Final Exam
Tuesday, December 18, 2:00–3:50 p.m.
Final Exam

The final exam is cumulative and the format is multiple-choice.

Questions will be both concept- and code-based.

You should be familiar with material from the lectures, slides, and reading.

You should be able to read and answer questions about HTML, CSS, SVG, and JavaScript code.

Be sure to arrive on time and bring your NYU ID and a pencil.
What is the Internet?

A computer network consisting of a worldwide network of computer networks that use standardized network protocols to facilitate data transmission and exchange.
1964, On Distributed Communications
Networks

Centralized, decentralized, and distributed

A decentralized network represents a less-hierarchical structure than a centralized network. Complete reliance on a single point is not required.

The foundational concept of decentralized networks would be deployed in tandem with what came to be known as “packet-switching,” which entails breaking up communications into small parts, sending them along, and reconstructing them at the end.
The Internet and the World Wide Web
The Internet and the World Wide Web

The Internet and the Web are separate but related things.

The Internet is a massive network of networks, a networking infrastructure that connects computers globally.

The Web is a way of accessing information over the medium of the Internet, an information sharing model that is built on top of the Internet.

The Web is just one of the ways that information can be disseminated over the Internet but it is the one we are focused on in this class.
Internet Access
1980s–Present

- Personal Computing
- Portable Computing
- Mobile Computing
- Ubiquitous Computing
IBM 5150
1981
Apple PowerBook 540c
1993
Apple iPhone
2007
Ubiquitous Computing
The Open Web and its Discontents

In many ways we are experiencing the afterglow of the technological promise of freedom and openness.

Networked tools and digital media still offer lots of possibilities but also significant problems.

What are some of the dystopian aspects of the Internet and the Web today?
Re-Decentralization

“A new Decentralized Web has the potential to be open, empowering users around the globe to control and protect their own personal data better than before.”

Decentralized Web Summit
Future of Blockchain
scet.berkeley.edu/future-blockchain-berkeley-perspective
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Class 1
Introduction and Overview
Digital Media Storage

Modern vernacular of 1s and 0s

On/Off

Electrical impulses (+5v / -5v)

- Single 0 or 1 = 1 “bit”
- A group of 8 bits = 1 “byte”
- 1 million bytes ≈ 1 “megabyte”
- 1,024 megabytes = 1 “gigabyte”
- 1,000 gigabytes = 1 “terabyte”
Class 1
Introduction and Overview

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Class 1
Introduction and Overview
Digital Media Transfer

Megabits (Mb)

Internet connection speed is normally measured in megabits.

Megabits (Mb) are not the same as megabytes (MB).

8 bits = 1 byte; therefore, a megabyte is 8 times the size of a megabit.

The average Internet connection speed in the United States in 2015 was 12.6 Mb/second.
Introduction and Overview

The graph shows the transistor count over time. The curve indicates that the transistor count is doubling every two years. This exponential growth is a result of advances in semiconductor technology and design over the decades.
Moore’s Law

Describes a constant rate of change in computer processor speed

The number of transistors that can be placed inexpensively on an integrated circuit doubles every two years.

The number of transistors is closely connected to processor speed, memory, etc.

Computer processor speed has doubled approximately every two years.

Moore’s Law seems to be plateauning but has held steady for the past 40 years.

Digital media is in a constant state of flux.
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Class 1
Introduction and Overview
Guiding Principles

Open Source

- Anyone is free to use it
- Usually free of charge
- Source code is made available
- Can be modified and redistributed
Guiding Principles

Net Neutrality

The principle that Internet service providers should enable access to all content and applications regardless of the source, and without favoring or blocking particular products or websites.
Guiding Principles

Web Standards

The formal, non-proprietary standards and technical specifications that define and describe aspects of the World Wide Web and its interoperability.

