Final Exam

Thursday, December 19
4:00–5:50 p.m.
Room 1302
Warren Weaver Hall
Multiple-choice questions

Ten Topics

1. Computer Principles
2. Photoshop
3. GIF Animation
4. Operating Systems
5. HTML
6. CSS
7. Dreamweaver
8. WordPress
9. Digital Audio
10. Flash
Introduction to Web Design & Computer Principles
CSCI-UA 4

Class 1
Introduction and Overview
Digital Revolution
Represents a shift from analog and electronic technology to digital

Industrial Revolution (18th–19th c.)
Electronic Media (19th–20th c.)
Information Age (20th c.– )

These technological developments build upon and continue to inform each other today
Digital Media
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”
Introduction to Web Design & Computer Principles
CSCI-UA 4

Class 1
Introduction and Overview

00101011
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 doubles approximately every two years.

Digital media is in a constant state of flux.
“Internet of Things”
The integration of physical objects and sensors into networked media

Examples
• Twine wireless sensor block
• Nest thermostat
• Nike+
• Tile
• Various smartphone applications
Cloud Computing
Remotely hosted, on-demand software and IT services

Examples
• Google Cloud Platform
• Amazon Web Services
• Apple iCloud
• Adobe Creative Cloud
Open Source

- Anyone can use it
- It can be modified
- It can be redistributed
- The source code is available
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
Technological Basis

Bitmap; raster 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 lines.

Layer support introduced in version 3 (circa 1993).
Introduction to Web Design & Computer Principles
CSCI-UA 4

Operating Systems
1950s to Present
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.
Introduction to Web Design & Computer Principles
CSCI-UA 4

Operating Systems
1950s to Present

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

Basic Commands

- cd
- ls
- pwd
- chmod
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)
### Permission

<table>
<thead>
<tr>
<th></th>
<th>U</th>
<th>G</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>rwx</td>
<td>rwx</td>
<td>rwx</td>
<td></td>
</tr>
<tr>
<td>rwx</td>
<td>rwx</td>
<td>r-x</td>
<td></td>
</tr>
<tr>
<td>rwx</td>
<td>r-x</td>
<td>r-x</td>
<td></td>
</tr>
<tr>
<td>rw-</td>
<td>rw-</td>
<td>r--</td>
<td></td>
</tr>
<tr>
<td>rw-</td>
<td>r--</td>
<td>r--</td>
<td></td>
</tr>
</tbody>
</table>

### Command

- `chmod 777 filename`
- `chmod 775 filename`
- `chmod 755 filename`
- `chmod 664 filename`
- `chmod 644 filename`
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
Hyper Text Markup Language
The Internet and the World Wide Web

The Internet and the Web are two separate but related things.

The Internet is a massive network of networks, a networking infrastructure.

The Internet connects millions of 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.
HTML

Hyper Text 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

HTML Markup

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>
HTML Documents

Web Pages

HTML documents describe Web pages
Contain HTML tags in plain text
HTML documents are Web pages
Web Browsers
For rendering HTML documents

Examples include Firefox, Chrome, Safari, and Internet Explorer

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
Example

Bare minimum

<!DOCTYPE html>
<html>
<head>
<title>Document Title</title>
</head>
<body>
<p>Document content.</p>
</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

Text between <p> and </p> is a paragraph of text
HTML5

New standard for HTML

First version published in 2008

Still a work in progress but supported by all major browsers

- New Elements
- New Attributes
- Full CSS3 Support
- Video and Audio
- 2D/3D Graphics
- Web Applications
- Smartphone Apps
Introduction to Web Design & Computer Principles
CSCI-UA 4

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
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
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
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;
}
```
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
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 Layout Types

- Fixed
  A fixed layout uses pixel-based widths.

- Fluid
  A fluid layout uses percentages for widths.

- Elastic
  An elastic layout uses ems for all dimensions.
CSS Box Model

```
Margin
Border
Padding
Content
```
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
Introduction to Web Design & Computer Principles
CSCI-UA 4

Responsive Web Design
Media Queries
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.
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
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

