CS 160: User Interface Design

Graphic Design & Gestalt Principles  03/28/11
UI of the day: Color

http://www.youtube.com/watch?v=8AS3IAUthSY
Midterm

Graded exams will be returned on Wednesday.
Due Wednesday

Peer Review Form
Due in class

Feedback will determine whether you score higher or lower than your group average.

There will be a 2nd round of feedback later.
Due Next Week

**Interactive Prototype (due Apr 4)**
Redesign interface based on low-fidelity feedback  
Create first working implementation on device  
Can include Wizard of Oz parts *where justified*  
Can include pre-built functionality but *only if heavily justified*

**In class Presentations (Apr 4 & 6)**
5 min presentation (short! be careful about timing)  
Focus on two items:  
  - tell the high-level story  
  - show the prototype (live may not be best idea)  
Feedback from class  
(you will provide feedback on each presentation)
Presentation Schedule: 4/4

1. Group R - Rarer error
2. Group P - What 9000?!
3. Group T - Under the Underdogs
4. Group C - Charmander
5. Group L - Lambda
6. Group S - Scrumptious
7. Group E - Droid Rage
8. Group I - OneHundredAndSixty
9. Group A - Awsomeness
10. Group D - Innovationers
# Presentation Schedule 4/6

1. Group G
2. Group B - Bravo
3. Group O - TBD
4. Group K - Caddy Whompus
5. Group H - Bosslike Design
6. Group N
7. Group M - SmartNature
8. Group F - Fanstastic Four
9. Group J - Ski Interface
10. Group Q - Qrious
Android Devices

One device per group.

We have a mix of Archos 5, Archos 70.

Check out device at end of class

Write a collateral check over $200 to UC Regents.
Android Devices

You can also use your own personal devices.
(Each group should have $\geq 1$ personal device)
Topics

1. Brief History of Graphic & Product Design
2. Simplicity and Elegance
3. Color
4. Gestalt Principles
5. Typography
6. Composition
Graphic & Product Design
Graphic Design is about Communication
Graphic Design is also about Interpretation

Max Huber, Poster, 1948

Wes Wilson, Poster, 1966

A Brief History of Graphic Design

Johann Gutenberg, Gutenberg Bible 1450-55

TYPE, SPACES, AND LEADS

Upper Case.

Lower Case.
A PAIR OF CASES.

California Job Case.

Fig. 2.—Showing Lay of Cases.
A Brief History of Graphic Design

Aldus Manutius, *Hypnerotomachia Poliphili*, 1499

L.R. Luce, JJ. Barbou, *Essai d’une nouvelle typographie*, 1771

19th Century: Advertising

Letterpress poster, 1875

James Reilly, Poster for O’Brien’s Circus, 1866.

Images from:
E. Lupton, Thinking With Type, Princeton, 2004
Modern Design
Modern Design: Bauhaus
Bauhaus

Joost Schmidt, Exhibition Poster, 1923

Herbert Bayer, Exhibition Poster, 1926

Images from:
Jan Tschichold

Before: Tschichold, Leipzig Trade Fair, 1922

After: Tschichold, Elemental Typogrpahy, 1925
Grid-Based Design

Josef Müller-Brockmann
Exhibition Poster, 1980
Design Systems: Corporate Identity

22-17. Paul Rand, IBM trademark, 1956. The original design is shown with outline versions and the eight- and thirteen-stripe versions currently used.

22-18. Paul Rand, IBM package designs, late 1950s. A strong corporate identification was produced by a repeating pattern of blue, green, and magenta capital letters on the black package fronts, white handwritten product names, and blue package tops and sides.

22-19. Paul Rand, IBM package design, 1975. After two decades the original packaging design program was replaced by an updated design using the eight-stripe logo.
Design Systems: Content-Driven Sites

Moscow vows to avenge bomb blasts
Russia's leaders pledge to "destroy" those behind rush-hour suicide attacks on the Moscow Metro in which 38 people died.

More from BBC News
Detour: The mid-1990s

David Carson, Ray Gun magazine, 1994
Product Design is about Form and Function

Philippe Starck, Juicer for Alessi

Oxo Angled Measuring Cup
Early Mass Production

Unknown, Mimeograph, 1918
It's quicker and easier with a "Yankee" Chain Drill

Turn the brace—that's all you need think of when using a "Yankee" Chain Drill. No hand feeding. The "Yankee" Automatic Friction and Ratchet Feed does away with that. Saves drill breakage from inaccurate, uncertain pressure.

It's the only chain drill with automatic friction and ratchet feed. "Yankee" Bench Drills have same feed.