These include:
- HTML5
- CSS
- JavaScript
- SVG
- WOFF
Operating Systems

Software that manages a computer’s resources

Allocates resources among other programs

Resources include the central processing unit (CPU), computer memory, file storage, input/output (I/O) devices, and network connections

Runs indefinitely and terminates only when the computer is turned off
Operating Systems

Examples

- DOS (Generic term)
- Microsoft OS
- Mac OS
- Linux
- iOS
- Android
- Symbian OS
Operating Systems

History

First digital computers had no operating systems.
Ran one program at a time, which had command of all system resources.
A human operator would provide any special resources needed.
First operating systems were developed in the mid-1950s.
Command Line Interface / Graphical User Interface
Unix

Operating system by AT&T Bell Labs
Originally developed in 1969
Command line interface
Portable, multi-tasking, multi-user
Free distribution, open system
Servers, workstations, mobile devices
Basis of Linux and MacOS
Unix

Commands

See Reading section of course site for basic Unix commands.
Chmod

Chmod sets permissions

Every file and directory has nine permissions associated with it.

Files and directories have three types of permissions (or none):
- `r` (read)
- `w` (write)
- `x` (execute)
- `-` (no permission)

The above permissions occur for each of the following classes or users:
- `u` (user/owner)
- `g` (group)
- `o` (other/world)
<table>
<thead>
<tr>
<th>Permission</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>rwx rwx rwx</td>
<td>chmod 777 filename</td>
</tr>
<tr>
<td>rwx rwx r-x</td>
<td>chmod 775 filename</td>
</tr>
<tr>
<td>rwx r-x r-x</td>
<td>chmod 755 filename</td>
</tr>
<tr>
<td>rw- rw- r--</td>
<td>chmod 664 filename</td>
</tr>
<tr>
<td>rw- r-- r--</td>
<td>chmod 644 filename</td>
</tr>
</tbody>
</table>
## Chmod

### Files and folders

Standard file permission: **644**

- Owner can read and write file;
- Group can read file;
- Others can read file

Standard directory permission: **755**

- Owner can read, write and execute file;
- Group can read and execute file;
- Others can read and execute file
HTML
HyperText
Markup Language

A language for describing Web pages
HTML is not a programming language, it is a markup language
A markup language is a set of markup tags
HTML uses markup tags to describe Web pages
HTML

Early history key dates

1990: Original HTML specification written by physicist, Tim Berners-Lee for cross-referencing documents

1993: First text-based browser, Lynx, released

1993: Mosaic browser released, adding images, nested lists, forms

1994: First World Wide Web conference held in Geneva

1994: Netscape is formed

1994: The World Wide Web Consortium is formed, w3.org
HTML Tag

Opening/Closing

Keywords surrounded by angle brackets, for example: `<html>`

HTML tags normally come in pairs, like `<h1>` and `</h1>`

The first tag in a pair is the “start tag,” the second tag is the “end tag”

Start and end tags are also called “opening” and “closing” tags
HTML Element
Everything from the start tag to the end tag

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

Start tag:
<p>

Element content:
This is a paragraph.

End tag:
</p>
Web Pages

HTML Documents

HTML documents describe Web pages
Contain HTML tags in plain text
HTML documents are Web pages
Recommended plain text editors: Sublime Text, Brackets, and Atom
Web Browsers

Render HTML Documents

Reads HTML documents and displays them as Web pages

Web browsers do not display HTML tags, but use them to interpret the content of the page

Recommended browsers:
Firefox, Chrome, Safari, Edge
Example

Bare minimum

<!DOCTYPE html>
<html>
  <head>
    <meta charset="utf-8">
    <title>Page Title</title>
  </head>
  <body>
  </body>
</html>
Example Explained

<!DOCTYPE html> tells browsers that they are interpreting an HTML document

Text between <html> and </html> describes the Web page

Text between <title> and </title> is displayed as the page title

Text between <body> and </body> is the visible page content
SFTP

SSH (Secure) File Transfer Protocol

Web pages are usually created “locally” on a personal computer, then uploaded to a web server.

A web page is not publicly accessible until it’s published to a web server.

An FTP client is used to transfer files from a personal computer to a server.

Cyberduck, Fetch, WinSCP, Transmit, and FileZilla are good SFTP clients.

