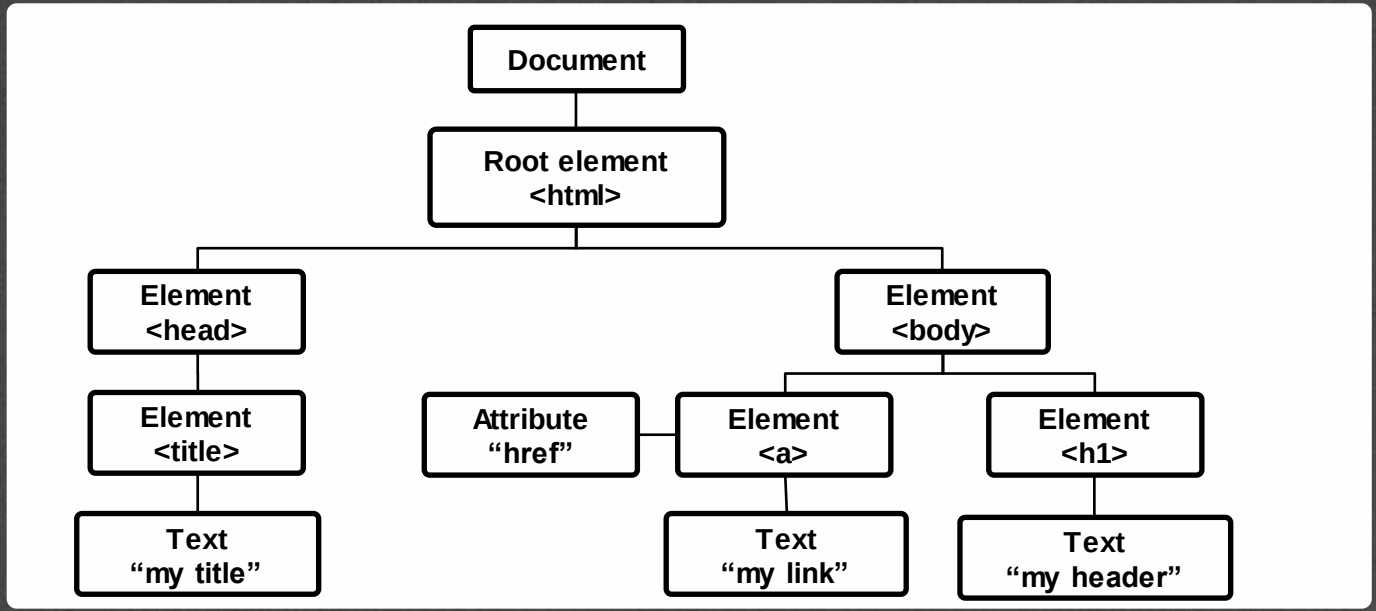
Document Object Model

Writing clean code

The Document Object Model (DOM)

- Basis of HTML5 is "*New features should be based on HTML, CSS, the DOM, and JavaScript…*"
- DOM provides common tree-like structure that all pages should follow
- Computer Scientists love trees (the mathematical kind) because you can test them.

HTML is built on the DOM



Adapted from w3Schools.com

Three parts of a well-formed document

- Doctype
  - Version of HTML that you will be using
- Head
  - Metadata
- Body
  - Displayable content

Doctype

- HTML5
  - <!DOCTYPE html>
- Previous versions dictated backwards compatibility
  - <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN" "http://www.w3.org/TR/html4/strict.dtd">
  - <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org/TR/html4/loose.dtd">

Head

- Additional information used by the browser
  - Meta data – language, title
  - Supporting files – JavaScript, Styling, Add-ons

- Other than title, meta-data is not displayed

Body

- Bulk of your page
- Important to write well-formatted (tree-like) code.
- Most of the content is displayed by the browser, but there may be some meta data too

