements NOT allowed: <center>, <font>, <iframe>, <strike>, <u>

# HTML4: Doctype and DTD

CNN.com  index page (2011, before HTML5 was introduced):

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org/TR/html4/loose.dtd">
<html lang="en">
<head>
<title>CNN.com - Breaking News, U.S., World, Weather, Entertainment &amp; Video News</title>
<META http-equiv="refresh" content="1800;url=?refresh=1">
<META name="Description" content="CNN.com delivers the latest breaking news and information on the latest top stories, weather,
business, entertainment, politics, and more. For in-depth coverage, CNN.com provides special reports, video, audio, photo galleries,
and interactive guides.">
```

……………………………………………………

**DOCTYPE** (**Document Type Declaration**) is an instruction to associate a document (HTML, XHTML, XML, etc) with a **Document Type Definition** (**DTD**) (like HTML 4.01)

**W3C**        The owner of the DTD (W3C is the World Wide Web Consortium)
**DTD**        The type of document that is referenced (Document Type Definition)
**HTML 4.01 Transitional**  DTD Specification (that the public identifier references)
**EN**  The language identifier ("EN" = English). The language code is case-sensitive

"**http://www.w3.org/TR/html4/loose.dtd** "
The URI at which the parser can locate the referenced Document Type Declaration

Question: do we really need this crazy DOCTYPE ?   HTML5  uses:  <!DOCTYPE html>

# HTML5: Doctype and DTD

CNN.com  index page (2014, **HTML5** version):

```
<!DOCTYPE html>
<html lang="en-US">
<head>
<title>CNN.com - Breaking News, U.S., World, Weather, Entertainment &amp; Video News</title>
<meta http-equiv="content-type" content="text/html;charset=utf-8"/>
<meta name="description" content="CNN.com delivers the latest breaking news and information on the latest top stories, weather, business, entertainment, politics, and more. For in-depth coverage, CNN.com provides special reports, video, audio, photo galleries, and interactive guides."/>
```

## Differences?

- DOCTYPE is simple.
- Lower case **meta** tag
- **meta**  tag ends with **/>** instead of **>**

XHTML requirements

# XML: eXtensible Markup Language

**XML** – e**X**tensible  **M**arkup  **L**anguage

A text-based language designed to describe, deliver, and exchange structured information

```xml
<?xml version="1.0"?>
<catalog>
  <book id="bk101">
    <author>Ginger, Ryan</author>
    <title>XML Developer's Guide</title>
    <genre>Computer</genre>
    <price>44.95</price>
</book>
  <book id="bk102">
    <author>Mack, Art</author>
    <title>Pay Attention</title>
    <genre>Reality</genre>
    <price>5.95</price>
    <publish_date>2019-01-10</publish_date>
    <description>A way to pass a course and do well in it
without stressing about PokemonGo.</description>
  </book>
</catalog>
```

XML 1.0 Specs produced by W3C (1998)
http://www.w3.org/TR/REC-xml/

Can you do similar thing in HTML?

- HTML had limited (fixed) number of tags.
- Some tags didn't have closing tags:  <br> <img>
- Lower/upper case not enforced: <a> and <A>

# XML: eXtensible Markup Language

**Why XML ?**

**HTML** was developed to show <u>text</u> and <u>graphics</u> in an architecture-independent way

**HTML**: absence of structural mark-up makes quick searching difficult, only limited meta-data could be embedded in the document

**XML** is <u>not</u> intended to replace HTML – it is intended to <u>extend</u> the power of HTML by separating **data** (i.e. book information) from **presentation** (browser output).

Well-formed XML documents:
- Elements must be properly nested
- Elements must have a start and end tag
- Element names case-sensitive
- Attribute values must be enclosed in quote marks
- Attributes may not be repeated

# XHTML

**XHTML** – e**X**tensible  **H**yper**T**ext  **M**arkup  **L**anguage

**XHTML**:

- Developed by the **W3C** as the reformulation of **HTML 4.0** as an application of **XML**
- It combines the formatting strengths of **HTML 4.0** and the data structure and extensibility strengths of **XML**

- **XHTML** is strict **HTML + XML**

**HTML** is a set of markup symbols or codes placed in a file intended for display on a web browser. Prior to **HTML5** it was defined as an application of **SGML**

**XHTML** is an application of **XML**, a more restrictive subset of **SGML**

# XHTML

## XHTML Restrictions

In the past, it was possible to get away with a lot of sloppy coding like: `<b><u>SomeText</B></u>`

Strict coding is enforced under **XHTML:**

- Doctype indicator must be included in all documents.
- tag names must be in **lowercase**.
- all documents must be properly **structured**.