“Local” files are those on a personal computer, “remote” files are those on a web server—“live.”
HTML5
New standard for HTML
First version published in 2008
An official W3C recommendation as of October 2014

• New Elements
• New Attributes
• Full CSS3 Support
• Video and Audio
• 2D/3D Graphics
• Web Applications
• Smartphone Apps
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CSS
Cascading Style Sheets
CSS
Cascading Style Sheets

Defines a Web page’s appearance

CSS separates style and content

Consists of a plain text file with rules for the display of HTML elements

Formatting includes fonts and colors as well as layout and position

Can be created outside of your HTML and applied to multiple Web pages

Well-formed HTML is important for your CSS to work properly
CSS

History

Prior to CSS, Web pages were commonly styled with HTML tags and structured with tables. This was both tedious and inefficient. Nine different style sheet languages were proposed, two were chosen as the foundation. CSS Level 1 emerged as a W3C Recommendation in December 1996. Browsers began to support CSS over the next few years.
CSS Application

CSS can be applied in three different ways to a Web page:

- In an external .css file
- In the `<head>` section of an HTML document
- Inline with HTML code
CSS
Rule Set

Selector: Indicates which HTML element will be formatted

Declaration block: Describes the formatting to apply

Property/value pair: Specifies format

Style rules are separated by a semicolon

```css
h1 {
    color: green;
    background: yellow;
}
```
CSS
Cascade

The principle of the “cascade” is applied when style rules are in conflict.

Three primary factors determine which style rule wins out:

• Inheritance
• Specificity
• Location
CSS
Display Mode

Elements in HTML are primarily “inline” or “block” elements.

• An inline element allows content to flow around its left and right sides.

• A block element fills the entire line and nothing is displayed on its left or right side.

The CSS display property allows you to specify the type of box used for an HTML element.
CSS

Box Model

In a web page, every element is rendered as a rectangular box.

This box includes the following, changeable properties.

• Content
• Padding
• Border
• Margin
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CSCI-UA 4

CSS
Cascading Style Sheets
CSS

Units of Length

There are two types of length units in CSS, relative and absolute.

Relative units of length include:
- `em` (relative to font size)
- `%` (relative to the containing element)

Absolute units of length include:
- `px` (pixels)

Alternatively specifications:
- `auto` (browser calculates length)
- `inherit` (from the parent element)
CSS3

Latest standard for CSS

CSS2 is best supported

CSS3 is still evolving but offers new features for designers and developers

Modern browsers support many aspects of CSS3

Backwards compatible with CSS2
Raster Graphics

Also known as “bitmap” graphics

A grid of picture elements, “pixels,” each of which contain color and brightness information

Pixels can be changed individually or as a group with program algorithms

Contrast vector graphics which describe points and lines
Raster Graphics

Web Formats

JPEG
“Joint Photographic Experts Group”

PNG
“Portable Network Graphics”

GIF
“Graphic Interchange Format”

WebP
Up-and-coming image format but not well supported yet
Photoshop
1987

Created by Thomas Knoll, then a PhD student at the University of Michigan

Originally called “Display”

For displaying grayscale images, scanned into a computer

Acquired by Adobe in 1988

Released as Photoshop 1.0 for Macintosh in 1990

Layer support introduced in version 3 (c. 1993)
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Web Images
Raster Graphics

Ps
SVG
Scalable Vector Graphics

SVG is a language for describing two-dimensional graphics in XML.

SVG allows for three types of graphic objects: vector graphic shapes, images, and text.

SVG drawings can be interactive and even styled with CSS.

Scalable Vector Graphics (SVG) 1.1
Introduction
www.w3.org/TR/SVG/
SVG
Scalable

To be scalable means to increase or decrease uniformly

In terms of graphics, means not being limited to a single, fixed, pixel size

On the Web, scalable means that a particular technology can grow

SVG is scalable in both senses of the word

Scalable Vector Graphics (SVG) 1.1
Concepts
http://www.w3.org/TR/SVG/concepts.html
SVG
Vector

Vector graphics contain geometric objects such as lines and curves.

This gives greater flexibility compared to raster-only formats.

Since all modern displays are raster-oriented, the difference between raster-only and vector graphics comes down to where they are rasterized.

Vector graphics are rasterized client side; raster graphics are, by nature, already rasterized on the server.

Scalable Vector Graphics (SVG) 1.1 Concepts
http://www.w3.org/TR/SVG/concepts.html
Most existing XML grammars represent either textual information or raw data. They typically provide only rudimentary graphical capabilities. SVG provides a rich, structured description of vector and mixed vector/raster graphics.

