## Visual Design

SWE 632 Spring 2022





#### Administrivia

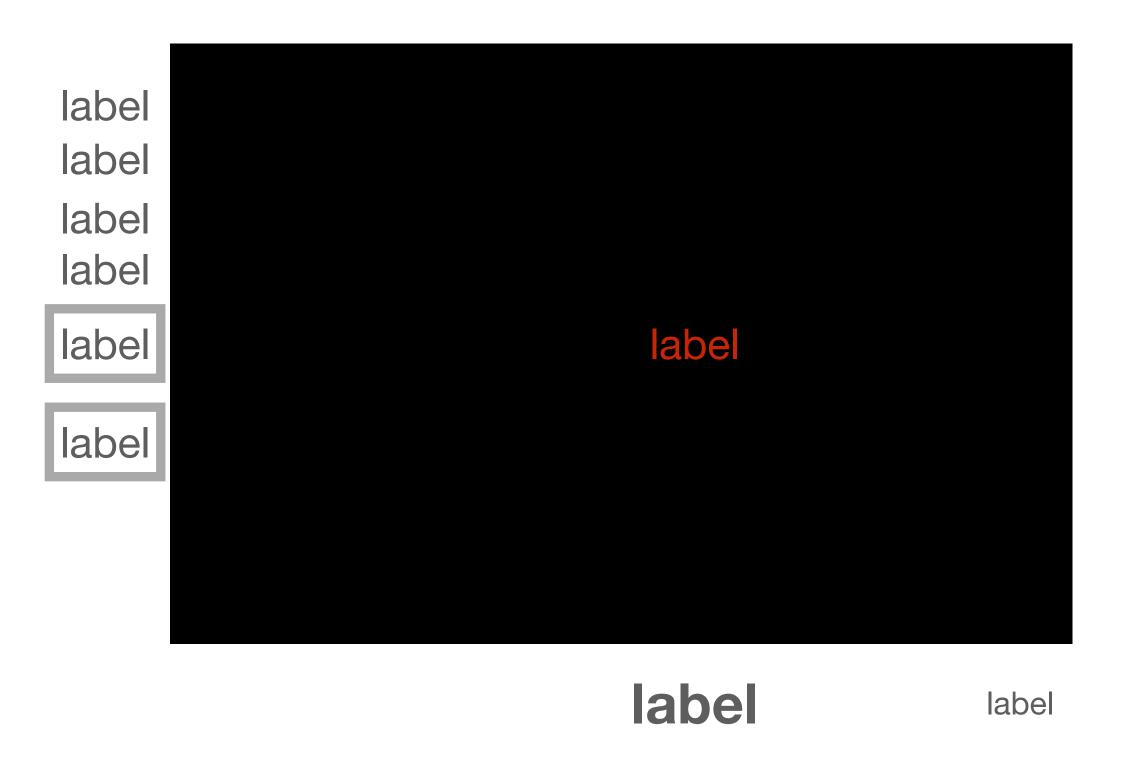
HW6 due on 4/20

#### Class Overview

- 1. Overview of Visual Design: What it is and Why it Matters
- 2. Guidelines for Visual Design: Simplicity and Regularization
- 3. Scale, Contrast, & Proportion: Formatting Matters
- 4. Organization & Structure: Information Conveyance
- 5. Images & Icons: Getting the Right Picture Across
- 6. <u>Design Languages:</u> Unifying your Design

## Overview of Visual Design

## Elements of Visual Design

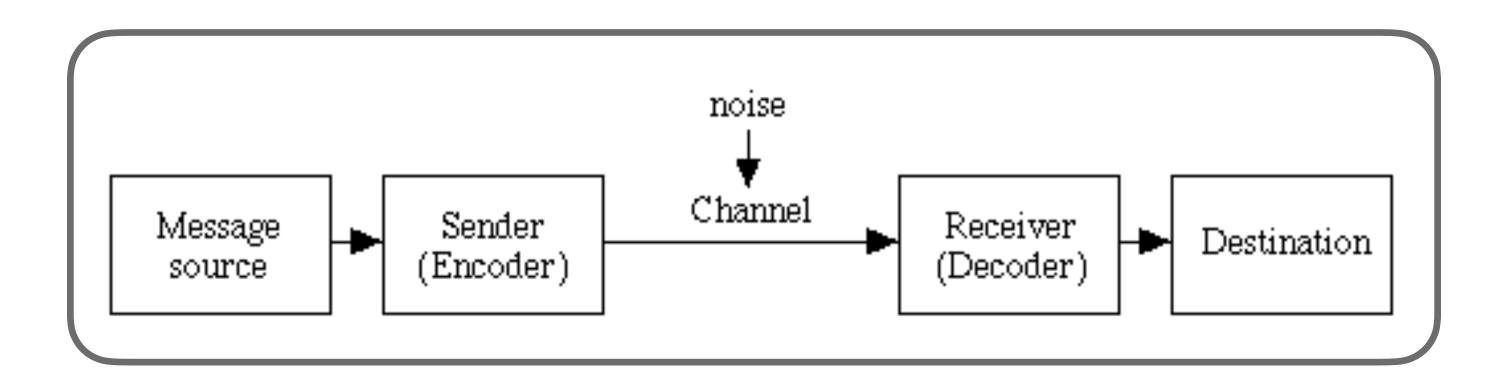


#### Visual Design

- Solving <u>communications problems</u> in ways that are both functionally effective and aesthetically pleasing.
- Creating a visual language containing a vocabulary of design elements characterized by
  - Visual variables—shape, size, position, orientation, color, texture, ...
  - Organizational relations between elements—balance, structure, proportion,
  - Visual syntax—rules for assembling elements w/in design language

#### Visual Design as Communication

- Goal: <u>efficiently</u> & <u>accurately</u> transmit information from system to user
- Visual variables & organization encode information



#### Goals for Visual Design

- Successfully transmit information
- Present coherent & consistent design that reduces ambiguity and potential confusion
- Reduce visual <u>search</u> time through layout & organization
- Create desired <u>emotional</u> reactions through aesthetic choices

# General Guidelines for Visual Design

#### Elegance & Simplicity

- Elegance—derives from Latin eligere, to "select carefully"
- <u>Judicious</u> selection of elements and economy of expression revealing an intimate understanding of problem
- Removing & combining superfluous elements until only the necessary remains



#### Benefits of Simplicity

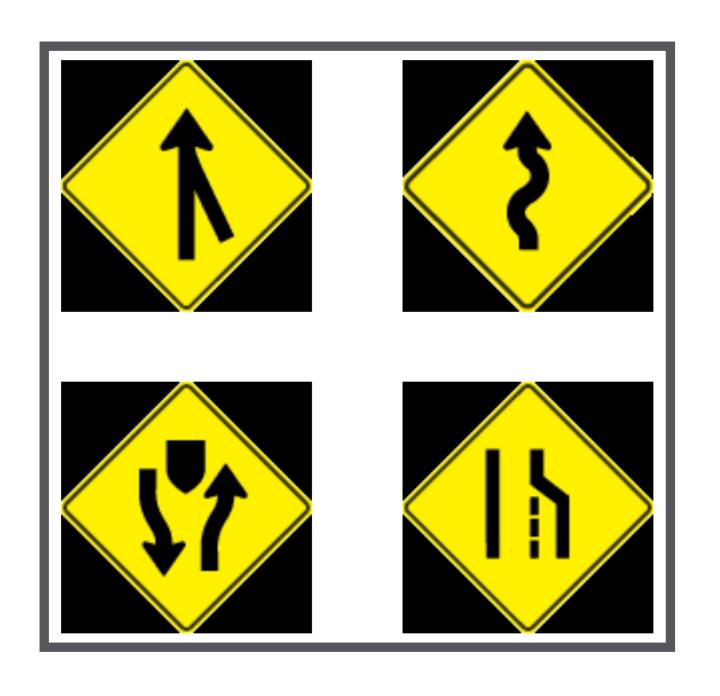
- Approachability rapidly understood affordances, allowing glanceable understanding of possible interactions
- Immediacy greater emotional impact because interactions can be quickly understood



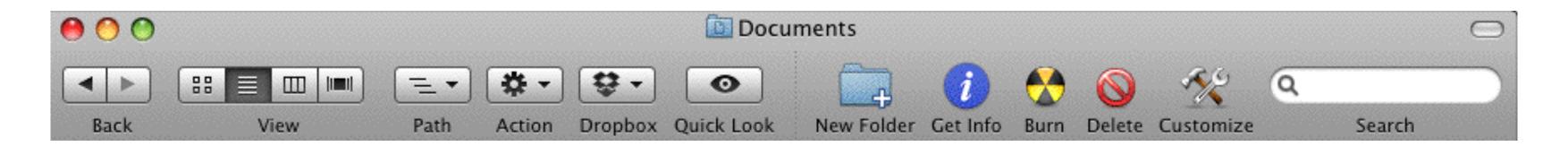
Marc Berthier. Tykho Radio. 1997. Synthetic rubber and other materials, 5  $1/2 \times 5 1/2 \times 15/8''$  (14 x 14 x 4.1 cm). Manufactured by Lexon, France. The Museum of Modern Art, New York. Gift of the manufacturer.

#### Reducing a Design to its Essence

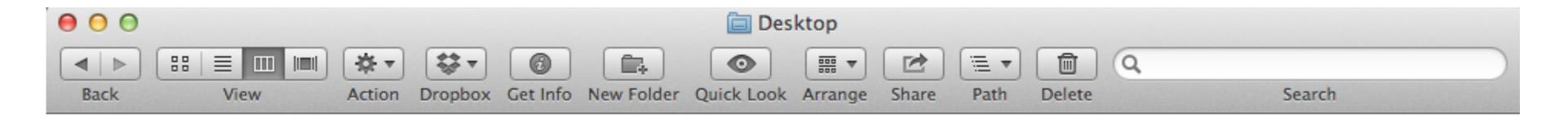
- Make design simple, bold, and direct by removing inessential details & elements
  - Even essential elements may be suggested
- 1. Determine essential qualities & information to be conveyed
- 2. Critically examine each element & ask how design would suffer without it.
- 3. Try removing elements. What happens?



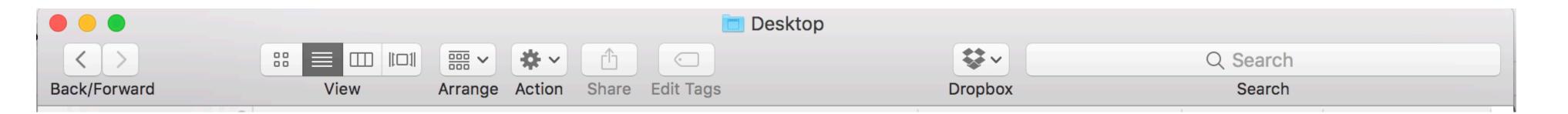
### Trade-offs in Simplicity



OSX c.2010



OSX c.2011



OSX c.2016



#### Guidelines for Visual Design



Reduction in new map: relative distances don't matter

### Regularizing the Elements of a Design

- Reduce information by repeating elements according to a rule, principle or rhythm
- Enable user to scan ahead
- Use irregularity where needed to clarify that something is irregular!
  - 1. Use <u>regular</u> geometric forms, simplified controls, muted colors where possible
  - 2. If multiple similar forms required, make them *identical* as much as possible in size, shape, color, texture, spacing, alignment
  - 3. *Limit variation* in typography to a few sizes
  - 4. Make sure critical elements intended to stand out are *not* regularized

