

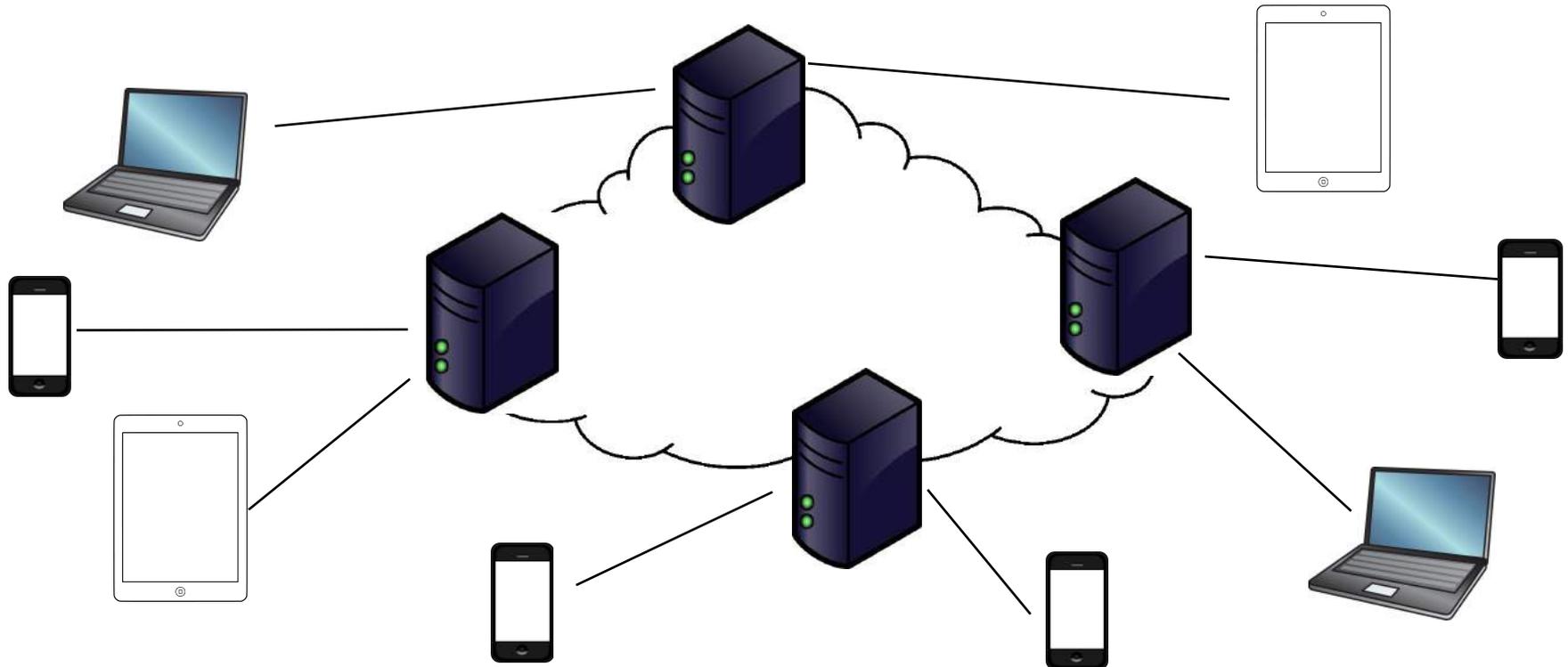


Video 1.1

Chris Murphy

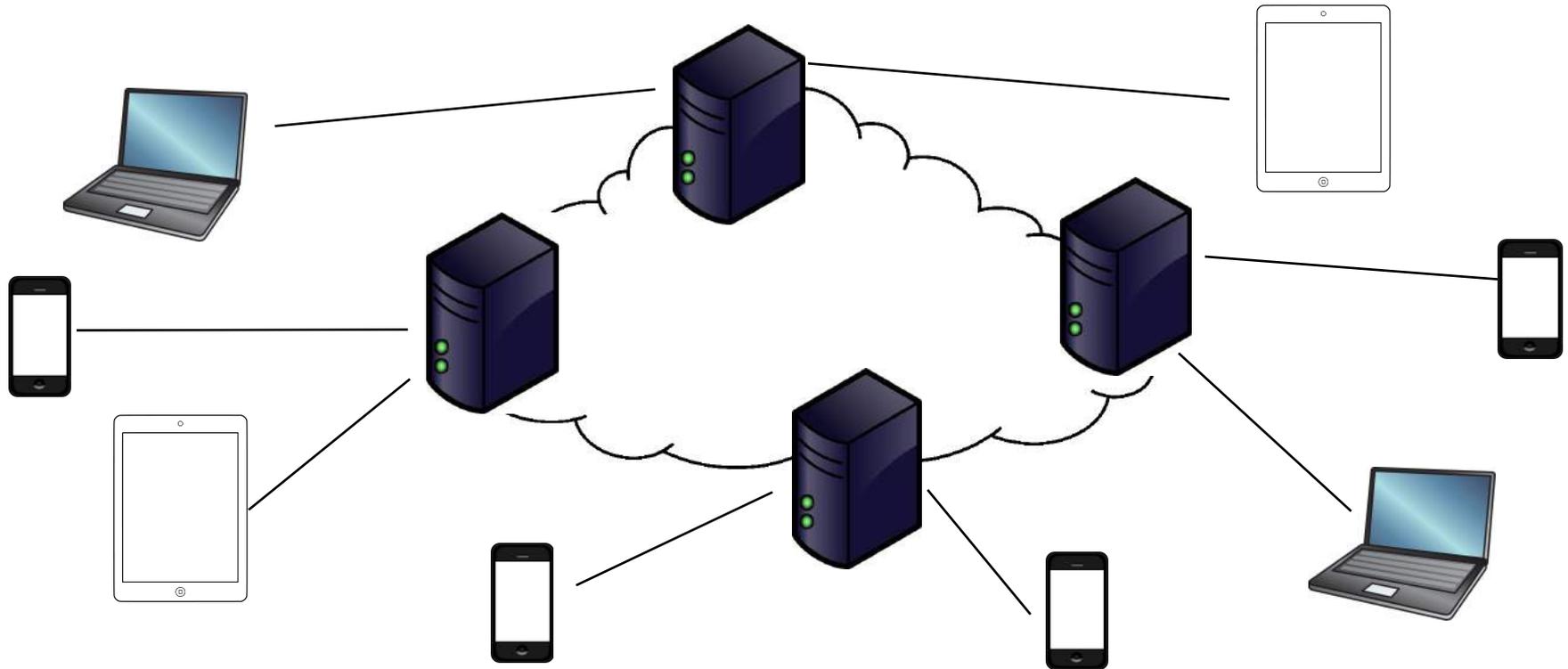
What is the Internet?

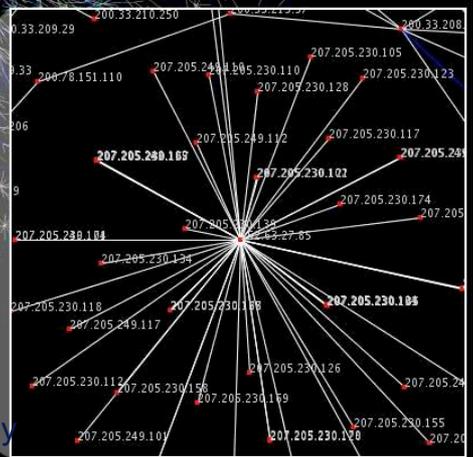
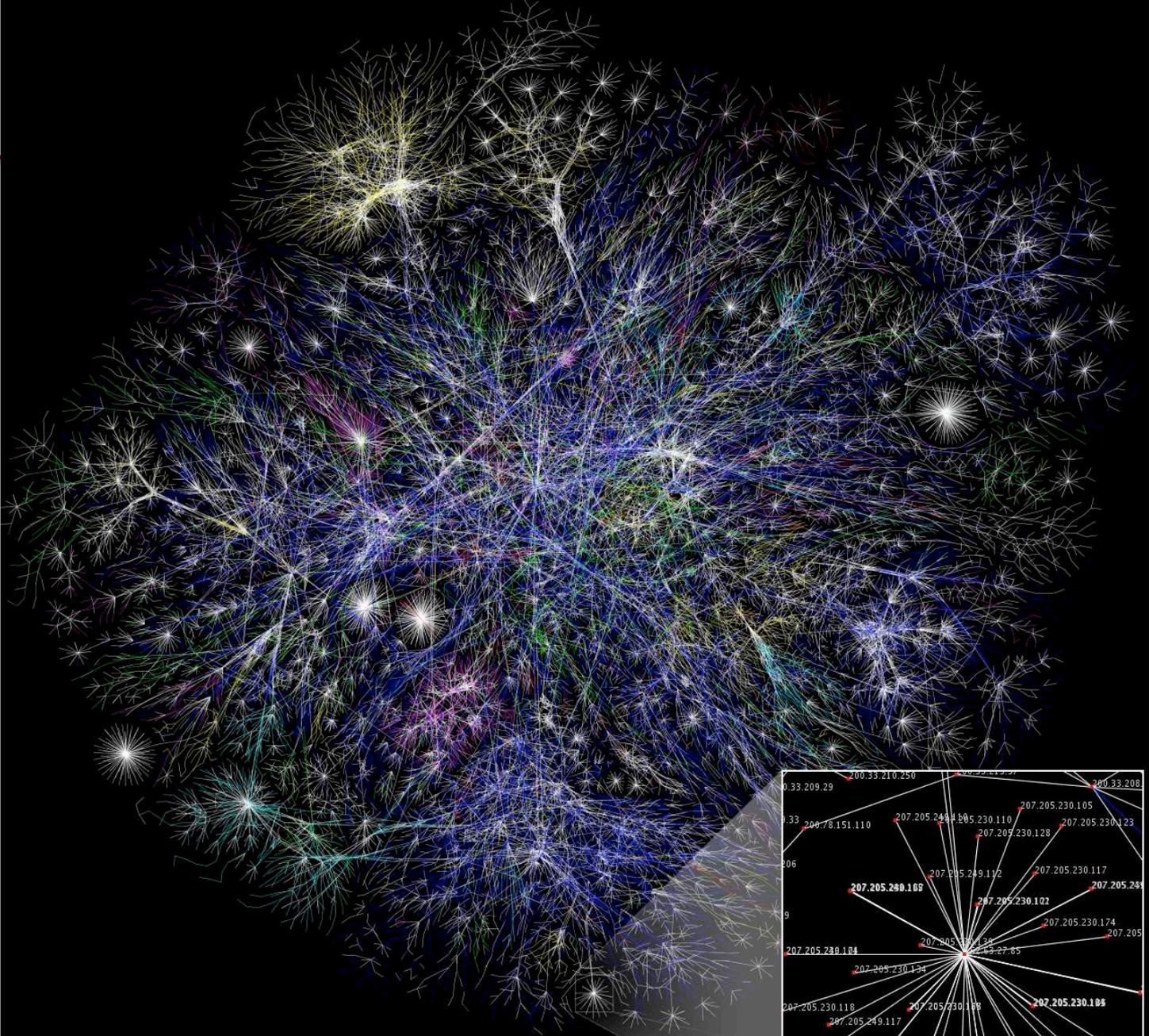
- **Internet** – network of machines (servers, clients, routers, switches, etc.) connected by media (fiber, wifi, etc.) that allows communication among devices



The Internet

- We can think of the Internet as a graph:
 - Nodes represent devices and information
 - Edges represent a connection (physical or virtual)





World Wide Web == Internet?

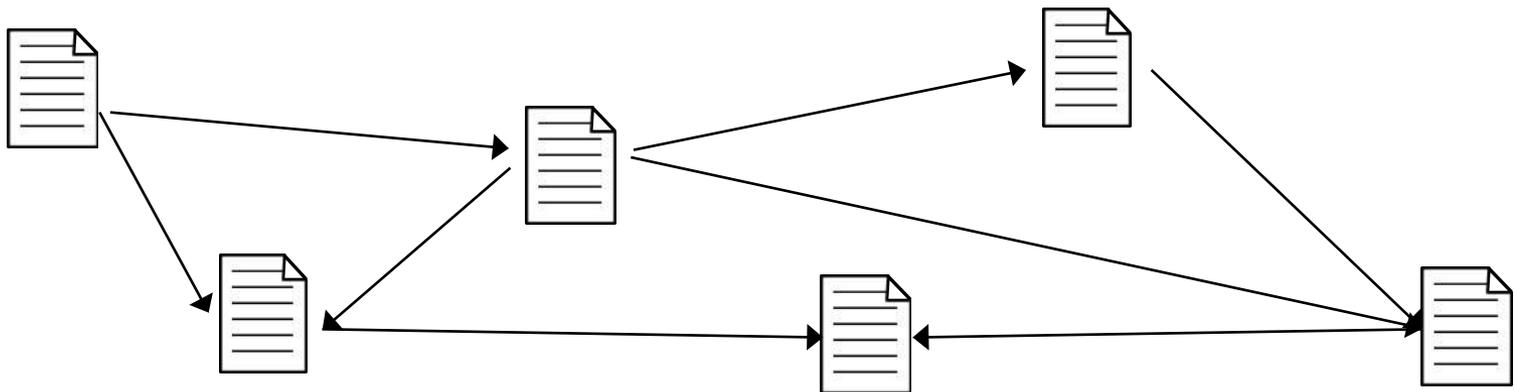
- **No!** They're not the same!
- The World Wide Web is an **application** that operates **over the Internet**
 - Internet provides infrastructure
 - World Wide Web utilizes the infrastructure to run an application on which users connect and exchange data
- Other applications use the Internet as well, e.g email

What is the World Wide Web?

- **World Wide Web (WWW)** – an application on the Internet that combines many protocols to allow for communication and transfer of data between machines
- Web is composed of documents that are logically **linked** to each other
- Originally designed to:
 - Provide easy access to documents for anyone
 - Provide way in which users can discover documents through a **browser**

The World Wide Web

- Web follows similar network structure as the Internet
- Web pages link to other web pages, thus forming a graph where:
 - Nodes represent an individual document/resource
 - Edges represent a link from one document/resource to another (directed edges)



Web Page Addresses

- **Uniform Resource Identifier (URI)** – alphanumeric string of characters used to uniquely identify a web page or resource
- **Uniform Resource Locator (URL)**: type of URI that specifies the location on the WWW and the mechanism (protocol) for retrieving it

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<http://www.example.com/home/index.html?a=12&b=34>

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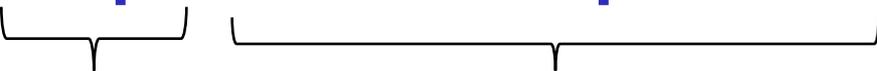


