

# Web Engineering

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Lecture 6

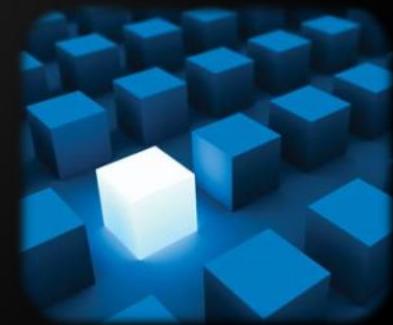


# HTML 5

New Tags, New Attributes, New JavaScript APIs,  
Forms, Validation, Audio, Video, SVG, Canvas



- ◆ Introduction to HTML 5
- ◆ Changed Old Tags
- ◆ New Tags
  - ◆ Audio and Video Tags
  - ◆ New Structural Tags (<header>, <footer>, ...)
  - ◆ New Form Elements and Validation
- ◆ New Attributes
- ◆ Canvas vs. SVG
- ◆ Local Storage





# Introduction to HTML 5

What the ... is HTML 5?



- ◆ HTML5 – the next major revision of the HTML
  - ◆ Currently under development
    - ◆ Far away from final version
  - ◆ Developed under the HTML 5 working group of the World Wide Web Consortium (W3C) in 2007
  - ◆ First Public Working Draft of the specification
    - ◆ January 22, 2008
  - ◆ Parts of HTML5 are being implemented in browsers before the whole specification is ready

- ◆ 1991 – HTML first mentioned – Tim Berners-Lee – HTML tags
- ◆ 1993 – HTML (first public version, published at IETF)
- ◆ 1993 – HTML 2 draft
- ◆ 1995 – HTML 2 – W3C
- ◆ 1995 – HTML 3 draft
- ◆ 1997 – HTML 3.2 – “Wilbur”
- ◆ 1997 – HTML 4 – “Cougar” – CSS
- ◆ 1999 – HTML 4.01 (final)
- ◆ 2000 – XHTML draft
- ◆ 2001 – XHTML (final)
- ◆ 2008 – HTML5 / XHTML5 draft
- ◆ 2011 – feature complete HTML5
- ◆ 2022 – HTML5 – final specification



- ◆ Latest version is HTML5
  - ◆ Aimed to have all of the power of native applications
  - ◆ Run on any platform (Windows, Linux, iPhone, Android, etc.)
- ◆ New features should be based on HTML, CSS, DOM and JavaScript
- ◆ Reduce the need for external plugins
- ◆ Better error handling
- ◆ More markup to replace scripting



DESIGN

# Designer Outlook

What a Designer Should Know?



- ◆ Doctype tag:

```
<!DOCTYPE html>
```

- ◆ HTML tag:

```
<html lang="en" xml:lang="en">
```

- ◆ Meta tag:

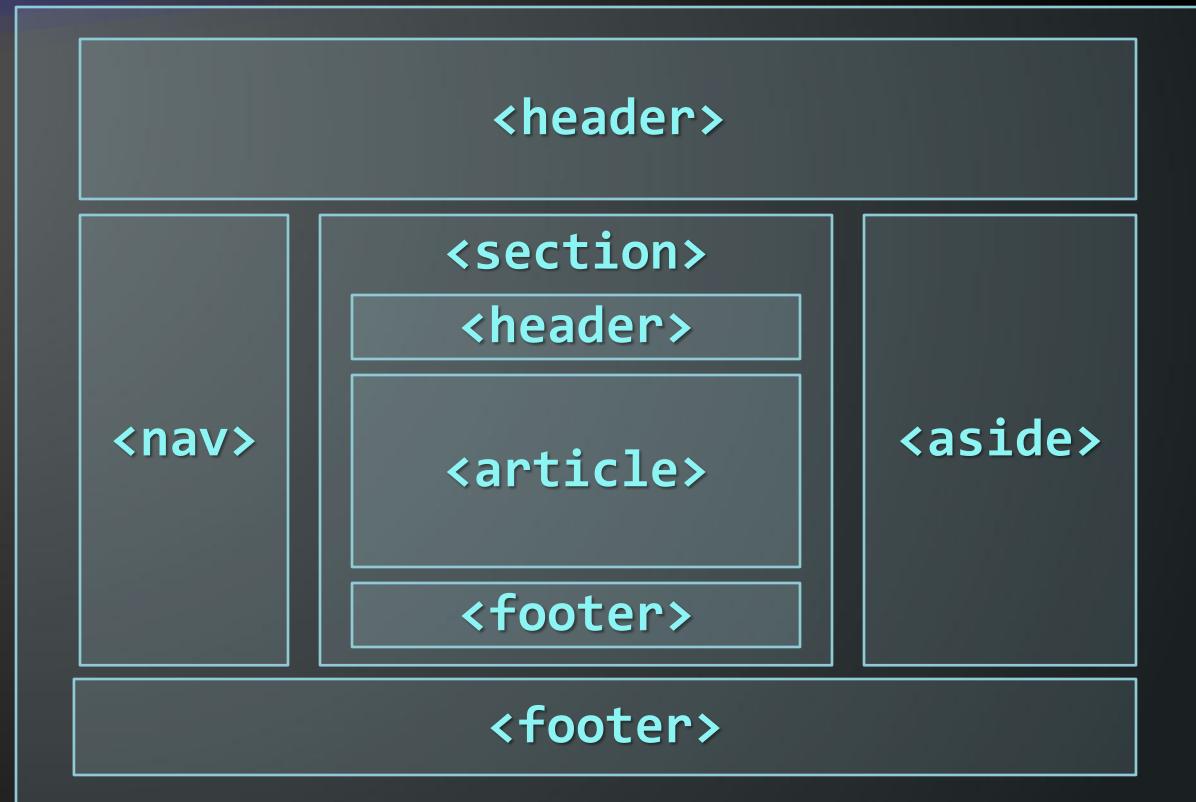
```
<meta charset="utf-8">
```

- ◆ Link tag:

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

- ◆ Better layout structure: new structural elements

- ◆ `<section>`
- ◆ `<header>`
- ◆ `<nav>`
- ◆ `<article>`
- ◆ `<aside>`
- ◆ `<footer>`