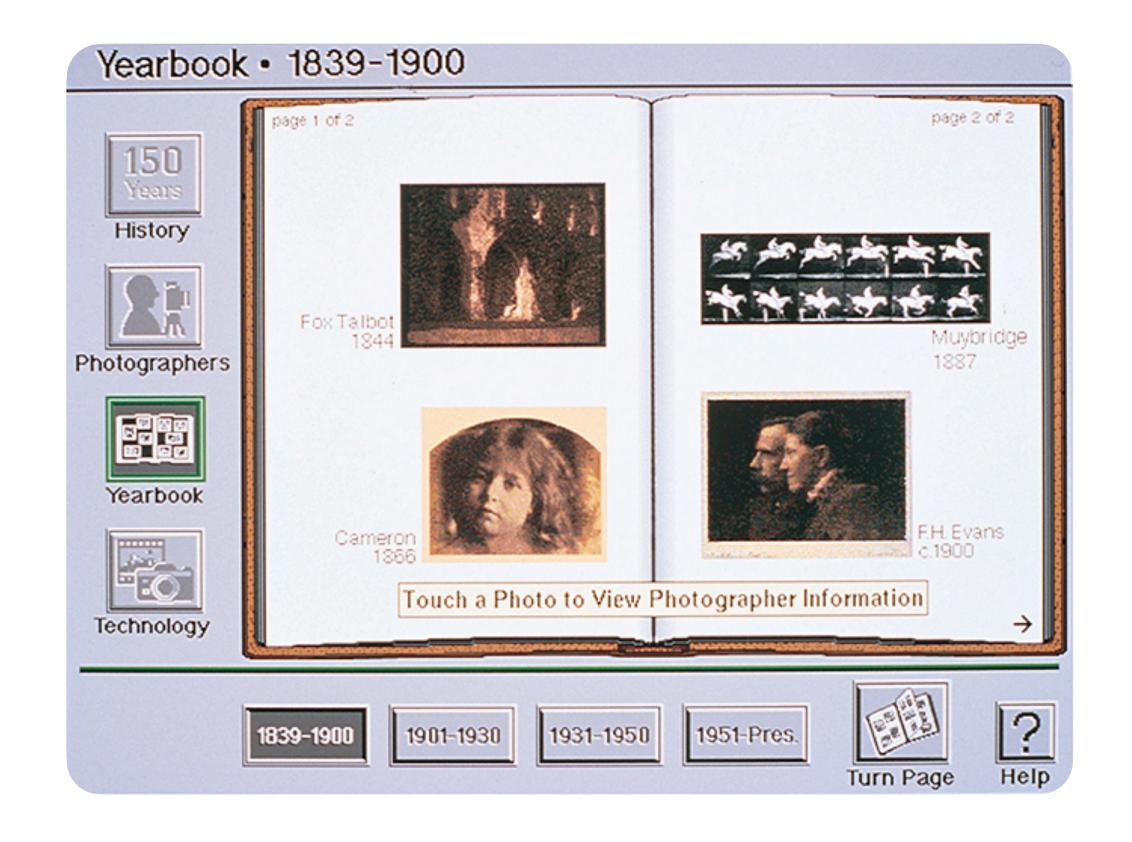
#### Guidelines for Visual Design

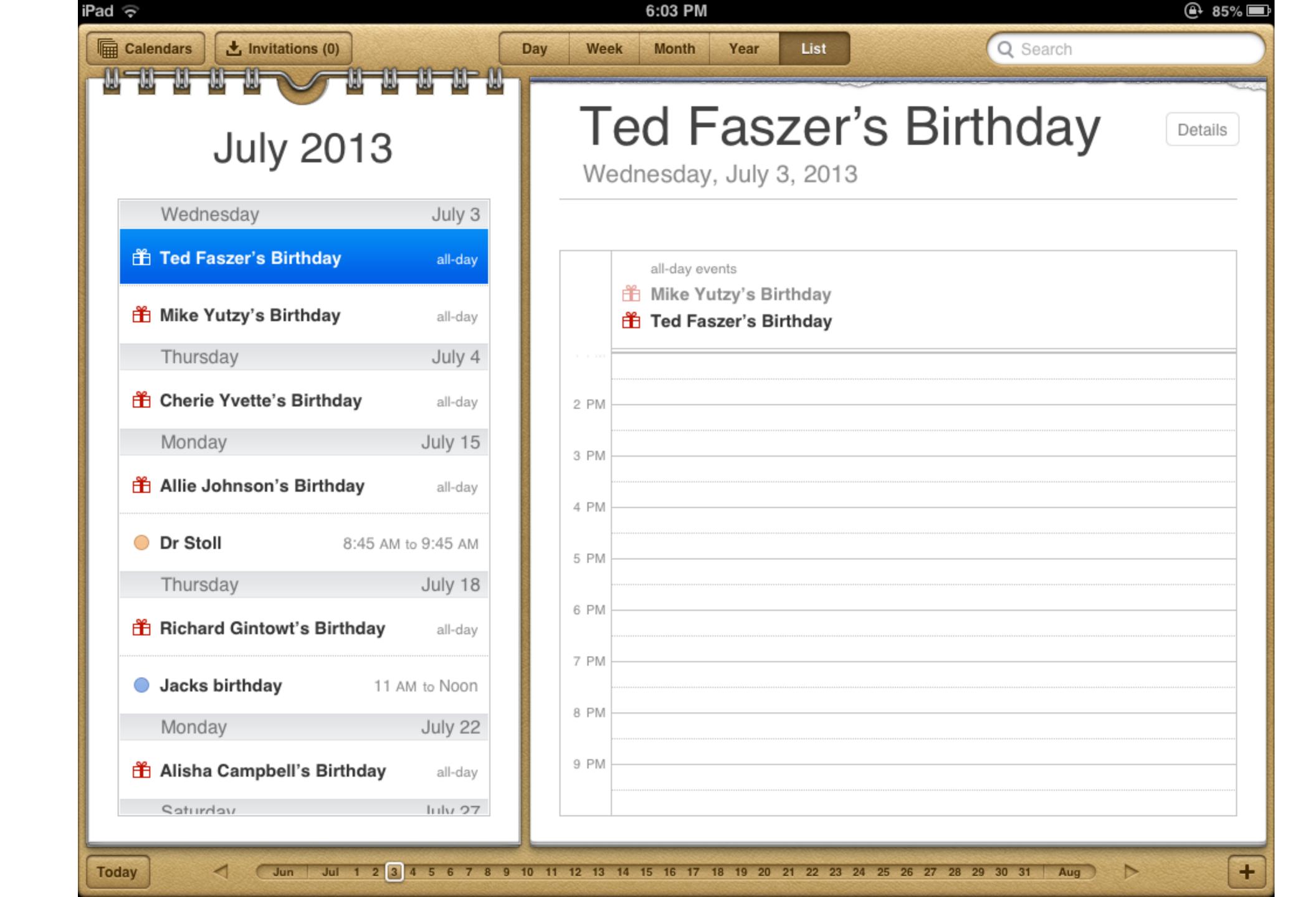


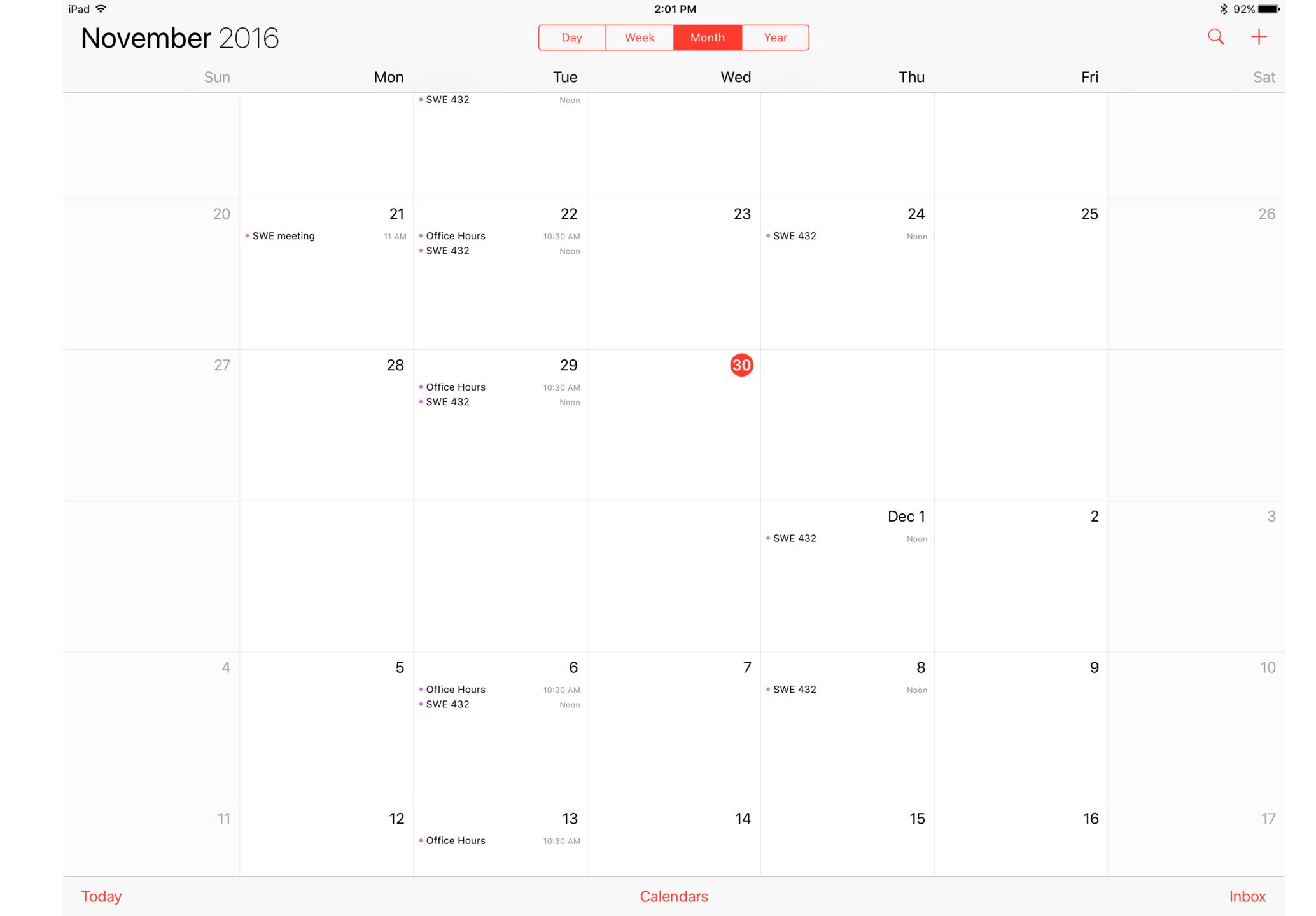
Regularization in new map: Straight lines result in station names laid out in a line, rather than bouncing around

#### Error - Excessive Skeuomorphism

- Skeuomorphism making visual design resemble reality (like metaphors)
- Excessive skeuomorphism is distracting and wastes potential visual bandwidth that could encode meaningful information
- Trend towards "flat" interfaces







## Scale, Contrast, & Proportion

#### Scale, Contrast, & Proportion

Information consists of differences that make a difference. (Edward Tufte, Envisioning Information)

Individual visual variables of design that encode information

#### Terminology

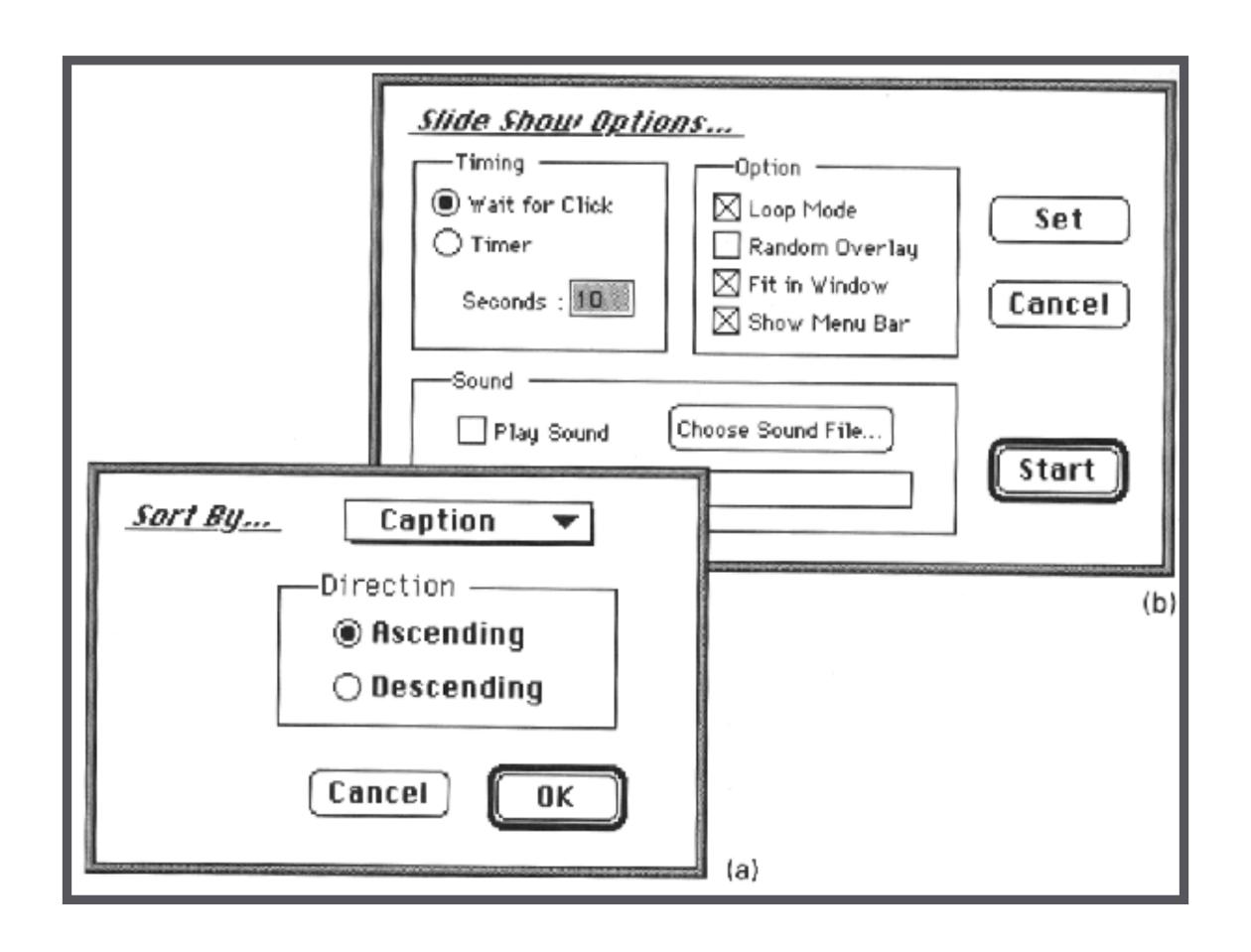
- Scale <u>relative</u> size or magnitude of element in comparison to related elements
- Contrast visually noticeable <u>distinctions</u> along a common visual dimension
- Proportion ratio and <u>balance</u> between elements
- Emphasis contrasts can emphasize important elements or areas & add visual <u>interest</u> by creating tension & drama



#### Principles

- <u>Clarity</u> contrasts should be clear and easily differentiated, not slight and subtle
- Harmony proportions and ratios should be harmonious
- Activity use contrasts to maintain orientation & context within design
- <u>Restraint</u> contrasts should be conscious, strong, few in number, and never overwhelming

#### **Error - Excessive Typographic Contrasts**



5 different types sizes in 3 different fonts (!!)

#### Layers

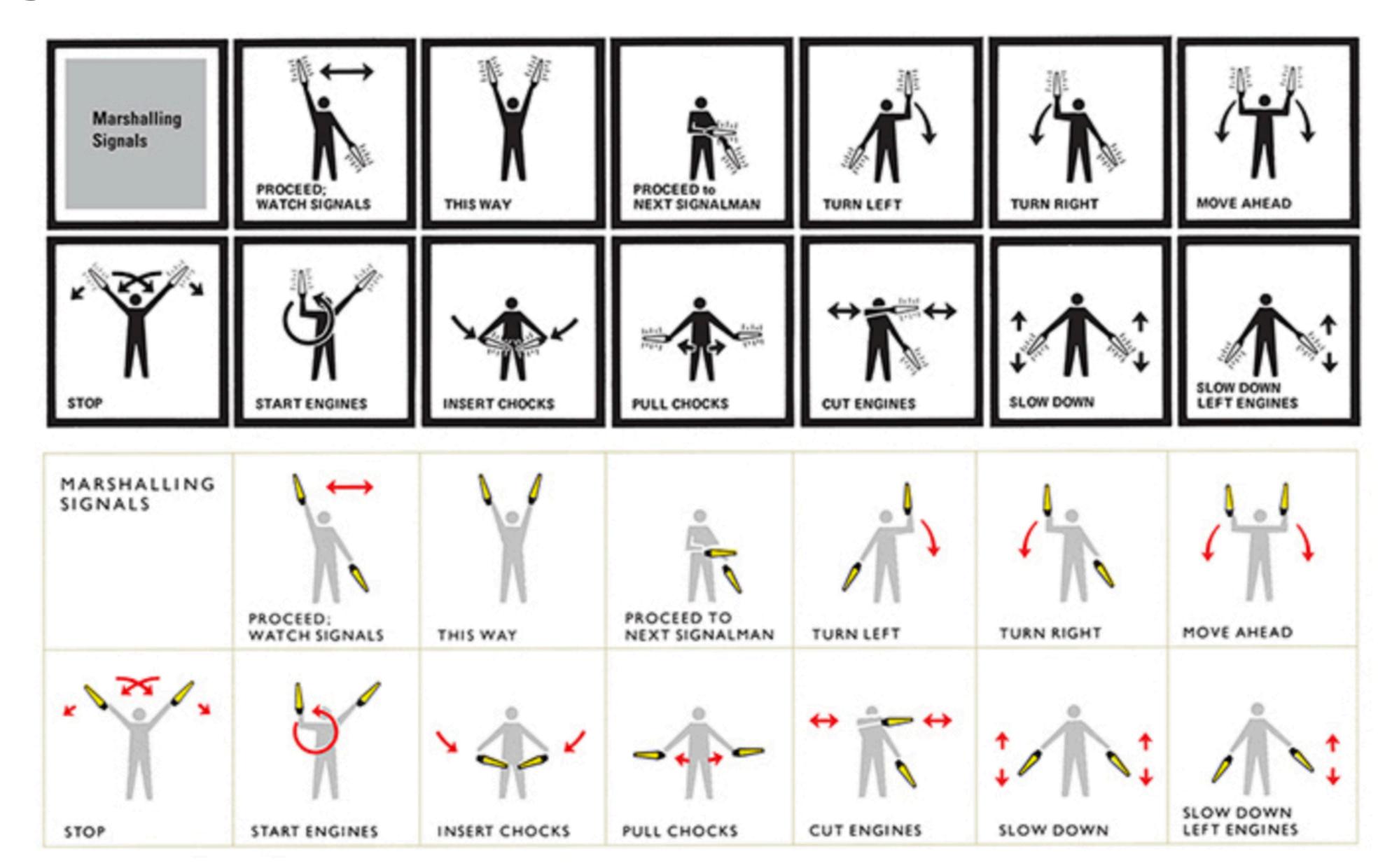
- Contrasting color, value, texture can segregate information into separate layers
- Supports <u>overlapping</u> information in displays, allowing selective processing of specific sets of elements
- Allows different layers to be read and interpreted <u>separately</u>



#### Creating Layers

- 1. Group items into categories based on intended use
- 2. Determine rank & importance of groups
- 3. Use perceptual variables (size, value, hue, etc.) to establish layering effect
- 4. Maximize differences between groups while minimizing differences within groups
- 5. Use squint test to ensure elements in group retain together but visually separated

# Layers



## Organization & Structure

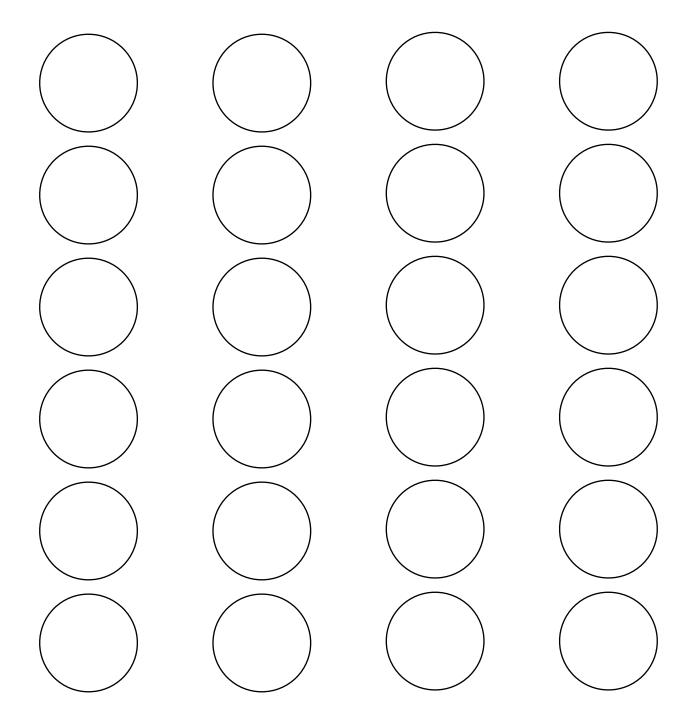
#### Organization & Structure

- Organization needs to be designed
- Benefits
  - Unity ties together related elements so that they work together
  - Integrity & readability offers structure that helps user to easily scan & make comparisons
  - Control determines where user will focus attention in the design
- Gestalt -> psychology of perception

