Lecture 28

Principles of Design and Practical Implications

*Course logo spider web photograph from [Morguefile](http://www.morguefile.com) openstock photograph by Gabor Karpati, Hungary.*
About This Lecture

- Is the lecture content dated?
  - Some of it.

- Do fundamental principles change?
  - Not Really!

- Do platforms & enabling tech change?
  - Absolutely!

So pay attention to dates and movement as this lecture bounces from 2009 to 2011 to 2016. Try to spot what is transient and what is fundamental.
About Design Principles

- General concepts & recommendations
- Illustrated with examples
- Main topics:
  - Why a website – audience
  - Organization & Human Perception
  - Screen size and the use of Space
  - Color and layouts
  - Navigation
  - Learn from History
Why? To inform.
Why? To Amuse (2009)

xkcd - A Webcomic - Matrix Transform

xkcd
A webcomic of romance, sarcasm, math, and language.

XKCD updates every Monday, Wednesday, and Friday. There are signed prints in the store.

Matrix Transform

\[
\begin{bmatrix}
\cos 90^\circ & \sin 90^\circ \\
-sin 90^\circ & \cos 90^\circ
\end{bmatrix}
\begin{bmatrix}
\alpha_1 \\
\alpha_2
\end{bmatrix}
= \begin{bmatrix}
\alpha_1 \\
\alpha_2
\end{bmatrix}
\]
**Same Site 2016**

A WEBCOMIC OF ROMANCE, SARCASM, MATH, AND LANGUAGE.

**Protip:** If you don’t like how your garden is growing, you can click to prune it. Copy the URL to save/share (garden will be view-only from other browsers.)

EXPLOITS OF A MOM

HI, THIS IS YOUR SON’S SCHOOL. WE’RE HAVING SOME COMPUTER TROUBLE.

OH, DEAR - DID HE BREAK SOMETHING? IN A WAY–

DID YOU REALLY NAME YOUR SON Robert? DROP TABLE Students;--?

OH, YES. LITTLE BOBBY TABLES, WE CALL HIM.

WELL, WE’VE LOST THIS YEAR’S STUDENT RECORDS. I HOPE YOU'RE HAPPY.

AND I HOPE YOU’VE LEARNED TO SANITIZE YOUR DATABASE INPUTS.
Why? To Sell.

Welcome to Target

http://www.target.com/gp/homepage.html

Weekly Ad

This week, it's only available online.
Enter for a chance to win a $1,000 Target GiftCard™

Nintendo DSi
Step into the next generation of gaming.

- 2 cameras with interactive "lenses" to creatively edit photos
- Music player and voice recorder to interact with music
- Downloadable games and applications
- Sleek design with bigger touch screen
- Free downloadable games from Nintendo DSi Shop included with purchase

Shop All Nintendo DSi

Women's
Spend $50, get free shipping on styles you crave.

Kitchen
Free shipping on select gadgets and essentials.

Weekly Ad
Why? To Confuse – Or Not.

FactCheck.org

Ask FactCheck You Ask the Questions

Hot Topics
Questions we're asked most often.

Today's Question
Is Snopes.com run by "very Democratic" proprietors? Did they lie to discredit a State Farm insurance agent who attacked Obama?

NEW
A chain e-mail that "exposed" Snopes contains falsehoods. And in fact, the site is run by someone who has no political party affiliation and his non-voting Canadian wife. A State Farm spokeswoman confirms what they reported about the Obama-baiting agent.

Read Full Answer »

Recent Postings

Hot Air on Wind Energy
April 10, 2009

Don't expect wind power to replace coal as the nation's main source of electric power, whatever Obama's interior secretary said.

Specert's Scorched-Earth Slip-Ups
April 2, 2009

Our Disinformed Electorate
Consider Your Audience!

- Small
- Large
- Young
- Old
- Restricted
- Broad
- ...

CT 310: Web Development
Department of Computer Science
Spring 2009
CT 310 Homepage

CT 310 is a one-semester introduction to web development. Emphasis is placed on the essentials needed to create fully functional web sites including rich graphical content and dynamic content. The course will cover HTML, XHTML, Cascading Style Sheets and graphical content. Dynamic web pages will be developed using PHP. MySQL will be introduced as a means of managing website data.