# New Layout Structure (2)

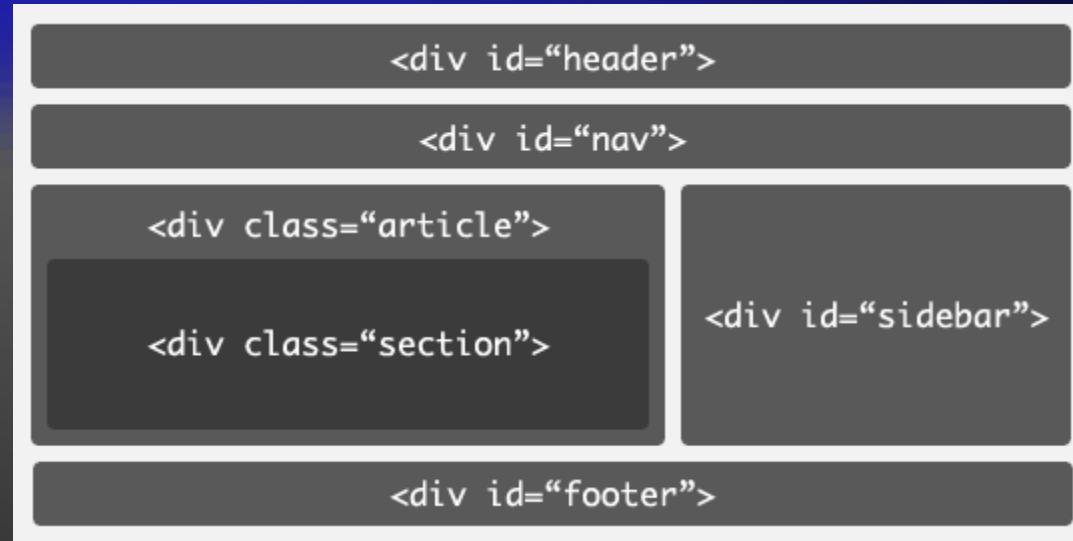
- ◆ Elements like header and footer are not meant to be only at the top and bottom of the page
- ◆ Header and footer of each document section
  - ◆ Not very different from <DIV> tag but are more semantically well defined in the document structure

# New Layout Structure – Example

```
<body>  
  <header>  
    <hgroup>  
      <h1>HTML 5 Presentation</h1>  
      <h2>New Layout Structure</h2>  
    </hgroup>  
  </header>  
  
  <nav>  
    <ul>  
      Lecture  
    </ul>  
    <ul>  
      Demos  
    </ul>  
    <ul>  
      Trainers  
    </ul>  
  </nav>
```



```
<section>
  <article>
    <header>
      <h1>First Paragraph</h1>
    </header>
    <section>
      Some text
    </section>
  </article>
</section>
<aside>
  <a href="http://academy.telerik.com"> more info</a>
</aside>
<footer>
  Done by Doncho Minkov, (c) 2011, Telerik Academy
</footer>
</body>
```



# New Layout Structure Tags

Live Demo

- ◆ <article>

- For external content, like text from a news-article, blog, forum, or any other external source

- ◆ <aside>

- For content aside from (but related to) the content it is placed in

- ◆ <details>

- For describing details about a document, or parts of a document

- ◆ <summary>

- A caption, or summary, inside the details element

- ◆ <mark>
  - ◆ For text that should be highlighted
- ◆ <nav>
  - ◆ For a section of navigation
- ◆ <section>
  - ◆ For a section in a document (e.g. chapters, headers, footers)
- ◆ <wbr>
  - ◆ Word break. For defining an appropriate place to break a long word or sentence
- ◆ Other tags
  - ◆ <command>, <datalist>, <details>, <progress>, etc.



- ◆ Media Tags

- ◆ <audio>

- ◆ Attributes: **autoplay, controls, loop, src**

- ◆ <video>

- ◆ Attributes: **autoplay, controls, loop, height, width, src**

```
<audio width="360" height="240" controls= "controls" >
  <source src="someSong.mp3" type="audio/mp3">
</source>
  Audio tag is not supported
</audio>
```



# Playing Audio

## Live Demo

# Embed Tag – New Syntax

- ◆ <embed>
  - ◆ Defines embedded content, such as a plug-in
- ◆ Attributes
  - ◆ src="url", type="type"

```
<embed src="helloworld.swf" />
```



- ◆ New attributes

Attribute	Description
Autocomplete	ON/OFF. In case of “on”, the browser stores the value, auto fill when the user visits the same form next time
Autofocus	Autofocus. Input field is focused on page load
Required	Required. Mandates input field value for the form submit action
Draggable	True/false indicates if the element is draggable or not

# New <input> Types

- ◆ New <input> type(s)

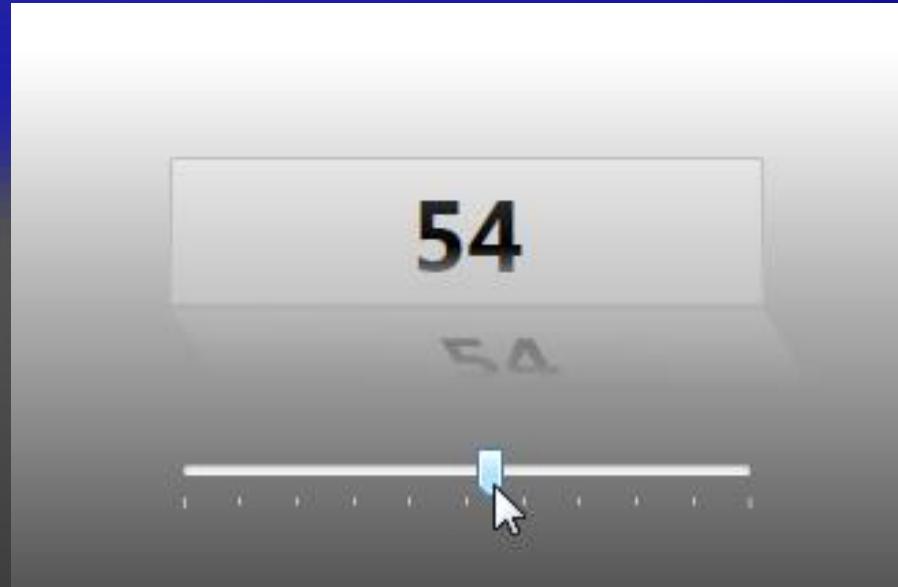
Attribute	Description
Number/Range	Restricts users to enter only numbers. Additional attributes min, max and step and value can convert the input to a slider control or a spin box
date, month, week, time, date + time, and date + time - time zone	Provides a date picker interface.
Email	Input type for Email Addresses
URL	Input field for URL address
Telephone	Input type for Telephone number

# HTML5 Form Input Type

New form input types assist users with input.