#### Gestalt Principle - Proximity

Elements associated <u>most</u> strongly w/ nearby elements

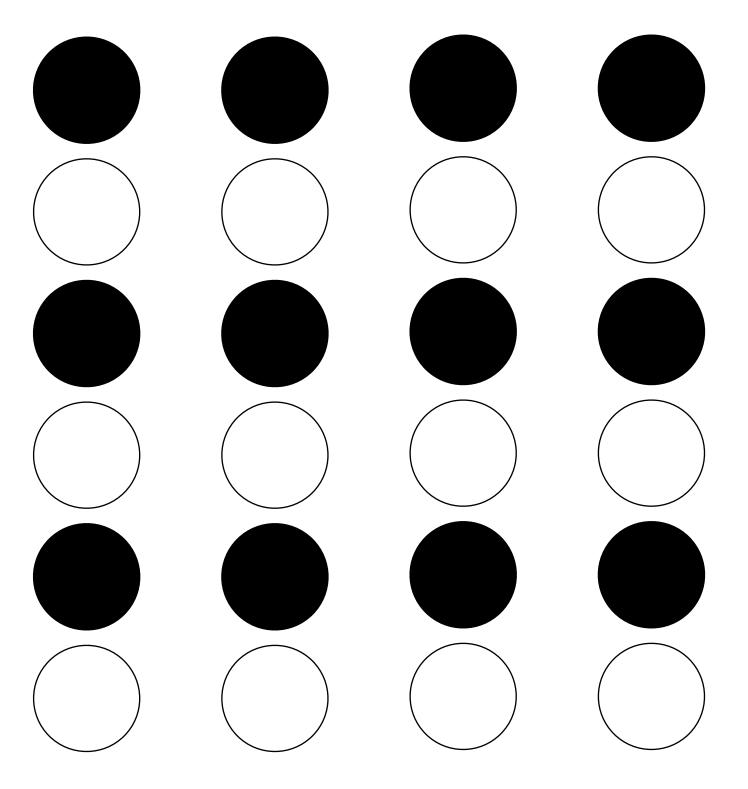
parsed as 4 columns based on close vertical spacing then parsed as two sets of two columns based on spacing



#### Gestalt Principle - Similarity

 Elements associated more strongly when share common visual attributes than when they differ

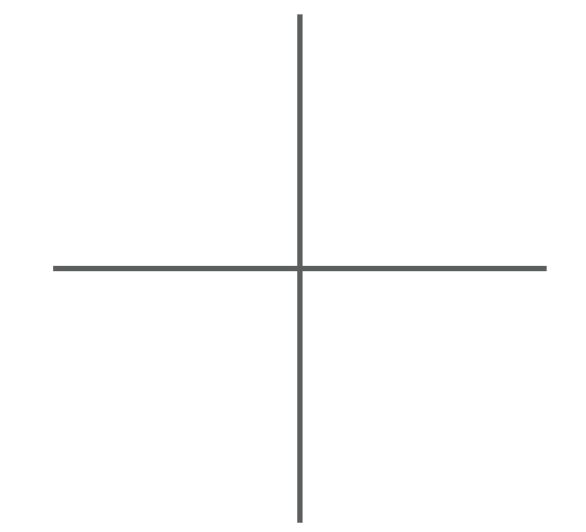
parsed as rows based on fill similarity, despite closer column spacing



#### Gestalt Principle - Continuity

Preference for <u>simplest</u> physical explanation of complex figure

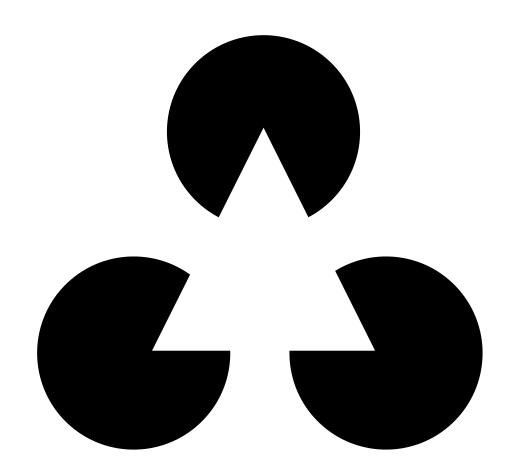
parsed as two lines, rather than 4 separate lines or 4 opposing angles

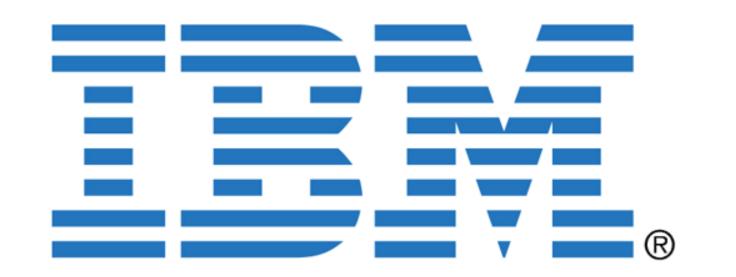


### Gestalt Principle - Closure

 Preference to interpret figures as complete, even when missing information

Parsed as triangle superimposed on 3 complete circles, even though none of these is actually present

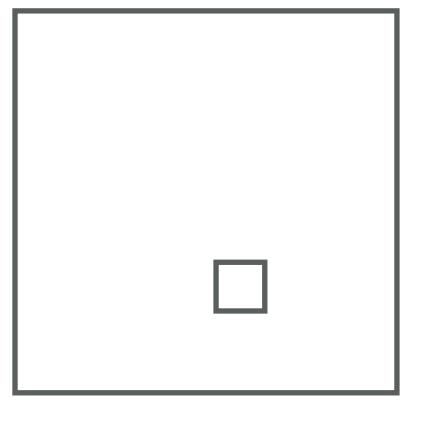




#### Gestalt Principle - Area

 Preference to interpret smaller overlapping elements as figure, larger as ground

Small rectangle parsed as small rectangle on top of larger, rather than hole

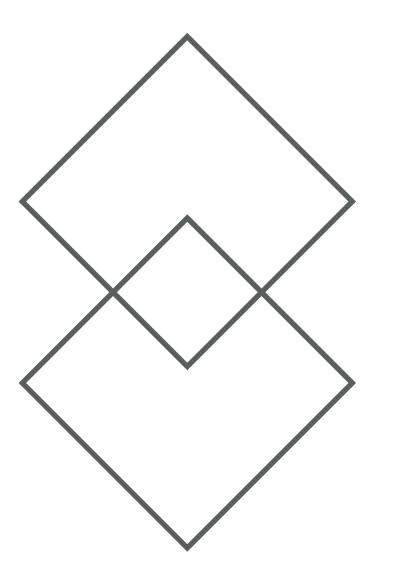




#### Gestalt Principle - Symmetry

 Preference to interpret ambiguous form as multiple symmetric elements

Parsed as two overlapping objects rather than 3 separate shapes



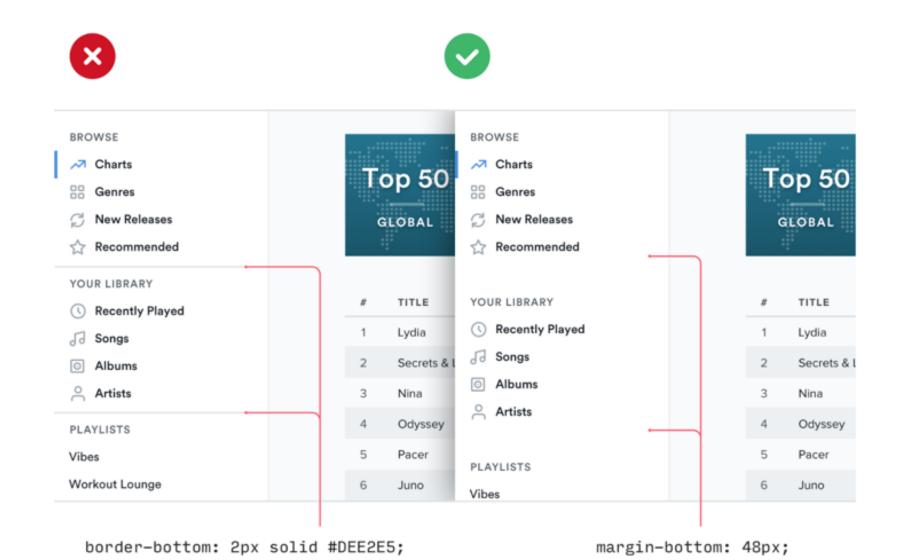
#### Grouping

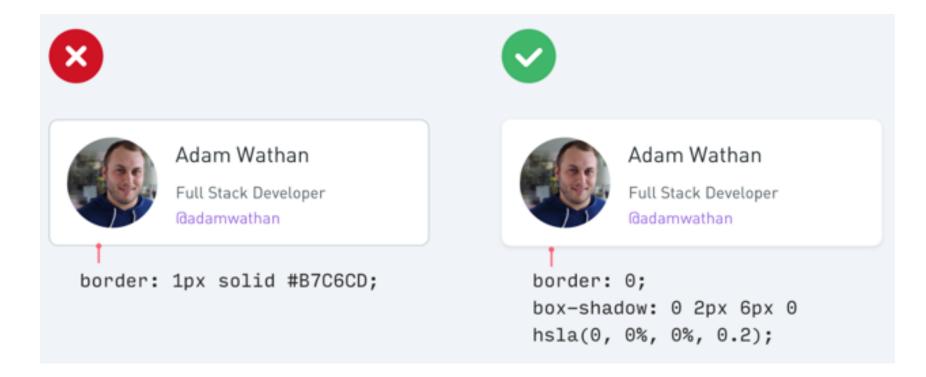




- Binding UI elements tightly together while distinguishing them from surrounding controls
- "Showing" not "telling"
- Can be achieved through
  - Bounding boxes (not recommended)
  - Negative space & contrasts
  - Arrangement & alignment

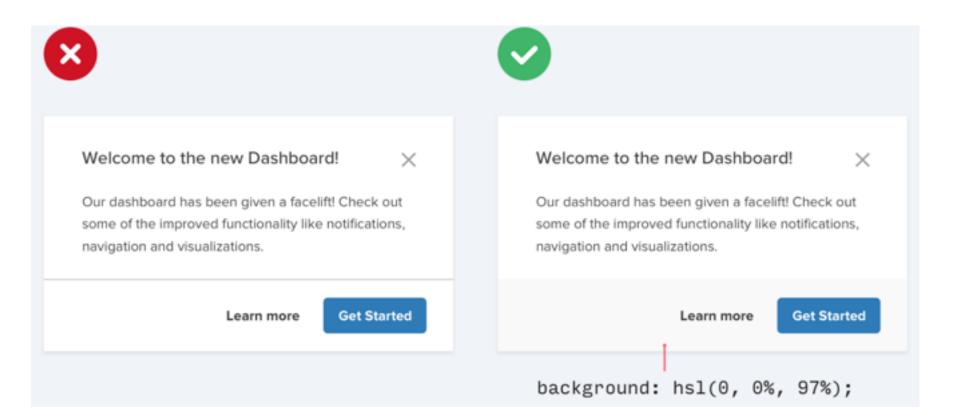
### Use Fewer Borders





box shadows

negative space



different backgrounds

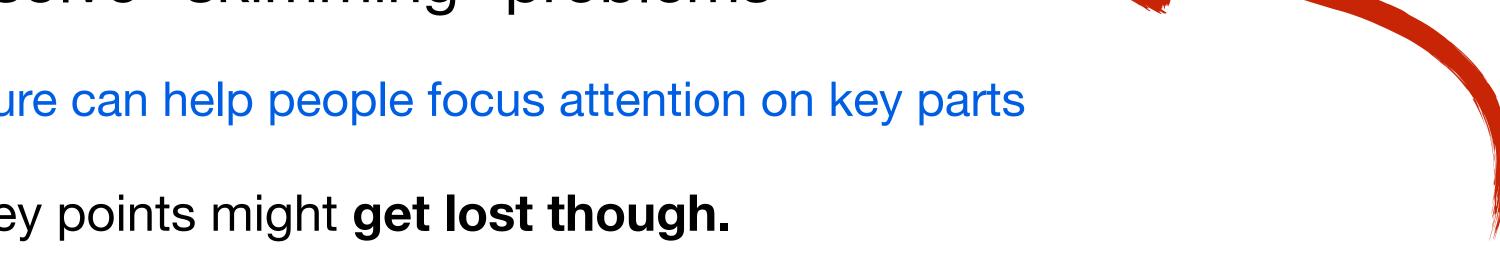
### Hierarchy

Order groups based on perceptual prominence corresponding to intended reading sequence

Can help solve "skimming" problems

Structure can help people focus attention on key parts

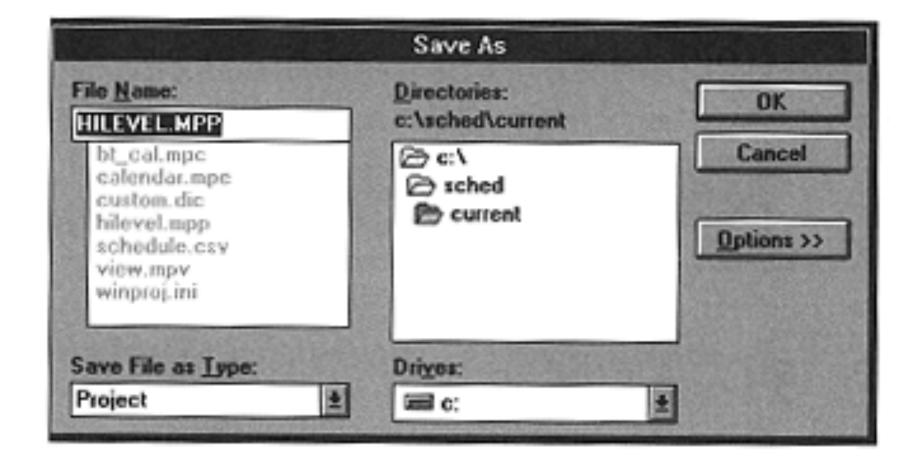
Key points might get lost though.

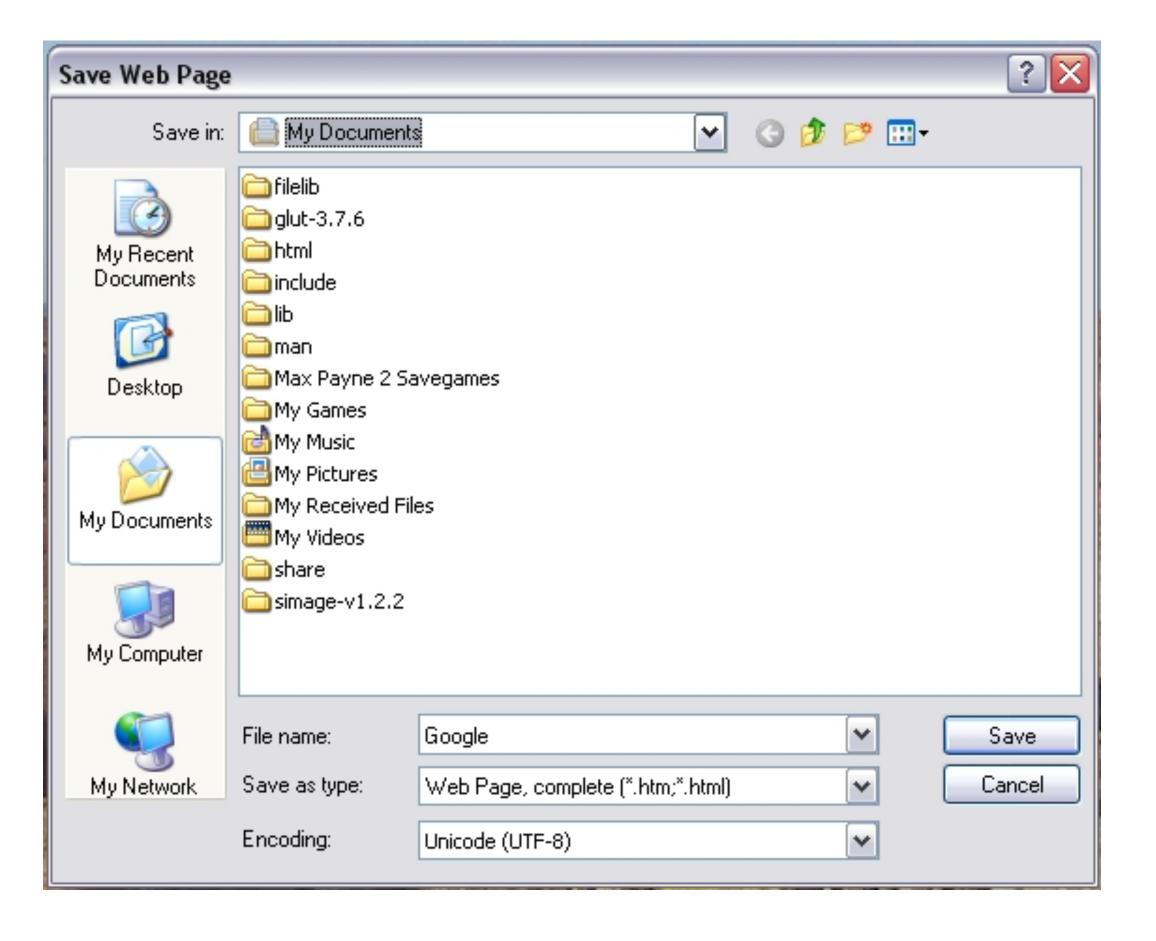


But bolding helps! Plus this obnoxious red arrow and text in a totally

different font!