Protocol

Web Page Addresses

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Protocol

Host Name

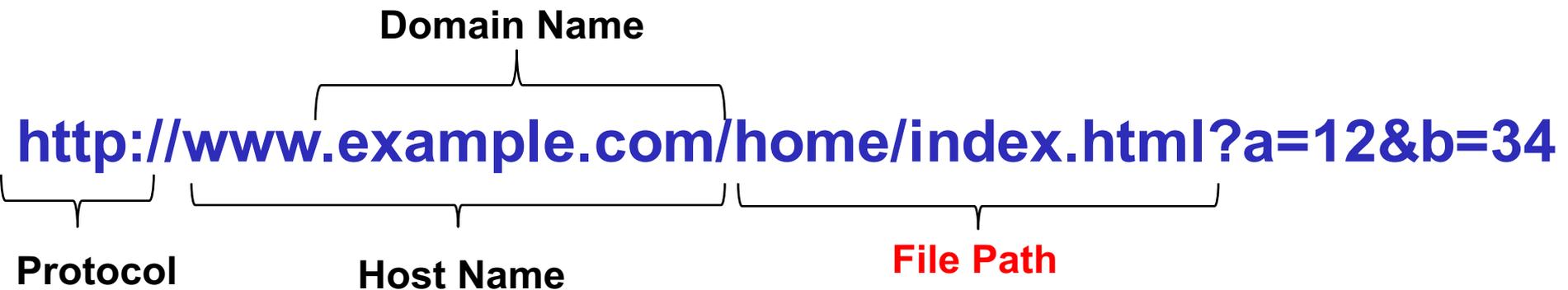
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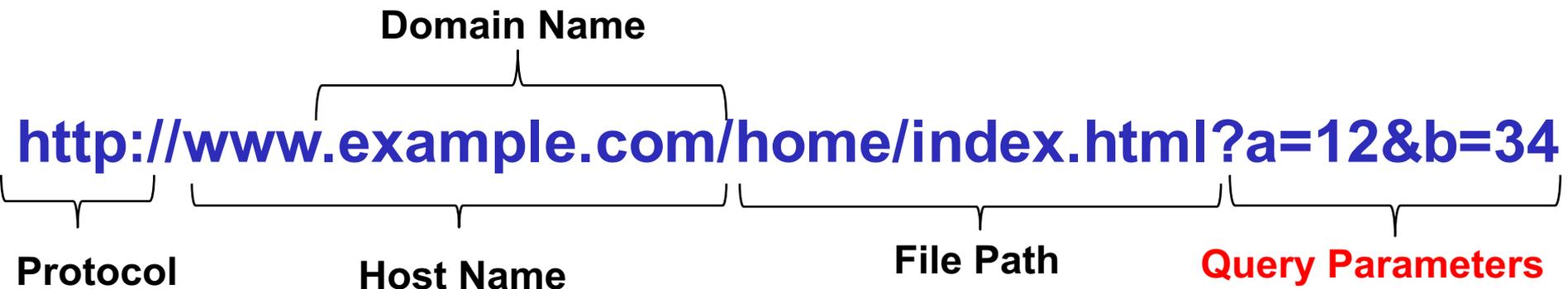
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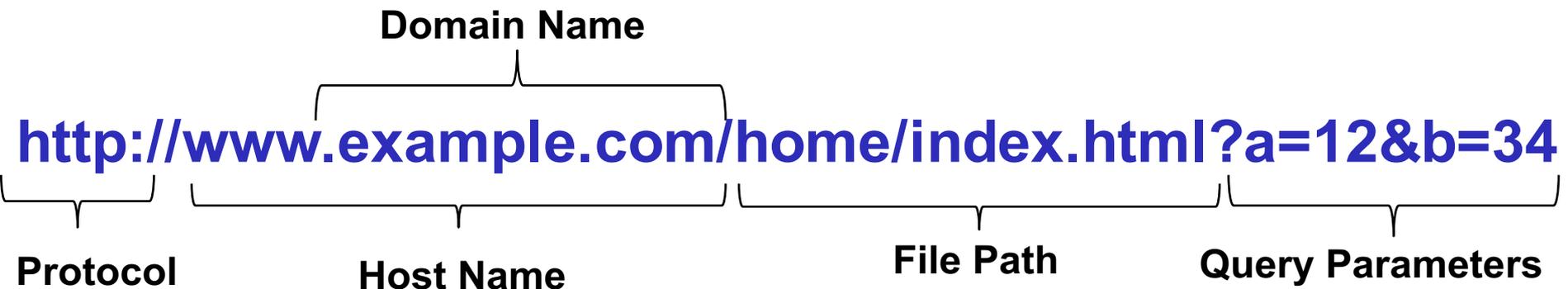
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Content on the World Wide Web

- **Static:** same for all users and at all times
 - Appearance may vary based on specific browser, but content itself is the same
 - Technologies: HTML, CSS
- **Dynamic:** programmatically generated depending on the user, context, configuration, arguments, etc.
 - Technologies: JavaScript

Looking Ahead

- How does a browser request a web page or resource?
 - what does it send?
 - what does it receive?
- Once the content is received, how does a browser display it?
- Later: how can you write programs to generate dynamic content in the browser?



Video 1.2

Chris Murphy

Review

- The **Internet** is a physical network of devices
- The **World Wide Web** is an application that utilizes the Internet to allow for accessing data
- Resources on the Web have unique **URLs** that include the protocol, host name, and file/resource name

#<<<>>>
#copyright

Your continued donations keep Wikipedia running!

Lynx (web browser)

From Wikipedia, the free encyclopedia

Jump to: [navigation](#), [search](#)

CAPTION: Lynx

Wikipedia Main Page displayed in Lynx

Wikipedia Main Page displayed in Lynx

Maintainer: Thomas Dickey
Stable release: 2.8.5 (February 4, 2004) [\[\[+/-\]\]](#)
Preview release: 2.8.6 (?) [\[\[+/-\]\]](#)
OS: Cross-platform
Use: web browser
License: GPL
Website: lynx.isc.org

Lynx is a text-only Web browser and Internet Gopher client for use on cursor-addressable, character cell terminals.

Browsing in Lynx consists of highlighting the chosen link using cursor keys, or having all links on a page numbered and entering the chosen link's number. Current versions support SSL and many HTML features. Tables are linearized (scrunched together one cell after another without tabular structure), while frames are identified by name and can be explored as if they were separate pages.

Lynx is a product of the Distributed Computing Group within Academic Computing Services of the University of Kansas, and was initially developed in 1992 by a team of students at the university (Lou Montulli, Michael Grobe and Charles Rezac) as a hypertext browser used solely to distribute campus information as part of a Campus-Wide Information Server. In 1993 Montulli added an Internet interface and released a new version (2.0) of the browser [\[1\]](#) [\[2\]](#) [\[3\]](#).

Stylesheet

- Local Files
- www.czilla.cz
- www.dog.cz
- www.google.cz
- www.opera.cz
- www.seznam.cz

Spící Andík 3

Spící 1



Popular Browsers



What is a Web Browser?

- **Browser:** software that is used to access and display Web content, and to navigate across the Web

- **Main Components of the Browser**
 - Rendering Engine (HTML/CSS) – responsible for static content presentation, formatting, and layout
 - JavaScript Engine (JavaScript) – responsible for creating and modifying dynamic content and appearance

How Does a Web Browser Work?

- Browser and the World Wide Web utilize **Hypertext Transfer Protocol (HTTP)** to transfer documents

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Client

How Does a Web Browser Work?

- Browser and the World Wide Web utilize **Hypertext Transfer Protocol (HTTP)** to transfer documents



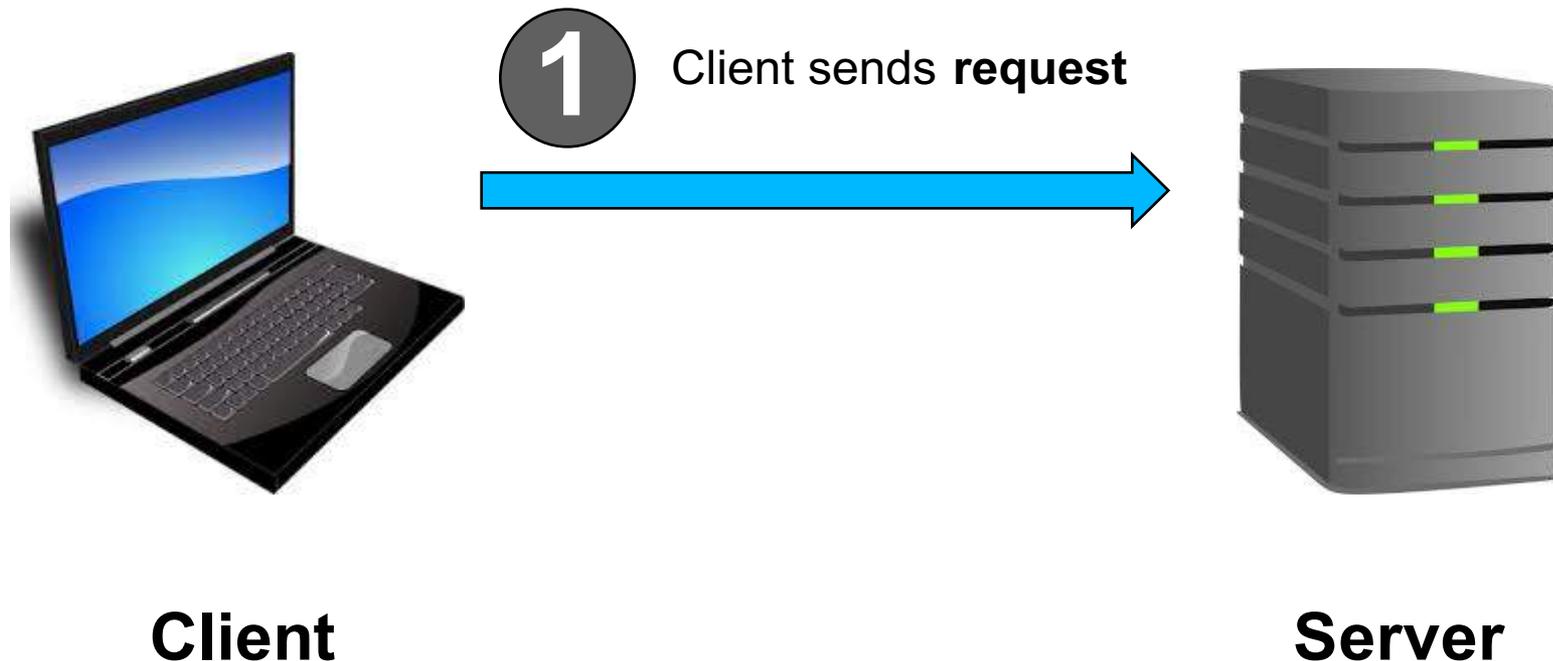
Client



Server

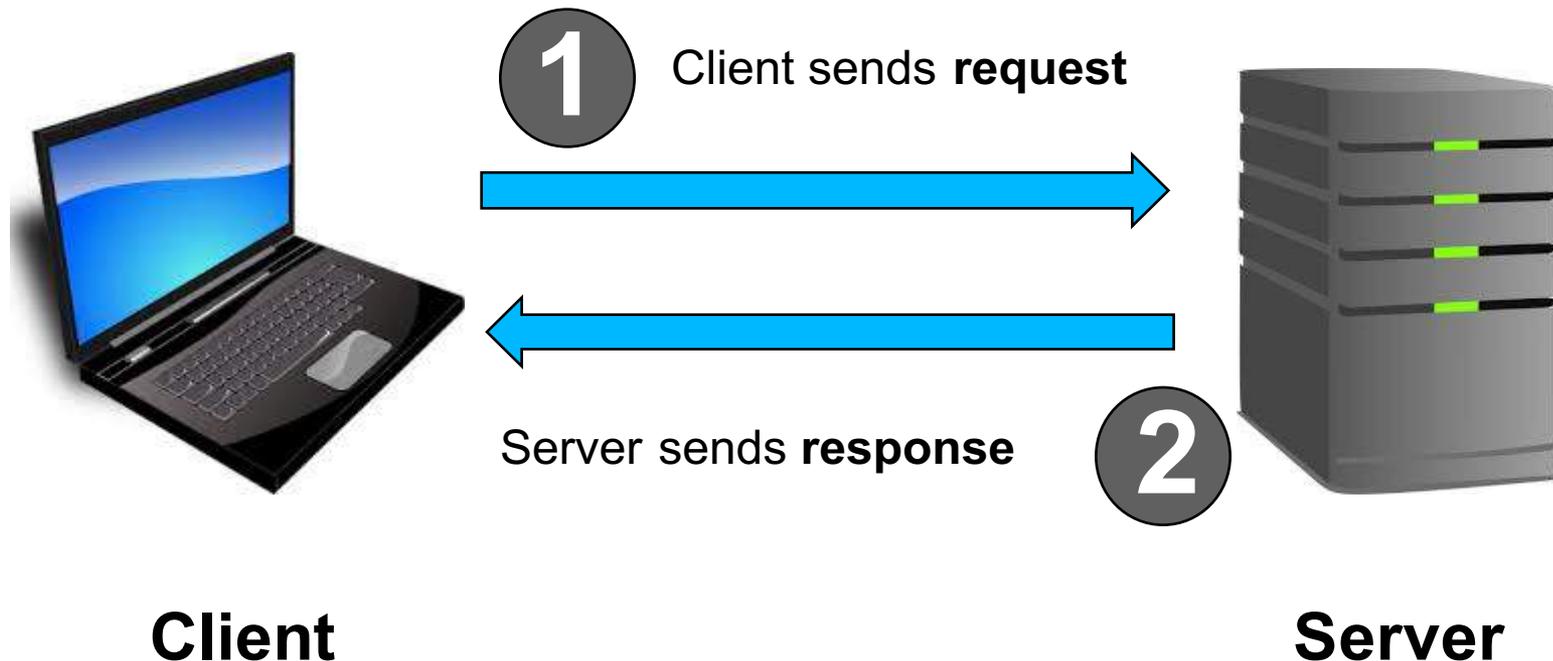
How Does a Web Browser Work?

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How Does a Web Browser Work?

- Browser and the World Wide Web utilize **Hypertext Transfer Protocol (HTTP)** to transfer documents



HTTP Overview

- HTTP is a plain-text, human-readable protocol used for exchanging data on the Web
- Initially developed by Tim Berners-Lee at CERN in 1989
- Based on client-server model:
 - Client sends **request** for resource, possibly including information about the client
 - Server sends **response**, including header (status information) and requested resource

```
josh@blackbox:~$ telnet en.wikipedia.org 80
Trying 208.80.152.2...
Connected to rr.pmtpa.wikimedia.org.
Escape character is '^]'.
GET /wiki/Main_Page http/1.1
Host: en.wikipedia.org
```

Request

```
HTTP/1.0 200 OK
Date: Thu, 03 Jul 2008 11:12:06 GMT
Server: Apache
X-Powered-By: PHP/5.2.5
Cache-Control: private, s-maxage=0, max-age=0, must-revalidate
Content-Language: en
Vary: Accept-Encoding, Cookie
X-Vary-Options: Accept-Encoding;list-contains=gzip, Cookie;string-contains=enwikiToken;string-contains=enwikiLoggedOut;string-contains=enwiki_session;
string-contains=centralauth_Token;string-contains=centralauth_Session;string-contains=centralauth_LoggedOut
Last-Modified: Thu, 03 Jul 2008 10:44:34 GMT
Content-Length: 54218
Content-Type: text/html; charset=utf-8
X-Cache: HIT from sq39.wikimedia.org
X-Cache-Lookup: HIT from sq39.wikimedia.org:3128
Age: 3
X-Cache: HIT from sq38.wikimedia.org
X-Cache-Lookup: HIT from sq38.wikimedia.org:80
Via: 1.0 sq39.wikimedia.org:3128 (squid/2.6.STABLE18), 1.0 sq38.wikimedia.org:80 (squid/2.6.STABLE18)
Connection: close
```

Response headers

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en" dir="ltr">
  <head>
    <meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
    <meta name="keywords" content="Main Page,1778,1844,1863,1938,1980 Summer Olympics,2008,2008 Guizhou riot,2008 Jerusal
...
... This content has been removed to save space
...
"Non-profit organization">nonprofit</a> <a href="http://en.wikipedia.org/wiki/Charitable_organization" title="Charitable organization">charity</a>.<b
r /></li>
    <li id="privacy"><a href="http://wikimediafoundation.org/wiki/Privacy_policy" title="wikimedia:Privacy policy">Privac
y policy</a></li>
    <li id="about"><a href="/wiki/Wikipedia:About" title="Wikipedia:About">About Wikipedia</a></li>
    <li id="disclaimer"><a href="/wiki/Wikipedia:General_disclaimer" title="Wikipedia:General disclaimer">Disclaimers</a>
</li>
  </ul>
</div>
</div>
<script type="text/javascript">if (window.runOnloadHook) runOnloadHook();</script>
<!-- Served by srv93 in 0.050 secs. --></body></html>
```

Response body

```
Connection closed by foreign host.
```

```
josh@blackbox:~$ █
```

Anatomy of an HTTP Request

- First line of request will always be a **verb** followed by an **argument**
 - **GET** – retrieve resource
 - **HEAD** – retrieve only headers (information about the resource)
 - **POST** – create resource (usually used in form submission context)
- Next comes the protocol (usually HTTP/1.1)
- Optionally include other information about the request and/or the client



1

Client sends **request**



HTTP Request Example

```
GET /examples/index.html HTTP/1.1
Host: www.edx.org
User-Agent: Mozilla/4.0
Accept-Language: en-us
Content-Length: 9

a=12&b=34
```

HTTP Request Example

```
GET /examples/index.html HTTP/1.1
Host: www.edx.org
User-Agent: Mozilla/4.0
Accept-Language: en-us
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a=12&b=34
```

→ Request Line

HTTP Request Example

Request Verb

```
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Request Line

HTTP Request Example

Request Verb

URI

```
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User-Agent: Mozilla/4.0
Accept-Language: en-us
Content-Length: 9

a=12&b=34
```