- <input type="range"> - for sliders
- <input type="color"> - for color pickers
- <input type="tel"> - for telephone numbers
- <input type="url"> - for web addresses
- <input type="email"> - for email addresses
- <input type="date"> for calendar date pickers
- <input type="month"> - for a list of months
- <input type="week"> - for weeks
- <input type="time"> - timestamps
- <input type="datetime"> -for precise, absolute date+time stamps
- <input type="datetime-local"> for local dates and times
- <input type="number"> - for spinboxes
- <input type="search"> - for search boxes





# New Form Tags: `<input type="range">`

Live Demo



# Built-In Forms Validation

Live Demo



# Canvas vs. SVG



- ◆ Allows dynamic, scriptable rendering of 2D shapes and bitmap images
- ◆ Low level, procedural model
  - ◆ Updates a bitmap
  - ◆ Does not have a built-in scene graph
- ◆ Consists of a drawable region defined in HTML
  - ◆ Has height and width attributes
  - ◆ Accessible by JavaScript Code
- ◆ Used for building graphs, animations, games, and image composition

- ◆ In HTML:

```
<canvas id="example" width="200" height="200">  
    This is displayed if HTML5 Canvas is not supported.  
</canvas>
```

- ◆ Access with JavaScript:

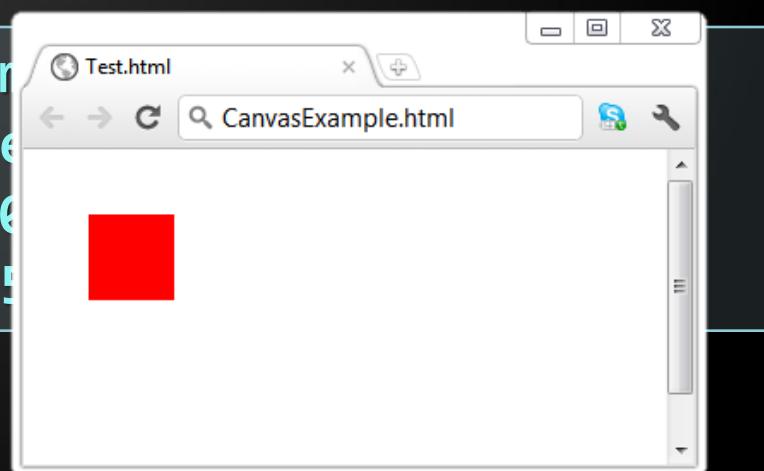
```
var example = document.getElementById('example');  
var context = example.getContext('2d');  
context.fillStyle = "rgb(255,0,0)";  
context.fillRect(30, 30, 50, 50);
```

- ◆ In HTML:

```
<canvas id="example" width="200" height="200">  
    This is displayed if HTML5 Canvas is not supported.  
</canvas>
```

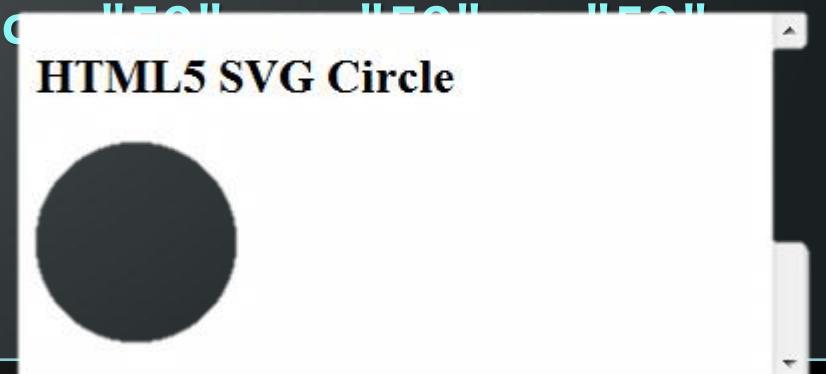
- ◆ Access with JavaScript:

```
var example = document.getElementById("example");
var context = example.getContext("2d");
context.fillStyle = "rgb(255,0,0)";
context.fillRect(30, 30, 50, 50);
```



- ◆ SVG stands for Scalable Vector Graphics
  - ◆ A language for describing 2D-graphics
  - ◆ Graphical applications
- ◆ Most of the web browsers can display SVG just like they can display PNG, GIF, and JPG
  - ◆ Internet Explorer users may have to install the Adobe SVG Viewer
- ◆ HTML5 allows embedding SVG
  - ◆ Directly using <svg>...</svg>
- ◆ <https://developer.mozilla.org/en/SVG>

```
<!DOCTYPE html>
<head>
    <title>SVG</title>
    <meta charset="utf-8" />
</head>
<body>
    <h2>HTML5 SVG Circle</h2>
    <svg id="svgelem" height="200"
        xmlns="http://www.w3.org/2000/svg">
        <circle id="redcircle" cx="50" cy="50" r="50"
            fill="red" />
    </svg>
</body>
</html>
```



```
<svg id="svgelem" height="200"
xmlns="http://www.w3.org/2000/svg">
<defs>
  <radialGradient id="gradient" cx="50%" cy="50%"
r="50%" fx="50%" fy="50%">
    <stop offset="0%"
      style="stop-color:rgb(200,200,200);stop-opacity:0"/>
    <stop offset="100%"
      style="stop-color:rgb(0,0,255);stop-opacity:1"/>
  </radialGradient>
</defs>
<ellipse cx="100" cy="50" rx="100" ry="50"
  style="fill:url(#gradient)" />
</svg>
```



# Canvas vs. SVG

Live Demo



- ◆ More persistent than temporary internet files and cookies
- ◆ Most useful for (mobile) devices that are not connected to the Internet all the time, or when bandwidth is scarce
- ◆ More storage space available - 5MB limit per domain (recommended by W3C), compared to 4KB per cookies

Cookies are intended to be read by the server, whereas localStorage can only be read by the browser

## LocalStorage

5MB/10MB storage  
It's not session based, need to be deleted via JS or manually  
Client side reading only  
Less older browsers support

## SessionStorage

5MB storage  
It's session based and working per window or tab  
Client side reading only  
Less older browsers support

