

Web Development Fundamentals



Lecture 2

An Introduction to Web Development

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Autumn 2018

Where do I start?

Created by MB on 14/09/17

Where do I start?

- Get a basic understanding of:
 - How the internet and web work
 - How web pages work

Employers will expect to see:

Working sites

(that demonstrate your skills and experience)

Good sites have well-written, ‘clean’:

HTML

Style sheets

(and possibly scripts behind the scenes ...)

We'll learn about these
today ...

What does a web designer do?

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What does a web designer do?

Web-design

Catch-all phrase for complex process requiring different disciplines ...

We can divide roles & responsibilities into 4 categories:

1. Design
2. Development
3. Content Strategy
4. Multimedia

1. DESIGN

What does a web designer do:

DESIGN

No so much about looks

More about how site WORKS

Web site workings ...

WHO are users of site

WHAT are their information goals / interaction goals

HOW does user know their current location in the site?

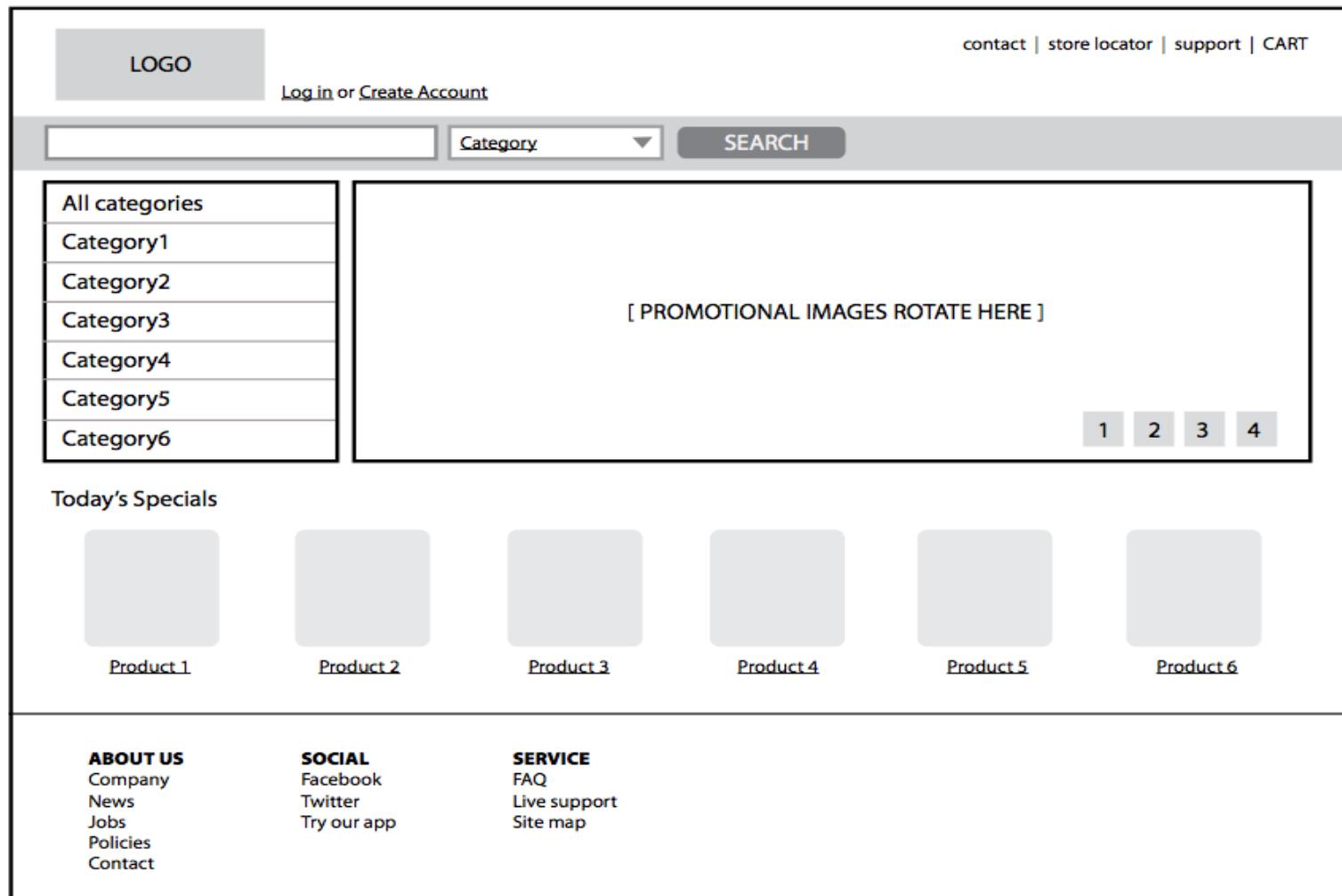
HOW can user find out how to get to where they need to?

DESIGN:

“UX” = the User Experience

To meet the (business) “objectives” of the website

Wireframe diagram

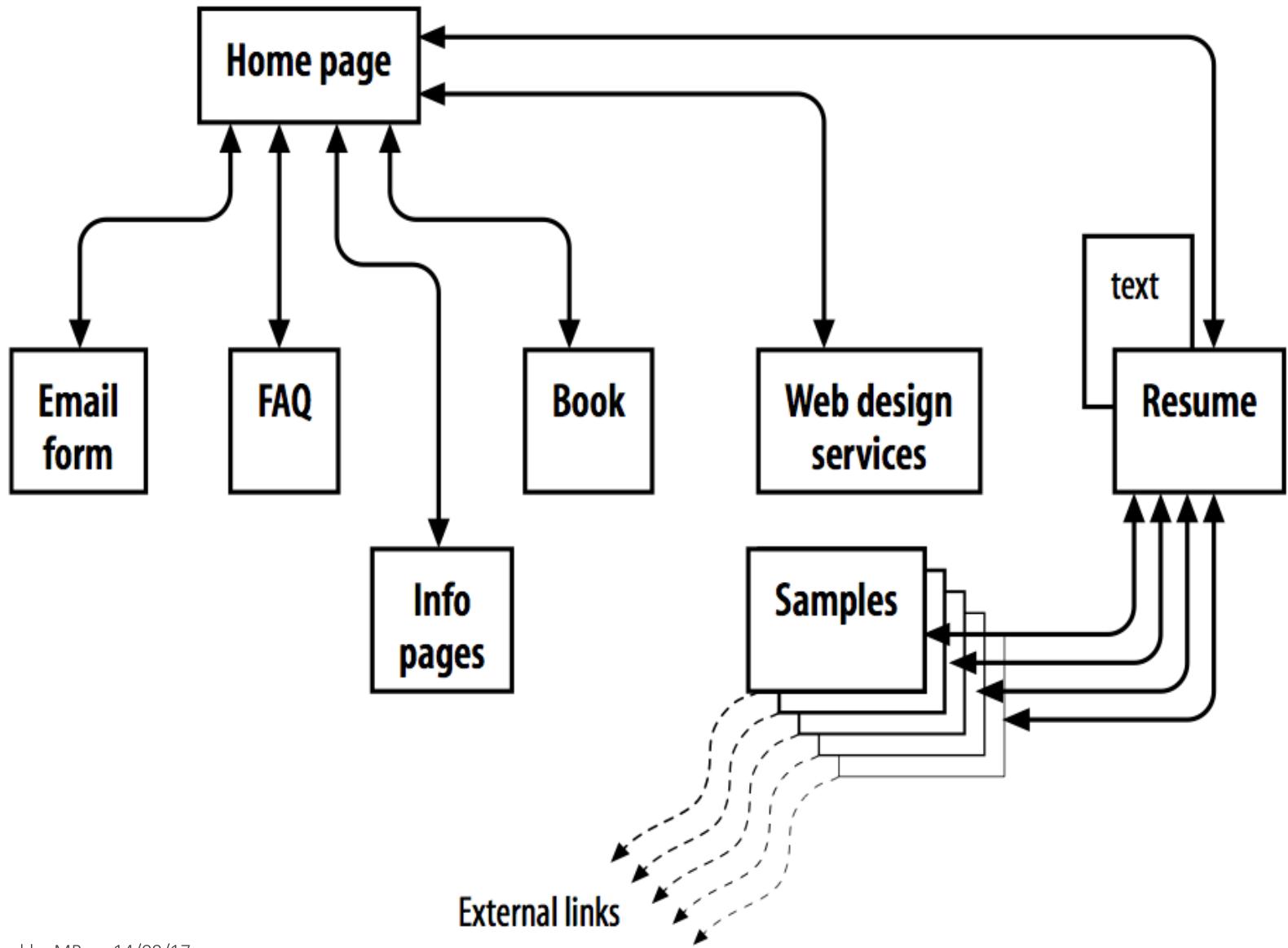


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copyright statement

Figure 1-1. Wireframe diagram.

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Figure 1-2. A simple site diagram.

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[Join the discussion...](#)

Talk with people like yourself in our threaded discussion group, "Pro-Choice Talk." There's a variety of topics to choose from.

Join the discussion...

About
we're speaking up!

Member Organizations
40 great resources

Seen us on TV?
our ad campaign

Tell us about you
this brief questionnaire
can be anonymous

Keep in touch
contact information

Get involved!

Not satisfied just reading These organizations can show about your changing rights? you what you can do to help

Need some help?

Need to find a clinic near you but don't know who to ask? Just need to talk? These resources can save the day.

Get more info

There's more going on out there than you may know. These resources can get you up to speed on topics that affect your life.

Stop the violence

You've seen the scare tactics on tv and read about them in the paper. Find out about the people who are working to keep the peace.

Figure 1-4. Look and feel sketches for a simple site.

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2. DEVELOPMENT

What does a web designer do: **DEVELOPMENT**

Creating and troubleshooting (debugging):
Documents, Style sheets, Scripts, Images

This process called 'development' or 'production'

Not necessary looking at the site as a whole
Implementing the designs they are given
Coding up the content and multimedia they are given
The WORKERS of the team ...

3 broad Development tasks:
Authoring/markup
Styling
Scripting and Programming

DEVELOPMENT: Authoring / Markup

Authoring/markup

Preparing content for web delivery

i.e. 'marking-up' content using HTML 'tags'

E.g.

ITB home page



`<title> ITB Home Page </title>`

DEVELOPMENT: Styling

Styling

Writing style rules to determine appearance of content in browser

Rules are written in the CSS language

Cascading Style Sheets

The text file containing style rules is called a ‘style sheet’

DEVELOPMENT: Scripting

SCRIPTING / PROGRAMMING

Interactivity requires writing in programming languages

Programming in web pages often referred to as ‘scripting’

Client-side (front end) = on the browser

JavaScript

Server-side (back-end) = on the server

Languages such as PHP, Java/JSP, .NET, Python etc.

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You'll learn JavaScript and PHP in other modules...

3. CONTENT STRATEGY

What does a web designer do:

CONTENT

Content strategy and Creation

The text, images etc. content to be made available to users through the website

And how arranged / organized

Someone (content author/strategist) needs to:

Create the content

Ensure it is consistent

Ensure it meets the website / organizational goals

Someone (information architect) needs to:

Organise the content into pages / website sections

Making it logical and easy to locate by the user

4.

MULTIMEDIA

What does a web designer do: **MULTIMEDIA**

NOTE:

We'll only worry about still IMAGES in this module

Non-text content:

Audio, Video, still Images, Animations
Interactive games/graphics

Examples include:

Flash, Unity 3D

Digital artistic & technical skills

E.g. the BA (Hons) Creative Digital Media programme graduates ...

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What languages do I need to learn?