Scalable Vector Graphics (SVG) 1.1 Concepts
http://www.w3.org/TR/SVG/concepts.html
**SVG**

**Advantages**

- SVG images can be created and edited with any text editor.
- SVG images can be searched, indexed, scripted, and compressed.
- SVG images are scalable, can be printed at any resolution, and are zoomable without degradation.
- SVG is an open standard.
- SVG files are pure XML.

SVG Introduction

http://www.w3schools.com/svg/svg_intro.asp
SVG

XML

XML stands for Extensible Markup Language

XML is a markup language much like HTML

XML was designed to carry data, not to display data

XML tags are not predefined. You must define your own tags

XML is designed to be self-descriptive

SVG is written in XML

Introduction to XML

http://www.w3schools.com/xml/xml_whatis.asp
The advantages of style sheets are now generally accepted, certainly for use with text. SVG extends this control to the realm of graphics. It allows for script-based manipulation of the document tree and the style sheet.

Scalable Vector Graphics (SVG) 1.1 Concepts
http://www.w3.org/TR/SVG/concepts.html
There are a variety of ways in which SVG content can be included within a Web page:

- A stand-alone SVG Web page
- Embedding by reference, using the HTML ‘img’ element
- Embedding inline
- External link, using the HTML ‘a’ element
- Referenced from a CSS property
Thought
Thought

Design is a process that involves you.
Form

Photography
Illustration
Line and Shape
Texture
Color
Typography
Composition
Form
Typography

Font selection
Type size
Alignment
Letter spacing
Line spacing
Grammar
Form
Composition

Rhythm
Proportion
Structure
Variation
Balance
Boundary
Space
Context
**Context**

- Device
- Web browser
- Age of visitor
- Literacy
- Geographic location
- Language(s)
- Ability
The Web should be accessible to all regardless of ability and we must design for accessibility.
Accessibility

Categories of Disability

Vision impairment
Mobility impairment
Auditory impairment
Cognitive impairment
Cultivating a mindful design approach allows you to do more with less.
Wireframing

Website wireframing allows you to plan the layout of your website.

It is the process of making design decisions before they are implemented.

Wireframing can range from a simple skeletal framework to a detailed mockup of each page.

Spending time planning your site makes coding easier.
Wireframing
And Prototyping

Here is an approach to wireframing that can be adapted to a variety of design projects.

• Think
• Design
• Implement
• Revise

This sequence can be looped through as necessary.
Wireframing

Site Map

- HOME
  - Buy
  - Rent
  - List
  - Grid
  - Map
  - Properties

- Our Branches
  - Branch
  - Staff

- Content
  - Locations
Display Mode

Elements in HTML are primarily “inline” or “block” elements.

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The CSS display property allows you to specify the type of box used for an HTML element.
Page Layout

There are several ways to design the layout of a web page with CSS.

- CSS float property
- CSS positioning
- CSS flexible box
- CSS grid
Page Layout

CSS Float Property

The CSS `float` property allows you to position block elements inline. This means that any element, block or inline, can be positioned alongside another element. The CSS `float` property is one of the main techniques of web page layout.
The CSS position property specifies the type of positioning used for an element on a page.

- **static**: Elements are rendered in order, as they appear in the document flow (this is the default).
- **absolute**: Element is positioned relative to its first positioned (not static) parent element.
- **fixed**: Element is positioned relative to the browser window.
- **relative**: Element is positioned relative to its normal position.
Use the CSS Flexible Box Layout Module (Flexbox) for arranging items along one axis.

Flexbox consists of flexible containers and flexible items within.

A flex container expands items to fill available free space or shrinks them to prevent overflow.

In practice, flexbox can accommodate different screen sizes and different display devices more easily than the CSS float property.
Page Layout

CSS Grid

Web pages are often laid out using grid systems.

CSS grids are intended to make this process more intuitive by defining a grid and then specifying where content should be placed within it.

Use the CSS Grid Layout Module for the overall page structure.
Responsive Web Design

“The control which designers know in the print medium, and often desire in the web medium, is simply a function of the limitation of the printed page. We should embrace the fact that the web doesn’t have the same constraints, and design for this flexibility. But first, we must ‘accept the ebb and flow of things.’”