## Cookie

4KB storage  
Expiry depends on the setting and working per window or tab  
Server and client side reading  
More older browsers support

```
<form>
<fieldset>
    <label for="value">enter key name:</label>
    <input type="text" id="key" />
    <label for="value">enter key value:</label>
    <input type="text" id="value" />
</fieldset>
<fieldset>
    <button type="button" onclick="setValue()">
        store the key value</button>
    <button type="button" onclick="getValue()">
        retrieve the key value</button>
    <button type="button" onclick="getCount()">
        retrieve the number of keys</button>
    <button type="button" onclick="clearAll()">
        clear all key values</button>
</fieldset>
</form>
```

```
var $ = function (id) {  
    return document.getElementById(id);  
}  
  
function setValue() {  
    window.localStorage.setItem($("#key").value,  
    $("#value").value);  
}  
  
function getValue() {  
    alert(window.localStorage.getItem($("#key").value));  
}  
  
function getCount() {alert(window.localStorage.length);}  
  
function clearAll() {window.localStorage.clear();}
```

# How to Detect HTML5?

- ◆ HTML5 is not a thing someone can detect
  - ◆ It consists of many elements that can be detected
    - ◆ <canvas>, <video>, etc.
- ◆ The HTML5 specification defines how tags interact with JavaScript
  - ◆ Through the Document Object Model (DOM)
- ◆ HTML5 doesn't just define a <video> tag
  - ◆ There is also a corresponding DOM API for video objects in the DOM
  - ◆ You can use this API to detect support for different video formats, etc.

# Search engine optimization (SEO)

- ◆ Search engine optimization (SEO) is the process of improving the quality and quantity of website traffic to a website or a web page from search engines. SEO targets unpaid traffic (known as "natural" or "organic" results) rather than direct traffic or paid traffic. Unpaid traffic may originate from different kinds of searches, including image search, video search, academic search,[3] news search, and industry-specific vertical search engines.

## ◆ Search Engine Optimization

### ◆ On-Page Optimization

- Enhancing current content to associate better with current targeted keywords
- For Google Optimization, make sure to view and understand the [Webmaster Guidelines](#) before you start your campaign
- Making sure to be thorough in naming and describing images, videos, and other multimedia
- Enhancing SEO scores with current ranking sites
  - <http://website.grader.com/>
  - <http://whois.domaintools.com/>

### ◆ Off-Page Optimization

- Create more external links for your site!



- The best way to optimize your page for certain keywords and phrases is to utilize three lines of code in your <head>

- Keywords

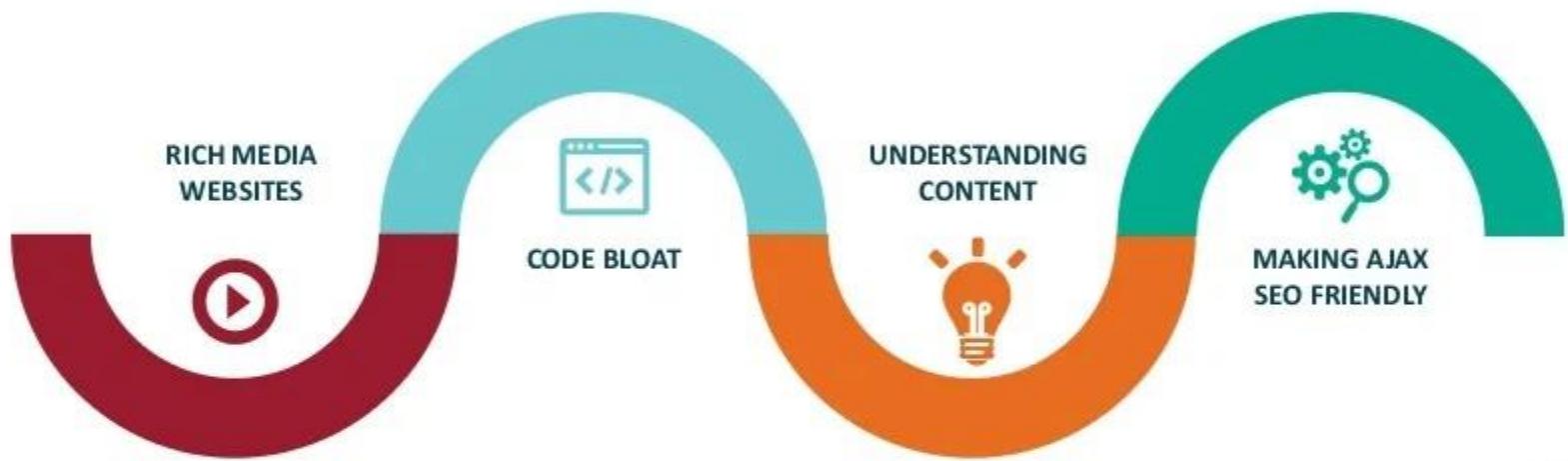
- Utilize [Google Keyword Tool](#) to generate more ideas based upon advertiser competition and traffic generated by that keyword (*5-7 phrases, usually 1 or 2 words long*)

- Title

```
<head>
    <meta name="keywords" content="seo, google optimization, website optimization, learn
    seo, external links">
    <meta name="description" content="Website optimization for Google can drive more
    traffic to your site and in turn, increase the sales of your company. Learn SEO
    techniques for beginners here!">
    <title>Learn SEO for Google Optimization</title>
</head>
```

- ◆ The most important factor in Google's natural organic placement is simply the number of links on the Internet to your site
- ◆ The Popularity and Morale and Ethical standards of the site that is linking to your site will also determine how important that link is to you (or more specifically the Google PageRank of that domain that links to you)
- ◆ Submit site URL to these FREE places:
  - DMOZ sources → <http://www.dmoz.org/>
    - Locate Your Category and then select 'suggest url' in that category, then fill out the information. DMOZ listing is a huge link bonus
  - All major Search Engines
    - Bing → <http://www.bing.com/docs/submit.aspx>
    - Google → <http://www.google.com/addurl/>
    - Yahoo → <https://siteexplorer.search.yahoo.com/submit>
- ◆ Submit site URL to competitor sites
  - Find out what sites are linking to your competitors or to yourself by going to Alexa.com Site Info and typing in your URL in the 'Site Lookup' section you want to search and clicking the number associated with the "Sites Linking In"
    - If they have a link on the page and it's a directory, chances are you could link there too!

## WHY SEO KEEPS AN EYE ON HTML5



### Key takeaway

No evidence that HTML5 affects SEO but it has great potential to change the way search engines index and understand content.

## Fun Facts



### Rich media

Great ALT support  
Audio and video elements



### Code bloat

Simpler HTML DocType & HTML5 file specification



### Content

Semantic markup helps crawlers get what blocks of code are doing in the page



### Ajax

Changing the URL in the address bar  
refreshing is great with History API



### Fun facts

- Short of a website made in Frontage using tables, SEOs hate nothing more than a website made in Flash.
- And right above that, we have parallax and other one pager websites that do not use History API.

