COMM 641
Web Programming Beginning

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Lecture 1

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This week at a glance…

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- Introduction to the FEWD Certificate Program
- Web Architecture
- HTML5, CSS3, and JavaScript
- The W3C
- Semantic HTML5
- Basic Structure of a Web Page
- HTML Syntax
- Browsers to Download
- Using Brackets
- Creating a Simple Web Page
- Validating Your Web Page

Web Architecture

Web Architecture

What is web architecture?

- Webster's has many definitions for architecture, the most generic being *"Orderly arrangement of parts".* The most complex *being "The overall design or structure of a computer system, including the hardware and the software required to run it"*.

- The Web is similar in concept to a computer system. In years past we'd have a mainframe as the foundation for company data. Terminals were used to retrieve and modify information within the mainframe computer. The mainframe was the supplier of data and the terminal was just a "dumb" access point.

- Fortunately, the Web changed the way many of us interact with computers. **Application service providers (ASP's)** are now common.

- Since this is the case, the architecture of computing had to change. We now work in a **tiered architecture** model.

Web Architecture

The Application Service Provider (ASP)

An Application Service Provider or ASP, is a third-party entity that manages and distributes software-based services and solutions to customers across a network from a central data center.

Let’s use eBay as an example.

Web Architecture

The Tiered Architecture Model

Tiered architecture provides a model for developers to create applications regardless of technology or platform.

- 1st Tier - The application is located somewhere. That application, regardless of technologies used, is a tier of the architecture.

- 2nd Tier - eBay auction information is stored in some sort of data source.

- 3rd Tier – The millions of buyers and sellers that use eBay daily make up the 3rd tier.

Web Architecture

The Tiered Architecture Model

Visitor (Client)

Web Architecture

The Tiered Architecture Model

Visitor (Client)

HTML, CSS, JavaScript

Web Architecture

The Tiered Architecture Model

Visitor (Client)

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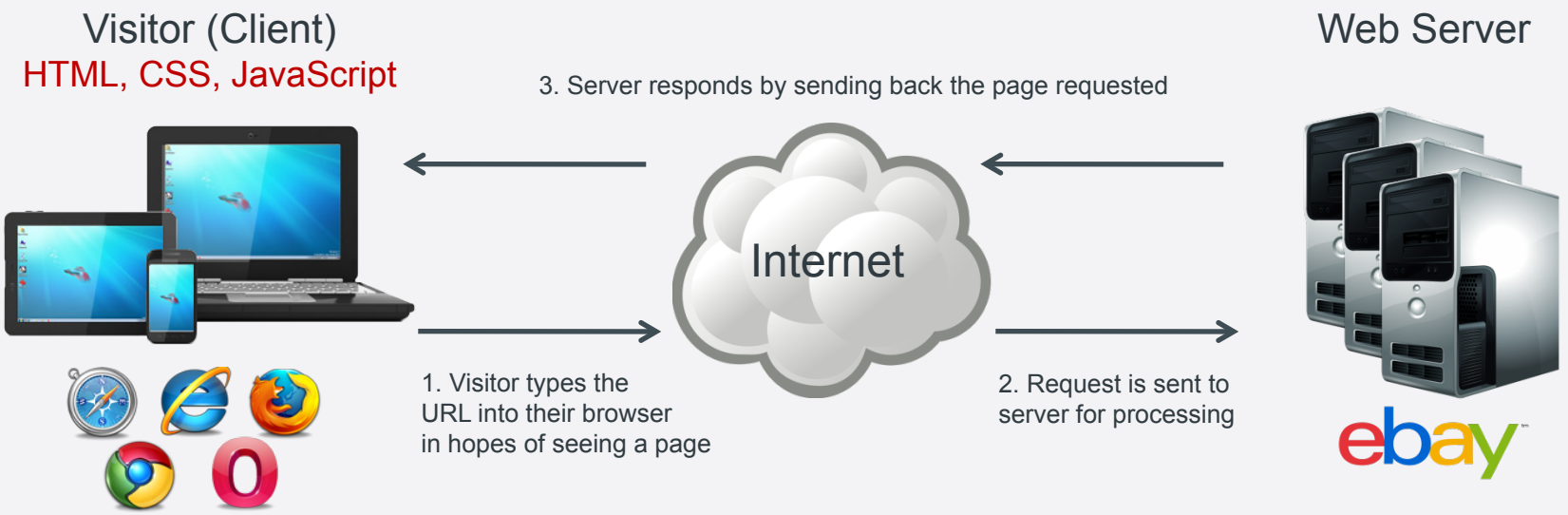
Web Server