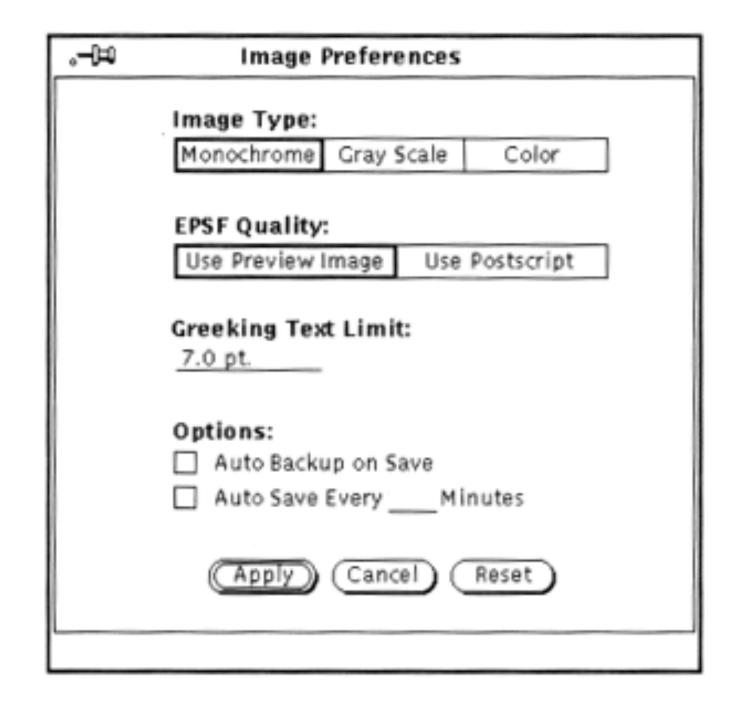
# Hierarchy in Uls

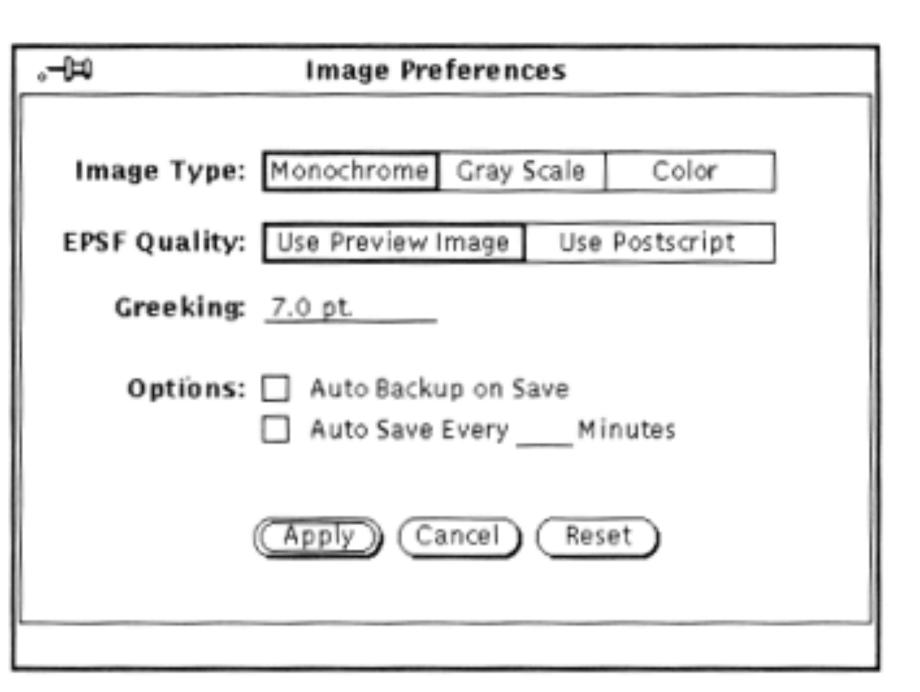




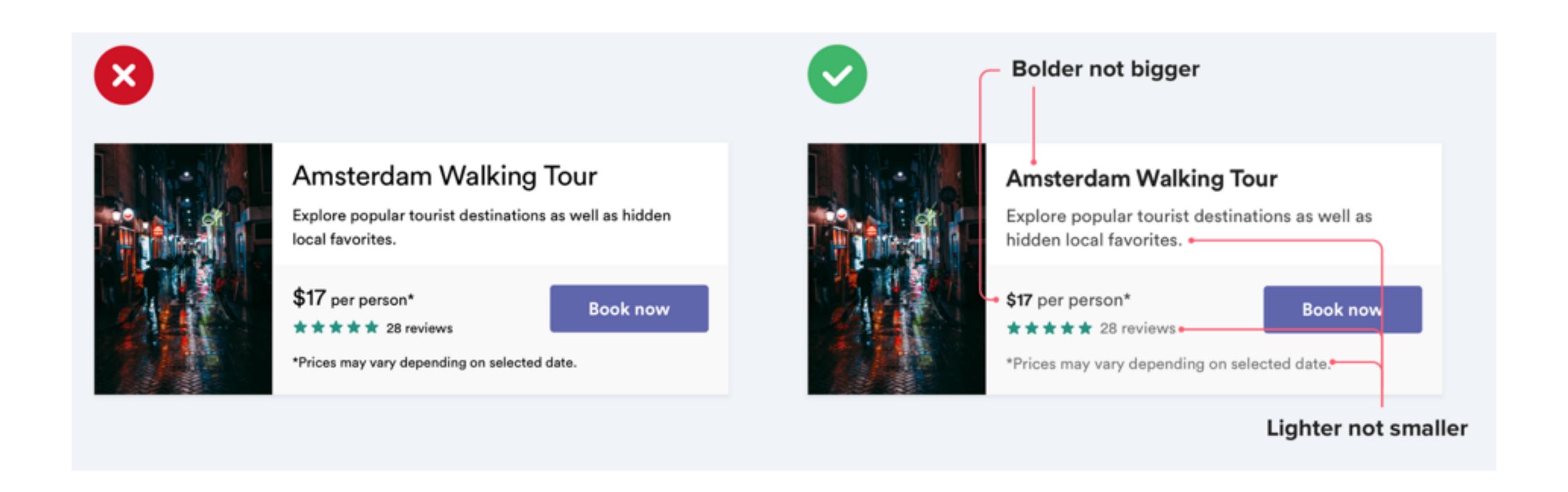
### Use Negative Space

- Directs attention to critical regions of display
- 1. Review design, prioritizing groups
- 2. Add extra <u>space</u> to ensure spatial separation & emphasis, particularly for important elements

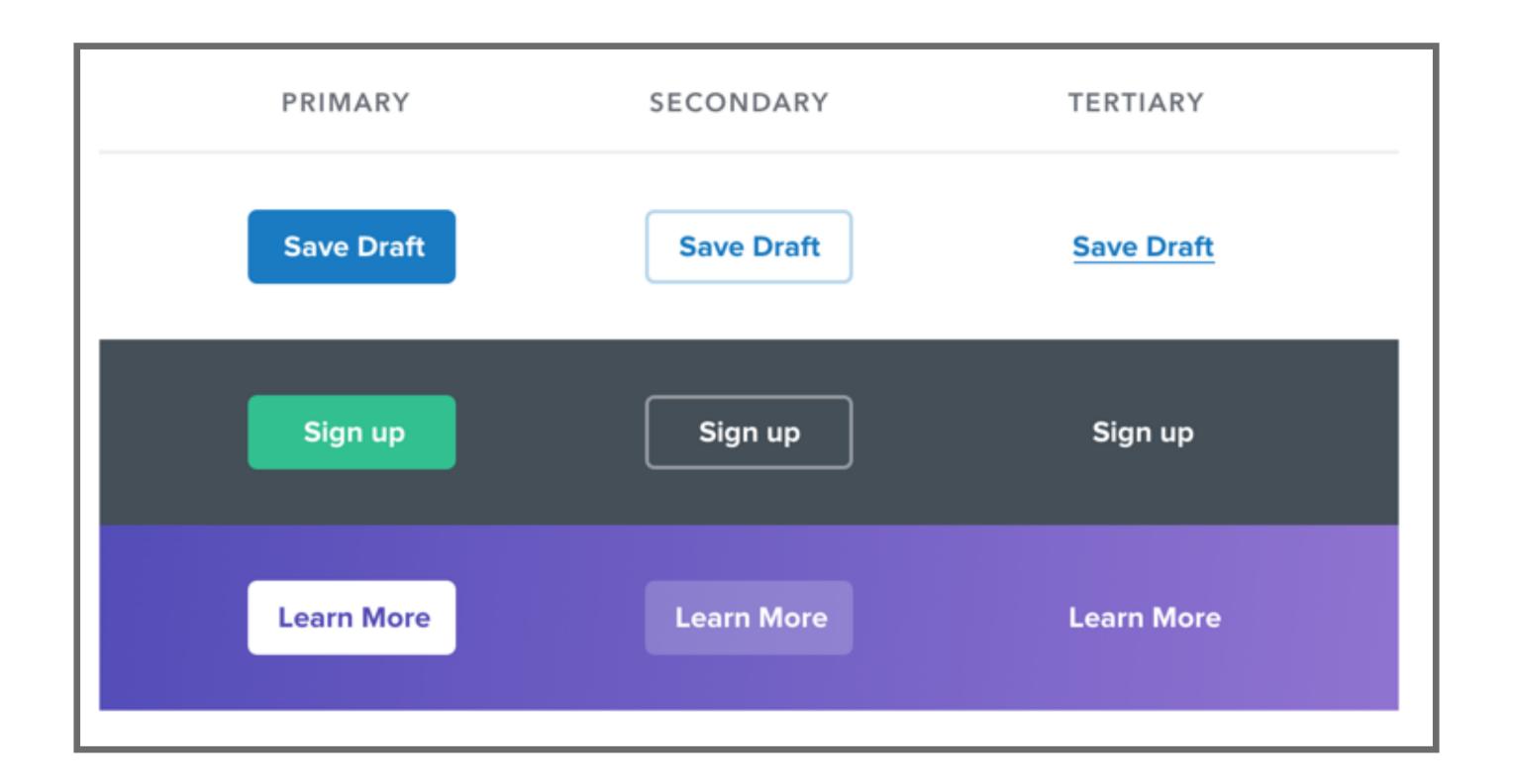




### Creating Hierarchy: Color and Weight Instead of Size



### Signal Importance of Action



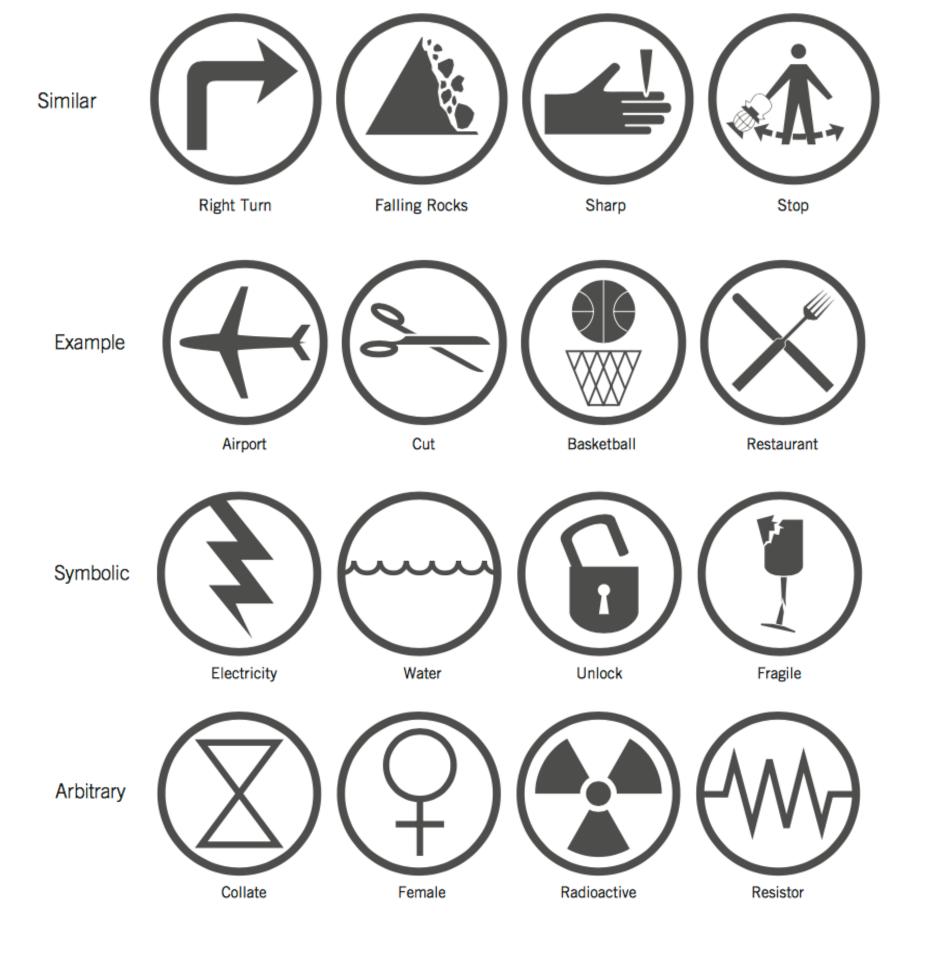
# Images & Icons

### Images & Icons

- Benefits
  - Identification images are easy to recognize
  - Expression breadth of artistic expression that can make design more engaging & enjoyable

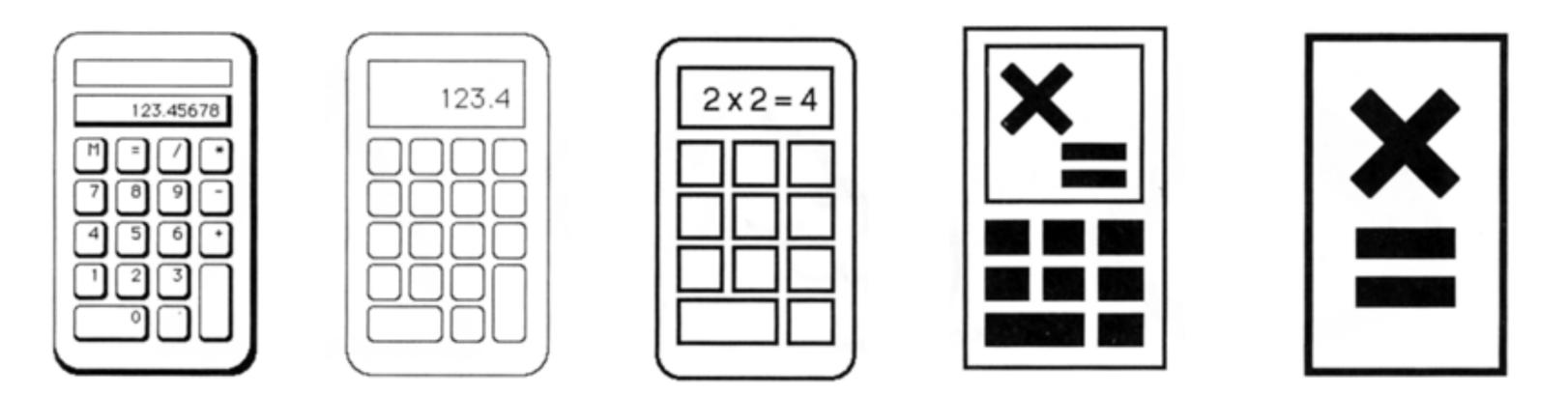
### Types of Iconic Representation

- Similar visually <u>analogous</u> to action, object, concept
- Example things that exemplify or are commonly associated
- Symbolic represent concept at higher level of <u>abstraction</u>
- Arbitrary little or no relationship to concept, must be learned through standard



### Use of Abstraction

- Simplifying highly concrete, realistic representations makes them easier to interpret up to the point at which further abstraction obscures icon's semantics
  - Makes icon more generic, more canonical, less complex



### Principles of Icon Design

 Immediacy - can be perceived effortlessly & involuntarily by being <u>bold</u>, clear, balanced

 Generality - represents a <u>class</u> of items, rather than an individual element, by removing details that may vary

 Cohesiveness - set of icons that function <u>together</u> by sharing visual variables

