Visual Design

SWE 632, Spring 2018

With at least 30 new things you won't believe!

#10 will shock you!

(actually we hope you believe it all)

GEORGE MASON UNIVERSITY

Today

- Importance of visual design: solving communication problems
- Some guidelines
- A lot of example and anti-examples

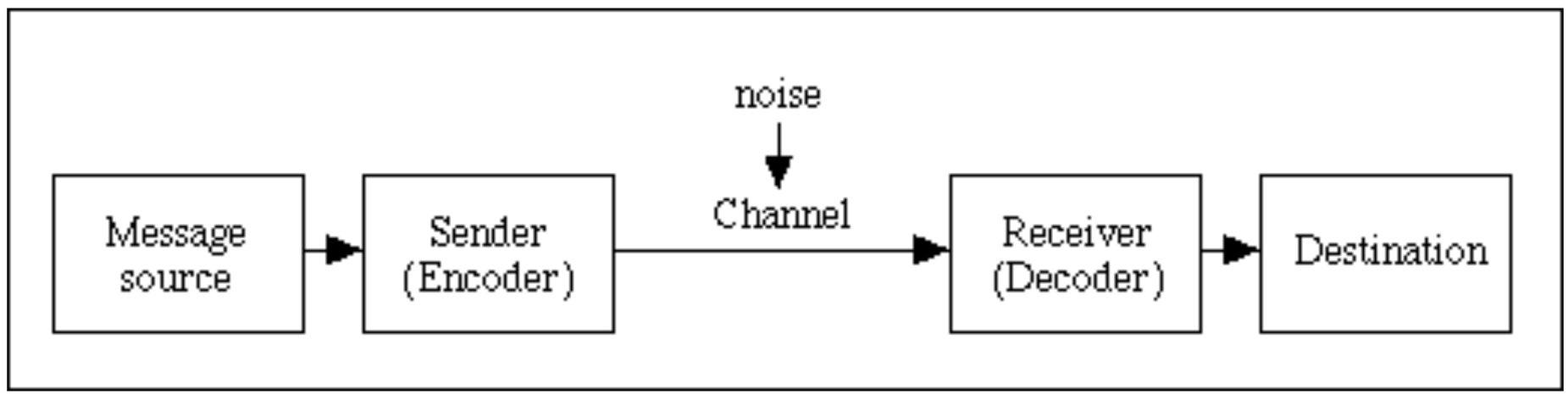
Example

Visual design

- *Solving **communications problems** 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: **efficiently** & accurately 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 **search** time through layout & organization
- Create desired **emotional** reactions through aesthetic choices

Guidelines for Visual Design

Elegance & simplicity

- *Elegance*—derives from Latin eligere, to “select carefully”
- **Judicious** 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

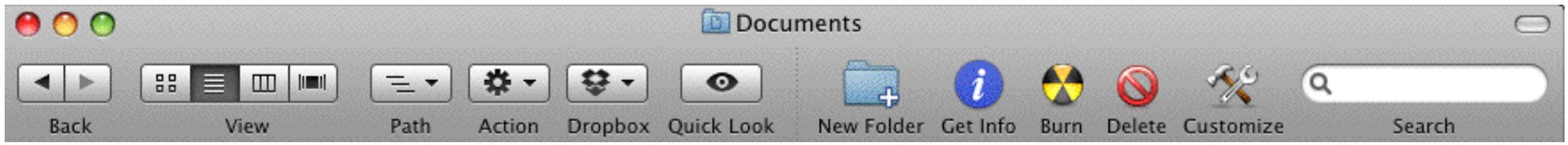
Marc Berthier. Tykho Radio. 1997. Synthetic rubber and other materials, 5 1/2 x 5 1/2 x 1 5/8″ (14 x 14 x 4.1 cm). Manufactured by Lexon, France. The Museum of Modern Art, New York. Gift of the manufacturer.

Reducing a design to its essence

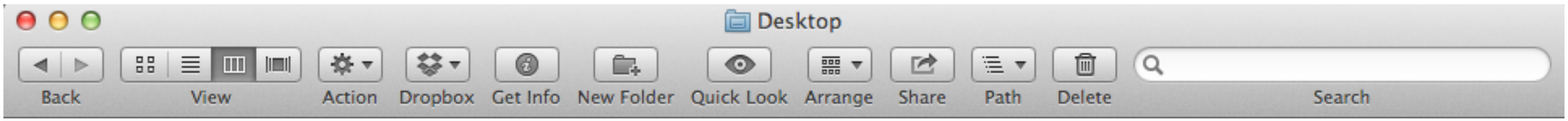
- Make design simple, bold direct by removing inessential details & elements
  - Even essential elements may be suggested

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?

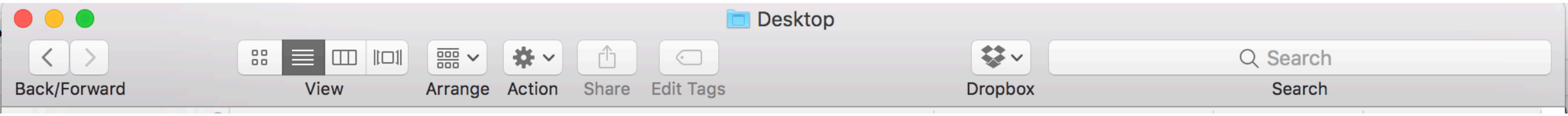
Trade-offs in Simplicity



OSX c.2010

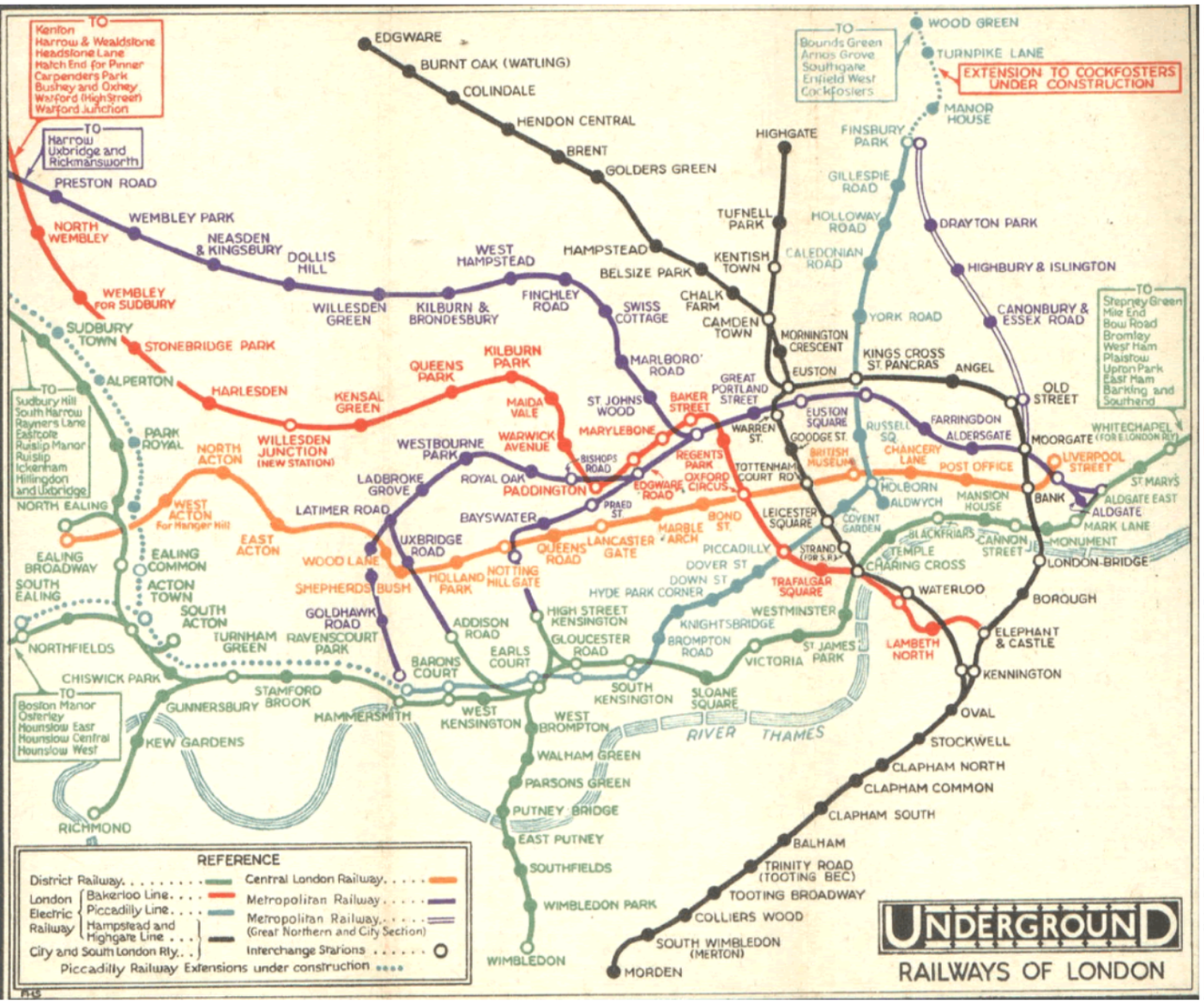


OSX c.2011



OSX c.2016

Guidelines for Visual Design



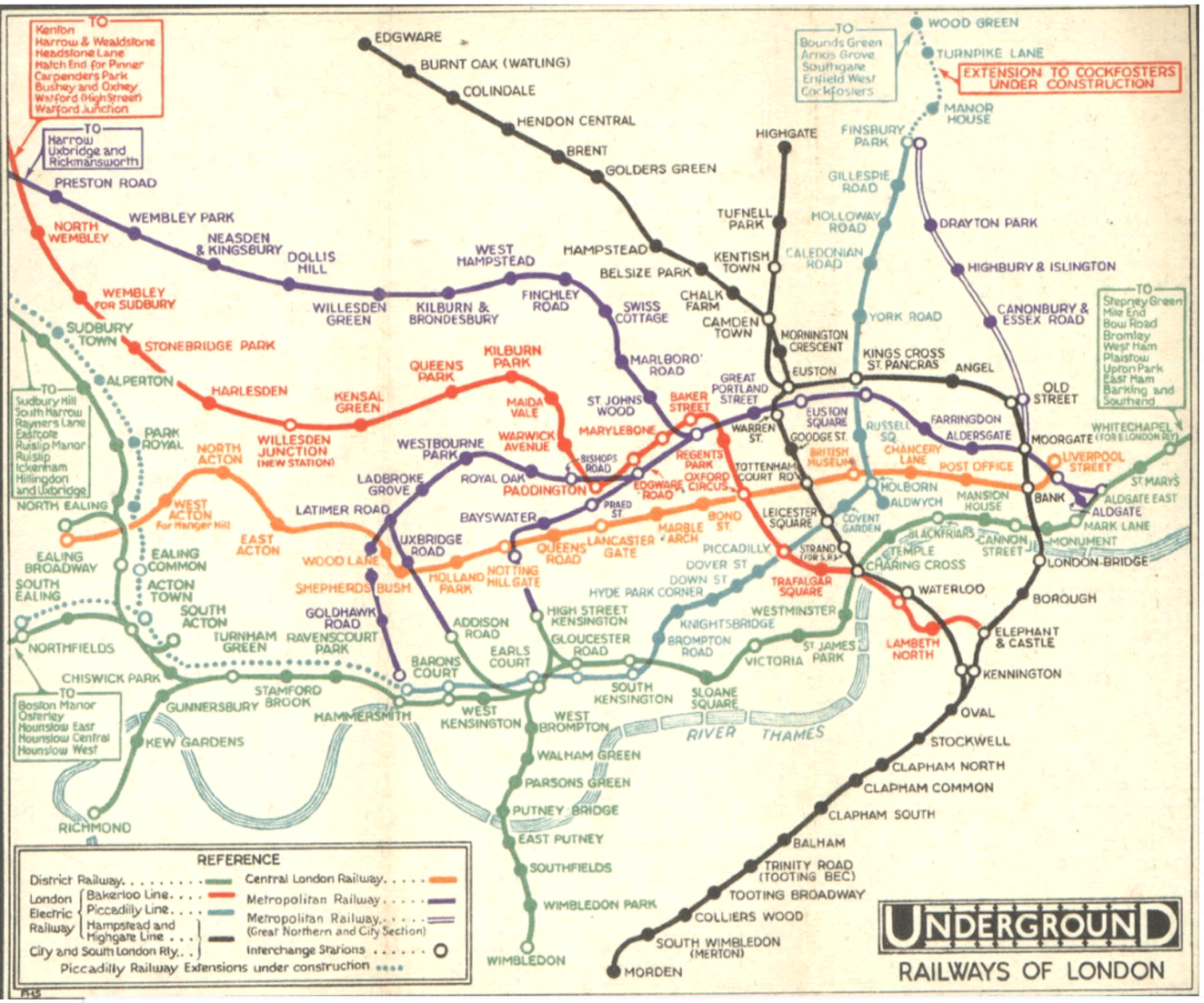
Reduction in new map: relative distances don't matter

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 **regular** 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

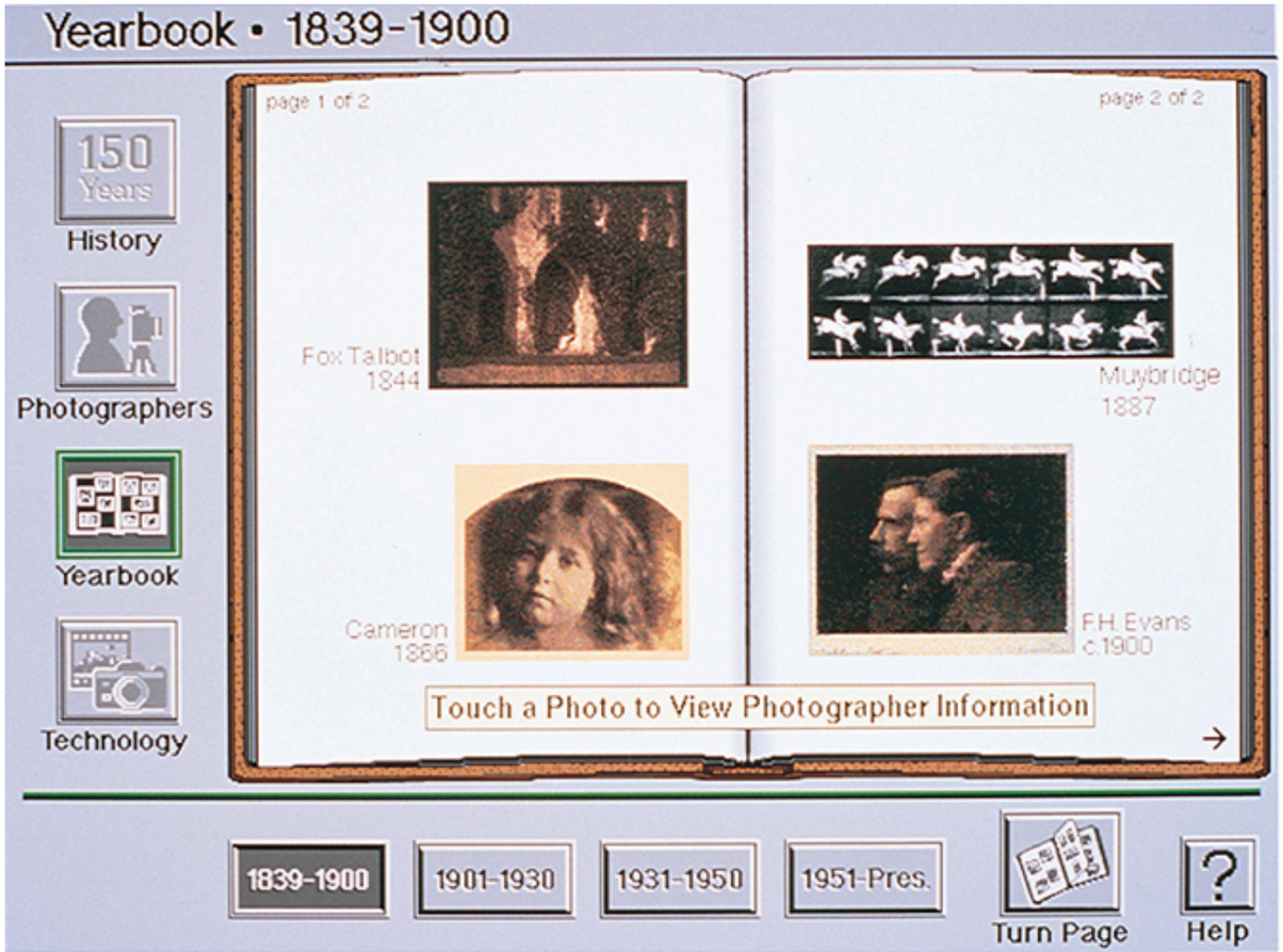
Guidelines for Visual Design



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



July 2013

Wednesday July 3

Ted Faszer's Birthday all-day

Mike Yutzy's Birthday all-day

Thursday July 4

Cherie Yvette's Birthday all-day

Monday July 15

Allie Johnson's Birthday all-day

Dr Stoll 8:45 AM to 9:45 AM

Thursday July 18

Richard Gintowt's Birthday all-day

Jacks birthday 11 AM to Noon

Monday July 22

Alisha Campbell's Birthday all-day

Saturday July 27

Ted Faszer's Birthday

Details

Wednesday, July 3, 2013

all-day events

Mike Yutzy's Birthday

Ted Faszer's Birthday

2 PM
3 PM
4 PM
5 PM
6 PM
7 PM
8 PM
9 PM

November 2016

Day | Week | Month | Year

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		• SWE 432 Noon				
20	21 • SWE meeting 11 AM	22 • Office Hours 10:30 AM • SWE 432 Noon	23	24 • SWE 432 Noon	25	26
27	28	29 • Office Hours 10:30 AM • SWE 432 Noon	30			
				Dec 1 • SWE 432 Noon	2	3
4	5	6 • Office Hours 10:30 AM • SWE 432 Noon	7	8 • SWE 432 Noon	9	10
11	12	13 • Office Hours 10:30 AM	14	15	16	17

