

# Visual Design and Fluid Navigation

Human Computer Interaction

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Academic Year 2023/2024

# Hall of Fame or Shame?



# Visual Design

Aesthetics for helping users in understanding and navigating the UI

# Visual Design

- **Guiding:** conveying structure, relative importance, relationships
- **Pacing:** drawing people into your app, orienting them, and showing where to go, providing hooks to dive deeper
- **Messaging:** expressing meaning and style, breathing life into your content
- Both at the conscious and sub-conscious levels
- And also...
  - Making everything look aesthetically beautiful  
(but this is not the goal)

# Visual Design vs. Art and Artistic Skills

- A.k.a. «Help, I'm not an artist!»
- Artistic skills help a bit but are neither necessary nor sufficient
- Art does not need to be practical; design does
- Real design skills take years to master
- Widely-accepted heuristics are a good and easy start



# The Basics of Visual Design

Basic visual design involves text, layout, and colors. First let's start with text. Gracefully using whitespace helps separate out logical chunks of content. Next, font size and style differences convey hierarchy. Finally, alignment is crucial for helping readers scan quickly.

# Whitespace

Basic visual design involves text, layout, and colors. First let's start with text.

Gracefully using whitespace helps separate out logical chunks of content.

Next, font size and style differences convey hierarchy.

Finally, alignment is crucial for helping readers scan quickly.

# Hierarchy

Basic visual design involves ...

## **T**ext

Gracefully using whitespace helps separate out logical chunks of content.

Next, font size and style differences convey hierarchy.

Finally, alignment is crucial for helping readers scan quickly.

## **L**ayout

## **C**olors

# Alignment

BASIC VISUAL DESIGN

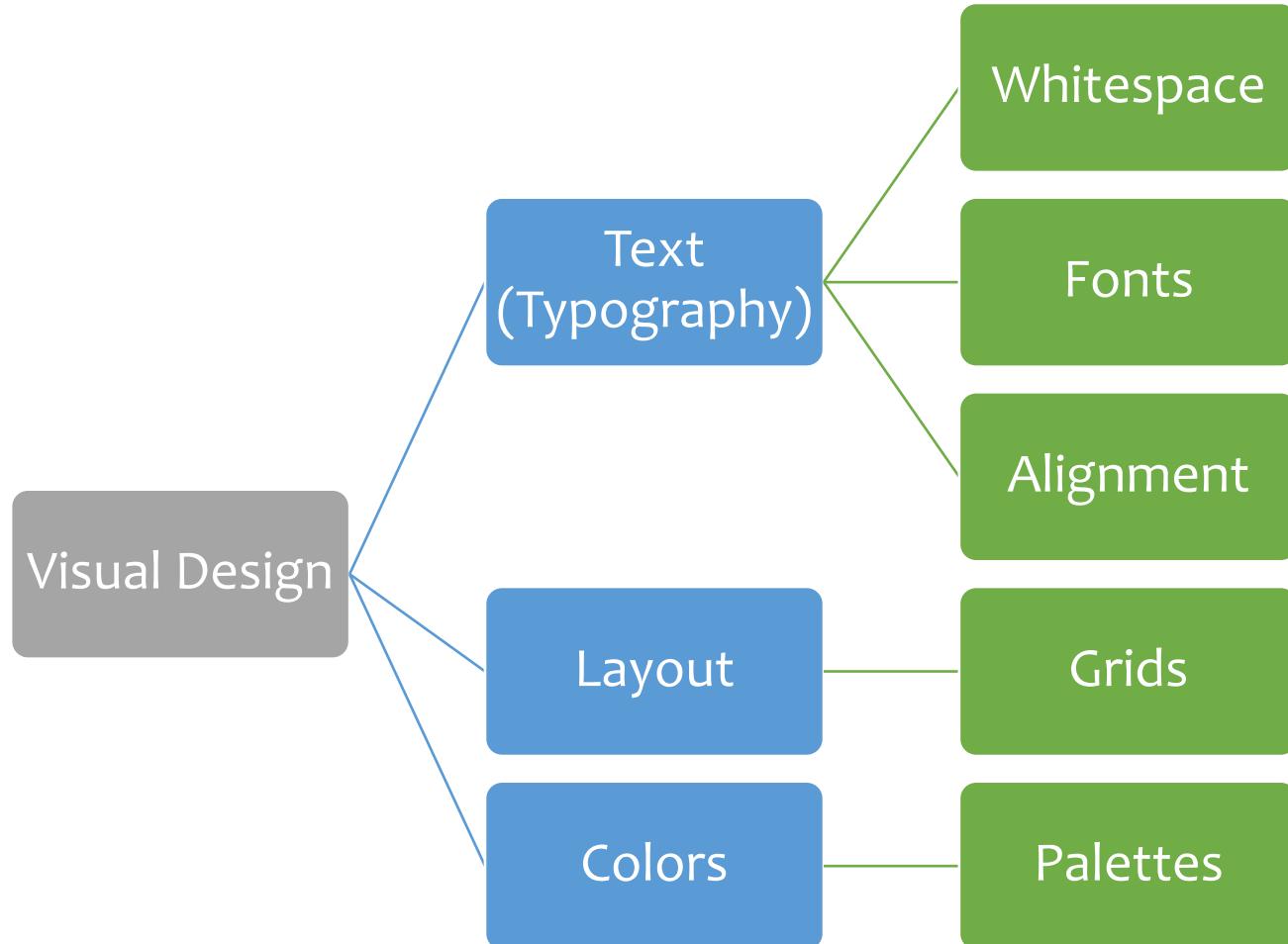
## Text

- **Whitespace**: helps separate out logical chunks of content
- **Font**: size and style differences convey hierarchy
- **Alignment**: crucial for helping readers scan quickly

## Layout

## Colors

# Key Ingredients



# Recognizable Page Structure



# Recognizable Page Structure

CNN World US Politics Business Health Entertainment Style Travel Sports Videos Edition ▾ 🔍

NEW PODCAST: Tug of war | COVID-19: Vaccination tracker | TRENDING: Elon Musk | Oldest surviving Miss America dies | SpaceX toilet problem | Queen |

## Brazil has big green plans. But its track record is dismal



The Brazilian government is bringing ambitious promises to the UN climate summit, but can it be believed?

Queen Elizabeth II tells world leaders at COP26 there's 'room for hope' on climate

Biden apologizes to world leaders for Trump's climate actions

How the 'Venice of Africa' is impacted by climate change

**DEVELOPING STORY**

### 22-story building collapses in Lagos, Nigeria



'Let's go Brandon,' explained

Two conservative justices seem open to arguments from abortion providers

Barclays CEO quits after investigation into links with Jeffrey Epstein

Missile attack on mosque and religious school kills and injures 29 Yemeni civilians

At least 12 people killed and 52 injured in Halloween weekend mass shootings in US

Reporter reveals what Lindsey Graham said during January 6 riot

Analysis: Trump escalates Jan. 6 cover-up

Tigrayan forces accused of killing 100 youths

**ANALYSIS**

**Manchin issues warning to Democrats on Biden's economic package**

Analysis: Tim Scott confirms he's on the Trump 2024 train

**News and buzz**

### Elon Musk offers to sell Tesla stock 'right now' if UN can show how \$6 billion would

**Featured**



UNIVERSAL HISTORY ARCHIVE/GETTY IMAGES

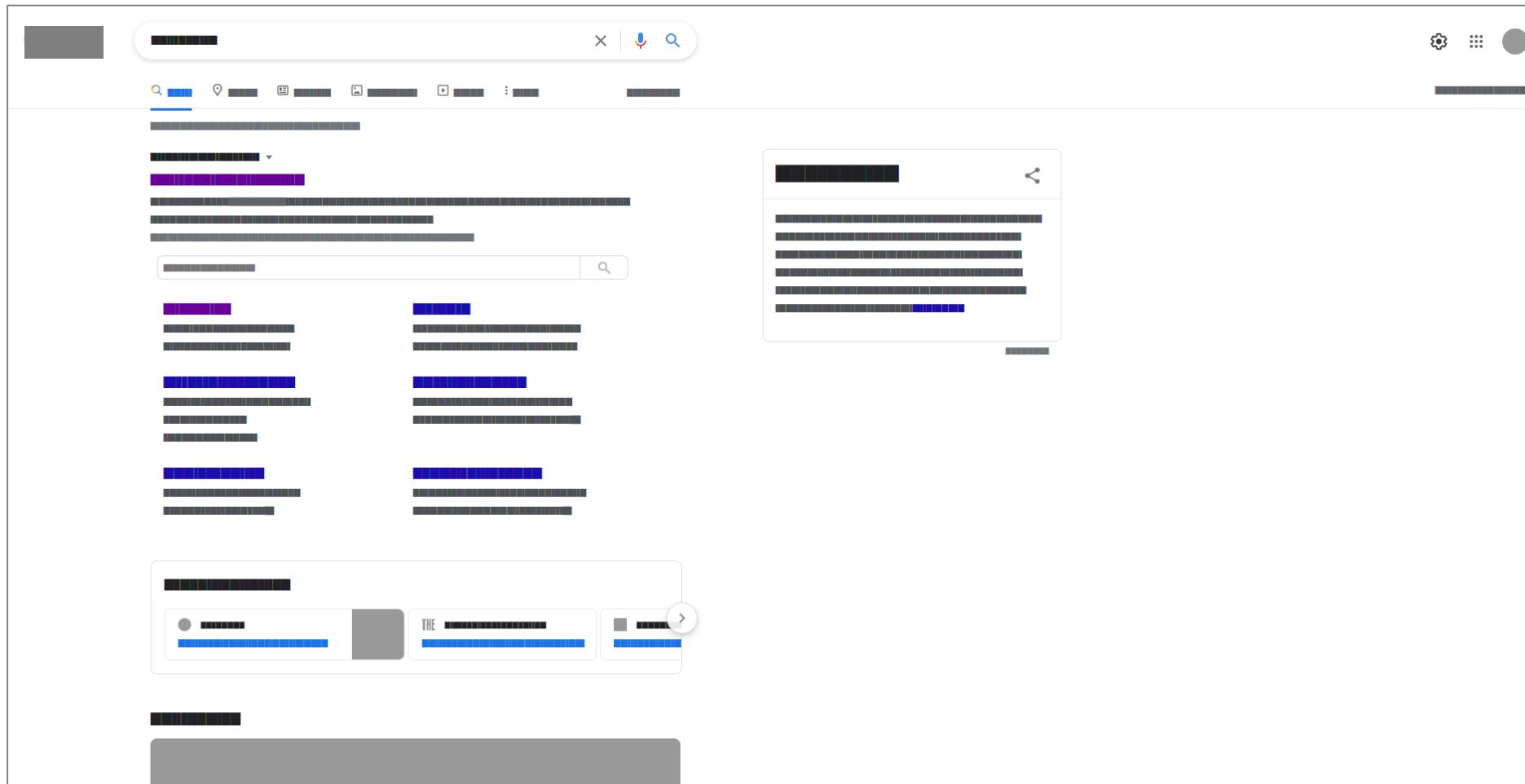
**Spotlight**

Man scheduled to be executed for murder he says he didn't commit seeks clemency

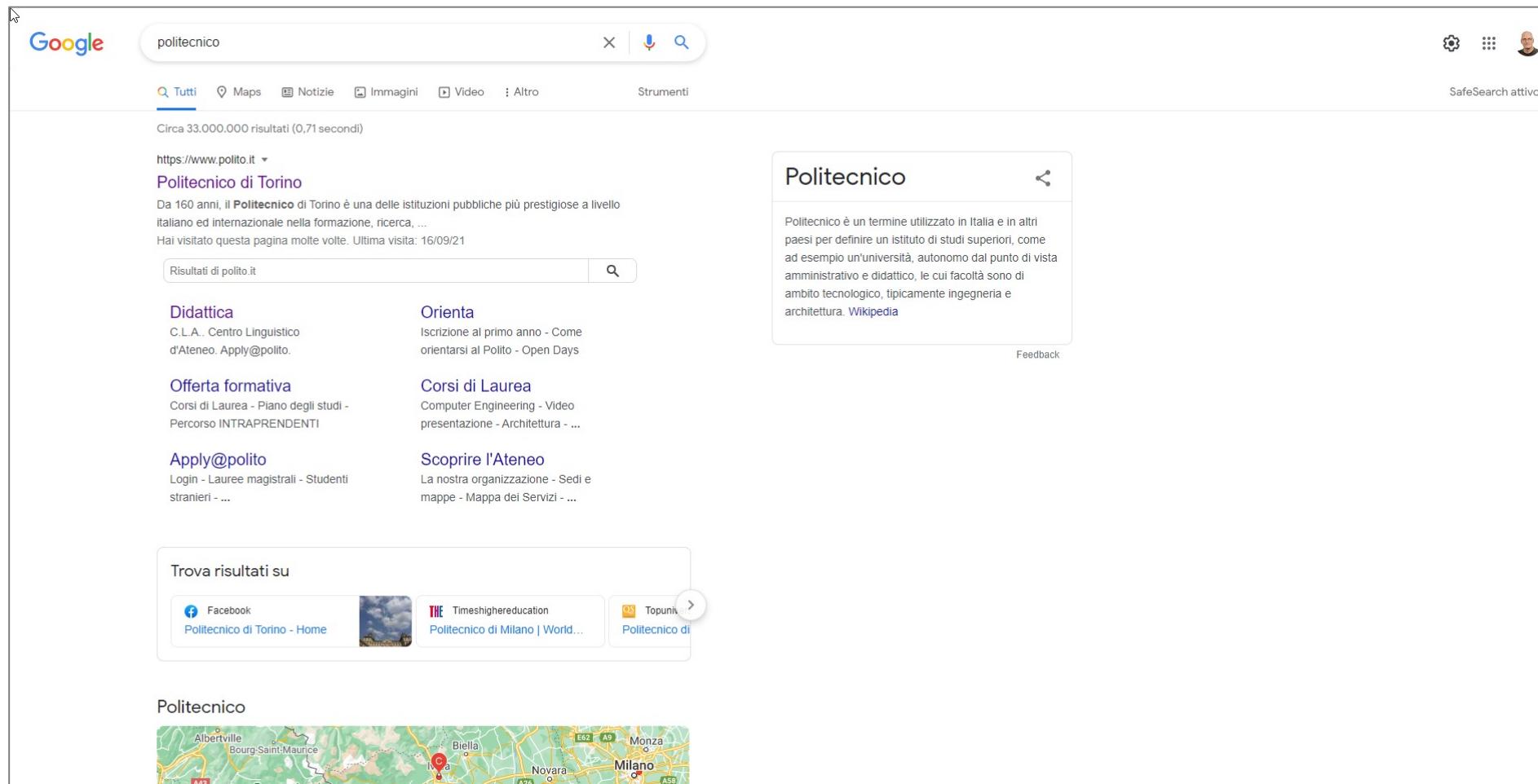
Could Covid-19 vaccines impair a child's future fertility? Officials say no.

Kal Penn, 'Harold and Kumar' and 'House' star, comes out as gay

# Recognizable Page Structure



# Recognizable Page Structure



# Recognizable Page Structure



# Recognizable Page Structure

The screenshot shows the homepage of Stack Overflow. The left sidebar includes links for Home, PUBLIC Questions (selected), Tags, Users, COLLECTIVES, Explore Collectives, FIND A JOB, Jobs, Companies, and TEAMS. The main content area displays a list of 'All Questions' with 21,855,928 entries. Each question card includes the title, a brief description, the number of votes and answers, tags, and the user who asked it. To the right of the main content are several sidebar panels: 'The Overflow Blog' (with posts like 'Podcast 388: Software for your second brain' and 'Why SOLID principles are still the foundation for modern software architecture'), 'Featured on Meta' (with posts like 'Now live: A fully responsive profile' and 'Please welcome Valued Associates #999 - Bella Blue & #1001 - Salmon of Wisdom'), 'Collectives' (listing 'Go Language' with 13k members, 'Google Cloud' with 11k members, and 'GitLab' with 3k members), and 'Related Tags' (listing 'javascript' (2290823), 'python' (1824472), 'java' (1808306), and 'sql' (1524673)).

# Recognizable Page Structure



# Recognizable Page Structure

The screenshot shows the Tripadvisor website interface for searching hotels in New York City. At the top, there's a navigation bar with links for "New York City", "Hotel", "Cose da fare", "Ristoranti", "Voli", "Case vacanza", "Pacchetti vacanza", "Crociere", "Autonoleggio", and a "Scrivi una recensione" button. Below the navigation is a map of New York City with a "Guarda la mappa" button. The main title is "Hotel New York City e alloggi". There are input fields for "Arrivo" (Arrival) and "Partenza" (Departure), and a guest selection field showing "Ospiti 1 camera, 2 adulti, 0 bambini". On the left, there are filters for "COVID-19" (checkbox for "Strutture che adottano misure di sicurezza"), "Offerte" (checkboxes for "Cancellazione gratuita", "Prenota ora, paga quando soggiorni", and "Strutture con Offerte Speciali"), "Prezzo" (a range slider from 0 € to 623 € and a dropdown for "Prezzo + tasse e spese"), and "Molto richiesti" (checkboxes for "Colazione inclusa" and "5 stelle"). The main content area shows a list of 911 structures in New York City, ordered by "Qualità-prezzo". The first result is "Fairfield Inn & Suites" with a price of 161 €. A detailed view of this hotel is shown on the right, featuring a large image of the building, a "Vedi l'offerta" button, and a summary of its features: "Colazione inclusa", "Sponsorizzato", "Fairfield Inn & Suites New York Midtown Manhattan/Penn Station", "Info sull'hotel", "1.865 recensioni", and a list of amenities including "Cancellazione gratuita", "Prenota ora, paga quando soggiorni", "Visita il sito dell'hotel", "00 1212-563-0900", "Offerta Speciale", "Connessione Wi-Fi gratuita", "Bar/Lounge", "Centro fitness", and "Misure di sicurezza adottate".