Web Architecture

The Tiered Architecture Model



Web Architecture

The Tiered Architecture Model

Visitor (Client)
HTML, CSS, JavaScript

Web Server

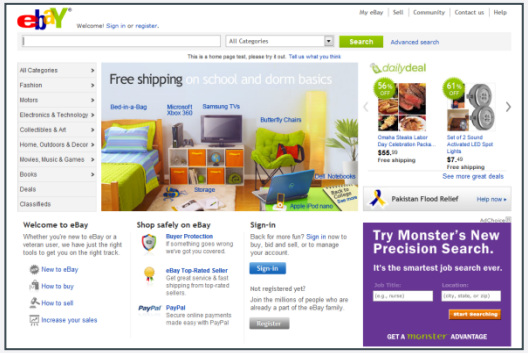
3. Server responds by sending back the page requested

Internet

1. Visitor types the URL into their browser in hopes of seeing a page

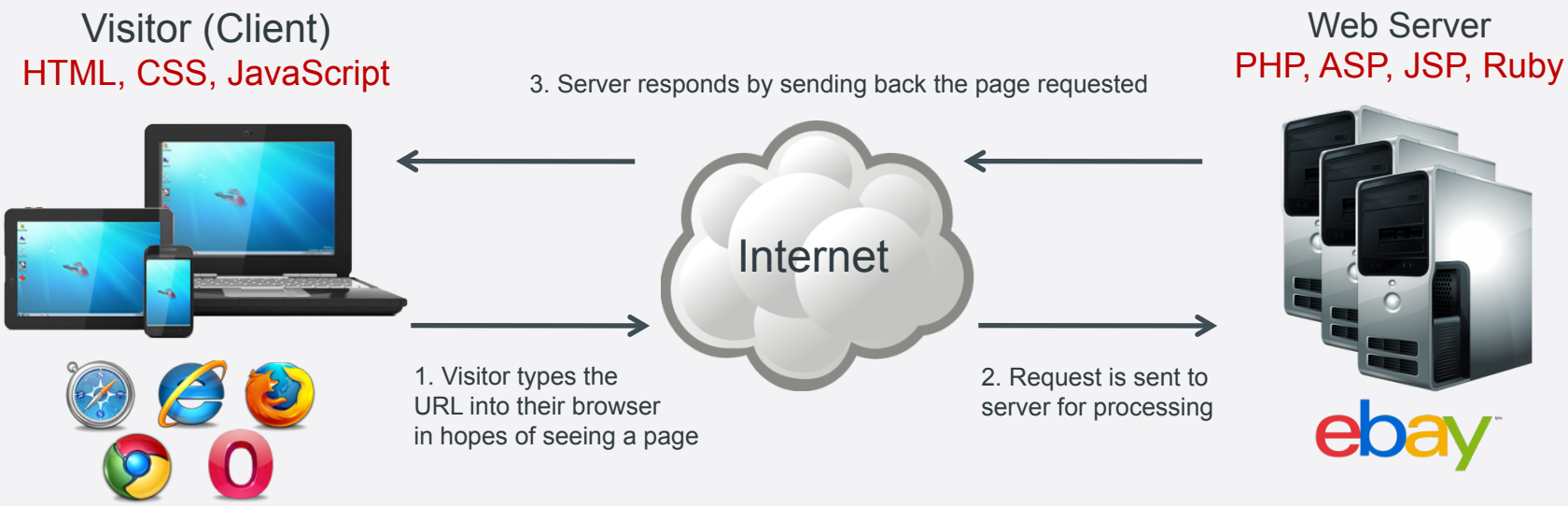
2. Request is sent to server for processing