Scale, Contrast, & Proportion

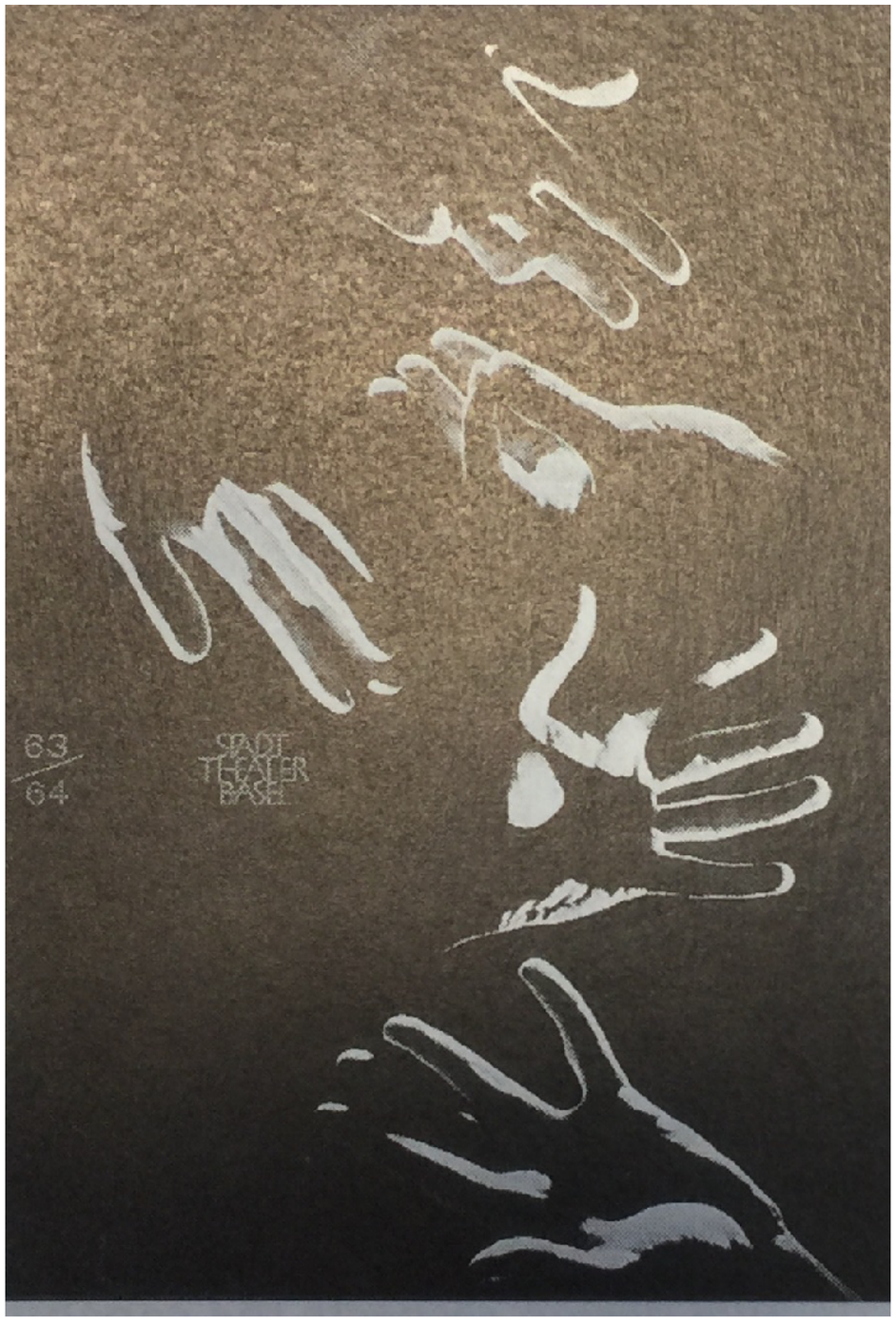
Scale, contrast, & proportion

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

Individual visual variables of design that encode information

Terminology

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

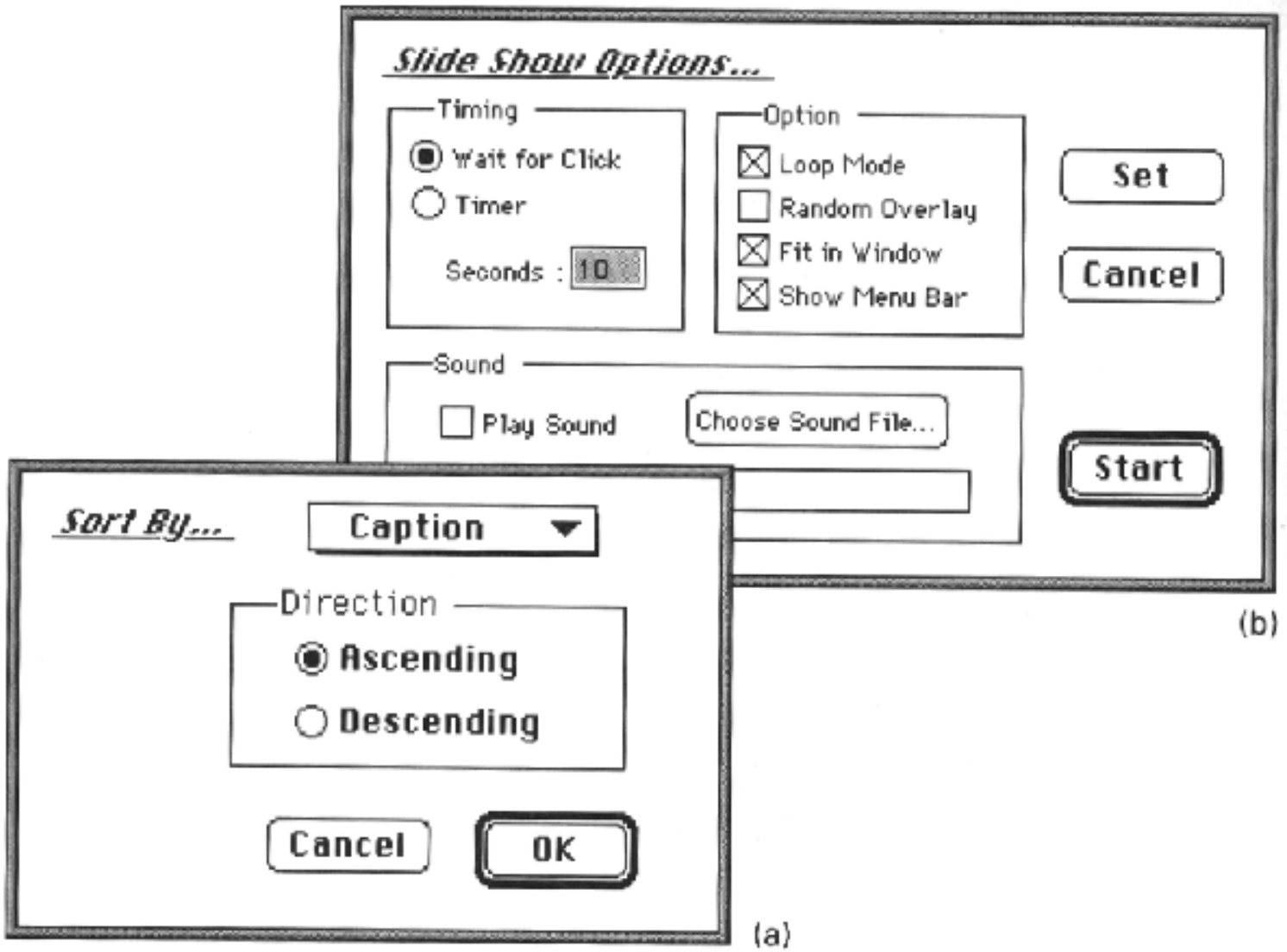


Principles

- Clarity - 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
- Restraint - contrasts should be conscious, strong, few in number, and never overwhelming

Error - excessive typographic contrasts

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



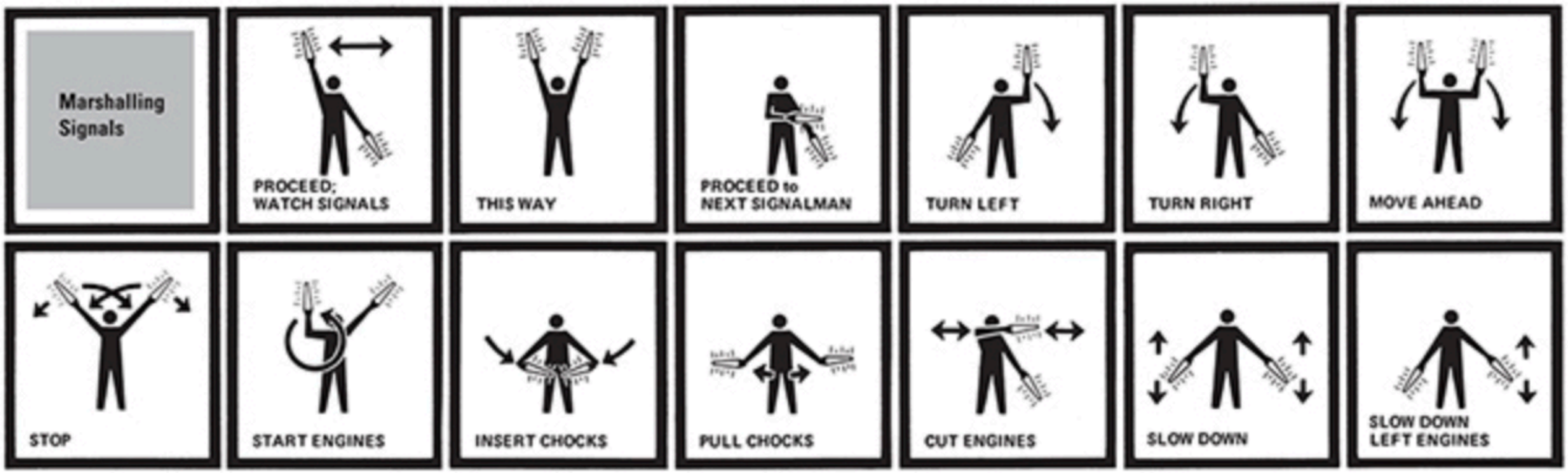
Layers

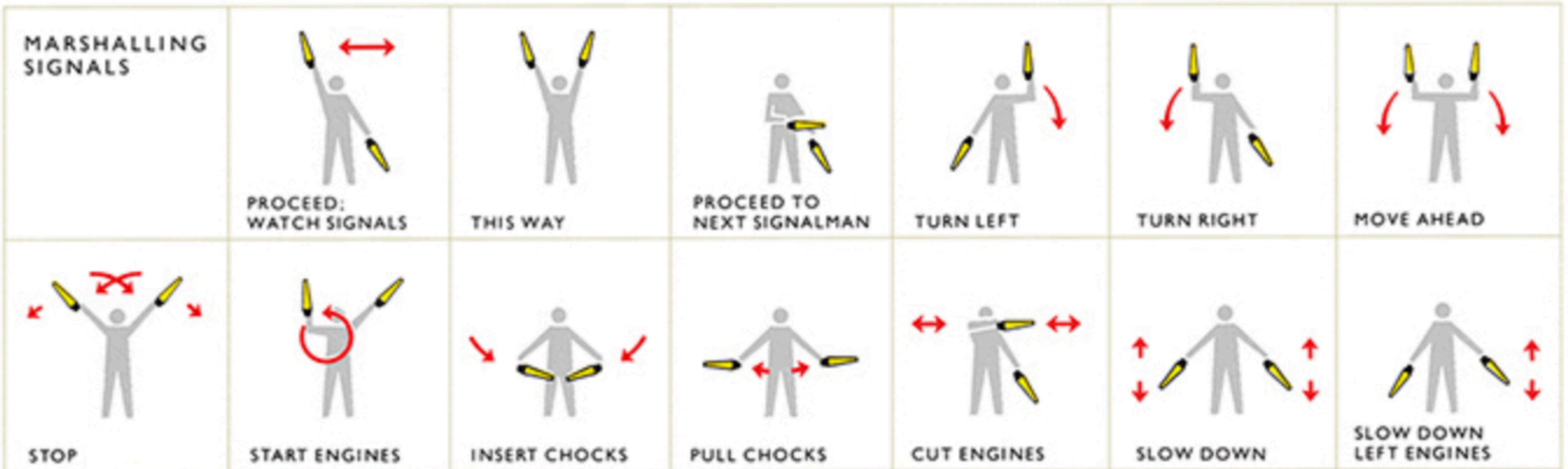
- Contrasting color, value, texture can segregate information into separate layers
- Supports **overlapping** information in displays, allowing selective processing of specific sets of elements
- Allows different layers to be read and interpreted **separately**

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


Marshalling Signals
PROCEED; WATCH SIGNALS
THIS WAY
PROCEED to NEXT SIGNALMAN
TURN LEFT
TURN RIGHT
MOVE AHEAD
STOP
START ENGINES
INSERT CHOCKS
PULL CHOCKS
CUT ENGINES
SLOW DOWN
SLOW DOWN LEFT ENGINES


MARSHALLING SIGNALS
PROCEED; WATCH SIGNALS
THIS WAY
PROCEED TO NEXT SIGNALMAN
TURN LEFT
TURN RIGHT
MOVE AHEAD
STOP
START ENGINES
INSERT CHOCKS
PULL CHOCKS
CUT ENGINES
SLOW DOWN
SLOW DOWN LEFT ENGINES

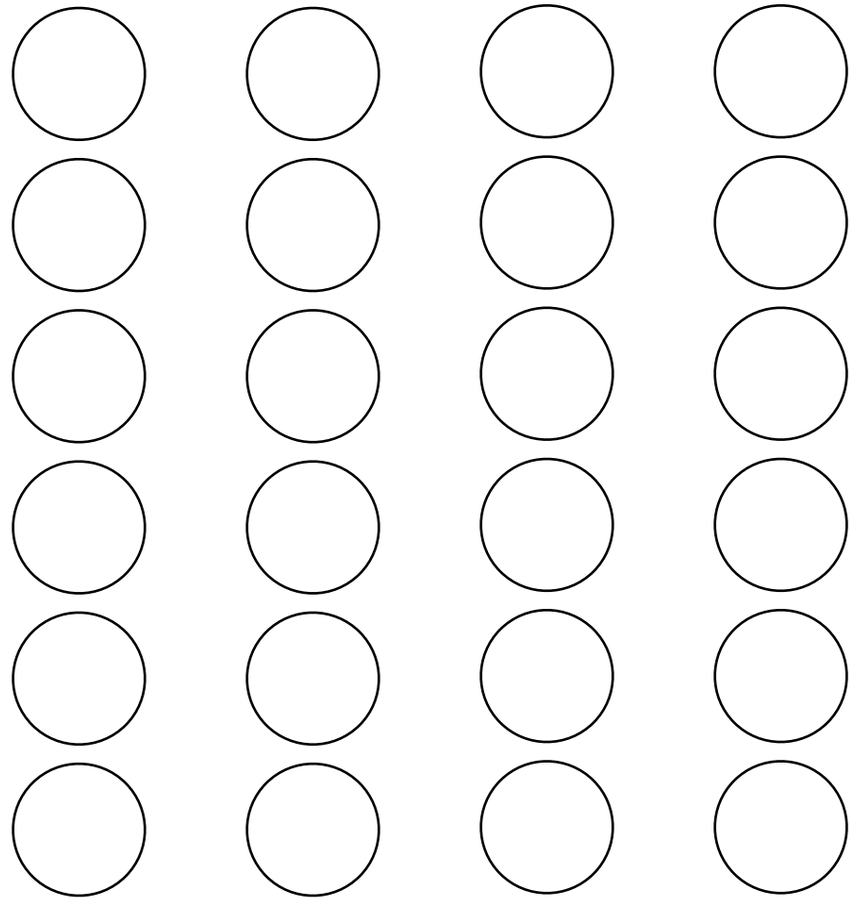
Organization & Structure

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 MOST strongly w/ nearby elements