Request Line

HTTP Request Example

Request Verb

URI

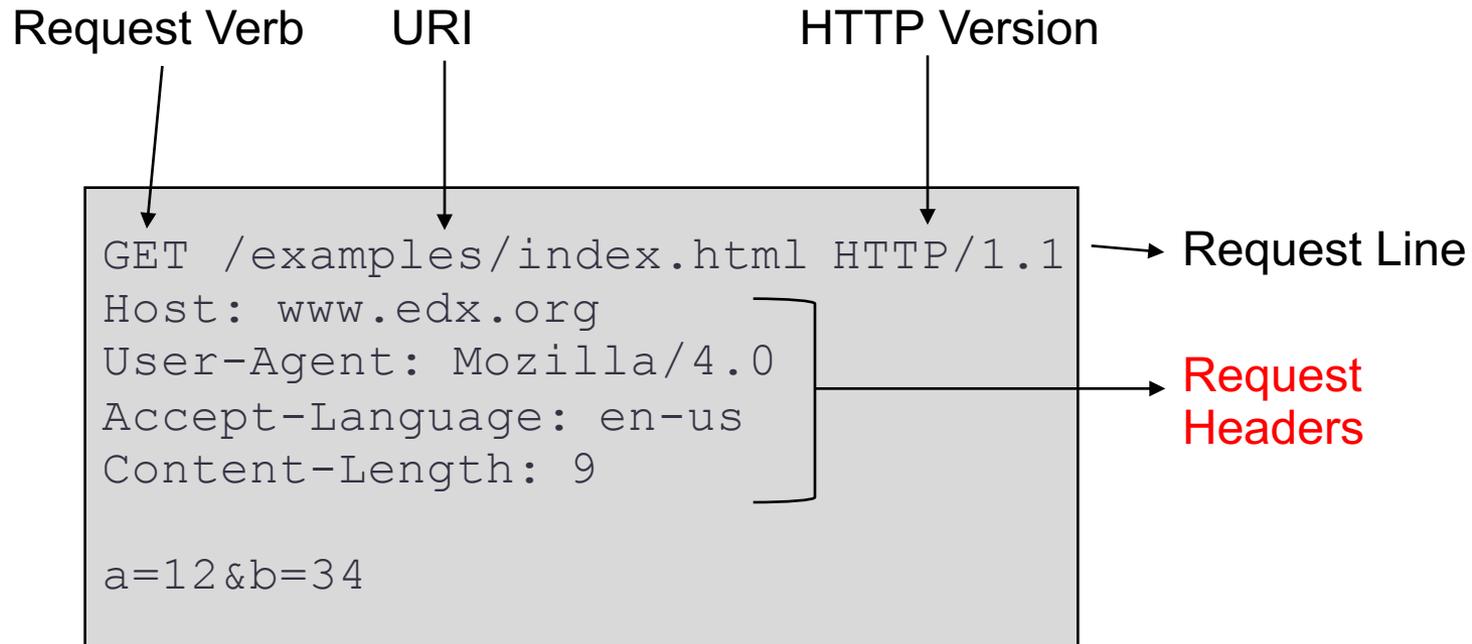
HTTP Version

```
GET /examples/index.html HTTP/1.1
Host: www.edx.org
User-Agent: Mozilla/4.0
Accept-Language: en-us
Content-Length: 9

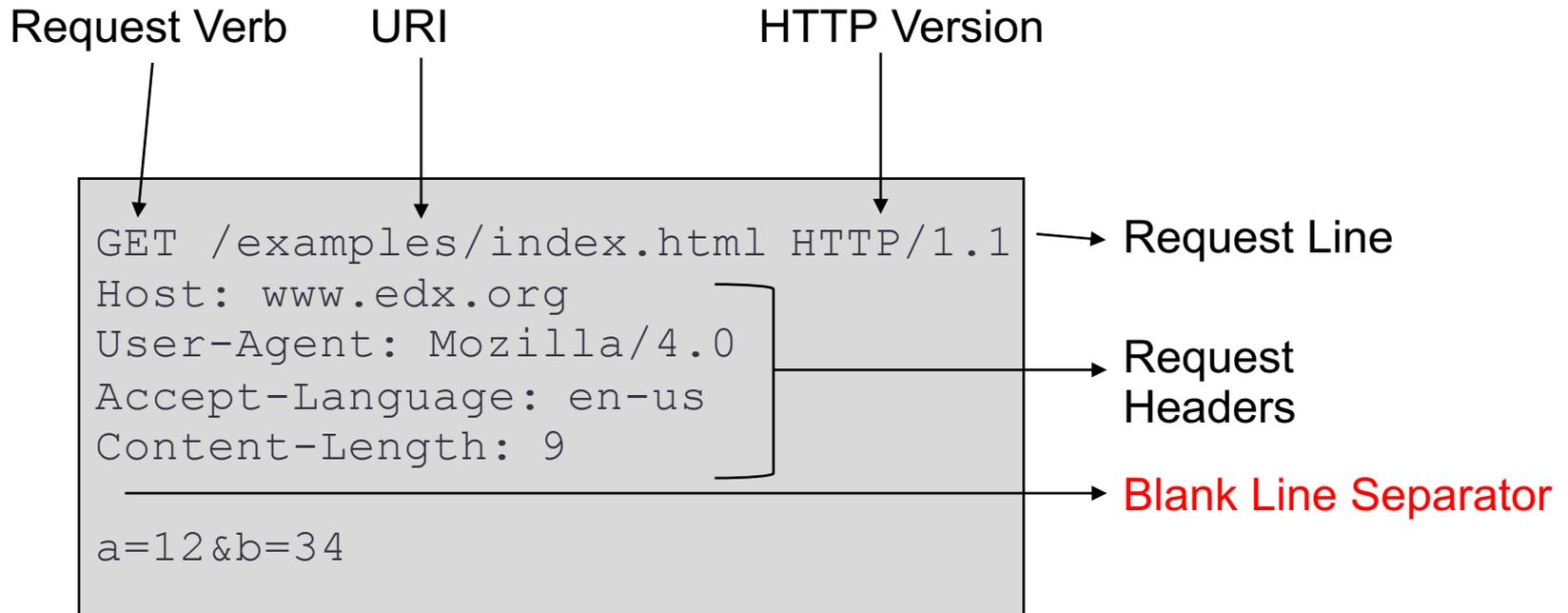
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Request Line

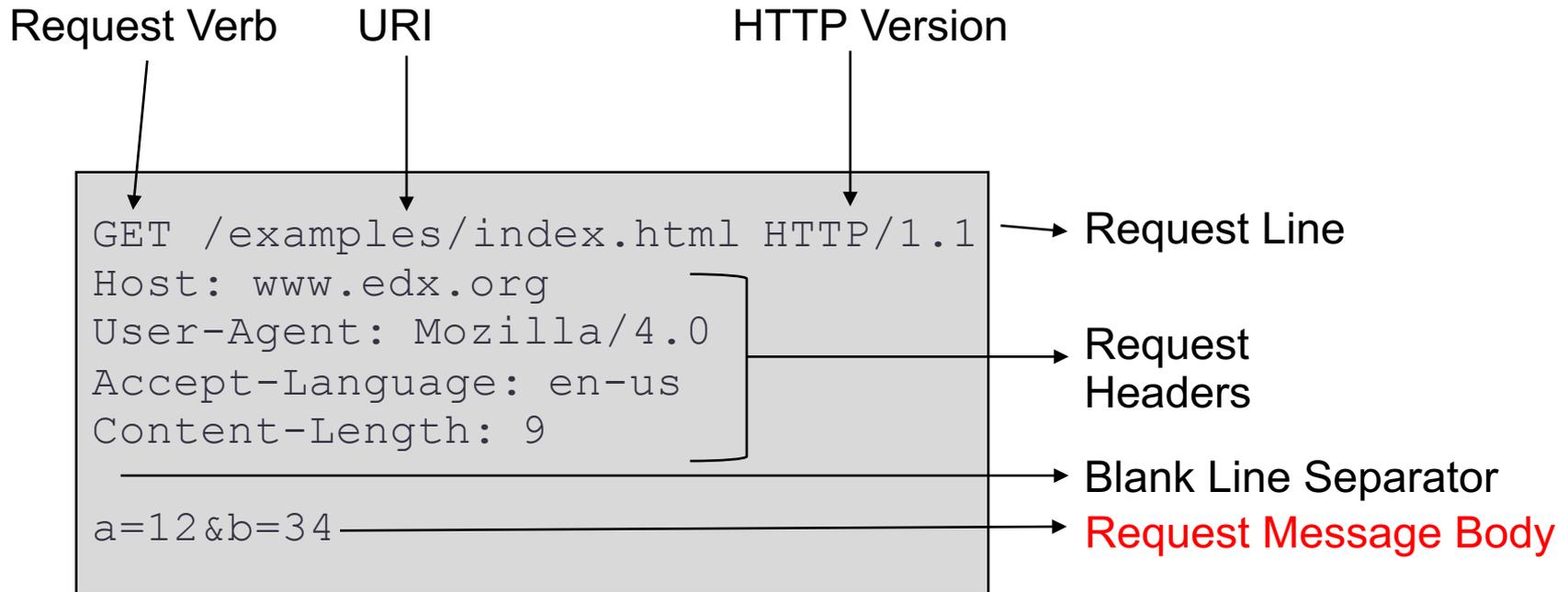
HTTP Request Example



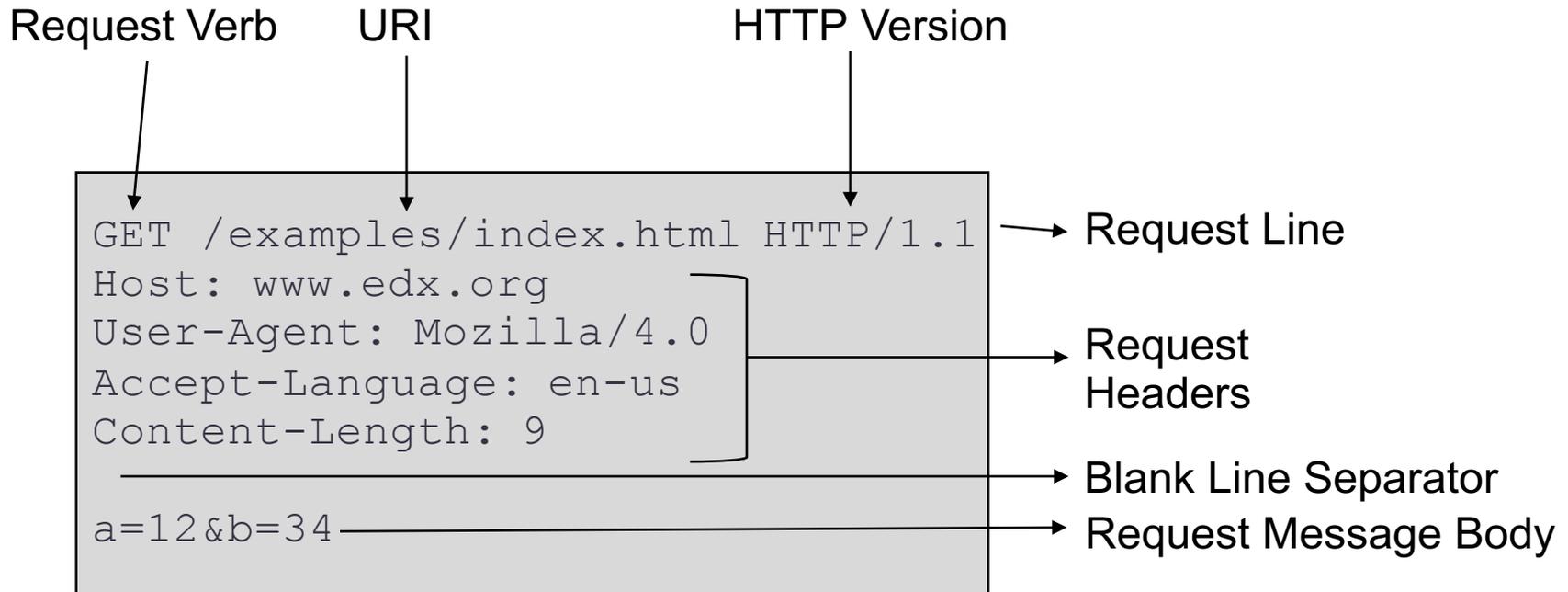
HTTP Request Example



HTTP Request Example



HTTP Request Example



Anatomy of an HTTP Response

- First line is always protocol and **status code**
 - 1XX – information only
 - 2XX – success
 - 3XX – client redirect
 - 4XX – client error
 - 5XX – server error



Server sends **response**

2



Most Common Status Codes

- **200 OK** – request succeeded, resulting resource (as stated in request) will be included in message body
- **404 Not Found** – requested resource does not exist
- **500 Server Error** – Error on the server side in processing request



Server sends **response**

2



Anatomy of an HTTP Response

- Following protocol and status code will be other **header information** regarding the response and/or the server
- Then a blank line
- Then the response body, i.e. the resource that was requested



Server sends **response**

2



HTTP Response Example

```
HTTP/1.1 200 OK
Date: Fri, 06 Apr xxxx 09:30:00 GMT
Server: Apache/1.4
Last-Modified: Wed, 04 Apr xxxx
Connection: close
Content-Type: text/html
Content-Length: 228

<!DOCTPYE html><html><head>...
```

HTTP Response Example

```
HTTP/1.1 200 OK
Date: Fri, 06 Apr xxxx 09:30:00 GMT
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Response Line

HTTP Response Example

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```

Response Line

Response
Headers

HTTP Response Example

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Response Line

Response
Headers

Blank Line Separator

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HTTP Response Example

HTTP Version

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HTTP/1.1 200 OK
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Response Line

Response
Headers

Blank Line Separator

Response
Body (Resource)

HTTP Response Example

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Connection: close
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Content-Length: 228
```