No. 1500 (Illustrated) 3-jaw chuck for round shank drills up to 3/8 in.
No. 500—2-jaw chuck for square shank drills up to 3/8 in.

Dealers everywhere sell "Yankee" Tools

NORTH BROS. MFG. CO., Philadelphia, U.S.A.

"YANKEE" TOOLS
Make Better Mechanics

Some other "Yankee" Tools
Ratchet Breast Drills
Ratchet Tap Wrenches
Ratchet Bench Drills
Ratchet ScrewDrivers
Plain ScrewDrivers
1/4 to 1 1/2 in.

Write for FREE Book Describing Them All

Advertisement, Popular Mechanics, Oct 1923
**DO YOU KNOW?**

**Dearborn Cabinet**
Delivered 13.00
will Save Your Stenographer’s Time. Improve Quality of Work and Save YOU Money

42 in. Long
24 in. Deep
28 in. High
Roll Curtains to Paper Cabinet

**Dearborn Desk Co.**
Alexander A. Samuel, General Manager
504 Fisher Building, Chicago, U. S. A.

**Advertisements**
Popular Mechanics, April 1906

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**Faster than an Auto**
**Cheaper than a Horse**

Get A Manson
It is speedy and reliable, adapted to all roads, and maintained at a moderate expense. Attachments designed for pleasure and utility

Write us
Fowler - Manson - Sherman
Cycle Mfg. Co.
Clinton and Fulton Sts., Chicago, Ill.
Bauhaus Again

Le Corbusier
Grand Confort, 1928

Marcel Breuer
Wassily Chair, 1925
Streamlining

Raymond Loewy, from: hyperakt.com
Streamlining

Pennsylvania Railroad S1, 1939 (Wikipedia)
Streamlining gone too far...
Form Follows Function

It is the pervading law of all things organic and inorganic, Of all things physical and metaphysical, Of all things human and all things super-human, Of all true manifestations of the head, Of the heart, of the soul, That the life is recognizable in its expression, That form ever follows function. This is the law.

- Louis Sullivan
Henry Dreyfuss: Human Factors
Dreyfuss: Model 500 phone
American mass production has created countless benefits, not the least of which is an amazing rise in the level of public taste through good design of consumer products. Evidence of this is reflected by these "before" and "after" illustrations culled from Sears Roebuck catalogues of today and twenty-five years ago.
1. When the industrial designer is summoned by a potential client he must first cautiously determine that he can make a positive contribution to the product. If, after study and consultation, it is found that he can, the following sequence of events is set in motion.

2. A meeting is held with the executive group, composed of department heads, to learn their objectives in terms of time, cost, techniques, and distribution. Only in this way can the industrial designer be sure that his ideas jibe with the practical facts of business life.

3. A thorough study is made of the market. The industrial designer assembles photographs of competitive lines. Often rival products are purchased and operated. Although the client, naturally, is cognizant of his competition, the designer sees it through different eyes.

4. Time is allocated to the study of factory methods and production facilities. This ensures the industrial designer's becoming acquainted with any limitations that may exist, so he won't project a product that cannot be manufactured efficiently.

5. The industrial designer enters into close cooperation with the client's engineering personnel. Their offices become one. Together they go over countless sketches, working drawings, and blueprints. Three-dimensional models are developed in clay, plaster, wood, or plastic.

6. The final model—a working one, if possible—is presented to the entire client group by the industrial designer and the client engineers. The presentation is designed to show management what they will get, when they will get it, and what it will sell for.

7. Agreement on a final working model is a milestone, but the industrial designer's work is far from done. He continues to work with the engineers and toolmakers, making every effort to integrate changes if they will improve the product or the price picture.

8. If the product is to be packaged, the industrial designer goes to work on the container, carton, and price tags. He interests himself in these matters because they complement the product. Often they create the invaluable first impression in the mind of the customer.
Excess of Form Follows Function

Centre Georges Pompidou, Paris
All infrastructure (ducts, vents, stairs) on outside of building
Simplicity and Elegance
Steal Good Design Ideas

“Good artists borrow (from other artists), but great artists steal!” - Pablo Picasso

Compelling visual design takes practice and experience – a natural part of which is study and critique of other’s work
Simplicity

Simple, minimalist, designs are often most effective
Elegance

Reduction: Only include essential elements
Regularization: Use one set of shapes, colors, forms etc.
Leverage: Use elements in multiple roles

scrollbar allows scrolling and indicates position in document
Benefit: Approachability