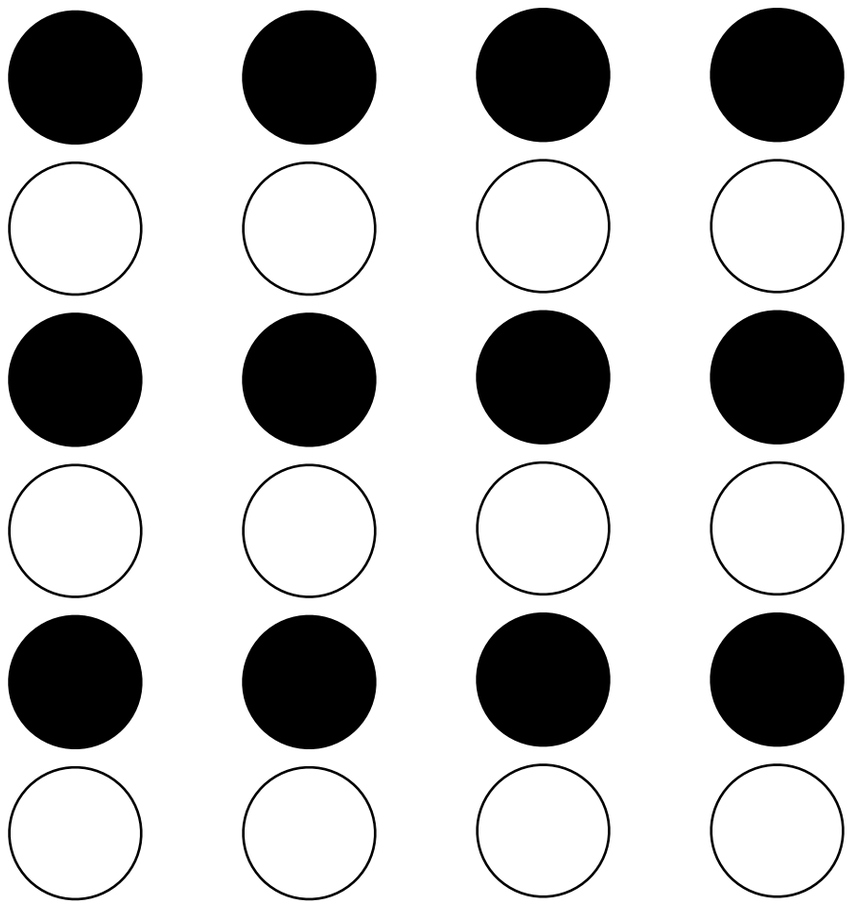


- parsed as 4 columns based on close vertical spacing
- then parsed as two sets of two columns based on spacing

Gestalt principle - Similarity

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

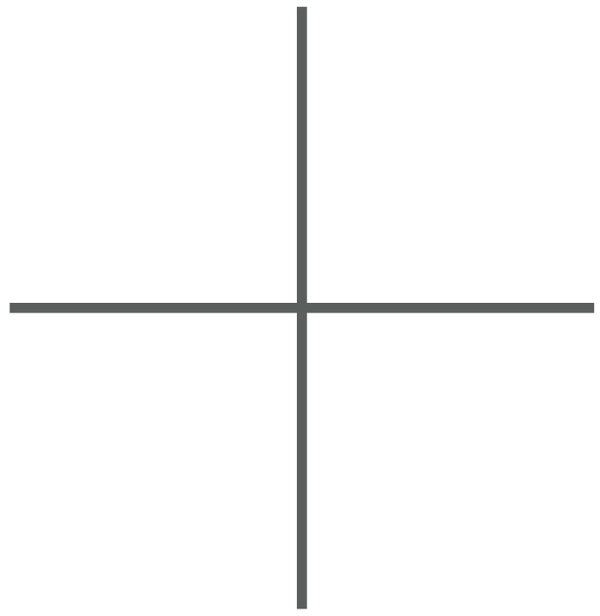
- parsed as rows based on fill similarity, despite closer column spacing



Gestalt principle - Continuity

- Preference for **simplest** physical explanation of complex figure

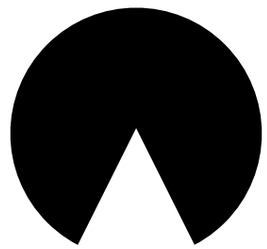
parsed as two lines, rather than 4 separate lines or 4 opposing angles

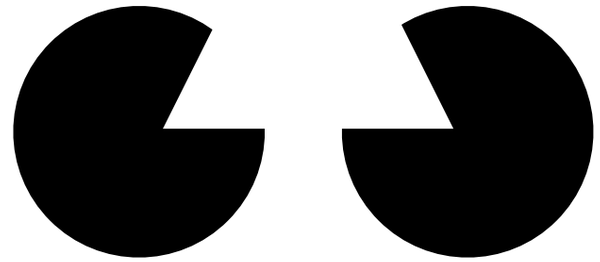


Gestalt principle - Closure

- 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

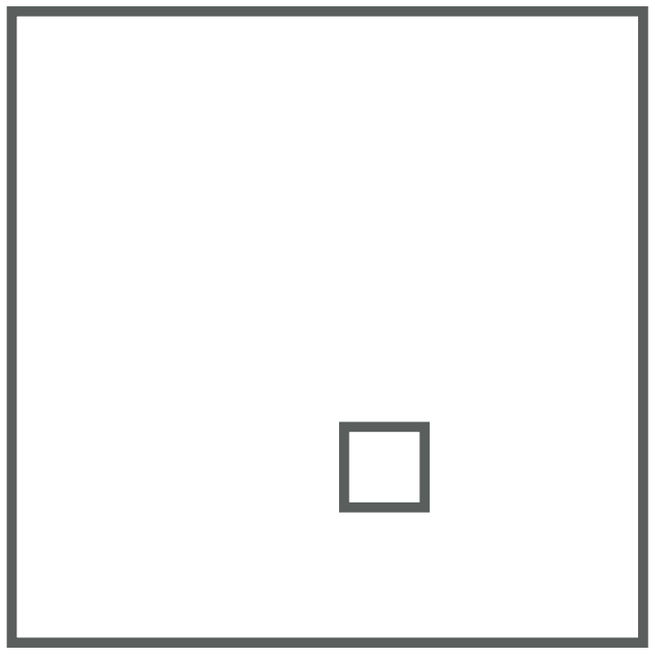




Gestalt principle - Area

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

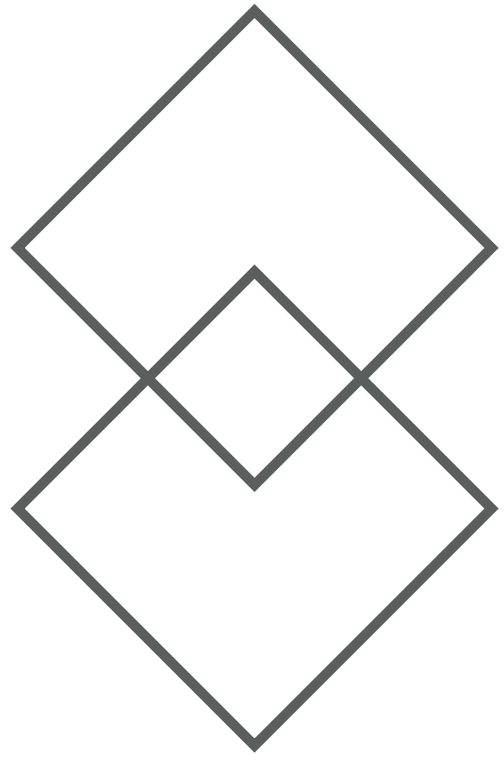
Small rectangle parsed as small rectangle on top of larger, rather than hole



Gestalt principle - Symmetry

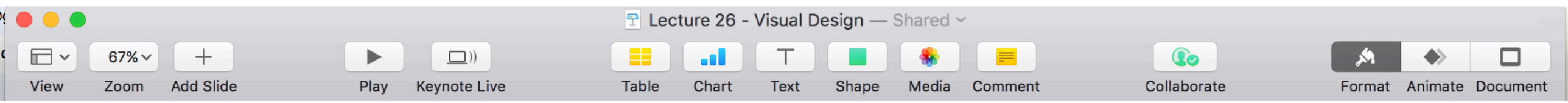
- Preference to interpret ambiguous form as multiple symmetric elements

Parsed as two overlapping objects rather than 3 separate shapes



Grouping

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

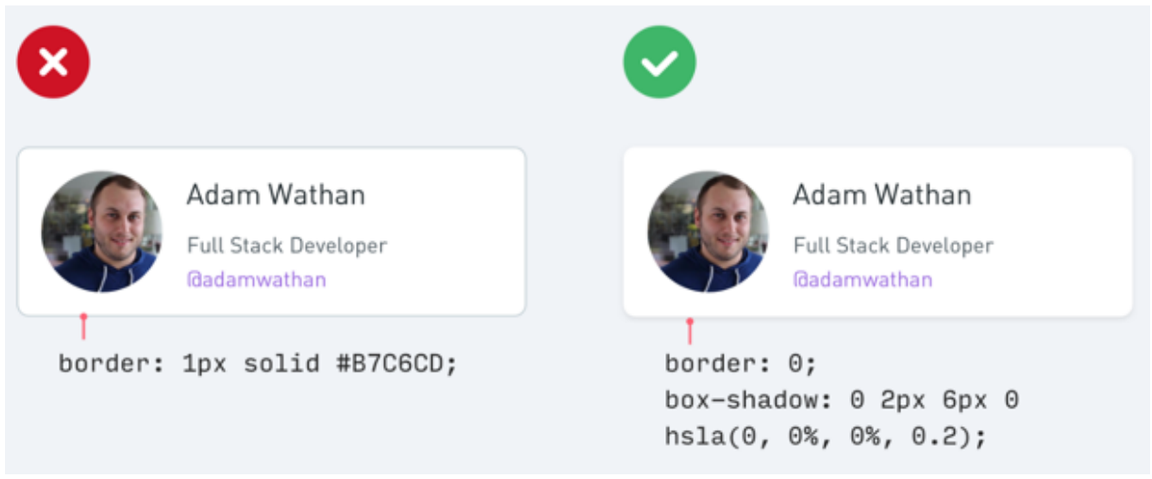


Use fewer borders

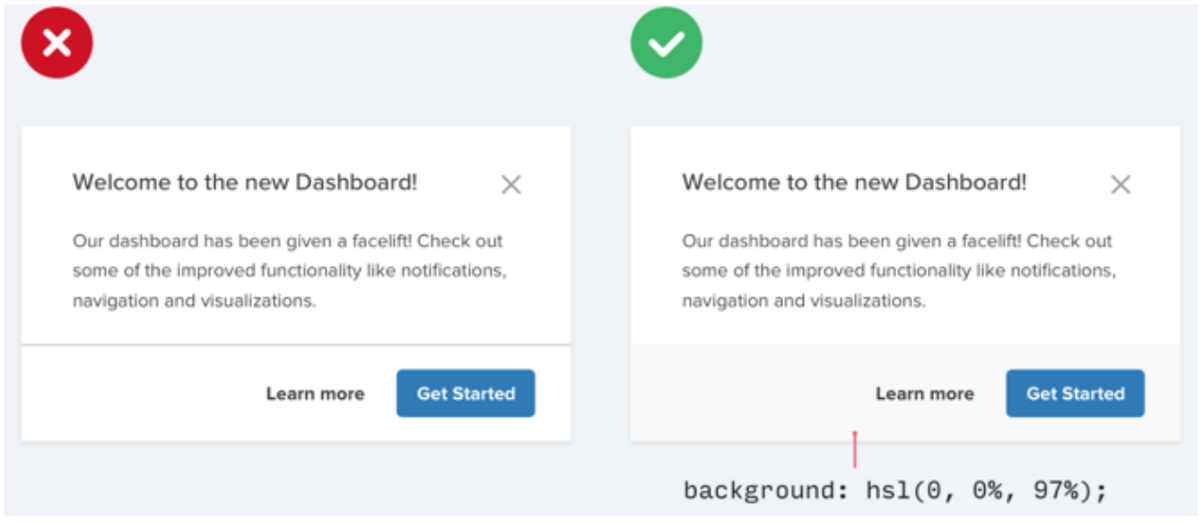
- Many alternatives

https://medium.com/refactoring-ui/7-practical-tips-for-cheating-at-design-40c736799886

negative space



box shadows



different backgrounds

Hierarchy

Order groups based on perceptual prominence corresponding to intended reading sequence

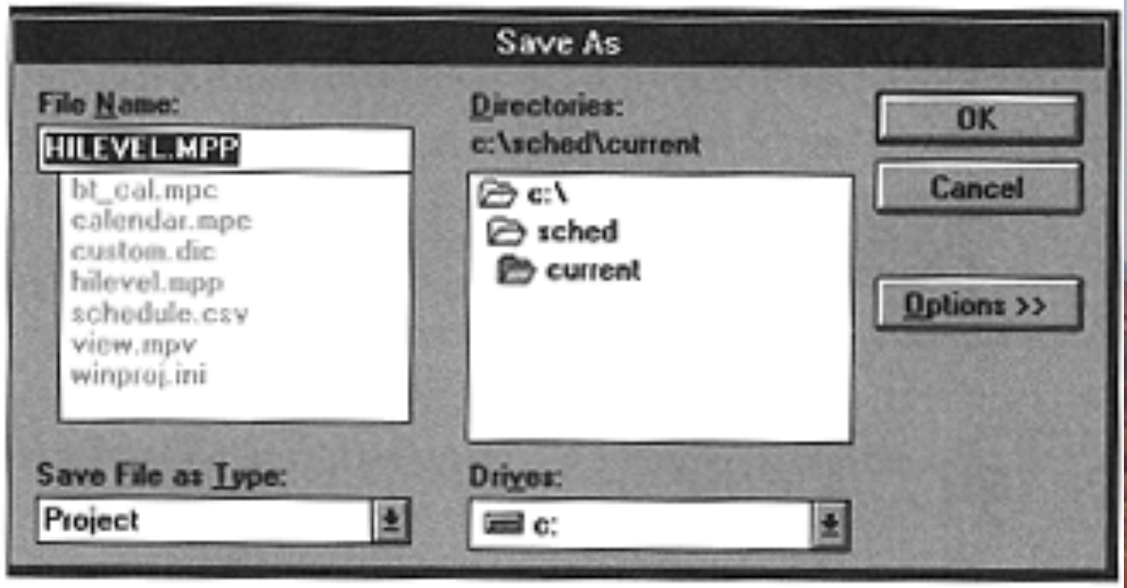
Can help solve “skimming” problems

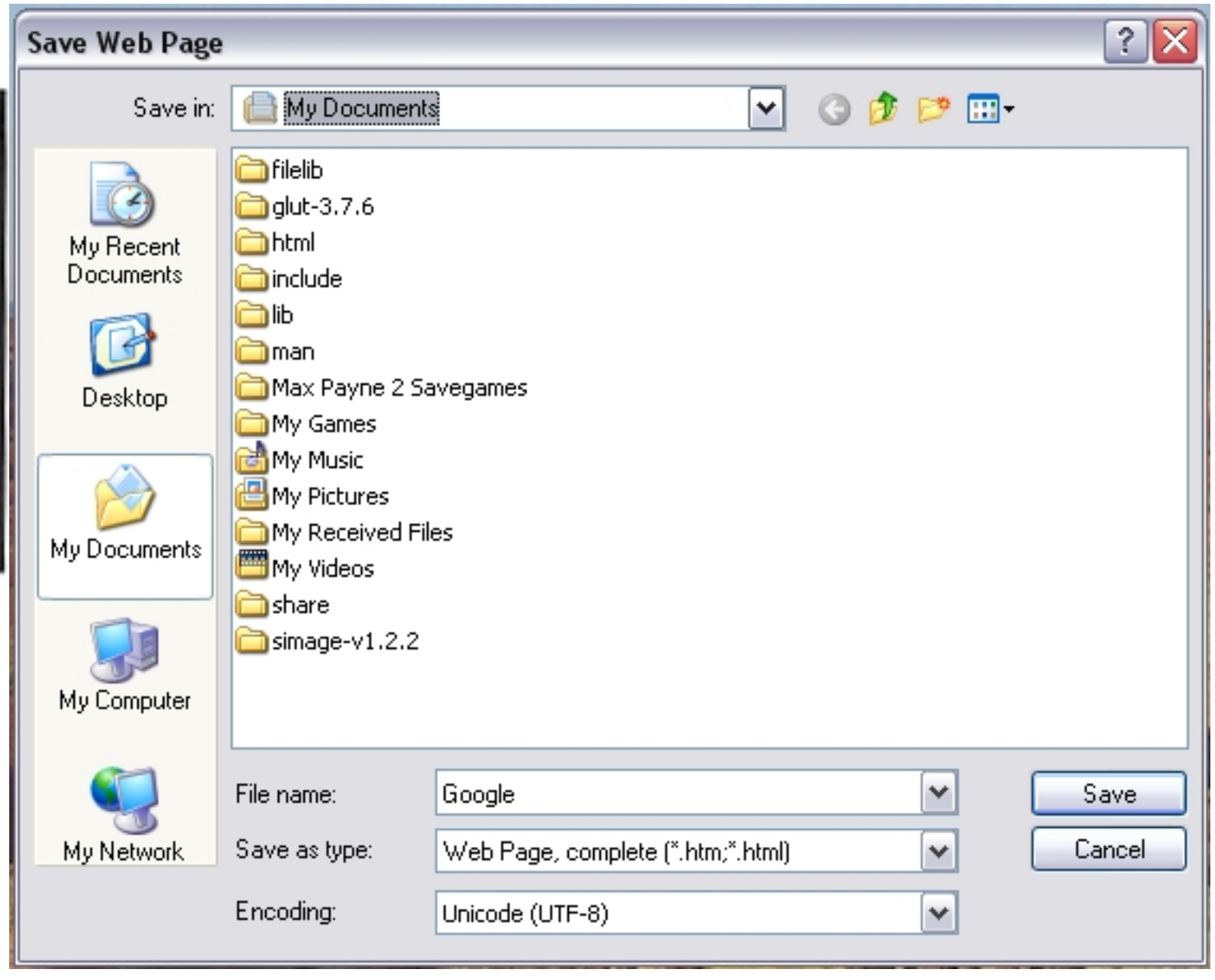
Structure can help people focus attention on key parts