## Tags that will be critical to the SEO success of a website



- <article>** for an independent block of content.
- <section>** for a subsection of a block of content.
- <header>** to specify the header of a page or the header section of a self-contained block of content.
- <footer>** for an entire HTML document or the footer of an **<article>**.
- <nav>** for main site navigation, previous/next article links, pagination.
- <aside>** for content related but not part of the main document
- <video>** to provide a cross-browser compatible way to display video.

## Importance for SEO



**Semantic HTML speaks louder than a thousand divs.**

Semantic markup speaks to software  
...and in turn allows webmasters to  
speak to search engines



## Rich content

### Audio

`<audio>` means that ultimately, we will no longer have to rely upon third party plugins in order to render audio.

### Images

`<figure>` and `<figurecaption>` allow SEOs to explain images better to search engines & users.

### Video

`<video>` specifies a standard way to embed a video in a web page.

SEOs can tell search engines about content related to the video, such as `<captions>` and `<subtitles>`.





## Myth 2: HTML5 and VSEO

HTML5 allows for the use of labels, captions, and subtitles on video content

SO STOP USING FLASH



## Rich Snippets

### HTML

```
<div>
  My name is Bob Smith but people call me Smithy. Here is my home page:
  <a href="http://www.example.com">www.example.com</a>
  I live in Albuquerque, NM and work as an engineer at ACME Corp.
</div>
```

### HTML5

```
<div itemscope itemtype="http://schema.org/Person">
  My name is <span itemprop="name">Bob Smith</span>
  but people call me <span itemprop="nickname">Smithy</span>.
  Here is my home page:
  <a href="http://www.example.com" itemprop="url">www.example.com</a>
  I live in Albuquerque, NM and work as an <span itemprop="title">engineer</span>
  at <span itemprop="affiliation">ACME Corp</span>.
</div>
```

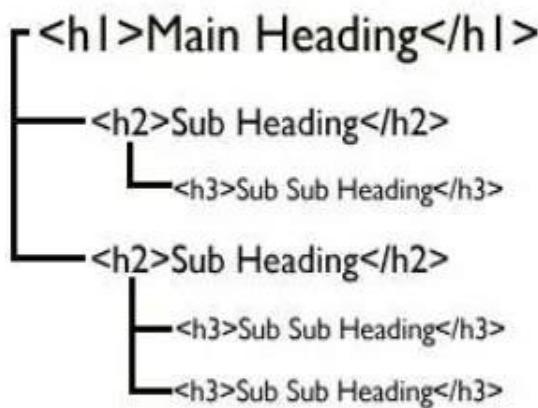
### HTML5 Microdata

Google supports Rich Snippets for other data types including products, recipes, reviews, events and software application information.

HTML5 supports geolocation micro data when location-based content is marked-up semantically which is great for mobile and local SEO.



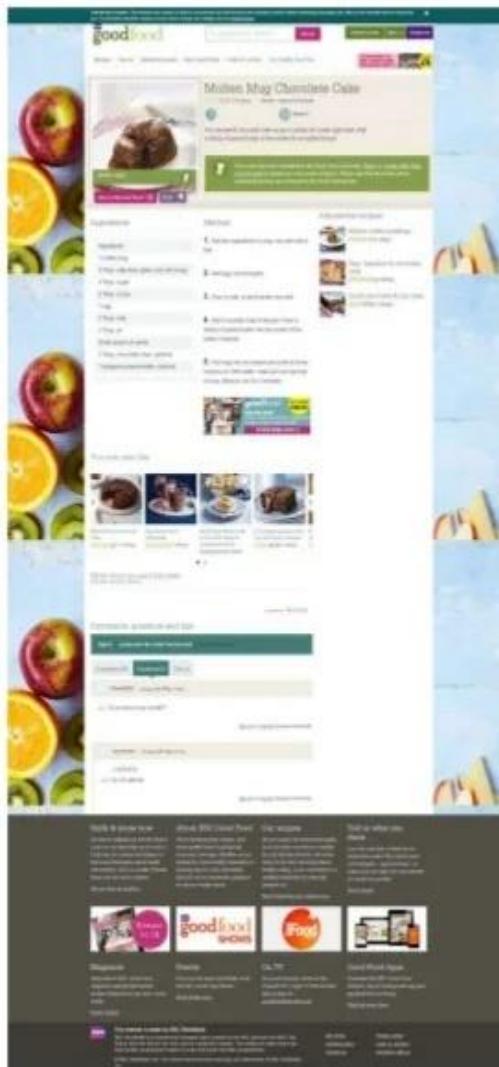
## Myth 3: The great H1 debate



1. You can use multiple H1 tags without killing your SEO
2. RULE OF THUMB: One H1 per section
3. RULE OF DUMB: SEO experts often recommend a single H1 because clients never implement content hierarchy properly.

This is where SEO and Accessibility may differ in opinions: navigation menus and footers should not be part of the content hierarchy as H tags as they often add nothing to help understand the overall theme of a page.





## The great H1 debate

```

<h1>Main Heading</h1>
  -<h2>Sub Heading</h2>
    -<h3>Sub Sub Heading</h3>
  -<h2>Sub Heading</h2>
    -<h3>Sub Sub Heading</h3>
    -<h3>Sub Sub Heading</h3>
  
```

<http://www.bbctogoodfood.com/recipes/8047/molten-mug-chocolate-cake>

C38 headings

- (Missing heading)
- My Good Food
- Main navigation
- Not sure what to cook?
- (Missing heading)
- What's in season?
- Quick & easy
- Subscribe
- Molten Mug Chocolate Cake
- Cooking time
- Servings
- Ingredients
- Method
- You may also like
- Microwave chocolate cake
- Peppermint hot chocolate
- Mini Paris-Brest with white chocolate & crystallised fruit
- Chocolate sponge with hot chocolate custard
- Hot chocolate milkshakes
- Chocolate brownie cake
- Chocolate berry cups
- Izak's chocolate coconut squares
- Comments, questions and tips
- Comments
- Pages
- Questions
- Tips
- (Missing heading)
- Alternative recipes
- Chocolate coffee pudding
- Tea, banana & chocolate cake
- Cake chocolates & rice krispies
- Skills & know how
- About BBC Good Food
- Our recipes
- Tell us what you think...
- Magazine
- Events
- On TV
- Good Food Apps
- (Missing heading)