Instructor:
Ross Beveridge
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Email: ross@cs.colostate.edu

GTA:
Thomson Comer
Office Hours: 12:00-2:00 Mon, 1:00-2:00 TR

Blackboard Learning System

College of Natural Sciences
Colorado State University

Course logo photo by Mark Logan.

4/24/17
CSU CT 310, Web Development, ©Ross Beveridge
CT 310 is a one semester course on web development. Emphasis is placed on the essentials needed to create fully functional websites including rich graphical content and dynamic content. The course will cover HTML, Cascading Style Sheets and graphical content. Dynamic web pages will be developed using JavaScript. MySQL and SQLite are introduced for website data management. Asynchronous JavaScript (AJAX) is introduced for fine-grained client-server interaction. Students will develop their own dynamic websites to manage authentication, transactions and user updates.

This course's web presence has a public side which you are viewing as well as the private side managed through CSU's Canvas system. General information concerning lectures, schedule, assignment posting, etc. are managed through the course management system. Student-specific information such as grading, quizzes, etc. are managed through Canvas.

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GTA:
Darshan Gulur Srinivasa
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Office Hours: Tue 8-10AM, Wed 10-11AM, Thu 3-4PM
Email: dasriniv@mail.colostate.edu

Lecture Time and Place:
9:00-9:50, MWF, CSB Room 130

Recitation 1 Time and Place:
Site Organization: Hierarchical
Organization – Linear (2009)
Think about 2 ways to see more content:

1. Scroll down the page
2. Push/click to see next

Here are examples of linear (scrolling):

Gracefully handling width changes is still a challenge in 2016.
Organization - Random

Webby – best visual design 2006
Structure and Organization

- Structure doesn’t happen naturally
- Explicitly planned and designed
  - People seek order and structure, even if none was intentionally designed
- Must help the user build a model!
  - Content structure matches expectation.
  - Visual layout guides and reinforces.

For Visual layout Use Gestalt principles to create structure...
How is Content Structured?

Home

Syllabus
Progress
Assignments
Resources
Show
Show
Show
Gestalt Grouping Principles

- Proximity
- Similarity
- Continuity
- Closure
- Area
- Symmetry
Proximity

Individual elements associated more strongly with nearby elements than with those further away.
Similarity

- Elements associated more strongly when they share basic visual characteristics
  - Shape
  - Size
  - Color
  - Texture
  - Orientation
Continuity

- Our Visual system prefers continuous, unbroken contours
- We will seek out simplest possible explanation for abstract drawings
- Even if several, plausible, combinations exist
Closure

- Our visual system will “fill in holes” to create a complete picture.
- Our visual system will close figures when information absent.
Area

- Figure is the element that is interpreted as the object of interest
- Ground is area on which figure rests
- Principle of area suggests that smaller of two overlapping elements seen as the figure while larger element is seen as ground
- Also, darker objects appear more often as figure with lighter areas seen as ground
Figure Ground (Reversal)

Competing visual interpretations

Face it, you are seeing a vase 😊
Symmetry

- We prefer symmetry
- The greater the symmetry, the more we ascribe meaning, relationships in the composition
- Symmetrical, unconnected elements are integrated into one coherent object
Good Design
Achieving Organization & Structure

Grouping  Hierarchy
Relationship  Balance
Grouping

- Apply Gestalt principles to create groups of similar or related items
  - Proximity, continuity, similarity…

- Use Gestalt principles rather than applying explicit visible structure “telling” user what the groups should be (e.g., using bounding boxes)
Hierarchy

- Create a visual hierarchy to guide viewer, to allow scanning of information
- Create hierarchy according to intended reading/viewing sequence
- Hierarchy created by adjusting properties such as size, position, spacing, white space ...
Establish relationships between elements by using

- Position
- Size
- Value (color, shape, etc.)

Alignment is a very effective tool for creating relationships

Similarity of form is also effective
Balance

- Create visually stable compositions
  - Similar to physical balance
- Stability achieved by manipulating properties such as
  - Position, Size, Hue and Form
- Symmetric layouts achieve balance naturally
Common Errors

- Haphazard Cluttered layout
- Proximity not taken into account when laying out components in interface
- Unclear hierarchy
- Bounding boxes creating visual clutter, competing for attention
- Use negative space (white space) instead
More Psychology - Attention

Fort Collins, CO [80526]

- Mostly Cloudy
- Feels Like 44°F
- Wind Variable Gusts 3.3 mph

Today is forecast to be MUCH WARMER than yesterday.