Key points might **get lost though.**

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

Hierarchy in UIs

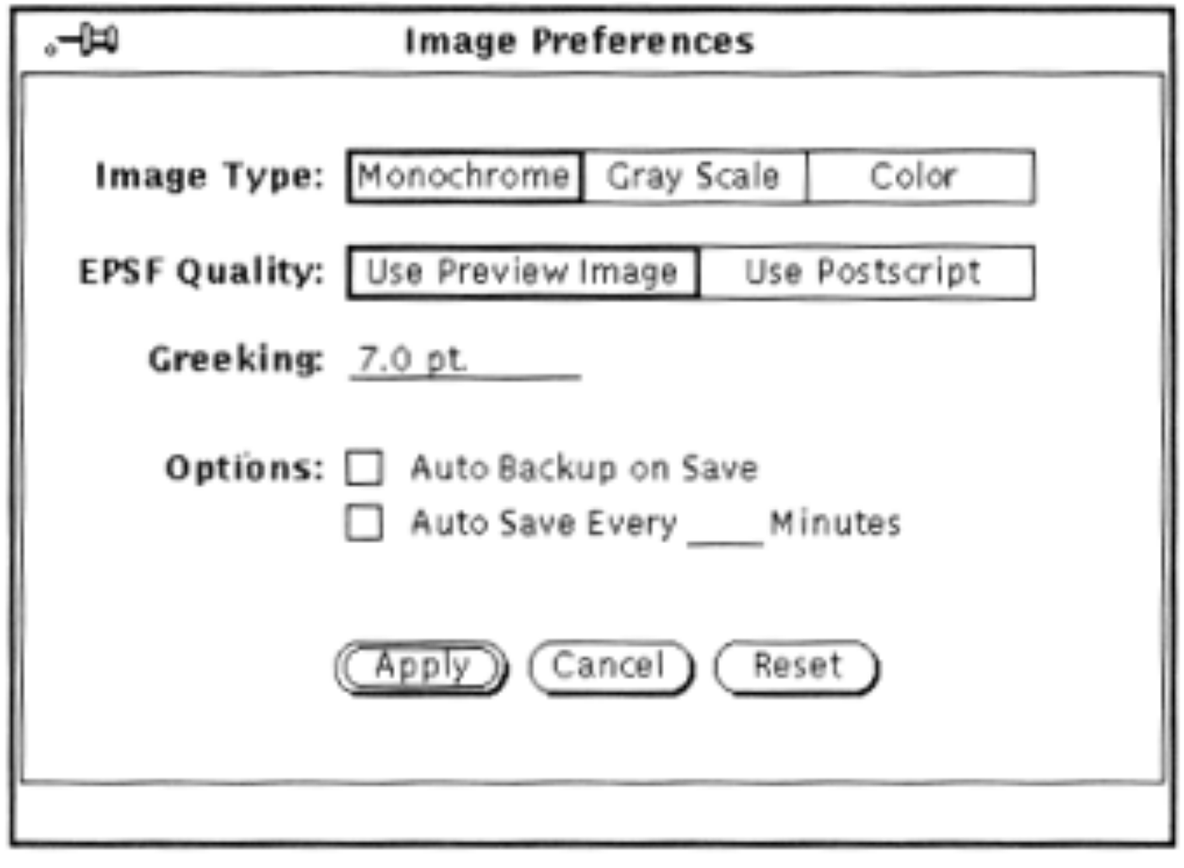




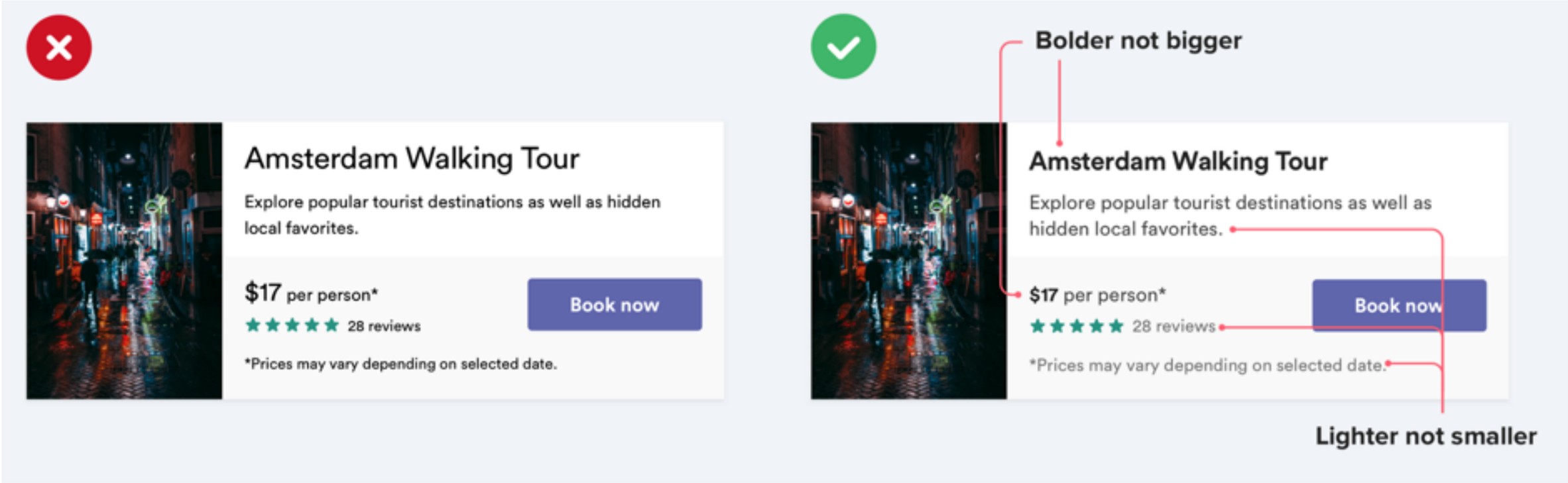
Use negative space

- Directs **attention** to critical regions of display

1. Review design, prioritizing groups
2. Add extra **space** to ensure spatial separation & emphasis, particularly for important elements

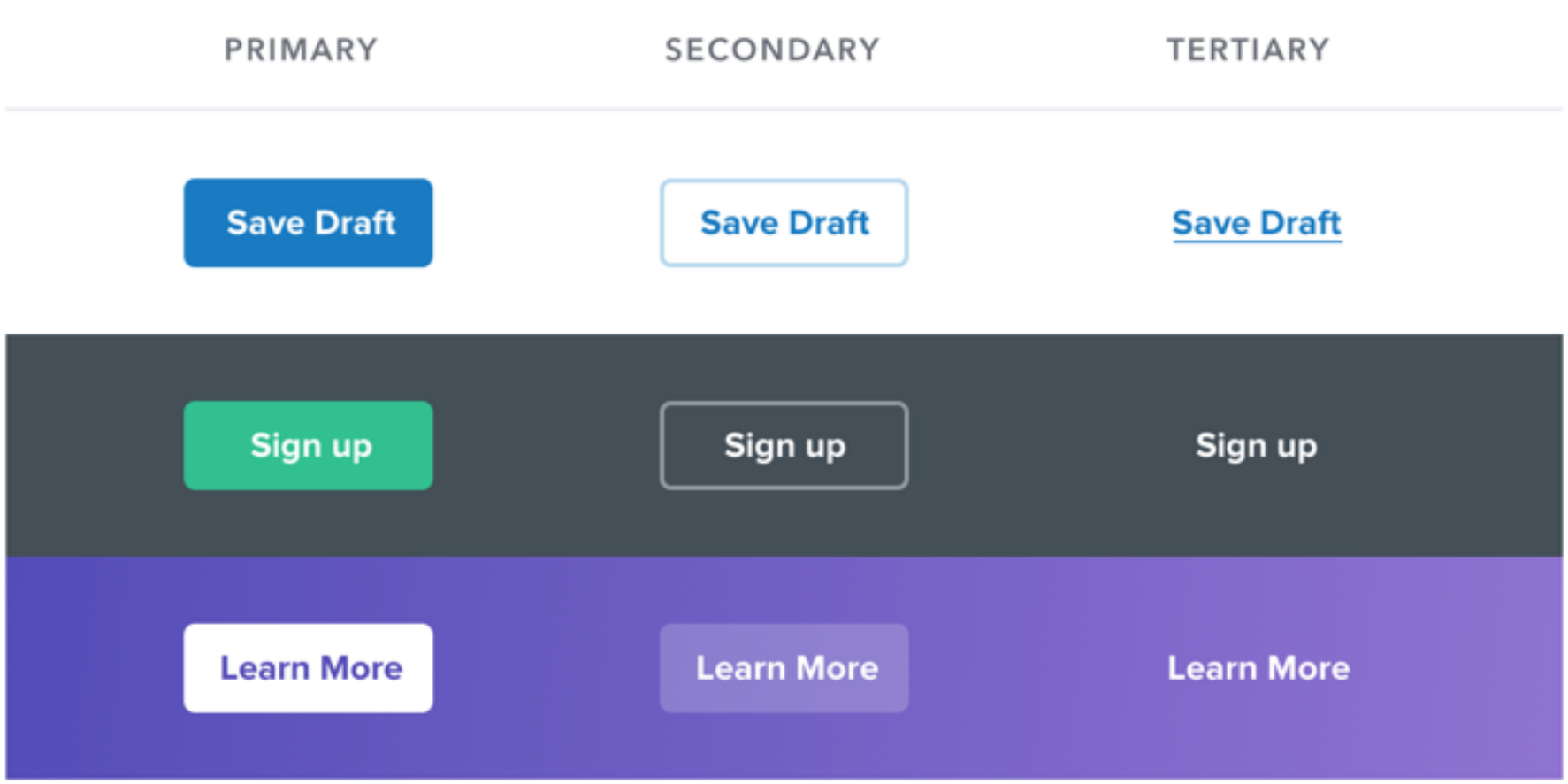


Creating hierarchy: Color and weight instead of size



https://medium.com/refactoring-ui/7-practical-tips-for-cheating-at-design-40c736799886

Signal importance of action



https://medium.com/refactoring-ui/7-practical-tips-for-cheating-at-design-40c736799886

Images & Icons

Images & Icons

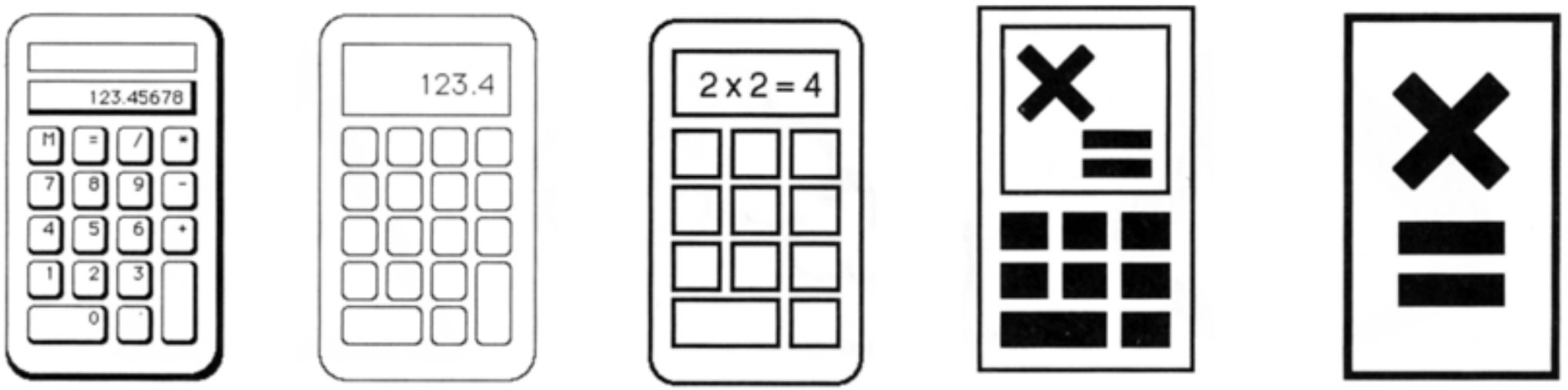
- Benefits
  - Identification - images are easy to recognize
  - Expression - breadth of artistic expression that can make design more engaging & enjoyable

Types of iconic representation

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

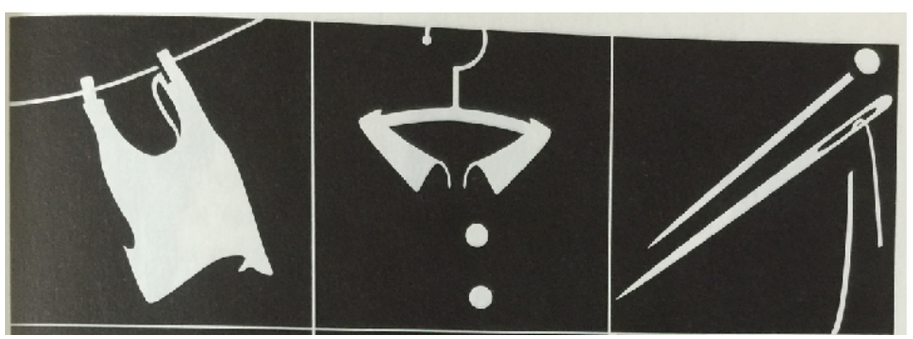
Use of abstraction

- 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 **bold**, clear, balanced
- Generality - represents a **class** of items, rather than an individual element, by removing details that may vary
- Cohesiveness - set of icons that function **together** by sharing visual variables
- Characterization - call to mind one or more **distinctive** features

