Midterm exam on Tuesday, March 8
Midterm Exam

Format

Multiple-choice

Based on lectures, class work, and assigned reading

No supplementary materials

Bring your NYU ID and 1 or 2 pencils
Midterm Exam

Content

HTML
CSS
SVG
CSS Transforms
CSS Transitions
CSS Animation
Version Control
Graphics on the Web
Graphics on the Web

Raster Graphics

GIF: Graphics Interchange Format

JPEG: Joint Photographic Experts Group

PNG: Portable Network Graphics

HTML5 Canvas (renders directly)
Graphics on the Web

Vector Graphics

Flash (SWF files)

SVG: Scalable Vector Graphics

CSS3 (vector-like capability)
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.
Graphics on the Web
State of Flux

The technologies discussed in this class are not all established standards. They are mostly agreed upon but not evenly implemented.

Most modern browsers support everything we will do, but not everyone uses up-to-date, modern browsers (and that’s ok).

Web graphics technologies are, as ever, in a state of flux.
Drawing on the Web
CSCI-UA 380

HTML
HyperText Markup Language
Drawing on the Web
CSCI-UA 380

HTML
HyperText Markup Language

colorfield.joshuaclayton.net
Simple Net Art Diagram

http://www.mtaa.net/mtaaRR/off-line_art/snad.html
HTML

HyperText Markup Language

A language for describing Web pages

HTML is not a programming language, it is a markup language

JavaScript is a programming language

A markup language is a set of markup tags

HTML uses markup tags to describe Web pages
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:

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

Start tag:

```html
<p>
```

Element content:

This is a paragraph.

End tag:

```html
</p>
```
Web Pages

HTML Documents

Web pages are plain text documents that contain HTML tags.

HTML documents are Web pages.

Recommended plain text editors: Atom, Sublime Text, Notepad++
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

This is where most of our drawing will happen

Recommended browsers: Chrome, Safari, Firefox
This is where we will publish our projects during the semester.

A server is just a computer that is always on, ready to serve files when they are requested.

i6 is a secure, Unix-based Web server.

You will receive an email with your account information (if you don’t already have one).
i6 URL
i6.cims.nyu.edu/~netid
FTP

File Transfer Protocol

FTP, like HTTP, is a communications protocol of the Internet.

FTP allows us to transfer files between computers (i.e. laptop to Web server).

i6 requires a secure FTP connection, known as SFTP.

Recommended SFTP clients: Fetch, Cyberduck, WinSCP, Transmit.
File Permissions

**chmod**

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
HTML5
New standard for HTML

First version published in 2008
An official W3C recommendation as of October 2014

• Simpler doctype declaration
• New elements
• New attributes
• Full CSS3 support
• Video and audio elements
• 3D graphics support
• Web applications
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
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
Cascading Style Sheets

Style Construction

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 ;

h1 {
    color: green;
    background: yellow;
}

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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
Cascading Style Sheets

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
CSS Box Model
Setting an Element’s Dimensions

- Auto
  Browser calculates the width

- Length
  Defines the width in a unit like pixels

- %
  Defines the width in percent of the containing block

- Inherit
  Specifies that the value should be inherited from the parent element
Responsive Web Design
Responsive Web Design

Media Queries

Features you can include in media queries: • 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
Responsive Web Design
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 Style Sheet Link

<link rel="stylesheet" href="main.css">

Style Sheet Link with Media Query

<link rel="stylesheet" media="only screen and (min-width: 640px)" href="main.css"/>
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;}
}
Drawing on the Web
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SVG
Scalable Vector Graphics
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, dynamic, and animated.
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.
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.
SVG supports the ability to change vector graphics over time

Using SVG’s animation elements, you can define motion paths, fade-in or fade-out effects, and objects that grow, shrink, spin or change color

SVG has been designed to allow SMIL to use animated or static SVG content as media components

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

Scalable Vector Graphics (SVG) 1.1 Concepts
http://www.w3.org/TR/SVG/concepts.html
CSS3
Transforms, Transitions, and Animation
CSS3 Transforms

2D Transforms

With CSS3 transforms, we can move, scale, turn, spin, and stretch elements.

A transform is an effect that lets an element change shape, size and position.

Chrome (36), Firefox (16), IE (10), Opera (23), and Safari (9) support 2D transforms.

2D transform methods include: translate, rotate, scale, skew, matrix.

[1] W3Schools
CSS3 2D Transforms
www.w3schools.com/css/css3_2dtransforms.asp
CSS3 Transforms

3D Transforms

CSS3 allows you to format your elements using 3D transforms.