4. Browser parses HTML, CSS, and JavaScript and visitor sees the page.



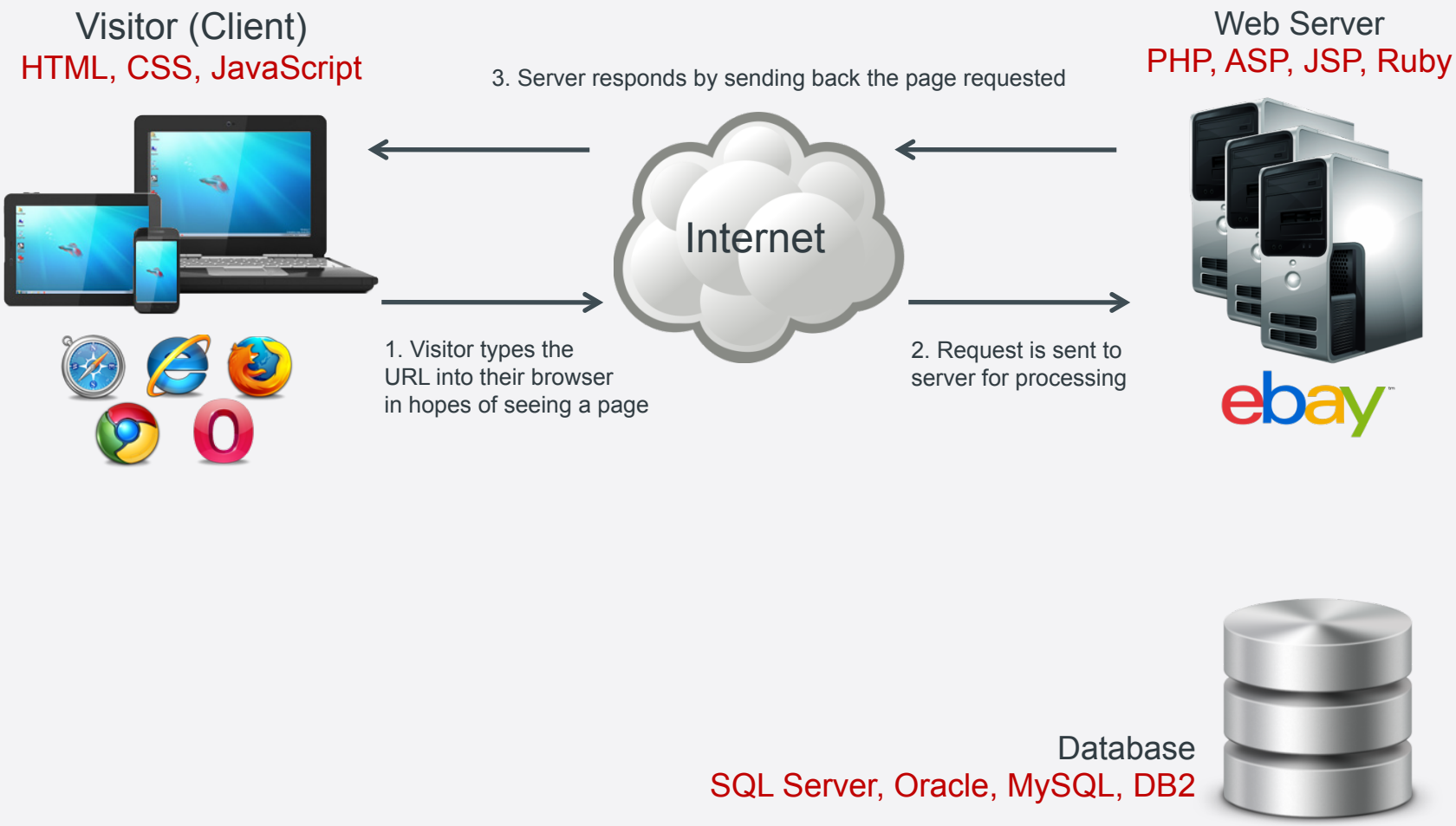
Web Architecture

The Tiered Architecture Model



Web Architecture

The Tiered Architecture Model



Web Architecture

The Tiered Architecture Model

Visitor (Client)
HTML, CSS, JavaScript

1. Visitor types the URL into their browser in hopes of seeing a page

Internet

2. Request is sent to server for processing

Web Server
PHP, ASP, JSP, Ruby

ebay

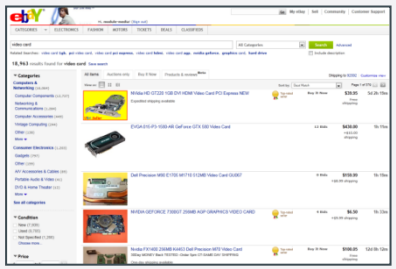
3. Server-side application accesses information contained within data store. Also known as a query.

4. Data is returned in the form of a recordset.

Database
SQL Server, Oracle, MySQL, DB2

5. Server-side application processes data returned in a format the browser can understand. Typically HTML.

6. Browser parses HTML, CSS, and JavaScript and visitor sees the page.



HTML, CSS, and JavaScript

HTML, CSS, and JavaScript

HTML

- Stands for HyperText Markup Language
- Began as a subset of SGML
- Proposed and prototyped by Tim Berners-Lee in 1989
- Formally adopted and began to see use in 1993
- Provides a way for developers to semantically "markup" web pages
- Written using a series of tags
- Tags are parsed by web browsers and the result is displayed visually to the user
- HTML can include other technologies like JavaScript for scripting, CSS for format and structure, and more
- HTML5.1 is the newest specification
- All modern browsers support most features of HTML5

HTML, CSS, and JavaScript

CSS

- Stands for Cascading Style Sheets
- Used to describe the structure and presentation of a web page
- Originally created primarily to allow developers to separate HTML from the presentational aspects of the page
- Contains many properties that up until its inception weren't available by HTML
- Properties include the ability to format type, backgrounds, lists, paragraphs, borders, the layout of a page, and a lot more