# Recognizable Page Structure

TBS Newsi Tokyo Broadcasting System, News Portal Site

リアルタイム経営こそ、IT戦略 FUTURE<sup>®</sup> Architect  
経営とITをデザインする、フューチャーアーキテクト。

News10 アラフト元議長の骨からゾロニウム検出。暗黙の可能性高まる 11/07 04:20 RSS/RDF配信 文字サイズ 中 大

社会 政治 経済 國際 スポーツ 列島 天気 連続動画 報道コラム ニュース検索 検索

注目キーワード 【メニュー表示問題】[みずほ暴力团説立]原発[米盗難疑惑]

最終更新:2013年11月7日(木) 04時34分

NEW「三越伊勢丹」も不適切表示、他の百貨店にも拡大

ステップワゴン スズメ! 家族の冒険プロジェクト  
ニッポン 家族冒険スポット  
総選挙!  
ドンドン投票してね!  
HONDA

TBSニュース番組ダイジェスト配信  
TBSニュースパート NEWS 23  
NRB NNN

台風情報  
Smart News  
地震情報  
福島第一原発情報カメラ

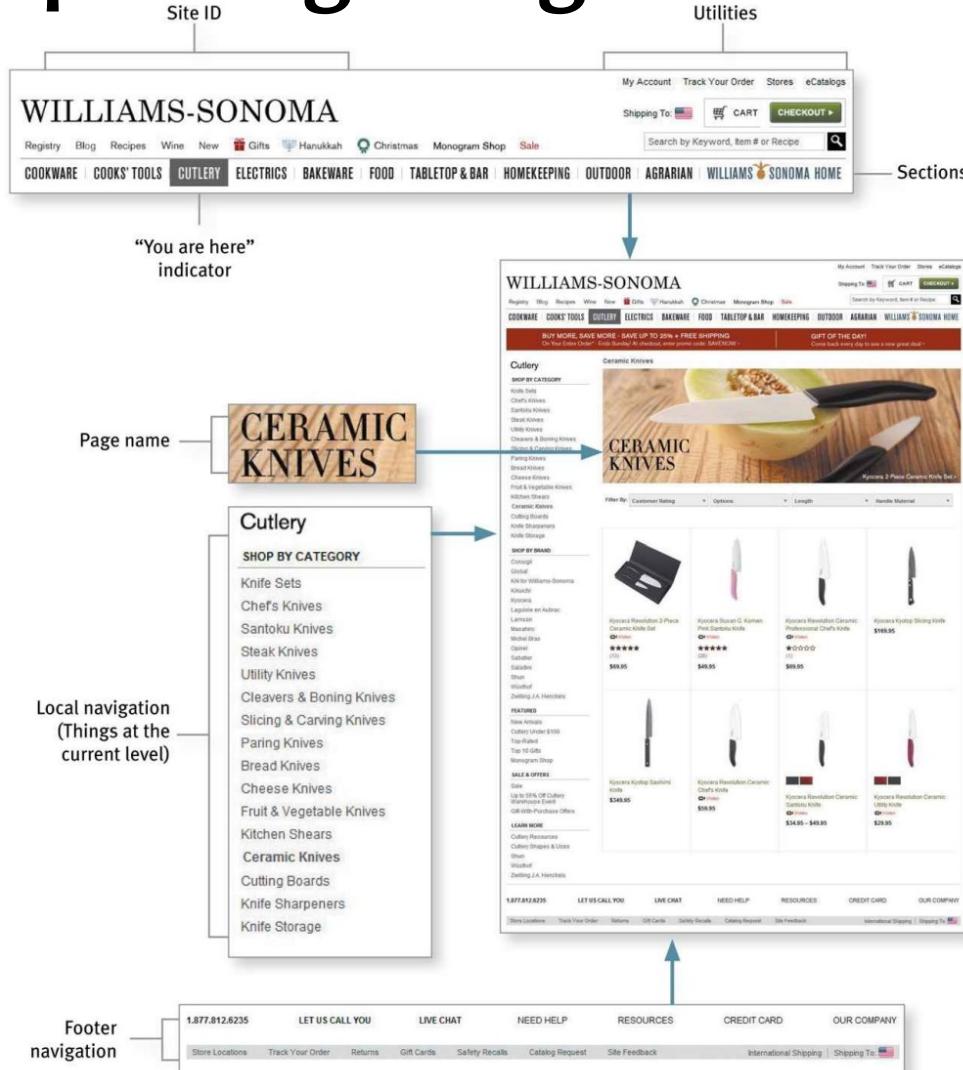
NEW 日本人初の船長・若田さん、きょう宇宙へ  
NEW 「特定秘密保護法案」きょうから国会審議  
NEW 豚木議員、金正恩氏の従兄人・張成沢氏と会談  
NEW 山西省連続爆発事件、共産党本部狙った計画的犯行か

社会 政治 経済

■ 来ネット販売、23品目“3年間安全調査後”解禁へ  
■ 福島第一原発4号機を公開、燃料取り出しへ高いハードル  
■ 「もんじゅ」で核物質管理に不備、原子力機関に厳重注意  
■ 温室効果ガスの平均濃度、過去最高値記録  
■ カルガモから鳥インフル、北海道で今シーズン初  
■ 一軒 食材偽装を認める、「三笠」運営会社の社長辞任へ  
■ 安曇楽牧場「和牛丼」法、闇漁会社などを提訴へ  
■ 表示適正化方策、消費者庁が業界3団体に要請文  
■ 「崖」など芸能人の偽サイン板売、容疑の親子らを3人逮捕  
■ 大阪・川に少年突き落とし、遺体は下着姿  
■ 歌舞伎町のホスト変死、何者かが暴行か  
■ 小学校の4階から小6男児転落、意識不明の重体

関連リンク ニュース | TBS25 | 最速判決 | リクナビnet | 時事新報 | 新選組 | ニュースカード | グローバルナビ | フロント | ビジネスクリック  
TOPページ | TBS報道番組一覧 | JNN各局

# Conventions Help Recognizing Structure



# **‘Gestalt’ principles**

Hints from the psychology of Shapes and of Representation

# Gestalt principles

- Laws from 1920s' psychology: how humans typically see objects by grouping similar elements, recognizing patterns and simplifying complex images
- Designers use these to engage users via powerful -yet natural- “tricks” of perspective and best practice design standards
- “*The whole is other than the sum of the parts*” - Kurt Koffka



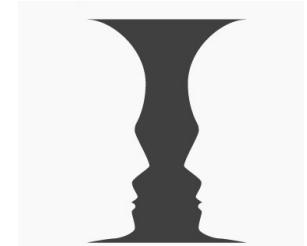
<https://www.interaction-design.org/literature/topics/gestalt-principles>

<https://www.usertesting.com/blog/gestalt-principles/>

# Some Gestalt Principles

- **Figure/Ground:** Disliking uncertainty, we look for solid, stable items. Foreground catches the eye first
- **Closure:** Preferring complete shapes, we automatically fill in gaps to perceive a complete image; we see the whole first
- **Common Region:** We group elements that are in the same closed region
- **Element Connectedness:** We group elements linked by other elements
- **Continuation:** We follow and “flow with” lines
- **Proximity (Emergence):** We group closer-together elements, separating them from those farther apart.
- **Good Form:** We differentiate elements that are similar in color, form, pattern, etc. and cluster them together
- **Meaningfulness (Familiarity):** We group elements if they form a meaningful or personally relevant image.
- **Prägnanz:** We perceive complex images as simple ones.
- **Convexity:** We perceive convex shapes ahead of concave ones
- **Regularity:** Sorting items, we tend to group some into larger shapes, and connect elements that form a pattern.
- **Similarity (Invariance):** We seek differences and similarities in an image and link similar elements.
- **Symmetry:** We seek balance and order in designs, struggling to do so if they aren’t readily apparent.
- **Common Fate:** We group elements that move in the same direction
- **Synchrony:** We group static visual elements that appear at the same time.

# Examples: Figure-ground



Basecamp 3

Version 3 is all new for 2016!

Working with other people? Struggling to keep everyone on the same page?

DID WE GET THAT DONE YET?  
WHEN IS THIS DUE?  
NO ONE TOLD ME THAT!  
WAIT, WHO MADE THAT DECISION?  
WHERE DO I PUT THAT?  
WHO SENT THIS TO THE CLIENT?  
THIS IS EXHAUSTING!

Sign up now for free below  
Just last week, 10,772 companies got started with Basecamp 3!  
Sign up using Google  
Or, sign up with your email  
Your Name: Julie Appleseed  
Your Email: julie@widgetco.com  
Company/Organization: Widget, Co.

SYNDICATES STARTUPS FUNDS STARTUP JOBS RECRUITING MORE ▾

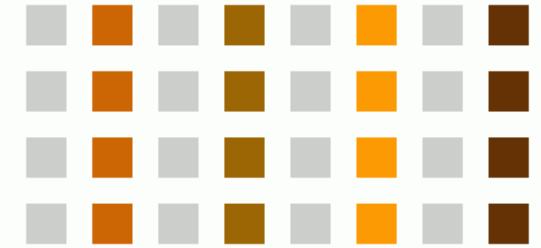
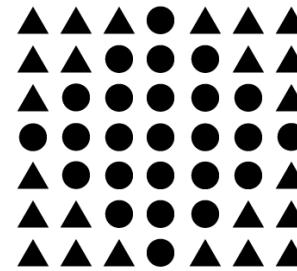
SEARCH Join Log In

Find a Startup Job Post a Job Raise Money Online Invest in Startups

# AngelList

Where the world meets startups

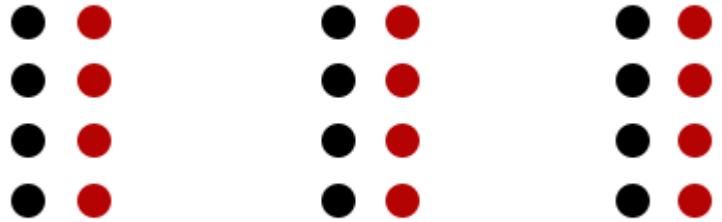
# Examples: Similarity



The GitHub sign-up page features a dark background with various software-related icons. At the top, there's a search bar and navigation links for Explore, Features, Enterprise, Pricing, Sign up (highlighted in green), and Sign in. Below the header, a large heading says "Where software is built" with the subtext: "Powerful collaboration, code review, and code management for open source and private projects. Public projects are always free. Private plans start at \$7/mo." A "Sign up for GitHub" button is prominently displayed. To the right, there are fields for "Pick a username", "Your email", and "Create a password", along with a note about character requirements. A small terms of service link is also present. At the bottom, a blue banner asks "Want to use GitHub on your servers?"

The LA STAMPA news website has a light-colored header with the logo "LA STAMPA" and links for GNN, NEWSLETTER, and social media. Below the header, a navigation bar includes MENU, LEGGI IL QUOTIDIANO, TOP NEWS, TUTTOLIBRI, and a search icon. The main content area shows several news articles with images and titles. One article features a video thumbnail of a man speaking. Another article discusses ArcelorMittal's departure from Taranto. There are also sections for "Intervista - Calenda", "Il surriscaldamento climatico", and "SECONDO NOI". The footer contains a decorative graphic of colored squares.

# Examples: Proximity



Save big in every department

- Electronics
- Home
- Exercise & Fitness
- Health
- Clothing & Jewelry
- Furniture
- Cold Weather Prep
- Tax Preparation
- Auto & Tires
- Office Supplies
- Home Improvement
- Outdoor Sports
- Baby

VICE

WATCH SECTIONS PHOTOS MAGAZINE TOPICS: CITY GUIDES ELECTION 2016 OPINION MORE NEWS

Feb 24, 2016 NEWS **Medical Marijuana Users in Canada Can Legally Grow Their Own Weed Now** Manisha Krishnan

Feb 24, 2016 NEWS **The Women Who Love Ted Cruz** Joah Androsky

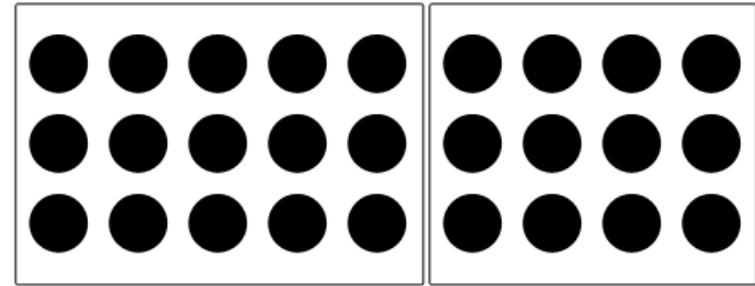
Feb 24, 2016 NEWS **How Donald Trump Won Nevada's Cliven Bundy Vote** Grace Wyler

Feb 24, 2016 STUFF **MOTHERBOARD**



<https://www.usertesting.com/blog/gestalt-principles/>

# Examples: Common Region



P architecture

Grotto Sauna by Parisa, Toronto  
[Future Architecture; futuristicnews.co...]  
86 409 183 53

Maple  
handmade real wood macbook skin covers shipping worldwide from usa  
fb 316 189 85

Promoted by artis goods

Von Plataforma Arquitectura  
Namai Spa / MIA Design Studio  
Me encanta la idea de jardín de este Spa. Parece que las plantas fueran.  
139 35

Ayelen Cayarga  
promenade

Fontanny w ogrodzie - wedne inspiracje  
Pinterest: XYeazySIX #architecture #design #projects #Mundo das Casas www.mundodascasas...  
fb 1113 193 86

Sophie Crouch  
architecture

Houzz Yesterday at 5:30am ·

11 Things You Didn't Think You Could Fit Into a Small Bedroom  
<http://bit.ly/21k8Nvl>

11 Things You Didn't Think You Could Fit Into a Small Bedroom

Clever designers have found ways to fit storage, murals and even chandeliers into these tight sleeping spaces

WWW.HOUZZ.COM

Like Comment Share

157 Top Comments ▾

33 shares

Write a comment...

Frankie Sez Really great ideas for the 'minimalist' in some of us...  
Like · Reply · 1 Like · Yesterday at 5:42am

Country Mountain Homes Space for books is a must!  
Like · Reply · Yesterday at 10:07am

View 2 more comments



# Examples: Continuity

Customers Who Bought This Item Also Bought

The screenshot shows a horizontal scrollable list of five books. Each book entry includes the title, author, a small thumbnail image, a brief description, and purchase links.

- CROSSING THE CHASM** by Geoffrey A. Moore
- THE LEAN STARTUP** by Eric Ries
- THE INNOVATOR'S DILEMMA** by Clayton M. Christensen
- THE INNOVATOR'S SOLUTION** by Clayton M. Christensen
- HOW WILL YOU MEASURE YOUR LIFE?** by Clayton M. Christensen

Each book entry includes a star rating, number of reviews, and price. Navigation arrows are visible at the top and bottom of the list.

Page 1 of 20



## Step 1

Choose your meals, drinks and treats from our daily rotating menu.



## Step 2

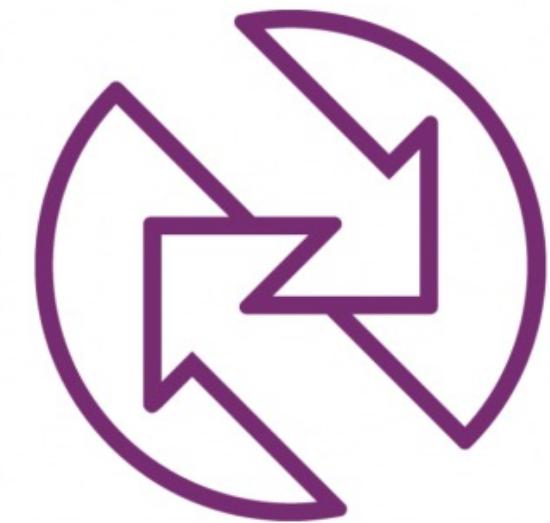
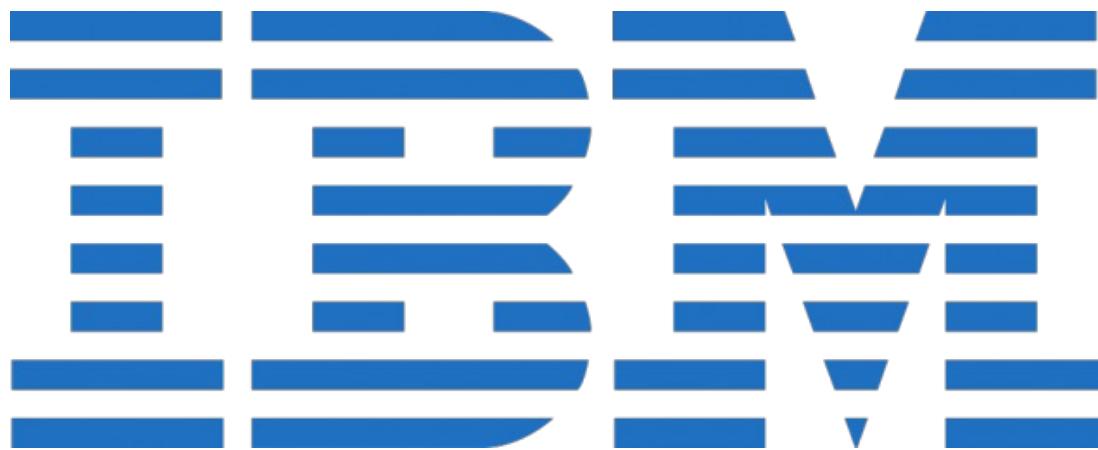
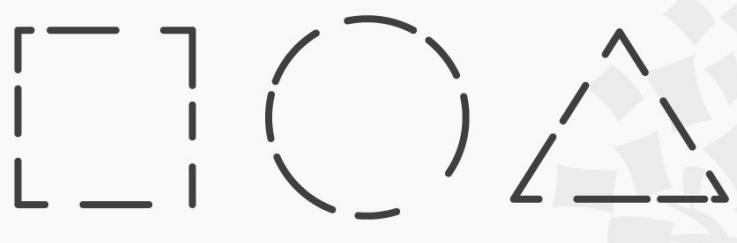
Our friendly servers organize your food for delivery - hot and ready to eat!



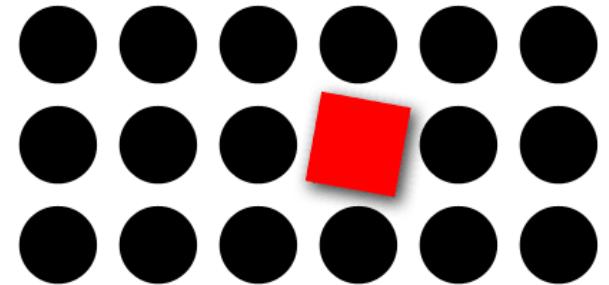
## Step 3

Your meal arrives in around 20 minutes - like a home-cooked meal without the effort!

## Examples: Closure



# Examples: Focal Point



The Twilio website homepage features a dark background image of a crowded street. At the top, the Twilio logo is on the left, followed by navigation links: PRODUCTS & PRICING, USE CASES, API & DOCS, NOT A DEVELOPER?, SIGN UP, and LOG IN. Below the navigation, the main headline reads "BUILD APPS THAT COMMUNICATE WITH EVERYONE IN THE WORLD". A sub-headline below it says "A Messaging, Voice, Video and Authentication API for every application". Two prominent buttons at the bottom are "See Use Cases" and "Get a free API key".

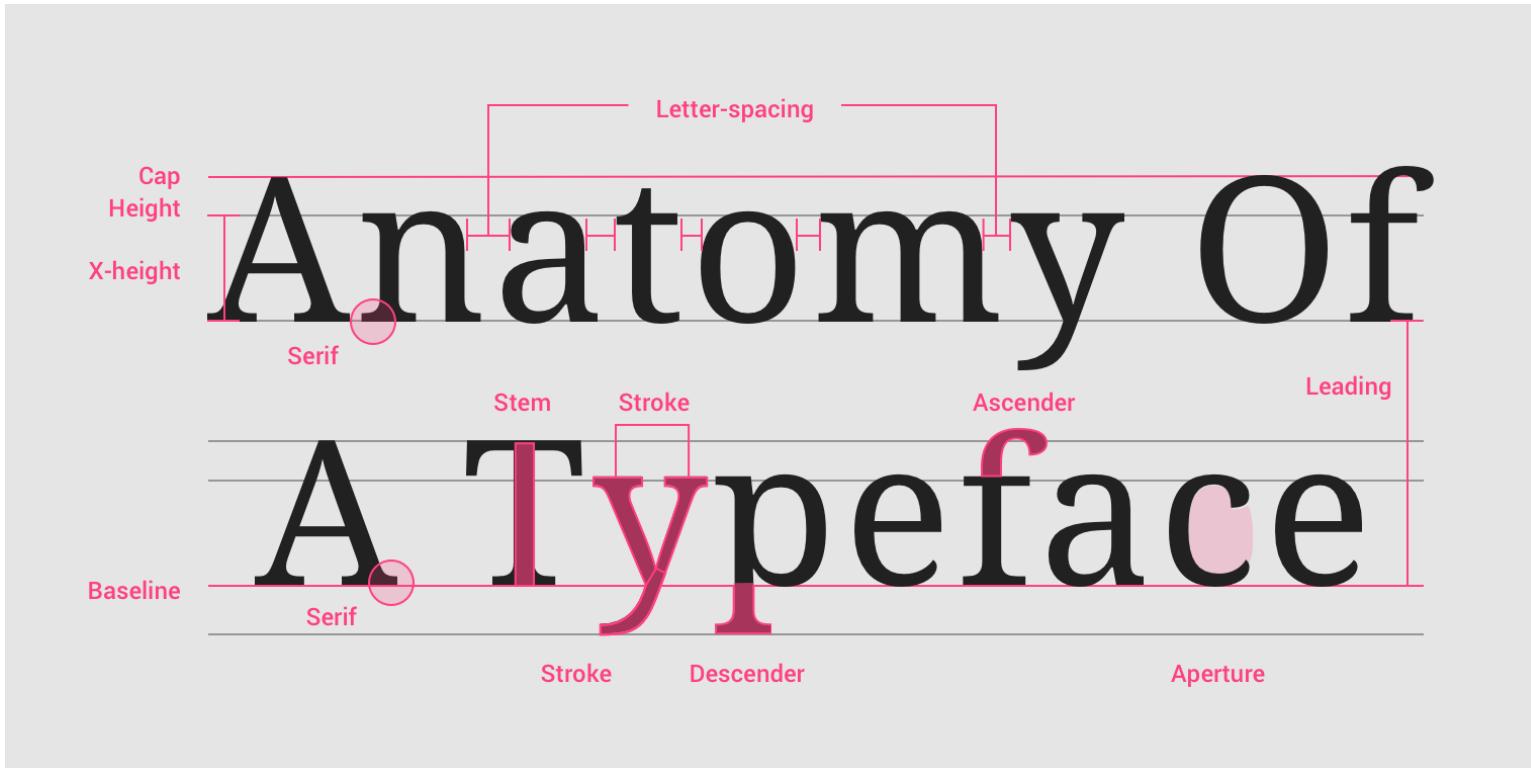
The Instacart website homepage is overlaid on a photograph of a person holding a brown paper grocery bag filled with various items like a sandwich, chips, and vegetables. The Instacart logo is at the top of the overlay. Below it, the text "Groceries delivered in 1 hour" and "Enter your zip code to see your local stores" is displayed, along with a "Find Stores" button. At the bottom of the overlay, there is a note about free delivery: "FREE delivery on your first order\*".