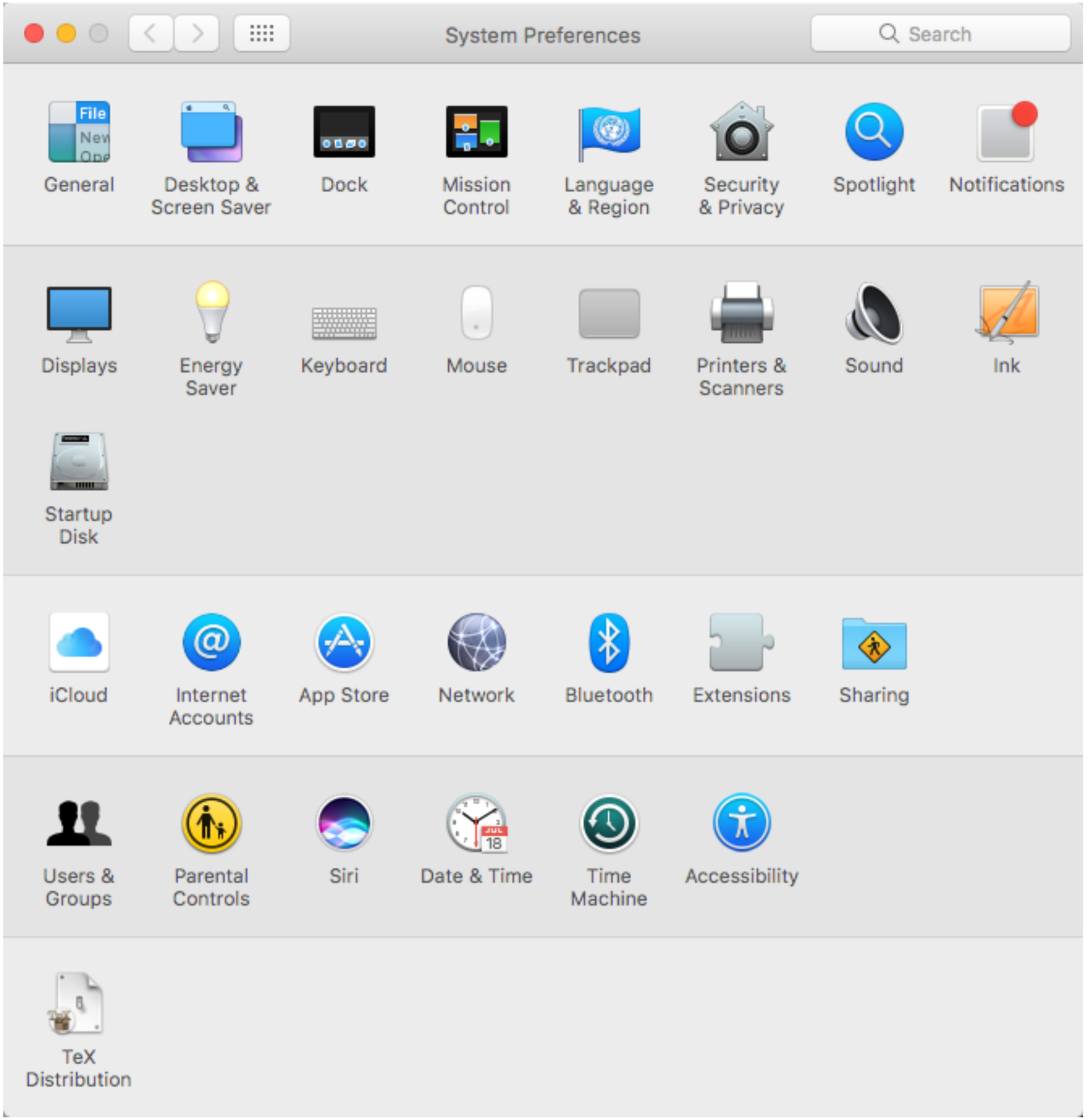


Selecting the right type of icon

- 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

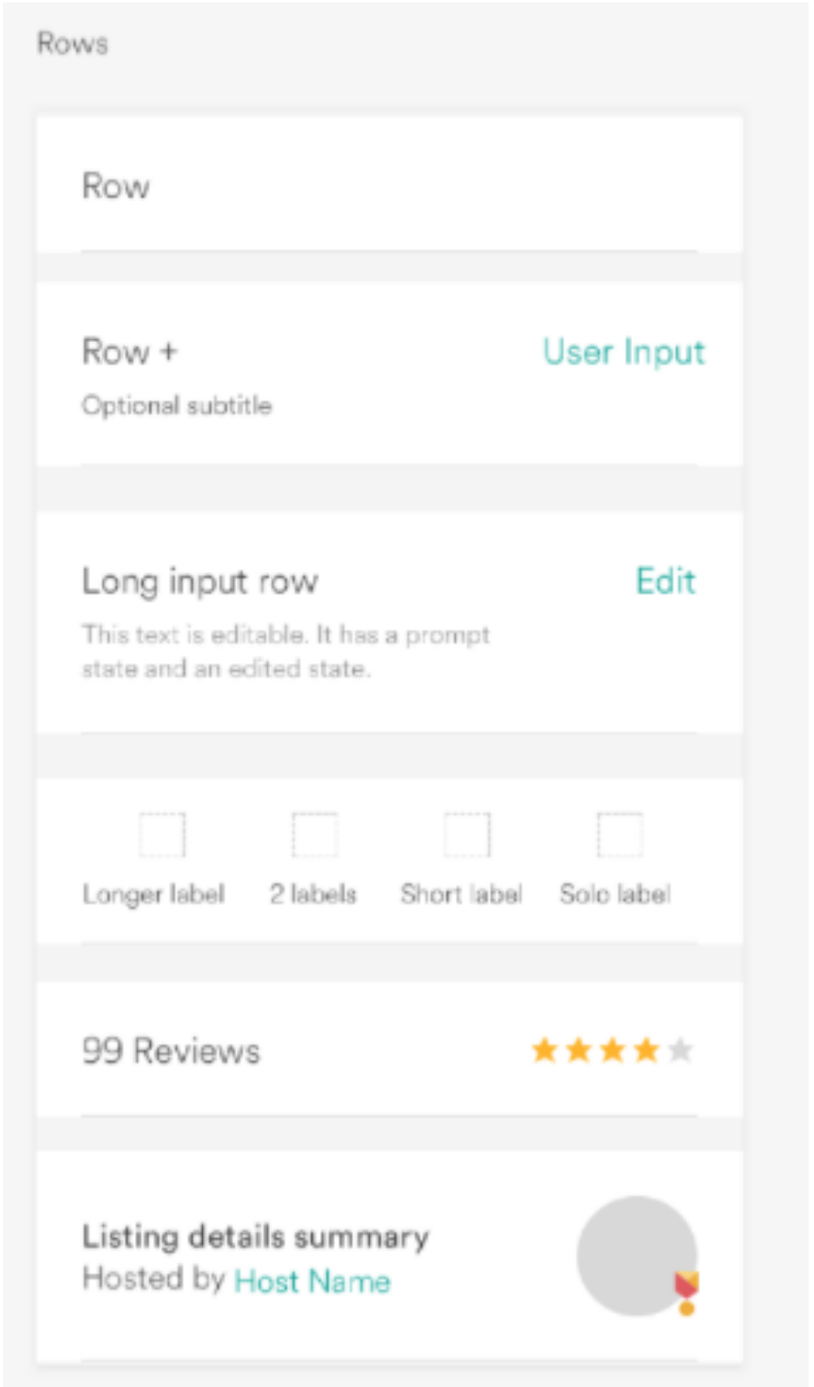
Best 3, worst 3 and why? Then: How to make worst 3 better?


System Preferences
Search
General
Desktop & Screen Saver
Dock
Mission Control
Language & Region
Security & Privacy
Spotlight
Notifications
Displays
Energy Saver
Keyboard
Mouse
Trackpad
Printers & Scanners
Sound
Ink
Startup Disk
iCloud
Internet Accounts
App Store
Network
Bluetooth
Extensions
Sharing
Users & Groups
Parental Controls
Siri
Date & Time
Time Machine
Accessibility
TeX Distribution

Design languages

Design languages

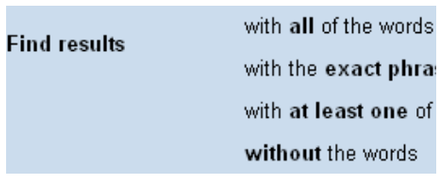
- Many, **many** choices about visual variables and syntax of composition
  - How do you ensure choices are made consistently across web app?
- Solution: design language
  - Describes how to express ideas and concepts in the interface
  - May be communicated through Human Interface Guideline documentation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