- CSS can also allow the same markup to be presented in different styles for different rendering methods. This is known as Responsive Web Design (RWD)
- CSS3 is the newest specification
- All modern browsers support most features of CSS3

HTML, CSS, and JavaScript

JavaScript

- JavaScript is an implementation of ECMAScript. Closely related to C
- Don’t confuse JavaScript with Java. The two languages are unrelated and have very different semantics
- Originally developed by Netscape under the name Mocha. Renamed to LiveScript for the release of Netscape 2.0 and 4 months later was released under the name JavaScript to coincide with Netscape’s support for Java in Netscape’s browser release of 2.0B3
- Implemented as part of a web page to provide enhanced user interfaces, interactions, conditional logic, calculations, validation, and more
- Use of JavaScript diminished for almost a decade during the “Flash” era
- The advent of jQuery, asynchronous coding in the form of AJAX, and numerous other JavaScript-related libraries have helped return JavaScript to the spotlight

Semantic HTML5

Semantic HTML5

Introduction to Semantic Markup in web development

- Semantic Markup is the use of HTML markup (HTML5) to reinforce semantics, or meaning, of the information in web pages rather than merely to define its presentation or look.

- In 2001 Tim Berners-Lee led a discussion titled "The Semantic Web", where it was presented that intelligent software "agents" might one day automatically crawl the Web and find, filter, and correlate previously unrelated, published facts for the benefit of end users.

Semantic HTML5

The need for Semantic Markup

- In previous versions of HTML, markup was used for presentation (formatting, design, etc.), structure (tables, frames, etc.), and if it was convenient…for semantics.

- Today, HTML5 is used purely for semantic purposes. Presentation and structure are handled by Cascading Style Sheets (CSS).

- The intelligent user agents that Tim Berners-Lee was referring to almost 15 years ago are seen today as Google, Yahoo, and Bing, etc.