# Typography

Property of text

# Characteristics of Text

- Point Size
- Leading
- Cap Height, x-height
- Ascenders, Descenders
- Weight
- Serifs



<https://material.io/design/typography/understanding-typography.html>

# Example: Material Design Type Scale

A combination of 13 styles that are supported by the type system

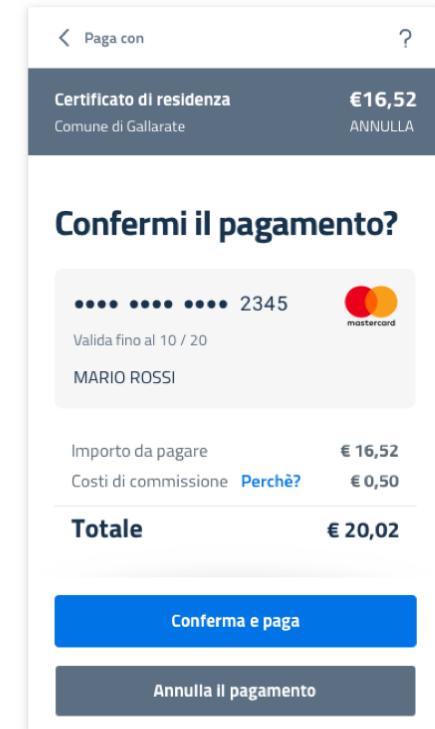
Reusable categories of text, each with an intended application and meaning

Scale Category	Typeface	Font	Size	Case	Letter spacing
H1	Roboto	Light	96	Sentence	-1.5
H2	Roboto	Light	60	Sentence	-0.5
H3	Roboto	Regular	48	Sentence	0
H4	Roboto	Regular	34	Sentence	0.25
H5	Roboto	Regular	24	Sentence	0
H6	Roboto	Medium	20	Sentence	0.15
Subtitle 1	Roboto	Regular	16	Sentence	0.15
Subtitle 2	Roboto	Medium	14	Sentence	0.1
Body 1	Roboto	Regular	16	Sentence	0.5
Body 2	Roboto	Regular	14	Sentence	0.25
BUTTON	Roboto	Medium	14	All caps	1.25
Caption	Roboto	Regular	12	Sentence	0.4
OVERLINE	Roboto	Regular	10	All caps	1.5

<https://material.io/design/typography/the-type-system.html#type-scale>

# Text

- Font size, color and spacing define a hierarchy of visibility and attention
- The visual hierarchy should match the relative importance of the information content



<https://docs.italia.it/italia/designers-italia/design-linee-guida-docs/it/stabile/doc/user-interface/il-disegno-di-un-interfaccia-e-lo-ui-kit.html>

# Text and Layout Convey Meaning

Building Type:	Detached House
Year Of Construction:	2012
Listing Price:	\$750,000
Address:	742 Evergreen Terrace
Bedrooms:	3
Bathrooms:	2
Real Estate Agent:	Tiffany Heffner
Contact:	(555) 555-4321

DETACHED HOUSE • 5Y OLD  
\$750,000  
742 Evergreen Terrace

REALTOR  
 Tiffany Heffner  
(555) 555-4321

3 Bedrooms      2 Bathrooms

- Present data in a more useful way
- Emphasize the most important content
- Combine labels and values into human-readable phrases

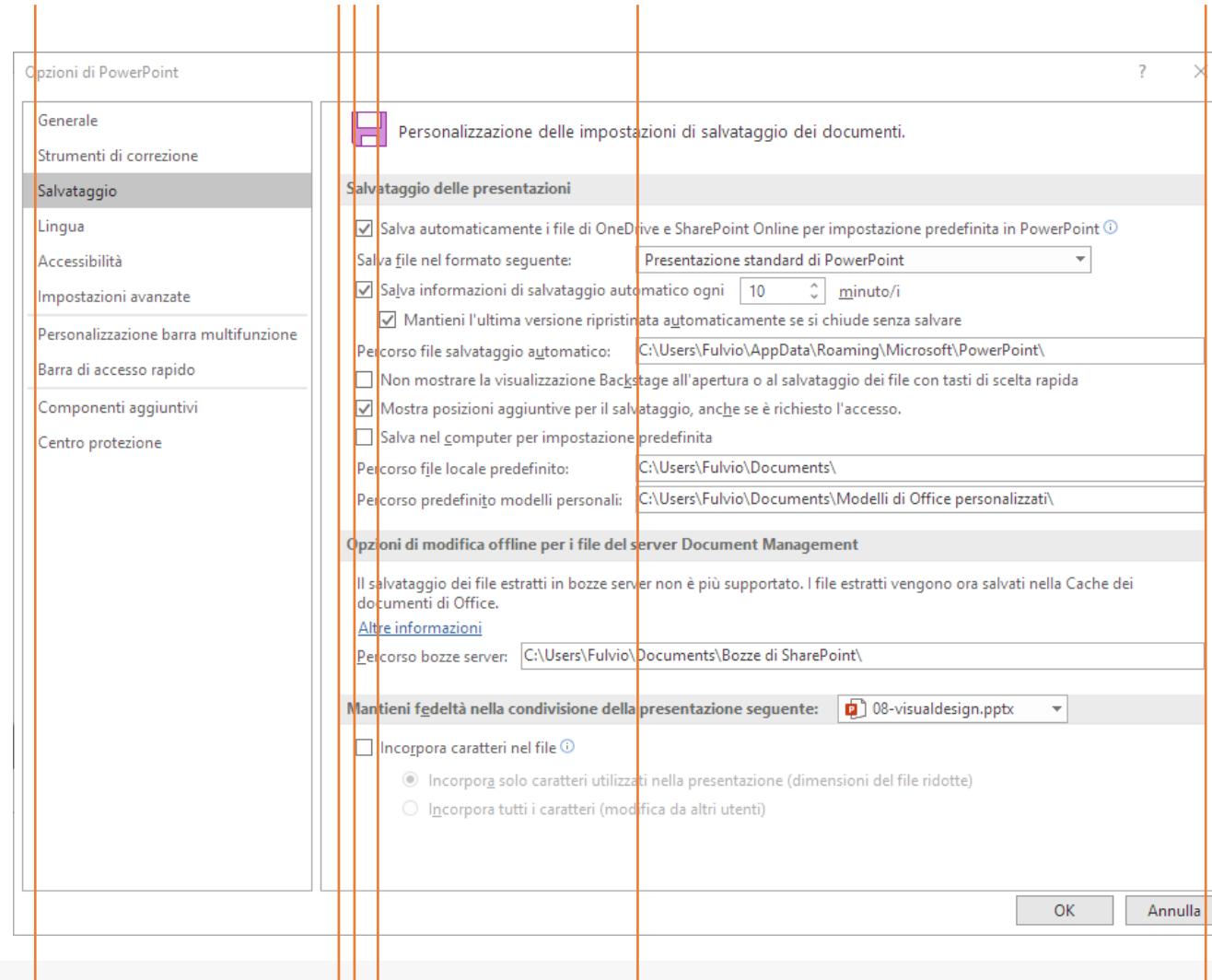
# Grids and Alignment

Exploiting grouping and alignment to convey content, at different levels

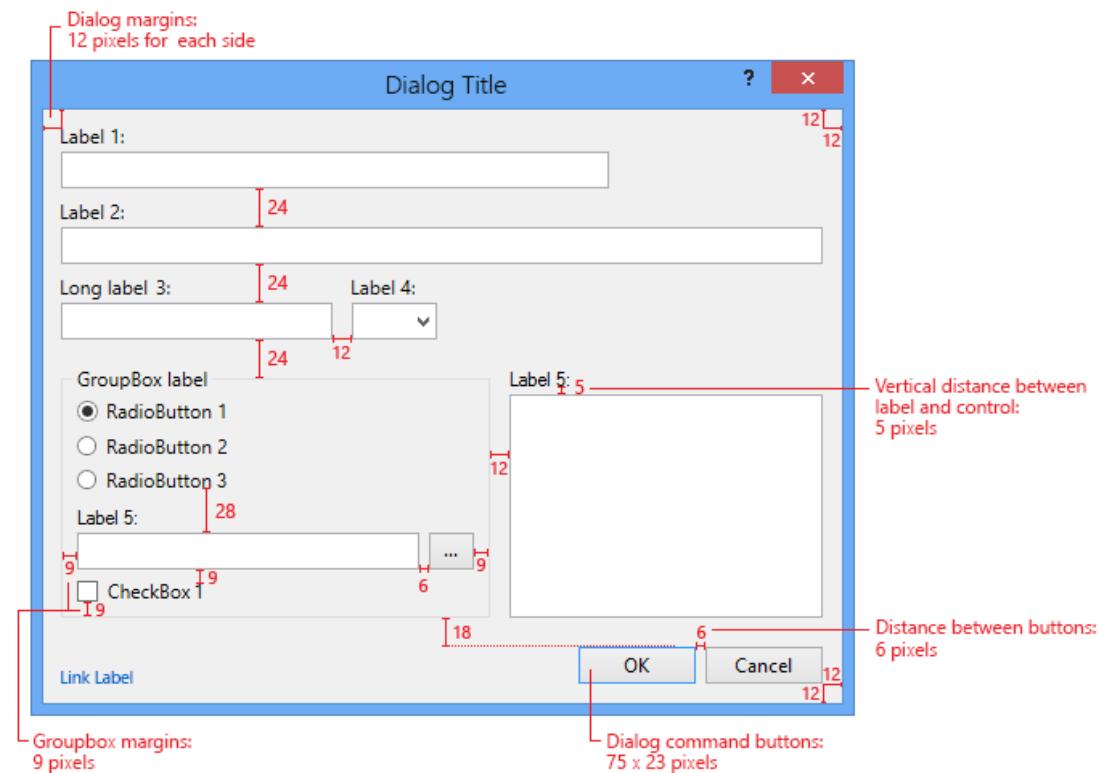
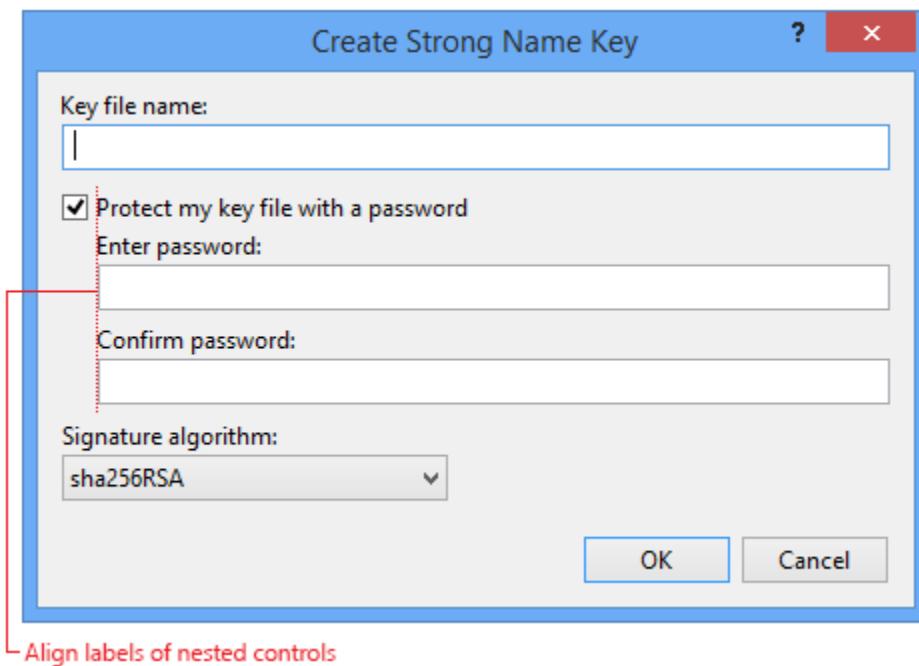
# Alignment

- Invisible lines that run through the interface and “attract” the left- or right-edge of a widget control
  - Vertical
  - Horizontal

# Example

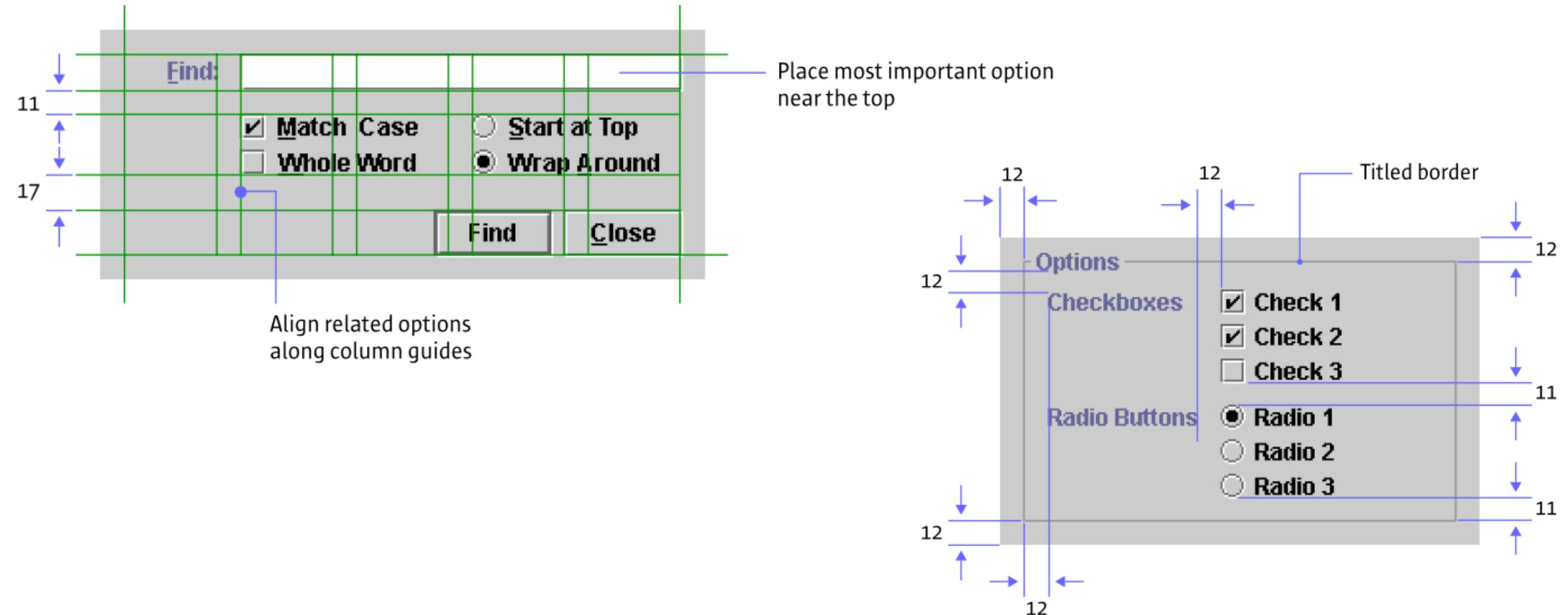


# Examples



<https://docs.microsoft.com/en-us/visualstudio/extensibility/ux-guidelines/layout-for-visual-studio?view=vs-2019>

# Examples

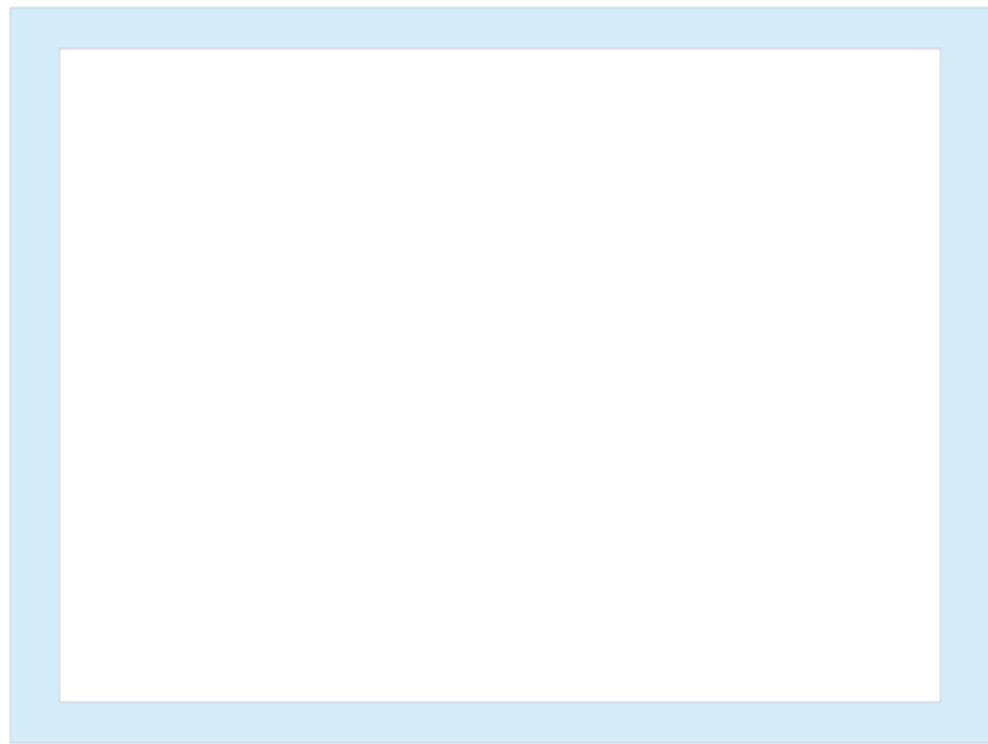


# Grid Layout Ingredients

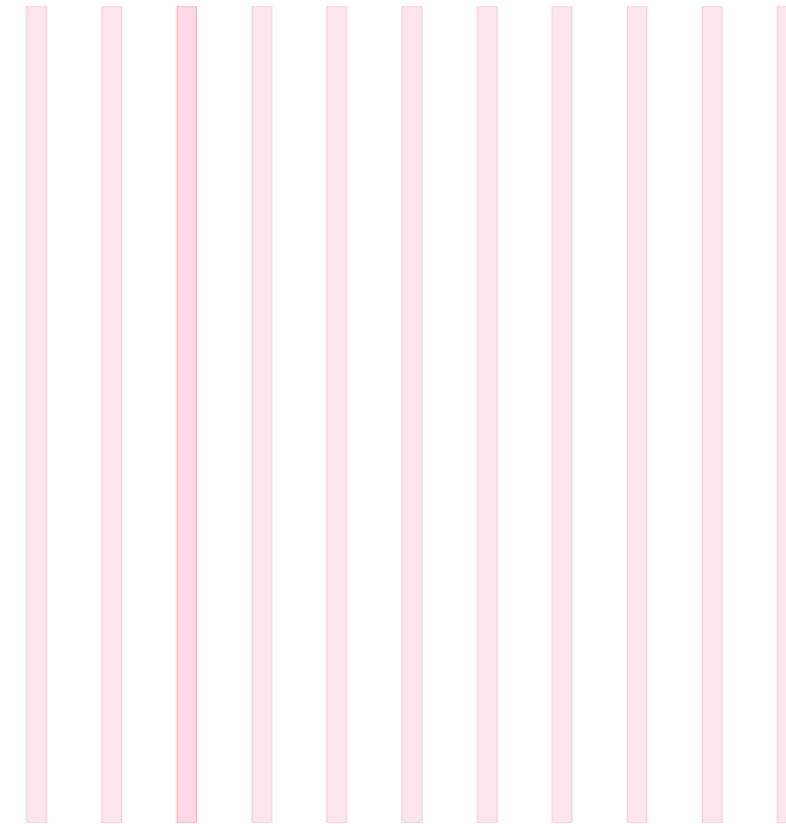
- **Guides:** The edge which you choose to align content with
- **Column:** A vertical division of content
- **Row:** A horizontal division of content
- **Margins:** The area surrounding your content
- **Gutters:** The margins between columns
- **Hang-line:** A horizontal guide to align content to hang off of
- **Baseline:** The horizontal guide for an element to sit on top of
- **Rhythm:** Proportion systems that can help define the sizing frequency and spacing of each of the above elements.