This website is supplied by BBC Worldwide

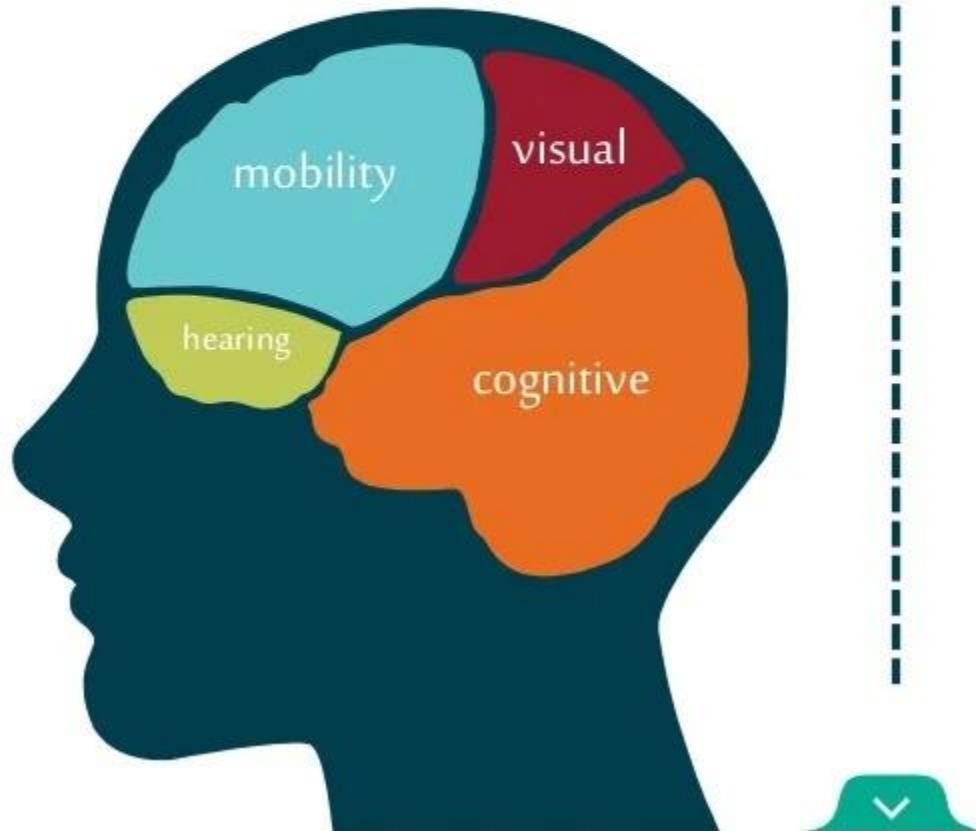


Oftentimes, if you take care of the SEO technical checklist, you've managed to cover 70% of the accessibility technical checklist as well.



# Accessibility

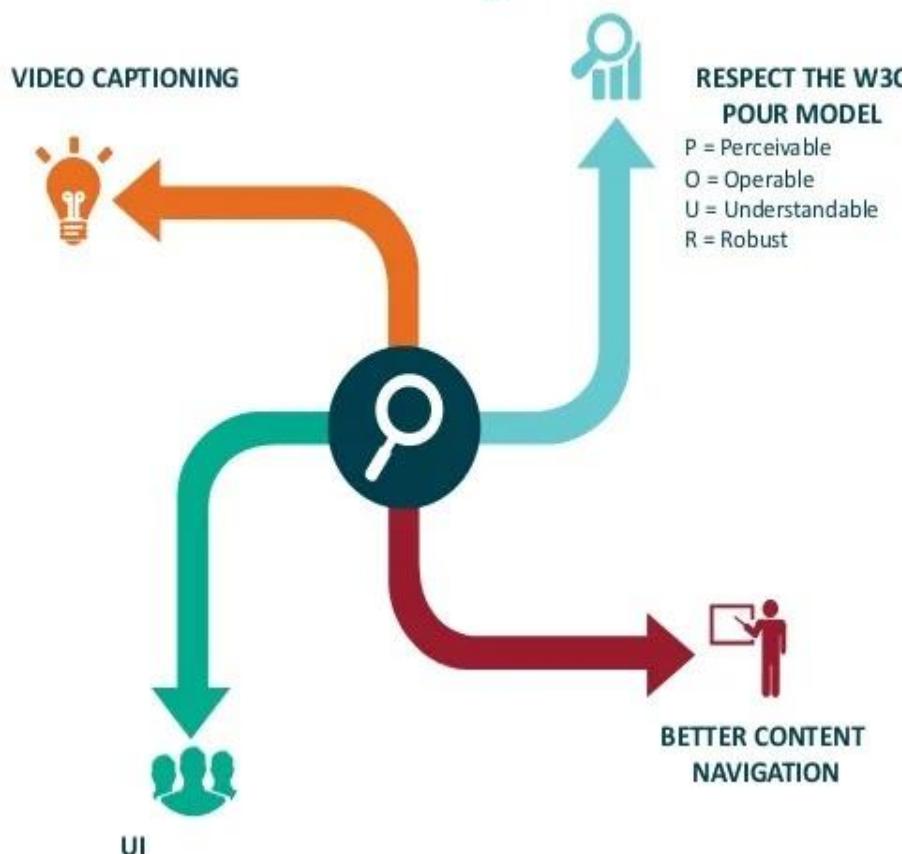
## A comprehensive definition of accessibility



Accessibility for the web means making sure that our web pages and applications are available to everyone, including people with disabilities.

A website is accessible when it is compatible with adaptation technologies (software).

## Using semantic HTML improves accessibility



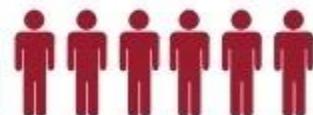
Semantic HTML means the HTML tags in a page should describe the content in a way that has to do with its meaning rather than its presentation.

Ajax – HTML5 enables a refreshing of the page without reloading the content which in turns allows the user to continue browsing without starting all over again.