- Semantic Markup helps web developers organize data on our sites in a way that allows the data to be easily found, filtered, and correlated by these user agents....or search engines. This is a huge part of Search Engine Optimization (SEO).

Semantic HTML5

Metadata vs. POSH

- Software agents are dependent on the semantic clarity of web pages they find as they use various techniques and algorithms to read and index millions of web pages a day.
- In the old days this was accomplished through the use of meta keywords, meta descriptions, title tags, manual search engine registration, and more.
- Today, Semantic Markup (and a few other factors) governs a large part of SEO.
- Semantic Markup can be separated into 2 distinct categories: metadata and Plain Old Semantic HTML (POSH).

Semantic HTML5

Metadata

- In order for search-engine spiders to be able to rate the significance of data in web pages, the semantic structures that exist in a web page need to be widely and uniformly applied to bring out the meaning of published text.

- One way to do this is through the use of metadata.

- Metadata can be broken up into 3 categories including:
  - Microdata
    `itemscope`, `itemtype`, `itemprop`, and `datetime` attributes
  - Microformats
    keywords added within `class` attribute
  - RDFa
    `rel`, `typeof`, and `property` attributes

Semantic HTML5

Plain Old Semantic HTML (POSH)

- While a large part of Tim Berners-Lee's Semantic Web relies on metadata, every HTML document makes its contribution to the meaningfulness of the Web by the correct use of headings, lists, titles and other semantic markup wherever possible. This "plain" use of HTML has been called "Plain Old Semantic HTML" or POSH.

- The correct use of plain old HTML5 markup creates folksonomies that may be equally or even more meaningful in some cases.

- POSH can be broken up into 2 categories including:
  - Presentational POSH
    heading tags, `p`, `blockquote`, `em`, `strong`, `fig`, `figcaption`, etc. tags
  - Structural POSH
    `main`, `header`, `nav`, `section`, `footer`, `article`, and `aside` tags

Semantic HTML5

"Hummingbird" and the case for Semantic Markup in SEO

- Hummingbird is the name of the new search engine algorithm that Google is using, one that Google says should return better results.
- With Hummingbird, the old format of crawling, indexing, and displaying data is gone.
- Google has advanced beyond providing search results as a list of sites according to how well they match the terms entered in the search box.
- Google now factors in intent, sentiment, freshness, personalization, localization, and more.
- Through Semantic Markup you can help Google understand how the content on your site is a solution to what the user is looking for.

Semantic HTML5

Google and the way it was

- In years past, bandwidth was restrictive. So much so that search engine spiders could not possibly crawl the millions of web pages that existed on the Internet.

- Web developers used meta keywords, meta descriptions, carefully crafted title tags, link exchanges, keyword injecting, manual search engine registrations, and more to get their web pages ranked.

Semantic HTML5

Google and the way it is

- The future of SEO lies in "Rich Snippets".
- Rich Snippets provide detailed information to users in search results. This helps users understand the content that's being search on a more meaningful level.
- How fresh is the content? How closely does it relate to my needs? How close is the organization to my physical location?
- Rich Snippets are the backbone behind Hummingbird and are created using Semantic Markup using both metadata and POSH.

Semantic HTML5

Rich Snippets

- Consider the following information on a restaurant web site:

  - ✓ Restaurant
  - ✓ Restaurant name
  - ✓ Restaurant's description
  - ✓ Dates and times that the restaurant is open
  - ✓ Phone number
  - ✓ Menu