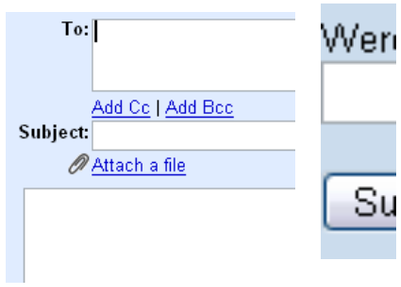


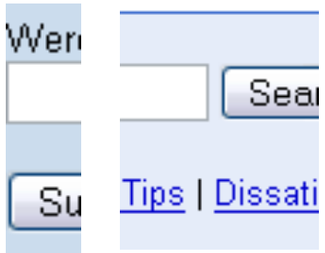
Example: Elements, Google 2004

Example: Syntax, Google 2004

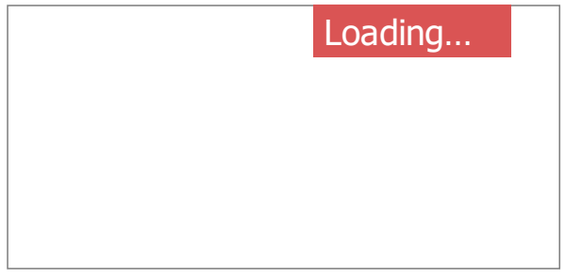
task



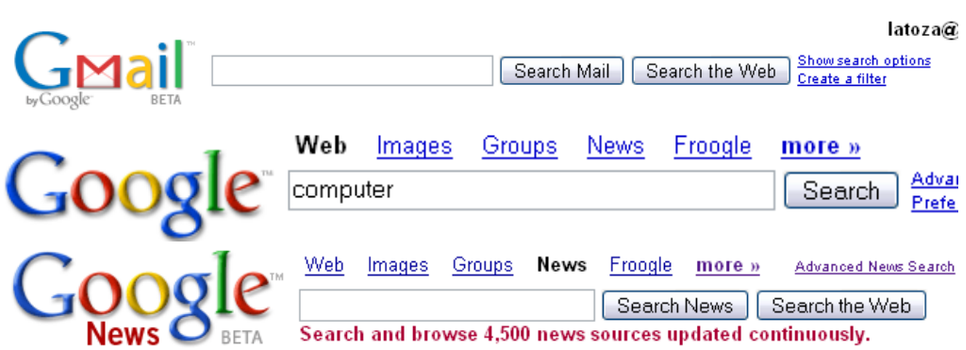




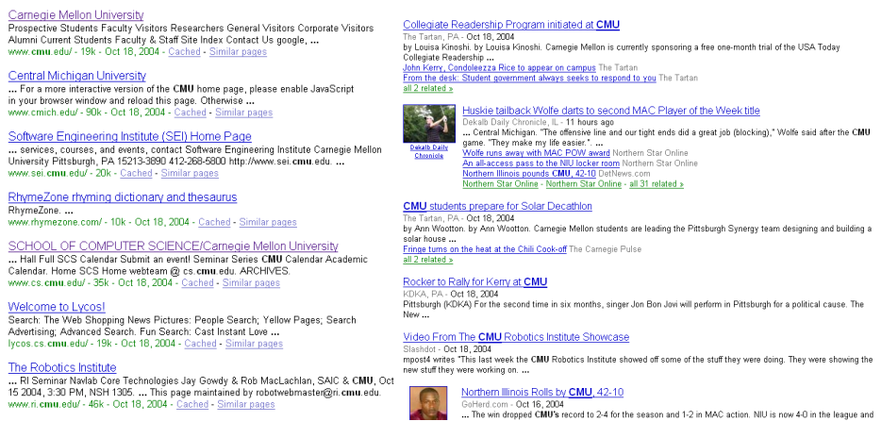
placeholder



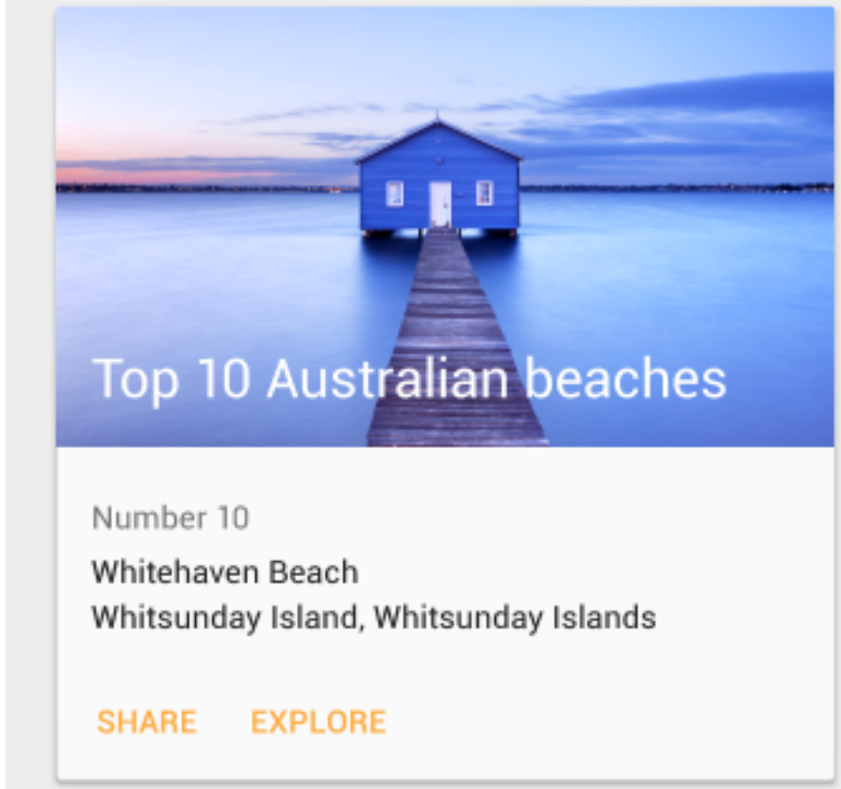
toolbar

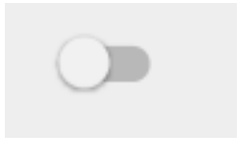


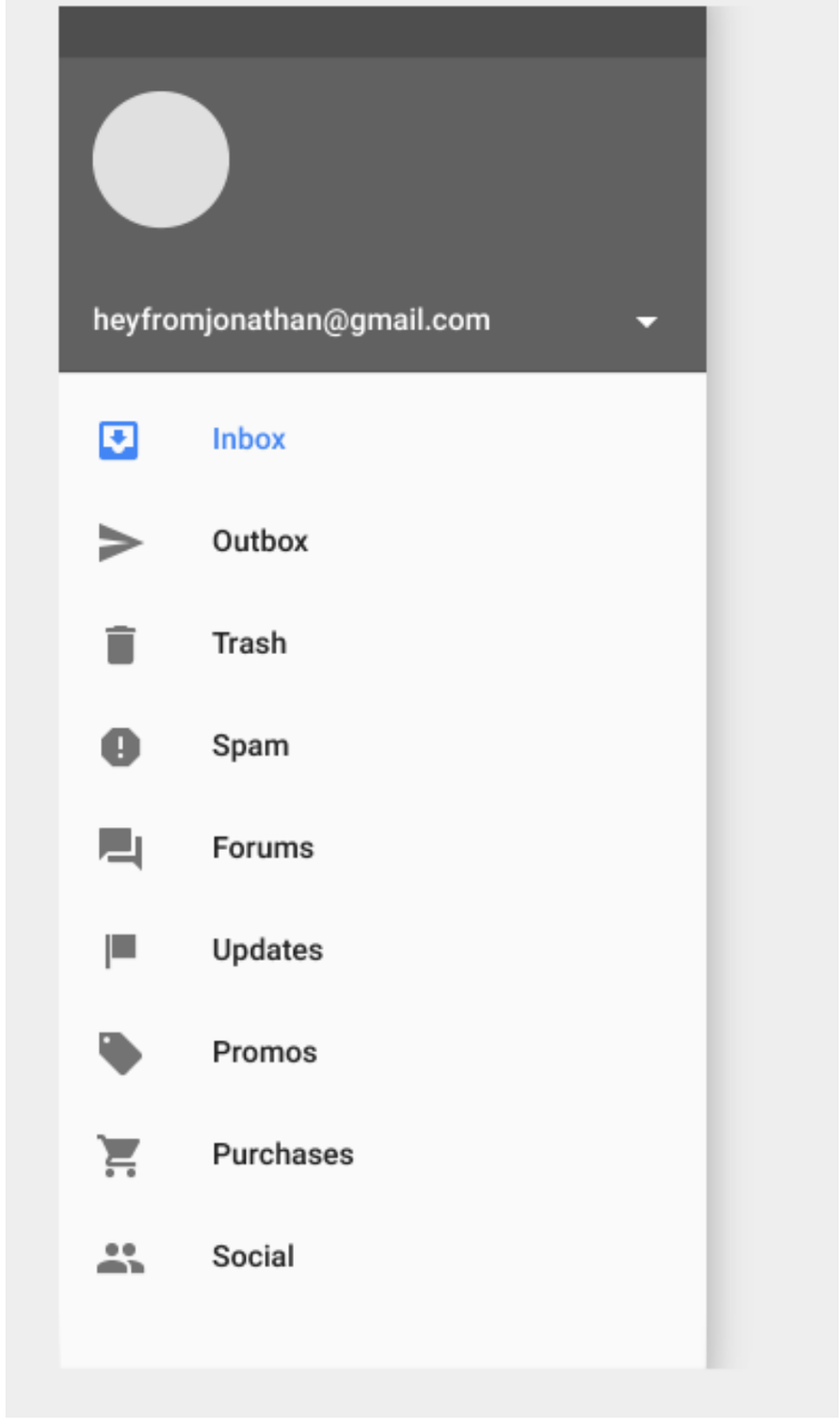
list



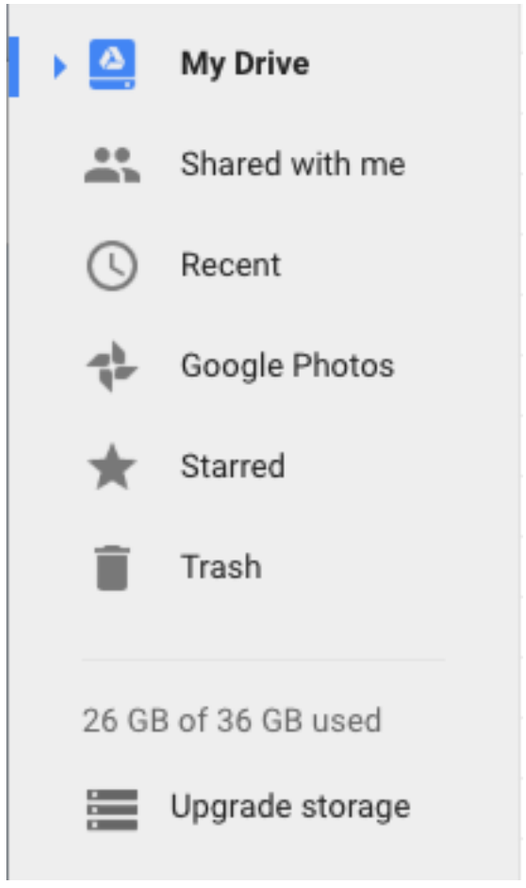
Examples: Google 2016

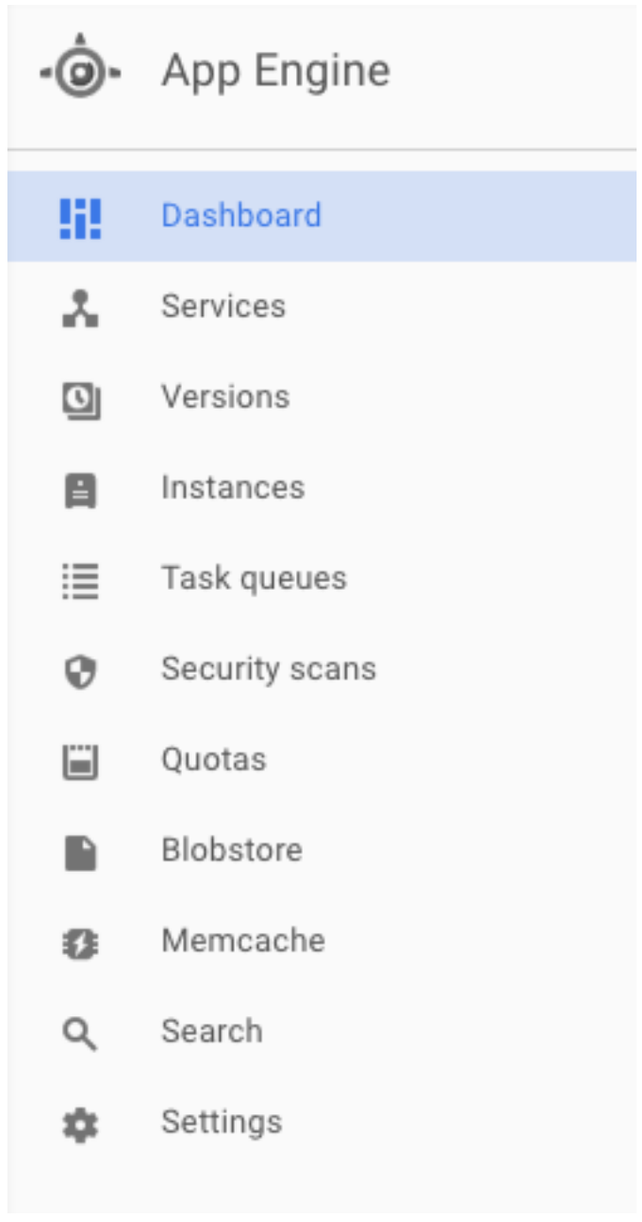


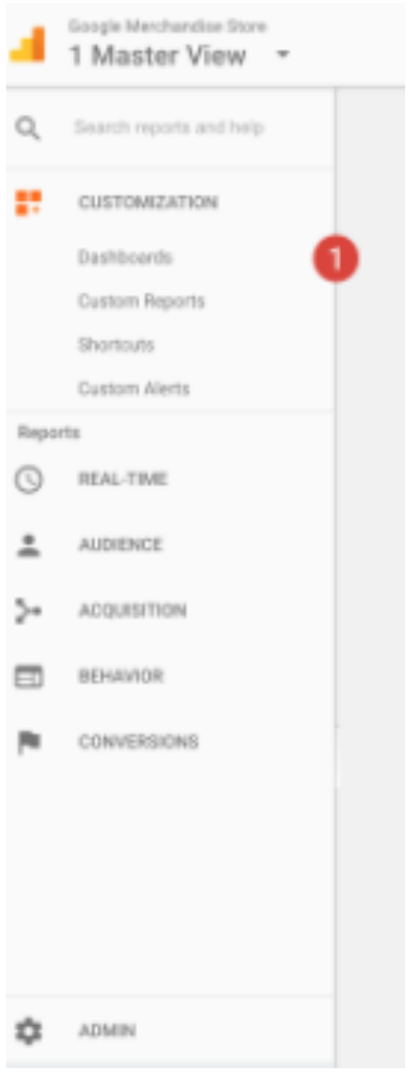




Examples: Google 2016







Examples: IBM

Product Analytics

Service Onboarding | Documents | Profiles | Community

New Onboarding Statistics

Completion time (Avg)	**38 days**
Error rate (Avg)	**18%**
Type of industry	**Automotive**
Client feedback score (Avg)	**3.5 - 4**
Busiest month	**May**

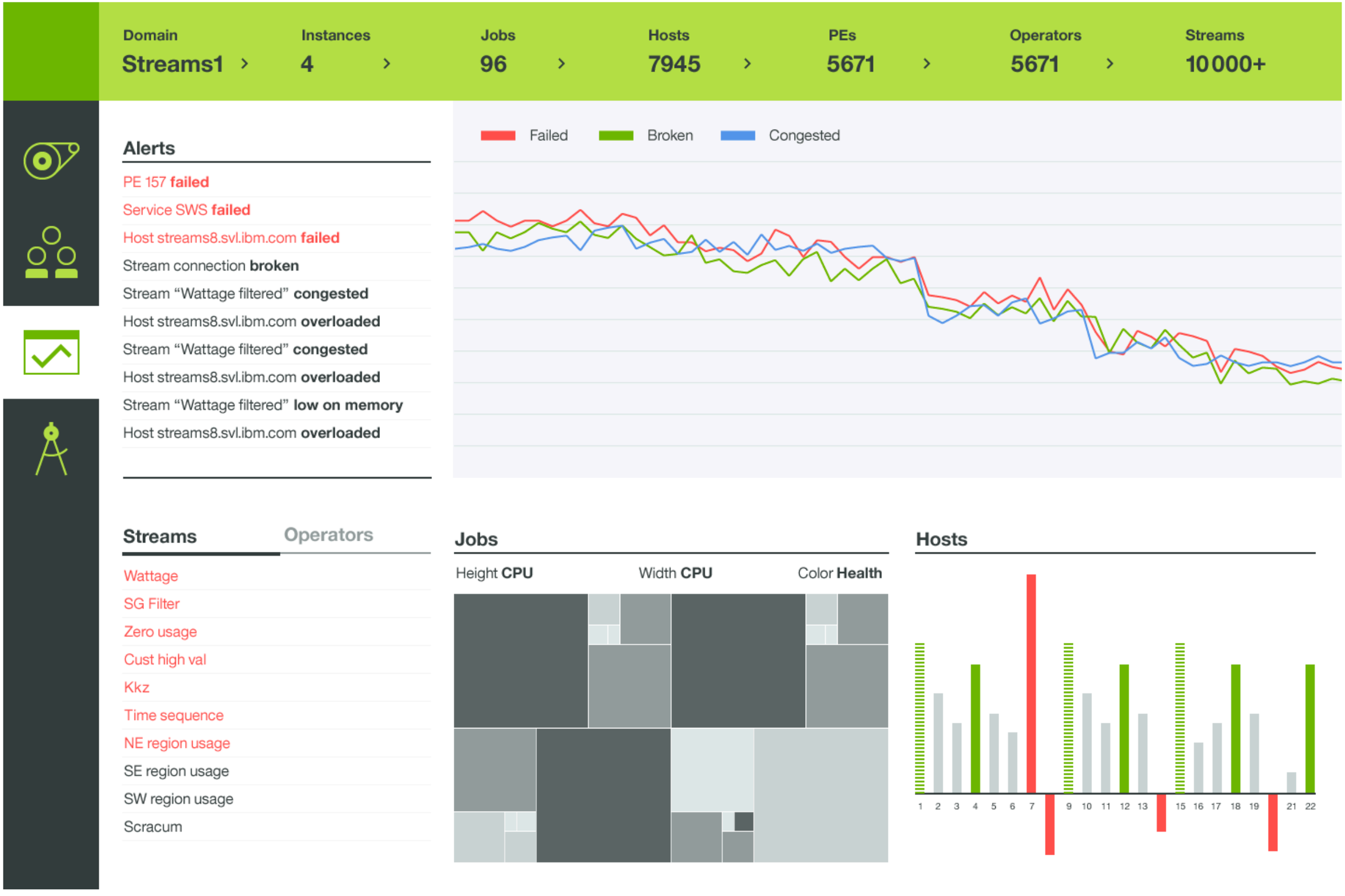
New Onboarding Statistics

Rejected	**21**
Completed	**186**
Pending	**54**
Active	**315**
Total	**576**

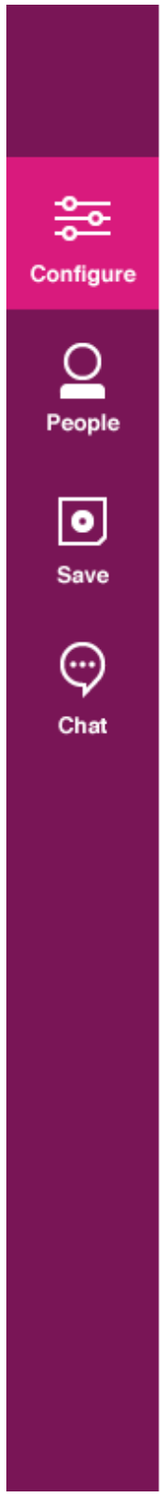
Service Industry Breakdown

Automotive	**42%**
Travel	**23%**
Healthcare	**20%**
Retail	**15%**
Total	**100%**

Examples: IBM

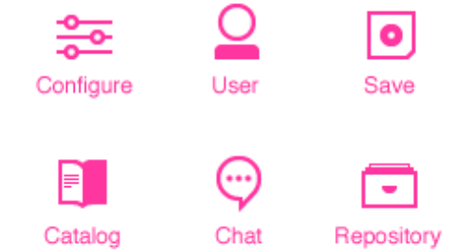


Examples: IBM

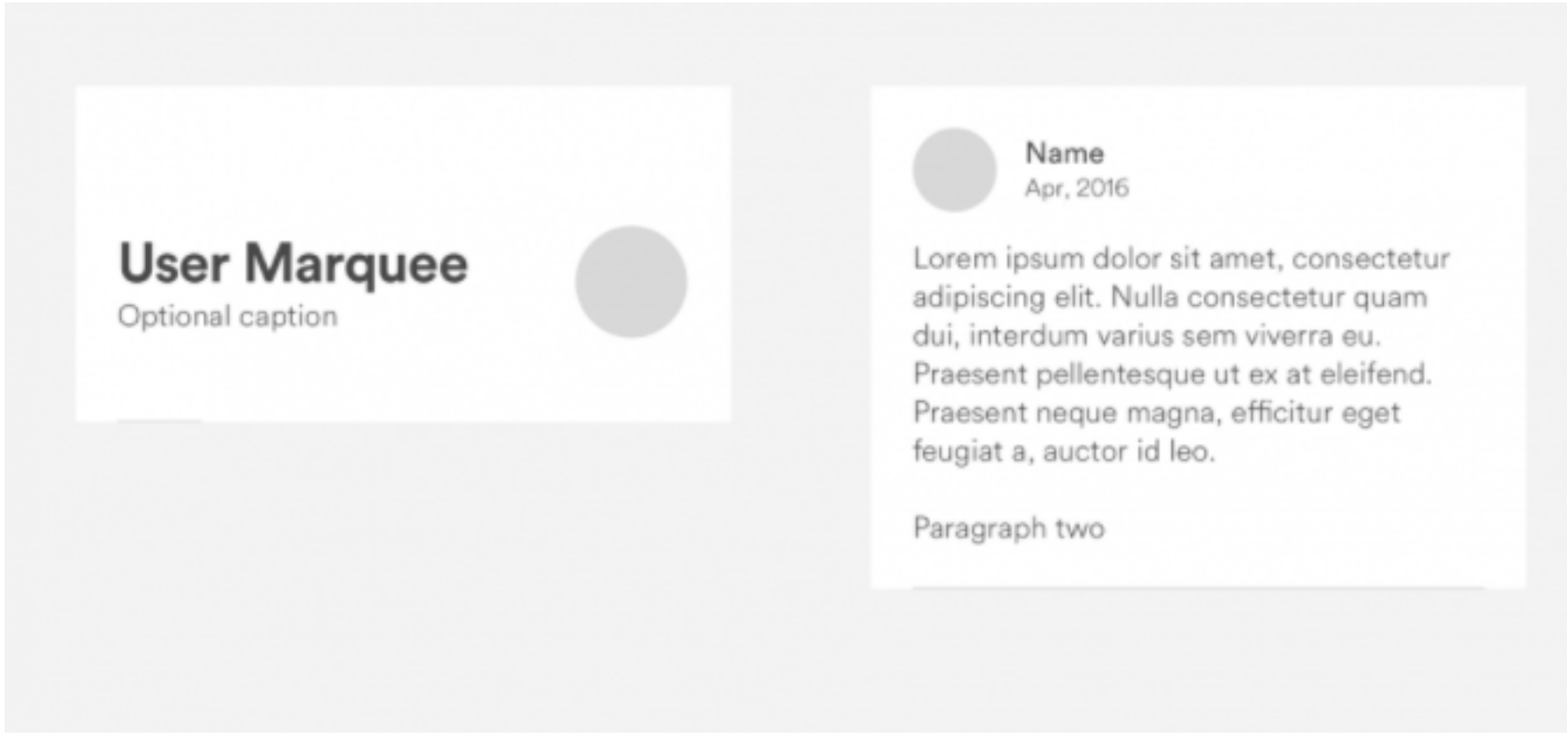


Application data

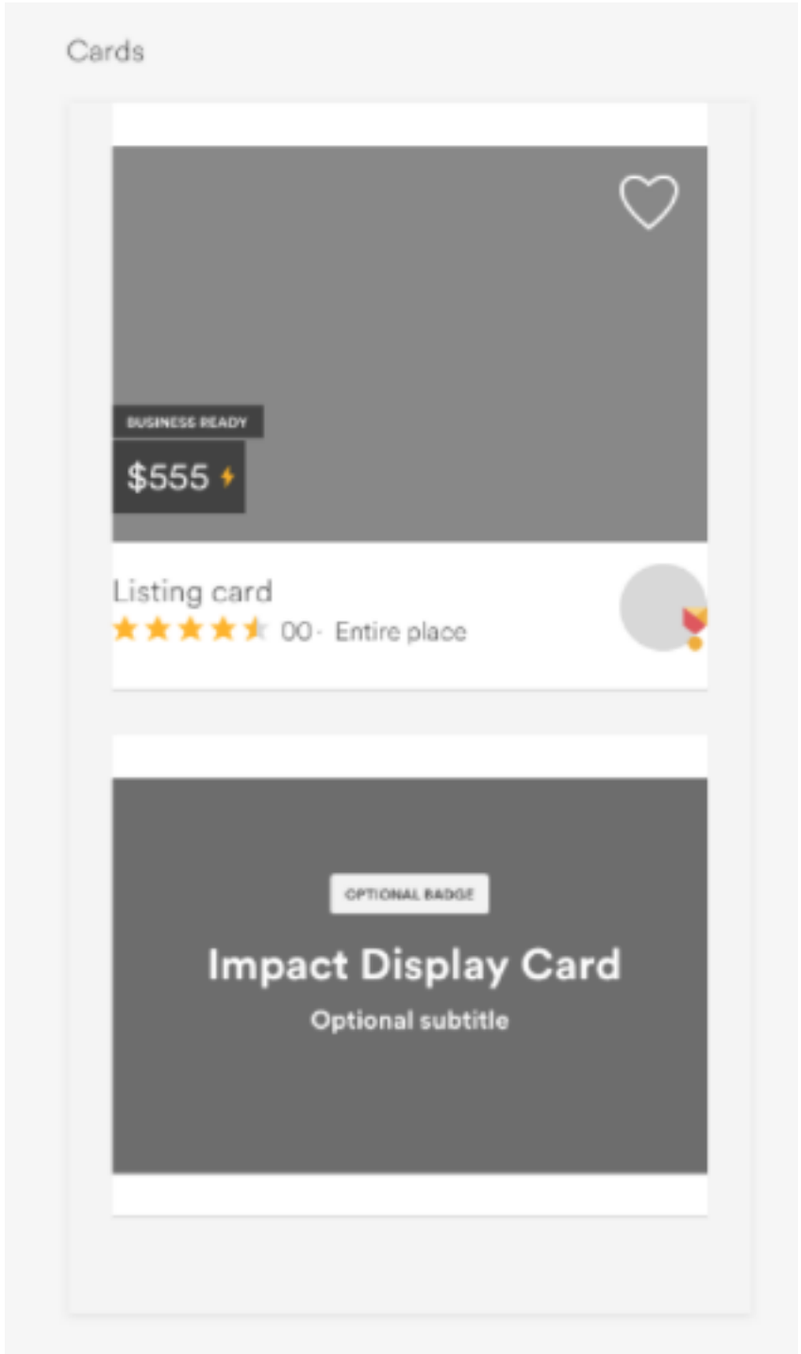
Title	Title	Value	Date	Value
Imperial	true	9 456 234	21. Feb 2014	9 456 234
Hard	false	987 345	21. Feb 2014	987 345
Cider	false	43 567	21. Feb 2014	43 567
Anaerobic	true	324 543	21. Feb 2014	324 543
Cold filter	false	432 456	20. Feb 2014	432 456
Barrel hand	true	32 432	20. Feb 2014	32 432
Pump wort	true	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