## Disabilities – a few statistics

Between 110 million and 190 million adults have significant difficulties in functioning.  
That's roughly **15% of the world's population.**

Deafness



360 million people have disabling hearing loss

Visual Impairment



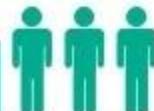
285 million people are visually impaired

Cognitive



Clear statistics are hard to find with the World Health Organization

Mobility

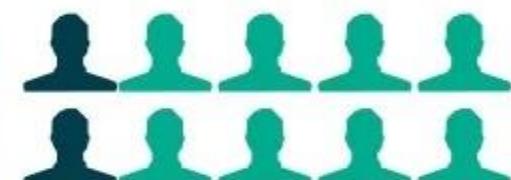
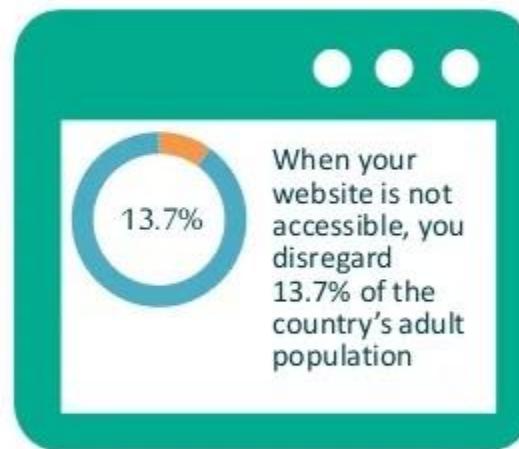


Clear statistics are hard to find with the World Health Organization

## Disabilities – Canadian statistics



3.8 million adult Canadians live with a disability. That's **nearly 1 in 10 Canadians.**



More than 8 out of 10 persons with disabilities use aids and assistive devices



## Norms and standards

### **Worldwide Standard - WCAG 2.0 (Web Accessibility Content Guidelines)**

In Québec, there are 3 standards :

SGQRI-008-01

SGQRI-008-02

SGQRI-008-03

Ontario has an accessibility law based on the characteristics of companies.

Level A – put into effect in January 2014

Level AA – deadline for January 2021

Level AAA





## 3 Quick accessibility tests you can do with [a1yproject.com](https://a1yproject.com) in under 10 minutes

### Quick Test: Check Comprehension Level

Using these tools you can check the reading level of your written content.

### Quick Test: Check contrast with your mobile device

Using an ordinary mobile device you can check your site's readability.

### Quick Test: Navigate using just your keyboard

A quick 5 second accessibility test that you can run on your sites right now.



## A Github Repository

### `input` element + `datalist` element

#### PASS CRITERIA

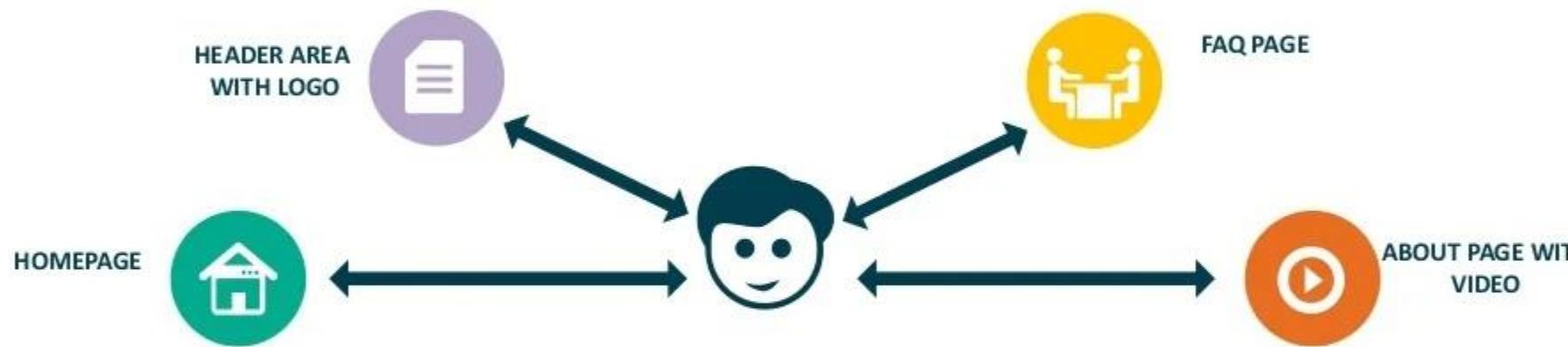
- #1: Element is supported
- #2: Element has correct HTML and Core Accessibility API mappings
- #3: Control is keyboard accessible:
  - #3.1: Control MUST be focusable
  - #3.2: MUST be able to select item from list
  - #3.3: MUST be enter and edit text
  - #3.4: MUST be able to submit value

#### REFERENCE

- [HTML5 datalist element](#)
- [HTML Accessibility API Mappings for datalist element](#)
- [Core Accessibility API Mappings for listbox role](#)
- [Core Accessibility API Mappings for aria-multiselectable="false"](#)
- [HTML Accessibility API Mappings for input type=text, search, tel, url or email element with list attribute](#)
- [Core Accessibility API Mappings for combobox role](#)
- [Core Accessibility API Mappings for aria-owns property](#)

<http://thepaciellogroup.github.io/AT-browser-tests/test-files/datalist.html>

## Creating an Accessible Web Site



Tip: test a page on your website that has all types of contents to see how components work (navigation menu, main graphics, main content, blocks of information, contact form).



## HTML5 Forms – Required attributes



Forms allow for a required attribute that specifies if a particular input is required.



Input types give hints to the browser about the type of keyboard layout to display for on-screen keyboards.



### Key takeaways:

Give access to all the information needed to fill out a form.

Required field allows screen readers to give out information on a mandatory field.