Languages/Technologies for Web Development

- So what technologies do you need to know about to develop web pages?
- Here's a list
 - We'll only be learning the first 2 in this module...
 1. HTML
 2. CSS (Cascading Style Sheets)
 3. Javascript/DOM scripting
 4. Server-side programming

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Technologies

1: HTML

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Technologies for Web Development

1. **HTML** = HyperText Markup Language
 - the language used to create web page documents
 - HTML is *not* a programming language
 - It is a mark-up language
 - system for identifying and describing the various components of documents such as headings, paragraphs, list, web-links and so on
 - Everyone involved in Web Development needs at least a basic understanding of HTML

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example of an HTML document

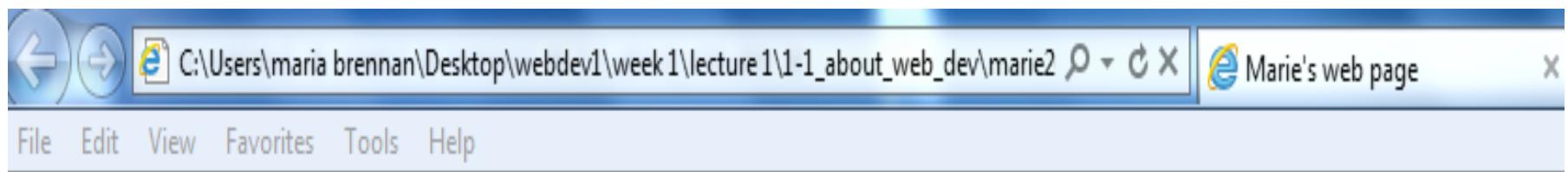
```
<!DOCTYPE html>
<html lang="en">

<head>
  <meta charset="utf-8">
  <title>Marie's web page</title>
</head>

<body>
  
  <h1>Marie Brennan</h1>
  <p>
    Marie is a lecturer at ITB.
    She is one of the Web Dev 1 lecturers this year.
  </p>
  <hr>
  <footer>Copyright 2015</footer>
</body>
</html>
```

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Marie Brennan

Marie is a lecturer at ITB. She is one of the Web Dev 1 lecturers this year.

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Technologies

2: CSS

(Cascading Style Sheets)

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Technologies for Web Development

2. CSS (Cascading Style Sheets)

- HTML is used to describe the content of a web page.
- CSS describe how you want that content to look.
- This is called the *presentation* of the page.
- A CSS document is called a *style sheet*.
- CSS is powerful way to formatting text, arranging the page layout, and any other visual formatting that is necessary.

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Technologies for Web Development

```
h1 {  
    color:green;  
}  
  
p {  
    font-size: small;  
    font-family: sans-serif;  
}  
  
img {  
    float: right;  
    margin-left: 12px;  
}
```



Note USA 'color' spelling

- The next slide shows you the result of applying this style sheet to the previous web page

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 C:\Users\maria brennan   X   

 Marie's web page X

File Edit View Favorites Tools Help

Marie Brennan

Marie is a lecturer at ITB. She is one of the Web Dev 1 lecturers this year.

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Technologies 3: Javascript/DOM scripting

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Technologies for Web Development

3. Javascript/DOM scripting

- Used to add interactivity and behaviours to web pages.
 - Checking forms for valid entries
 - Swapping out styles for an element or an entire site
 - Making the browser remember information about the user

DOM – Document Object Model

- allows scripts to locate / change web page elements in the browser –
interactive web pages – DYNAMIC ...

See this with JQuery at:

http://www.mattsmithdev.com/estimator_229/estimator.php

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Web Development “3-layer cake”

– client side (in the web browser)

Behaviour
layer

Javascript

Presentation
layer

CSS

Structure
layer

HTML

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Technologies 4: Server-side programming

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Technologies for Web Development

4. Server-side programming

- Used to develop web applications
- For example, shopping carts, databases, etc.
- Languages such as PHP, JSP, .NET, Python, Perl ...
 - Also – XML, Java, Flash

Web application (MVC) frameworks:

E.g. Symfony2, Zend

CMS (Content management system)

E.g. Wordpress

Server code ‘talks’ to server Database

E.g. MySQL, SQL Server, ORACLE

Web System – 3-tier system

Tier 1 = front end
(presentation)

Front-end
(JS/CSS/HTML)