Semantic HTML5

Rich Snippets

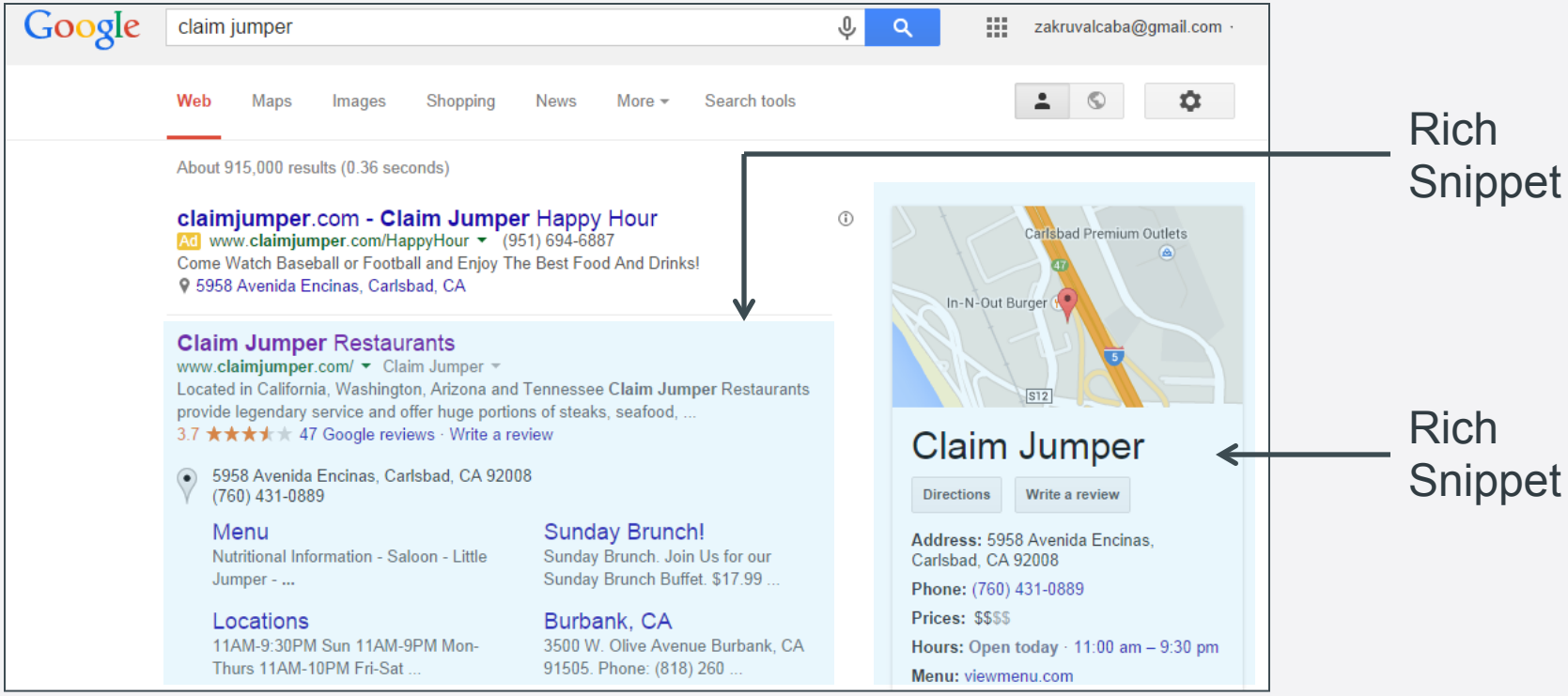
The information could be structured using Semantic Markup like this:

```
<section itemscope itemtype="http://schema.org/Restaurant">
<h1 itemprop="name">Claim Jumper Restaurants</h1>
<p itemprop="description">Provide legendary service and offer huge
        portions of steaks, seafood, appetizers and desserts.</p>
<p>Open: <time itemprop="openingHours" datetime="Mo,Tu,We,Th,Fr,Sa,Su
        11:00-9:30">Daily from 11:00am-9:30pm.</p>
<p>Phone: <span itemprop="telephone" content="+17604310889">
        (760) 431-0889</span></p>
<p>View <a itemprop="menu" href="http://viewmenu.com/claim-jumper-restaurant-9">
        Menu</a>.</p>
</section>
```

Semantic HTML5

Rich Snippets

The information shows up like this:



The W3C

The W3C

Introducing the W3C

- Stands for the World Wide Web Consortium
- It's the main international standards organization for the web
- Founded by Tim Berners-Lee in 1994
- Headquartered at MIT but has numerous offices worldwide
- Comprised of hundreds of member organizations from various businesses, nonprofit organizations, universities, and government entities who dedicate full-time staff positions to the W3C
- Also engages in education, outreach, software development, and serves as an open forum for discussion about the web

The W3C

Introducing the W3C

- Hosts and currently manages the newest specifications for HTML including HTML5 and more recently, HTML5.1:

  http://www.w3.org/TR/html51/

- Hosts and currently manages the newest specifications for CSS including CSS3:

  http://www.w3.org/TR/#tr_CSS

Basic Structure of a Web Page

Basic Structure of a Page

The basic structure of a web page

A typical web page will contain two major areas:

- The Doctype Declaration
- The Document Tree

Basic Structure of a Page

The Doctype Declaration

The first item to appear in the source code of a web page is the doctype declaration.
A doctype declaration (pre HTML5) would look like this:

CODE

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
```

In HTML5, the W3C simplified the doctype to look like this:

CODE

```
<!DOCTYPE html>
```

Basic Structure of a Page

The Document Tree

A web page is typically considered a document tree because it will contain a combination of HTML markup organized like the branches of a tree.

Pay close attention to the symmetry of the way that tags are opened and closed.

```
<!doctype html>
<html>
  ├─<head>
  │   ├─<meta charset="utf-8">
  │   └─<title>My new web page</title>
  │  </head>
  │
  └─<body>
      ├─<h1>This is my new web page</h1>
      ├─<p>
      │  It doesn't have a lot of content.
      │  It does however have <em>emphasized text</em>.
      │  </p>
      ├─<blockquote>It also has a blockquote.</blockquote>
      ├─<h2>It also contains a level 2 heading.</h2>
      ├─<p>That is it for now!</p>
      └─<hr>
    </body>
</html>
```

Basic Structure of a Page

The <html> tag

- Immediately after the doctype comes the html tag - this is the root tag of the document tree and everything that follows is a descendant of that tag.

- The html tag breaks the document into two main sections: the head and the body.

Basic Structure of a Page

The <head> tag

- The head tag contains meta data - information that describes the document itself, or associates it with related resources, such as scripts and style sheets.
- The example below contains the title element, which represents the document's title or name.

CODE

```
<!DOCTYPE html>
<html>
      <head>
            <title>Welcome to Vecta Corporation</title>
      </head>
      <body>
            ...visible content would go here...
      </body>
</html>
```

Basic Structure of a Page

The <body> tag

This is where the bulk of the page is contained. Everything that you can see in the browser window is contained inside this element, including paragraphs, lists, links, images, tables, and more. How the page looks will depend entirely upon the content that you decide to fill it with.

HTML Syntax

HTML Syntax

Six things to consider…

Writing valid HTML5 is not a terribly difficult task once you know the syntax and what the rules are for writing the code. The list below provides a quick reference to the "general rules" that will ensure your markup is well-formed and valid.

- Be mindful of the document tree
- Implement a correctly formed tag structure
- Make everything lowercase (with few exceptions)
- Be sure to close all of your tags (with few exceptions)
- Write your code so that it's readable
- Comment your markup!

HTML Syntax

Be mindful of the document tree

- A web page is, at its heart, little more than a collection of HTML elements.
- The element is created by writing an opening tag, and completed by writing a closing tag (in most cases).
- An element may contain other nested elements.
- Where this occurs, the opening and closing tags must be symmetrical. If an opening paragraph tag is followed by the opening em tag, the closing tags must appear in the reverse order:

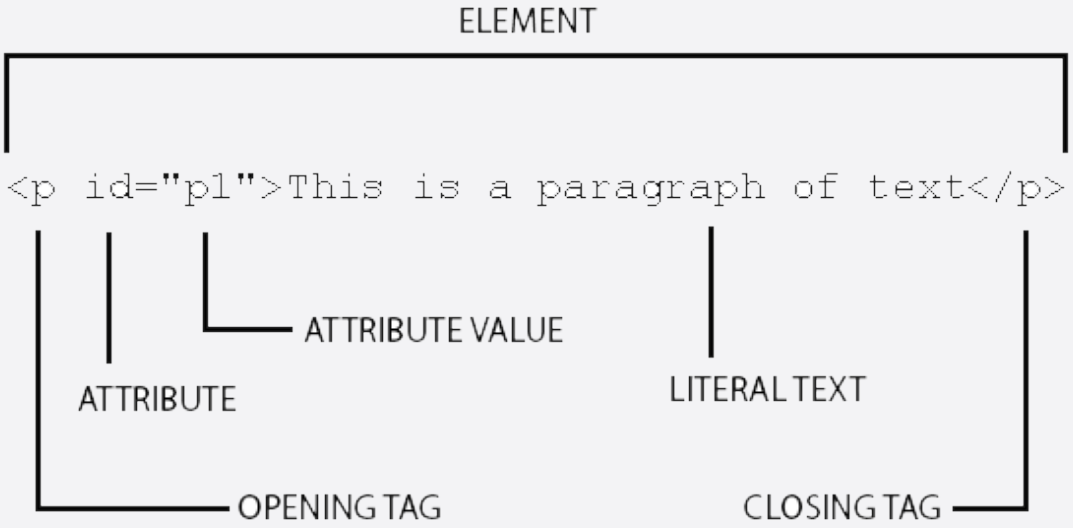
CODE