Visual elements rapidly understood - invite further exploration
Benefit: Recognizability

Less visual clutter makes it easier to recognize what is there
Benefit: Immediacy

Eye is immediately drawn to important visual elements
Details that remain are more prominent
Unity

One path to simplicity & elegance is through unifying themes:
Forms, colors, components with like qualities
Refinement

Draw viewers’ attention to essential information
Straighten subway lines to emphasize sequence of stops
From Literal to Abstract
Mistakes: Clutter & Noise
Mistakes: Interference

Shortcuts interfere with menu labels in (a) not in (b).
Different shapes cause confusion in alignment tools
Mistakes: Too Much Structure

Bounding boxes in (a) adds unnecessary structural information. Simpler structure in (b) using space rather than lines is better.
Mistakes: Belaboring the Obvious
Mistakes: Gratuitous use of 3D
Mistakes: Excessive Embellishment

Minimalists hate it, but sometimes users like embellishment
Color
Color Spaces

RGB
Additive
Electronic Media

CMY
Subtractive
Printed Media

Parameters of color space driven by technology
Technology-Centered Colors

Nice RGB Hex codes, “evenly” distributed
But, lime green and hot pink?
Perceptual Organization

Parameters of color space driven by perception

- Lightness
- Colorfulness
- Hue
Munsell Color Space

Perceptually uniform book of painted chips

Hue

Chroma vs. Value
Tips for Picking Colors

Use a limited palette (e.g., 6 colors in Java look and feel)

Don’t rely on fully saturated colors

Ensure good color contrast for text
Let Someone Else Pick For You
Let Someone Else Pick For You
Let Someone Else Pick For You

ColorBrewer.org
Gestalt Principles
Principles

- figure/ground
- proximity
- similarity
- symmetry
- connectedness
- continuity
- closure
- common fate
- transparency
Figure/Ground

Ambiguous

Principle of surroundedness

Principle of relative size

http://www.aber.ac.uk/media/Modules/MC10220/visper06.html
Figure/Ground

Ambiguous

Unambiguous

http://www.aber.ac.uk/media/Modules/MC10220/visper06.html
Proximity

Dots that are near one another are grouped
Dots that are concentrated are grouped

[from Ware 00]
Proximity

Tuesday, November 4
Election Day
An American Menu $75
Caesar salad with anchovies, egg, and Parmesan cheese
Clam chowder with Maine lobster and pancetta
Grilled chicken with house-made barbeque sauce with potato purée and greens
Apple and raspberry pecan crisp with vanilla ice cream
Proximity

Tuesday, November 4 — Election Day

An American Menu

$75

Caesar salad with anchovies, egg, and Parmesan cheese

Clam chowder with Maine lobster and pancetta

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Apple and raspberry pecan crisp with vanilla ice cream
Similarity

Rows dominate due to similarity [from Ware 04]
Similarity

TUESDAY, NOVEMBER 4 – ELECTION DAY

AN AMERICAN MENU

Caesar salad
with anchovies, egg, and Parmesan cheese

Clam chowder
with Maine lobster and pancetta

Grilled chicken
with house-made barbeque sauce with
potato purée and greens

Apple and raspberry pecan crisp
with vanilla ice cream
Symmetry

Bilateral symmetry gives strong sense of figure [from Ware 04]
Connectedness overrules proximity, size, color shape [from Ware 04]
Continuity

We prefer smooth not abrupt changes [from Ware 04]

Connections are clearer with smooth contours [from Ware 04]
Closure

We see a circle behind a rectangle, not a broken circle [from Ware 04]

Illusory contours [from Durand 02]
Common Fate

Dots moving together are grouped

http://coe.sdsu.edu/eet/articles/visualperc1/start.htm
Typography
Principles (from R. Bringhurst)

1. Typography exists to honor content.

2. Read the text before designing it.

3. Choose a typeface that matches the character of the text.
Type Categories: Oldstyle (Humanist)

Oldstyle

Serif (pronounced "sair iff," not "suh reef")

Diagonal stress

Moderate thick/thin transition in the strokes

Serifs on lowercase letters are slanted

Goudy

Palatino

Times

Baskerville

Garamond

Source: R. Williams
The Non-Designers Design Book
Type Categories: Modern

- Vertical stress
- Serifs on lowercase letters are thin and horizontal
- Bodoni Poster Compressed
  - Radical thick/thin transition in the strokes

Bodoni, Times Bold, Fenice, Ultra, Walbaum

Source: R. Williams
The Non-Designers Design Book
Type Categories: Slab Serif

Serifs on lowercase letters are horizontal and thick (slabs)