# Grid Layout Ingredients

## Margins

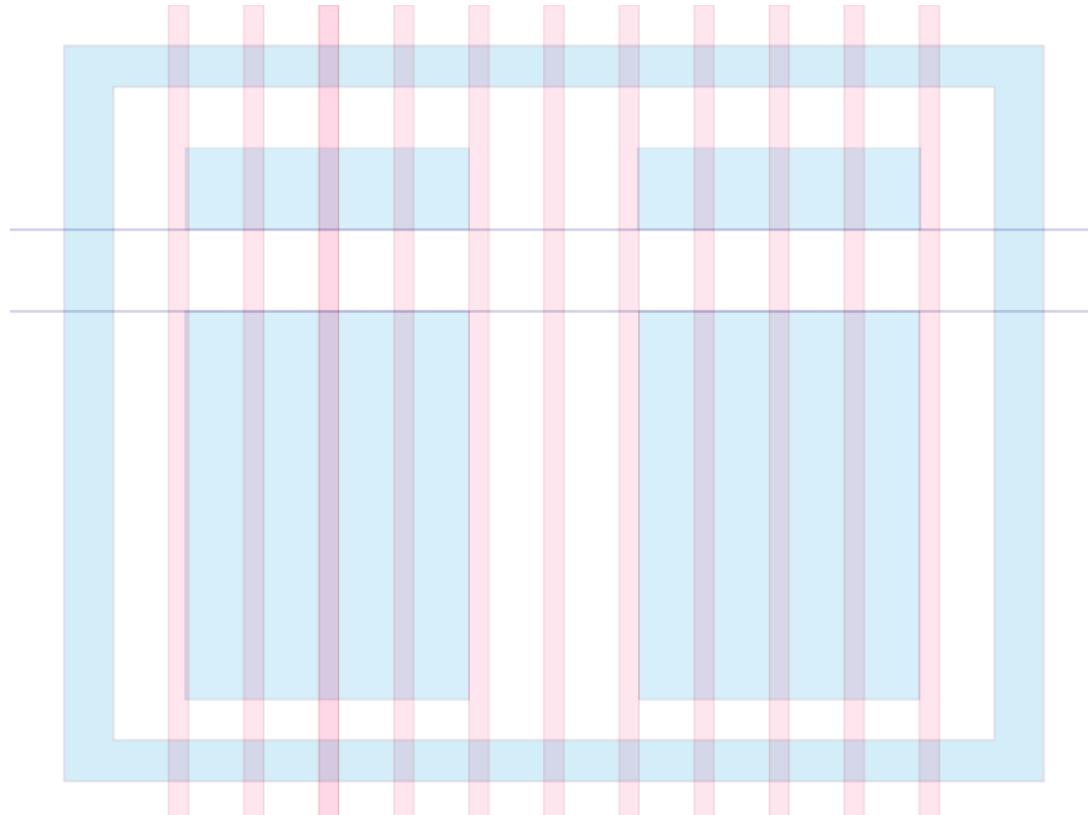


## Columns & Gutters



# Grid Layout Ingredients

## Hanglines and Baselines

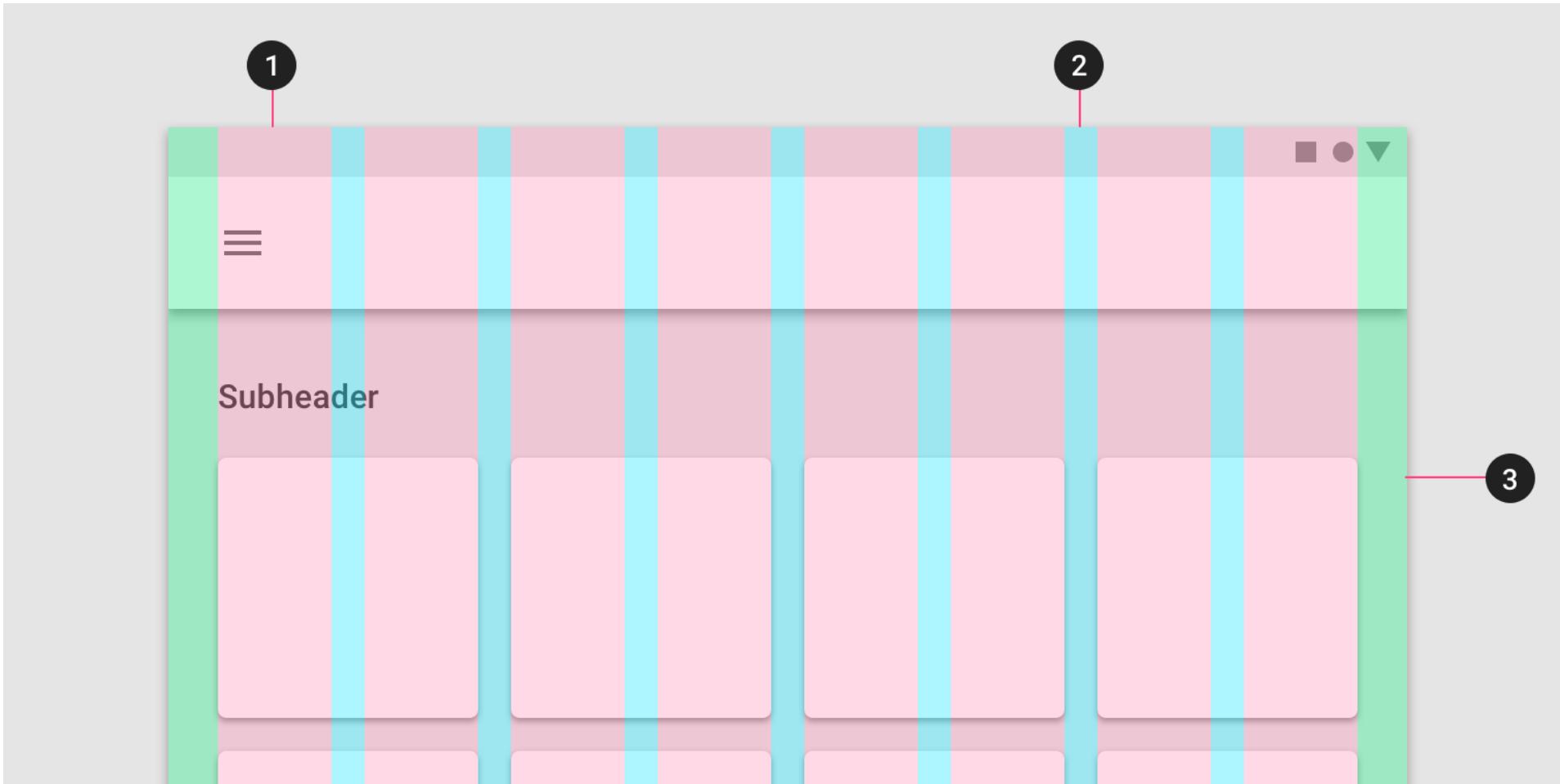


## Baseline Grids



# Example Grid-based layout

1. Columns
2. Gutters
3. Margins



# Example: Bootstrap grid

Always 12 columns in total

May choose to span a group of columns

Each column is tagged according to the screen size:

- xs (phones - <768px)
- sm (tablets - >=768px)
- md (small laptops - >=992px)
- lg (laptops and desktops - >1200px)

span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1				
span 4				span 4				span 4							
span 4				span 8											
span 6						span 6									
span 12															

# Responsive Grid Layout

The image shows four screenshots of a website's homepage, illustrating a responsive grid layout. The layout consists of a main content area and a footer. The main content area features a hero section with a title and a 'Get started today' button. Below this are several columns of content, each with a title, a brief description, and a 'Learn More' button. The columns are arranged in a grid that adapts to different screen sizes. The footer contains copyright information and links to terms of use and privacy policy.

```
<div class="row">
  <div class="col-md-6 col-lg-4 col-xl-3">
    <h2>HTML</h2>
    <p>...</p>
    <p><a href="..." class="btn btn-success">...</a></p>
  </div>
```

<https://www.tutorialrepublic.com/twitter-bootstrap-tutorial/bootstrap-responsive-layout.php>

# Other Grid Systems

Unsemantic (responsive, based on %)

The screenshot shows the Unsemantic website. At the top, there's a navigation bar with links for Home, About, Demo, CSS Documentation, and Sass Documentation. Below the navigation is a button labeled "Download Here" and a GitHub Repo link. The main content area has two sections: "What is it?" and "Example Usage". The "What is it?" section defines "Unsemantic" as an adjective and a noun, explaining it's a CSS framework. The "Example Usage" section shows a snippet of CSS code for a grid container with four items, each with a width of 25%.

**What is it?**

**Example Usage**

```
<div class="grid-container">
  <div class="grid-25">
    I am 25% wide.
  </div>
  <div class="grid-50">
    I am 50% wide.
  </div>
  <div class="grid-25">
    I am 25% wide.
  </div>
```

**Successor to 960.gs**

**SE-Oh?**

**Built with SASS**

Unsemantic was built with extensibility in mind, using [Sass](#). While you can use the CSS as is, some developers prefer to use their own class names, and want only the bare minimum CSS required for a particular page.

By using push-x and pull-x classes, you can rearrange the visual layout of page, without affecting its source order. While SEO is a bit of a "moving target," this has been known to help search engines determine the most relevant content on a page.

For instance, if you want a 50% wide column, simply use `class="grid-50"`. There are grid classes for multiples of five: 5, 10, 15, ..., 95, 100. There are also grid classes for dividing a page into thirds: `grid-33` and `grid-66`.

Typically, code at the top of a page is what search engines tend to focus on the most, and Unsemantic can help to ensure your source code is geared towards that goal.

**Responsive Demo**

These demos use @media queries.

- [Responsive Demo](#)
- [Responsive Demo - RTL text](#)

**Adapt.js Demo**

These demos use [Adapt.js](#).

- [Adapt.js Demo](#)
- [Adapt.js Demo - RTL text](#)

**Browser Support**

Unsemantic supports all major browsers: Chrome, Firefox, Internet Explorer (7+), Opera, and Safari.

If you think you've found a bug, and can verify that it is reproducible, file a ticket on [GitHub](#).

Note: If you reached this site by mistake, perhaps you are seeking Unsemantic's arch nemesis... [Semantic.com](#)

Licensed under [GPL](#) and [MIT](#). Created by [Nathan Smith](#). Built with [Sass](#). Hosted by [Dreamhost](#).

<https://unsemantic.com>

tailwindcss (responsive, flexible)

The screenshot shows the TailwindCSS website. At the top, there's a navigation bar with links for Docs, Components, Blog, Showcase, and a search bar. The main headline reads "Rapidly build modern websites without ever leaving your HTML." Below the headline, a subtext states: "A utility-first CSS framework packed with classes like `flex`, `pt-4`, `text-center` and `rotate-90` that can be composed to build any design, directly in your markup." There's a "Get started" button and a search bar. On the right, there's a dark sidebar with a bio for Sarah Dayan, Staff Engineer at Algolia, and a block of CSS code.

**Rapidly build modern websites without ever leaving your HTML.**

A utility-first CSS framework packed with classes like `flex`, `pt-4`, `text-center` and `rotate-90` that can be composed to build any design, directly in your markup.

Get started Quick search... K

**Sarah Dayan**  
Staff Engineer, Algolia

```
<figure class="bg-slate-100 rounded-xl p-8 dark:bg-slate-800">
  
  <div class="pt-6 space-y-4">
    <blockquote>
      <p class="text-lg">
        "Tailwind CSS is the only framework that I've seen scale on large teams. It's easy to customize, adapts to any design, and the build size is tiny."
      </p>
    </blockquote>
    <div>
      <img alt="Sarah Dayan" class="w-12 h-12 rounded-full" />
      Sarah Dayan
    </div>
    <div>
      Staff Engineer, Algolia
    </div>
  </div>
</figure>
```

<https://tailwindcss.com>

# Grid Structure

Main body:  
Mix of 2x and 3x  
columns

Alternating row  
types



Title area outside the grid

Right column for other types of articles

# Grid Structure

Main content  
(center, wide)

Navigation  
(left, smaller)

Related content  
(right, smaller)

The screenshot shows the Stack Overflow homepage with a grid layout. The left column, outlined in orange, contains the navigation menu with links like Home, PUBLIC, Tags, Users, Jobs, TEAMS, and a search bar. The central column, also outlined in orange, displays the 'Top Questions' section with a list of 15 questions. The right column, outlined in orange, contains related content such as the 'Blog' section with news items, 'Custom Filters', 'Watched Tags', and 'Ignored Tags', and a 'Hot Network Questions' sidebar.

# Example (2019)

Software								Top	
1° anno		Periodo	Codice	Lingua	Insegnamento	Crediti	Docente	Note	Vincoli
1	01PDW0V	GB	Information systems	ING-INF/05 (6)		6	M. Morisio	<a href="#">View</a>	
1	02GOLOV	IT	Architetture dei sistemi di elaborazione	ING-INF/05 (10)		10	P. Bernardi E. Sanchez Sanchez	<a href="#">View</a>	
				Ottobre					
1	02LSEOV	GB	Computer architectures	ING-INF/05 (10)		10	P. Montuschi	<a href="#">View</a>	
1	01SQJOV	GB	Data Science and Database Technology	ING-INF/05 (6)		8	S. Chiusano	<a href="#">View</a>	
				Ottobre					
1	01SQMOV	IT	Data Science e Tecnologie per le Basi di Dati	ING-INF/05 (8)		8	E. Baralis	<a href="#">View</a>	
1	01OTW0V	GB	Computer network technologies and services	ING-INF/05 (6)		6	M. Baldi	<a href="#">View</a>	
				Ottobre					
1	02KPNOV	IT	Tecnologie e servizi di rete	ING-INF/05 (6)		6	G. Marchetto	<a href="#">View</a>	
2	02JEUOV	GB	Formal languages and compilers	ING-INF/05 (6)		6	R. Sisto	<a href="#">View</a>	
				Ottobre					
2	05BIDOV	IT	Ingegneria del software	ING-INF/05 (8)		8	G. Bruno	<a href="#">View</a>	
				Ottobre					
2	04GSPOV	GB	Software engineering	ING-INF/05 (8)		8	M. Morisio	<a href="#">View</a>	
2	01UDFOV	IT	Applicazioni Web I	ING-INF/05 (6)		6	E. Masala	<a href="#">View</a>	
				Ottobre					
2	01TXYOV	GB	Web Applications I	ING-INF/05 (6)		6	F. Cormo	<a href="#">View</a>	
2	02GRSOV	IT	Programmazione di sistemi	ING-INF/05 (10)		10	G. Cabodi	<a href="#">View</a>	
				Ottobre					
2	01NYHOV	GB	System and device programming	ING-INF/05 (10)		10	S. Quer	<a href="#">View</a>	
2° anno		Periodo	Codice	Lingua	Insegnamento	Crediti	Docente	Note	Vincoli
1	01TYMOV	GB	Insegnamento a scelta 1	Information systems security	ING-INF/05 (6)	6		<a href="#">View</a>	
				Ottobre					
1	01UDUOV	IT	Sicurezza dei sistemi informativi	ING-INF/05 (6)		6		<a href="#">View</a>	
1	01SQNOV	GB	Software Engineering II	ING-INF/05 (6)		6		<a href="#">View</a>	
1,2	01TYDOV	GB	Crediti liberi			6			
1,2	29EBHOV		Tesi			30			
2			Insegnamento a scelta 2			6			
Insegnamento a scelta 1									
Periodo	Codice	Lingua		Insegnamento		Crediti	Docente	Note	Vincoli
1	01TYDOV	GB	Cloud Computing	Cloud Computing	ING-INF/05 (6)	6		<a href="#">View</a>	
1	01PDCOV	GB	Digital control technologies and architectures	Digital control technologies and architectures	ING-INF/04 (6)	6		<a href="#">View</a>	
1	01TXZOV	GB	Distributed systems programming	Distributed systems programming	ING-INF/05 (6)	6		<a href="#">View</a>	Si
1	01NWPOV	IT	Elaborazione dell'audio digitale	Elaborazione dell'audio digitale	ING-INF/05 (6)	6		<a href="#">View</a>	
1	01UDGOV	GB	Energy management for IoT	Energy management for IoT	ING-INF/05 (6)	6		<a href="#">View</a>	Si
1	02JSKOV	GB	Human Computer Interaction	Human Computer Interaction	ING-INF/05 (6)	6		<a href="#">View</a>	
1	01SQIOV	GB	Machine Learning and Artificial Intelligence	Machine Learning and Artificial Intelligence	ING-INF/05 (6)	6		<a href="#">View</a>	
1	01PDXOV	GB	Modern design of control systems	Modern design of control systems	ING-INF/04 (6)	6		<a href="#">View</a>	
1	01OUUVOV	GB	Optimization methods and algorithms	Optimization methods and algorithms	MAT/09 (6)	6		<a href="#">View</a>	
1	01CETOV	IT				6		<a href="#">View</a>	

# Example (same page in 2020)

Software

▼ 1° anno 2020/2021

Periodo	Codice	SSD	Insegnamento	Lingua	Crediti	Docente	Note	Orario
1	01PDW0V	ING-INF/05 (6)	Information systems	🇬🇧	6	M. Morisio (118 iscr.)	🕒	
1	02GOLOV	ING-INF/05 (10)	Architetture dei sistemi di elaborazione	🇮🇹	10	P. Bernardi (150 iscr.) E. Sanchez Sanchez (159 iscr.)	🕒	
oppure								
1	02LSEOV	ING-INF/05 (10)	Computer architectures	🇬🇧	10	P. Montuschi (207 iscr.)	🕒	
1	01SQJOV	ING-INF/05 (8)	Data Science and Database Technology	🇬🇧	8	S. Chiusano (172 iscr.)	🕒	
oppure								
1	01SQMOV	ING-INF/05 (8)	Data Science e Tecnologie per le Basi di Dati	🇮🇹	8	E. Baralis (254 iscr.)	🕒	
1	01OTW0V	ING-INF/05 (6)	Computer network technologies and services	🇬🇧	6	G. Marchetto (161 iscr.)	🕒	
oppure								
1	02KPN0V	ING-INF/05 (6)	Tecnologie e servizi di rete	🇮🇹	6	G. Marchetto (253 iscr.)	🕒	
2	02JEU0V	ING-INF/05 (6)	Formal languages and compilers	🇬🇧	6	R. Sisto (60 iscr.)	🕒	
2	05BID0V	ING-INF/05 (8)	Ingegneria del software	🇮🇹	8	G. Bruno (132 iscr.)	🕒	
oppure								
2	04GSPOV	ING-INF/05 (8)	Software engineering	🇬🇧	8	M. Morisio (202 iscr.)	🕒	
2	01UDFOV	ING-INF/05 (6)	Applicazioni Web I	🇮🇹	6	E. Masala (91 iscr.) L. De Russis (57 iscr.)	🕒	
oppure								
2	01TXY0V	ING-INF/05 (6)	Web Applications I	🇬🇧	6	F. Corno (185 iscr.)	🕒	
2	02GRSOV	ING-INF/05 (10)	Programmazione di sistema	🇮🇹	10	G. Cabodi (100 iscr.) A. Savino (112 iscr.)	🕒	
oppure								
2	01NYH0V	ING-INF/05 (10)	System and device programming	🇬🇧	10	S. Quer (108 iscr.)	🕒	
▼ 2° anno 2021/2022								
Periodo	Codice	SSD	Insegnamento	Lingua	Crediti	Docente	Note	Orario
1			Insegnamento a scelta 1		6		🕒	
1	01TYM0V	ING-INF/05 (6)	Information systems security	🇬🇧	6		🕒	
oppure								
1	01UDU0V	ING-INF/05 (6)	Sicurezza dei sistemi informativi	🇮🇹	6		🕒	
1	01SQNOV	ING-INF/05 (6)	Software Engineering II	🇬🇧	6		🕒	
1,2			Crediti liberi		6		🕒	
1,2	29EBHOV		Tesi		30		🕒	
2			Insegnamento a scelta 2		6		🕒	

# Example (2015 vs. 2019)

## Add an address

**Full Name:**

**Address Line 1:**   
Street address, P.O. box, company name, c/o

**Address line 2:**   
Apartment, suite, unit, building, floor, etc.

**City:**

**State/Province/Region:**

**ZIP:**

**Country:**

**Phone Number:**  [Learn more](#)

### Optional Delivery Preferences ([What's this?](#))

**Weekend Delivery:**

**Security Access Code:**   
For buildings or gated communities

[Save & Add Payment Method](#)

[Save & Continue](#)

Il tuo account > I tuoi indirizzi > [Nuovo indirizzo](#)

## Aggiungi un nuovo indirizzo

Oppure ritira i tuoi colli quando desideri, presso i nostri punti self-service. Per aggiungere un punto di ritiro o un Amazon Locker, clicca [qui](#).