- all tags must be properly **nested**.
- all tags must be **closed.**
- all attributes must be **quoted**.
- the `<title>` tag must come first in the `<head>` tag.

HTML vs XHTML: http://wiki.whatwg.org/wiki/HTML_vs._XHTML

**FANSHAWE**
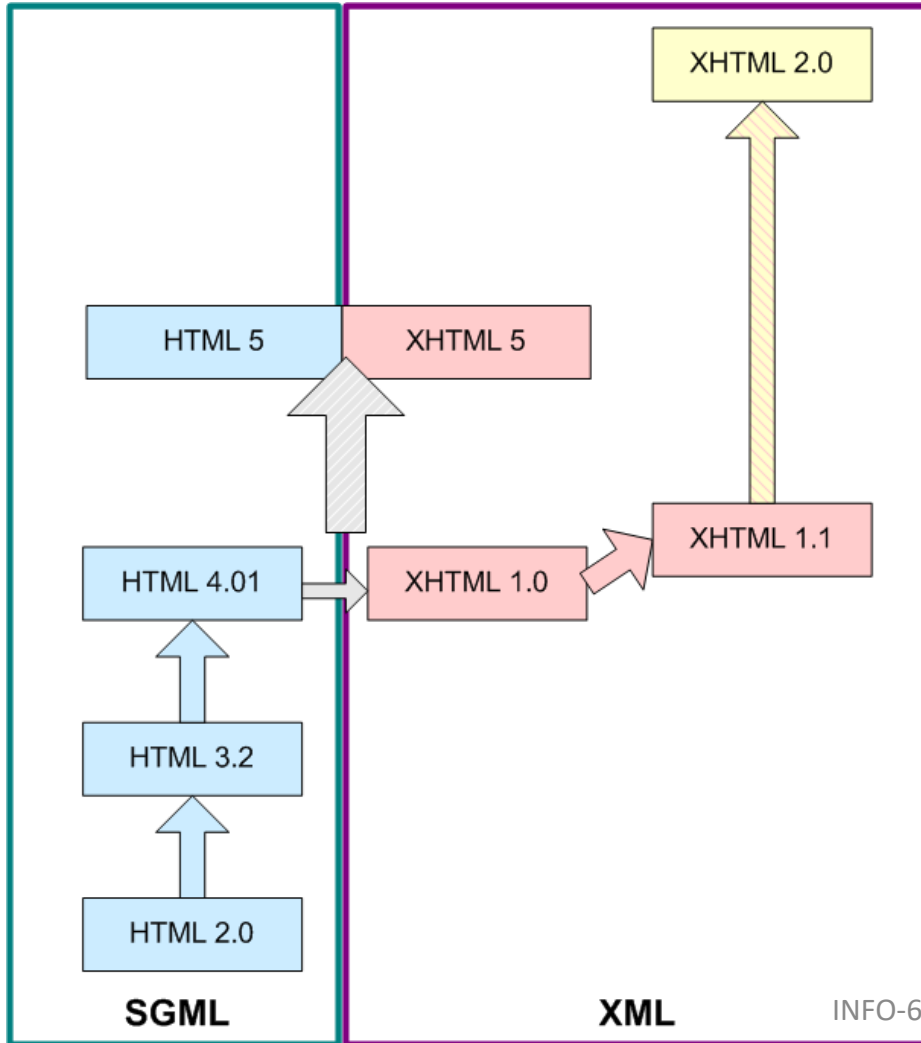


The relationship between **XHTML**, **HTML**, and **XML**

HTML (2.0-4.01) is based on **SGML**. **XML** is a subset of **SGML**.

**HTML5** syntax is no longer based on **SGML** despite the similarity of its markup structure.

**HTML5** Doctype Declaration:
**<!DOCTYPE html>**

Modern Browsers only partially support **HTML5**
Check yours: http://html5test.com/

INFO-6076

27

# HTML/XHTML/HTML5 : Overview

**HTML/XHTML/HTML5** documents are <u>text</u> documents that contain:

- Formatting instructions, called **tags**
- The **text** that is to be displayed on a Web page

Simple **text**, i.e.    This is a simple website

**Tags** (Elements), i.e.    **&lt;html&gt;, &lt;p&gt;, &lt;br /&gt;**

**Attributes/Values**, i.e.    **id="first"**

**Comments**, i.e.    **&lt;!--** this is not visible **--&gt;**

Full list of **HTML5 compliant tags**:     http://www.w3schools.com/tags/

http://www.w3schools.com/tags/ref_byfunc.asp

## HTML5 document: your first page

HTML validator!
http://validator.w3.org/

```
<!doctype html>
<html lang="en">
        <head>
                <meta charset="UTF-8" />
                <title>Basic HTML5 Page</title>
        </head>
        <body>
                <h2>Hello World!</h2><p>This is my first page</p>
        </body>
</html>
```

<head>
Special section that is loaded first. Good to load external resources (javascript, css, etc)

<body>
Should contain the content that actually gets displayed by the web browser.