Client side
e.g. browser

Tier 2 = Business
logic/programming

Business logic,
e.g. PHP

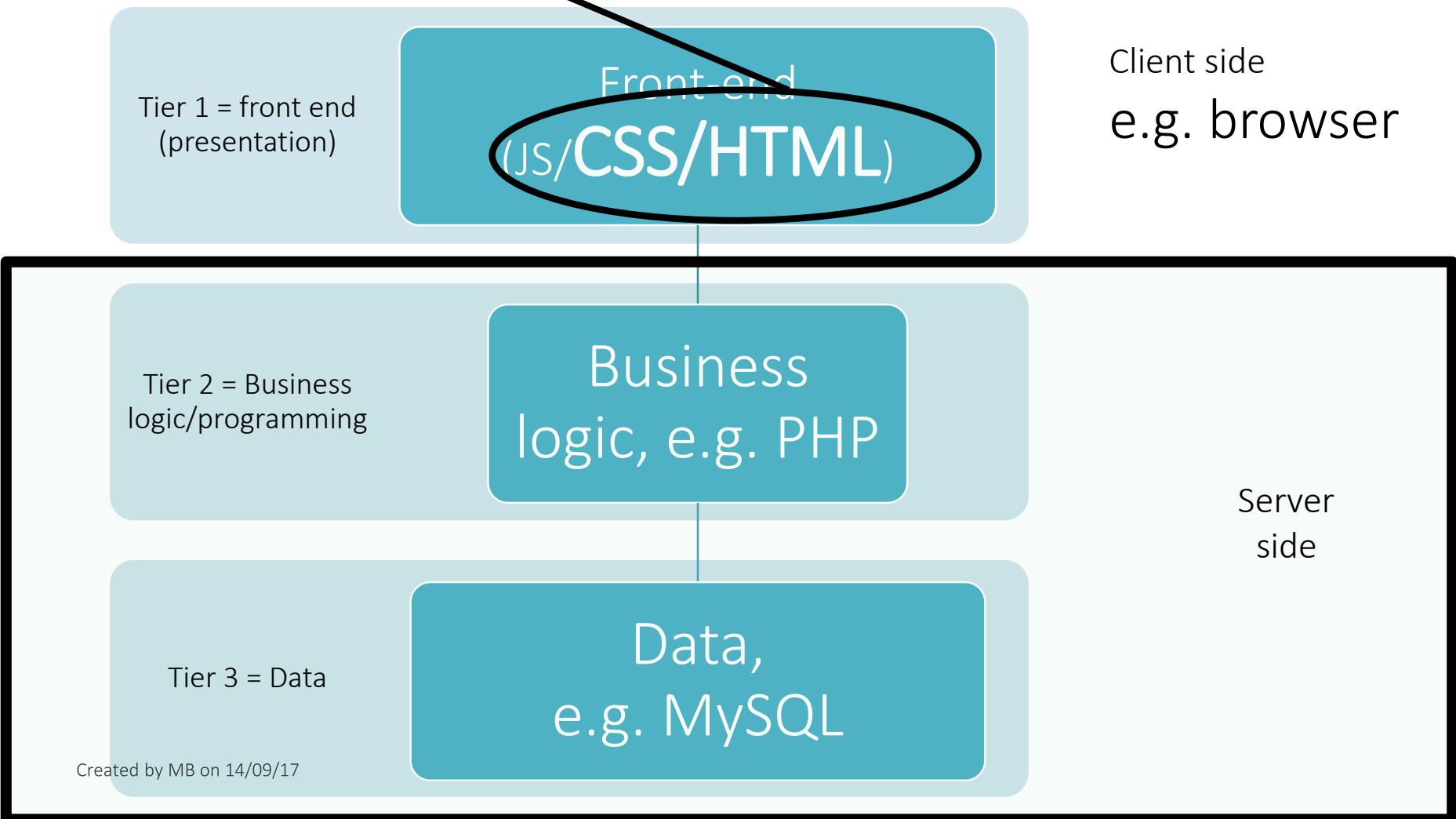
Server
side

Tier 3 = Data

Data,
e.g. MySQL

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HTML and CSS – only these 2 in this module !!!!!



Summary / Conclusions ... **Web Development**

Combination of:

Design

Development / Production

Content Strategy

Multimedia: e.g. audio, video, animations, still images

Client side / Server Side

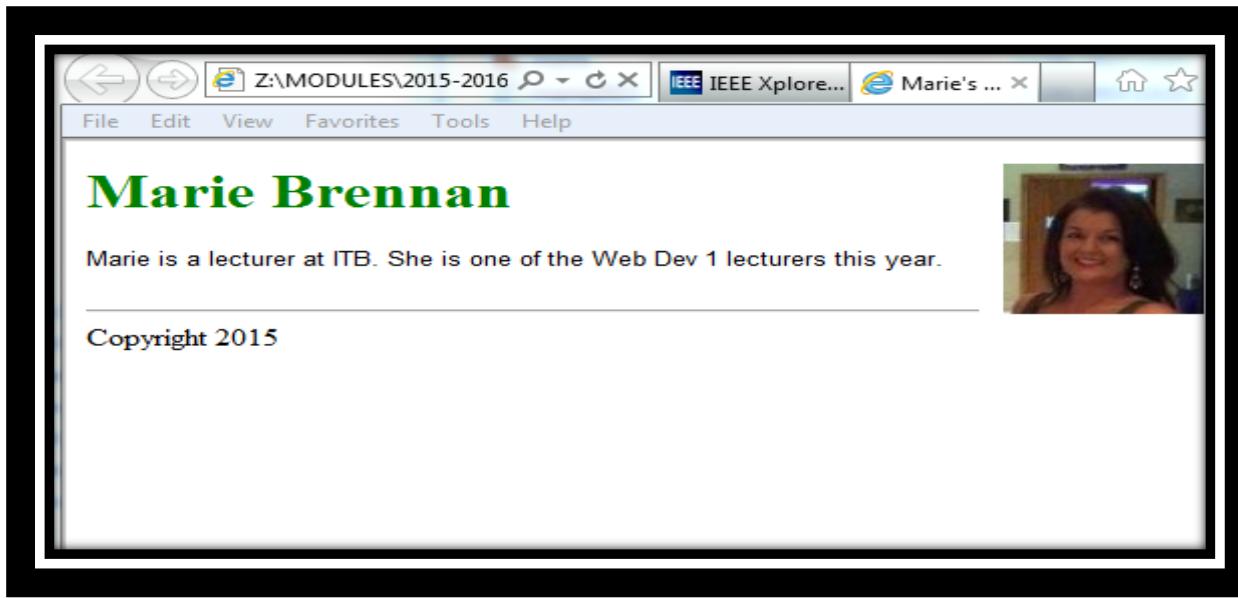
4 main technologies

HTML

CSS

JS/DOM scripting

Server side programming



- Now a brief look at what an HTML page looks like.
- We'll return to the earlier example
- This is what it looks like in a browser.

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- It's actually made up of two different files:
marie.html
marie.jpg
- The first one contains the HTML code.
- The second one contains the image.
- The one containing the HTML controls everything.
- HTML documents are simple text files and can be created in any software program that can edit text.
- We will be using *TextPad*.
- Let's have a brief look at the HTML code.

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="utf-8">
    <title>Marie's web page</title>
</head>
<body>



<h1>Marie Brennan</h1>
<p>
Marie is lecturer at ITB.
She is one of the Web Dev lecturers this year.
</p>