– John Allsopp, “A Dao of Web Design”
Responsive Web Design

Mobile traffic is as relevant as desktop traffic now.

We should build for the type of screens that will be used to access our sites.

One way to do this is with alternate style sheets.

Responsive web design uses “media queries” to figure out what resolution of device it’s being served on.

Flexible images and fluid grids size correctly to fit the screen.

Design for flexibility.
Responsive Web Design
Foundations

Flexible grids (fluid layouts)
Media queries
Flexible, responsive images
Media Queries

Features you can include in a query:
- width
- height
- device-width
- device-height
- orientation
- aspect-ratio
- device-aspect-ratio
- color
- color-index
- monochrome
- resolution
- scan grid

Most of the above can be combined with min- and max- prefixes

Most common are min-width and max-width prefixes

Media queries can be used to load an alternate style sheet or offer alternate styles within an existing style sheet
Media Query Syntax

Two possible values: only or not

only screens out older browsers from reading the rest of the query

not negates the result: not screen
means everything except screen
type is the media type

feature: value

Enclosed by parentheses and preceded by the word, and

Predefined media features

Multiple features and values can also be combined with and
Basic CSS Rule Set

body {background-color: orange;}

CSS Rule Set with @media Rule

@media only screen and (min-width: 480px) {
  body {background-color: orange;}
}

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JavaScript
Introduction
JavaScript

You can think of a web page as consisting of three layers: structure, presentation, and behavior

• HTML is the structure layer
• CSS is the presentation layer
• JavaScript is the behavior layer

JavaScript is a programming language for creating interactivity and functionality in web browsers
JavaScript was invented by Brendan Eich and introduced by Netscape in 1995.

At that time, the Java language was ascendant and the name “JavaScript” was an attempt to ride this popularity.

Eventually, browsers other than Netscape began to support JavaScript functionality, calling it “ECMAScript.”

Today, JavaScript is not only a lingua franca of the Web but a basis for many other computational media projects.
As with CSS, JavaScript targets HTML elements to do something with them. There are three ways you can apply JavaScript to HTML:

- Inline JavaScript
- Embedded JavaScript
- External JavaScript

External and embedded JavaScript are preferable for their separation of content and behavior.
JavaScript
Front-End Language

Like HTML and CSS, JavaScript is usually rendered in the web browser.

Because it’s rendered in the browser rather than on a server, JavaScript is considered a “front-end language”.

A browser’s “JavaScript engine” interprets and executes JavaScript code in the browser.

There are different JavaScript engines for different web browsers.
JavaScript

Capability

Computationally speaking, there isn’t much JavaScript can’t do; it’s a robust programming language.

Core functionality includes modifying HTML and CSS, communicating with the server, and storing data.

We will use JavaScript to modify page content and style, and for interactivity.

As with any technology, it’s good to consider when to—and not to—use it.
Document Object Model

When a browser loads a web page, it creates a model of that page. This is called a “DOM tree” and it is stored in the browser’s memory. Every element, attribute, and piece of text in the HTML is represented by its own “DOM node”
Document Object Model

Types of DOM Nodes

There are four main types of nodes.

- The Document node, which represents the entire page
- Element nodes, which represent individual HTML tags
- Attribute nodes, which represent attributes of HTML tags, such as class
- Text nodes, which represent the text within an element, such as the content of a p tag

We talk about the relationship between element nodes as “parents,” “children,” and “siblings.”
<html>
<head>
    <title>New York University</title>
</head>
<body>
    <h1>Intro to Web Design</h1>
    <p>In this lecture-based course you will learn how to build websites.</p>
    <p>Class notes are available <a href="notes.html">here</a>.</p>
</body>
</html>
html

head

title

New York University

body

h1

Intro to Web Design

p

In this lecture-based course . . .

p

Class notes are available here.
html → head → title → New York University

body → h1 → Intro to Web Design

p → This course . . .

p → Class notes are . . .

a → here
JavaScript methods that find elements in the DOM tree are called “DOM queries”

DOM queries may return one element, or they may return a “node list”

Which DOM query you use depends on what you want to do and the scope of browser support required
Document Object Model

DOM Queries

JavaScript methods that return a single element node:

• `getElementById()`
• `querySelector()`
Document Object Model

DOM Queries

JavaScript methods that return one or more elements as a node list:

- getElementsByClassName()
- getElementsByTagName()
- querySelectorAll()
JavaScript Events

As you navigate the web, your browser registers different types of events.