- Tags Names must be <u>lower case</u> and be enclosed in brackets (**< >**)

- All tags must be <u>properly closed</u> (starting tag and an ending tag):    **<h2>**SomeText**</h2>**

- Empty Elements must be <u>properly closed</u>:    **<br />**, **<hr />**,  **<image src="smile.gif" />**

- Tags must be properly nested: <tag> <tag2></tag2> </tag>  (**<tag2>** is a child node of **<tag>** )

The <html> tags have no parent nodes. <doctype> is not a tag!

MIT-6060                                                                                                                29

# HTML: Head Element

The <head> tags are a container for the head elements

| Tag | Description |
|-----|-------------|
| <title> | Define the title of the document |
| <style> | Defines the style information for the document |
| <meta> | Defines the metadata for an HTML document |
| <base> | Defines a default address for links on a page |
| <script> | Defines a client side script |
| <noscript> | Defines content for people accessing a page with a browser that doesn't support client side scripting |
| <link> | Defines the relationship between a document and an external source |

Head always loads before <body>  can be loaded & displayed properly

# HTML: Overview

Attribute <u>names</u> must also be in lower case
Example: <table <u>width</u>="100%">

Attribute <u>values</u> must be quoted (double " or single ' quotes are allowed)
Example: <table width="<u>100%</u>">

Attribute <u>minimization</u> is forbidden
Example: <td nowrap="nowrap">  (cannot use <td nowrap>)

The **id** attribute replaces the **name** attribute (used in HTML)
Wrong: <img src="pic.gif" **name=**"picture1" />
Right:   <img src="pic.gif" **id=**"picture1" />
Best:    <img src="pic.gif" **name=**"picture1" **id=**"picture1" />

# HTML: Tags and Entities

## Commonly Used Character Entities:

| Result | Description | Entity Name |
|--------|-------------|-------------|
|  | Non-breaking space |   |
| < | Less than | &lt; |
| > | Greater than | &gt; |
| & | Ampersand | &amp; |
| " | Quotation mark | &quot; |
| © | Copyright | &copy; |

<u>Heading</u> commands:

<H1>This is Heading 1</H1>
<H2>This is Heading 2</H2>
<H3>This is Heading 3</H3>
<H4>This is Heading 4</H4>
<H5>This is Heading 5</H5>
<H6>This is Heading 6</H6>

Note: This is the default sizes (can be random in CSS)
H1 – most important.  H6 – least important

| | |
|---|---|
| **<p>** | Paragraph |
| **<div>** | Division/Section of an HTML document (to group block elements) |
| **<br />** | Line break |
| **<hr />** | Horizontal rule / line |
| **<i>** | Renders as italic text |
| **<b>** | Renders as bold text |
| **<big>** | Renders as bigger text |
| **<tt>** | Renders as teletype text |
| **<small>** | Renders as smaller text |

HTML5 tags:
http://www.w3schools.com/tags/

# HTML: Images

| | |
|---|---|
| **.gif** | Graphics Interchange Format (ok size, animation) |
| **.jpeg** or **.jpg** | Joint Photographic Experts Group (best size) |
| **.bmp** | Bitmap (worst size, not used) |
| **.png** | Portable Network Graphics (good quality, bad size, transparent) |

**&lt;img /&gt;** has following important attributes:

| | |
|---|---|
| **src** | Specifies the location of the image file |
| **alt** | Alternate text, if image cannot display |
| **width**, **height** | Scales image, and helps to render and load faster |

Size is in **Pixels** ("picture elements")
Most monitors display 72 ppi (pixels per inch). Typical monitor resolution is 1024 x 768 pixels

&lt;img src="./test/picture.jpg" width="800" height="720" alt="My picture" /&gt;

# HTML: Hyperlink Tag

Example of HTML Hyperlink Tag:

<a href="http://fanshaweonline.ca/">Fanshawe Online</a>

| | |
|---|---|
| **Element Name**: **a** | <**a** href="http:// fanshaweonline.ca/">Fanshawe Online</a> |
| **Attribute**: **href** | <a **href**="http:// fanshaweonline.ca/">Fanshawe Online</a> |
| **Attribute Value**: **http:// fanshaweonline.ca/** | <a href="**http:// fanshaweonline.ca/**">Fanshawe Online</a> |
| **Content**: **Fanshawe Online** | <a href="http:// fanshaweonline.ca/">**Fanshawe Online**</a> |
| **End Tag**: **</a>** | <a href="http:// fanshaweonline.ca/"> Fanshawe Online**</a>** |

In general HTML Tags:

- Keywords used by browsers to interpret the content of the page
- Not displayed by the browser

# CSS: Cascading Style Sheets

CSS: Cascading Style Sheets

# CSS: Cascading Style Sheets

Problem: we have too many "blocks" of information to present and want to enforce different font size/styles, borders, margins, etc.