<hr>
<footer>Copyright 2015</footer>

</body>
</html>
```

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- Read through the HTML and try and match tags with what appears in the browser.
 - You should note the following things ..
-
- *Firstly* the text inside the tags does not display on the final page (<body> for example).
 - This is because they are instructions to the browser (markup), not content.
-
- *Secondly*, note that most of the tags occur in pairs.

<h1>Marie Brennan**</h1>**

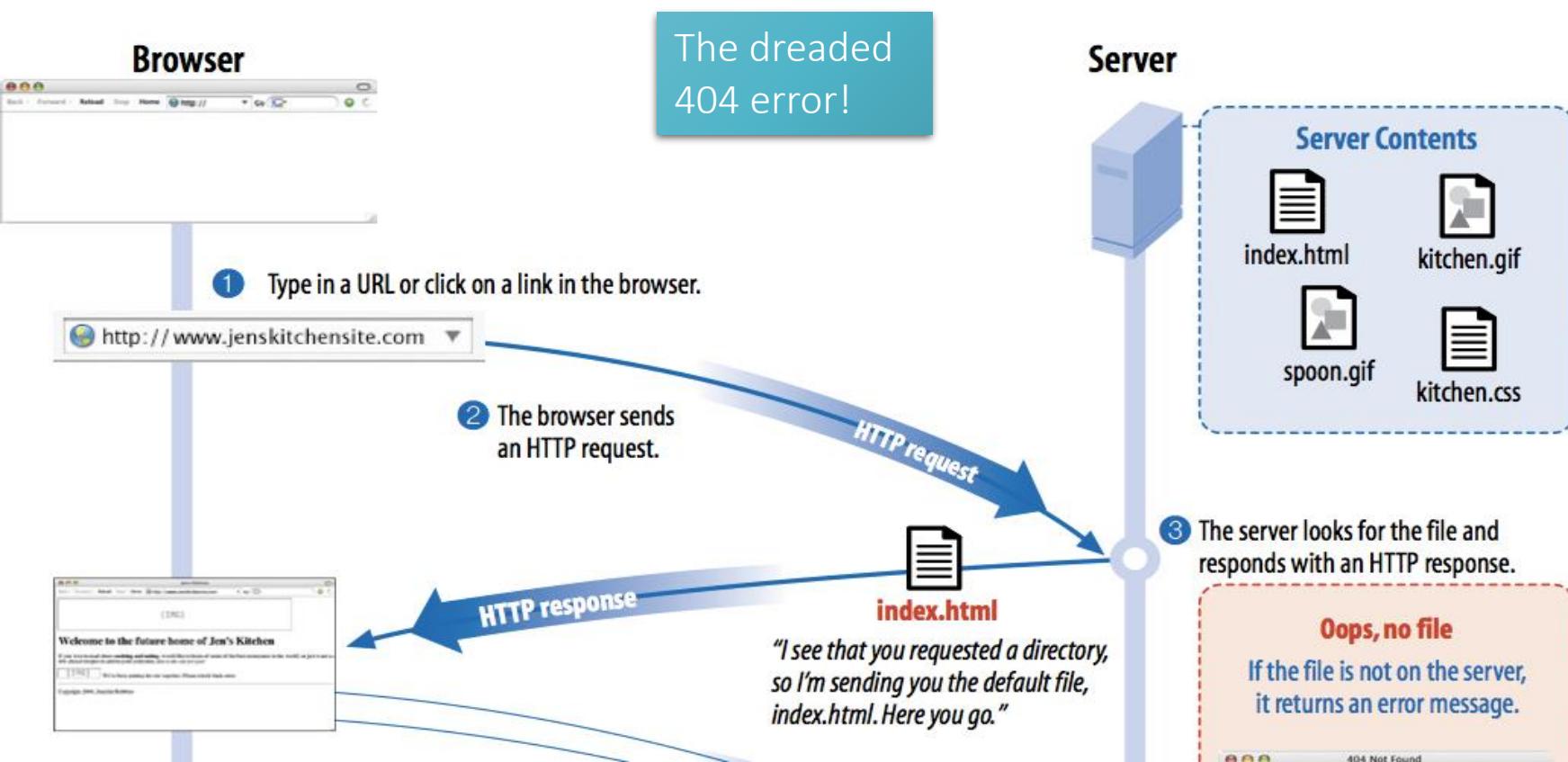
“beads on a string”

One way to think of the way the special HTML characters work is that they follow a special pattern sequence

Like a bracelet with a pattern made from beads on a string

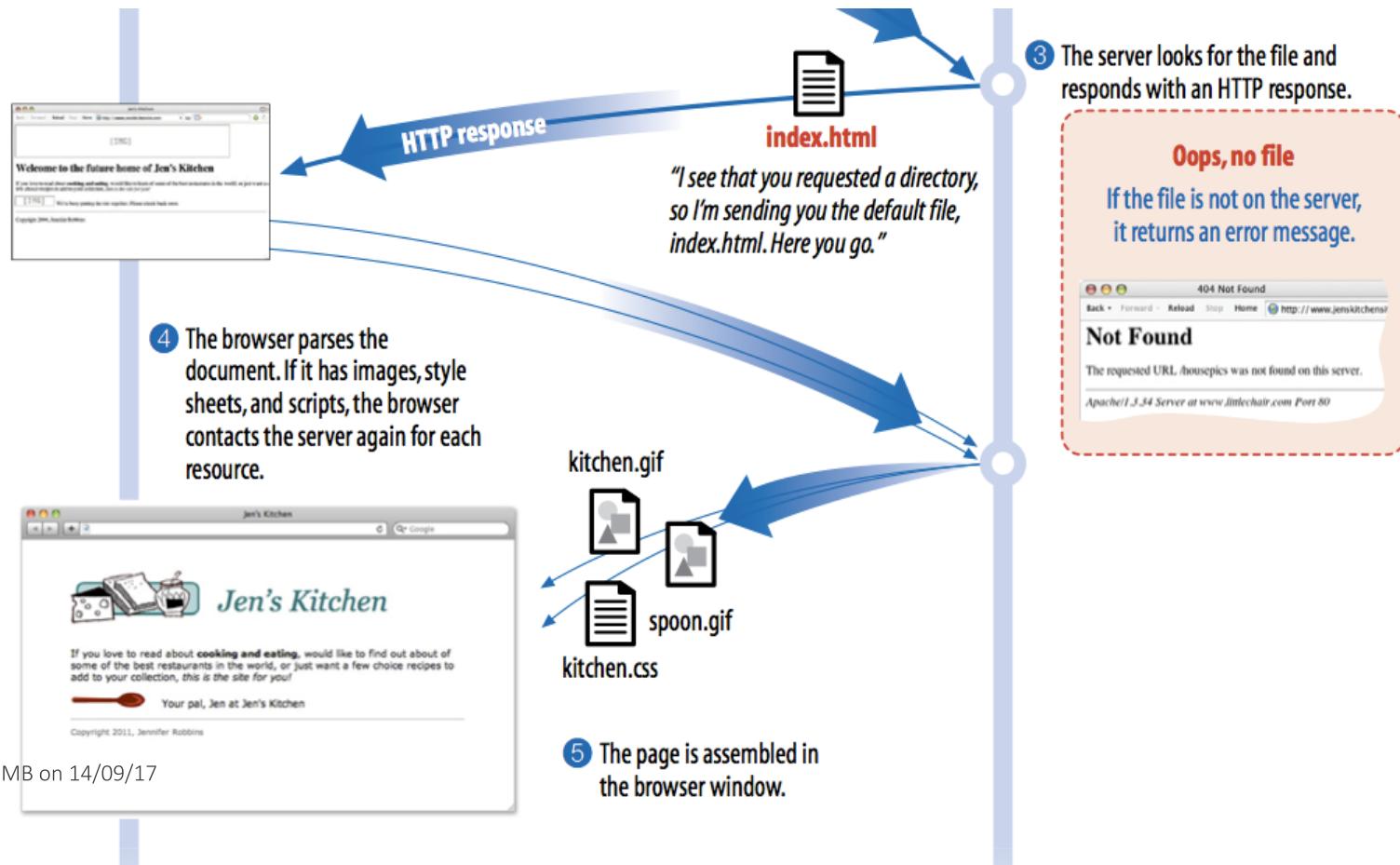


Browser REQUEST to Server – receive HTML



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Browser parse HTML, make more REQUESTs to Server – to receive CSS, images, JS, etc.



Modern browsers provide DEVELOPER TOOLS to help technical web developers (like US!)

Google Chrome provides some great web developer tools built-in to the browser:

Choose menu:

Tools | Developer tools

Then click network

And you can SEE the HTTP requests from browser

And you can SEE the HTTP responses received from server

Timing information, method (GET or POST), content of messages received etc.

A screenshot of a web browser window. The address bar shows 'Mail - Marie.Brennan@itb...'. The toolbar includes links for Helpdesk, ITB Library, Intranet, Moodle, Timetable, Webmail, Imported From IE, Mail - Marie.Brennan, ITB Email, Home - Dr. A context menu is open in the top right corner, listing options like New tab, New window, New incognito window, History, Downloads, Bookmarks, Zoom (set to 100%), Print..., Cast..., Find..., More tools, Edit, Cut, Copy, Settings, Help, and Exit.

Google Ireland

Institute of Technology

Dropbox Business

Outlook

ITB Moodle

Sign in to your account

ITB Portal

<https://owa.itb.ie/>

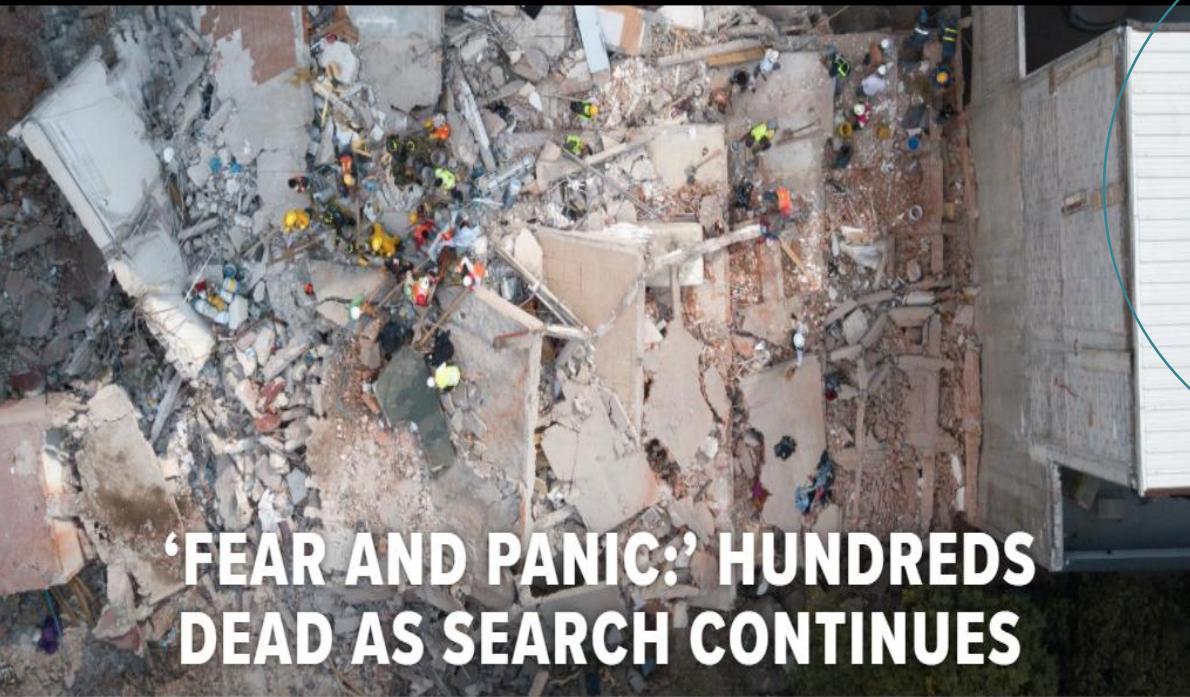
Institute of Technology



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The screenshot shows the Chrome DevTools interface with the 'Sources' tab selected. A blue oval highlights the list of network requests under the 'top' section. The requests listed include:

- (index)
- cr3wc89sw3-c.js
- cr3wc89sw3-m.js
- 0914.global.ssl.fastly.net
- apis.google.com
- apx.moatads.com
- assets.pinterest.com
- b.huffingtonpost.com
- b.scorecardresearch.com
- bam.nr-data.net
- cdn.glimeworldwide.com
- connect.facebook.net

Below the requests, sections for 'Call Stack', 'Breakpoints', 'XHR Breakpoints', 'DOM Breakpoints', 'Global Listeners', and 'Event Listener Breakpoints' are visible. A status bar at the bottom indicates 'Not Paused'. A blue bar at the bottom of the DevTools window displays 'Highlights from the Chrome 60 update'.