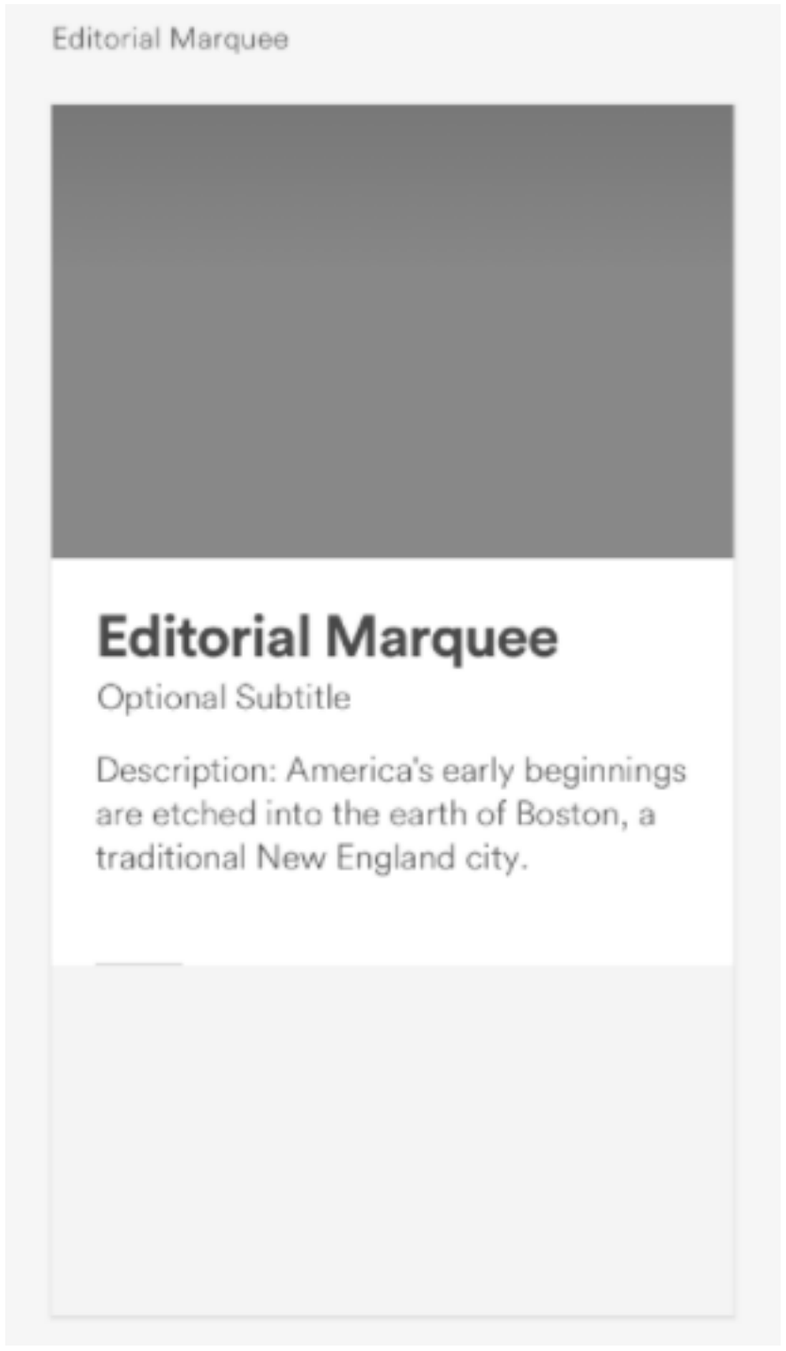


Examples: AirBnb

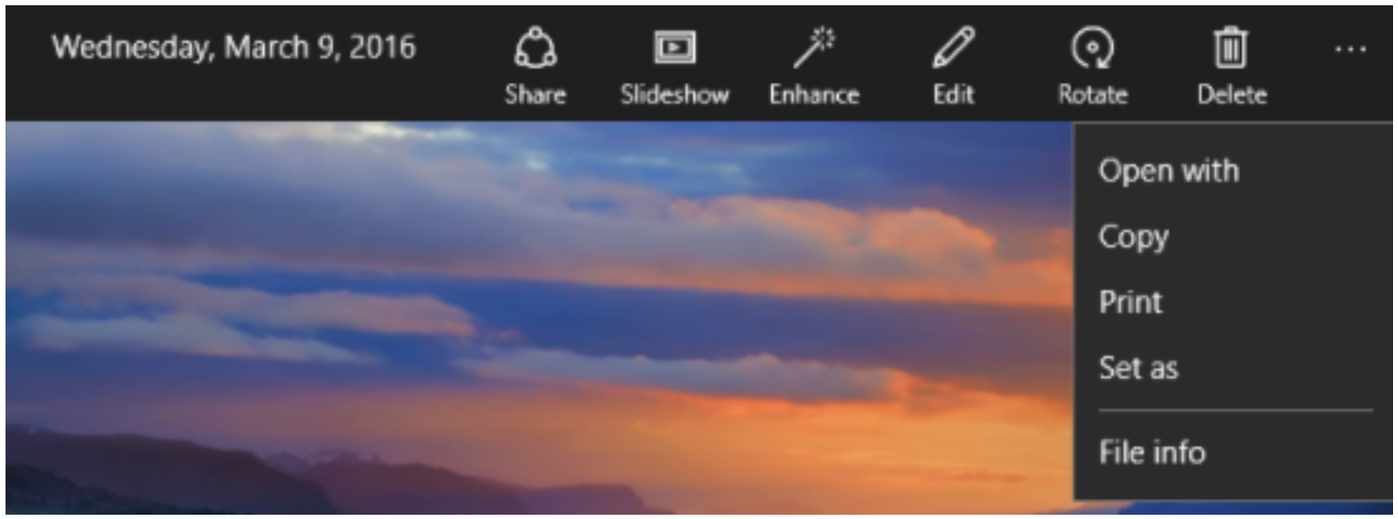


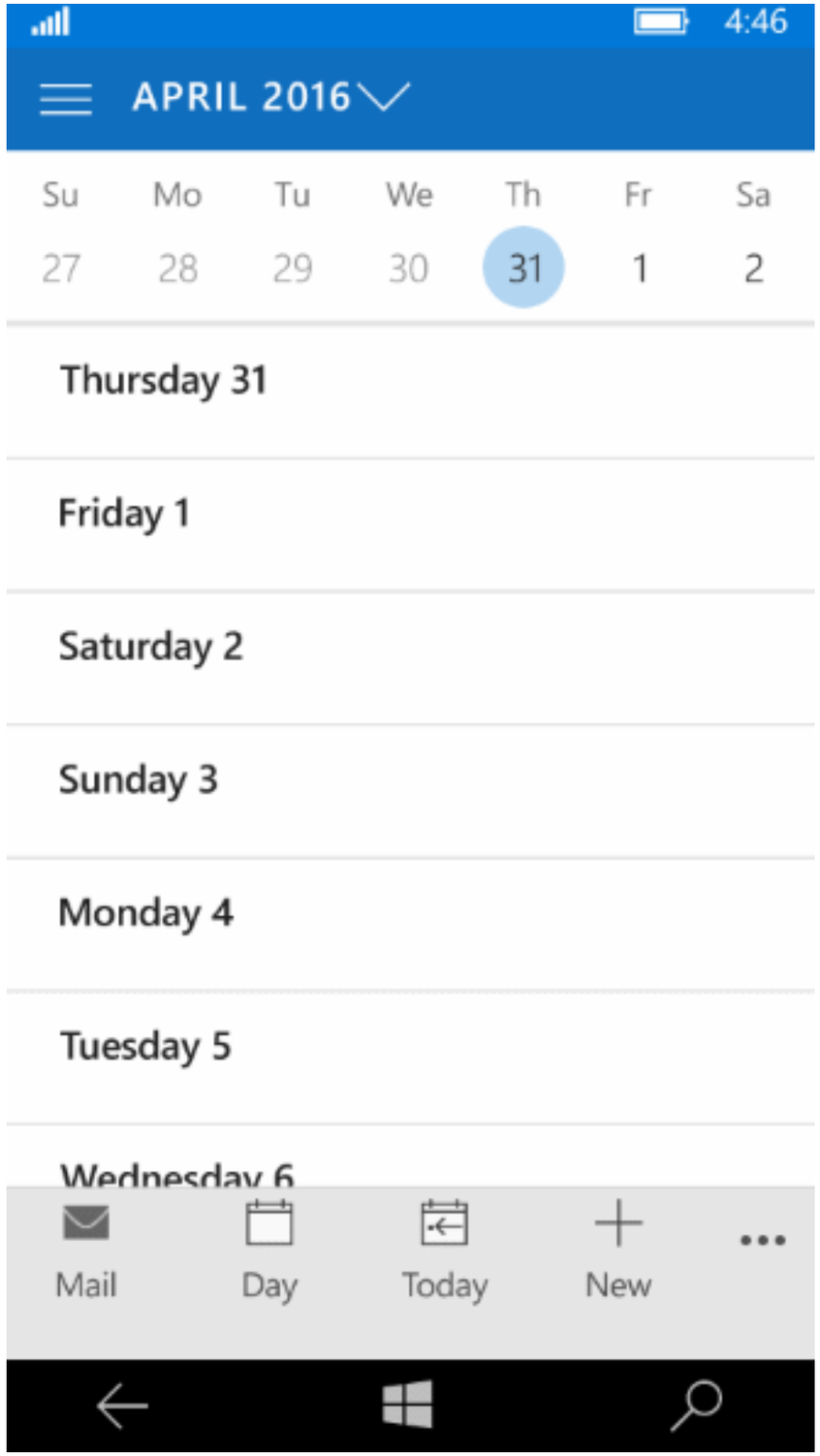
Examples: AirBnb



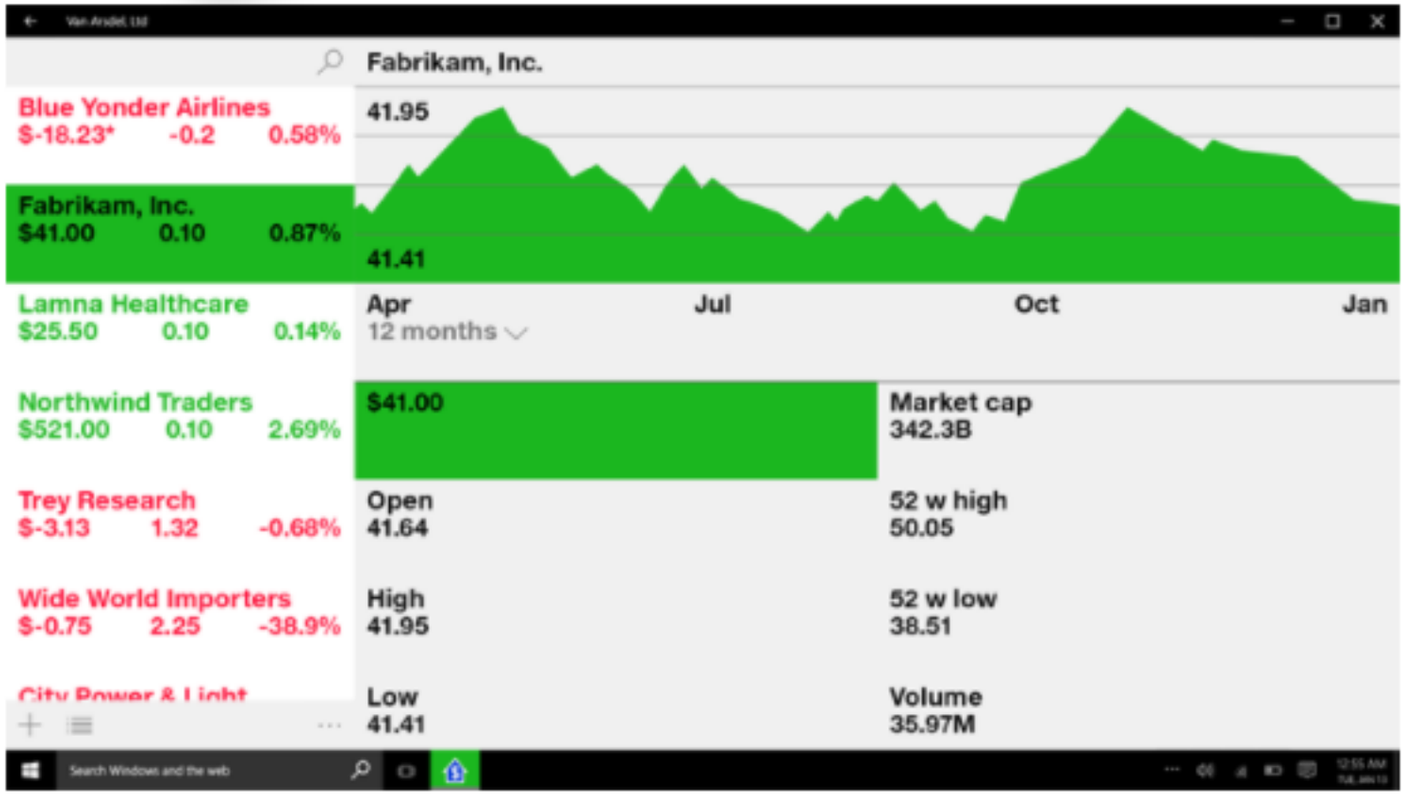


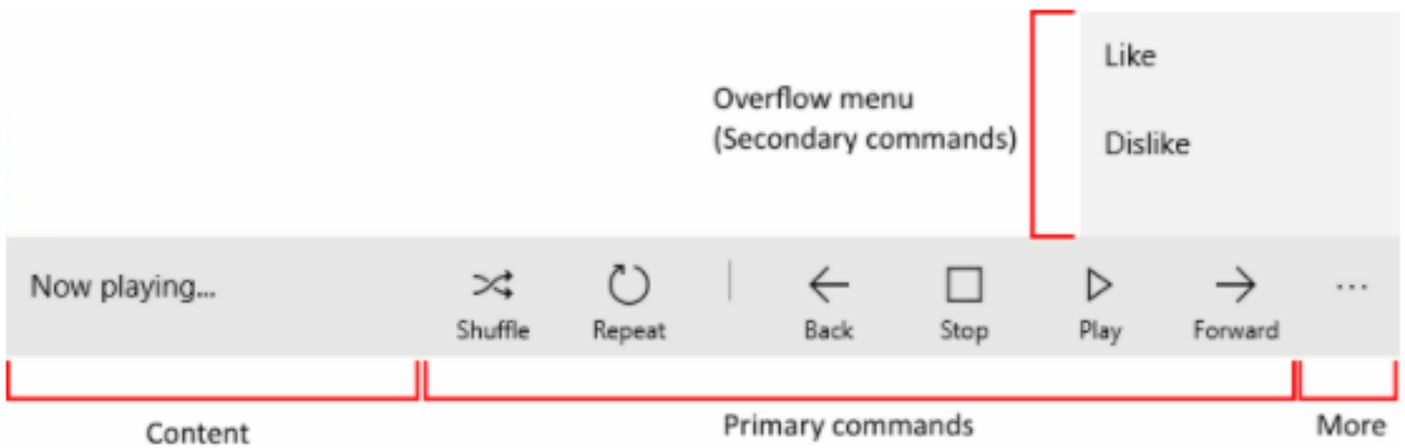
Examples: Microsoft

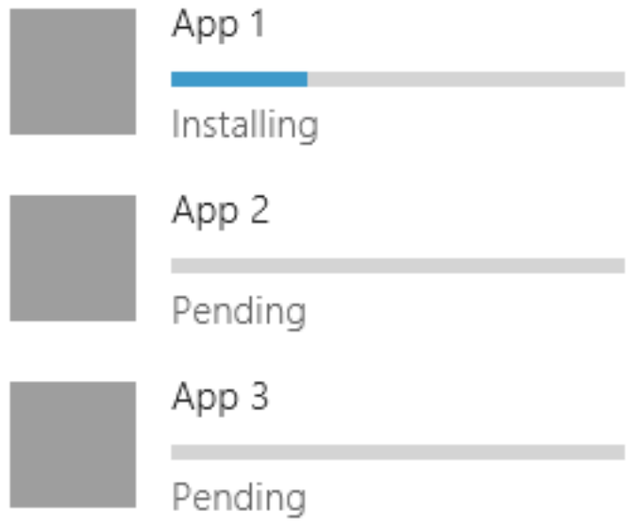


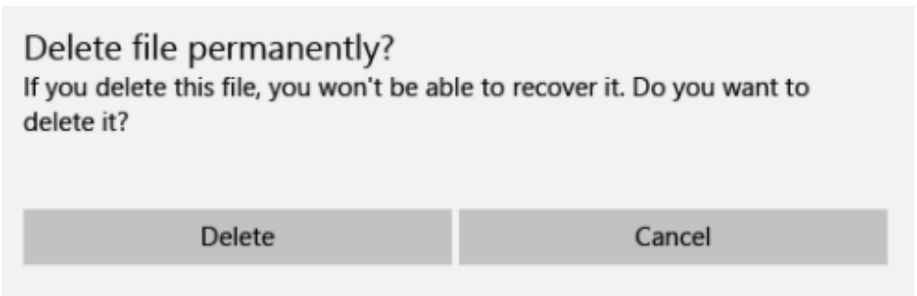


Examples: Microsoft

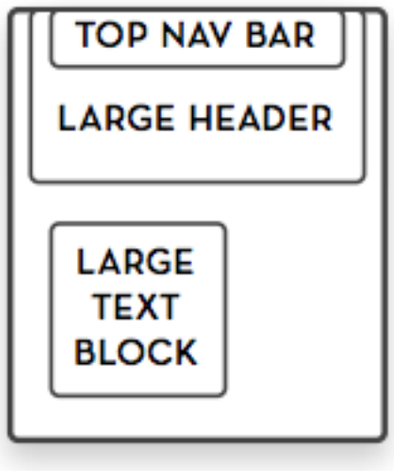


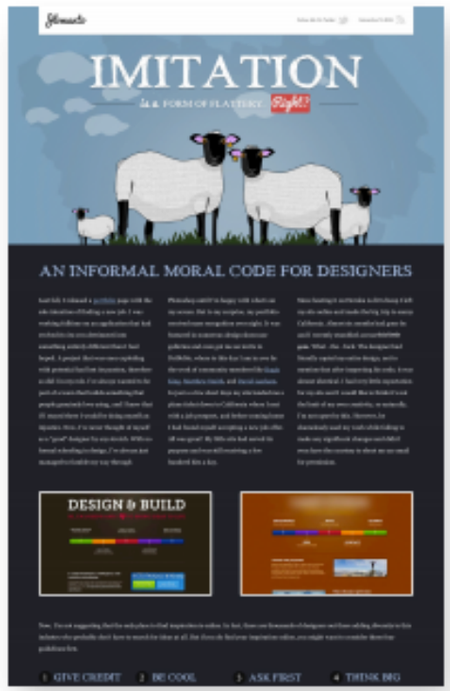






Example: Header with text blocks layout



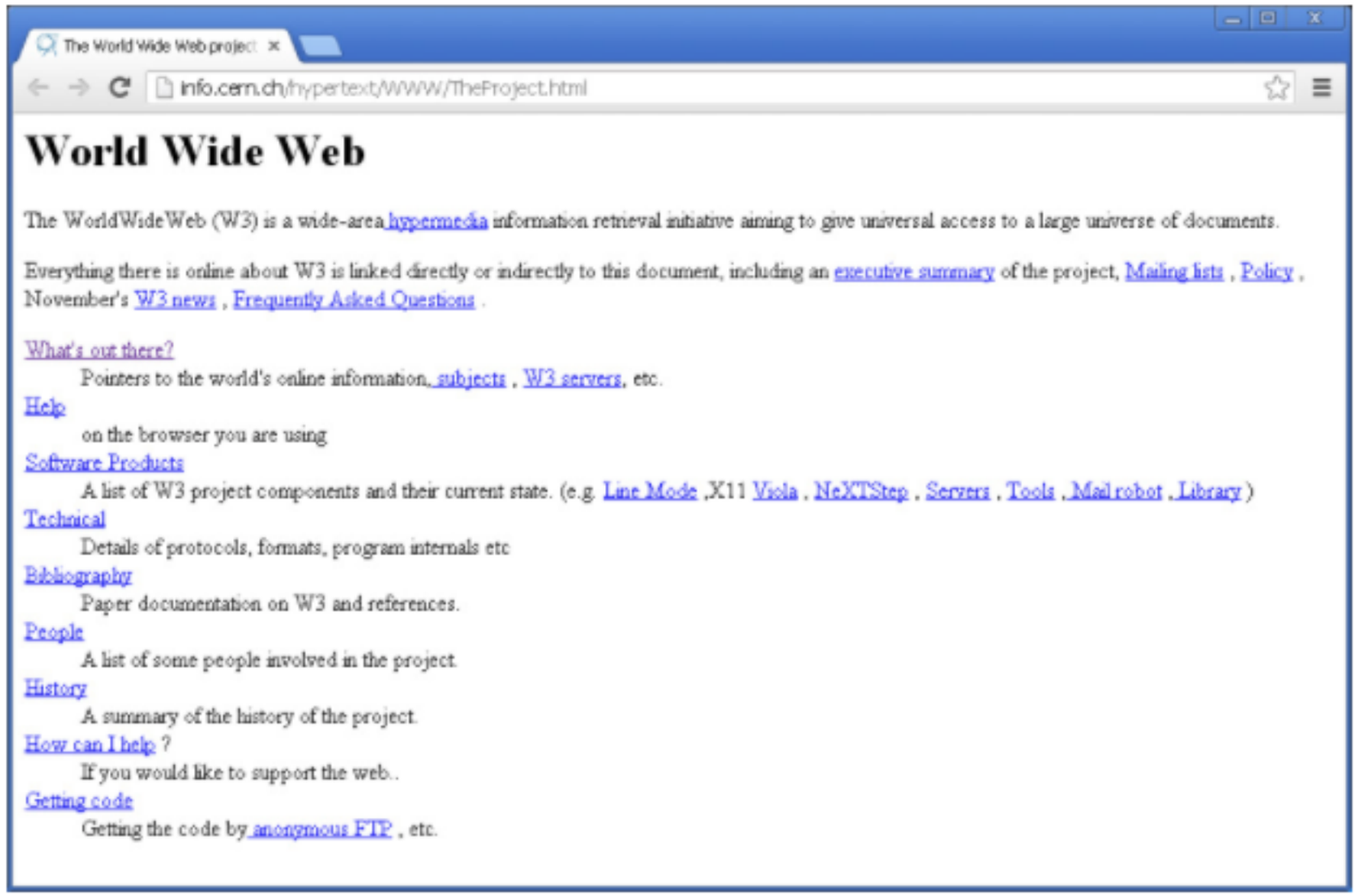


http://ranjithakumar.net/resources/webzeitgeist.pdf

Position encodes meaning and function

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

Web design languages over time



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

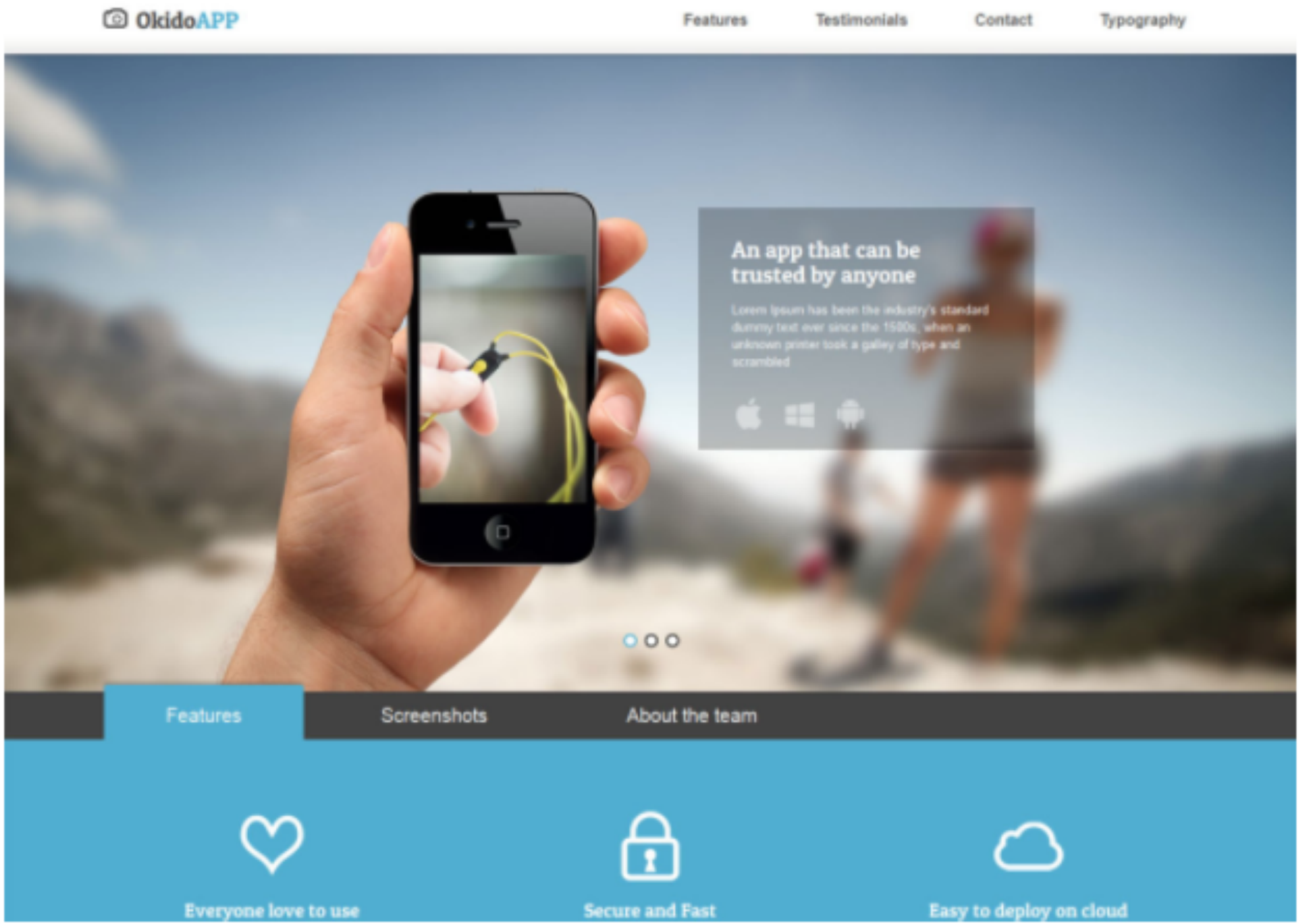
Web design languages over time