US National Geospatial-Intelligence Agency (2013):

**When is too much too much?**

```
⊟ <table cellspacing="0" cellpadding="10" border="0" summary="" style="width:100%">
    ⊟ <tbody>
        ⊟ <tr>
            ⊟ <td width="72%" valign="top">
                ⊟ <p class="MsoNormal">
                    <strong>   </strong>
                    ⊟ <table cellspacing="0" cellpadding="10" border="0" summary="" style="width:100%">
                        ⊟ <tbody>
                            ⊟ <tr>
                                ⊟ <td width="72%" valign="top">
                                    ⊟ <span>
                                        ⊟ <span>
                                            ⊟ <span style="font-family:'arial','sans-serif';
                                                color:black;font-size:11pt">
                                                ⊟ <span style="font-family:'arial','sans-
                                                    serif'">
                                                    ⊞ <p class="MsoNormal">
                                                    ⊞ <p class="MsoNormal" align="center" style="text-
                                                        align:center">
                                                </span>
                                            </span>
                                        </span>
                                    </span>
                                </td>
                            </tr>
                        </tbody>
                    </table>
                See the
```

36

# CSS: Cascading Style Sheets

## Main Idea:

We want to separate design elements from markup logic to reduce complexity & repetition and provide more flexibility and control in visual presentation (while conforming to **W3C** specs for **HTML/XHTML**)