Summary - BLOCK level and INLINE page elements

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BLOCK LEVEL and INLINE elements

BLOCK LEVEL elements

< p >

BLOCK level elements start on new lines and do not run together

< h1 >

E.g. heading and paragraph elements
Browsers treat block-level elements like they are enclosed in rectangular boxes, stacked up on the page.

Each one begins on a new line and there is space above and below it.

BLOCK LEVEL and INLINE elements

INLINE elements

INLINE elements do NOT start a new line

they stay within the flow of the paragraph
look at text marked up as emphasised (**em**).

For example, weakly emphasises elements

Inline elements do not start new lines,
they continue the flow

Identify Text Elements

BLOCK LEVEL & INLINE elements

Next slide shows the page with:

Block level elements on a purple background
inline elements on a green background

Note the space that the browser automatically places around the block elements.

Learn more about BLOCK level and INLINE in next few lectures ... simply but important distinction ...

Identify Text Elements



BLOCK LEVEL elements on a purple background

INLINE elements on a green background

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Adding Images to web pages

Introduction

We are now going to look at using the **img** element to add images to web pages.

Images are *inline* elements.

Images are used in two principal ways:

1. **Simply to display an image to the user.**

An image is used on a web page much the same way as it would be used in print, as a static image that adds information, a company logo etc.

2. **A ‘clickable’ image as a link to another resource**

Images can also be used as links, so clicking on them will redirect the browser somewhere else.

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Image Formats – for the web

There are many different kinds of digital image ‘format’

i.e. different ways that ‘data’ of an image can be encoded into files

Examples of different kinds of image include:

GIF, BMP (windows bitmap), TIFF, JPEG, RAW, PNG

Web browsers only display 3 kinds of image:

GIF .gif

PNG .png

JPEG .jpg (*or .jpeg – but only use .jpg please*)

Image files must be named with the correct file extension

If your image is in a different format you will have to convert it ...



This Jen's Kitchen page shows text, 2 images, and has been styled from a CSS style sheet file

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images

Where do the images come from?

there are no images in the HTML file

So where are the pictures?

And how does the browser know which pictures to put where when it draws the web page?

Telling browser to fetch an image

Look inside the elements to see how the browser knows which image files to request from the server