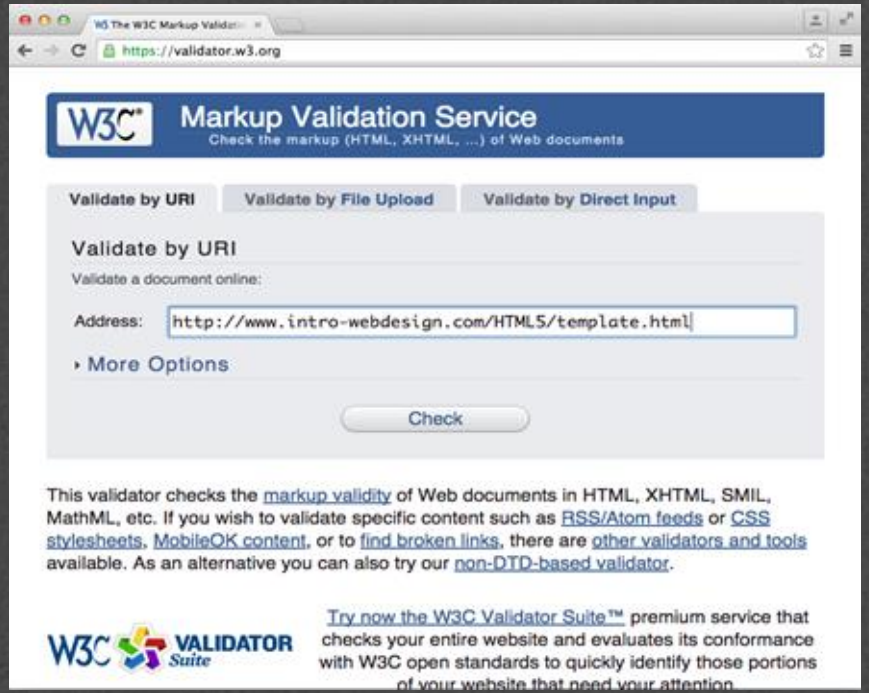
Example

Example: template.html

```
<!DOCTYPE html>
<html lang="en">
<head>
        <meta charset="UTF-8">
        <title>My First Page</title>
</head>
<body>
        This should be displayed by the browser.
</head>
</html>
```


My First Page
www.intro-webdesign.com/HTML5/template.html
This should be displayed by the browser.

Validate the Code



Success!!

This document was successfully checked as HTML5!

Result:	Passed, 2 warning(s)	
Address :	http://www.intro-webdesign.com/HTML5/template.htm	
Encoding :	utf-8	(detect automatically)
Doctype :	HTML5	(detect automatically)
Root Element:	html	

Review

- Well-formed pages use the DOM structure
  - Use beginning and end tags
  - Close inner tags before outer ones
  - Use valid attributes

- Browsers will "fix" bad code, but not always well. Use a validator to check your code

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HTML5 Tags and Syntax

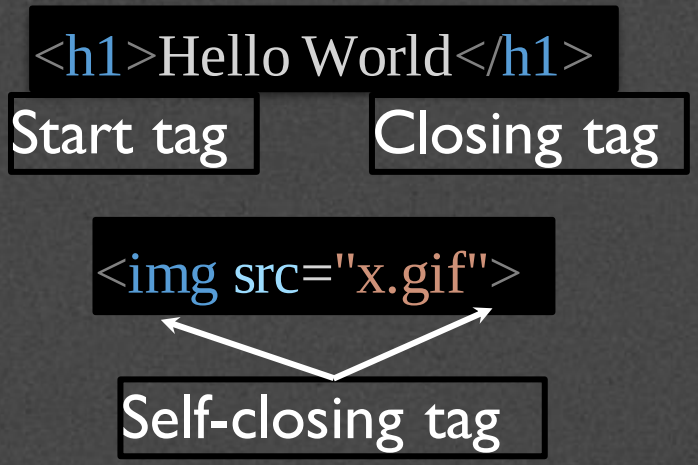
My first big disappointment to you

HTML tags

- I can't teach you all of the tags
- I can't teach you all of the tags
- You don't want me to teach you all of the tags

Finally, some tags…

- Tags have a beginning and an end
- Some tags have *attributes* (src, href, etc..)