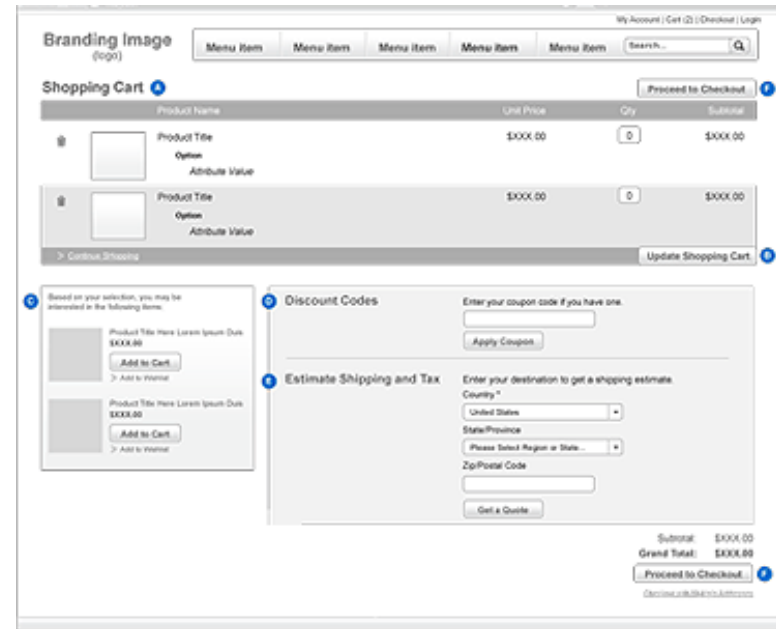
- Style Sheet language created by Hakon Wium Lie of MIT in 1994
- Published as a **W3C** Recommendation in 1996
- Currently CSS language has 3 levels (**W3C** Recommendations):
  - CSS1 (December 1996)
  - CSS2 (May 1998)
  - CSS3 (July 2011)

# CSS: Information Design

## Page Elements

- Logos
- Header /Footers
- Links
- Global / Local Navigation
- Search Form(s)
- Banners / 'Catchy' Info
- Extra Features

## Wireframes (Mock-up / Blueprints)



# Box model

# CSS: Visual Design

## Design Elements

- Color

- Texture

- Contrast

- Image Treatments

- Fonts

- Hierarchy

- Ornamental graphics

- Style

- Buttons



# Box model

# CSS: Box Model

http://www.w3schools.com/css/css_boxmodel.asp
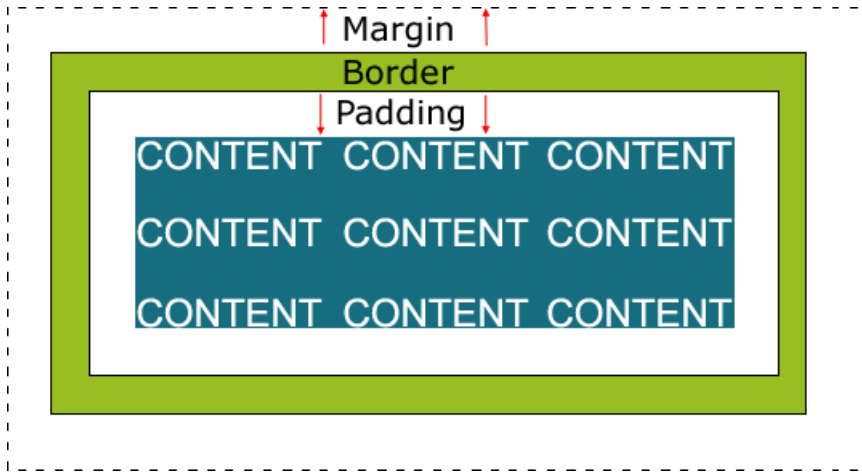


**Floating**

Move an element to one side of the box
(left, right, none, inherit)

Positioning:  http://www.w3schools.com/css/css_positioning.asp
Alignment:    http://www.w3schools.com/css/css_align.asp
Examples:     http://www.w3schools.com/css/css_examples.asp

**Margin**:

margin-top, margin-right, margin-left, margin-bottom

**Padding**:

padding-top, padding-right, padding-left, and padding-bottom

**Border**:

border-width

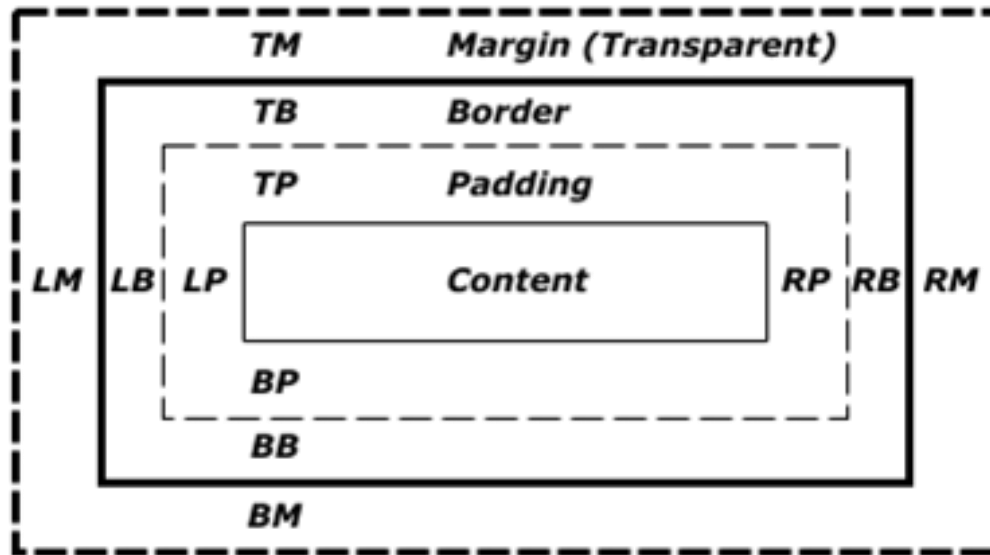thin, medium, thick

border-color

Sets the color

border-style

none, hidden, dotted, dashed, solid, double, groove, ridge, inset and outset

# CSS: Box Model

http://www.w3.org/TR/CSS2/box.html    http://www.w3schools.com/css/css_boxmodel.asp



The CSS box model describes the rectangular boxes that are generated for elements.

- Block and Inline elements (display)
- Content Flow
- Position (absolute, relative, fixed, etc.)
- Alignment (left, right, etc)
- Margin / Padding
- Width / Height
- Stacking (z-index)

"LM" for left margin, "RP" for right padding, "TB" for top border, etc.