Paese/Regione

Nome e cognome

Indirizzo

Città

Provincia

Codice postale

Numero di telefono

Può essere utilizzato per aiutare consegna

## Aggiungi istruzioni di consegna

Consegna nel fine settimana

[Aggiungi indirizzo](#)

# Some Best Practices

- When designing a template, start from the longest block of text
- Left-aligned text is (usually) faster to skim
- Alignment guides the eye and reduces clutter
  - Avoid slight misalignments
  - Patterns and deviations are “automatically” detected
    - Deviate from a pattern for strategic reasons
  - Use visual proximity and scale to convey semantic information

# Colors

The most dangerous weapon in your toolset

*I live inside my car leasing website all day Monday to Friday 9am-6pm. I lease the cheapest PCP and contract hire cars in the UK! - I am Ling, accept no substitutes*

# LINGS CARS.com

Leader of the Pack - The UK's favorite car leasing website!

Contract hire cars from Ling Valentine. LINGS CARS is the UK's favourite car leasing website - On 2016 I leased over £85 million in cars!

**Stop**

**BETTY**

**Believe it or not, this Gateshead-based website, featuring Mrs Ling jigging on her motorbike, is one of the biggest online drivers of car sales in Great Britain" 25th July 2017**

**4 News**

**PUBLIC PICCADILLY**

**Leader of the Pack**

"[Ling Valentine is] Britain's **BIGGEST** individual seller of new cars."

**BREXIT RISK FREE!** February 2017 **theguardian**

**LING'S BREXIT BORIS PROMISE:** If the UK leaves the EU with "no deal", tariffs may apply to EU built cars landing in the UK after Brexit day (31st Jan?). If this is the case with YOUR car, and if the price increases due to tariffs, YOU will be able to cancel the car order at **NO COST** to you. **YOU can order a new car from me, with NO BREXIT RISK.** - Ling

**MY BEST SELLING CAR LEASING DEALS!**

**500 IDEAS!**

**NICOLE...PAPA!**

**MEGA-HATCH!**

**CARS A-Z**

**ABARTH**

**ALFA ROMEO**

**AUDI**

**124 Spider Convertible**  
595 Convertible  
595 Hatchback  
695 Convertible

**1.2 Pop 8v (69bhp) (4 seats)**  
Hatchback 3dr 124cc Petrol Manual (5 Speed)

**Fiat 500**

**Renault Clio**

**Citroen C3**

**RENT NEW £127/mth including VAT**  
3 year cheap car leasing

**RENT NEW £152/mth including VAT**  
3 year cheap car leasing

**RENT NEW £157/mth including VAT**  
2 year cheap car leasing

**9+35**

**6+35**

**6+23**

**Car Leasing Online Service Response Times**

**75 CUSTOMERS IN 'PROPOSAL'**

**129 CUSTOMERS IN 'ORDER'**

**Ling replies in...**

**0:03 07**

**0:05 03**

**1 DELIVERY TODAY**

**Ford Ka+ to Arthur ATTLEBOROUGH, NR17**

**21 DELIVERIES IN LAST WEEK**

**Renault Captur to Cath PONTEFRACT, WF81**

**Mercedes GLC Coupe to Bill BEDLINGTON, NE22**

**BMW 2 Series Convert... to Pingu DERBY, DE56**

**Nissan Qashqai to Arlene GLASGOW, G11**

**Volvo XC60 Estate to Saif MILTON KEYNES, MK8**

**Seat Leon to Ben BARNSLEY, S70**

**Skoda Kodiaq Estate to Hannah HAY-ON-WYE, HR3**

**Renault Clio to Paul MIDDLEBROUGH, TS7**

**Renault Clio to Paul MIDDLEBROUGH, TS7**

**Seat Arona to Steve LONDON, SE18**

**Seat Leon to Adam HATFIELD, AL10**

**Audi A3 Sportback to Chris WYHONDHAM, NR18**

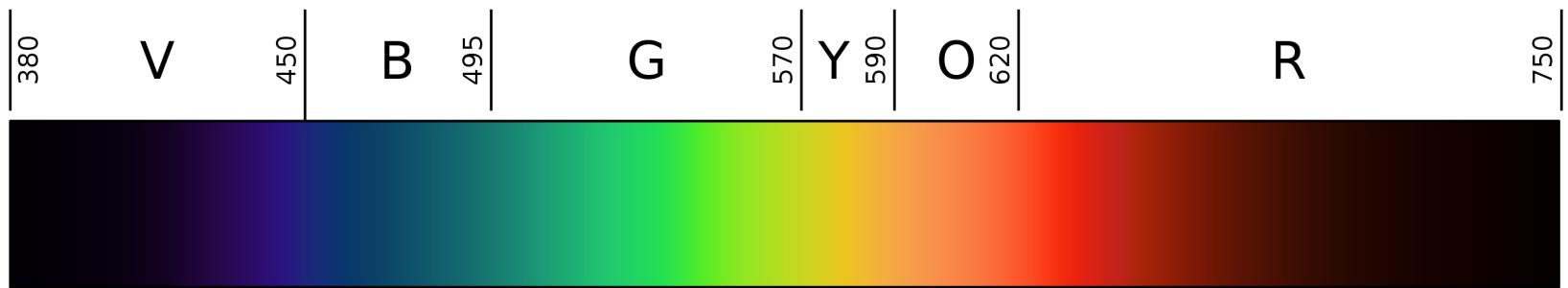
# Colors

- A powerful tool to improve interfaces by communicating **key information**
- Inappropriate use of colors can severely **reduce the performance** of an interactive system

# Colors: Suggestions

- Be careful, do not exaggerate
- Design in grayscale, first
  - Ensure information is conveyed by text and layout
- When adding colors, try to conserve the same luminance of the grayscale design
- Assign meaning to color
- Use a limited and consistent palette and use slight variations
- Avoid simultaneous display of pure (highly-saturated), spectrally extreme colors
  - e.g., no blue at the same time as red
  - desaturated combinations (pastels) are better

# Visible Spectrum

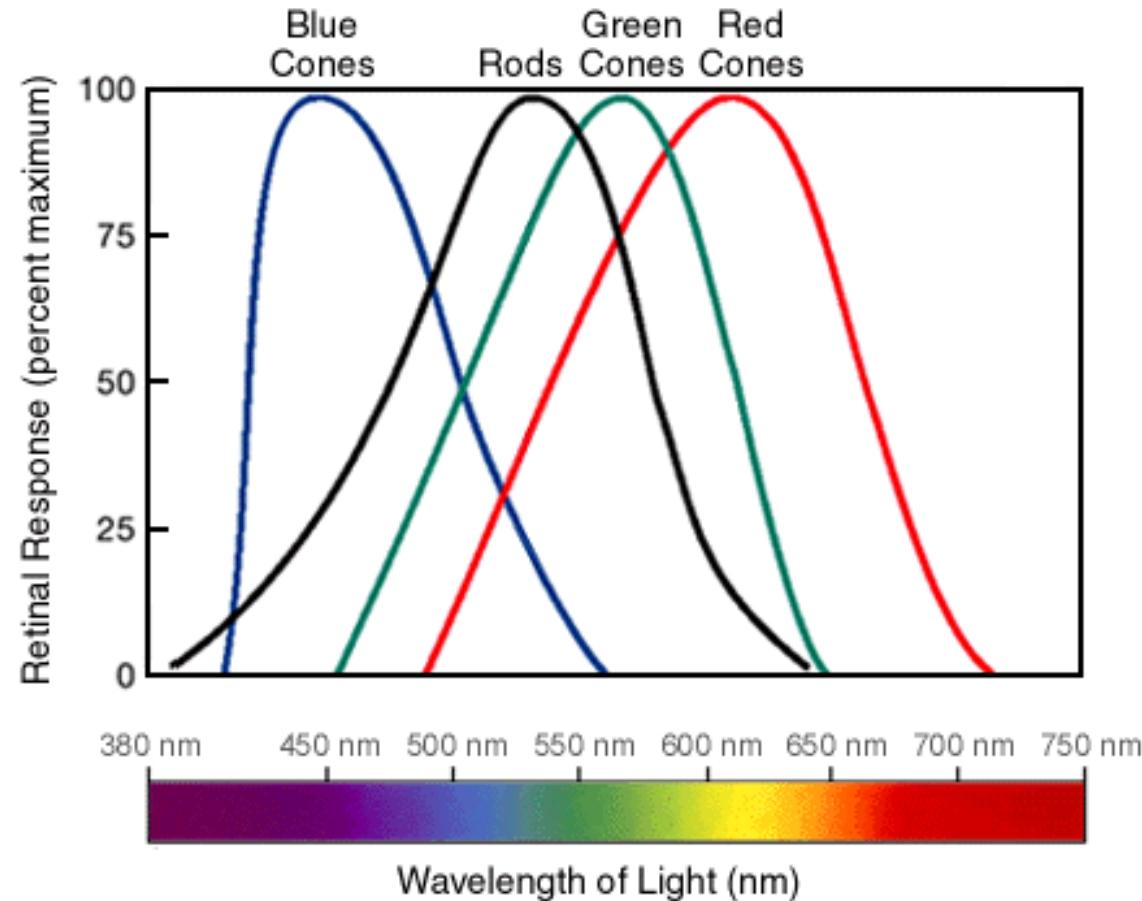


- UV spectrum ends on the left, IR starts on the right
- Wavelengths are in nm
- Source: [https://commons.wikimedia.org/wiki/File:Linear\\_visible\\_spectrum.svg](https://commons.wikimedia.org/wiki/File:Linear_visible_spectrum.svg)

# Human Vision

- **Human vision:** a highly complex activity, often the main source of information about the world
- The **eye:** a mechanism for receiving light and transforming it into electrical energy
  - light reflected from objects in the world and their image is focused upside down on the back of the eye
  - then, the receptors in the eye transform it into electrical signal which are passed to the brain
  - the brain detects, finally, pattern and movements

# Color Sensitivity of the Eyes



source: <https://askabiologist.asu.edu/rods-and-cones>

# Example

The image displays two identical screenshots of the Stack Overflow homepage, illustrating the layout and features of the site.

**Top Questions Section:**

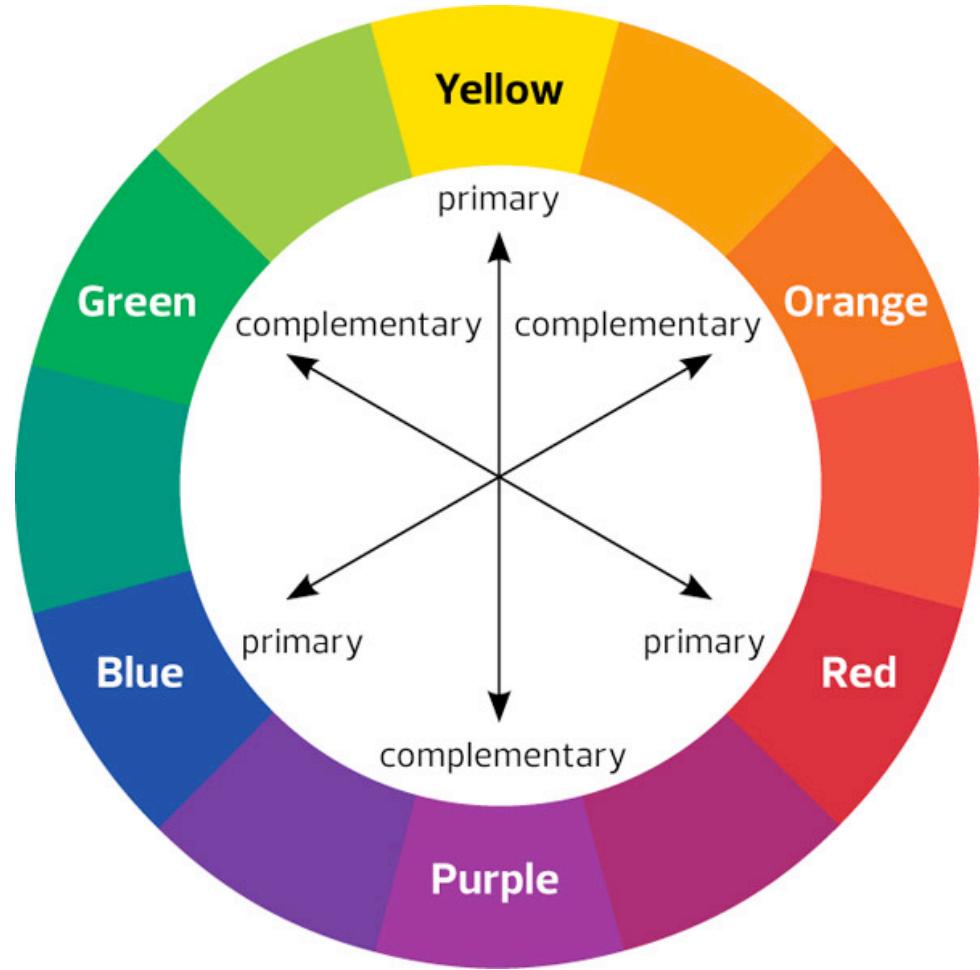
- Header:** Stack Overflow, Products, Search bar.
- Top Questions List:**
  - Loop backward in array of objects (2 answers, 14 views, asked 10 secs ago)
  - Chain of responsibility - handling more than one request (1 answer, 19 views, asked 2 mins ago)
  - How to change internal function in MendelianRandomization function in order to change decimal places in output? (0 answers, 7 views, asked 2 mins ago)
  - How can I remove duplicate words unseparated in a python string? (0 answers, 10 views, asked 24 secs ago)
  - Add 7 days to a date field and convert to unix time (0 answers, 6 views, asked 3 mins ago)
  - # Compiler Extension doesn't show messages on build (1 answer, 27 views, asked 3 mins ago)
  - How to access data retrieved into an anonymous inner class (a listener) from the enclosing class? (0 answers, 10 views, asked 3 mins ago)
  - QMediaPlayer stream data from a self signed Flask https server (0 answers, 5 views, asked 3 mins ago)
  - How to destroy component created dynamically angular 8 (0 answers, 10 views, asked 4 mins ago)
  - Import specific Components from cdn in react (0 answers, 5 views, asked 4 mins ago)
  - Is it safe to store a session ID with window.history.replaceState? (0 answers, 8 views, asked 4 mins ago)
  - List all dependents of a dependency from lock file (0 answers, 5 views, asked 4 mins ago)
  - Python: how to print to excel/csv (0 answers, 10 views, asked 4 mins ago)
- Sidebar:**
  - Blog:** The Overflow Newsletter #3 – The 36 pieces of code that changed history, A Technical Deep Dive into Our MS Teams Integration.
  - Featured on Meta:** Feedback post: Moderator review and reinstatement processes, Post for clarifications on the updated pronouns FAQ.
  - New Post Notices (Closed/On Hold/etc.):** rolling out on Stack Overflow.
  - Custom Filters:** Create a custom filter.
  - Watched Tags:** ajax, flask, git, java, javafx, javascript, jquery, json, mysql, python, python-requests, rest.
  - Ignored Tags:** Add an ignored tag.
  - Hot Network Questions:**
    - Effects of longer and higher stem on rider position/comfort and handling (0 answers, 10 views, asked 4 mins ago)
    - Does Enthral make targets require perception checks to perceive anything other than the caster? (0 answers, 5 views, asked 4 mins ago)
    - How to draw a double napped cone with TikZ (0 answers, 5 views, asked 4 mins ago)
    - Fantasy story about a knife that can cut holes to other dimensions (0 answers, 8 views, asked 4 mins ago)
    - Read the Memories of a Dead Man's Head (0 answers, 5 views, asked 4 mins ago)
    - Is it acceptable to mark off or comment on someone's presentation based on their non-standard English accent? (0 answers, 5 views, asked 4 mins ago)
    - How to reduce thousand of faces of an already low poly object (0 answers, 10 views, asked 4 mins ago)
    - Is it against a Terms of Service/End-User License? (0 answers, 6 views, asked 4 mins ago)

# Example

The image displays two side-by-side screenshots of the Politecnico di Torino website. The left screenshot shows the site with a blue header and a blue background for the main content area. The right screenshot shows the same site with a black header and a black background for the main content area. Both screenshots include the university's logo at the top left, followed by five navigation links: 'SCOPRIRE L'ATENEO', 'DIDATTICA E STUDENTI', 'IL MONDO DELLA RICERCA', 'INNOVAZIONE PER LE IMPRESE', and 'CAMPUS INTERNAZIONALE'. Below these links is a large banner for the 'festival della TECNOLOGIA' (TORINO, 7-10 NOV 2019) with the tagline 'Tecnologia è Umanità'. The banner features a grid of small icons. At the bottom of each screenshot, there are sections for 'EVENTI' and 'AVVISI E SCADENZE' with specific event details. The right screenshot is distinguished by a dashed orange border around the central content area.

# The Color Weel

- Aka the Hue Circle
- Pick non-adjacent colors
- Opponent colors go well together
  - Complementary colors
- Read more at  
<https://www.canva.com/colors/color-wheel/>



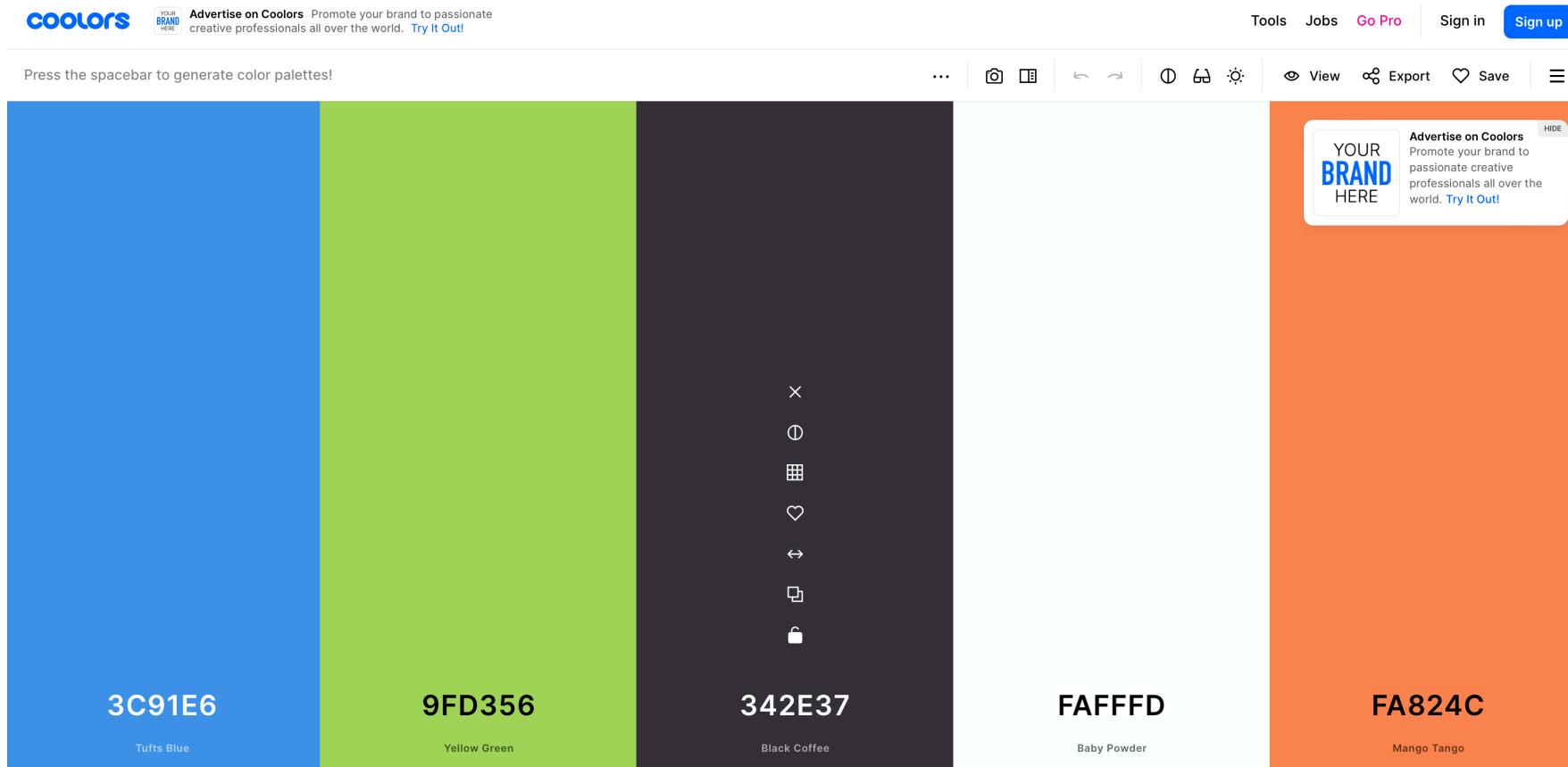
# Palettes - PoliTo

GERARCHIA COLORI



[https://www.politocomunica.polito.it/en/corporate\\_image/brand\\_and\\_visual\\_identity](https://www.politocomunica.polito.it/en/corporate_image/brand_and_visual_identity)

# Palettes Generator



<https://coolors.co>

# ColourLovers



## Share Your Color Ideas & Inspiration.

COLOURlovers is a creative community where people from around the world create and share colors, palettes and patterns, discuss the latest trends and explore colorful articles... All in the spirit of love.