Display

- One of the most important attributes of an element is its display. The two most common are *block* and *inline*
  - block (can take width and height)
    - Newline is inserted before and after, e.g. it "Takes up" whole width
  - inline (can not take width and height)
    - Only uses as much space as needed to contain the element.

Common Tags

- Headings (block)
  - <h1>, <h2>, <h3>, <h4>, <h5>, <h6>
  - These tags have syntax and semantics
- Paragraphs (block)
  - ….
  - Should only contain inline elements
- Divs (block)
  - ...
  - Generic section that is larger than a paragraph

More tags

- **Ordered lists**

```
<ol>
  <li> Item One </li>
  <li> Item Two </li>
</ol>
```

- **Unordered lists**

```
<ul>
  <li> Item One </li>
  <li> Item Two </li>
</ul>
```

- **Line breaks**

```
<br>
```

Attributes

- Attributes provide additional information about an element
- Always specified in the start tag
- Attributes come in name/value pairs

Images

- **Images (inline)**

```
<img src = "myPicture.jpg" alt = "Image of Colleen">
```

- **Images rarely work the first time**
    - **Show a broken link, too big, too small, etc.**
- **Save yourself heartache and size/carefully name your picture before you use it.**

Images

```
<img src="logo.jpg"
     alt="company logo"
     title = "AAA1 LLC"
     class = "thumbnail">
```

Image filename

Info for screen readers, broken links

Displays on hover

Extra formatting (height, width, position, etc.)

More Attributes

- As you learn the tags, you learn their specific attributes. Some apply to any tag
  - class – applies special properties to groups of elements
  - id – specifies a unique id to one element on the page
  - style – specifies a certain visual style (avoid this one!!!)
  - accesskey – a shortcut key to activate an element
  - tabindex – the order elements will come into focus using the tab key.

Special Entities

- Tags always start with a bracket (<)
- What if you want the browser to display a bracket, not start a tag?

Special Entities

If you want….	Then use…
<	<
>	>
©	©
blank space	
¢	¢
&	&

Review

- How do you know the difference between a tag and an attribute?
- What symbol ends a self-closing tag?