```
<!DOCTYPE html><html><head>...
```

Response Line

Response
Headers

Blank Line Separator

Response
Body (Resource)

Summary

- Web browsers are used to access data on the Web
- Browsers communicate with web servers using HTTP
- HTTP is based on a client-server model:
 - Client sends **request** for resource, possibly including information about the client
 - Server sends **response**, including header (status information) and requested resource

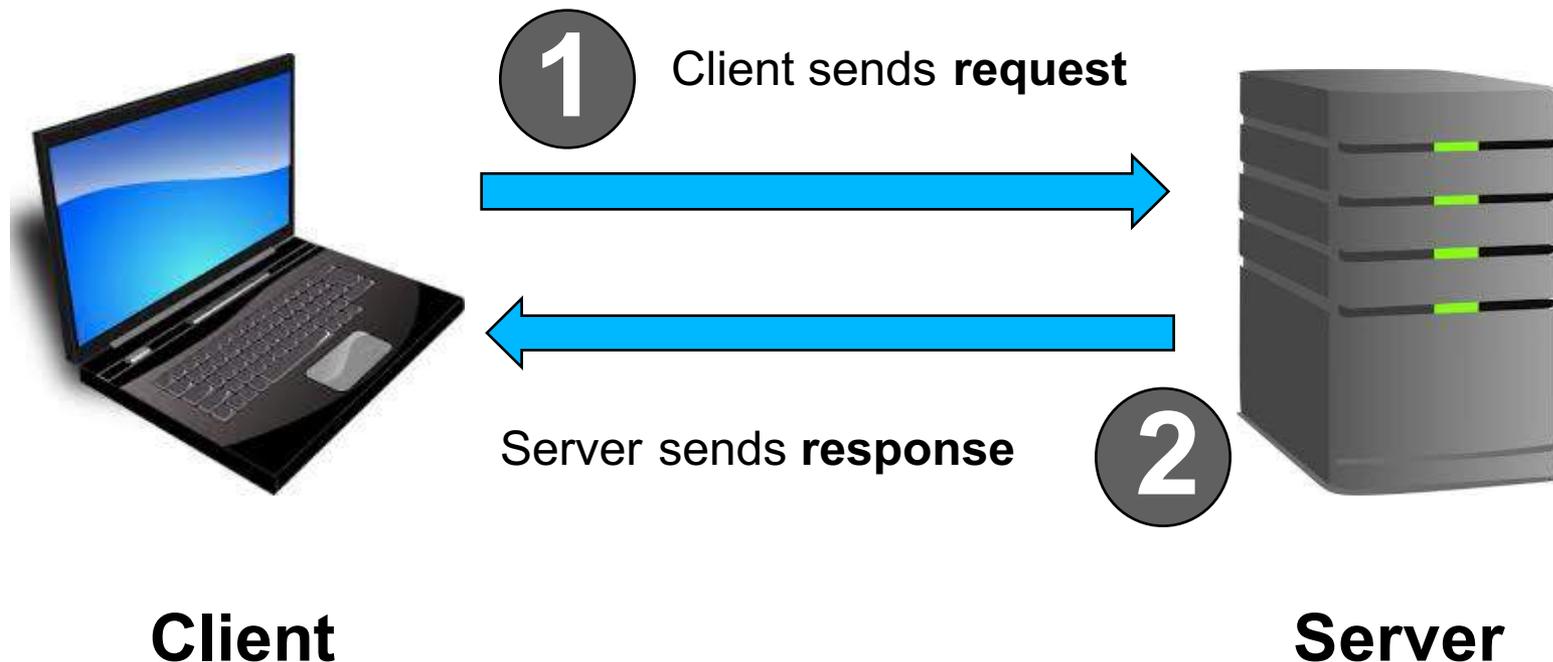


Video 1.3

Chris Murphy

Review

- Browser and the World Wide Web utilize **Hypertext Transfer Protocol (HTTP)** to transfer documents
- Uses the following structure:



Client

Server

HTML

- **Hypertext Markup Language (HTML)** – standard used to describe format and structure with which content should be displayed on a web page
- Document contains **elements**
- Each element generally includes a start **tag**, some content, and an end tag

HTML

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<p> This is a paragraph. </p>

HTML

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<p> This is a paragraph. </p>

Start Tag



HTML

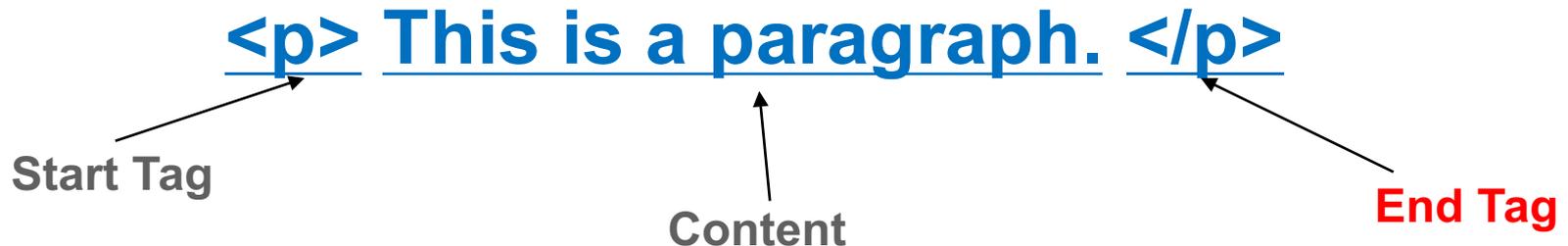
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<p> This is a paragraph. </p>

The diagram shows the HTML code for a paragraph: `<p> This is a paragraph. </p>`. The text is underlined. An arrow points from the label "Start Tag" to the opening tag `<p>`. Another arrow points from the label "Content" to the text "This is a paragraph.".

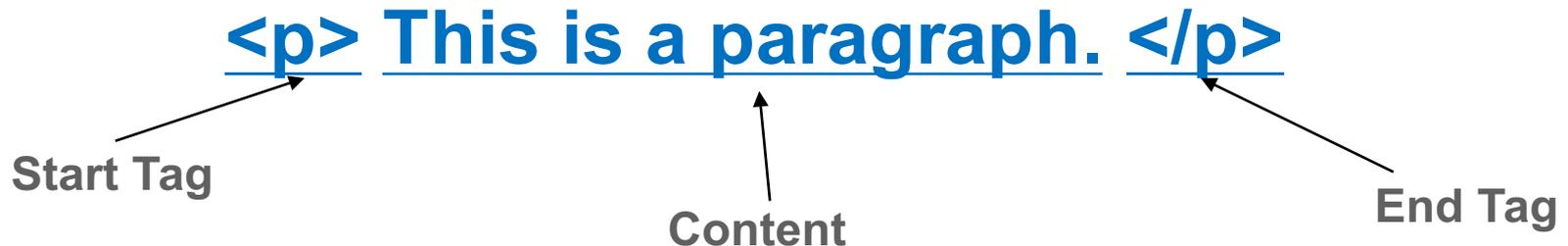
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HTML

- HTML is a plain-text, human-readable language that is used for representing content on the Web
- HTML specifies how to **structure** the data but not (necessarily) how to **display** it
- The browser chooses how to display the content

HTML

- HTML structure is hierarchical
- Elements may be nested, i.e. content of an element can be another element

```
<!DOCTYPE html>

<html>
  <head>
    <title>
      My First Web Page
    </title>
  </head>

  <body>
    Hello, World!
  </body>
</html>
```

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<!DOCTYPE html>

<html>
  <head>
    <title>
      My First Web Page
    </title>
  </head>

  <body>
    Hello, World!
  </body>
</html>
```

Important HTML Tags: `<!DOCTYPE>`

- NOT actually a tag, rather a declaration to the web browser of what version of html the following document uses
- For HTML5, doctype declaration is as follows:
`<!DOCTYPE html>`
- This declaration must be the very first line of an html document

```
<!DOCTYPE html>
```

(all content of html document should go below this declaration)

Important HTML Tags: <html>

- After the declaration, HTML pages must start with the <html> tag
- Often referred to as the *root element* because it can be considered the root of the tree-like structure of elements in an HTML page

```
<!DOCTYPE html>  
  
<html>  
    (all other elements should go here)  
  
</html>
```

Important HTML Tags: <head>

- Contains information about the document, not content

```
<!DOCTYPE>
<html>
<head>
  <title>My Web Page 2.0</title>
  <link rel="stylesheet" type="text/css" href="/style.css">
  <meta name="description" content="Learning about HTML.">
  <meta name="keywords" content="html, web development">
  <script src="code.js"></script>
</head>
</html>
```

Important HTML Tags: <head>

- Contains information about the document, not content
- Common elements included within <head></head>:
 - <title> - contains page title, displayed in browser's title bar

```
<!DOCTYPE>
<html>
<head>
  <title>My Web Page 2.0</title>
  <link rel="stylesheet" type="text/css" href="/style.css">
  <meta name="description" content="Learning about HTML.">
  <meta name="keywords" content="html, web development">
  <script src="code.js"></script>
</head>
</html>
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Important HTML Tags: <head>

- Contains information about the document, not content
- Common elements included within <head></head>:
 - <title> - contains page title, displayed in browser's title bar
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Important HTML Tags: <body>

- Appears directly beneath the head element
- Contains all web page content (images, text, etc.)
- Most web pages have one single body element

```
<!DOCTYPE html>
<html>
<head>
  . . .
</head>

<body>
  Hello world!
</body>

</html>
```

HTML and HTTP

- When a browser makes a request for a document (e.g. hello.html), the HTML will be returned in the body of the response and displayed in the browser

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Server: Apache/1.4
Last-Modified: Wed, 04 Apr XXXX
Connection: close
Content-Type: text/html
Content-Length: 228

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My First Web Page </title> </head>
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```



My First Web Page



Guest



/hello.html



Hello, World!

Environment Setup

- 1. Download a text editor**
- 2. Once installed, create new text file**
- 3. Write HTML in file**
- 4. Save document as “hello.html”**
- 5. Open local file (hello.html) in browser**
- 6. You can view the HTML source in the browser!**



My First Web Page



Guest



/hello.html



Hello, World!

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- Back
- Forward
- Reload

- Save As...
- Print...
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2 <html>  
3   <head>  
4     <title> My First Web Page </title>  
5   </head>  
6  
7   <body>  
8     Hello, World!  
9   </body>  
10 </html>  
11
```

Looking Ahead

- How else can we structure the content in HTML?
- How can we affect the appearance of the content?



Video 1.4

Chris Murphy

Review

- HTML is a plain-text, human-readable language that is used for representing content on the Web
- HTML specifies how to **structure** the data but not (necessarily) how to **display** it
- The browser chooses how to display the content

Review: HTML Tags

- `<!DOCTYPE>` specifies the version of HTML
- `<html>` root of the entire document
- `<head>` section that provides the page title, meta information, includes other files, etc.
- `<body>` the actual content



My First Web Page



Guest



/hello.html



Hello, World!

This is the most important header

This is a paragraph supporting the most important header.

This is a subheader

This is a paragraph supporting the subheader. Notice that the font size of the subheader is smaller than the size of the most important header.

Thought of the Day

Today's thought of the day: *"Don't make excuses, make improvements"* --Tyra Banks

Additional supporting text

Today we've learned about DOCTYPE declarations, head tags, body tags, heading tags, paragraph tags, & Inline vs. Block-level containers.

Important HTML Tags: <p>

- Appears anywhere within the body to represent a paragraph of text expressing a single thought
- Usually displayed with vertical space before and after paragraph

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- Usually displayed with vertical space before and after paragraph

```
<!DOCTYPE html>
<head> . . . </head>

<body>
  (all web content goes here!)
  <p> This is a paragraph within the p tag that expresses a single thought or
  idea. The paragraph should be surrounded with a vertical white space
  buffer both before and after the paragraph. </p>
</body>

</html>
```

HTML Content

- Remember, the HTML specifies the **structure** but not how the content will be **displayed**
- It is up to the browser to decide how to display the content

```
<p>  
This is some text.  
  
This is some more text.  
And here's a little bit more.  
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This is some text. This is some more text. And here's a little bit more.

Important HTML Tags: <h#>

- Referred to as section heading tags
- HTML supports 6 heading tags

h1 • <h1> used for most important titles (ex: title of entire web page)

h2 • <h2> used for next important subheader

h3 • <h3> used for least important subheader

h4 • Magnitude of importance affects font size that will be displayed

h5

h6 • Can be used to divide content into readable subsections

- Browser determines font and size depending on header magnitude

Important HTML Tags: <h#>

```
<body>
  <h1>This is the most important header</h1>
  <p>This is a paragraph supporting the most important header.</p>
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    size of the subheader is smaller than the size of the most important
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Important HTML Tags: `` and `<i>`

- `` indicates that the text should be **bold**
- `<i>` indicates that the text should be *italicized*
- Similar tags are `` and ``, respectively, which are meant to demonstrate that the text is “important”

Important HTML Tags: `<hr>` and `
`

- Both tags used to mark a break in content
 - `<hr>` Represents a more serious shift in content, visually separates content by inserting a visible line between preceding and subsequent content
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` Represents a single line break, inserts a blank line

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how your browser works. </p>  
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<p> This is a paragraph about  
how to set up your environment  
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documents. </p>  
<br>  
<p> This is a paragraph about  
important HTML tags that  
you should know. </p>
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Important HTML Tags: <div>

- Provides additional structure to web page
- Block-level container for organized content
- Often used for:
 - Page headers/footers
 - Menu or Navigation bar
 - Photo galleries
 - Ads or outside media

```
<div>  
  <h3> Thought of the Day </h3>  
  <p>Today's thought of the day: "Don't  
    make excuses, make improvements"  
    -Tyra Banks</p>  
  <p>Additional supporting text</p>  
</div>
```

Important HTML Tags: ``

- Inline container for organized content
- Similar to `div` but different in the following ways;
 - Block-level elements (`div`) are designed to contain larger chunks of content designed to stand alone as a unit; always starts with a new line
 - Inline elements (`span`) designed to contain smaller pieces of content, usually within a larger block of content; does not start with new line

```
<p>Today we've learned about  
  <span>DOCTYPE declarations</span>,  
  <span>head tags</span>,  
  <span> body tags</span>,  
  <span>heading tags</span>,  
  <span>paragraph tags</span>, and  
  <span>Inline vs. Block-level  
    containers</span>.  
</p>
```

Important HTML Tags: `<!-- Comments -->`

- Text in the HTML that will not be rendered in the browser
- Often used for:
 - Explaining the HTML to or leaving notes for other programmers
 - Temporarily removing HTML content

```
<!-- This is a listing of some important people -->  
<br>Eliana  
<br>Swapneel  
<!-- <br>Chris -->  
<br>Lydia
```

HTML Symbols & Special Characters

HTML Entity	Appearance
 	Non-breaking space; allows for extra white space between words

HTML Symbols & Special Characters

HTML Entity	Appearance
<code>&nbsp;</code>	Non-breaking space; allows for extra white space between words
<code>&lt;</code>	<
<code>&gt;</code>	>

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HTML Entity	Appearance
 	Non-breaking space; allows for extra white space between words
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>	>
&	&

HTML Symbols & Special Characters

HTML Entity	Appearance
 	Non-breaking space; allows for extra white space between words
<	<
>	>
&	&
©	©
®	®

Putting It All Together

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<html>
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      --Tyra Banks</p>
      <p>Additional supporting text</p>
    </div>
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    </p>
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</html>
```

Putting It All Together

```
<!DOCTYPE html>
<html>
  <head>
    <title>My Web Page 2.0</title>
    <meta http-equiv="Content-Type" content="text/html; charset=utf-8">
    <meta name="description" content="Learning about the most important web tags in html.">
    <meta name="keywords" content="html, web development">
  </head>
  <body>
    <h1>This is the most important header</h1>
    <p>This is a paragraph supporting the most important header.</p>
    <h2>This is a subheader</h2>
    <p>This is a paragraph supporting the subheader. Notice that the font size of the subheader
      is smaller than the size of the most important header. </p>
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Thought of the Day

Today's thought of the day: "*Don't make excuses, make improvements*"> --Tyra Banks

Additional supporting text

Today we've learned about DOCTYPE declarations, head tags, body tags, heading tags, paragraph tags, & Inline vs. Block-level containers.

Summary

- HTML is a plain-text, human-readable language that is used for representing content on the Web
- HTML specifies how to **structure** the data but not (necessarily) how to **display** it
- HTML uses **tags** to provide the structure



Video 1.5

Chris Murphy

Review

- HTML is a plain-text, human-readable language that is used for representing content on the Web
- HTML specifies how to **structure** the data but not (necessarily) how to **display** it
- HTML uses **tags** to provide the structure

Review: HTML tags

- `<p>` paragraph
- `<h#>` header
- `` bold (also ``)
- `<i>` italics (also ``)
- `<hr>` horizontal rule
- `
` break
- `<div>` block of text
- `` small section of text

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Additional supporting text

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HTML Attributes

- Purpose of an attribute: provide additional information about a particular HTML element
- Always included within element's start tag
- Usually comes in name/value pair as follows:
***name*="value"**
 - *name* – usually specifies the property of the element for which additional information is being provided
 - *value* –this is selected from set of possible values for given property

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`<p name="vaLue"> This is a paragraph with a defined attribute </p>`

Core Attributes: title

- Provides a suggested title for an element
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Test Title

"Welcome!"

Core Attributes: `style`

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<h1>this is a heading</h1>
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```
<h1 style="color:red; text-transform:capitalize">this is a heading</h1>
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This Is A Heading

Other properties of “style” attribute

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```
Hello <span style="color:white; background-color:green; font-family:verdana; font-size:200%">world!</span>
```

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```
Hello <span style="color:white; background-color:green; font-family:verdana; font-size:200%">world!</span>
```



```
<p style="color:blue">1 is an odd number</p>
```

```
<p style="color:white; background-color:blue">2 is an even number</p>
```

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<p style="color:blue">1 is an odd number</p>
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1 is an odd number

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<p style="color:white; background-color:blue">6 is an even number</p>
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Core Attributes: `id` and `class`

- Used to uniquely identify elements within an HTML document
- **`id`**
 - Provide ability to refer to specific element; `id` must be unique
 - Examples: header, footer
- **`class`**
 - Provide ability to refer to subgroups of elements within html document; does not have to be unique
 - Examples: comment, warning

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```
<p class="odd">1 is an odd number</p>
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<p class="even">4 is an even number</p>
<p class="odd">5 is an odd number</p>
<p class="even">6 is an even number</p>
</body>

</html>
```

```
<!DOCTYPE html>
<html>

<head>
<style>
.odd {
    color: blue;
}
.even {
    color: white;
    background-color: blue;
}
</style>
</head>

<body>
<p class="odd">1 is an odd number</p>
<p class="even">2 is an even number</p>
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Summary

- You can use a tag's **attributes** to give it properties
- The **style** attribute allows you to change the appearance of the text within that element
- The **class** attribute allows you to group elements so that they can easily have the same style applied



Video 1.6

Chris Murphy

Review

- You can use an HTML tag's **attributes** to give it properties
- The **style** attribute allows you to change the appearance of the text within that element
- The **class** attribute allows you to group elements so that they can easily have the same style applied

Plain HTML

Here are some memorable quotes from movies!

You can find more at the [Internet Movie Database \(IMDb\)](#).

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Stylish HTML

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What is CSS?

- **Cascading Style Sheets (CSS)** are a formatting language used to describe the appearance of content in an HTML file
- CSS has a standardized specification defined by the World Wide Web Consortium (W3C)

Why CSS?

- **HTML (“The Content”)**
 - What information does the page contain?
 - What is in the headings, body, etc.?
 - How is the information structured?

- **CSS (“The Presentation”)**
 - What does the page look like?
 - What *color, formatting, text size, etc.* should the various parts have?

How does CSS work?

- I. The Web Browser receives the HTML page from the server via HTTP

How does CSS work?