Vertical stress

Very little or no thick/thin transition, or contrast, in the strokes

Clarendon  Memphis
Memphis Extra Bold
New Century Schoolbook

Source: R. Williams
The Non-Designers Design Book
Type Categories: Sans Serif

- No serifs anywhere
- No thick/thin transition in the strokes
- No stress because there's no thick/thin

**Sans serif**

- Antique Olive
- Formata
- Gill Sans
- Franklin Gothic
- Folio
- Syntax

Source: R. Williams
The Non-Designers Design Book
Combining Type: Concordant

Typography

FROM WIKIPEDIA, THE FREE ENCYCLOPEDIA

Typography is the art and technique of arranging type, type design, and modifying type glyphs. Type glyphs are created and modified using a variety of illustration techniques. The arrangement of type involves the selection of typefaces, point size, line length, leading (line spacing), adjusting the spaces between groups of letters (tracking) and adjusting the space between pairs of letters (kerning).
Combining Type: Contrasting

Typography
From Wikipedia, the free encyclopedia

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Combining Type: Conflicting

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Composition
Principles

1. Contrast
   (don’t be a wimp)
2. Repetition
3. Alignment
Back to the Bauhaus...

THE NEW TYPOGRAPHY
Diagram, 1928
(redrawn)
Designer and author:
Jan Tschichold

Tschichold's diagram of good and bad magazine design advocates staggering images in relation to content instead of forcing text to wrap around blocks moored at the center of the page. Explaining this experiment, Tschichold wrote that his redesigned pages would be even more effective if the photographic halftones (called "blocks") were produced in fixed rather than arbitrary sizes.
Margins are the negative spaces between the format edge and the content, which surround and define the live area where type and images will be arranged. The proportions of the margins bear a great deal of consideration, as they help establish the overall tension within the composition. Margins can be used to focus attention, serve as a resting place for the eye, or act as an area for subordinate information.

Flowlines are alignments that break the space into horizontal bands. Flowlines help guide the eye across the format and can be used to impose additional stopping and starting points for text or images. There may be one flowline, or there may be several. If there are numerous flowlines at regular intervals, breaking the page top to bottom in a repeated proportion, a system of rows is created that intersects the vertical columns.

Spatial zones are groups of modules that form distinct fields. Each field can be assigned a specific role for displaying information; for example, one horizontal field might be reserved for images, and the field below it might be reserved for a series of text columns.

Columns are vertical alignments of type that create horizontal divisions between the margins. There can be any number of columns; sometimes they are all the same width, and sometimes they are different widths, corresponding to specific information. The page diagrammed here shows four columns of even width.

Markers are placement indicators for subordinate or consistently appearing text, such as running heads, section titles, folios, or any other element that occupies only one location in any layout.

Modules are individual units of space separated by regular intervals that, when repeated across the page format, create columns and rows.
Grid Systems

142: These typographic grids for book design subdivide the page uniformly into one to six columns. Grids for Gill design have important differences, but the goal of providing systematic structure is the same. From Basic Typography: Design with Letters, by Ruedi Rüegg, ABC-Verlag, Zurich, 1987.

143: Each of the grids in Figure 142 leaves a distinct imprint on the resulting layout. When the same grid is used throughout a book – or aui application – this imprint becomes a unifying element for the entire work. From Basic Typography: Design with Letters, by Ruedi Rüegg, ABC-Verlag, Zurich, 1987.
Web Page Layout

Grids can shape layout without over constraining it
- Grid is not always obvious from page layout
- Produces good repetition of size and shape
Alignment

Every item on a screen has a relationship to the other items. Elements that are almost collinear should be aligned.

Left, right and both-justified alignments create strong boundaries around a piece of text.

It's best to stick with one kind of justification within a page.
Alignment
Alignment
Common Mistakes

Arbitrary component positions and dimensions
Random window sizes and layouts
Unrelated icon sizes and imagery
Poor alignment
Techniques

Reinforce structure through repetition
Repeat design elements across the layout
Stylesheets can help
Techniques

** Canonical Grid  
Six-column grid with column separators and label templates  
Covers most common grid-based layouts  
Can be implemented with HTML tables
Summary

Design is about communication, form and function
Simplicity and elegance are keys to good design
Minimalism constrains you and reduces chances of bad design

Use a small palette of colors
Let others pick them for you (colorbrewer.org)

Human vision is organized by Gestalt Principles
Be aware of these principles as you design the visual look

Avoid common layout mistakes by using grid-based design
Next Time

Visual Information Design