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Semantic HTML5 Tags

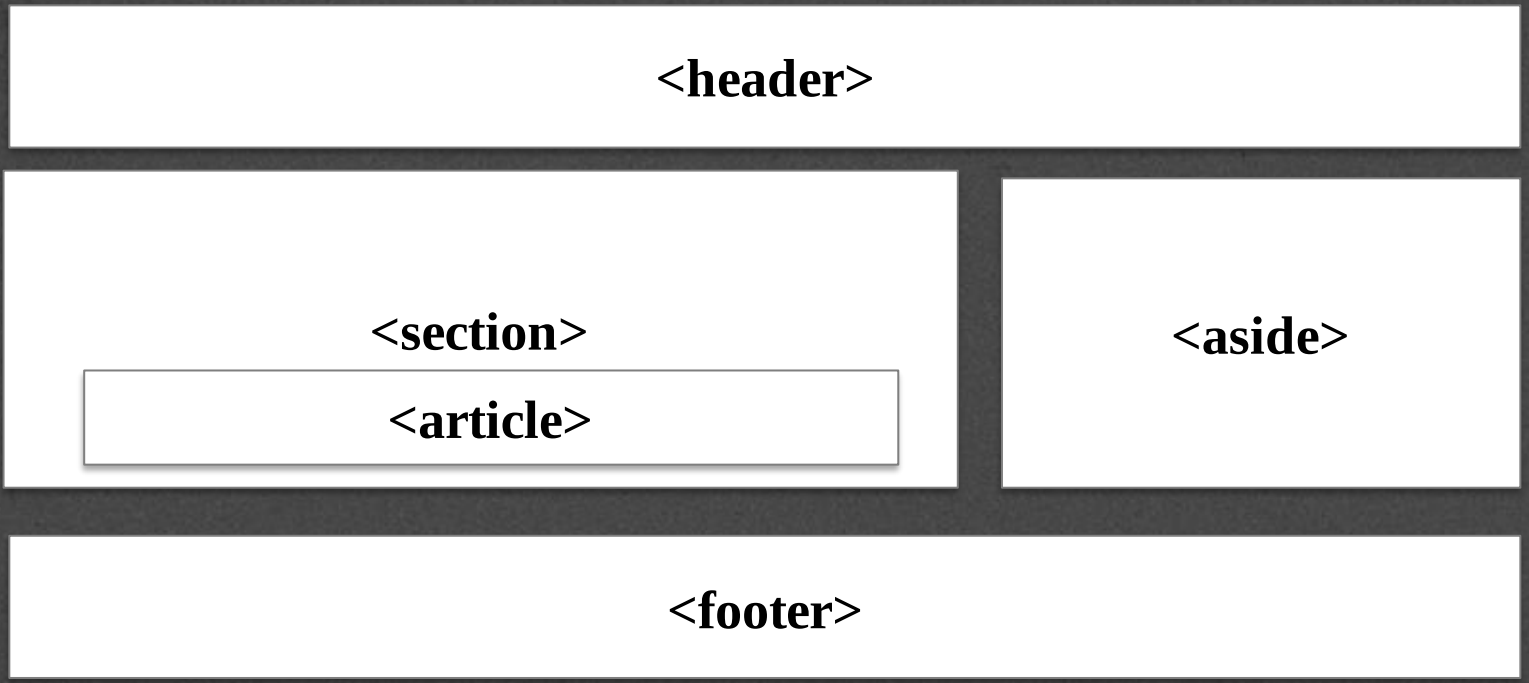
Making the most of the new tags

How to Design

- The most important step in web design is the *design*.

- You need a clear picture of what you want to create, before you can begin coding.

How to Design



Using Semantic Tags

- In the beginning (insert dramatic music of your choice…) there was div
- was a way to group related content together
- Divs almost always had special classes/ids associated with them

```
<div class = “header”>…</div>
<div class = “section”>…</div>
<div class = “footer”>…</div>
```

<header>

- A group of introductory or navigational aids: title, navigation links, etc.

```
<header>
    <h1>This is the Title</h1>
    <h2>The author is Colleen</h2>
</header>
```

- Not to be confused with <head> or the different headings.

<nav>

- A section of the page that links to other pages or to parts within the page.

```
<nav>
        <ul>
                <li><a href="#overview">Overview</a></li>
                <li><a href="#history">History</a></li>
                <li><a href="#development">Development</a></li>
        </ul>
</nav>
```

- Often found in the <header> tag

<footer>

- A section that contains info such as copyright data, related documents, and links to social media

```
<footer>
        &copy; 2015 by Colleen van Lent<br>
        <a href= "http://www.intro-webdesign.com/HTML5">Introduction to
    HTML5 </a>
</footer>
```

- Typically at the bottom of the page, but not required.

<figure>

- More semantics than <img>. Can include:
  - caption
  - multiple multimedia resources

```
<figure>
        <img src="sunset.gif" alt="Ashtabula sunset">
        <figcaption>
                A sunset over Lake Erie. Taken in Ashtabula Ohio.
        </figcaption>
</figure>
```

Other New Tags

- Structural Elements
  - article, aside, main, menuitem, summary, section
- Form Elements
  - datalist, keygen, output
- Input Types
  - color, date, email, list
- Graphics Elements
  - canvas, svg
- Media Elements
  - audio, embed, source, track, video

Review

- The age of is ending

- Semantic tags help guide users to information in your page

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Template Page

Create something in Visual Studio Code!!

Minimum requirements

- Create a page called index.html
- Page should utilize header, main, and footer elements. These elements should NOT be empty
- Make sure the page validates!