Chrome (36), Firefox (16), IE (10), Opera (23), and Safari (9) support 3D transforms.

With 3D transforms, an element can rotate around an X-, Y-, or Z-axis at a given degree.

3D transform methods include: translate, rotate, scale, and matrix.

W3Schools
CSS3 3D Transforms
www.w3schools.com/css/css3_3dtransforms.asp
CSS3 Transforms

Properties

- `transform`
- `transform-origin`
- `transform-style`
- `perspective`
- `perspective-origin`
- `backface-visibility`

W3Schools
CSS3 3D Transforms
www.w3schools.com/css/css3_3dtransforms.asp
CSS3 Transitions

CSS3 transitions are effects that let an element gradually change from one style to another.

Chrome (26), Firefox (16), IE (10), Opera (12.1), and Safari (6.1) support the transition property.

To apply a transition, you must specify two things:

• The CSS property you want to add an effect to
• The duration of the effect

W3Schools
CSS3 Transitions
www.w3schools.com/css/css3_transitions.asp
CSS3 Transitions
Properties

transition
transition-property
transition-duration
transition-timing-function
transition-delay

W3Schools
CSS3 Transitions
www.w3schools.com/css/css3_transitions.asp
With CSS3, we can create animations in Web pages

The @keyframes rule is where the animation is created

Specify a CSS style inside the @keyframes rule and the animation will gradually change from the current style to the new style

Chrome (43), Firefox (16), IE (10), Opera (30), and Safari (9) support the @keyframes rule and animation property
CSS3 Animation Properties

@keyframes
animation
animation-name
animation-duration
timing-function
delay
iteration-count
direction
play-state
The purpose of vendor prefixes was to allow browser-makers to support experimental CSS declarations. Even if details were not standardized, a new property could be implemented. All of the experimental features we explore in this class are standardized in the latest browsers.
Version Control

A system that records changes to a file or set of files over time so that you can recall specific versions later.

Commonly used for software source code but any type of file can be placed under version control.

A Version Control System (VCS) allows you to:

- Revert files back to a previous state
- Review changes made over time
- Collaborate more efficiently
- Maintain project backups
Version Control

Relevance

The creative process is often an iterative one, with ideas and forms leading to new ideas and forms.

A primary characteristic of Web aesthetics is the remix of existing material.

Creative code introduces both new challenges and new opportunities for keeping track of project versions.

A well-executed system is good for archiving, iteration, and collaboration.
Centralized Version Control Systems were developed to allow collaboration with developers on other systems.

With a CVCS, a single server contains all the versioned files and clients “check out” files from that central place.

For many years, this has been the standard for version control.

The downside of centralized version control is the vulnerability of having the entire history of a project in one place.
Pro Git
Scott Chacon
git-scm.com/book
With Distributed Version Control Systems, clients don’t just check out the latest snapshot of files, they fully mirror the entire history of the project. If a server dies, anyone with a copy of all the versioned files can restore it to the server. Every checkout is really a full backup of all the data. You can also collaborate with different groups of people in different ways simultaneously within the same project.
Git

History

Git was created by Linus Torvalds and the Linux development community for Linux kernel maintenance.

Linux is an open source operating system project of fairly large scope.

Git was born in 2005 after the breakdown of a relationship with the company that maintained Linux’s former version control system.

Its goal was to be a fully distributed VCS with a simple design, support for non-linear development, and the ability to handle large projects efficiently.

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git-scm.com/book
Git

Basics

Git thinks of its data like a set of snapshots of a mini file system.

Every time you save the state of your project, it basically takes a picture of what all your files look like then and stores a reference to that snapshot.

To be efficient, if files have not changed, Git doesn’t store the file again—just a link to the previous identical file it has already stored.

This makes Git more like a mini file system with some powerful tools built on top of it.
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Git

Three States

Git has three main states that your files can reside in: committed, modified, and staged

Committed means that the data is safely stored in your local database

Modified means that you have changed the file but have not committed it to your database yet

Staged means that you have marked a modified file in its current version to go into your next commit snapshot
Local Operations

- working directory
- staging area
- git directory (repository)

- checkout the project
- stage files
- commit

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Git

Workflow

1. Modify files in your working directory
2. Stage the files, adding snapshots of them to your staging area
3. Commit changes, which takes the files as they are in the staging area and stores that snapshot permanently to your Git directory

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git-scm.com/book
GitHub is a web-based hosting service that uses the Git VCS.

The site also provides social networking functionality such as feeds, followers, wikis, and statistics.

The company was founded in 2008 and is located in San Francisco.

In addition to computer programmers, architects, musicians, municipal governments, and academics are among its users.
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