Common events include:
- Clicking or tapping on a link
- Hovering or swiping over an element
- Resizing the browser window
- A web page loading

JavaScript can be used to respond to the multitude of events that occur within the DOM.
Event Types
Event Types

UI Events

load
unload
error
resize
scroll
Event Types

Keyboard Events

down
up
press
Event Types
Mouse Events

- click
- dblclick
- mousedown
- mouseup
-mousemove
- mouseover
- mouseout
Event Types

Focus Events

focus
blur
Event Types

Form Events

input
change
submit
reset
cut
copy
paste
select
Event Types

Mutation Events

DOMSubtreeModified
DOMNodeInserted
DOMNodeRemoved
DOMNodeInsertedIntoDocument
DOMNodeRemovedFromDocument
Event Types

Touch Events

touchstart
touchmove
touchend
touchcancel
Event Handling
Event Handling

1. Select an element for the script to respond to.
2. Specify which event will trigger the response.
3. Run code specific to that event.
Event Handling

Binding

Specifying which event will trigger the response is also known as binding.

There are three different ways to bind an event to an element.

• HTML event handlers
• DOM event handlers
• DOM event listeners
jQuery is a JavaScript framework that makes it easier to achieve common JavaScript tasks.

It is simpler to access elements using jQuery’s CSS-style selectors.

jQuery takes many common tasks and wraps them inside “methods” that you can call with a single line of code.

Furthermore, jQuery takes the guess work out of browser support, since it runs in legacy browsers as well.
jQuery

Features

• HTML manipulation
• CSS manipulation
• HTML events
• Effects and animation
jQuery and JavaScript

jQuery does not do anything that couldn’t be done with pure JavaScript

jQuery itself is just a JavaScript file

Its goal is for you to be able to do more with less code

With an introduction to jQuery, you will begin to get a sense of what can be done with JavaScript in general

JavaScript takes time to learn but it’s well worth it if you want to go further with web development
Forms
Receiving Information on a Web Page

Name

Email

Website

Submit
Web pages are good not just for providing information to visitors, but also gathering information from them.

The HTML `<form>` element is used to define a form for getting user input.

A variety of form elements are used to provide an interface for the input.

These form elements include text fields, checkboxes, drop-down menus, and buttons.
Forms
Receiving Information on a Web Page
NYU Login
Login to NYUHome

Username
Password

By your use of these resources, you agree to abide by the Policy on Responsible Use of NYU Computers and Data.

Need Help?
Forms
Receiving Information on a Web Page

charity: water
100% funds water projects

Email
Name
Street
City ZIP Code
United States

Give
<form action="my-script.php">
  First name:
  <input type="text" name="firstname">
  <br>
  Last name:
  <input type="text" name="lastname">
  <br>
  <input type="submit" value="Submit">
</form>
Forms always begin with the `<form>` element.

The `<form>` element’s action attribute specifies how the form will be processed.

The `<input>` element is used for various kinds of user input.

The `<input>` element’s type attribute determines what kind of input is received from users.

Each `<input>` element must also have a name attribute and value in order for the data to be sent.
Before form data gets sent, it’s important to validate the input.

• You may want to make certain form fields required.

• You probably want to make sure that certain fields are completed properly.

• You should also verify that malicious code is not sent along with form input.

Form validation can be done client-side, server-side, or both.

We will use a jQuery validation plugin for simple client-side form validation.
Normally, forms are sent to the server to be processed.

This requires a server-side application written in a back-end language.

Since server-side coding is beyond the scope of this class, we will use a free service that receives form data and emails it to you.

Formspree is a project that allows us to easily add forms to otherwise static HTML pages.
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Web Audio and Video
HTML5 Media Elements
Sound

Sound consists of pressure waves moving through air.

Without air, there is no sound.