1. The Web Browser receives the HTML page from the server via HTTP
2. The HTML page can include CSS either in same file or with link to separate file
 - If it's a separate file, the web browser will request that file separately via HTTP

How does CSS work? (2)

3. When all HTML and CSS files are available, the browser will render the page
4. For each element in the HTML page, the web browser will display the content and use the CSS to style it
5. Ideally, exactly one set of CSS styles will apply to any given element
6. If there are conflicting styles defined, complex rules determine which gets applied

How do we use CSS?

1. **Inline:** use tag's “style” attribute to specify appearance
2. **Internal:** create `<style>` elements in HTML and assign to different tags, classes, etc.
3. **External:** specify styling in a separate CSS file

Review: Inline CSS as “style” attribute

- Include CSS within the element tag itself as a “style” attribute

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```
...  
<h1 style="color:red">  
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  quotes from movies!  
</h1>  
...
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- Advantages
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 - Good for quick, one-off situations

Analysis: Inline CSS as “style” attribute

- Advantages
 - Easy to use
 - Good for quick, one-off situations
- Disadvantages
 - Mixing content and presentation: this should be avoided
 - Hard to manage for large, complex pages

Review: Internal CSS using `<style>` tag

- Include CSS within the head of the HTML using `<style>` elements

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<head>
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CSS Syntax

```
<style>  
  h1 {  
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    text-transform: capitalize;  
  }  
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```

CSS Syntax

- Selector (e.g., h1)

```
<style>
  h1 {
    color: red;
    text-transform: capitalize;
  }
</style>
```

CSS Selector



CSS Syntax

- Selector (e.g., h1)
- Properties and Values (e.g., color:red)

```
<style>
  h1 {
    color: red;
    text-transform: capitalize;
  }
</style>
```

CSS Selector

property:value

The diagram illustrates the components of a CSS style rule. It shows a code block with a style tag containing a selector and two property-value pairs. Arrows point from the text 'CSS Selector' to the 'h1' selector. Two arrows point from the text 'property:value' to the 'color: red;' and 'text-transform: capitalize;' declarations.

CSS Syntax

- Selector (e.g., h1)
- Properties and Values (e.g., color:red)

```
<style>
  h1 {
    color: red;
    text-transform: capitalize;
  }
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CSS Selector

property:value

The diagram illustrates the components of a CSS style block. It shows a code snippet with three annotations: 'CSS Selector' with an arrow pointing to 'h1', and 'property:value' with two arrows pointing to 'color: red;' and 'text-transform: capitalize;'.

Analysis: Internal CSS using `<style>` tag

- Advantages
 - Separates content and presentation
 - Easy to use
 - In particular, if you want to apply the same style to all tags of a certain type (say `<p>`) it's easier to do it with internal CSS than inline CSS
 - Good if you only have a limited amount of CSS in the page

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- Disadvantages
 - Hard to manage for large, complex pages
 - Cannot reuse across multiple pages

External CSS

- Include CSS in a separate file and link the file in the head of the HTML file

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```
<head>
...
<link rel="stylesheet"
      type="text/css"
      href="movie-styles.css" />
...
</head>
...
<h1>
  Here are some memorable
  quotes from movies!
</h1>
```

movies.html

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Analysis: External CSS

- Advantages
 - Separates content and presentation
 - Can include many different CSS pages with multiple `<link>` tags

Analysis: External CSS

- Advantages
 - Separates content and presentation
 - Can include many different CSS pages with multiple `<link>` tags
- Disadvantages
 - Lots of different files to manage (which might be overkill for smaller pages)

CSS Selectors

Type of Selector	What's in the CSS File?	What does this selector apply to?	What does the HTML file contain?
Element Selector	<code>h1 { color:red; }</code>	All <code><h1></code> elements	<code><h1> ... </h1></code>

CSS Selectors

Type of Selector	What's in the CSS File?	What does this selector apply to?	What does the HTML file contain?
Element Selector	<code>h1 { color:red; }</code>	All <code><h1></code> elements	<code><h1> ... </h1></code>
Class selector	<code>.address { ... }</code>	All elements in class "address"	<code><div class="address"> ... </div></code>

CSS Selectors

Type of Selector	What's in the CSS File?	What does this selector apply to?	What does the HTML file contain?
Element Selector	<code>h1 { color:red; }</code>	All <code><h1></code> elements	<code><h1> ... </h1></code>
Class selector	<code>.address { ... }</code>	All elements in class "address"	<code><div class="address"> ... </div></code>
Id Selector	<code>#section1 { ... }</code>	Unique element with ID "section1"	<code><p id="section1"> ... </p></code>

Summary

- **Cascading Style Sheets (CSS)** are a formatting language used to describe the appearance of content in an HTML file
- We can include CSS formatting in HTML in three ways:
 1. inline as style attributes
 2. internal using the `<style>` tag
 3. external in a separate file linked with the `<link>` tag
- A CSS element consists of a selector and property:value pairs



Video 1.7

Chris Murphy

Review

- **HTML** allows us to specify the structure of Web content
- **CSS** is a formatting language used to describe the appearance of content in an HTML file

Lists in HTML: `` and ``

- Lists can either be ordered or unordered

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Ordered List: ``

1. January
2. February
3. March

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Ordered List: ``

1. January
2. February
3. March

```
<ol>  
  <li> January </li>  
  <li> February </li>  
  <li> March </li>  
</ol>
```

Lists in HTML: `` and ``

- Lists can either be ordered or unordered

Ordered List: ``

1. January
2. February
3. March

Unordered List: ``

- Eliana
- Chris
- Swapneel

```
<ol>
  <li> January </li>
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```

- In both cases, use `` tag to represent List Items

Unordered Lists - Style

- Use CSS style properties to determine the style of bullet point used within the list as follows (inline example)

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```
<ul style="list-style-type:circle">  
  <li> Eliana </li>  
  <li> Chris </li>  
  <li> Swapneel </li>  
</ul>
```

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list-style-type:value	Bullet View
disc	• Disc is the default value
circle	○ This is the circle view
square	▪ This is the square view
none	No bullets, just list items

Ordered Lists - Style

- Use the *type* attribute of `` tag to select numbering of each item

Ordered Lists - Style

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```
<ol type="A" >  
  <li> January</li>  
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</ol>
```

Ordered Lists - Style

- Use the *type* attribute of `` tag to select numbering of each item

```
<ol type="A" >  
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Ordered List

- A. January
- B. February
- C. March

Ordered Lists - Style

- Use the *type* attribute of `` tag to select numbering of each item

```
<ol type="A" >  
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```

Ordered List

- A. January
- B. February
- C. March

type	View
type="1"	1. This is the default setting 2. for ordered lists
type="A"	A. Items ordered with B. Uppercase letters
type="a"	a. Items ordered with b. Lowercase letters
type="I"	I. Items ordered with II. Uppercase Roman Numerals
type="i"	i. Items ordered with ii. Lowercase Roman Numerals

Nested Lists

- List items can themselves include lists as well to produce a nested list effect

```
<ul style="list-style-type:circle">  
  <li> Eliana </li>  
  <li> Chris </li>  
    <ol type="A">  
      <li> SD2x </li>  
      <li> SD4x </li>  
    </ol>  
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- Eliana
- Chris
 - A. SD2x
 - B. SD4x
- Swapneel

Application Form

Full Name:

Email Address:

Password:

Date of Birth:

Graduation Year:

Phone Number:

Demographics

Gender: Male Female Undisclosed

Race: African American Asian White American Indian
 Pacific Islander Other

Personal Preferences:

Favorite Color:

Resume Submission: No file chosen



Forms

- Forms are used to retrieve information from user of a Web page
- Enclose all form fields within `<form>` elements

```
<form>
  Full name:<br>
  <input type="text" name="fullname" value="Jane Doe">
<br>
  Email Address:<br>
  <input type="email" name="email"
    value="jdoe@example.com">
<br><br>
  <input type="submit" value="Submit">
</form>
```

Full name:
Jane Doe
Email Address:
jdoe@example.com
Submit

Forms: `<input type="value">`

- Use the *type* attribute of the input tag to provide more information on what type of data to expect from the user
- Different *types* often allow different input formats that make data entry more convenient for the user

Application Form

Full Name:

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Forms – Text Inputs

Full Name:

Email Address:

Password:

Date of Birth:

```
<br> Full Name:  
<input type="text" name="username">  
  
<br> Email Address:  
<input type="email" name="email">  
  
<br> Password:  
<input type="password" name="password">  
  
<br> Date of Birth:  
<input type="date" name="dob">
```

Forms – Text Inputs

Full Name:

Email Address:

Password:

Date of Birth:

```
<br> Full Name:  
<input type="text" name="username">  
  
<br> Email Address:  
<input type="email" name="email">  
  
<br> Password:  
<input type="password" name="password">  
  
<br> Date of Birth:  
<input type="date" name="dob">
```

Forms – Text Inputs

Full Name:

Email Address:

Password:

Date of Birth:

```
<br> Full Name:  
<input type="text" name="username">  
  
<br> Email Address:  
<input type="email" name="email">  
  
<br> Password:  
<input type="password" name="password">  
  
<br> Date of Birth:  
<input type="date" name="dob">
```

Forms – Text Inputs

Full Name:

Email Address:

Password:

Date of Birth:

```
<br> Full Name:  
<input type="text" name="username">  
  
<br> Email Address:  
<input type="email" name="email">  
  
<br> Password:  
<input type="password" name="password">  
  
<br> Date of Birth:  
<input type="date" name="dob">
```

Forms – Text Inputs

Full Name:

Email Address:

Password:

Date of Birth:

```
<br> Full Name:  
<input type="text" name="username">  
  
<br> Email Address:  
<input type="email" name="email">  
  
<br> Password:  
<input type="password" name="password">  
  
<br> Date of Birth:  
<input type="date" name="dob">
```

Application Form

Full Name:

Email Address:

Password:

Date of Birth:

Graduation Year:

Phone Number:

Demographics

Gender: Male Female Undisclosed

Race: African American Asian White American Indian
 Pacific Islander Other

Personal Preferences:

Favorite Color:

Resume Submission: No file chosen

Forms – Slider/Range Input

Graduation Year:

```
<br> Graduation Year:  
<input type="range" name="gradYr" min="1950" max="2020">
```

Forms – Slider/Range Input

Graduation Year:

```
<br> Graduation Year:  
<input type="range" name="gradYr" min="1950" max="2020">
```

Application Form

Full Name:

Email Address:

Password:

Date of Birth:

Graduation Year:

Phone Number:

Demographics

Gender: Male Female Undisclosed

Race: African American Asian White American Indian
 Pacific Islander Other

Personal Preferences:

Favorite Color:

Resume Submission: No file chosen

Forms – Radio Buttons

Gender: Male Female Undisclosed

```
<br> Gender:  
  
<input type="radio"  
      name="genderOption"  
      value="male"> Male  
  
<input type="radio"  
      name="genderOption"  
      value="female"> Female  
  
<input type="radio"  
      name="genderOption"  
      value="undisclosed"> Undisclosed
```

Forms – Radio Buttons

Gender: Male Female Undisclosed

```
<br> Gender:  
  
<input type="radio"  
      name="genderOption"  
      value="male"> Male  
  
<input type="radio"  
      name="genderOption"  
      value="female"> Female  
  
<input type="radio"  
      name="genderOption"  
      value="undisclosed"> Undisclosed
```

Forms – Radio Buttons

Gender: Male Female Undisclosed

```
<br> Gender:  
  
<input type="radio"  
      name="genderOption"  
      value="male"> Male  
  
<input type="radio"  
      name="genderOption"  
      value="female"> Female  
  
<input type="radio"  
      name="genderOption"  
      value="undisclosed"> Undisclosed
```

Forms – Radio Buttons

Gender: Male Female Undisclosed

```
<br> Gender:  
  
<input type="radio"  
      name="genderOption"  
      value="male"> Male  
  
<input type="radio"  
      name="genderOption"  
      value="female"> Female  
  
<input type="radio"  
      name="genderOption"  
      value="undisclosed"> Undisclosed
```

Application Form

Full Name:

Email Address:

Password:

Date of Birth:

Graduation Year:

Phone Number:

Demographics

Gender: Male Female Undisclosed

Race: African American Asian White American Indian
 Pacific Islander Other

Personal Preferences:

Favorite Color:

Resume Submission: No file chosen

Forms – Checkboxes

Race: African American Asian White American Indian
 Pacific Islander Other

```
<br> Race:
```

```
<input type="checkbox" name="race" value="afrAmer"> African American
```

```
<input type="checkbox" name="race" value="asian"> Asian
```

```
<input type="checkbox" name="race" value="white"> White
```

```
<input type="checkbox" name="race" value="amIndian"> American Indian
```

```
<input type="checkbox" name="race" value="pacIsl"> Pacific Islander
```

```
<input type="checkbox" name="race" value="other"> Other
```

Forms – Checkboxes

Race: African American Asian White American Indian
 Pacific Islander Other

```
<br> Race:
```

```
<input type="checkbox" name="race" value="afrAmer"> African American
```

```
<input type="checkbox" name="race" value="asian"> Asian
```

```
<input type="checkbox" name="race" value="white"> White
```

```
<input type="checkbox" name="race" value="amIndian"> American Indian
```

```
<input type="checkbox" name="race" value="pacIsl"> Pacific Islander
```

```
<input type="checkbox" name="race" value="other"> Other
```

Forms – Checkboxes

Race: African American Asian White American Indian
 Pacific Islander Other

```
<br> Race:
```

```
<input type="checkbox" name="race" value="afrAmer"> African American
```

```
<input type="checkbox" name="race" value="asian"> Asian
```

```
<input type="checkbox" name="race" value="white"> White
```

```
<input type="checkbox" name="race" value="amIndian"> American Indian
```

```
<input type="checkbox" name="race" value="pacIsl"> Pacific Islander
```

```
<input type="checkbox" name="race" value="other"> Other
```

Application Form

Full Name:

Email Address:

Password:

Date of Birth:

Graduation Year:

Phone Number:

Demographics

Gender: Male Female Undisclosed

Race: African American Asian White American Indian
 Pacific Islander Other

Personal Preferences:

Favorite Color:

Resume Submission: No file chosen

Forms – Color Chooser

Favorite Color:

```
<br> Favorite Color:  
<input type="color" name="favcolor">
```

Forms – Color Chooser

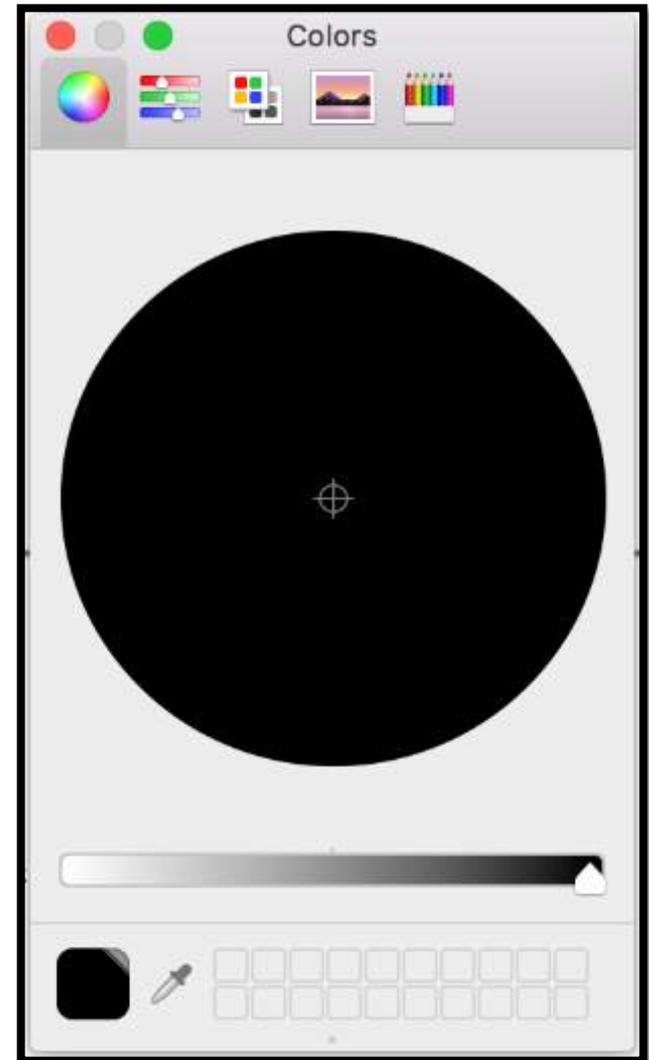
Favorite Color:

```
<br> Favorite Color:  
<input type="color" name="favcolor">
```

Forms – Color Chooser

Favorite Color:

```
<br> Favorite Color:  
<input type="color" name="favcolor">
```



Application Form

Full Name:

Email Address:

Password:

Date of Birth:

Graduation Year:

Phone Number:

Demographics

Gender: Male Female Undisclosed

Race: African American Asian White American Indian
 Pacific Islander Other

Personal Preferences:

Favorite Color:

Resume Submission:

Forms – File Uploads

Resume Submission: No file chosen

```
<br> Resume Submission:  
<input type="file" name="resume">
```

Forms – File Uploads

Resume Submission: No file chosen

```
<br> Resume Submission:  
<input type="file" name="resume">
```

Application Form

Full Name:

Email Address:

Password:

Date of Birth:

Graduation Year:

Phone Number:

Demographics

Gender: Male Female Undisclosed

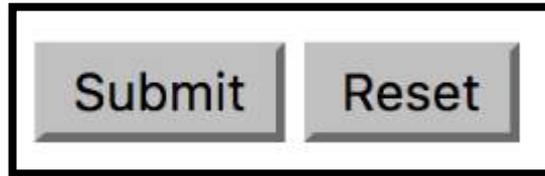
Race: African American Asian White American Indian
 Pacific Islander Other

Personal Preferences:

Favorite Color:

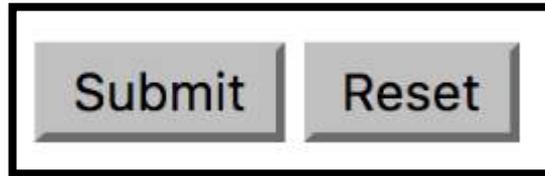
Resume Submission: No file chosen

Forms – Buttons



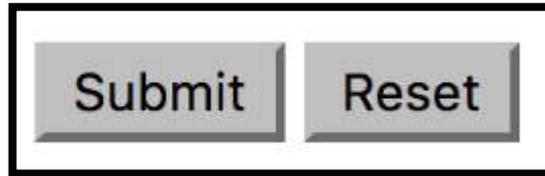
```
<input type="submit" value="Submit">  
<input type="reset" value="Reset">
```

Forms – Buttons



```
<input type="submit" value="Submit">  
<input type="reset" value="Reset">
```

Forms – Buttons



```
<input type="submit" value="Submit">  
<input type="reset" value="Reset">
```

Forms: Input Types

Type	Form Field
button	Clickable button
checkbox	Checkbox options
color	Color picker
date	Date picker (year, month, day)
email	Email address field
file	File select/browse for file uploading
hidden	Hidden input field
image	Allow image to serve as submit button
month	Month and year control
time	Time control

Type	Form Field
number	Number format entry
password	Masked characters for password entry
radio	Radio button options
range	Slider control to enter number as a range
reset	Reset all form values to default values (button)
search	Text field for searching
submit	Submit button
tel	Phone number input
text	Plaintext field
url	Field for URL

Summary

- HTML **lists** allow us to organize information in an HTML page and specify the appearance
- HTML **forms** allow us to accept input from the user



Video 1.8

Chris Murphy

#<<<>>>
#copyright

Your continued donations keep Wikipedia running!

Lynx (web browser)

From Wikipedia, the free encyclopedia

Jump to: [navigation](#), [search](#)

CAPTION: Lynx

Wikipedia Main Page displayed in Lynx

Wikipedia Main Page displayed in Lynx

Maintainer: Thomas Dickey
 Stable release: 2.8.5 (February 4, 2004) [[+/-]]
 Preview release: 2.8.6 (?) [[+/-]]
 OS: Cross-platform
 Use: web browser
 License: GPL
 Website: lynx.isc.org

Lynx is a text-only **Web browser** and **Internet Gopher** client for use on cursor-addressable, character cell **terminals**.

Browsing in Lynx consists of highlighting the chosen link using cursor keys, or having all links on a page numbered and entering the chosen link's number. Current versions support **SSL** and many **HTML** features. Tables are linearized (scrunched together one cell after another without tabular structure), while frames are identified by name and can be explored as if they were separate pages.

Lynx is a product of the Distributed Computing Group within Academic Computing Services of the **University of Kansas**, and was initially developed in 1992 by a team of students at the university (**Lou Montulli**, Michael Grobe and Charles Rezac) as a hypertext browser used solely to distribute campus information as part of a **Campus-Wide Information Server**. In 1993 Montulli added an Internet interface and released a new version (2.0) of the browser [[1]] [[2]] [[3]].

image.html x Guest

← → ↻ 🔍 image.html ⋮

Here's a photo of a woman cycling:

A photograph of a woman with long brown hair, wearing a dark tank top and shorts, riding a bicycle on a gravel path. She is smiling and looking towards the camera. The background features rolling green hills, a white building, and a blue sky with scattered white clouds. The path is made of light-colored gravel and leads into the distance.

Images in HTML: ``

- `` tag includes an image in the HTML page
- Required attributes:
 - **src** – specifies the link to the image to be included. Can be a relative or absolute path
 - **alt** – text to include as image description in case image does not load, or additional information is needed
- Other attributes:
 - **height**, **width** – specified in pixels (e.g. 50px)
 - **title** – tooltip text displayed when mouse hovers over image

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```

```

Absolute vs. Relative Path

```

```

Absolute vs. Relative Path

```

```

- **Absolute Path:** URL that can be accessed if provided to browser on its own

Absolute vs. Relative Path

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- **Relative Path:** path to a file included within local file system, relative to the HTML page

Absolute vs. Relative Path

```

```

- **Absolute Path:** URL that can be accessed if provided to browser on its own

```

```

- **Relative Path:** path to a file included within local file system, relative to the HTML page

```
▼ html  
  index.html  
  woman-cycling.jpg  
  ▼ photos  
    woman-cycling.jpg
```

Absolute vs. Relative Path

```

```

- **Absolute Path:** URL that can be accessed if provided to browser on its own

```

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```

```

```

```

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Absolute vs. Relative Path

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```
▼ html  
  index.html  
  woman-cycling.jpg  
  ▼ photos  
    woman-cycling.jpg
```

```

```

```

```

Links in HTML: <a>

- <a> tag used to include a link to another page/resource on Web
- Associated attributes
 - **href** (Required) – specifies the location to which to navigate if link is clicked
 - **target** – specifies where the link should be opened when clicked
- Similar to images, value of href attribute can either be a relative or absolute link
- Text of element will be displayed as clickable link

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```
<a href="http://www.seas.upenn.edu" target="_self">Penn Engineering</a>
```

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Creating Bookmarks Using Relative URLs

1. Define an `id` attribute for the element for which you would like to create a bookmark

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```
<h3 id="health"> Healthy Eating </h3>
```

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2. Create a link to serve as bookmark

Creating Bookmarks Using Relative URLs

1. Define an `id` attribute for the element for which you would like to create a bookmark

```
<h3 id="health"> Healthy Eating </h3>
```

2. Create a link to serve as bookmark

1. From within same page:

```
<a href="#health"> Jump to Healthy Eating Section </a>
```

Creating Bookmarks Using Relative URLs

1. Define an `id` attribute for the element for which you would like to create a bookmark

```
<h3 id="health"> Healthy Eating </h3>
```

2. Create a link to serve as bookmark

1. From within same page:

```
<a href="#health"> Jump to Healthy Eating Section </a>
```

2. From a different page:

```
<a href="index.html#health"> Jump to Healthy Eating Section </a>
```

Tables

```
<table border=1>
  <tr>
    <th> First Name </th>
    <th> Last Name </th>
    <th> Email Address</th>
  </tr>
  <tr>
    <td> John </td>
    <td> Doe </td>
    <td> jodoe@ex.com </td>
  </tr>
  <tr>
    <td> Jane </td>
    <td> Doe </td>
    <td> jadoe@ex.com </td>
  </tr>
</table>
```

First Name	Last Name	Email Address
John	Doe	jodoe@ex.com
Jane	Doe	jadoe@ex.com

Tables

```
<table border=1>
  <tr>
    <th> First Name </th>
    <th> Last Name </th>
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    <td> John </td>
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  </tr>
  <tr>
    <td> Jane </td>
    <td> Doe </td>
    <td> jadoe@ex.com </td>
  </tr>
</table>
```

- **<table>** tag is used to define and contain a table

First Name	Last Name	Email Address
John	Doe	jodoe@ex.com
Jane	Doe	jadoe@ex.com

Tables

```
<table border=1>
  <tr>
    <th> First Name </th>
    <th> Last Name </th>
    <th> Email Address</th>
  </tr>
  <tr>
    <td> John </td>
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    <td> jodoe@ex.com </td>
  </tr>
  <tr>
    <td> Jane </td>
    <td> Doe </td>
    <td> jadoe@ex.com </td>
  </tr>
</table>
```

- **<table>** tag is used to define and contain a table
- **<tr>** tag defines a table row

First Name	Last Name	Email Address
John	Doe	jodoe@ex.com
Jane	Doe	jadoe@ex.com

Tables

```
<table border=1>
  <tr>
    <th> First Name </th>
    <th> Last Name </th>
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  </tr>
  <tr>
    <td> John </td>
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    <td> jodoe@ex.com </td>
  </tr>
  <tr>
    <td> Jane </td>
    <td> Doe </td>
    <td> jadoe@ex.com </td>
  </tr>
</table>
```

- **<table>** tag is used to define and contain a table
- **<tr>** tag defines a table row
- **<th>** tag defines table header (first row, titles)

First Name	Last Name	Email Address
John	Doe	jodoe@ex.com
Jane	Doe	jadoe@ex.com

Tables

```
<table border=1>
  <tr>
    <th> First Name </th>
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    <td> John </td>
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  </tr>
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    <td> Jane </td>
    <td> Doe </td>
    <td> jadoe@ex.com </td>
  </tr>
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```

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Tables

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<table border=1>
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```

- **<table>** tag is used to define and contain a table
- **<tr>** tag defines a table row
- **<th>** tag defines table header (first row, titles)
- **<td>** tag defines table cell (“table data”)

First Name	Last Name	Email Address
John	Doe	jodoe@ex.com
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Tables

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<table border=1>
  <tr>
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```

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- **<tr>** tag defines a table row
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First Name	Last Name	Email Address
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Table CSS properties

Property	Description	Sample values
border	Draws a border around table, row, or cell; default is no border	<u>1px</u> <u>solid</u> <u>black</u>

Table CSS properties

Property	Description	Sample values
border	Draws a border around table, row, or cell; default is no border	1px solid black
padding	Space between cell content and its borders	15px

Table CSS properties

Property	Description	Sample values
border	Draws a border around table, row, or cell; default is no border	1px solid black
padding	Space between cell content and its borders	15px
text-align	Horizontal text alignment	center, left, right

Table CSS properties

Property	Description	Sample values
border	Draws a border around table, row, or cell; default is no border	1px solid black
padding	Space between cell content and its borders	15px
text-align	Horizontal text alignment	center, left, right
border-spacing	Space between cells	2px

Merging Cells

- Use **rowspan** attribute to span multiple rows (merge vertically)

```
<td rowspan="2">Content</td>
```

Row A	This td element spans 2 rows
Row B	

Merging Cells

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```
<td rowspan="2">Content</td>
```

Row A	This td element spans 2 rows
Row B	

Merging Cells

- Use **rowspan** attribute to span multiple rows (merge vertically)

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<td rowspan="2">Content</td>
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Row A	This td element spans 2 rows
Row B	

Merging Cells

- Use **rowspan** attribute to span multiple rows (merge vertically)

```
<td rowspan="2">Content</td>
```

Row A	This td element spans 2 rows
Row B	

- Use **colspan** attribute to span multiple columns (merge horizontally)

```
<td colspan="2">Content</td>
```

Column A	Column B
--- This td element spans 2 columns ---	

Merging Cells

- Use **rowspan** attribute to span multiple rows (merge vertically)

```
<td rowspan="2">Content</td>
```

Row A	This td element spans 2 rows
Row B	

- Use **colspan** attribute to span multiple columns (merge horizontally)