[Join the Community!](#)

[CONNECT WITH COLOURLOVERS](#)

[Follow @COLOURlovers](#) 1.59M followers

### LOVERS PEAK

- SadieSews on Vengeful 225  
Really nice look, with this! (:
- MisteryMoments on CoffeeBerries  
I love your Template Design Style.. thanks
- renniecat on Cold Night  
Beautiful!
- ColdenHuesinBlue on Golden Fall  
Wow, very nice!
- TongrenGirl on Comfort  
Wow...so beautiful!!!
- TongrenGirl on Extraordinary  
I love this!!!!
- TongrenGirl on Deep Waters  
Ooooo, fantastic colors!!!!
- TongrenGirl on Race to Spring  
Very nice!!!
- TongrenGirl on Race to Spring  
Thanks so much for coloring my

ALL WEDDING HOME FASHION WEB PRINT CRAFT DIGITAL ART

### LATEST BLOG POSTS

[View More](#)



Why Marketing Automation is  
Rocket-Fuel for Remote Workforce  
0 Comments



How to Become a Full-Time Creative  
and Do What You Love  
0 Comments



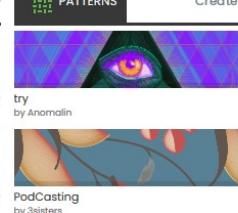
Colors, Human Growth Hormones,  
and Creativity  
0 Comments

### PALETTES



Nineteen  
by Júlia Freire  
garden palette 2  
by macarver

### PATTERNS



try  
by Anomalin  
PodCasting  
by 3sisters

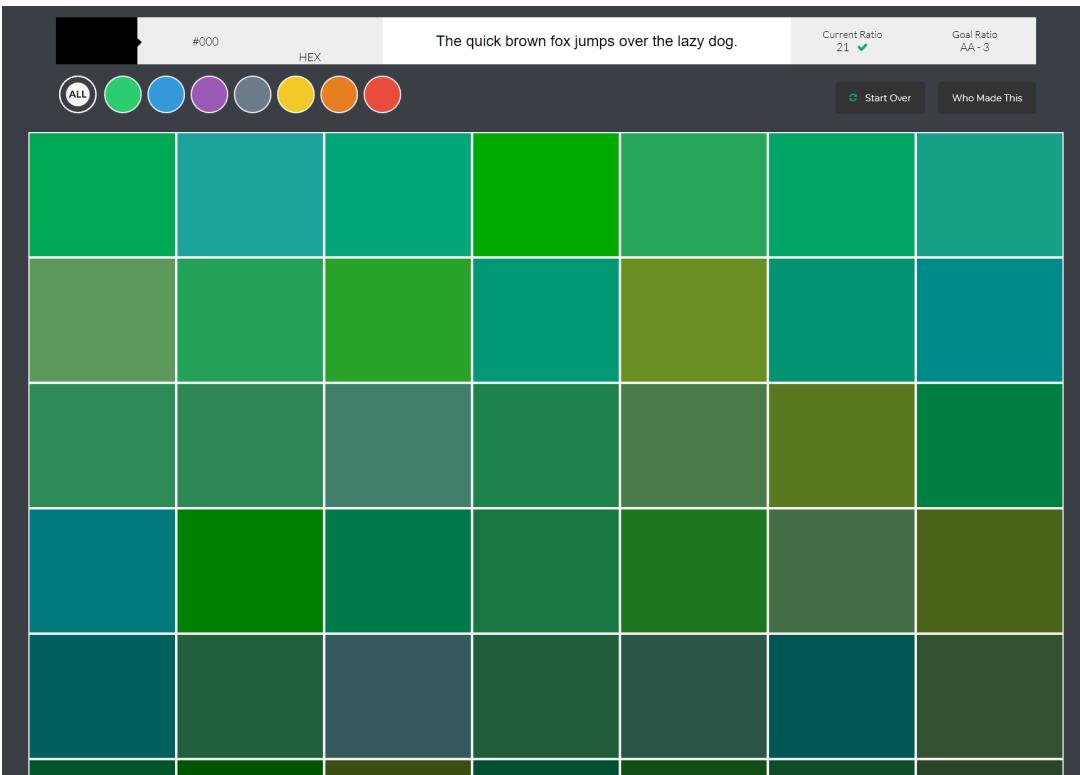
### COLORS



light gray purple  
by macarver  
slate purple  
by macarver

<https://www.colourlovers.com/>

# Color Contrast



<http://colorsafe.co/>

Default type color On light			Default type color On dark		
Primary	#000000	1a	Primary	#FFFFFF	1a
Secondary	#000000	0.54a	Secondary	#FFFFFF	0.54a
Disabled	#000000	0.26a	Disabled	#FFFFFF	0.26a
Link	#3367D6	1a	Link	#7BAAF7	1a
Positive	#0B8043	1a	Positive	#57BB8A	1a
Negative	#C53929	1a	Negative	#E67C73	1a
Warning	#EA6100	1a	Warning	#F7CB4D	1a

Google Chrome Palette

# Example

- Colors needing an explanation legend
- Time intervals are shaded with two different colors
  - “why is the first hour filled with a different color?”
- No indication of the “fill level”

Turni disponibili - Aule Studio - Sala studio al Secondo Piano di C.so Castelfidardo 39

Legenda turni prenotazione

Disponibile Passato Non prenotabile Prenotazioni non attive Turno al quale sei prenotato

Tutti gli orari sono da intendersi espressi secondo il fuso orario italiano

A partire da giorno 15 luglio 2020, è consentito l'uso della seguente Sala Studio della Sede Centrale:  
- Sala studio al Secondo Piano di C.so Castelfidardo 39, codice locale TO\_CIT11\_XP02\_001

Le sale studio sono aperte dalle ore 9.00 alle ore 18.00 dal lunedì al venerdì. L'accesso sarà consentito su due turnazioni orarie, dalle ore 9.00 alle 13.00 e dalle ore 14.00 alle ore 18.00

<<	Oggi	>>	21 Set 2020 - 27 Set 2020	1 giorno	3 giorni	Settimana lavorativa	Settimana	
		Lunedì 21 Set 2020	Martedì 22 Set 2020	Mercoledì 23 Set 2020	Giovedì 24 Set 2020	Venerdì 25 Set 2020	Sabato 26 Set 2020	Domenica 27 Set 2020
09:00	09:00 - 13:00 - prenotazioni: 36/36	09:00 - 13:00 - prenotazioni: 36/36	09:00 - 13:00 - prenotazioni: 35/36	09:00 - 13:00 - prenotazioni: 36/36	09:00 - 13:00 - prenotazioni: 34/36			
10:00								
11:00								
12:00								
13:00								
14:00	14:00 - 18:00 - prenotazioni: 36/36	14:00 - 18:00 - prenotazioni: 36/36	14:00 - 18:00 - prenotazioni: 34/36	14:00 - 18:00 - prenotazioni: 34/36	14:00 - 18:00 - prenotazioni: 26/36			
15:00								
16:00								
17:00								

# **Reading and Navigating**

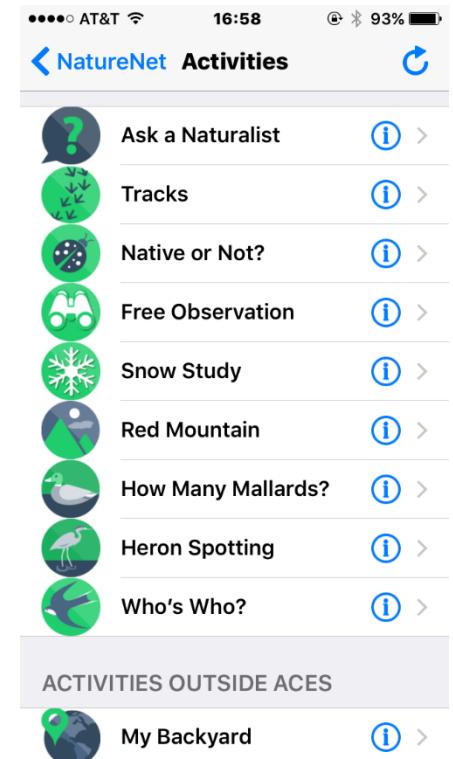
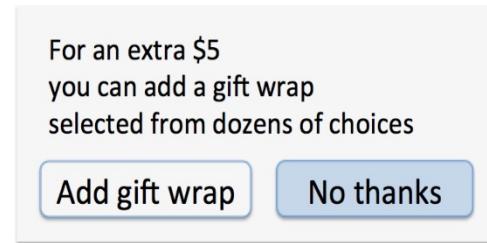
«Informavores» must quickly find the information they need

# Navigation

- Enables users to know where they are and to steer themselves to their intended destination
- Is about getting work done (or having fun) through a series of actions
- May consist of
  - **Task navigation:** successfully operating interactive applications, such as installing a mobile app, completing an on-line survey, or purchasing a ticket
  - **Web navigation:** finding information on a website or browsing social media
  - **Command menu navigation:** finding the action needed in a desktop application
- Has nothing to do with visual elegance / graphic shininess

# Navigation By Selection

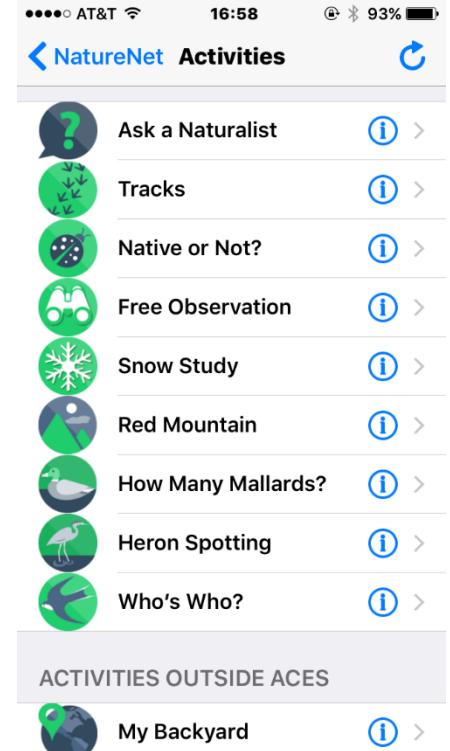
- Menu bars, pop-up menus, toolbars, palettes and ribbons
- Shortcuts and gestures for rapid interaction
- Long lists
- Linear versus simultaneous presentation



# Navigation By Selection

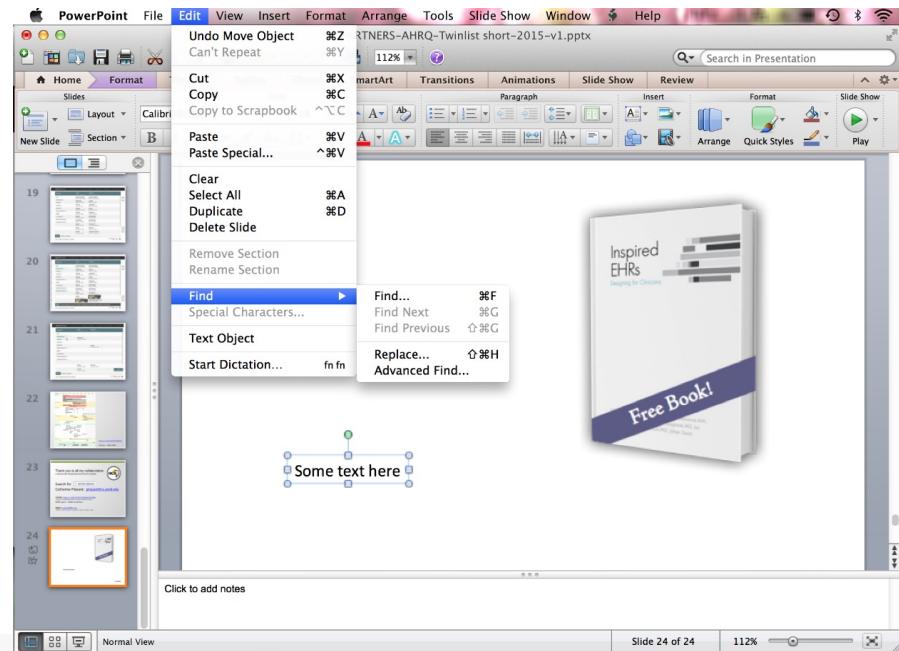
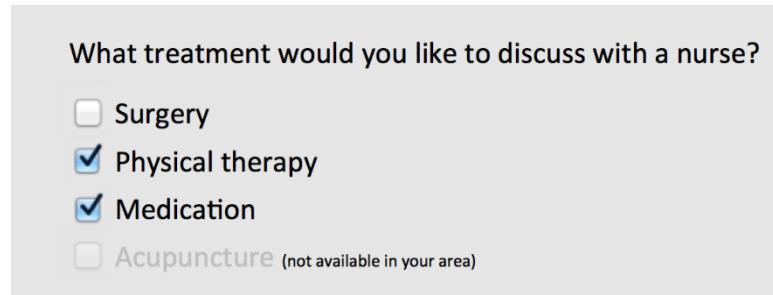
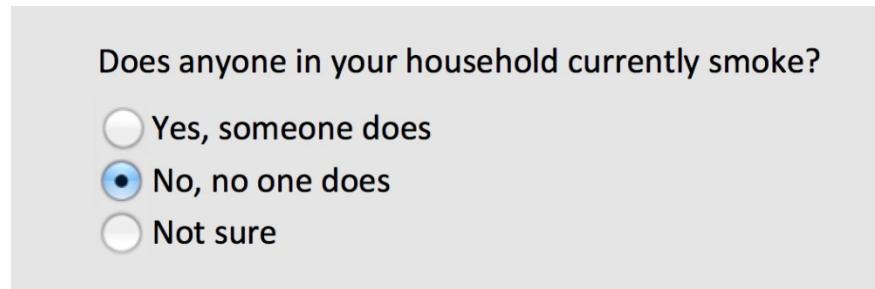
- Menu bars, pop-up menus, toolbars, palettes and ribbons
- **Shortcuts and gestures for rapid interaction**
- Long lists
- Linear versus simultaneous presentation

- Tap
- Long press
- Double tap
- Small swipe
- Large swipe
- Rapid swipe (fling)
- Pinch and spread
- 2-finger swipe
- ...



# Navigation By Selection

- Radio Buttons and Checkboxes
- Menu bars, pop-up menus, toolbars, palettes and ribbons



# Menus

The screenshot shows the NASA website's main page. At the top, there is a navigation bar with links to "Missions", "Galleries", "NASA TV", "Follow NASA", "Downloads", "About", and "NASA Audiences". A search bar is also present. Below the navigation bar, there is a banner for "The Martian" Director Ridley Scott Discusses NASA's Journey to Mars. To the right of the banner is a video player showing a view of Mars from space. The main content area features a grid of news stories:

- One-Year Crew**: Two astronauts in a space station module.
- Halfway There**: Two astronauts working on equipment.
- Eclipse**: A video player showing a rare supermoon eclipse.
- NASA Scientist Sheds Light on Rare Sept. 27 Supermoon Eclipse**: A text-based story.
- Image of the Day**: A small thumbnail image.
- Good Morning From the International Space Station**: A video player showing a view from the ISS.
- The Real Martians**: A text-based story with a thumbnail of a Mars rover.
- Real Martian Videos**: A link to a video section.
- Tweets**: A Twitter feed with a message about 3D-printed habitats.
- 3D Printed Habitat Challenge**: A link to a challenge page.
- Space Travel**: A video player showing a rocket launch.
- New Green Propellants Complete Milestones**: A text-based story.
- Fire and Smoke**: A video player showing a wildfire.
- Rough Fire Still Burning in California**: A text-based story.
- Real Martians Moment: We're Learning More!**: A video player showing a close-up of a rock.
- SDO Solar Mission**: A text-based story with a thumbnail of the Sun.
- SDO Catches an Earth-Moon Double Photobomb**: A video player showing a celestial event.

At the bottom, there is a "MORE STORIES" button and a footer with links to "No Fear Act", "FOIA", "Privacy", "Office of Inspector General", "Agency Financial Reports", and "Contact NASA". The footer also includes the NASA logo and the text "National Aeronautics and Space Administration" and "NASA Official: Brian Dunbar".

The screenshot shows the NASA TV channel on a mobile device. The interface is similar to the main NASA website, featuring a navigation bar with "NASA TV", a search bar, and a menu icon. The main content area displays a video player showing two astronauts working on equipment. Below the video player, there is a text overlay: "One-Year Crew" and "Halfway There". Further down, there is another video player showing three people in a laboratory setting.

# Content Organization

- Organizing menus in a meaningful structure results in faster selection time and higher user satisfaction
- Approaches:
  - Linear sequence (e.g., in a wizard or survey)
  - Hierarchical structure (tree) that is natural and comprehensible (e.g., a store split into departments)
  - Network structure when choices may be reachable by more than one path (e.g., websites)

# Tree-like Content Organization

▼ Help      Wish List      Gift Registry      Classes & Events       Store Locator       0      Checkout

Welcome to REI! | [Log In](#) or [Register](#)

**FREE SHIPPING** With \$50 minimum purchase.

**REI** Find great gear and clothing 

**SHOP REI** **SHOP REI OUTLET** **TRAVEL WITH REI** **LEARN** **BLOG** **MEMBERSHIP** **STEWARDSHIP**

Camp & Hike Climb Cycle Fitness Run Paddle Snow Travel Men Women Kids Footwear More **Deals**

**Bikes**  
Mountain Bikes  
Road Bikes  
Hybrid Bikes  
Kids' Bikes

**Bike Helmets**  
Road Helmets  
Mountain Bike Helmets  
Kids Helmets

**Cycling Clothing**  
Jerseys  
Jackets  
Shorts  
Tights and Pants  
Accessories

**Cycling Shoes**  
Road Shoes  
Mountain Bike Shoes

**Bike Accessories**  
Computers  
Lights  
Locks  
Pumps  
Racks  
Trailers  
Trainers  
Messengers/Backpacks  
Panniers/Bike Bags

**Bike Components**  
Brakes  
Saddles/Seat Posts  
Tires, Tubes and Wheels  
Tools and Maintenance  
Drivetrain Components  
Pedals  
Handlebars

  
**GIVE THE GIFT OF GEAR**  
ANYTIME, ANYWHERE  
REI gift & e-gift cards  
[Buy now ↗](#)

Car Racks | Novara Cycling | Cycling Deals | All Cycling

Deals (31)

**▼ Features**

Moisture wicking (27)  
 Quick drying (26)  
 Sun-protective fabric (22)  
 Waterproof (15)  
 Insulated (11)  
 Earflaps (6)  
 Made in USA (5)

[See 8 More](#)

**▼ Brand**

[Clear](#)  
 686 (6)


 (1)  
REI Rainwall Rain Jacket - Girls'  
\$31.83 - \$64.50 [Compare](#)

 (1)  
REI Rainwall Rain Pants - Kids'  
\$49.50 [Compare](#)

 (9)  
REI Sahara Convertible Pants - Girls'  
\$44.50 [Compare](#)


**ONLY AT REI**

Human Computer Interaction

# Rules for Tree-like Organization

- Use **task semantics** to organize menus
- Limit the **number of levels** (i.e., prefer broad–shallow to narrow–deep)
- Create groups of **logically similar** items: e.g., Level 1: countries, Level 2: states, Level 3: cities
- Form groups that **cover all possibilities**: e.g., Age ranges: [0–9] [10–19] [20–29] and [ $\geq 30$ ]
- Make sure that items are **non-overlapping**: e.g., use “Concerts” and “Sports.” over “Entertainment” and “Events”
- Arrange items in each branch by **natural sequence** (not alphabetically) or **group** related items
- Keep **ordering** of items **fixed** (or possibly duplicate frequent items in dedicated section of the menu)