```
<p><em>Hello World</em></p>
```

HTML Syntax

Implement a correctly formed tag structure

In general, all HTML elements will resemble the following structure:



HTML Syntax

Make everything lowercase (with few exceptions)

In HTML, tag names are **not** case sensitive. Since this is the case, you can write the markup in lowercase, mixed case, or uppercase letters. So the following would all be valid:

CODE

```
<p>this is a paragraph</p>
<P>this example</P>
<P>this markup would be valid</p>
```

As a general rule of thumb however, you should always write your code in lowercase.

HTML Syntax

Be sure to close all of your tags (with few exceptions)

In HTML, it's possible to omit some closing tags. For instance, this is valid markup:

CODE

```
<p>This is a paragraph without a closing tag
<p>This is a second paragraph without a closing tag
```

As a general rule of thumb however, you should always include a closing tag as follows:

CODE

```
<p>This is a third paragraph with a closing tag</p>
```

HTML Syntax

Write your code so that it's readable

Spaces

A browser doesn’t care whether you use a single space to separate attributes, ten spaces, or even complete line breaks; it doesn’t matter, as long as at least one space is present. Take into consideration however, that the more spaces you include, the larger your web page’s file size will be since each occurrence of whitespace takes up additional bytes.

Attribute Quotes

In HTML all attribute values **should** be quoted, so you’ll need to write id=“button1" rather than id=button1. It’s valid to omit the quotes from your HTML, though it may make reading the markup more difficult for developers revisiting old markup. Additionally, if you’re using a visual editor that colors your code, omitting the quotes from your attribute values will result in incorrect code colors.

HTML Syntax

Comment your markup

You may add comments in your HTML, perhaps to make it clear where sections start or end, or to provide a note to remind yourself why you approached the creation of a page in a certain way. The HTML comment looks like this:

CODE

```
<!-- This is a comment -->
```

These hyphens tell the browser when to start ignoring text content, and when to start paying attention again. The fact that the -- characters signify the beginning and end of the comment means that you should not use them anywhere **inside** a comment.

Browsers to Download

Browsers to Download

Psst, download them all!

- A web browser is a software application for retrieving, presenting, and navigating through information on the web.

- Markup languages like HTML were created for presenting information in a meaningful way within the browser.

Browsers to Download

Popular web browsers include…

- Microsoft's Internet Explorer
  windows.microsoft.com/en-us/internet-explorer/download-ie
- Mozilla's Firefox
  mozilla.com/firefox
- Apple's Safari
  apple.com/safari
- Google's Chrome
  google.com/chrome
- Opera
  opera.com