# CSS & HTML integration

**External**
Style Sheet:

```
<head>
  <link rel="stylesheet" type="text/css" href="./css/index.css" media="all" />
</head>
```

rel: relationship between the current and linked documents
type: MIME type of the linked document
href: location of linked document

**Embedded**
Style Sheets:

```
<head>
    <style type="text/css">
            h1 {  font: 30px Arial; color:#0000FF; }
    </style>
</head>
```

**Inline**
Style Sheets:

```
<head> …. </head>
<body>
……<p>
    <style type="text/css">
            h1 {  font: 30px Arial; color:#0000FF; }
    </style>
     ……
    </p>
</body>
```

# CSS: Basic Syntax

Element:    CSS Declaration:

**h1** {  font: **30px Arial**; color:**#0000FF**; }

Property        Value

<h1>Welcome to my page</h1>

CSS

HTML

Welcome to my page

Output

# CSS: Basic Syntax

The declarations are made up of a property paired with a value

- Properties and values are separated with a colon (:)
- Declarations end with a semicolon (;)
- Declaration groups are surrounded with curly braces ( {} )
- Declarations can be put on separate lines for readability

The two samples below are read by the browser in the <u>same</u> way:

Element {property1:value1; property2:value2; property3:value3;}

Element {
  property1:value1;
  property2:value2;
  property3:value3;
}

# CSS: Google News for Machines

view-source:https://news.google.ca/nwshp?hl=en&ei=j0_jV8LoC-jGjwSNpKCYAQ&ved=0EKkuCAkoBw

```
507    window.__GOOGLEAPIS.gwidget = window.__GOOGLEAPIS.gwidget || {};
508    window.__GOOGLEAPIS.gwidget.lang = 'en'</script><style type="text/css">#cachedcsstestdiv{cursor:text}.goog-inline-block{display:inline-bl
index:50}.ds1{height:32px}.ds2{height:25px}.ds3{height:22px}.lsbb1,.lsbb2,.lsbb3{background:#eee none repeat scroll 0 0;border-color:#ccc #99
width:1px}.lsbb1{height:30px}.lsbb2{height:23px}.lsbb3{height:20px}.lsb1,.lsb2{border:medium none;cursor:pointer;font-family:arial,sans-seri
none;cursor:pointer;font-family:arial,sans-serif;margin:0;vertical-align:top;position:relative}.lsb1:active,.lsb2:active{background:#ccc none
size:15px}.lsb2{height:23px;font-size:12px}.lsb3{height:20px;font-size:11px}.r{padding:0}.search-the-web{margin-left:4px}.main-pane b{font-we
hack{overflow:auto}.main-pane .centered{text-align:left}.footer{max-width:1400px}.story{zoom:1}.small-story .title{font-size:13px;line-heigh
space:nowrap;color:#767676}.pinning-enabled .left-nav-pinned{background:#fff none repeat scroll 0 0;position:fixed;top:0;z-index:99}.pinning-
y:auto}#gbar{margin-top:1px}table{font-size:100%;line-height:1.3em}body{padding:0;margin:0;background-color:#fff;line-height:1.3em}table{font
size:1.23em;line-height:1.2em;padding:0;margin:0}h3{font-size:1.1em;line-height:1.3em;padding:0;margin:0}form{padding:0;margin:0}input{margi
decoration:underline}.headline-story .sub-title{font-weight:bold}#main-table{width:100%}.main{z-index:100}.bottom-section{margin-top:8px}.bo
section .single-section .column2{padding-top:12px}.gadget{padding-bottom:16px;overflow:hidden;width:100%}.section{padding-bottom:8px}.bottom-
align:center}.snippet{line-height:1.2em}.breaking{-moz-border-radius:3px;-webkit-border-radius:3px;background-color:#c00;color:#fff;font-size
right:5px}.yt-holder{display:inline-block;width:0}.headline-story .additional-video a{padding-right:22px}.headline-story .aa-inner{width:100%
story{overflow:hidden;padding:8px 6px 8px 4px}.small-story{padding:4px}.small-section .basic-title{margin-bottom:4px}.gsid-LCL .header-title-
title{font-size:85%;padding:2px 0 2px 13px}.basic-title .small{font-size:83%;font-weight:normal}.basic-title .small .time,.picture-story .ti
space:normal}.headline-story .thumbnail .source{font-size:.8em;line-height:1.3em;overflow:hidden;padding:0}.headline-story .thumbnail{paddin
left{float:left;width:60%;padding-right:10px}.source-query{color:#6f6f6f}.related-story{float:left;padding-right:10px;white-space:nowrap}.sma
unit{display:none}.offscreen{left:-1000em;position:absolute}body a:visited{color:#551a8b}body a.persistentblue,body a.persistentblue:visited-
link:visited{color:#4272db;text-decoration:none}body a.secondary-link:hover{text-decoration:underline}.js-link:visited{color:#15c!important}.