 Characterization - call to mind one or more <u>distinctive</u> features



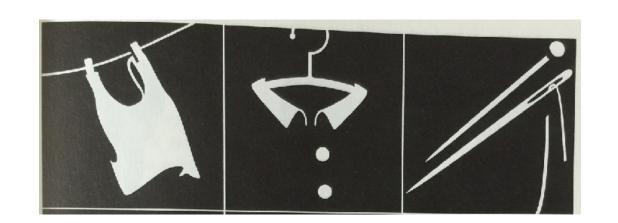








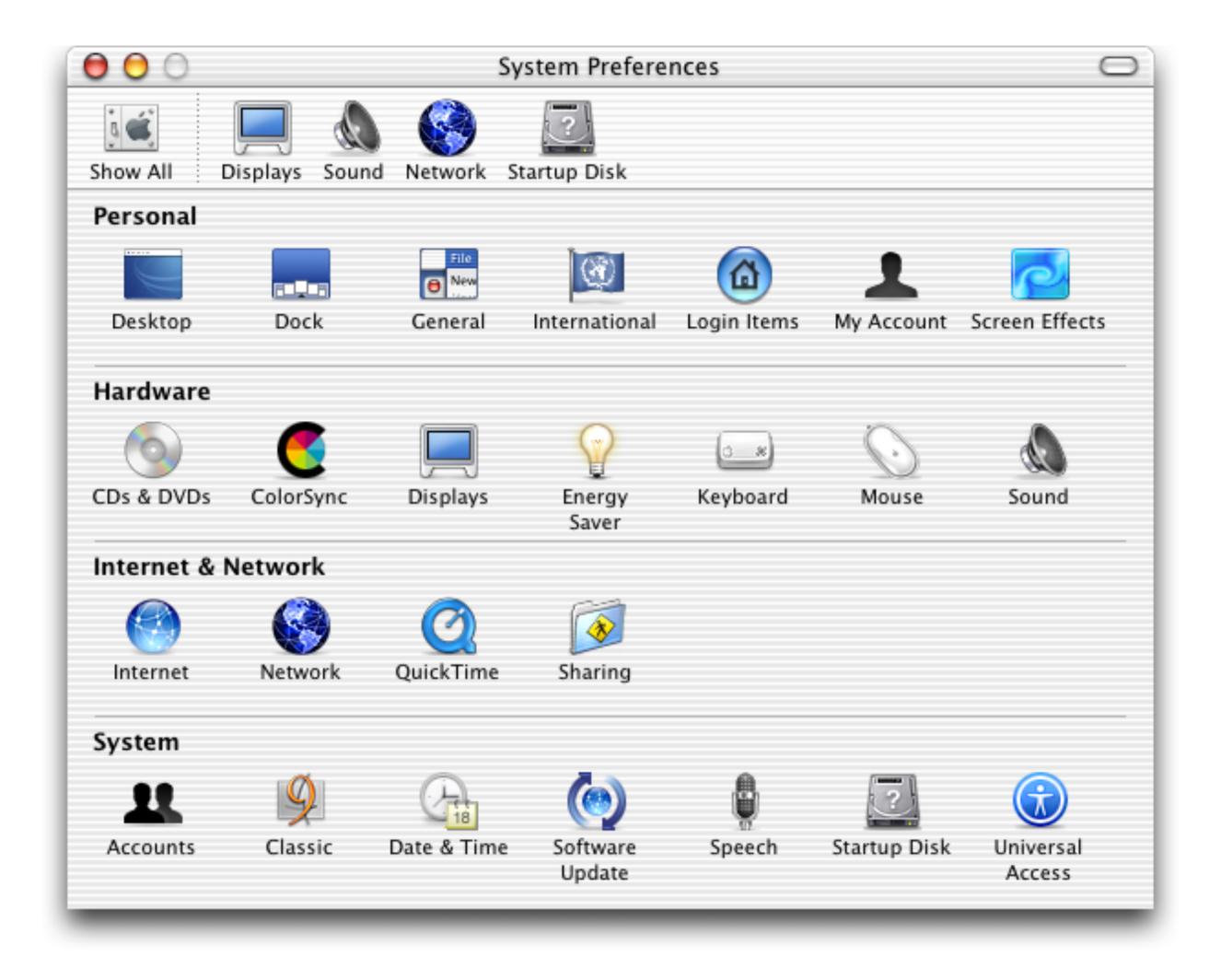




### Selecting the Right Type of Icon

- If concept is concrete, familiar, tangible, use similar or example icon
- If concept will be used repeatedly, consider using more symbolic or arbitrary icon based on convention
- If concept is abstract process or subtle, use textual label

### Activity: OS 10.2 Preferences Icons



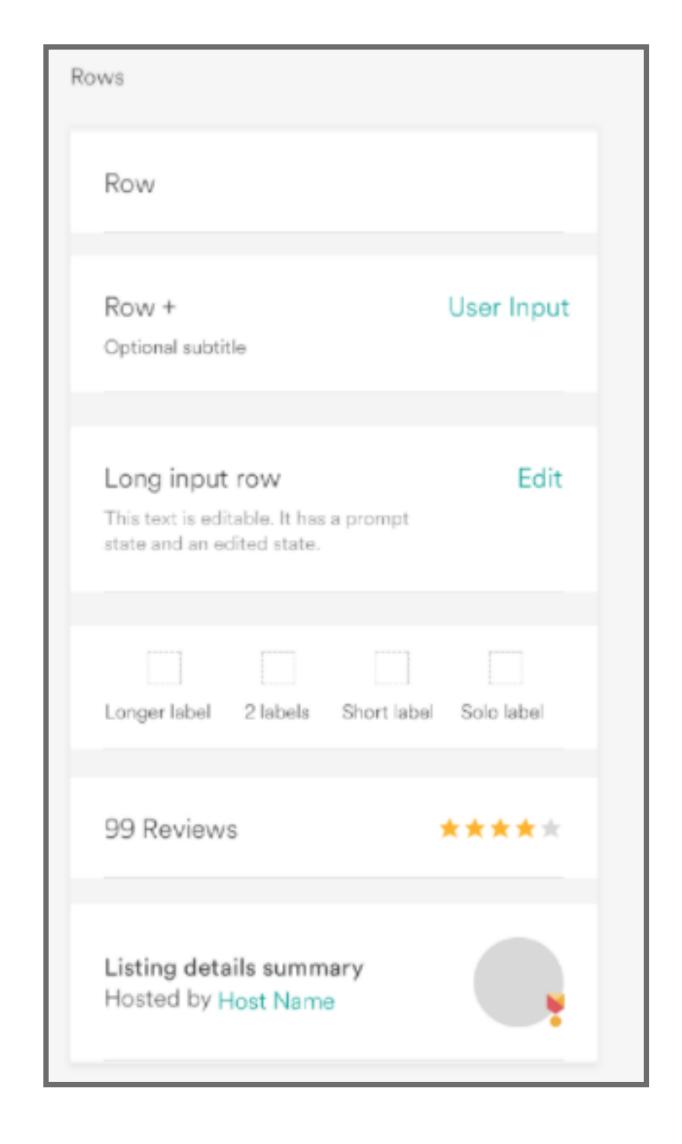
### Activity: OS 10.15 Preferences Icons



# Design Languages

### Design Languages

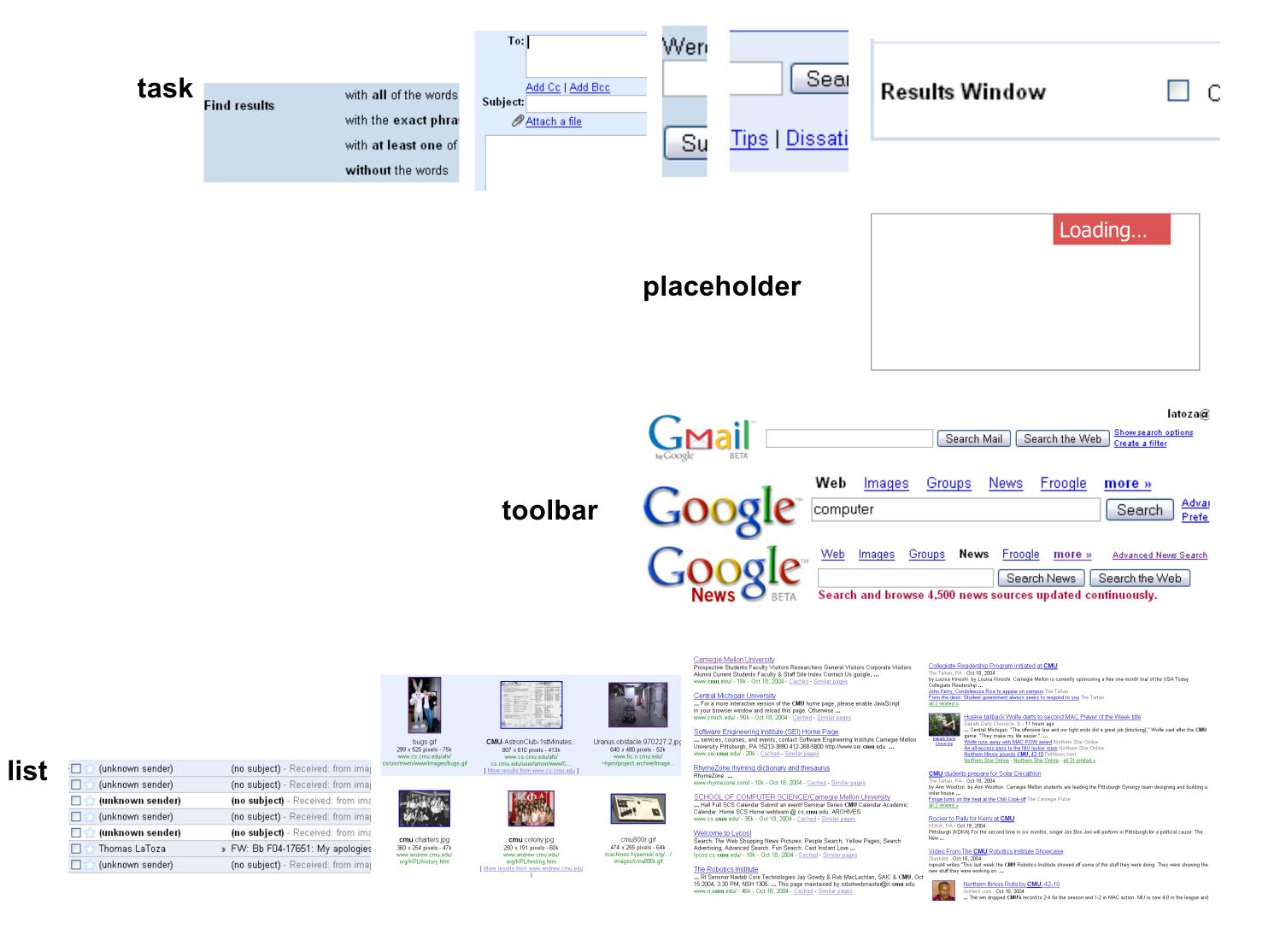
- Many, <u>many</u> choices about visual variables and syntax of composition
  - How do you ensure choices are made consistently across web app?
- Solution: design language
  - Describes how to express ideas and concepts in the interface
  - May be communicated through Human Interface Guideline documentation
  - (Example of consistency and standards)