Start with a Shell

- Doctype
- Meta-Data
- Displayable content

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Images

How to add images to your page

Images – its more than the tag

- Many file types are widely supported
  - JPEG (.jpg and .jpeg), GIF, and PNG
  - SVG and BMP are additional options
  - File extensions must be included
- Every image must be downloaded, so size can be a factor
- Every image requires an HTTP Request

Image Sizes

- When you link to an image the browser displays the image as big (or small) as the file.
    - This size is rarely optimal
- "Quick" solutions – change file, use width/height attributes

Using an Editor

- Editors can be used to *permanently* change the size of the image
  - Only works on local files
- Built-in software for this includes Preview (Mac) and Paint (Windows)

Using Attributes

- Always strive to keep style out of your HTML files but…
  - Some style may improve accessibility
  - <img> tag includes width and height attributes

Default Image Size

```
<figure>
        <img src="imgs/Ashtabula.jpg" alt="My
house">
        <figcaption> Default image size</figcaption>
</figure>
```

Using Width in Pixels

```
<figure>
        <img src="imgs/Ashtabula.jpg"
    width="500px"  alt="My house">
        <figcaption>Set image size</figcaption>
</figure>
```

Using Width and Height

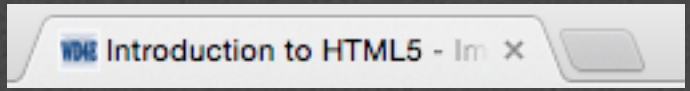
```
<figure>
        <img src="imgs/Ashtabula.jpg"
    width="500px"  height="100px"
    alt="My house">
        <figcaption>Skewed image size</figcaption>
</figure>
```

Using Percentages

```
<figure>
        <img src="imgs/Ashtabula.jpg"
    width="50%"  alt="My house">
        <figcaption>Relative image size</figcaption>
</figure>
```

Favicons

- You can put image/logo/icon next to the title of your page (in the tab)



- Must go in <head> section

```
<link rel ="icon" type = "image/png"  href="imgs/wd4elogo.png">
```

Alternative Text Attribute

- Provides a textual alternative to non-text content
- Read by screen readers
- Displayed in place of images
- Provides semantic meaning for search engines

Review

- Misuse of file extensions, filename, and file paths are often a problem
- For now, style the height/width in the html code.

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Accessible Images

Making your images accessible and inclusive

Alternative Text Attribute

- Provides a textual alternative to non-text content
- Read by screen readers
- Displayed in place of images
- Provides semantic meaning for search engines

Creating Good alt text

- Be accurate
- Be succinct
- Don’t be redundant
- Don’t include “picture of..”, “graphic of ..”

Empty alt text

- It is okay to leave alt text empty (null)
  - Decorative images used for non-informative purpose

- Do not skip the alt attribute though!

Long alt text

- Some images (especially infographics) may require elaborate alt text

- Consider replacing alt text with link to separate page with full explanation

Finding Usable Images

- Where can you find images for your site
  - Personal images
  - Images from image-sharing sites
  - Images with creative commons usage
  - Icons

Emojis and Icons

- A description of an emoji will be read by a screen reader, but not for an icon.
- Since icons are not images, they can't use the alt attribute.
- Instead, icons can use an aria-label attribute

```
<i class="fa-brands  fa-pinterest"></i>

<i class="fa-brands  fa-pinterest"  aria-label="Pinterest"></i>
```

Images for Impact

- Don’t constrain yourself to the most common images
  - Include images of food from different cultures, athletes in adaptive sports, people of different body types.

- Using diverse images has the ability to draw more people to your site.

Tips

- Utilize guidelines: alt Decision Tree | Web Accessibility Initiative (WAI) | W3C
- Add aria-labels when you can't add alt text
- Avoid excessive emojis
- Diversify your images

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Hyperlinks

Creating a linked document

Links

- Links are what make the Web a web.
- The interlinked nature of the web leads to the "knowledge" that search engines appear to have.