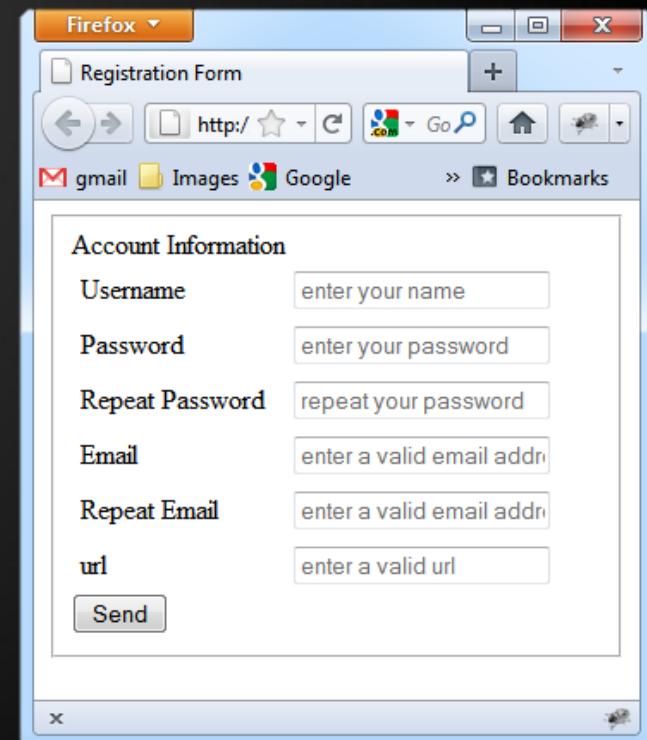
## HTML5 – Audio & Video Accessibility



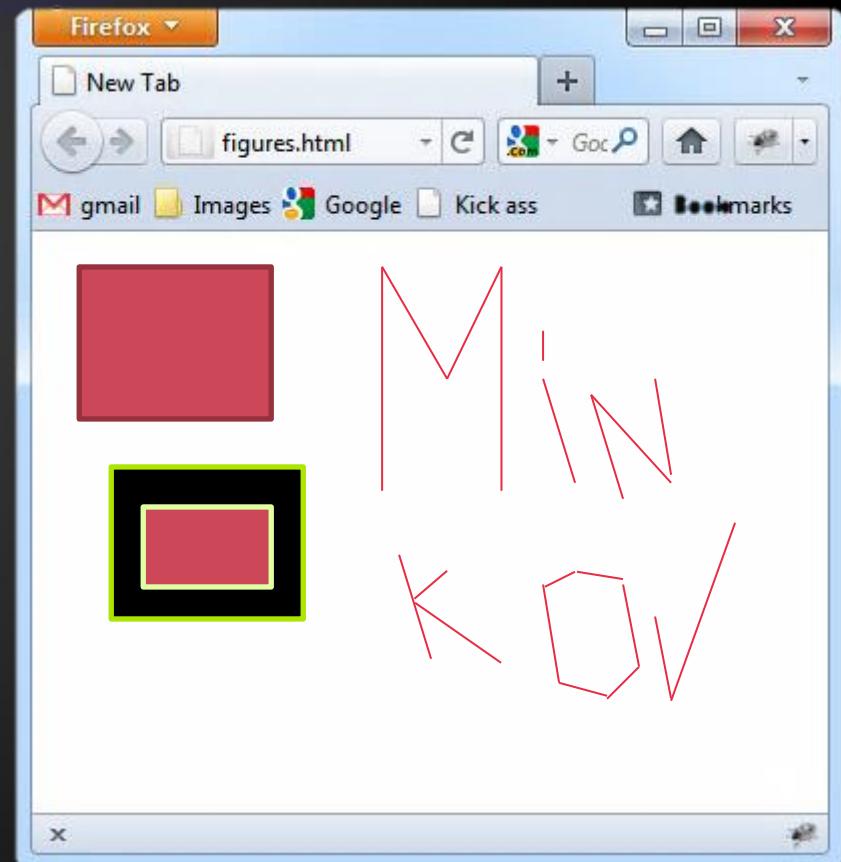
# Questions?

# Extra slides

1. Make the following Web Page.
  - Note that there should be validators for emails and url (email and url are required fields)
2. Using the previously made Web Page, add functionality to check if the text in "email" and "repeat email" fields is equal. If not show warning message and reload the page



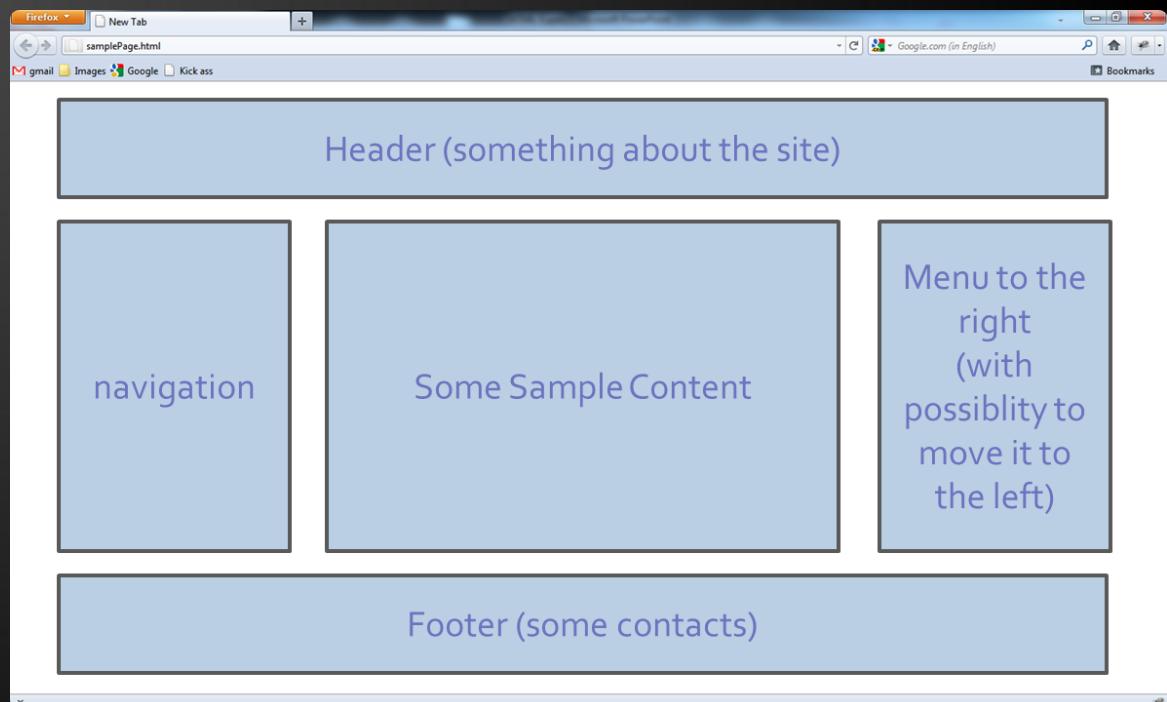
3. Using Canvas draw the following figures
4. Try doing the same using SVG
  - Hint: Use JavaScript



## 5. Build the following Web Page using HTML5 and CSS

### 2.1

- Use "Lorem Ipsum" to fill with some sample Content
- Try to make the page look OK when the window is resized



# References: HTML 5 – Showcases and Resources

- ◆ HTML 5 Rocks – Examples, Demos, Tutorials
  - ◆ <http://www.html5rocks.com/>
- ◆ HTML 5 Demos
  - ◆ <http://html5demos.com/>
- ◆ Internet Explorer 9 Test Drive for HTML 5
  - ◆ <http://ie.microsoft.com/testdrive/>
- ◆ Apple Safari HTML 5 Showcases
  - ◆ <http://www.apple.com/html5/>
- ◆ Dive into HTML 5
  - ◆ <http://diveintohtml5.org/>