bg{left:0;position:absolute;top:0;z-index:99}.modal-dialog{background-color:#c9d7f1;border:1px solid #3a5774;color:#000;padding:8px;position
color:#f5f5f5;color:#000;cursor:pointer;font-size:120%;font-weight:bold;padding:8px 15px 8px 18px;position:relative;vertical-align:middle}.mo
repeat;width:16px;height:16px;cursor:default;position:absolute;right:10px;top:8px}.modal-dialog-content{background-color:#fff;padding:12px 18
renderer{position:absolute;border:1px solid #558be3;border-top-color:#a2bff0;border-left-color:#a2bff0;background-color:#fff;white-space:nowr
color:#fff;padding:2px 5px;line-height:22px;cursor:pointer;font-weight:bold}.ac-renderer div b{font-weight:normal}.editors-pick-header{font-w
5px}.editors-pick-help-header{font-weight:bold}.t-EDITORS_PICK .basic-title .text{padding:3px 0 2px}.goog-menu{cursor:default}.goog-menuitem-
bottom-color:#999;border-right-color:#999;font-family:arial,sans-serif}.small-story .more-coverage-text{font-weight:normal}.bt-border{border-
icon{padding:0!important}.large-section .basic-title a,.large-section .basic-title a:visited{text-decoration:underline}.thumbnail .source{cur
.thumbnail{padding-top:4px}.headline-story .thumbnail .source{width:80px}.versions{padding-left:4px;font-weight:bold}.nav .sidebar .new{line-
left:8px}a,.sub-header .lt a,.sub-header .lt a:visited,.thumbnail .source,#pagination .next a,#pagination .prev a,#pagination .next a:visited
text,a.more-coverage-text:visited,.more-zippy-toggle a,.additional-source .source a,.source-link a,.quote-story .info a,.source-link a:visite
space:normal}.no-local{background-color:#eff8ff;border:1px solid #e0e6f1;margin:16px}.no-local .heading{padding:8px}.no-local .suggestions{bo
form{display:inline}.stock-tckrs{white-space:nowrap;float:left;padding-right:10px}.stock-tckrs a{color:#4272db}.stock-tckr{background-repeat
title,.thumbnail-true .sources,.thumbnail-true .additional-article{margin-right:0}.thumbnail-true .snippet{margin-right:80px}.thumbnail{floa
text{font-weight:bold;float:left;padding-right:10px;white-space:nowrap}.headline-story .video-curtain,.headline-story .additional-video .vid
box{height:1px;width:1px;display:none}.additional-video .video-preview{display:none}.video-box,.video-embed-object{height:100%;width:100%}.v
link,a.email-link:visited{color:#4272db;white-space:nowrap}.email-link .email-icon{float:left;margin-top:2px}#notify-box{width:90%;position:a
box.visible{display:block}#notify-box .notify{background-color:#ff8;white-space:nowrap;padding:3px 5px;font-weight:bold}#notify-box.fixed{pos
decoration:none}.no-shareablesection{margin:16px 0;font-size:16px;text-align:left}#gnhp{behavior:url(#default#homePage);display:none}.follow-
#ccc;border-style:solid;border-width:1px;cursor:pointer;font-family:arial,sans-serif;margin-top:6px;vertical-align:top;display:inline-block;p
```

# CSS: Google News for Humans

```
1    window.__GOOGLEAPIS.gwidget.lang = 'en'</script><style type="text/css">
2
3  ⊟  #cachedcsstest div {
4   │   cursor:text
5  └   }
6
7  ⊟  .goog-inline-block {
8   │   display:inline-block
9  └   }
10
11 ⊟  .inline-block {
12  │   display:inline-block;
13  │   position:relative
14 └   }
15
16 ⊟  .ds1,.ds2,.ds3 {
17  │   border-right:1px solid #e7e7e7;
18  │   z-index:50
19 └   }
20
21 ⊟  .ds1 {
22  │   height:32px
23 └   }
24
25 ⊟  .ds2 {
26  │   height:25px
27 └   }
28
```

46

# CSS: Elegant Approach

**CSS** allows you to <u>redefine</u> the <u>default</u> styling of **HTML** elements.

<u>Example:</u> paragraph (<p>) and header (<h1>) tags:

p {  font: **24px Verdana**; color: **red**; }
h1 { font: **28px Verdana**; color: **blue**; }

CSS

<p>example text</p>
<h1>example text</h1>

HTML

example text

example text
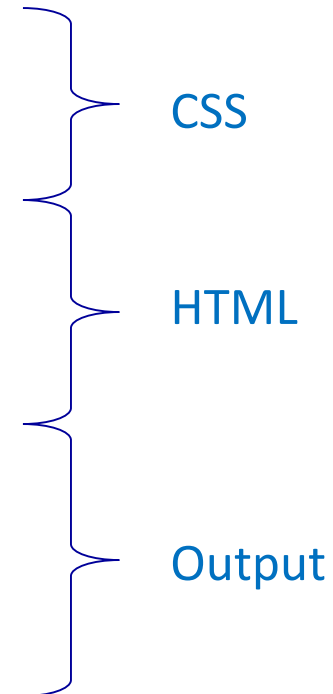
Output

# CSS: Inheritance

- Nested tags inherit styles of their parent tags
- Not all properties will inherit
- Nested tags value override inherited style

p {  font: 18px Verdana; color: #0000ff; }
b {  font: 24px Arial; }

CSS

<p> example  <b> text </b> </p>

HTML

example **text**

Output

# CSS: Grouping

You can list multiple HTML tags/elements with the same style:

b, h1 {  font: 18px Verdana; color:#0000ff; }  → CSS

<h1>My Page</h1> example  <b> text </b>  → HTML

**My Page**

example **text**  → Output

# CSS: Customization

You can create <u>your own</u> classes and IDs that can be used in conjunction with **HTML** tags:

.purple26 {  font: 26px Arial; color:#9966FF; }

#small_grey { font: 8px Arial; color:#111111; }

CSS

&lt;p class="purple26"&gt;  example text &lt;/p&gt;

&lt;p id="small_grey"&gt;  example text &lt;/p&gt;

HTML

example text

example text

Output

# CSS: Advantages

**Web Usability**
Separation of design from markup.