```html
<link rel="stylesheet" href="style/basic.css" />
```

Style Sheet Link with Media Query

```html
<link rel="stylesheet" media="only screen and (min-width: 640px)" href="style/main.css" />
```
Web Design & Computer Principles
CSCI-UA 4

GIF
File Format and Animation
What is a GIF?
Graphics Interchange Format

Bitmap image format
Introduced by CompuServe in 1987
Designed to minimize file size and electronic transfer time
One of the first two image formats commonly used on Web sites
Technical Aspects

- Color palette of up to 256 distinct colors
- Preserves transparency
- Uses a compression algorithm to reduce file size
- Also supports sequential frame animation
- “Dithering” approximates a wider range of colors with a small color palette
Dreamweaver

Proprietary Web development application

Version 1.0 released December 1997

Made by Macromedia

Purchased by Adobe in 2005
Features

WYSIWYG

Graphical user interface

Supports Web technologies such as CSS and JavaScript

Syntax highlighting

Site management
Limitations

Disconnect between buttons and code
Extraneous code
Proprietary development environment
Cost
Introduction to Web Design & Computer Principles
CSCI-UA 4

WordPress
Content Management System
WordPress started as just a blogging system, but has evolved to be used as a full content management system.

Designed to act as a simple, generic framework that can be used to make and maintain dynamic websites.

Widely considered the most popular blogging system in use on the Web today.

Estimated that the software manages 22% of all new websites as of 2011.
i6 Installation

Six steps

1. Setup your MySQL database
2. Download WordPress
3. Modify your “wp-config.php” file
4. Upload WordPress to the i6 server
5. Set up your “uploads” folder
6. Set up your site
Once WordPress is installed, your new site should be available at:

i6.cims.nyu.edu/~netid/wordpress/

From here, you can log in and will be directed to the “dashboard” page.

The dashboard lets you manage various aspects of your WordPress-powered site.
Working with WordPress

- Posts
- Media
- Pages
- Widgets
WordPress Themes

A popular feature of WordPress is the ability to quickly change the visual layout of a site through the use of a “theme”

Themes in WordPress can be thought of as templates that can alter the appearance of an entire site with a click of a button.

Themes are just CSS files with a complete set of style rules for a WordPress site.
Introduction to Web Design & Computer Principles
CSCI-UA 4

Digital Audio
Sound Editing with Audacity
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)
Web Design & Computer Principles
CSCI-UA 0004

Flash
Animation and Interactivity
Flash
Multimedia environment for the production of interactive applications and animation

Animation, Video, Interactivity
Manipulates raster and vector graphics
Pioneered vector graphics on the Web
Supports streaming of audio and video
Scripting language called “ActionScript”
Commonly used for creating websites, animation, standalone applications, streaming media, and games
Early History
1995–2005

Originated at FutureWave Software as SmartSketch

1995: Repositioned as FutureSplash Animator, a way to draw and animate vector-based graphics for Web delivery

In competition with Macromedia Shockwave, made with Director

Pitched to Adobe but bought by Macromedia in 1996

Bundled with Internet Explorer 5
Adobe
2005–2011

Adobe purchased Macromedia in 2005
Tried to kill it before it acquired it
Development continued at Macromedia, including scripting language, to become a full presentation development tool
Flash plugin becomes nearly ubiquitous in Web browsers
Filled in a gap for delivering video content over the Web
Requires Flash player plugin
Desktop Focus

2011

H.264 video codec, open-source video standards, and Microsoft Silverlight begin to dislodge video content

Apple releases iPhone in 2007 without support for Flash

Harder to support processor-intensive Flash player on mobile browsers

HTML 5 gaining traction

2011: Adobe announces discontinuation of support for mobile Flash development
Adobe releases Creative Cloud in May 2013 with a new version of Flash

Ability to export Flash content to HTML with CreateJS toolkit

Emphasis on mobile app development with device-specific functionality

Basic vector animation capability still foundational

Variety of export options including HTML5 and animated GIFs
Final Exam

Thursday, December 19
4:00–5:50 p.m.

Room 1302
Warren Weaver Hall