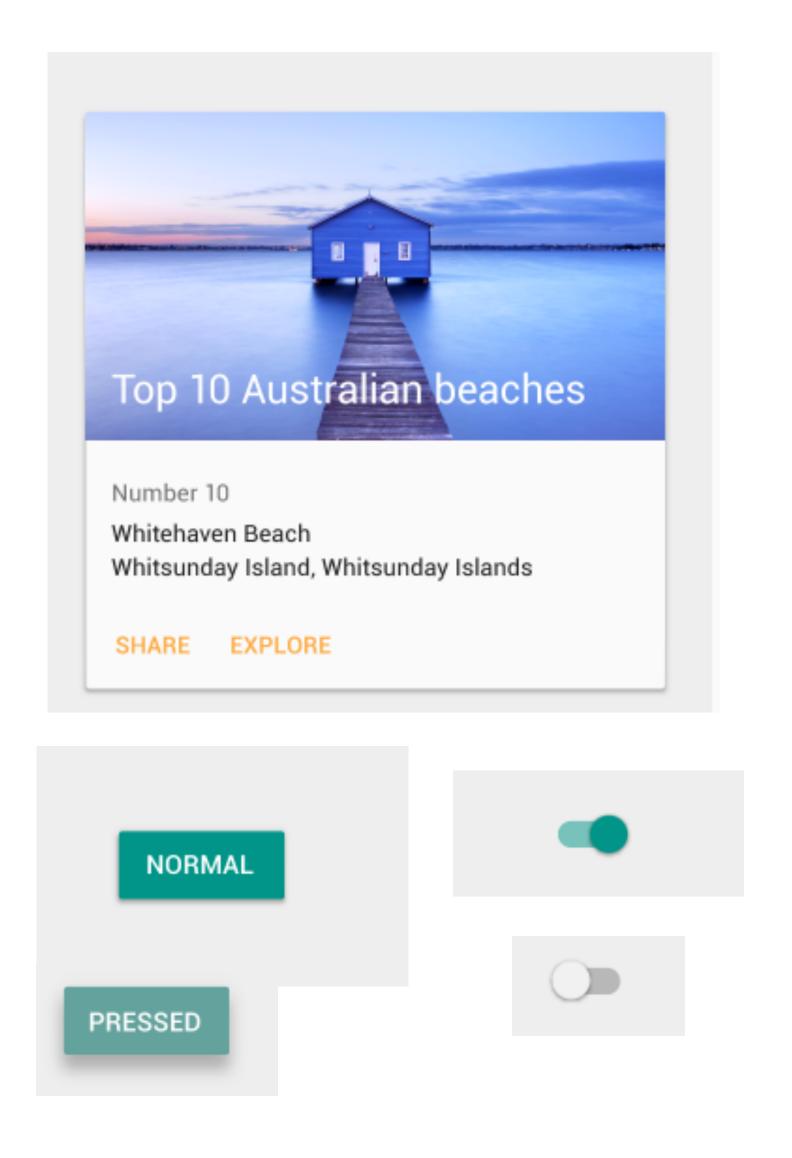
### Example: Elements, Google 2004

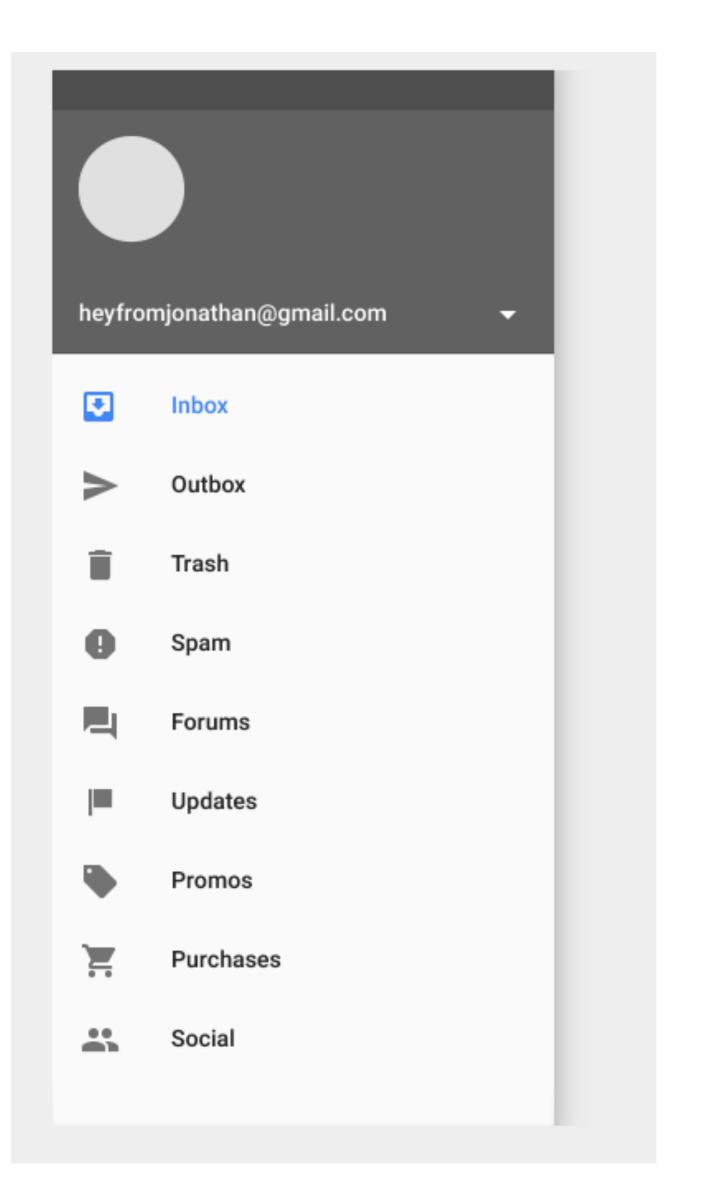


# Example: Syntax, Google 2004

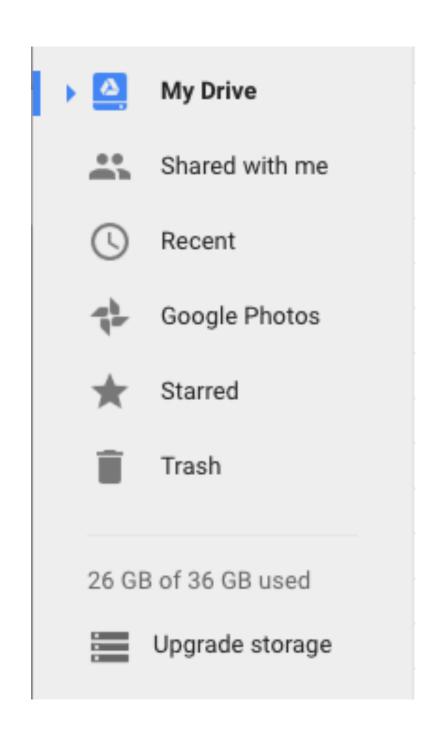


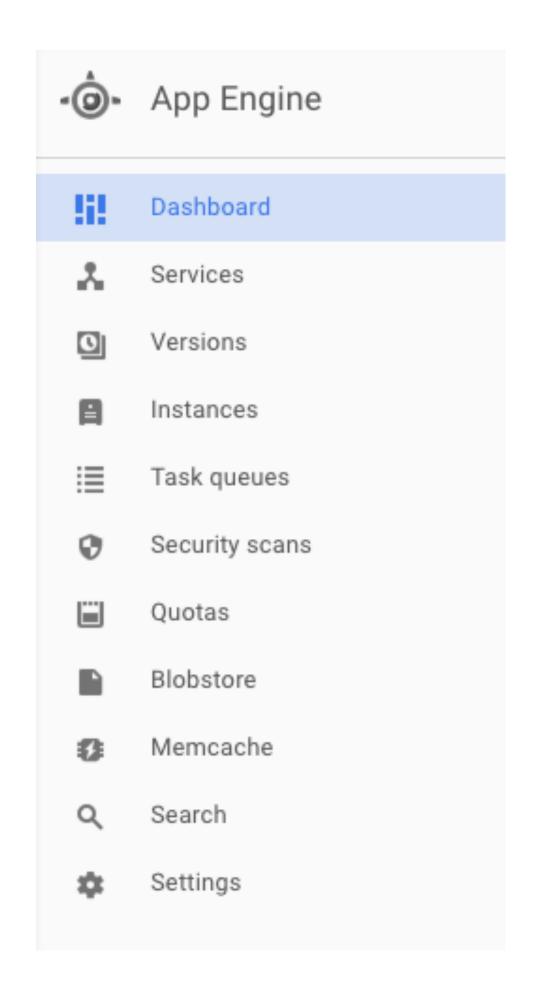
### Examples: Google 2016

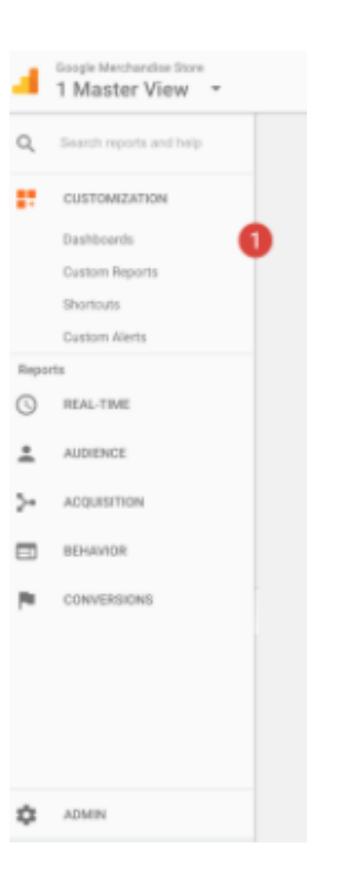




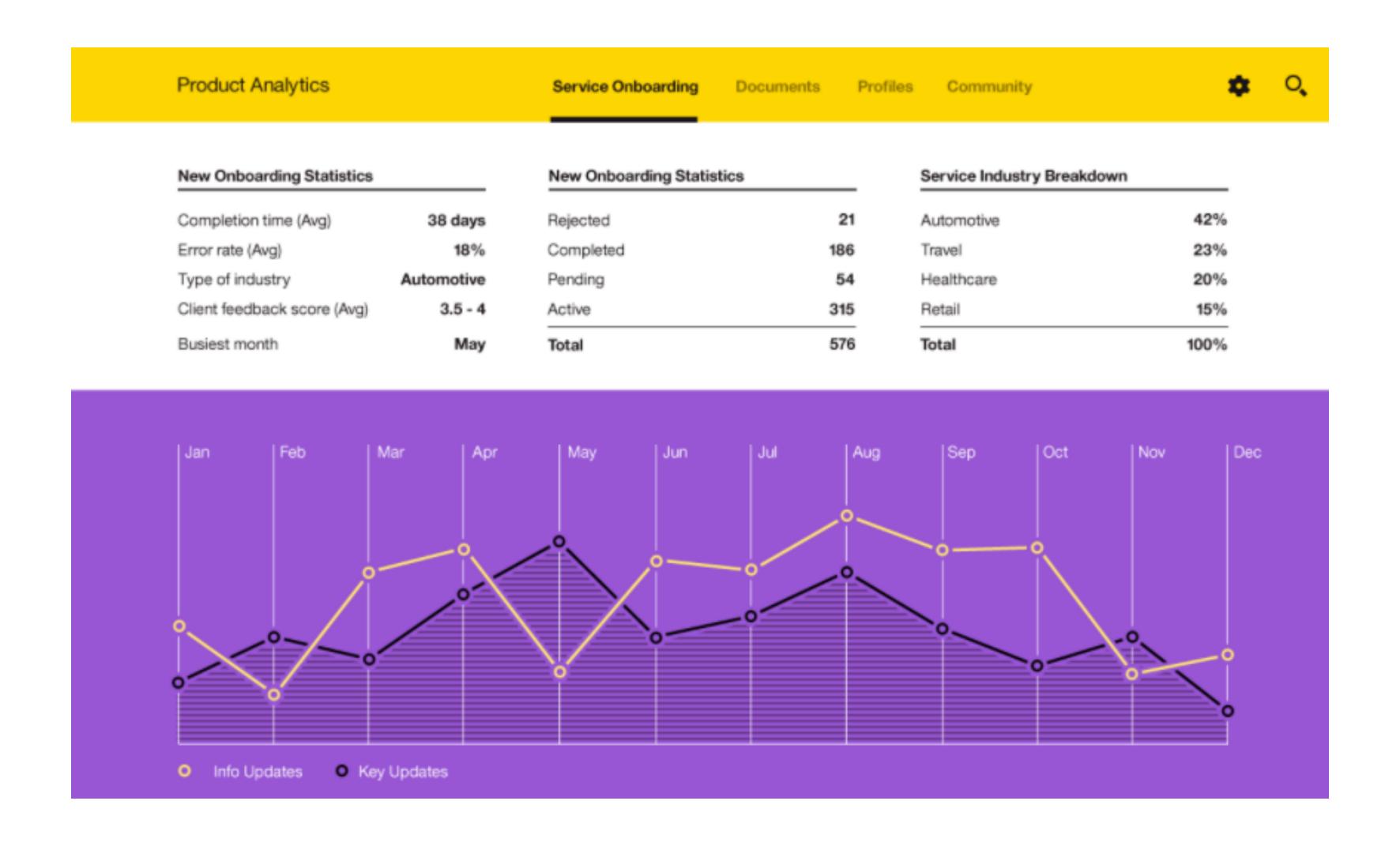
## Examples: Google 2016



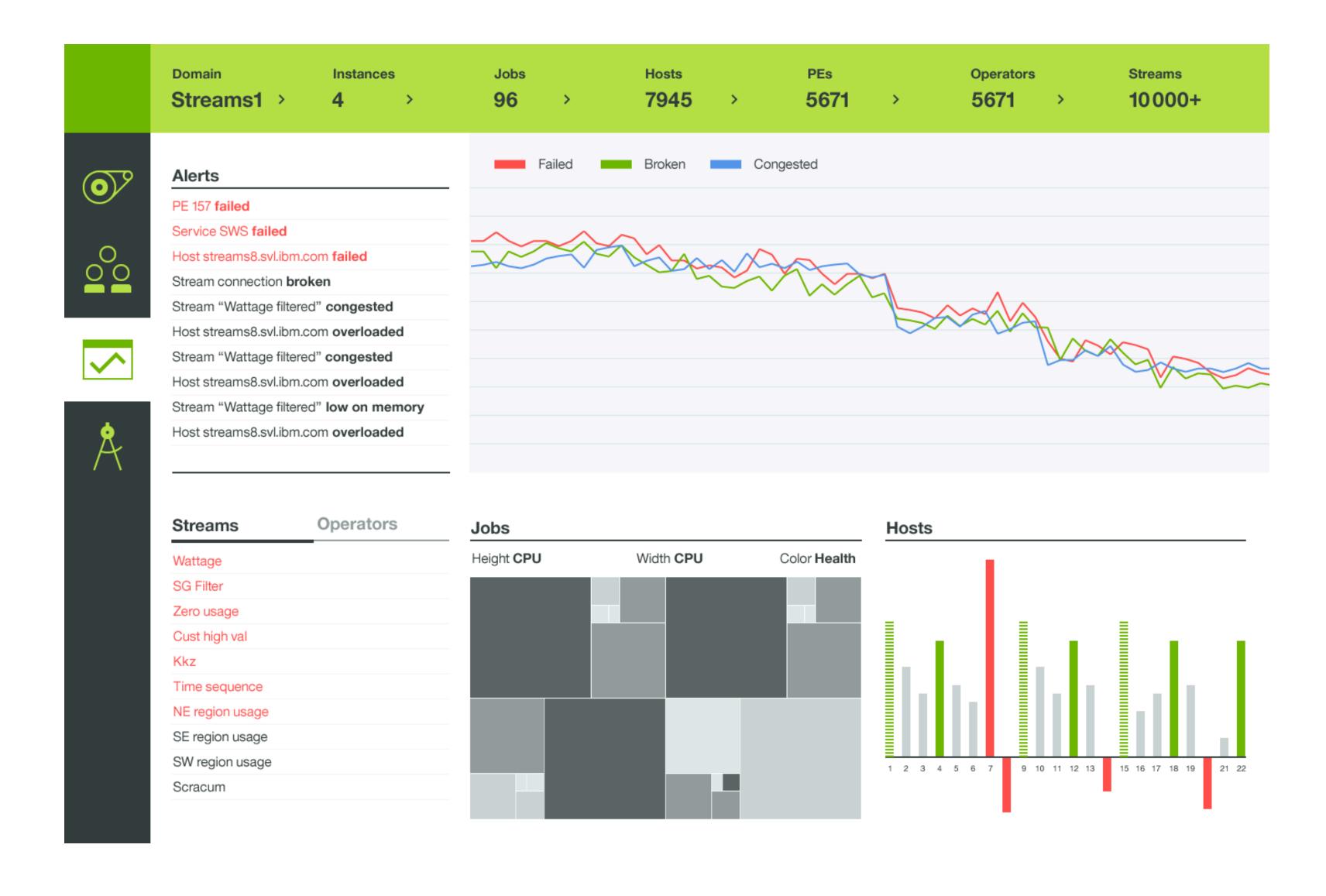




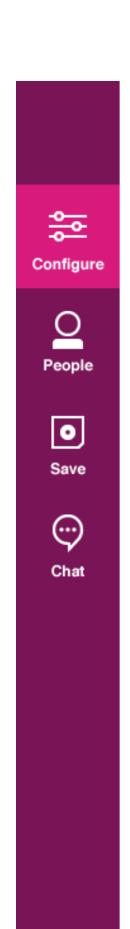
### Examples: IBM



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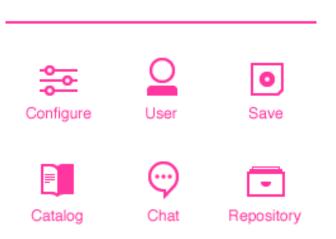


# Examples: IBM

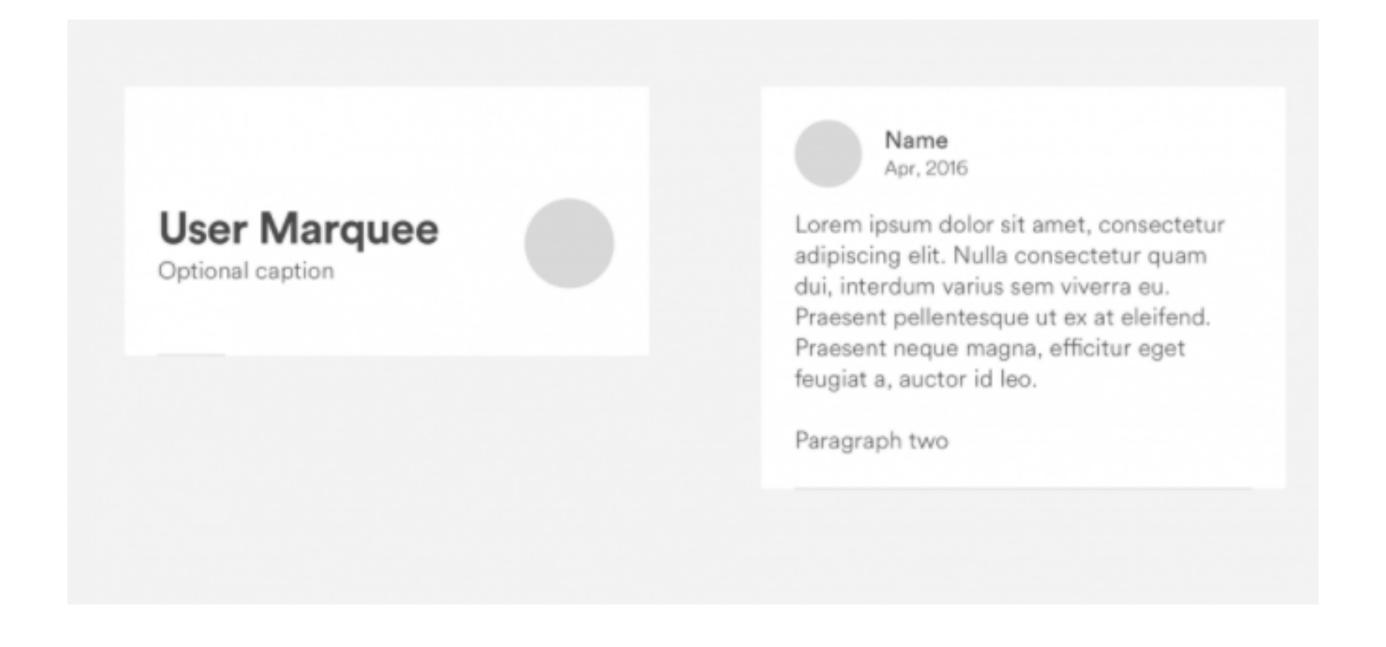


#### Application data

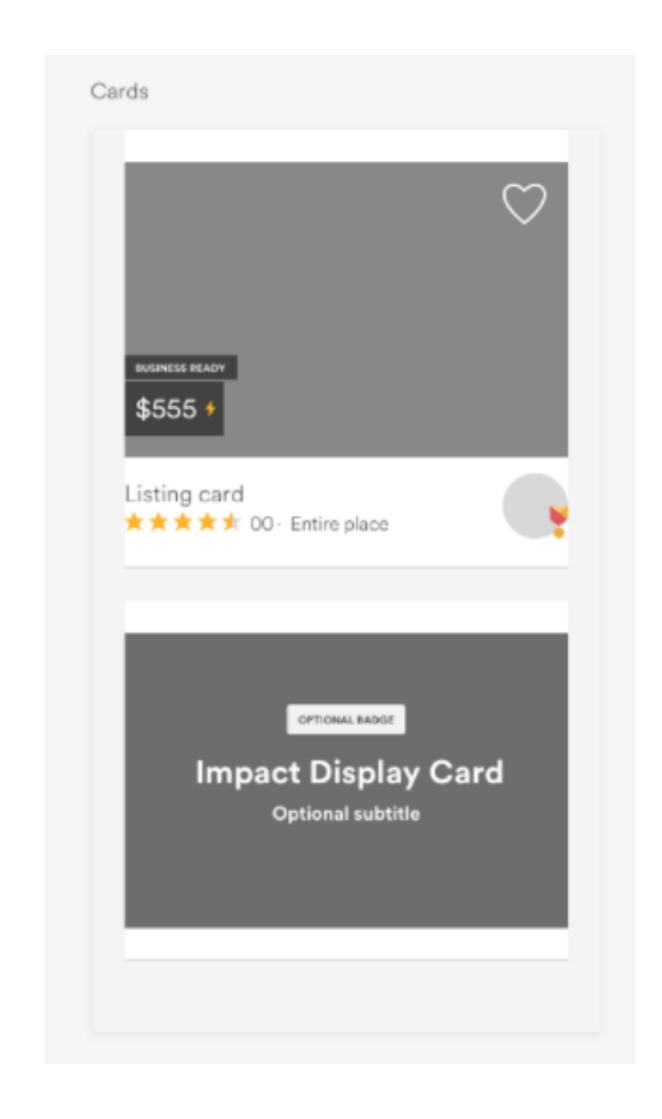
Title	Title	Value	Date ▼	Value
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Hard	false	987 345	21. Feb 2014	987 345
Cider	false	43 567	21. Feb 2014	43 567
Anaerobic	true	324 543	21. Feb 2014	324 543
Cold filter	false	432 456	20. Feb 2014	432 456
Barrel hand	true	32 432	20. Feb 2014	32 432
Pump wort	true	4 567	20. Feb 2014	4 567
Dry hopping	false	34 567	20. Feb 2014	34 567
Carbonation	true	434 567	20. Feb 2014	434 567
Mash tun	false	9 456 234	20. Feb 2014	9 456 234
Bittering hops	true	987 345	20. Feb 2014	987 345
Heat exchanger	false	43 567	19. Feb 2014	43 567
Lauter aerobic	false	324 543	19. Feb 2014	324 543
Abbey seidel	true	432 456	19. Feb 2014	432 456
Brewhouse	false	32 432	19. Feb 2014	32 432
Brewpub adjunct	true	4 567	19. Feb 2014	4 567
Dextrin seidel	true	34 567	19. Feb 2014	34 567
Aau beer	false	434 567	19. Feb 2014	434 567
Krug abv	true	434	19. Feb 2014	434