Today
- High 59° Low 36°F
- 50% Chance of Precip.

Yesterday
- High 50.7° Low 32.7°F
- Precip. 0 in

Thunderstorms possible at 10:30am.
With homepages, it's polite to stare

- **Jeff Glick:**
  When to tell stories with multimedia, text

- **Kinsey Wilson:**
  Online ads: Why placement & size matter

Homepage designs, Eyetrack III researchers noticed a common pattern: The eyes most often fixated first in the upper left of the page, then hovered in that area before going left to right. Only after perusing the top portion of the page for some time did their eyes explore further down the page.
**Tips for Using Space Wisely**

- Most important information at the top.
- **Poynter Institute Eye tracking study.**
  - Most valuable page real estate.
  - Upper left and then center top.
- Avoid horizontal scrolling.
- Open space is very powerful.
- Beware excess.
Seven +/- 2

- Short term memory.
- Related to Chunking.
- Controversial in detail, ...
- ... but widely accepted in general.
Navigation

- Visual Continuity – where am I?
- Where can I go – choices.
- Visual interest.
- Ease of use, avoiding overload.
- Rule of three
  - All points reachable in 3 clicks.
- Chunking: 7 + or - 2
Color & Audience

- Sweeping Generalities:
  - Kids - bright colors
  - Teen & 20s - dark
  - 40s & up - light, big
- Black on White
- Most of the web.
- Mostly harmless.
Layout with Examples

Pay Attention to …

Screen Size

Common Element Placement

Changes over time
Screen Size 2016

CT 310 Web Development
Computer Science Department
Spring 2016
CT 310 Syllabus

Description
CT 310 is a one-semester course in web development. Emphasis is placed on the essentials needed to create fully functional websites including rich graphical content and dynamic content. The course will cover HTML, Cascading Style Sheets and graphical content. Dynamic web pages will be developed using PHP and JavaScript. MySQL and SQL are introduced for website data management. Asynchronous JavaScript and XML (AJAX) is introduced for time-shared client-server interaction. Students will develop their own dynamic websites able to manage authentication, transactions and user updates.

Prerequisites
The prerequisite for CT110 is CS130.

Textbook
Learning PHP, MySQL, JavaScript, CSS & HTML4, 6th Ed. by Ruth Nance.

This text is available through the CSU bookstore. The author also maintains a textbook related website.

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CTA:
Dashan Gohar Srinivas
Office: CSR 120 Lab
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Email: dashan.gohar@colostate.edu

Lecture Time and Place:
9:00-10:00, MWF, CSR Room 130
Recitation 1 Time and Place:
10:00-11:00, Mon, CSR 225
Recitation 2 Time and Place:
11:00-12:30, Tue, CSR 225
Recitation 3 Time and Place:
12:00-1:30, Fri, CSR 225

4/24/17
CSU CT 310 Web Development ©Ross Beveridge & Jamie Ruiz
Starbucks 2004, 2007

- Starbucks Homepage - Microsoft Internet Explorer
- Starbucks Homepage - Windows Internet Explorer

Experience coffee passion
See what's new in stores this fall.

Genius Loves Company
Ray Charles gets a little help from his friends.

Starbucks now on XM Radio
Find out about our new "Hear Music" channel.

Search
(keyword or catalog number)

Store Locator
Find your nearest Starbucks.

Nutrition Information
Check out Starbucks beverages and food details.

Our coffees
Our stores
Starbucks card
In grocery
For business
About us

Powered by HP

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Starbucks 2016

Get Automatic Gold Status

This April, get automatic Gold Status after your first purchase with the new Starbucks Rewards™.

*Must pay with Starbucks® App or registered Card. At participating stores. Offer valid: 4/12/16 - 5/2/16.

JOIN NOW
<table>
<thead>
<tr>
<th>Ice</th>
<th>Fixed size and anchored to the upper left. Example: Poudre Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jello</td>
<td>Centered on the page, often filling some fraction of the page width. Colorado State University</td>
</tr>
<tr>
<td>Liquid</td>
<td>Fill the entire page. Example: Slashdot</td>
</tr>
</tbody>
</table>
## History: Layouts - 2011

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ice</td>
<td>Fixed size and anchored to the upper left. Example: Colorado State Parks</td>
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</tbody>
</table>
Responsive!