```

```

```

```

So Google Chrome browser has to make 2 MORE requests to the SERVER asking for images:

- *kitchen.gif*
- *spoon.gif*

WebDevFundamentals/Lab02/index.html, foods.gif spoon.gif

1

index.html

```
<!DOCTYPE html>
<html>
<head>
<title>Jen's Kitchen</title>
<link rel="stylesheet" href="kitchen.css" type="text/css" >
</head>

<body>
<h1> Jen's Kitchen</h1>

<p>If you love to read about <strong>cooking and eating</strong>, would like to find out about of some of the best restaurants in the world, or just want a few choice recipes to add to your collection, <em>this is the site for you!</em></p>

<p> Your pal, Jen at Jen's Kitchen</p>
<hr>
<p><small>Copyright 2011, Jennifer Robbins</small></p>
</body>
</html>
```

There are
3 files

2

foods.gif



3

spoon.gif



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The img Element

The `img` element is an empty element that essentially tells the browser to “display an image here”.

Add it into the flow of text at exactly the point you want to image to appear.

It is an inline element so it does not cause line breaks

```
<p>
Marie Brennan
 is a lecturer in
Computing at ITB and is located in E007. </p>
```

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The img Element

The src and alt attributes are required.

The src attribute tells the browser which image file to display

- *This is REQUIRED by the grammar rules of HTML*

The alt attribute provides alternative text that displays if the image is not available

This is REQUIRED by the grammar rules of HTML

The img Element

Note the following about the `img` element:

1. *It is an empty element,*
 - no content being ‘marked-up’
 - no closing tag required
2. *It’s an inline element*
 - goes with the text flow and acts like a ‘big letter’
3. *By default, the bottom edge of the image is aligned with the baseline of the text*
4. *A ‘replaced element’ (since this element will be replaced in the document by the loaded image file)*

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Normal 'inline' flow ...

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Inline images are part of the normal document flow

If you resize the browser window then they will readjust their position just like a paragraph of text would.

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Using the src Attribute

Most times using images on own server.

Here's an example of adding an image which resides in the images directory

```

```

Here's how to add an image in the icons folder inside the images directory

```

```

Can also add images which are stored on other servers. E.g.

```

```

MUST include http:// and the website address:

```

```

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(e.g. the CSS Validator 'badge' of valid code ...)

Using the alt Attribute

Must provide brief description of image using **alt** attribute.

Used by screen readers, it is visible to browsers who have images turned off, and useful for mobile devices with small screens.

For example:

```

```

Image as link (clickable image)

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Image as clickable link

To make an image a link, just wrap an anchor element around it (the `<a>` element)

E.g.:

```
<a href="index.html"></a>
```

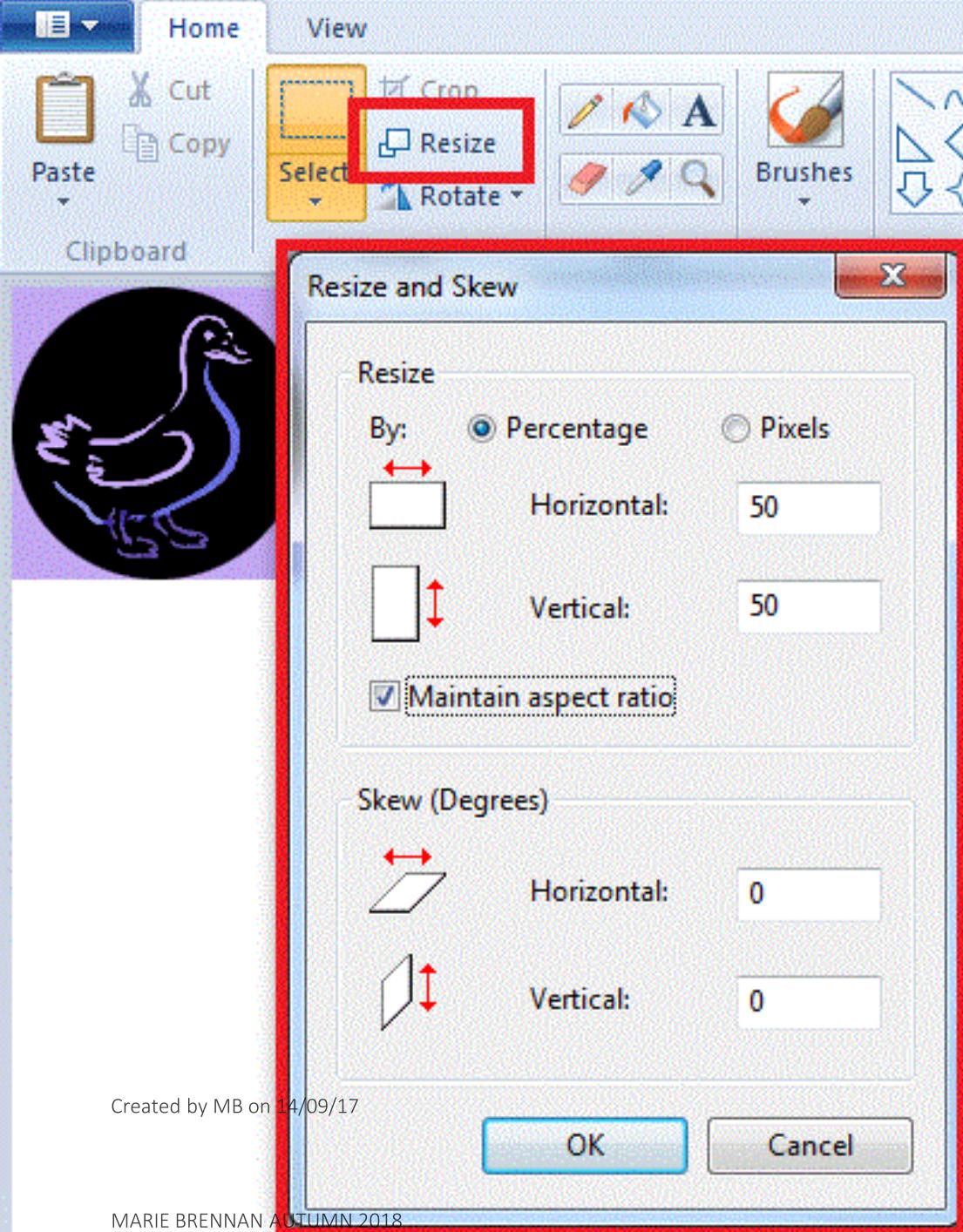
NOTE: avoid any SPACES between these symbols: `><`
otherwise you may see odd underscores on either side of the image
(any newline or tab or space between end of one tag and beginning
of next tag will count as an item of ‘whitespace’)

```
<a href="index.html"></a>
```

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Image editing – skill 2 – change dimensions
(e.g. 800 x 600 to become 400 x 300



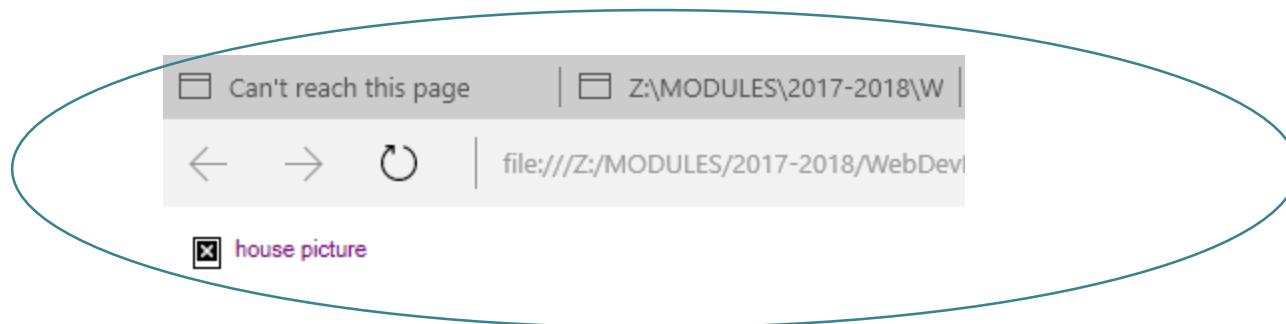
Converting image size in
MS Paint or other tool on
mac or windows

When alt attribute may be left empty

If image purely decorative (not add anything meaningful to text content) then may use an empty **alt** attribute.

```

```



BUT for this Web Dev module ALWAYS add meaningful description in alt for EVERY image ...

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Optional attributes: Indicating Width and Height

Width and height attributes of img element used to indicate width and height of image in pixels

If browser has this information it can load page much quicker in many situations.

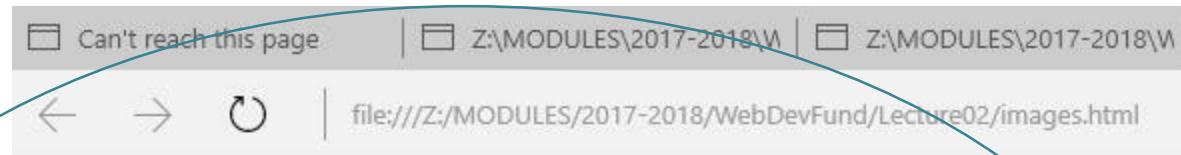
Important that width and height values provided match exact dimensions of image

- If they differ, browser will resize the image, usually causing distortion (stretching)

```

```

We will be using the css to format images in this module..more on css later in the course



.....We will be using css to change the height and width going forward

Summary / Conclusions ...

Only 3 image formats for the web

GIF, JPEG (JPG), PNG

Display images using element

‘src’ attribute URL to indicate location and name of image to display

Can ‘wrap’ link element <a> around an image

And so make image a ‘clickable’ image link to another page/resource

Thank You

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