# Example

**Tool Prenotazioni**

Selezionare l'ambito per il quale ci si intende prenotare

Ambiti per i quali è possibile effettuare una prenotazione

- > Aule Studio
- > Biblioteca
- > Segreteria generale studenti

**Tool Prenotazioni**

Selezionare l'ambito per il quale ci si intende prenotare

Ambiti per i quali è possibile effettuare una prenotazione

- > Aule Studio
- > Biblioteca
- > Segreteria generale studenti

**Aule Studio - Seleziona Aula Studio**

- > Sala studio al Secondo Piano di C.so Castelfidardo 39
- > Sala studio sotto l'aula 7

**Turni disponibili - Aule Studio - Sala studio al Secondo Piano di C.so Castelfidardo 39**

Legenda turni prenotazione

Disponibile Passato Non prenotabile Prenotazioni non attive Turno al quale sei prenotato

Tutti gli orari sono da intendersi espressi secondo il fuso orario italiano

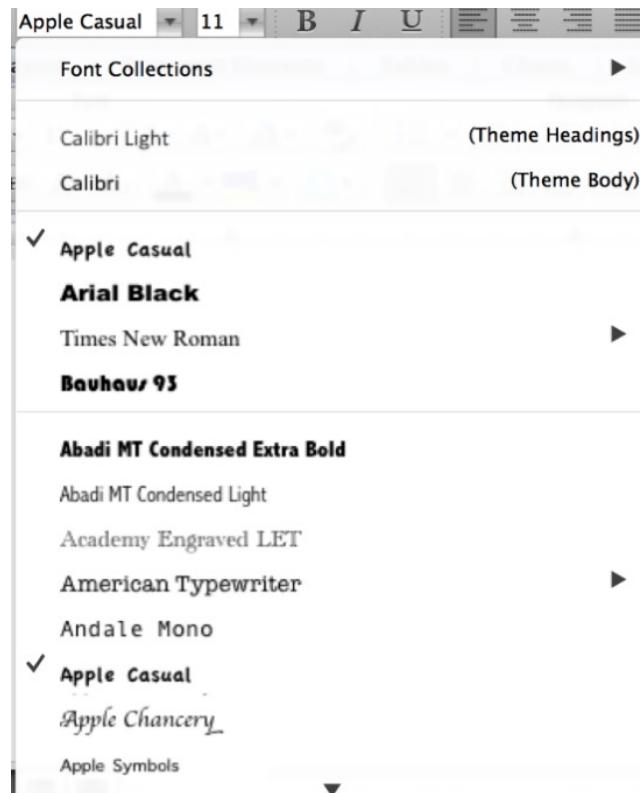
A partire da giorno 15 luglio 2020, è consentito l'uso della seguente Sala Studio della Sede Centrale:  
- Sala studio al Secondo Piano di C.so Castelfidardo 39, codice locale TO\_CIT11\_XP02\_001

Le sale studio sono aperte dalle ore 9.00 alle ore 18.00 dal lunedì al venerdì. L'accesso sarà consentito su due turnazioni orarie, dalle ore 9.00 alle 13.00 e dalle ore 14.00 alle ore 18.00

		14 Set 2020 - 18 Set 2020						
		Lunedì 14 Set 2020	Martedì 15 Set 2020	Mercoledì 16 Set 2020	Giovedì 17 Set 2020	Venerdì 18 Set 2020		
09:00	09:00 - 13:00 - prenotazioni: 36/36	09:00 - 13:00 - prenotazioni: 33/36	09:00 - 13:00 - prenotazioni: 36/36	09:00 - 13:00 - prenotazioni: 32/36	09:00 - 13:00 - prenotazioni: 35/36			
10:00								
11:00								
12:00								
13:00								

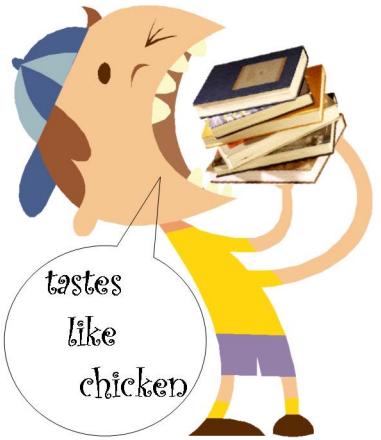
# Menu Grouping: example

- 3 groups
  - Template styles
  - Frequently used fonts
  - All fonts
- Alphabetical order within each group
  - Lack of a semantic ordering
- Preview for recognition
- Scrollable list



# Information Scent

- Informavores orient themselves using *information scent*
- How can we figure out how to get the information we want?
- Do we realize what options are available to us?
- Web pages (and UIs general) provide cues to suggest where to find information
  - Icons, Menus, Breadcrumbs, Color coding, ...



Informavore, an organism that consumes information

# Poor Information Scent

- Users flailing around...
  - Do not know where to go
- Low confidence
  - Users are not sure of their actions, both before executing it and after they see its effects
- Back button
  - When it's used too often...

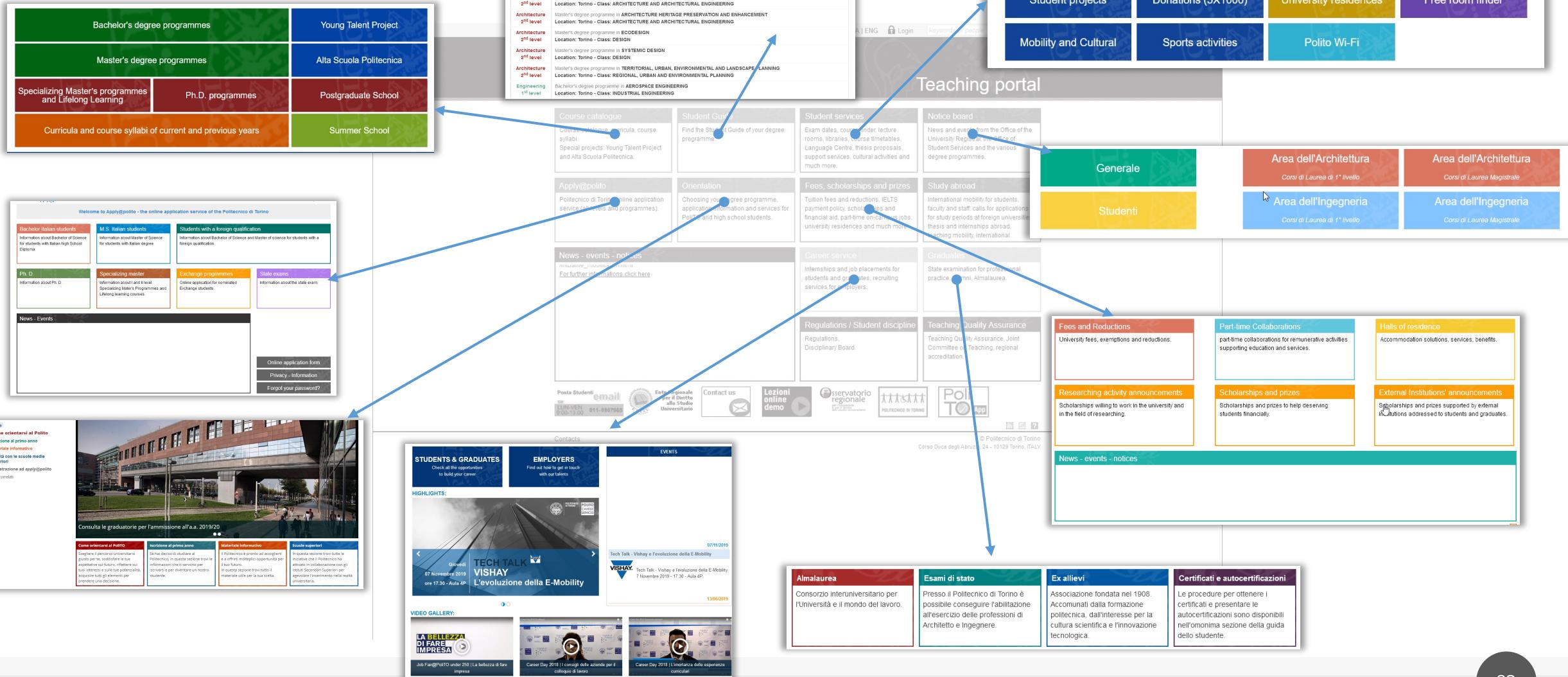
# Example

The screenshot shows the homepage of the Politecnico di Torino Teaching portal. At the top, there is a navigation bar with links for 'The Politecnico' (selected), 'Teaching', 'Research', 'Business', and 'International Campus'. It also includes language links ('ITA | ENG'), a 'Login' button, and a search bar. The main header features the Politecnico di Torino logo and the text 'POLITECNICO DI TORINO'. Below the header, the page title 'Teaching portal' is displayed. The content area is organized into several colored boxes:

- Course catalogue**: Course catalogue, curricula, course syllabi. Special projects: Young Talent Project and Alta Scuola Politecnica.
- Student Guide**: Find the Student Guide of your degree programme.
- Student services**: Exam dates, course finder, lecture rooms, libraries, course timetables, Language Centre, thesis proposals, support services, cultural activities and much more.
- Notice board**: News and events from the Office of the University Registrar, the Office of Student Services and the various degree programmes.
- Apply@polito**: Politecnico di Torino online application service (all levels and programmes).
- Orientation**: Choosing your degree programme, application information and services for PoliTO and high school students.
- Fees, scholarships and prizes**: Tuition fees and reductions, IELTS payment policy, scholarships and financial aid, part-time on-campus jobs, university residences and much more.
- Study abroad**: International mobility for students, faculty and staff; calls for applications for study periods at foreign universities, thesis and internships abroad, teaching mobility, international.
- News - events - notices**: For further informations click here.
- Career service**: Internships and job placements for students and graduates, recruiting services for employers.
- Graduates**: State examination for professional practice, alumni, AlmaLaurea.
- Regulations / Student discipline**: Regulations, Disciplinary Board.
- Teaching Quality Assurance**: Teaching Quality Assurance, Joint Committee on Teaching, regional accreditation.

At the bottom, there are links for 'Posta Studenti', 'email' (with a phone number 010-33300 011-897965), 'Ente Regionale per il Diritto allo Studio Universitario' (with a logo), 'Contact us' (with an envelope icon), 'Lezioni online demo' (with a play button icon), 'Osservatorio regionale' (with a green icon), 'POLITECNICO DI TORINO' (with a blue icon), and 'PoliTO App' (with a blue icon). There are also social media icons for YouTube, Facebook, and Twitter, along with a question mark icon. The footer contains the text '© Politecnico di Torino Corso Duca degli Abruzzi, 24 - 10129 Torino, ITALY'.

# Example



# Example

**Survey@Polito**

Administration -- Logged in as: **corno**

**Surveys:** Smart Home Survey

**Survey Smart Home Survey (ID:365355)**

**Question groups:** Please choose...

**Title:** Smart Home Survey (ID 365355)  
**Survey URL (English):** <https://survey.polito.it/365355/lang-en>

**Description:** This very short survey aims at exploring the future and expected user interaction between user and smart environments, in particular smart homes. The research goal is to update, and compare, the research findings of a similar survey held in year 2010 (5 years ago). The expected completion time for this survey is 5 minutes or less.

**Welcome:** Thank you for agreeing to take part in this survey. All the answers you give are anonymous, and the data-set will be released as open data after the survey ends. You may choose to reply in any of the supported languages, preferably your mother tongue.

**End message:** Thanks for completing the survey. The results will be available on the website <http://elite.polito.it> The paper describing the previous survey (in 2010) is available at: <http://porto.polito.it/2380988/>

**Administrator:** Fulvio Corno (fulvio.corno@polito.it)

**Start date/time:** -

**Expiry date/time:** -

**Template:** default

**Base language:** English

**Additional languages:** French  
German  
Italian  
Portuguese  
Spanish

**End URL:** e-Lite research group webpage

**Number of questions/groups:** 11/3

**Survey currently active:** Yes

**Survey table name:** beta\_survey\_365355

**Hints:** Answers to this survey are anonymized.  
It is presented group by group.  
Participants can save partially finished surveys  
Basic email notification is sent to: fulvio.corno@gmail.com  
Regenerate question codes: [\[Straight\]](#) [\[By group\]](#)

LimeSurvey Version 1.92+ Build 120919

# Common Problems

- Unexpected categories
- Short links
- Hidden navigation
- Icons are too generic, or not easily recognizable

# Icons

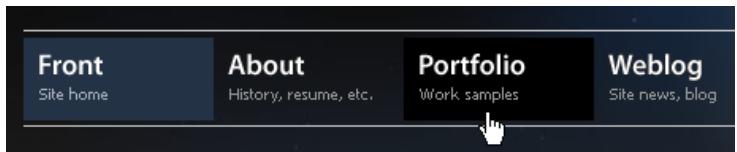
- Icons facilitate recognition over recall
  - When they are consistently used, and frequently visible
- Redundant coding helps recognition and memorization
  - Icon + Text + Tooltip + Context



# Links

- Always use multi-word links
  - Download the [next assignment template](#)
  - Assignment template: click [here](#)
- Straight language, not jargon
  - [Scor-o-matic](#) download
  - Download the [spreadsheet for computing scores](#)

# “Speaking” block navigation



A screenshot of a dark-themed navigation bar. It has five sections: 'Front Page' (This is where it all begins), 'Our Portfolio' (Let us show you our work), 'Who We Are' (Get to know us a little better, ), 'What We Do' (A rundown of our services), and 'Contact Us' (How to get in touch with us).



A screenshot of a dark-themed navigation bar. It has six items: 'Newsletter' (Free newsletter), 'Store' (Maximize your ministry), 'Events' (Attend an event near you, ), 'Podcast' (Free audio training), 'Coaching' (Networks for Worship Leaders), and 'free resources'.

<https://www.smashingmagazine.com/2008/02/navigation-menus-trends-and-examples/>

# Forms

- Logical field grouping
  - Sections
    - Dividers
    - Columns (spacing)
  - Titles
- Real-time error checking and validation feedback
  - Suggestions for correction
- Explicit submit button

**Create an IEEE Account** ? X

\* Required field

Provide your personal information

\* Given/First name: Catherine

Middle name:

\* Last/Family/Surname: Plaisant

Enter e-mail address & password

The e-mail provided here will be the username of your account.

\* E-mail address: cplaisant@

\* Re-enter e-mail address:

\* Password: Your password is good

\* Confirm password:

**Set security questions**

For your security, IEEE Accounts are required to have two security questions and answers.

\* Security question 1:  
Select

\* Type your answer:

\* Security question 2:  
Select

\* Type your answer:

[Privacy & Opting Out of Cookies](#)

Create Account and Continue Joining > Cancel

# Form Elements and UI Elements

The collage illustrates a variety of user interface elements:

- Text input fields:** Let you input text.
- Checkboxes:** NonFederal (99), Federal (57).
- Radio buttons:** Yes, No.
- Dropdowns:** Find your state or... Go.
- Date pickers:** SEP 18<sup>th</sup> 2010, JUN 22.
- Social sharing:** Send, Post, Tweet.
- Buttons:** ON, OFF.
- List boxes:** Are like dropdowns, But they let you make multiple selections, Like checkboxes do.
- Navigation:** General Settings, Your Profile, Sign Out.
- Calendars:** Sep. 2010, Jun 22.
- File icons:** Document, Image, Video, etc.
- Grid icons:** Grid, List, etc.
- Menu bar:** Menu Item, Messages (1), About Us.
- Modal window:** This is a box, containing placeholder text: "Lorem ipsum dolor sit amet, consectetur adipiscing elit. Fusce metus. Pellentesque sit amet velit. Phasellus non quam. Nulla diam purus, tristique quis, eleifend ac, molestie eu, sapien. Vestibulum ante ipsum primis. Vestibulum ante ipsum primis." with a READ MORE button.
- Search bar:** Enter Keywords, Search Option One, Search Option Two, Search Option Three.
- Search dropdown:** Enter Keywords, Category, SEARCH.
- Search filters:** Search: Everything, Entries, Photos, Videos, Audio.
- Image slider:** A sequence of five gray squares with left and right arrows.
- Pagination:** 1 2 3 4 5 6 7 8 9 10 next, Previous, Next.
- Tags:** Costs (72), Health Conditions (54), Improving Care (53), Prevention (50), Rights, Protections and Benefits (135), Insurance Coverage (141).
- Progress bar:** A horizontal bar with numbered steps (1, 2, 3) and labels: 1. Skills, 2. Location, 3. Finish.
- Step buttons:** Step 1 Select your plan, Step 2 Select your plan, Step 3 Select your plan.
- Form buttons:** Clean, Fresh, Modern, Unique, X, +.

<https://www.usability.gov/how-to-and-tools/methods/user-interface-elements.html>

# Example: Redesign This

Attenzione, i seguenti insegnamenti sono in corso di sospensione potranno essere sostenuti entro la sessione sotto indicata. Se terminata la sessione d'esame non risulteranno ancora superati, verranno sostituiti con l'insegnamento riportato in tabella.						
Codice	Nome insegnamento	Crediti	Cod Ins Sostituto	Nome Ins Sostituto	Crediti sostituto	Scadenza esame
12BHDLZ	Informatica	8	14BHDLZ	Informatica	8	9/2021
Se non è ancora stato specificato un sostituto, il referente del corso provvederà in seguito a segnalare con quali esami sostituire gli spenti						

# Reading Content

Organizing text and content for maximum visibility

# Reading Content

“How people  
read on-line?”

“They don’t”

How Users Read on the Web  
by Jakob Nielsen on September 30, 1997  
<https://www.nngroup.com/articles/how-users-read-on-the-web/>

# Eye Tracking



- Observe eye movements
  - One or more cameras
  - Usually in infra-red
- Infer where the user was looking  
(on the screen)
- Record the positions where your gaze will go
- Combine observations from many users

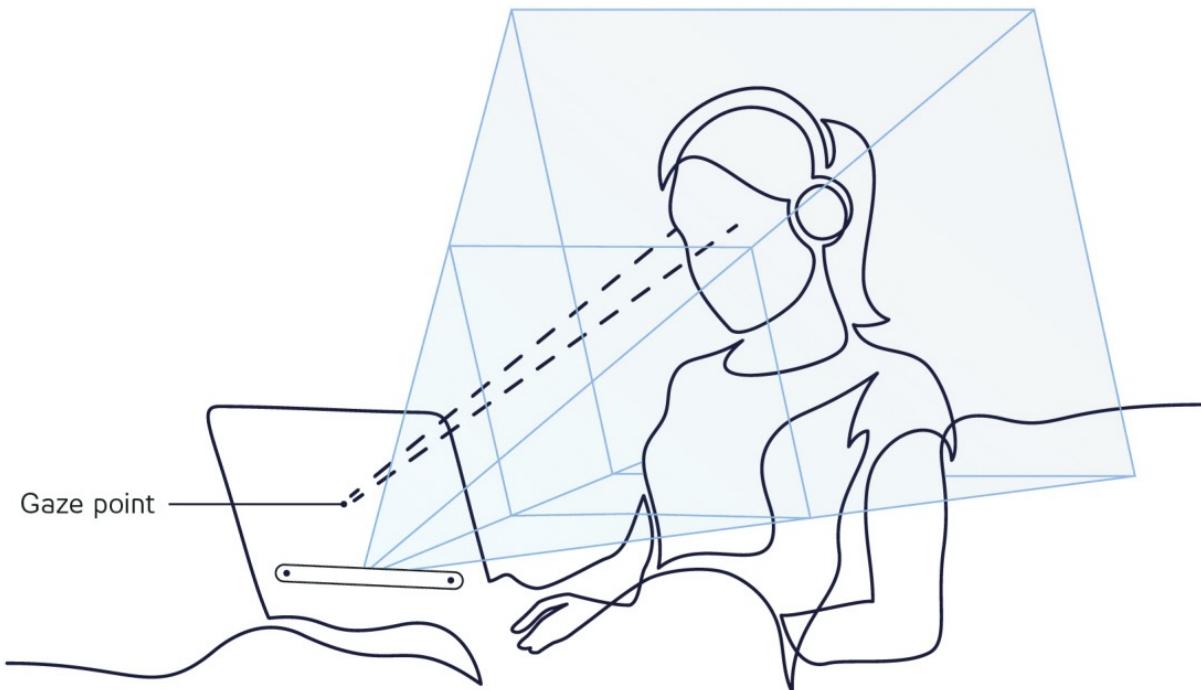
# Eye Trackers



source: <https://www.tobii.com>

# Eye Tracker: How It Works

- 1 An eye tracker consists of cameras, projectors and algorithms.
- 2 The projectors create a pattern of near-infrared light on the eyes.
- 3 The cameras take high-resolution images of the user's eyes and the pattern.
- 4 Machine learning, image processing and mathematical algorithms are used to determine the eyes' position and gaze point.