```
<td colspan="2">Content</td>
```

Column A	Column B
--- This td element spans 2 columns ---	

Summary

- We can embed images in HTML files using the `` tag and specifying the images' relative or absolute paths
- We can embed links to other HTML files using the `<a>` tag
- We can organize content into tables using the `<table>` tag



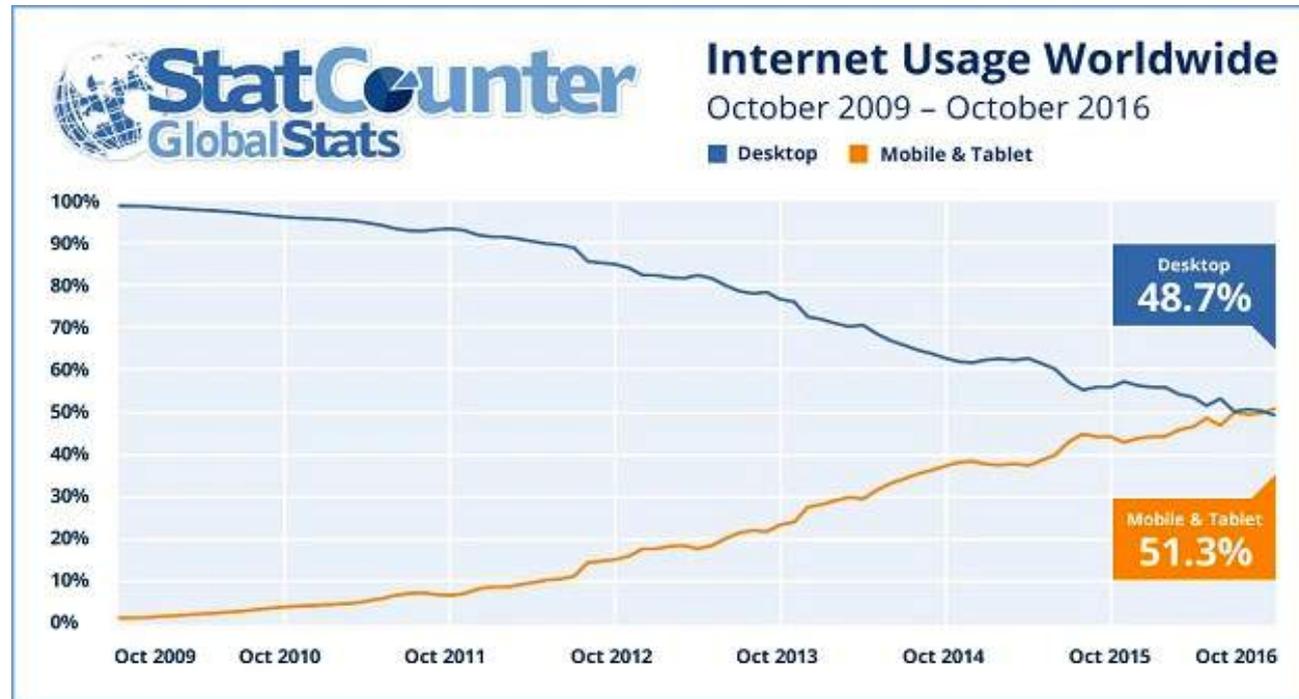
Video 1.9

Chris Murphy

Considering Multiple Devices



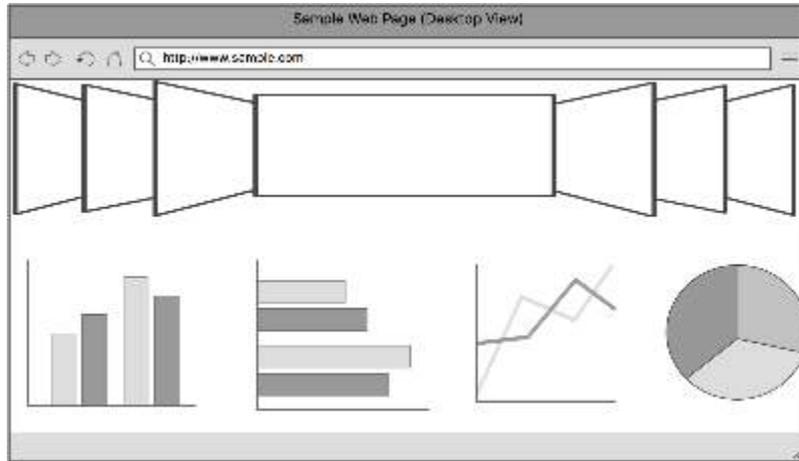
Considering Multiple Devices



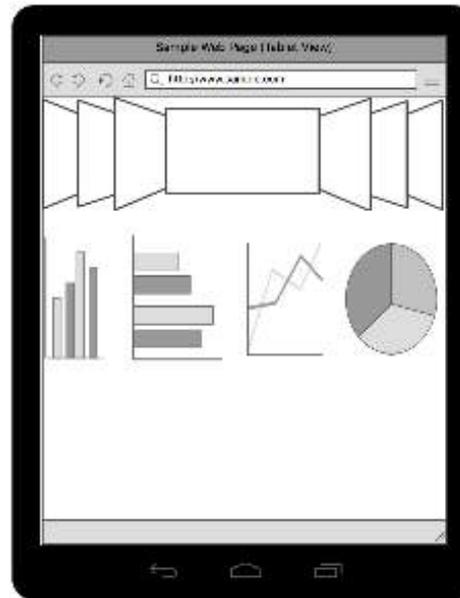
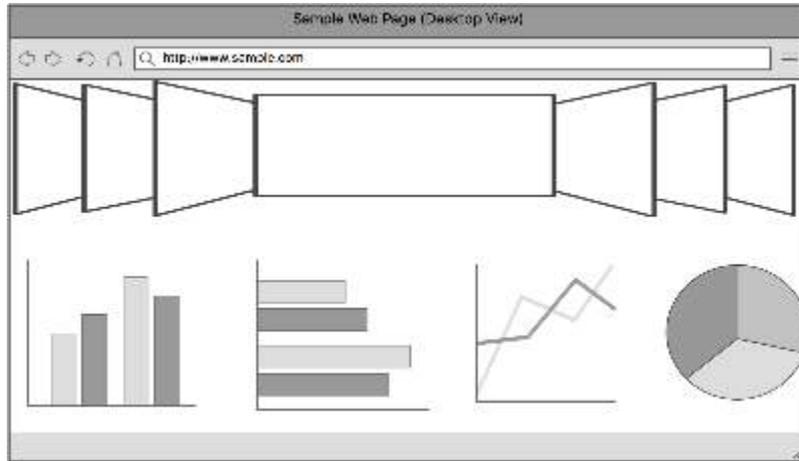
Heisler, Yoni. "Mobile internet usage surpasses desktop usage for the first time in history." BGR. N.p., 02 Nov. 2016. Web.

As of October 2016, mobile and tablet internet usage has surpassed desktop internet usage, constituting more than half of all worldwide usage

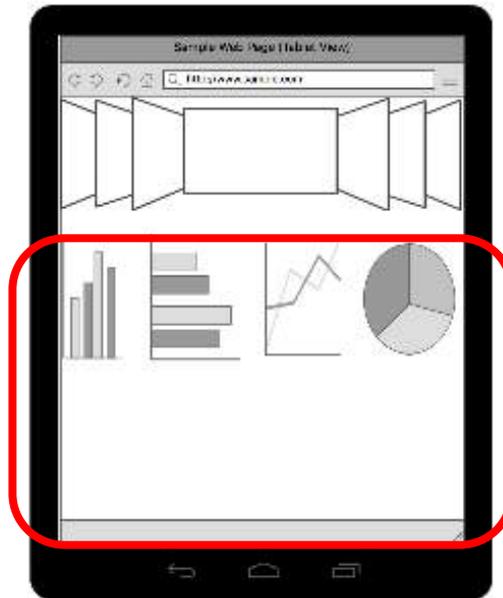
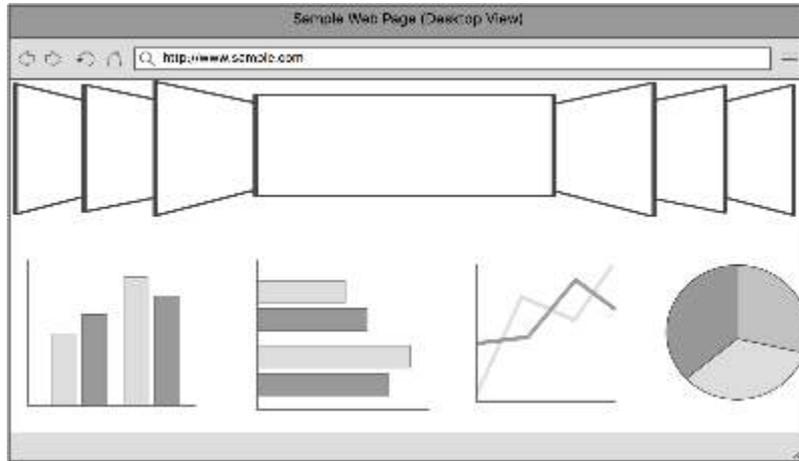
Traditional Web Design



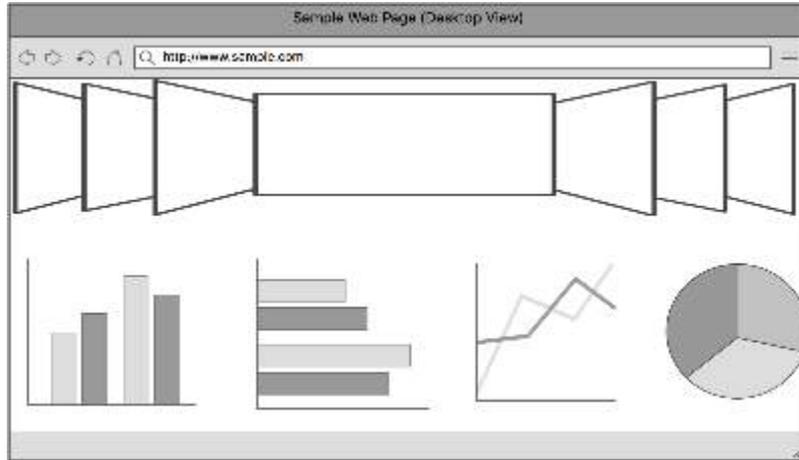
Traditional Web Design



Traditional Web Design

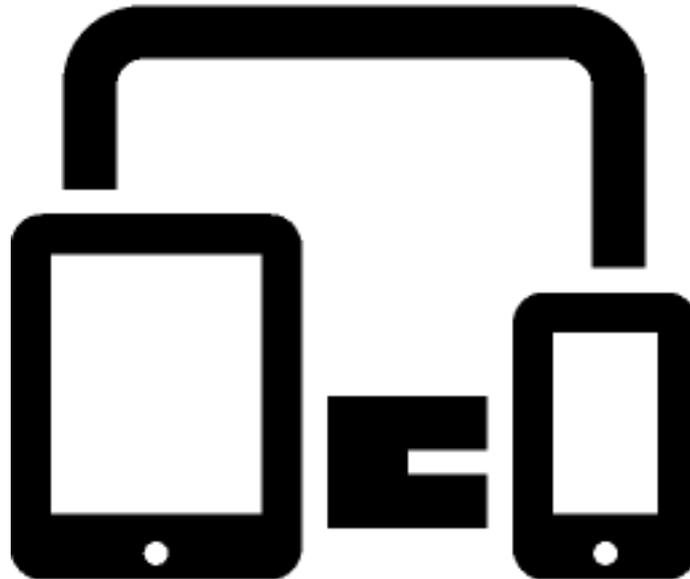


Responsive Web Design



Responsive Web Design

- **Responsive Web Design (RWD)** – approach to designing web pages in a way that takes all possible devices into account
- Approach must be visually flexible to adapt to all potential screen sizes



Achieving RWD - Challenges

- How should we go about achieving RWD?
- Providing CSS for each possible platform is challenging as new devices become available
- Manual CSS implementation would take quite a bit of time and effort

Solution: Automatic RWD

- **Bootstrap** – open source front-end development framework produced and maintained by Twitter that aids in producing clean, responsive web pages and applications
 - “Mobile-first” library
 - CSS with predefined tags for developers’ use
 - Includes UI components, layouts, and other tools



Bootstrap

Bootstrap Grid System

- **Grid System** – Bootstrap’s solution to making the most of the space provided on a given platform
 - Includes between 1 and 12 columns depending on scale of device viewport
 - Utilizes predefined classes to maximize web page layout options

Using Bootstrap

1

Begin with basic HTML page

```
<!DOCTYPE html>
<html>
<head>
  <title>Bootstrap Example</title>
</head>

<body>
  <!-- content will go here -->
</body>

</html>
```

Using Bootstrap

2

Include Bootstrap in your project

- Include the following within the <head> section
- See <https://getbootstrap.com/getting-started/> for most recent versions

```
<!-- Latest compiled and minified CSS -->
<link rel="stylesheet"
      href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.min.css">

<!-- jQuery Library -->
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.1.1/jquery.min.js">
</script>

<!-- Latest compiled JavaScript -->
<script src="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/js/bootstrap.min.js">
</script>
```

Using Bootstrap

3

Additional Details: Utilize 'mobile-first' framework (Add within <head> section above other tags)

```
<meta name="viewport" content="width=device-width, initial-scale=1">
```

Using Bootstrap

3

Additional Details: Utilize ‘mobile-first’ framework (Add within <head> section above other tags)

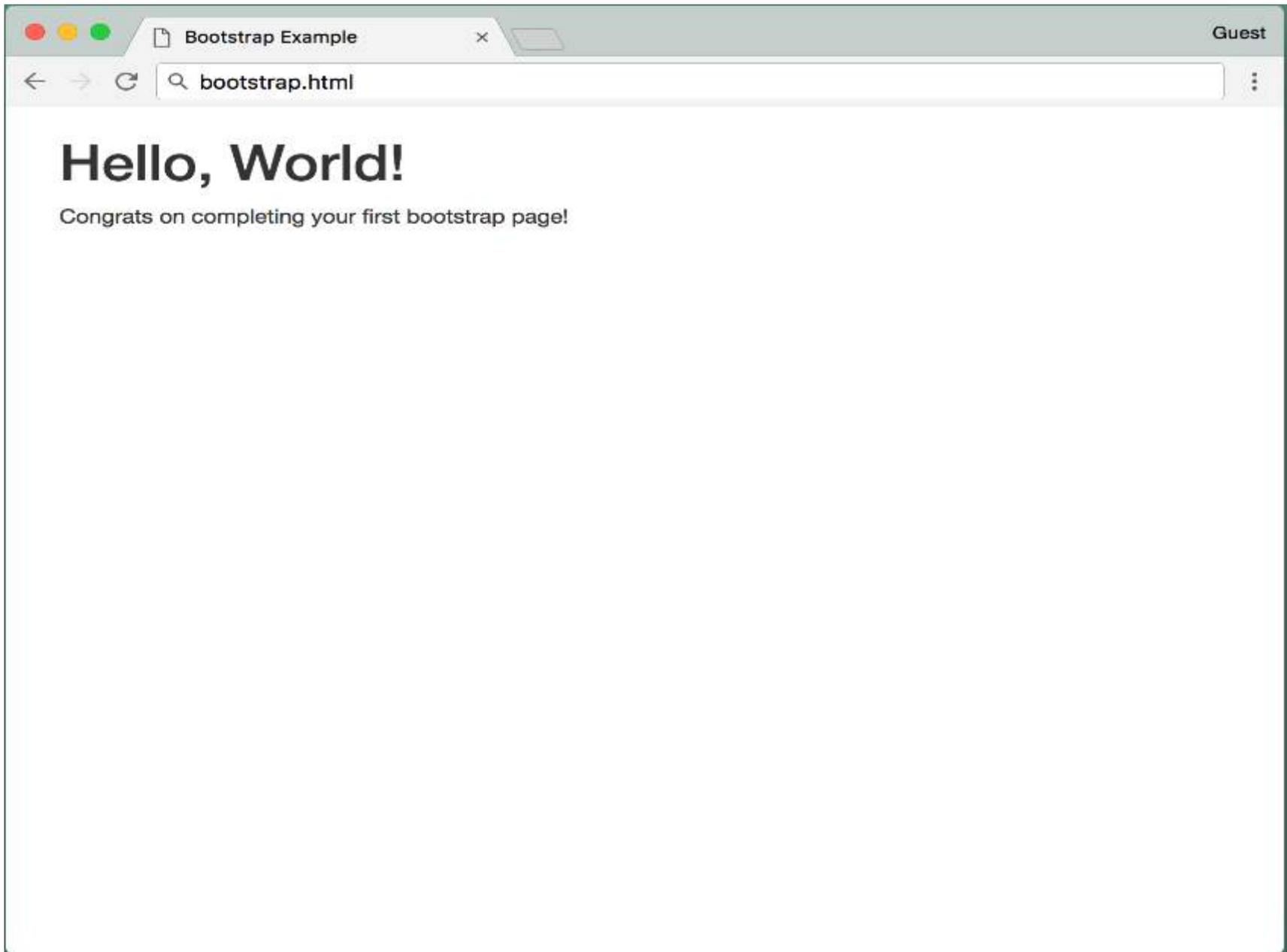
```
<meta name="viewport" content="width=device-width, initial-scale=1">
```

4

Add content in the <body>

- Create a <div> using the “container” class

```
<body>  
  <div class="container">  
    <h1> Hello, World! </h1>  
    <p> Congrats on completing your first bootstrap page! </p>  
  </div>  
</body>
```



Using the Bootstrap Grid System

- Content is organized into **rows**: “horizontal group of columns”
- If no set width is specified, Bootstrap will automatically size all columns in a row so that they are equally spaced
- Column classes allow user to indicate width of a column represented as columns out of 12 that should be used

```
<body>

  <div class="container">
    <div class="row">
      <div class="col-md-4">This is the first piece of RWD content.</div>
      <div class="col-md-4">This is the second piece of RWD content.</div>
      <div class="col-md-4">This is the third piece of RWD content.</div>
    </div>
  </div>

  <p>

  <table width="100%" border="1">
    <tr align="center">
      <td>This is the first table cell</td>
      <td>This is the second table cell</td>
      <td>This is the third table cell</td>
    </tr>
  </table>

</body>
```

```
<body>

  <div class="container">
    <div class="row">
      <div class="col-md-4">This is the first piece of RWD content.</div>
      <div class="col-md-4">This is the second piece of RWD content.</div>
      <div class="col-md-4">This is the third piece of RWD content.</div>
    </div>
  </div>

  <p>

  <table width="100%" border="1">
    <tr align="center">
      <td>This is the first table cell</td>
      <td>This is the second table cell</td>
      <td>This is the third table cell</td>
    </tr>
  </table>

</body>
```

```
<body>

  <div class="container">
    <div class="row">
      <div class="col-md-4">This is the first piece of RWD content.</div>
      <div class="col-md-4">This is the second piece of RWD content.</div>
      <div class="col-md-4">This is the third piece of RWD content.</div>
    </div>
  </div>

  <p>

  <table width="100%" border="1">
    <tr align="center">
      <td>This is the first table cell</td>
      <td>This is the second table cell</td>
      <td>This is the third table cell</td>
    </tr>
  </table>

</body>
```

```
<body>

  <div class="container">
    <div class="row">
      <div class="col-md-4">This is the first piece of RWD content.</div>
      <div class="col-md-4">This is the second piece of RWD content.</div>
      <div class="col-md-4">This is the third piece of RWD content.</div>
    </div>
  </div>

  <p>

  <table width="100%" border="1">
    <tr align="center">
      <td>This is the first table cell</td>
      <td>This is the second table cell</td>
      <td>This is the third table cell</td>
    </tr>
  </table>

</body>
```

```
<body>

  <div class="container">
    <div class="row">
      <div class="col-md-4">This is the first piece of RWD content.</div>
      <div class="col-md-4">This is the second piece of RWD content.</div>
      <div class="col-md-4">This is the third piece of RWD content.</div>
    </div>
  </div>

  <p>

  <table width="100%" border="1">
    <tr align="center">
      <td>This is the first table cell</td>
      <td>This is the second table cell</td>
      <td>This is the third table cell</td>
    </tr>
  </table>