**Precise Control / Customization**
Positioning, ordering, dynamic content presentation.

**Performance**
Style sheet(s) are cached by browsers.
Multiple web pages can use the same external style sheet.

**SEO (Higher Search Engine Rankings)**
Cleaner code is easier for search engines to index.
Greater density of index-able content.

# CSS: Limitations

- **Not easy or intuitive** to go from Photoshop mock-up to CSS design.

- **Limited** to HTML elements.

- To get good **cross-browser support**, extra steps or common styles must be used (inconsistencies between browsers).

- **Box model** – how many boxes do we need?

- **Inheritance** – what attribute you'll get inside $10^{th}$ nested **<div>** ?

- **Strict** control of **IDs** and **classes**.

- Absence of **expressions** / Lack of **variables**.

# CSS: Zen Garden

**http://www.csszengarden.com**

is a great site for illustrating the power of using external CSS files

Different CSS file applied to the same HTML mark up content

# WebApp Testing Platforms

# WebApps

- There are numerous of Web Application testing environments out there

    - Mutillidae

    - Damn Vulnerable Web App (DVWA)

    - OWASP Juice

    - Etc.

# WebApps

- We will focus on Mutillidae, Damn Vulnerable Web App (DVWA), and OWASP Juice Shop in this course

# Mutillidae

- …is a free, open source, deliberately vulnerable web-application providing a target for web-security enthusiasts



[https://www.owasp.org/index.php/OWASP_Mutillidae_2_Project](https://www.owasp.org/index.php/OWASP_Mutillidae_2_Project)

# Damn Vulnerable Web App

- …is a PHP/MySQL web application that is damn vulnerable. Its main goals are to be an aid for security professionals to test their skills …



http://www.dvwa.co.uk/
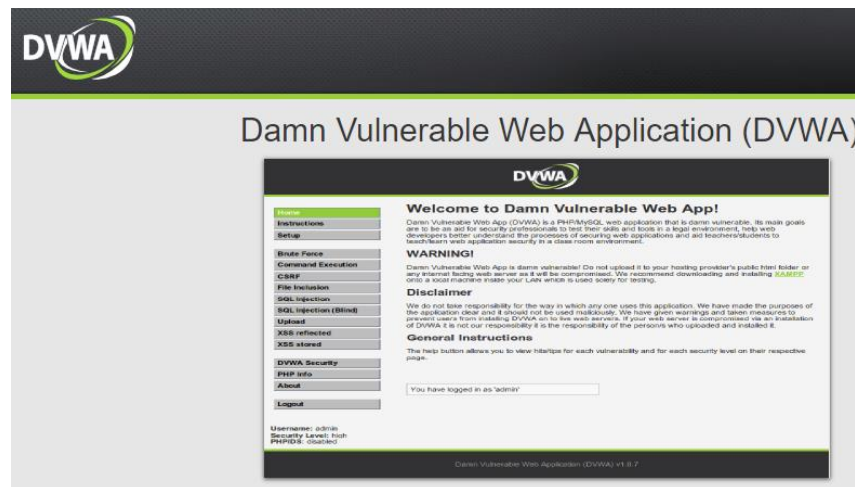
# Lab Details

# LAB-02: Details

# Lab-02: Basic HTML & CSS

- Install Notepad ++ on Windows 10 VM

- Create a basic HTML5 page and add extra elements to it

- Add presentation layer (CSS) to the HTML5 page

- Install FTP Server on the Ubuntu VM

- Install FTP FileZilla Client on Windows 10 VM to transfer files to the Ubuntu Web Server