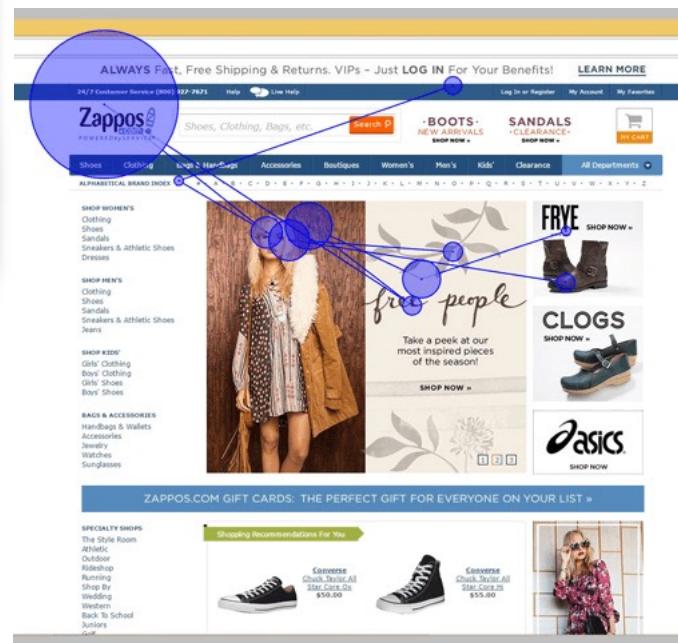


source: <https://www.tobii.com/group/about/this-is-eye-tracking/>

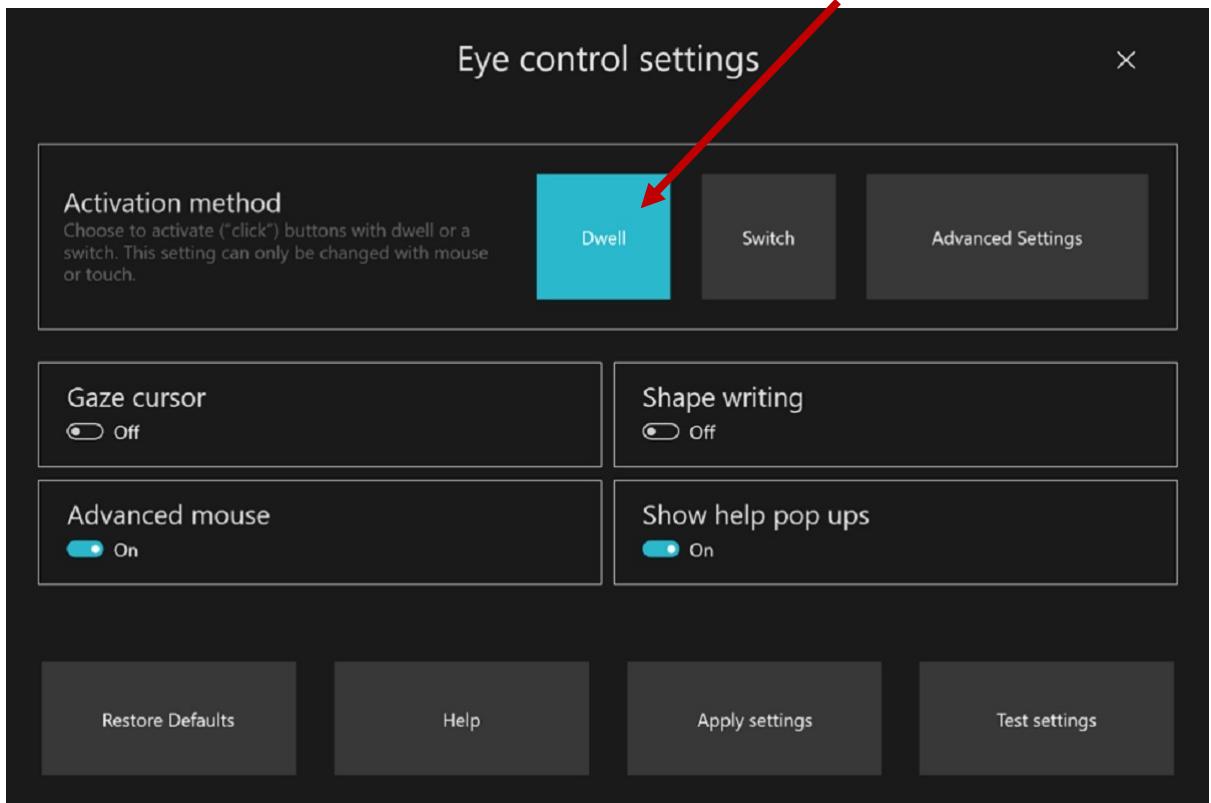
# Eye Tracker: Examples



Heatmap and scan path analysis



Beware the Midas' Touch!



Windows 10 Eye Control Settings

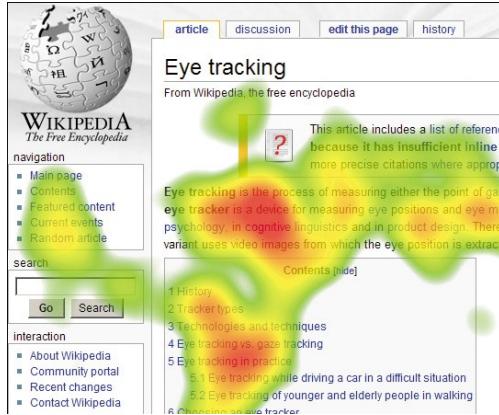
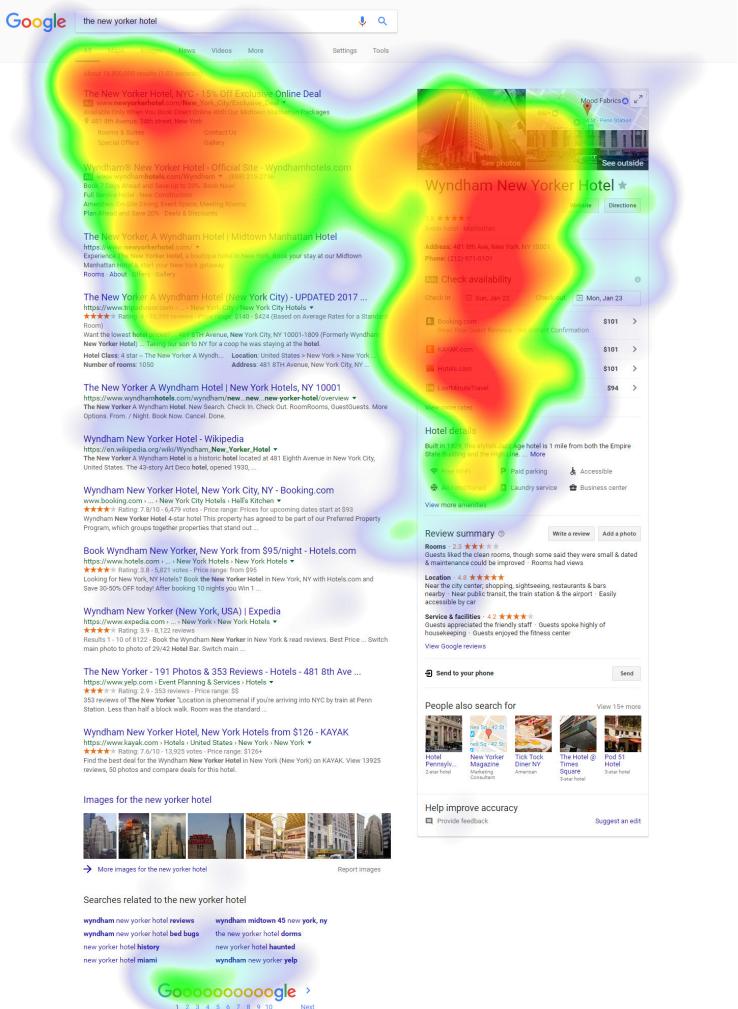
# Location on the Page

Eye tracking studies show where the users actually look on the page

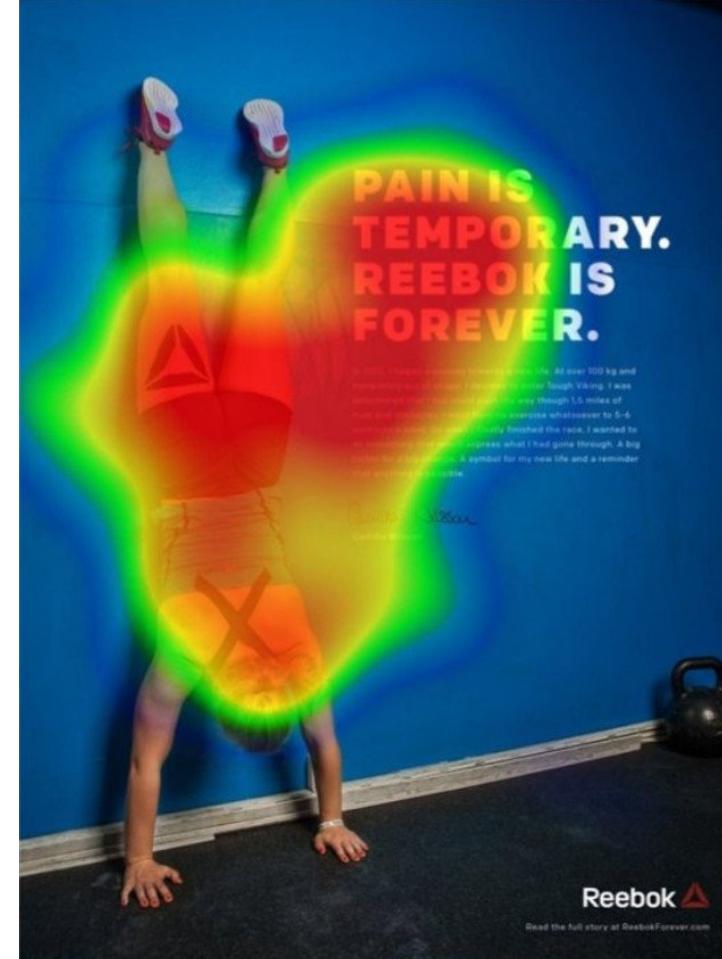
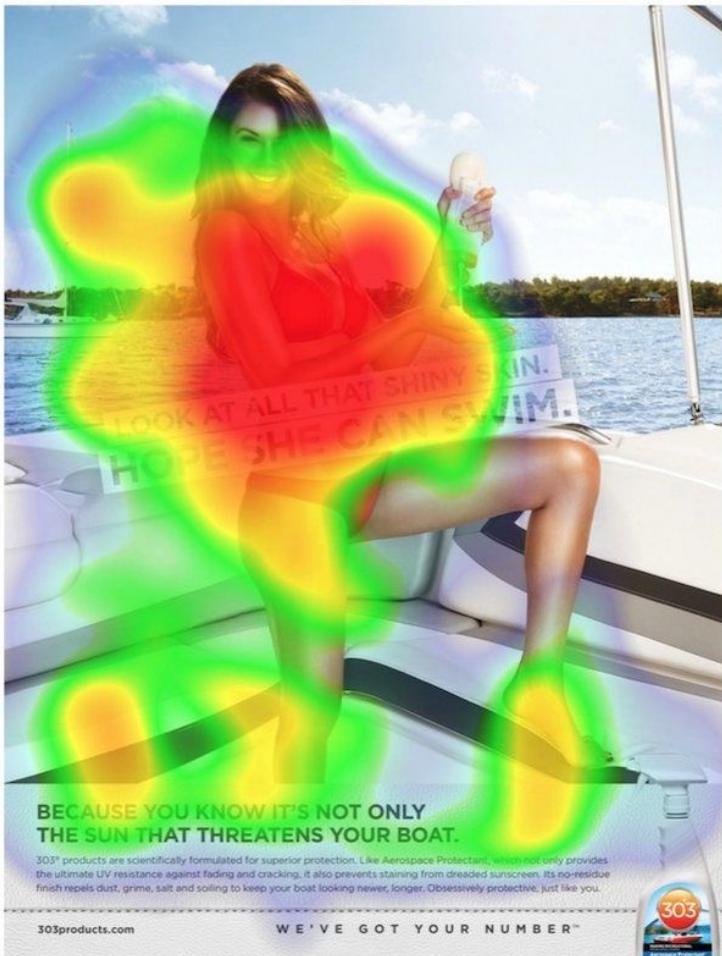
Search “eye tracking heat map” and see the major patterns

Users “glance” and spend limited amount of time on each page.

F-shaped pattern



# Did Anyone Ever Look at the Product Name?

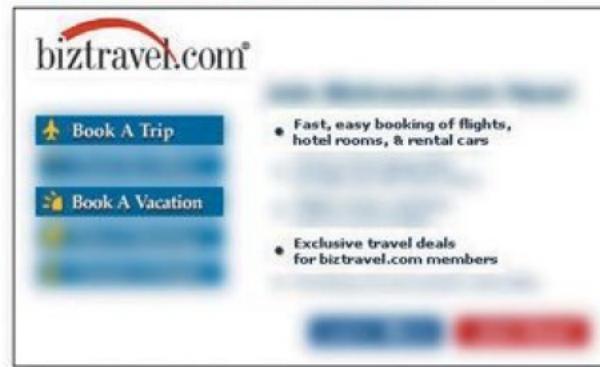


# Scanning

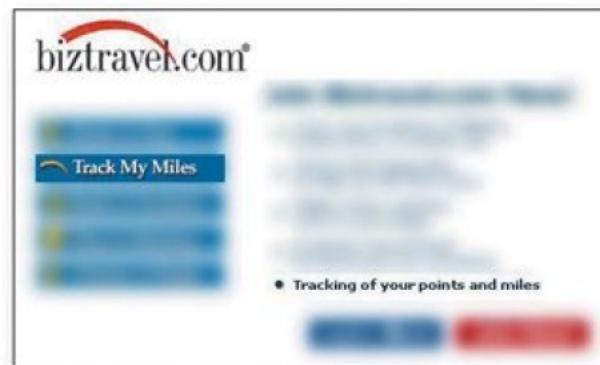
## WHAT DESIGNERS BUILD...



## WHAT USERS SEE...



I want to  
buy a  
ticket.



How do I  
check my  
frequent  
flyer miles?

# Experiment

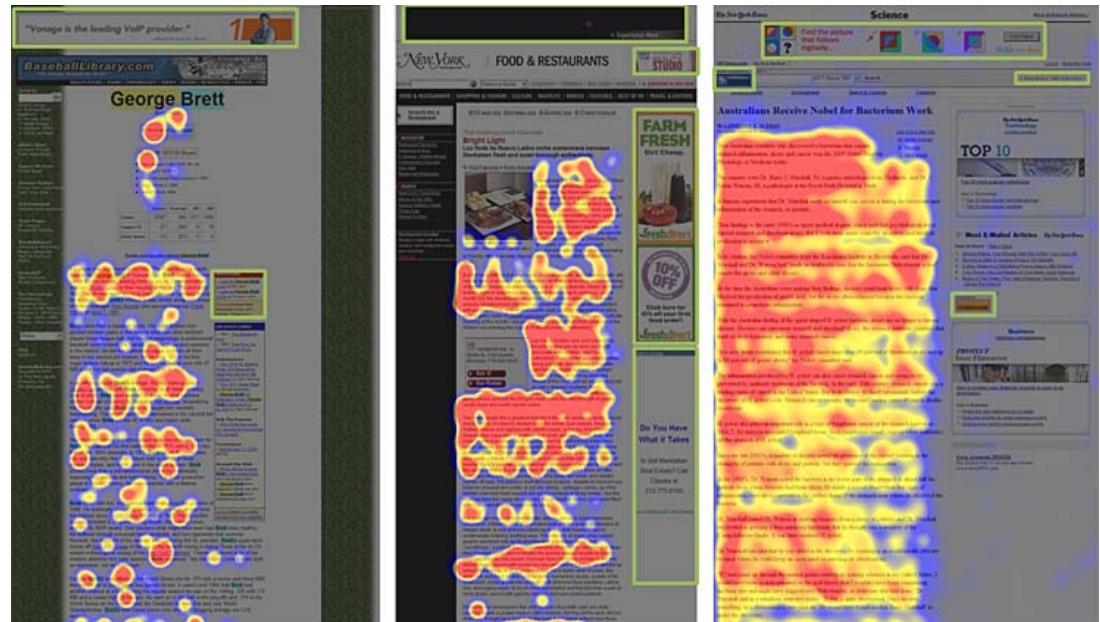
Site Version	Sample Paragraph	Usability Improvement (relative to control condition)
<b>Promotional writing (control condition)</b> using the "marketese" found on many commercial websites	Nebraska is filled with internationally recognized attractions that draw large crowds of people every year, without fail. In 1996, some of the most popular places were Fort Robinson State Park (355,000 visitors), Scotts Bluff National Monument (132,166), Arbor Lodge State Historical Park & Museum (100,000), Carhenge (86,598), Stuhr Museum of the Prairie Pioneer (60,002), and Buffalo Bill Ranch State Historical Park (28,446).	0% (baseline)
<b>Concise text</b> with about half the word count as the control condition	In 1996, six of the best-attended attractions in Nebraska were Fort Robinson State Park, Scotts Bluff National Monument, Arbor Lodge State Historical Park & Museum, Carhenge, Stuhr Museum of the Prairie Pioneer, and Buffalo Bill Ranch State Historical Park.	+58%
<b>Scannable layout</b> using the same text as the control condition in a layout that facilitated scanning	<p>Nebraska is filled with internationally recognized attractions that draw large crowds of people every year, without fail. In 1996, some of the most popular places were:</p> <ul style="list-style-type: none"> <li>•Fort Robinson State Park (355,000 visitors)</li> <li>•Scotts Bluff National Monument (132,166)</li> <li>•Arbor Lodge State Historical Park &amp; Museum (100,000)</li> <li>•Carhenge (86,598)</li> <li>•Stuhr Museum of the Prairie Pioneer (60,002)</li> <li>•Buffalo Bill Ranch State Historical Park (28,446).</li> </ul>	+47%
<b>Objective language</b> using neutral rather than subjective, boastful, or exaggerated language (otherwise the same as the control condition)	Nebraska has several attractions. In 1996, some of the most-visited places were Fort Robinson State Park (355,000 visitors), Scotts Bluff National Monument (132,166), Arbor Lodge State Historical Park & Museum (100,000), Carhenge (86,598), Stuhr Museum of the Prairie Pioneer (60,002), and Buffalo Bill Ranch State Historical Park (28,446).	+27%
<b>Combined version</b> using all three improvements in writing style together: concise, scannable, and objective	<p>In 1996, six of the most-visited places in Nebraska were:</p> <ul style="list-style-type: none"> <li>•Fort Robinson State Park</li> <li>•Scotts Bluff National Monument</li> <li>•Arbor Lodge State Historical Park &amp; Museum</li> <li>•Carhenge</li> <li>•Stuhr Museum of the Prairie Pioneer</li> <li>•Buffalo Bill Ranch State Historical Park</li> </ul>	+124%

# Best Locations to Put Content

- Above the fold
  - Prioritize, do not cram
- Where people expect
  - Where other pages put similar content
  - **Not** where the ads usually go
- Users will scroll down if the first content is interesting

# Banner Blindness

- The brain learns to avoid uninteresting content
- Banners and Advertisements are recognized subconsciously (by their appearance) and are never considered
  - Ads also “poison” adjacent elements
- Lesson learned: never create a message / title / warning / etc. that might look like an ad. (Faux ads)



# References and Acknowledgment

- Scott MacKenzie: Human-Computer Interaction -  
An Empirical Research Perspective, Morgan Kaufmann
  - Chapter 3: Interaction Elements
- Ben Shneiderman, Catherine Plaisant, Maxine S. Cohen, Steven M. Jacobs, and Niklas Elmquist, Designing the User Interface: Strategies for Effective Human-Computer Interaction
  - Chapter 8: Fluid Navigation
- COGS120/CSE170: Human-Computer Interaction Design, videos by Scott Klemmer,  
[https://www.youtube.com/playlist?list=PLLssT5z\\_DsK\\_nuHL\\_Mjt87THSTIgrsyJ](https://www.youtube.com/playlist?list=PLLssT5z_DsK_nuHL_Mjt87THSTIgrsyJ)
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