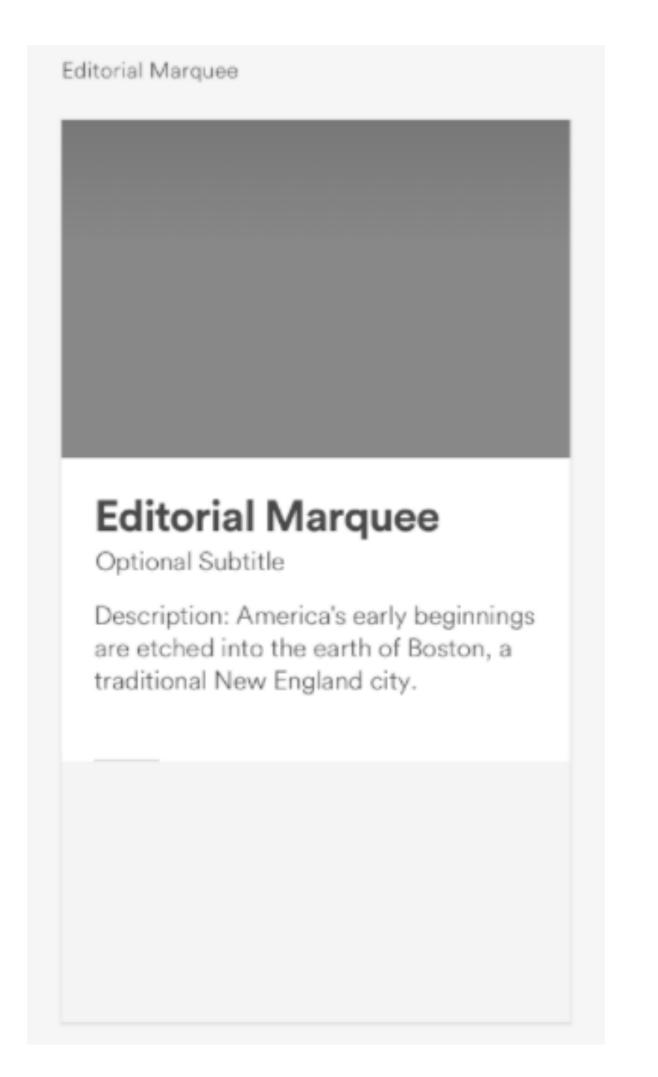


## Examples: AirBnb

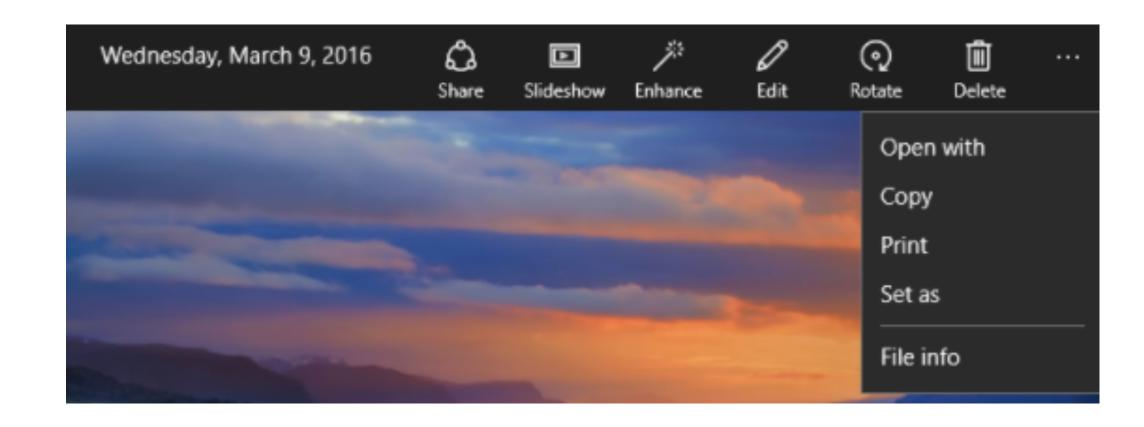


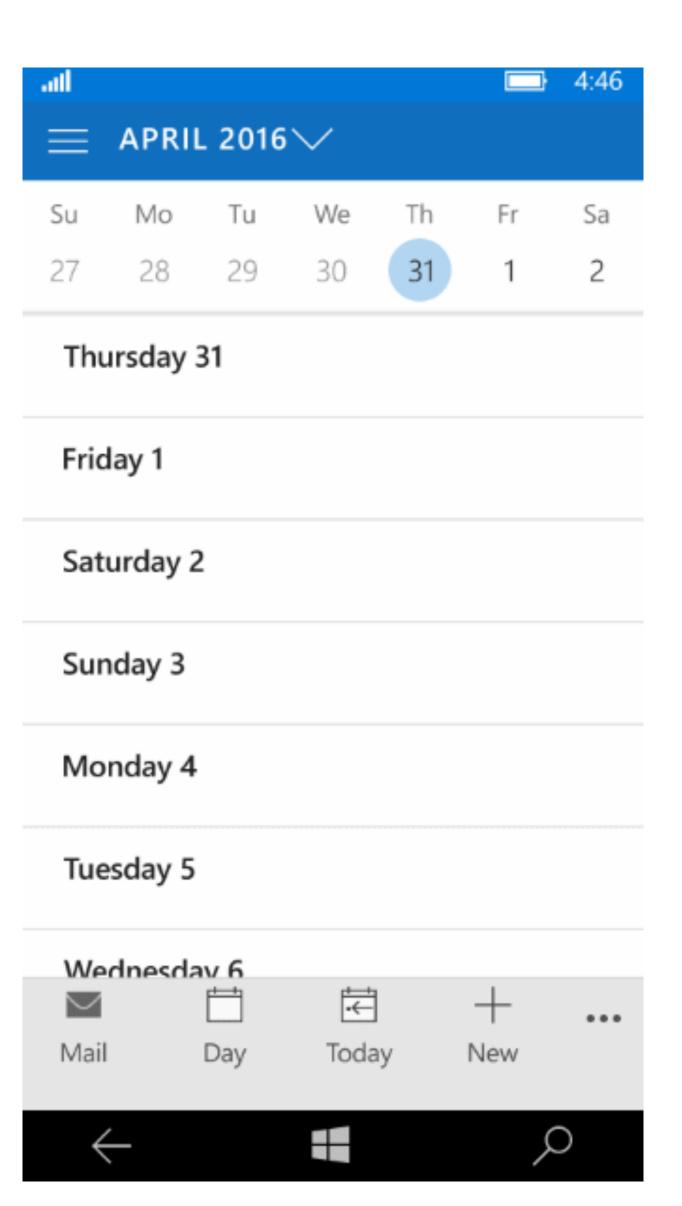
## Examples: AirBnb





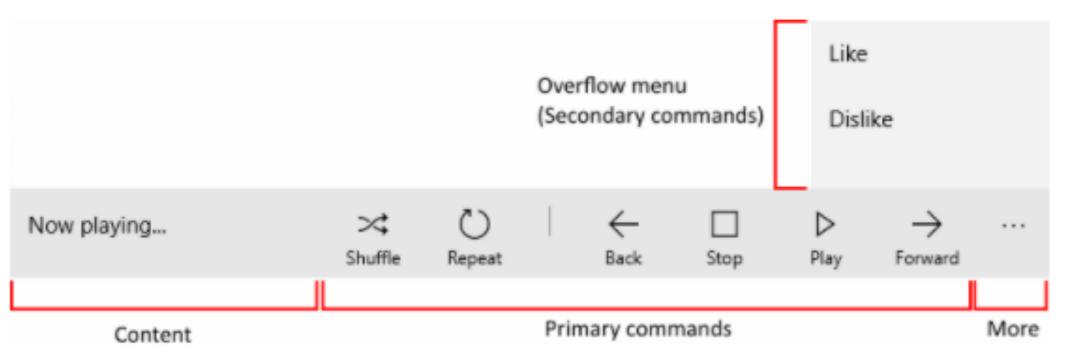
### Examples: Microsoft

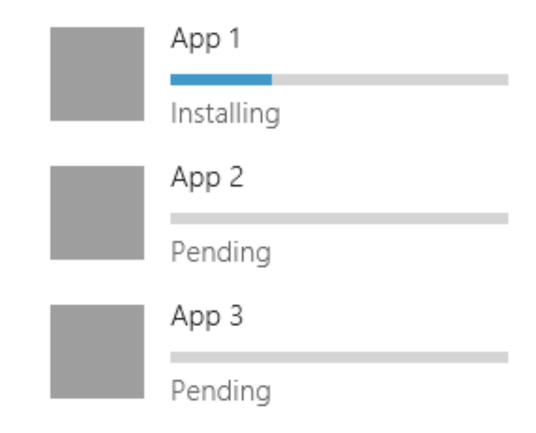


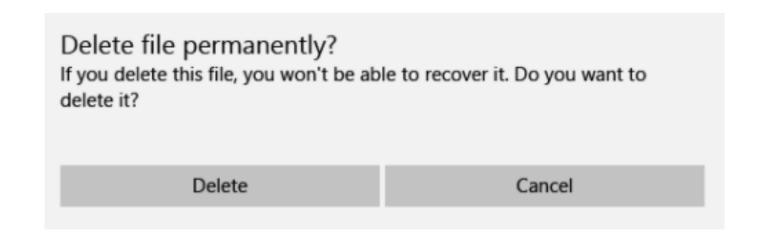


### Examples: Microsoft

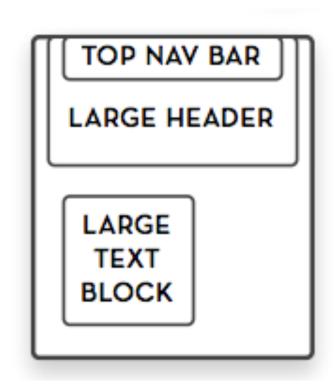


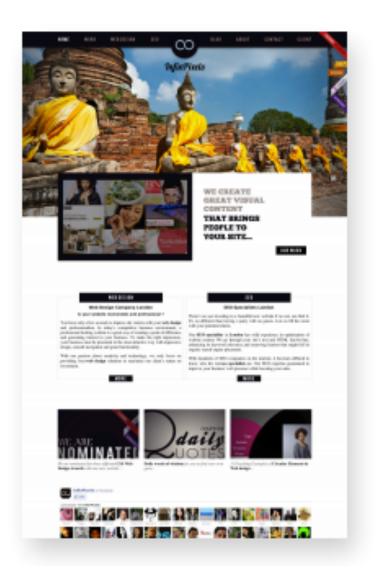


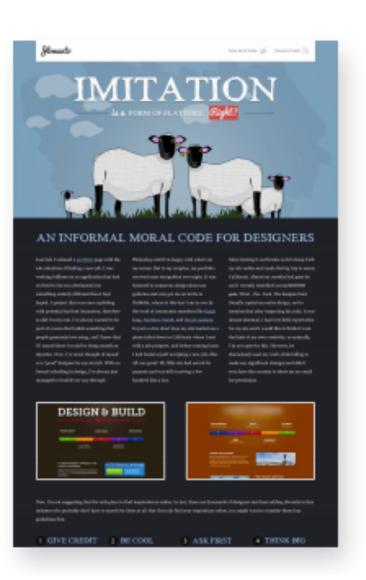


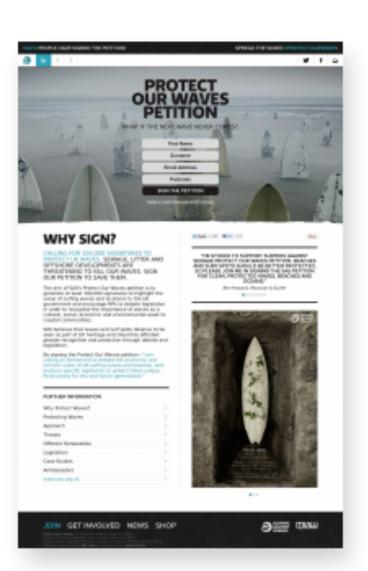


### Example: Header with text blocks layout







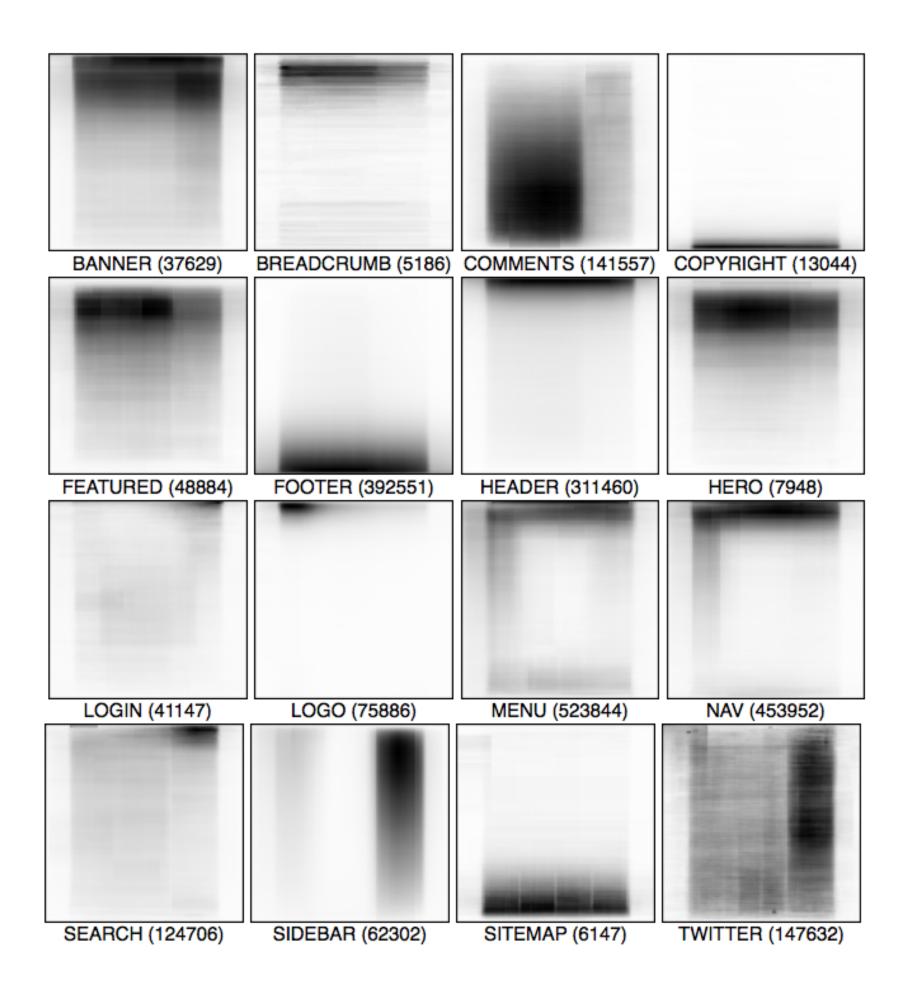






http://ranjithakumar.net/resources/webzeitgeist.pdf

### Position Encodes Meaning and Function



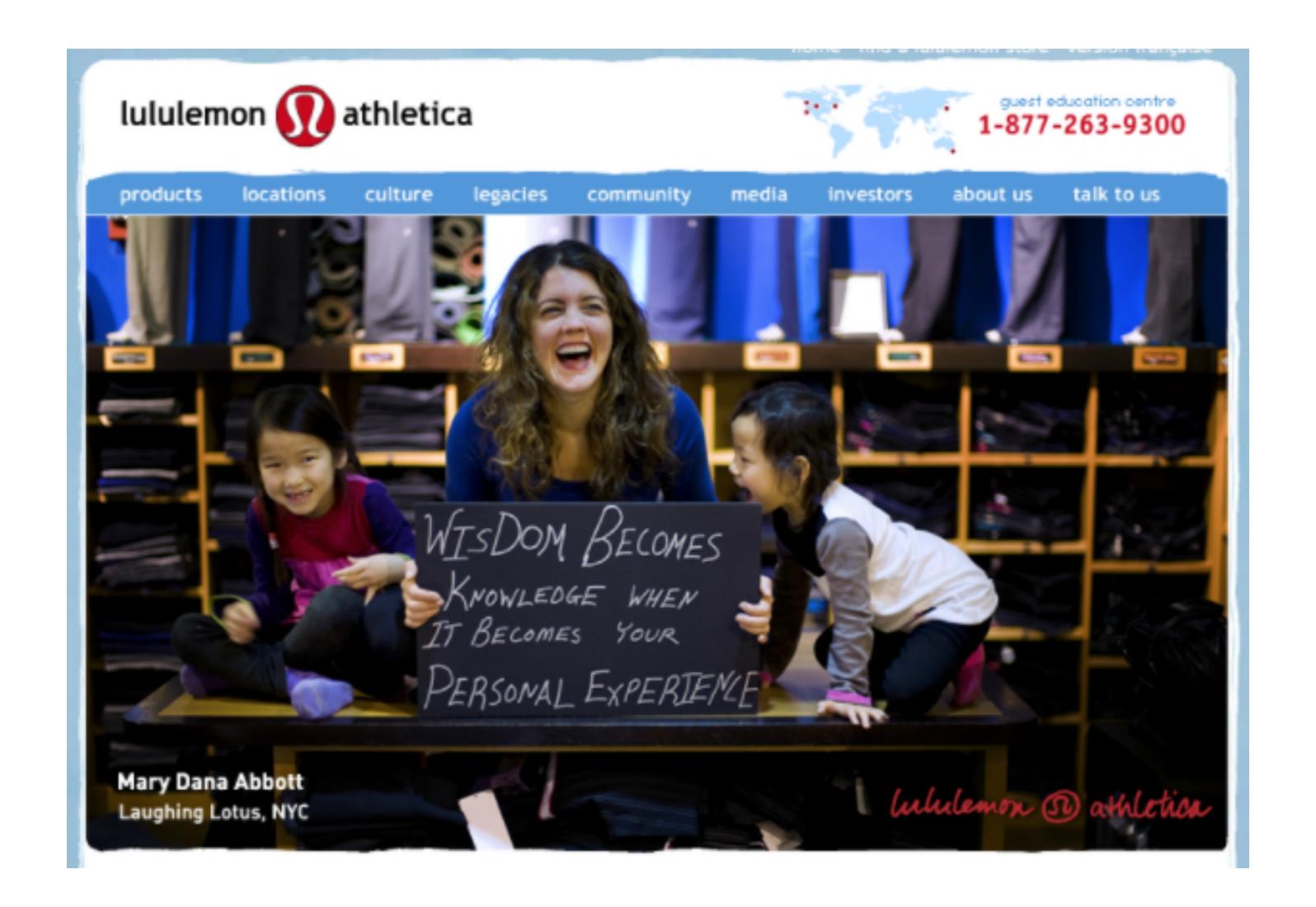


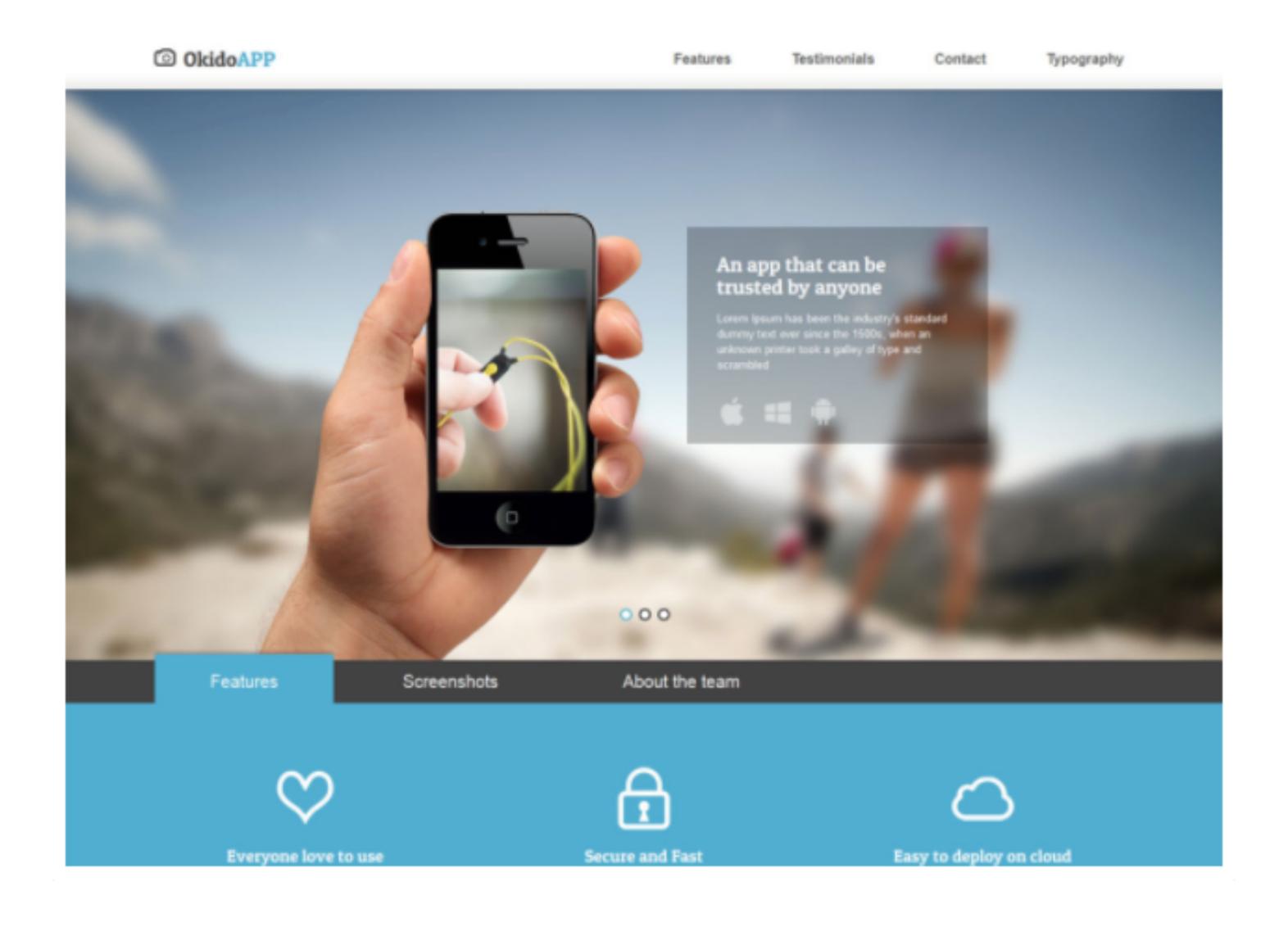
https://blog.hubspot.com/marketing/look-back-20-years-website-design#sm.00000ip14jejk1d51u53crk6cwrns





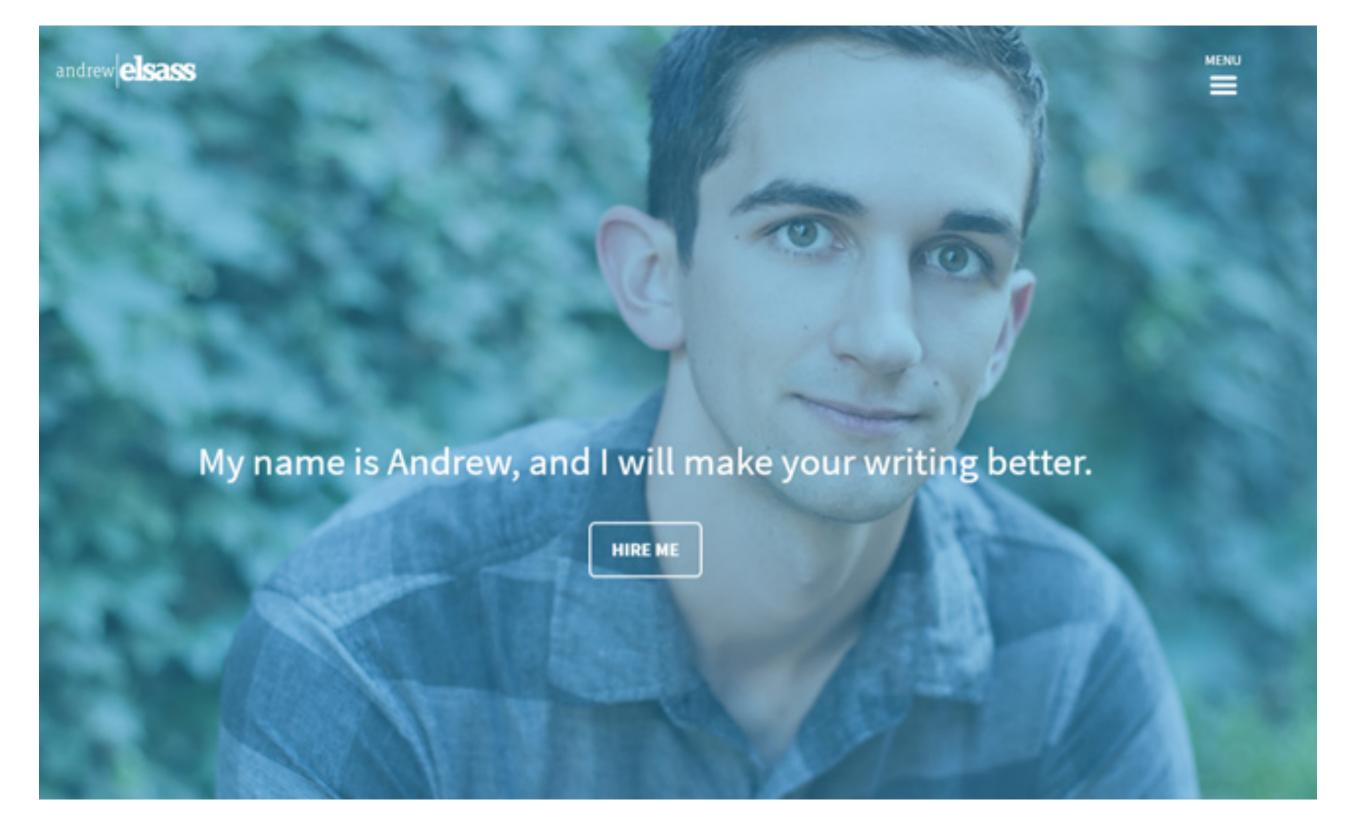






### Common Visual Idioms, Circa 2016

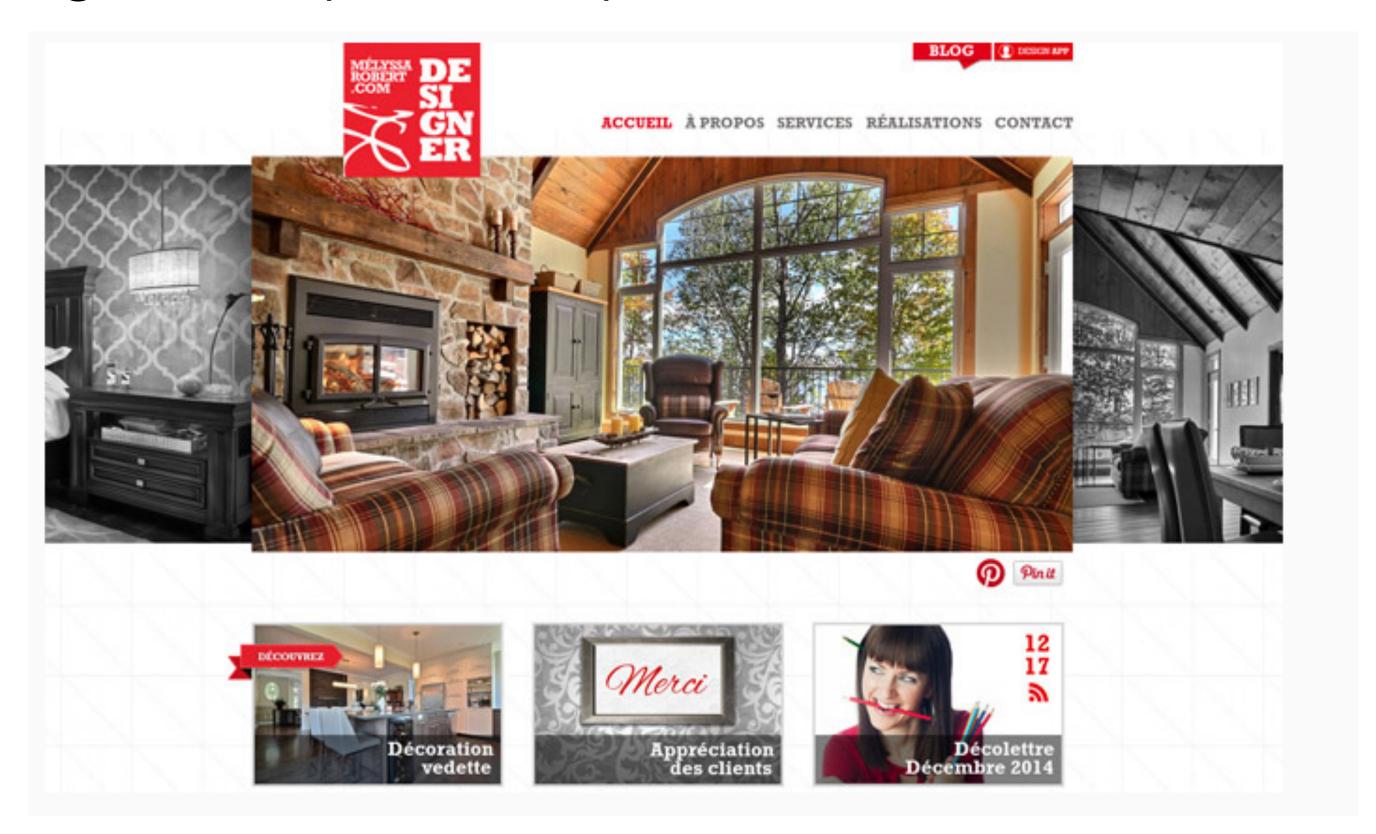
Hero images: large attractive header image



https://envato.com/blog/exploring-hero-image-trend-web-design/

### Common visual idioms, circa 2016

Rotating image galleries (carousels)

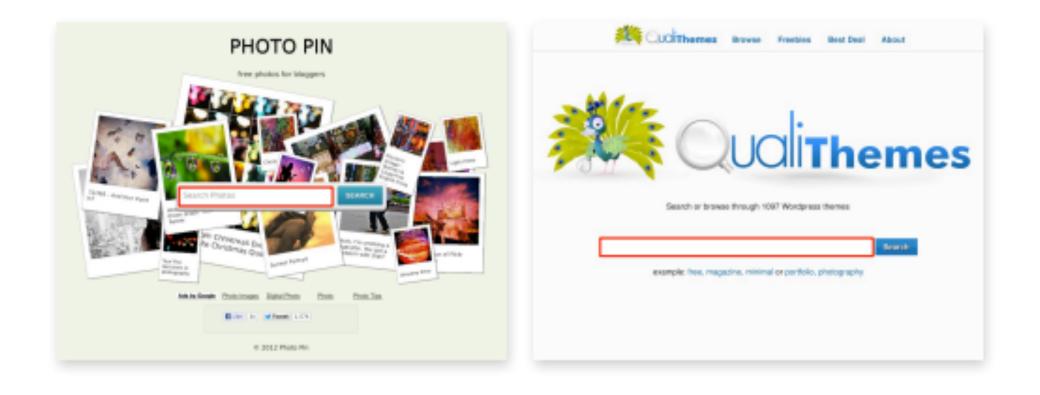


https://envato.com/blog/exploring-hero-image-trend-web-design/

### Why it Matters

 Users will have idioms they expect to see, particularly if suggested by other related elements

 Branding: Users will see your website and have particular associations based on what it exemplifies





### Goals in Designing a Design Language

- Offer guidance and options on
  - Colors: examples of color palettes
  - Typography: justification, sizes, fonts, different heading levels
  - Organization

- Support different resolutions, devices
- Support universal design
  - Visually impaired, color blind users

# In-Class Activity

### Activity: Design a Design Language

- In groups of 2 or 3, brainstorm an idea for a new company, and then design a Design Language for the new company.
- Your design language should include at least 10 types of elements. For each type of element you should:
  - (1) To identify each category of element, describe (1.1) what is its purpose (e.g., marque image caption, detail text, footer detail text), (1.2) in what situations might it be used
  - (2) Define a style, describing its visual characteristics.
- Deliverables (submitted on Blackboard)
  - Brief description of company
  - Description of design language with at least 10 types of elements
  - Brief description of how design language helps establish and communicate the brand of the company

### Activity: Design a Design Language

- Some example visual design guidelines from well-known companies:
  - https://developer.apple.com/design/human-interface-guidelines/macos/ visual-design/
  - https://m3.material.io
  - https://docs.microsoft.com/en-us/windows/uwp/design/