Our ears are sensitive to pressure waves and transmit these signals to the brain.
Hand Clap
Periodic Wave
Sound Recording
Acoustic waves to electrical waves

A microphone consists of a small membrane that vibrates
Movements of the membrane are translated into electrical signals
Higher pressure typically corresponds to higher voltage
Digital Audio

Analog to digital

An audio signal is an analog (continuous) format.

The electrical waves must be converted to digital information for computational processing.

Digital recording is accomplished with an analog-to-digital converter (ADC).

The ADC captures a snapshot of the electric voltage on an audio line and represents it as a digital number.

Capturing the voltage thousands of times per second creates a good approximation of the original audio.
Digital/Analog Sound
Digital Audio Playback

Digital to analog

All computers must give us analog signals to be useful.

The screen converts digital information to light.

The digital-to-analog converter (DAC) takes the sample and sets a certain voltage on the analog outputs to recreate the signal.

This voltage is conveyed to the speakers which create pressure waves in the air.
Audacity
Open-source sound editing software

Free, open-source software that can be altered and redistributed
Multilingual
Easy to use
Records live audio
Cuts, copies, splices and mixes sounds together
Exports to different formats (with appropriate plugin)
HTML5 now supports audio and video natively in the web browser.

For years, it was necessary to rely on a third party to deliver this kind of content.

Now we can use the `<audio>` and `<video>` tags.

The `<audio>` and `<video>` tags use the `<source>` tag to specify one or more media resources.
Domain Names

Domain names serve as a more memorable reference to Internet resources.

Domain names are used to identify Internet Protocol (IP) addresses.

An IP address is an identifier for a node—a computer or device on a network.
Domain Names

TLD

Every domain name has a suffix that indicates which top level domain (TLD) it belongs to.

Top-level domains today are grouped as follows:

- Generic top-level domains
- Country-code top-level domains
- Infrastructure top-level domain
- Sponsored top-level domain
Domain Names

Generic TLDs

Generic top-level domains initially consisted of:

- GOV Government agencies
- EDU Educational institutions
- ORG Nonprofit organizations
- MIL Military
- COM Commercial business
- NET Network organizations

Some of these, such as .com and .net, are no longer restricted to their original intended usage.

More generic TLDs have since been added and are being added today.
Domain Names

Selection

When you register a domain name, you are not its owner, rather you have the exclusive right to use it.

Some factors to consider when selecting a domain name:

• Relevance to site
• Communicability
• Availability

Here is a list of all domain name registrars: www.internic.net/alpha.html
Web Hosting

A Web hosting service allows individuals and organizations to make their website accessible to others.

The host usually provides storage space on a server as well as Internet connectivity.

Theoretically, any computer can serve as a Web host, but it needs to always be on and implement measures for security and stability.
Web Hosting
Selection

Web hosting costs anywhere from $5 per year to $40 per month, depending on a variety of factors

• Disk space (more is better, but you often don’t need more than a few GB)
• Bandwidth (data transfer)
• Up time (reliability)
• Overage: Would you rather be charged extra or have a hard cap if you reach your data limits?
Web Hosting

Extras

Optional extras

• Databases (for CMS, blog, etc.)

• Mailboxes (if you want an email address with your domain)

• Customer support (email only or phone also?)
Search engine optimization (SEO) is the process of making your site easy for others to locate. The more thoughtfully and selectively you add keywords to your pages, the better your search rankings. There are several factors that help your website to rise in search results.
On-page techniques are the methods you can use to improve search results for your site.

This involves identifying and implementing keywords in seven particular places in your page:

1. Page title
2. URL
3. Headings
4. Text
5. Link text
6. Image alt text
7. Page descriptions
SEO
Off-Page Techniques

Search engines also look at the number of other sites that link to yours to determine search ranking.

This is especially so when the content of a referring site is similar to yours.

It’s ideal when the words that appear in links to your site also appear in the text of the page that the site links to.

Finally, as more people visit your site, the search ranking will also improve.
Analytics

Once people start visiting your site, it’s helpful to know!

Analytics tools allow you to observe data about the traffic your site receives.

This can include the following information:

- Number of visits
- Geographic location of visitors
- Time spent on pages
- Referring web page
- Browser information
- Real-time activity
Final Exam
Tuesday, December 18, 2:00–3:50 p.m.