Anchor links

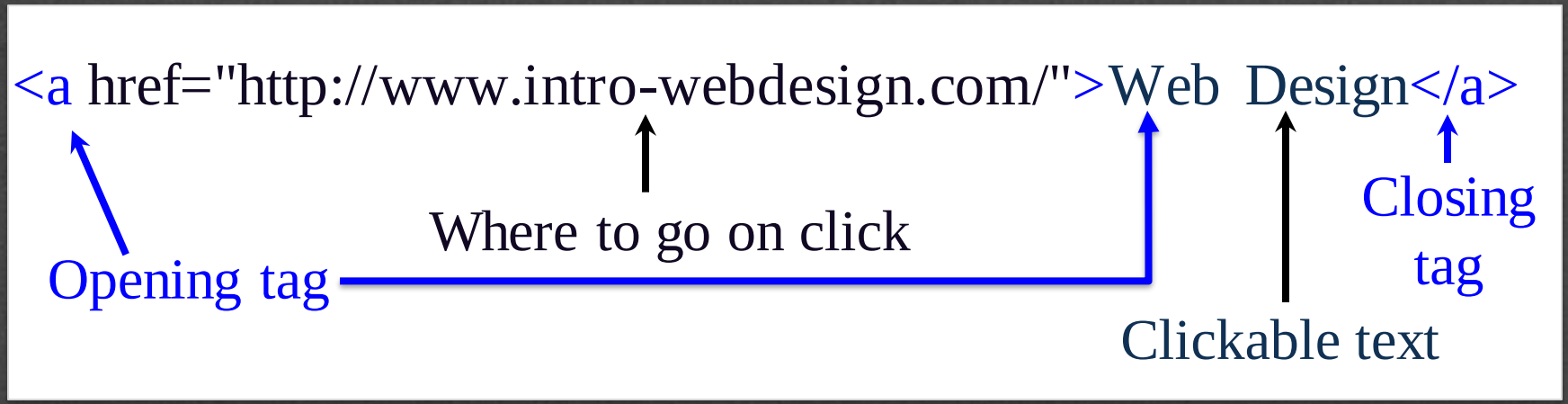
- The <a> tag stands for *anchor link*
- Needs a hyper-reference AND content
  - **href**: reference to location of new content
  - content: the "clickable" part (text or image)

```
<a href = "http://www.umich.edu">University of Michigan</a>
```

Types of links

- Absolute
- Relative
- Internal
- Graphical

Absolute reference



Relative References

```
<a href = "page2.html">Second Page</a>
```

Link to a local file in the same folder

```
<a href = "docs/page2.html">Second Page</a>
```

Link to a local file in a different folder called “docs”

```
<a href = "#history">History section</a>
```

Link to a different location in the same file

Absolute vs Relative

- When would you use absolute links?
- Are there any benefits to using local links?
- Your links should NEVER have folders that are specific to your computer

C:\page2.html

Using Images as the Link

- The “clickable” component doesn’t have to be text.

```
<a href = "http://www.redcross.org">
   <img src = "imgs/redcross-logo.png"  alt = "Red Cross logo"></a>
```

```
<a href = "http://www.redcross.org">
  <img src = "http://www.redcross.org/images/redcross-logo.png”
  alt = "Red Cross logo"> </a>
```

Usability Issues

- Make sure the clickable component has an informative name
- Information in the images should be available to those who can't see the image

Targets

- Anchors can take a target attribute
  - _self - default action
  - _blank – open in new tab or window
  - _top and _parent

Review

- A page without links is rare
- Links can be absolute, relative and internal
- Use caution when using images in links

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Useful Tags

Tags for blocks of code and simple snippets

Choosing Your tags

- **Generic:** <p>,
- **Semantic:** <header>, <nav>, <footer>, <figure>

Block Tags

- Containers
  - <article>, <aside>, <section>, <main>, …
- <hr>
- <address>
- <blockquote> - has cite attribute
- <details> with <summary>

Inline tags

- was the original inline tag for plain text
- <cite>
- <abbr
- <time>
- <code>
- <sub> and <sup>

Tags that need "more"

- <button>
- <meter>
- <progress>
- <iframe> – often used to embed documents
- <bdo> attribute dir (ltr or rtl)
- <map> with <area> -- creates "clickable element in image" but needs JavaScript

Review

- Use the most specific tag possible
- Sometimes tags “don’t work”
  - Run your code through a validator, you may have a syntax error
  - Run your code in multiple browsers (good idea even if your code looks good)

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