Web design languages over time

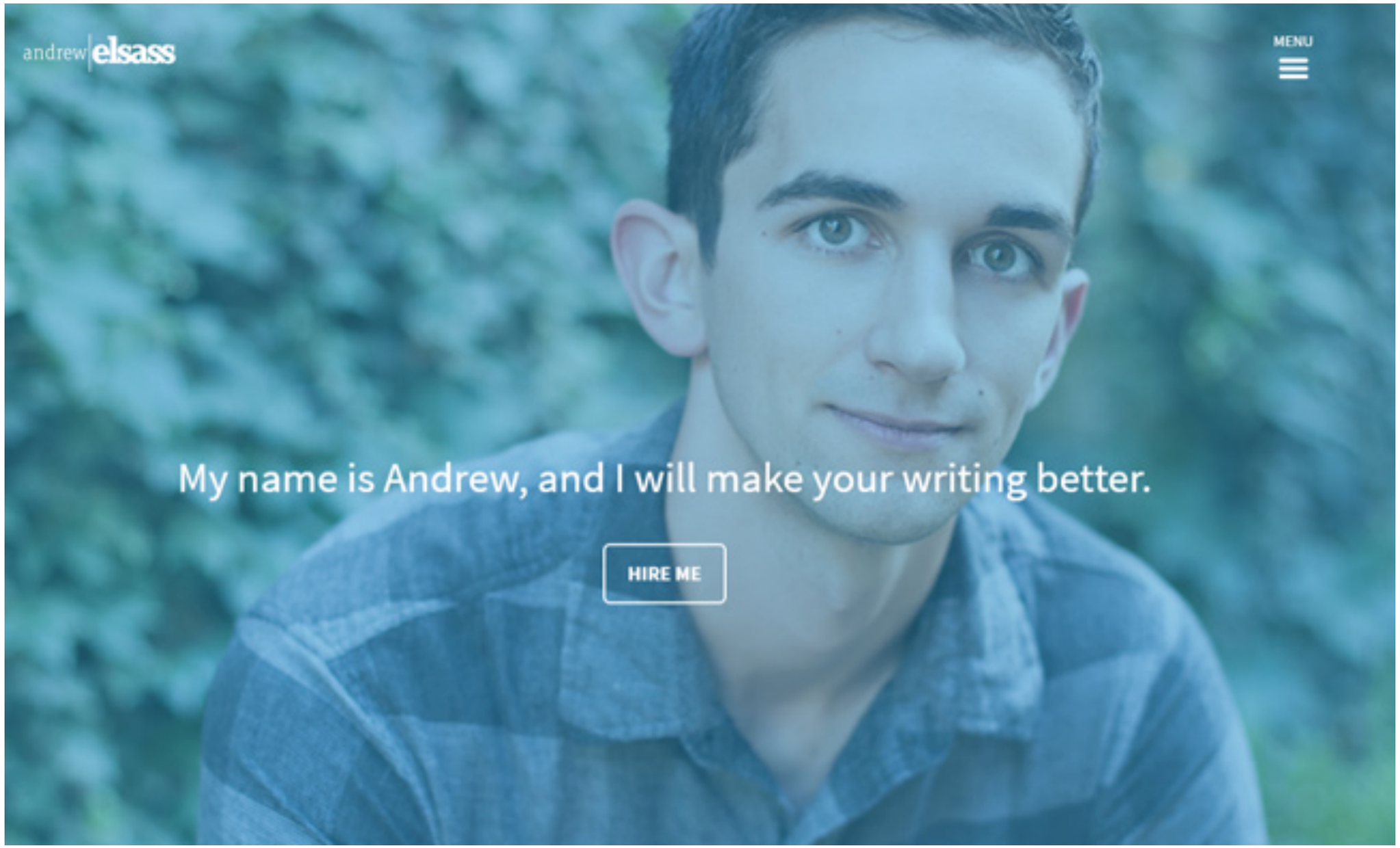
Web design languages over time

Web design languages over time

Web design languages over time

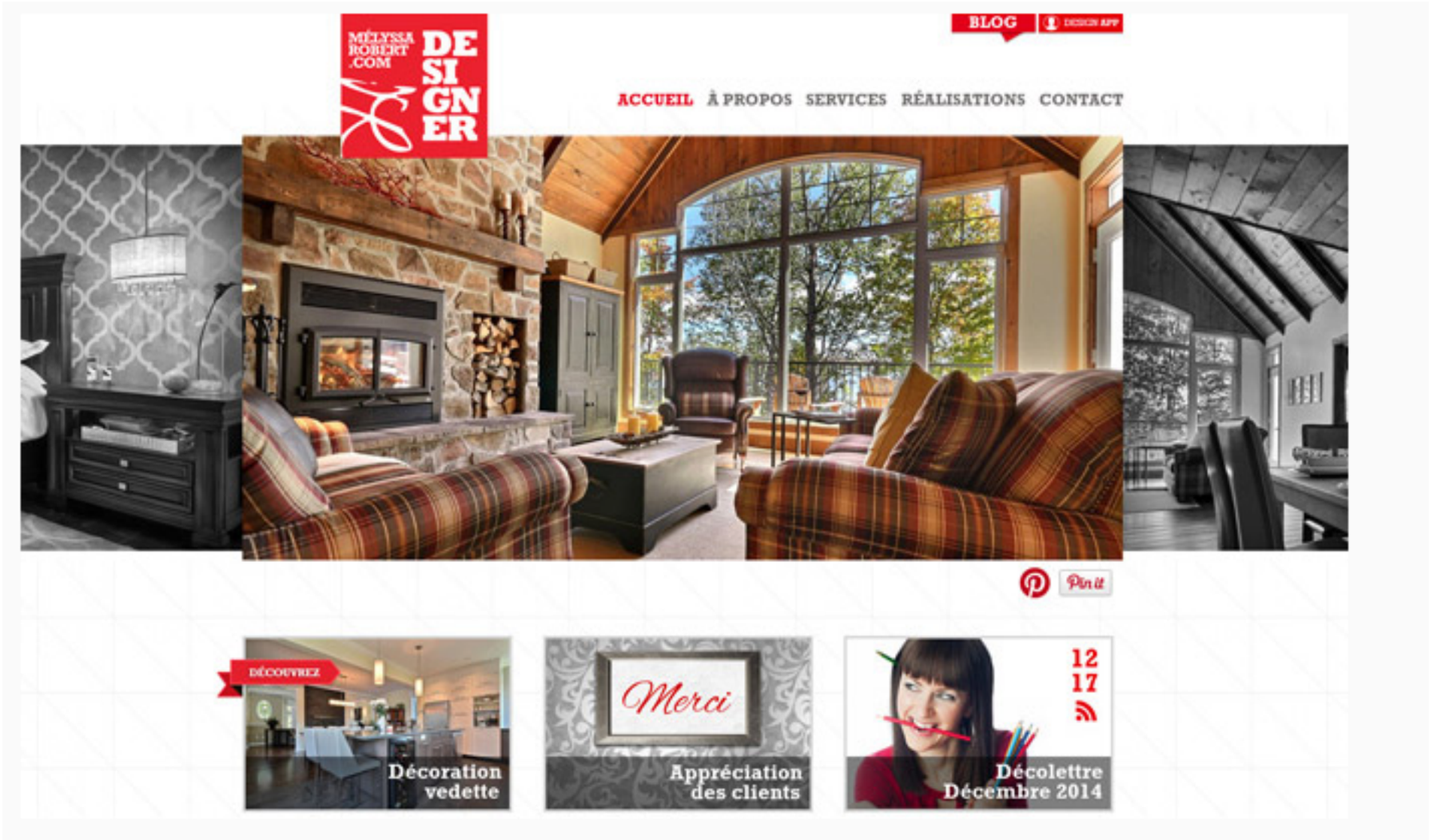


Common visual idioms, circa 2016



- Hero images: large attractive header image
- https://envato.com/blog/exploring-hero-image-trend-web-design/

Common visual idioms, circa 2016

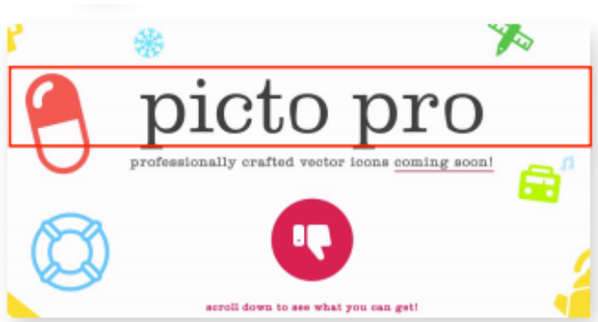


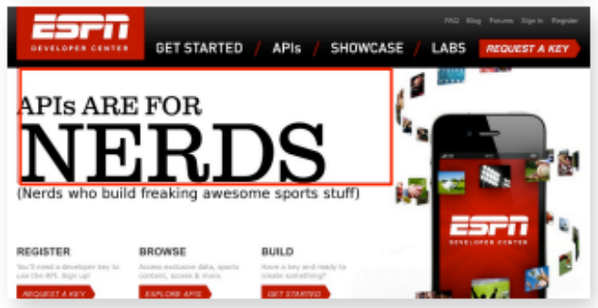
- Rotating image galleries (carousels)
- https://envato.com/blog/exploring-hero-image-trend-web-design/

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 two or three:
  - Design a design language.
  - Identify key design language elements.
- For each element you identify
  - What differentiates it?
  - What does it mean?
  - In what situations can it be used?