Bootstrap is the most popular HTML, CSS, and JS framework for developing responsive, mobile first projects on the web.

Download Bootstrap
More Sites Through Time

Think About ...

- Intended audience.
- Attention – real estate & placement.
- Cognitive load, the 7+/−2 rule.
- Navigation – how clear.
- Visual excitement.
- Proximity & Alignment.
- Branding (where are you?).
- Responsive Design.
Microsoft is conducting an online survey to understand your opinions of the Microsoft Web site. We'd like to see which pages you visit today and then have you complete a survey when you leave the Microsoft Web site.

Would you like to participate?

Yes  No

Privacy Statement

Learn more  Shop now

April 2016
The new iPod shuffle. The first music player that talks to you.

Small talk.

April 2009
iPad 2

Thinner. Lighter. Faster.
FaceTime. Smart Covers. 10-hour battery.

April 2011
Live a better day.

To ask less of the planet, we ask more of ourselves.

iPhone
This is 7.
Allied Militants Threaten Pakistan’s Populous Heart
By SABRINA TAVERNISE, RICHARD A. OPPEL Jr. and ERIC SCHMITT
The Taliban is teaming up with local militant groups in Punjab, revigorating an alliance that poses a serious risk to the stability of Pakistan.

U.S. May Drop Key Condition for Talks With Iran
By DAVID SEGAL
New proposals would allow the two sides to begin direct talks.

Labor Groups Reach

Glamour Dims as Hecklers Hit Auto Shows
By DAVID SEGAL
After receiving government bailout money, G.M. and Chrysler are finding somewhat hostile crowds at their exhibits. Above, Christian Alt Parry, a G.M. presenter.

Scary Small-Car Buyers Sacrifice Safety
By MICHAEL L. WALD 12:11 AM ET
A study performed by an insurance group showed that crash dummies in minicars fared comparatively poorly in collisions with midsize

OPINION
‘Welcome Back’
The artist Jeff Scher looks forward to the arrival of spring in an animated film.

SCIENCE TIMES
Last Voyage for the Keeper of the Hubble
For 18 years, one astronaut has tended to the space telescope.

MARKETS
At 2:39 AM ET
JAPAN
Nikkei 8,842.66 +81.75 +0.92%
Hang Seng 15,363.00 +14.70 +0.96%
Shanghai 2,528.40 +14.70 +0.58%

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The New York Times
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Congress Passes Budget Bill, but Some in G.O.P. Balk
By JENNIFER STEINHAUSER
2 minutes ago
The House and Senate passed the compromise legislation to finance the federal government, with 59 House Republicans breaking ranks to vote against the deal.
- House Vote | Senate Vote
- For Boehner, a Silver Cloud With a Dark Lining

Read Comments (166)

Libyan Port City Is Filled With Migrants Desperate to Exit
By C. J. CHIVERS
29 minutes ago
Since February, Misurata has been besieged

They Gather Secretly and Then They Eat
By PATRICIA LEIGH BROWN
8 minutes ago
At a quasi- clandestine monthly event in San Francisco, young chefs and their followers are remaking the traditional farmer's market as an indie food rave.

Lady Liberty Is a Las Vegas Teenager
By SEVERSON and MATTHEW HEALEY
7 minutes ago
Statue Service's new Statue of Liberty is accidentally based on the replica at the New York-New York casino in Las Vegas.

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Privacy Policy | What's This?

WHAT'S POPULAR NOW
- The Default Major: Skating Through B-School
- For Many Bachelors in China, No Deed Means No Dates

The New York Times
Thursday, April 14, 2011  Last Update: 10:28 PM ET
I'M WITH HER

April 2016

New York Wins Propels Trump and Clinton

ELECTION 2016

New York City Voted

The Opinion Pages

EDITORIAL
Sanders and Kasich Should Ignore Any Pressure to Quit

Legislation by Stealth

New York’s primary results will bring new calls for both parties’

In Congress, new provisions favored by

www.nytimes.com
If you like history.