</body>
```

The screenshot shows a web browser window with the title "Bootstrap Example" and a "Guest" user. The address bar contains "bootstrap.html". The page content consists of a table with three columns and two rows. The first row contains three text blocks: "This is the first piece of RWD content.", "This is the second piece of RWD content.", and "This is the third piece of RWD content.". The second row contains three table cells: "This is the first table cell", "This is the second table cell", and "This is the third table cell".

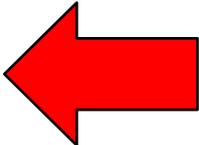
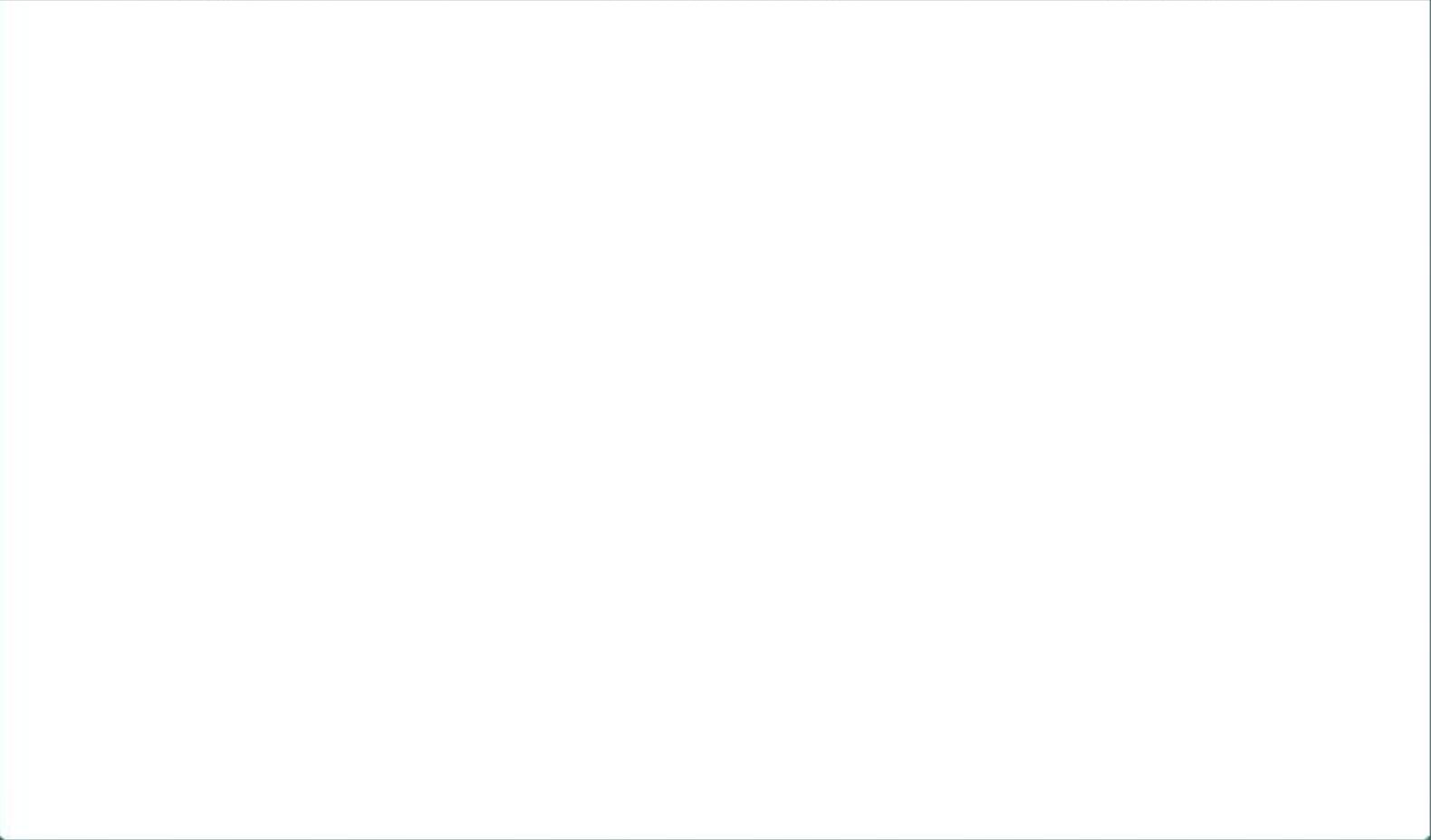
This is the first piece of RWD content.	This is the second piece of RWD content.	This is the third piece of RWD content.
This is the first table cell	This is the second table cell	This is the third table cell

Bootstrap Example x Guest

bootstrap.html

This is the first piece of RWD content.
This is the second piece of RWD content.
This is the third piece of RWD content.

This is the first table cell	This is the second table cell	This is the third table cell
------------------------------	-------------------------------	------------------------------

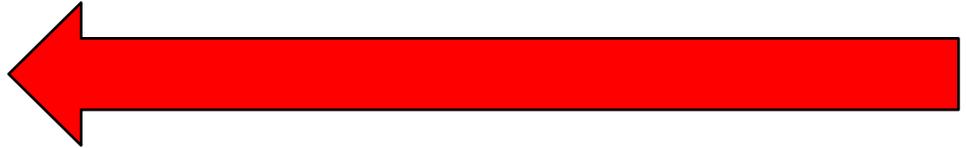
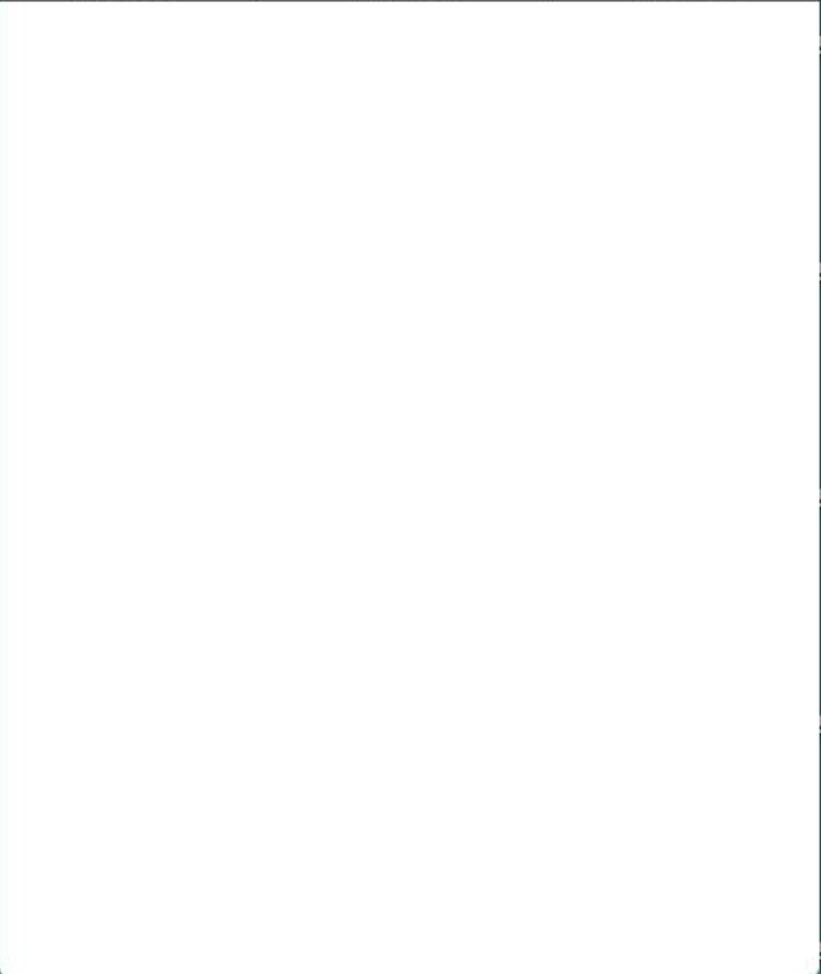


Bootstrap Example Guest

bootstrap.html

This is the first piece of RWD content.
This is the second piece of RWD content.
This is the third piece of RWD content.

This is the first table cell	This is the second table cell	This is the third table cell
------------------------------	-------------------------------	------------------------------



This is the first piece of RWD content.
This is the second piece of RWD content.
This is the third piece of RWD content.

This is the first table cell

This is the second table cell

This is the third table cell

This is the first piece of RWD content.
This is the second piece of RWD content.
This is the third piece of RWD content.

This is the first table cell	This is the second table cell	This is the third table cell
------------------------------	-------------------------------	------------------------------

- Back
- Forward
- Reload

- Save As...
- Print...
- Cast...
- Translate to English

- View Page Source
- Inspect

This is the first piece of RWD content.
This is the second piece of RWD content.
This is the third piece of RWD content.

This is the first table cell	This is the second table cell	This is the third table cell
------------------------------	-------------------------------	------------------------------

- Back
- Forward
- Reload

- Save As...
- Print...
- Cast...
- Translate to English

- View Page Source
- Inspect**

Responsive 960 x 796 50%

This is the first piece of RWD content.
This is the second piece of RWD content.
This is the third piece of RWD content.

This is the first table cell	This is the second table cell	This is the third table cell
------------------------------	-------------------------------	------------------------------

Elements

```
<!DOCTYPE html>  
...<html lang="en"> == $0  
  ▶<head>...</head>  
  ▶<body>...</body>  
</html>
```

html

Styles Event Listeners

:hov .cls +

Console

top Filter Verbose

Responsive ▾

960 x 796 50% ▾

This is the first piece of RWD content.
This is the second piece of RWD content.
This is the third piece of RWD content.

This is the first table cell	This is the second table cell	This is the third table cell
------------------------------	-------------------------------	------------------------------

Elements >> X

```
<!DOCTYPE html>  
...<html lang="en"> == $0  
▶<head>...</head>  
▶<body>...</body>  
</html>
```

html

Styles Event Listeners >>

:hov .cls +

Console X

top ▾ Filter Verbose ▾ ⚙

Responsive ▾ 960 x 796 50% ▾

- ✓ Responsive
- Galaxy S5
- Nexus 5X
- Nexus 6P
- iPhone 5
- iPhone 6
- iPhone 6 Plus
- iPad
- iPad Pro
- Edit...

This is the
This is the
This is the

This is the first ta	e second table cell	This is the third table cell
----------------------	---------------------	------------------------------

Elements >>

```
<!DOCTYPE html>  
..<html lang="en"> == $0  
▶<head>...</head>  
▶<body>...</body>  
</html>
```

html

Styles Event Listeners >>

:hov .cls +

Console X

top ▾ Filter Verbose ▾

Responsive ▾ 960 x 796 50% ▾

- ✓ Responsive
- Galaxy S5
- Nexus 5X
- Nexus 6P
- iPhone 5**
- iPhone 6
- iPhone 6 Plus
- iPad
- iPad Pro
- Edit...



Elements >> X

```
<!DOCTYPE html>  
...<html lang="en"> == $0  
▶<head>...</head>  
▶<body>...</body>  
</html>
```

html

Styles Event Listeners >>

:hov .cls +

Console X

top ▾ Filter Verbose ▾ ⚙

iPhone 5 ▾ 320 x 568 50% ▾

This is the first piece of RWD content.
This is the second piece of RWD content.
This is the third piece of RWD content.

This is the first table cell	This is the second table cell	This is the third table cell
---------------------------------	----------------------------------	---------------------------------

Elements >>

```
<!DOCTYPE html>  
..<html lang="en"> == $0  
  ▶<head>...</head>  
  ▶<body>...</body>  
</html>
```

html

Styles Event Listeners >>

:hov .cls +

Console

top ▾ Filter Verbose ▾

iPad ▼ 768 x 1024 38% ▼

This is the first piece of RWD content.
This is the second piece of RWD content.
This is the third piece of RWD content.

This is the first table cell	This is the second table cell	This is the third table cell
------------------------------	-------------------------------	------------------------------

Elements >> X

```
<!DOCTYPE html>  
...<html lang="en"> == $0  
▶<head>...</head>  
▶<body>...</body>  
</html>
```

html

Styles Event Listeners >>

:hov .cls +

Console X

top ▼ Filter Verbose ▼ ⚙

iPad ▼ 768 x 1024 38% ▼



This is the first piece of RWD content.
This is the second piece of RWD content.
This is the third piece of RWD content.

This is the first table cell	This is the second table cell	This is the third table cell
------------------------------	-------------------------------	------------------------------

Elements >> X

```
<!DOCTYPE html>  
...<html lang="en"> == $0  
  ▶<head>...</head>  
  ▶<body>...</body>  
</html>
```

html

Styles Event Listeners >>

:hov .cls +

Console X

top ▼ Filter Verbose ▼ ⚙

This is the first piece of RWD content.	This is the second piece of RWD content.	This is the third piece of RWD content.
This is the first table cell	This is the second table cell	This is the third table cell

```
<!DOCTYPE html>  
..<html lang="en"> == $0  
▶<head>...</head>  
▶<body>...</body>  
</html>
```

:hov .cls +

Learning more about Bootstrap

- There are many examples of Bootstrap layouts and components at

<https://getbootstrap.com/getting-started/#examples>

- The best way to learn is to select an example and view its source code.
 - This source code is available for re-use
 - Access source code by right-clicking in the web page and selecting “View Page Source”
 - Or right-click on an element and select “Inspect”



Buttons



Tables



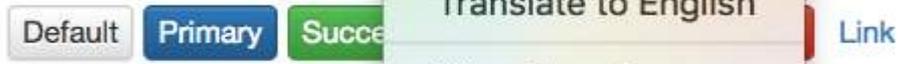
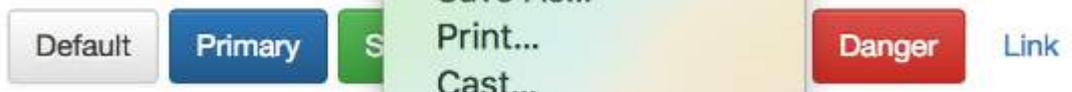
Buttons

Default Primary Success Info Warning Danger Link

Tables



Buttons

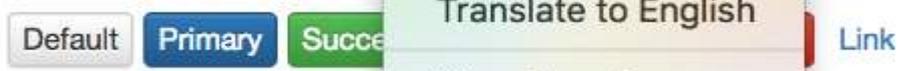
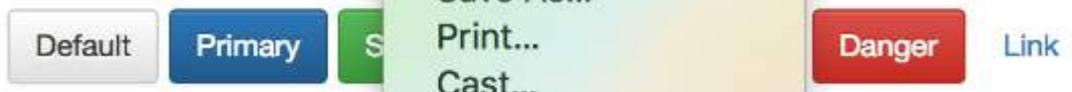


- Back
- Forward
- Reload
- Save As...
- Print...
- Cast...
- Translate to English
- View Page Source
- Inspect

Tables



Buttons



- Back
- Forward
- Reload
- Save As...
- Print...
- Cast...
- Translate to English
- View Page Source
- Inspect

Tables

1024 x 768

```
> <nav class="navbar navbar-inverse navbar-fixed-top">...</nav>  
▼ <div class="container theme-showcase" role="main">  
  ::before  
  <!-- Main jumbotron for a primary marketing message or call to action -->  
  > <div class="jumbotron">...</div>  
  > <div class="page-header">...</div>  
  ▼ <p>  
    <button type="button" class="btn btn-lg btn-default">Default</button>  
    ... <button type="button" class="btn btn-lg btn-primary">Primary</button> ==  
    <button type="button" class="btn btn-lg btn-success">Success</button>  
    <button type="button" class="btn btn-lg btn-info">Info</button>  
    <button type="button" class="btn btn-lg btn-warning">Warning</button>  
    <button type="button" class="btn btn-lg btn-danger">Danger</button>  
    <button type="button" class="btn btn-lg btn-link">Link</button>  
  </p>  
  > <p>...</p>  
  > <p>...</p>  
  > <p>...</p>  
  > <div class="page-header">...</div>  
  > <div class="row">...</div>  
  > <div class="row">...</div>
```

html body div.container.theme-showcase p button.btn.btn-lg.btn-primary

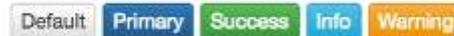
Styles Event Listeners DOM Breakpoints Properties

Filter :hov .cls +

Console

top Filter Verbose

Buttons



Tables

#	First Name	Last Name
1	Mark	Otto

1024 x 768

Elements Console Sources Network Performance

```

▶ <nav class="navbar navbar-inverse navbar-fixed-top">...</nav>
▼ <div class="container theme-showcase" role="main">
  ::before
  <!-- Main jumbotron for a primary marketing message or call to action -->
  ▶ <div class="jumbotron">...</div>
  ▶ <div class="page-header">...</div>
  ▼ <p>
    <button type="button" class="btn btn-lg btn-default">Default</button>
    <button type="button" class="btn btn-lg btn-primary">Primary</button>
    <button type="button" class="btn btn-lg btn-success">Success</button>
    <button type="button" class="btn btn-lg btn-info">Info</button>
    <button type="button" class="btn btn-lg btn-warning">Warning</button>
    <button type="button" class="btn btn-lg btn-danger">Danger</button>
    <button type="button" class="btn btn-lg btn-link">Link</button>
  </p>
  ▶ <p>...</p>
  ▶ <p>...</p>
  ▶ <p>...</p>
  ▶ <div class="page-header">...</div>
  ▶ <div class="row">...</div>
  ▶ <div class="row">...</div>

```

Buttons



Tables

#	First Name	Last Name
1	Mark	Otto

html body div.container.theme-showcase p button.btn.btn-lg.btn-primary

Styles Event Listeners DOM Breakpoints Properties

Filter :hov .cls +

Console

top Filter Verbose

Review: Week 1

- **HTTP** is the protocol used to transfer content on the Web
- **HTML** allows us to specify the structure of Web content
- **CSS** is a formatting language used to describe the appearance of content in an HTML file
- **RWD** libraries provide CSS formatting that we can use to address the challenges of displaying Web content on various devices