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# Visual Design and Fluid Navigation

**User Experience Design**

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Academic Year 2024/2025

# 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 …

**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.

**Layout**

**Colors**

# Alignment

BASIC VISUAL DESIGN

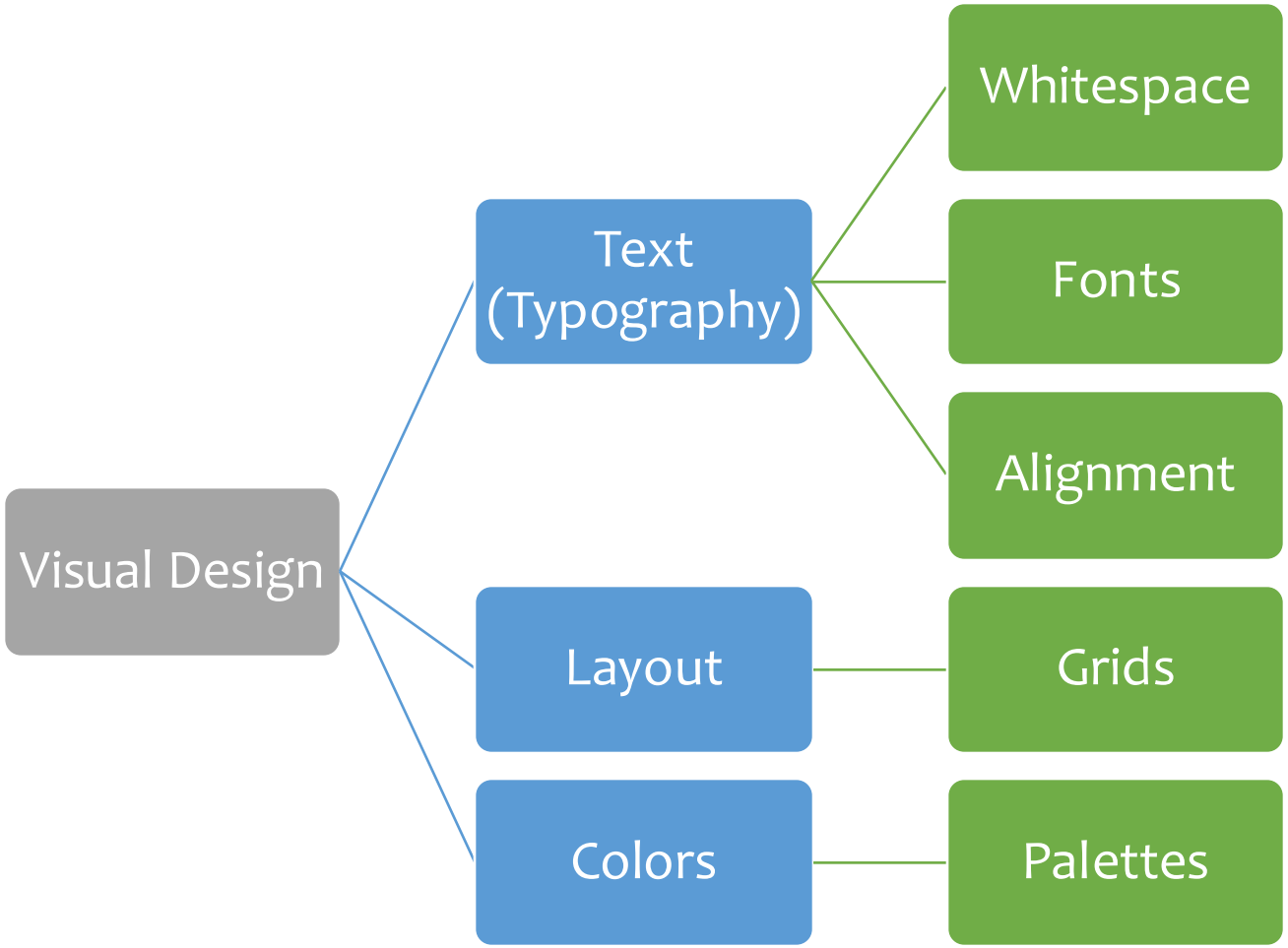
## Text

- ***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

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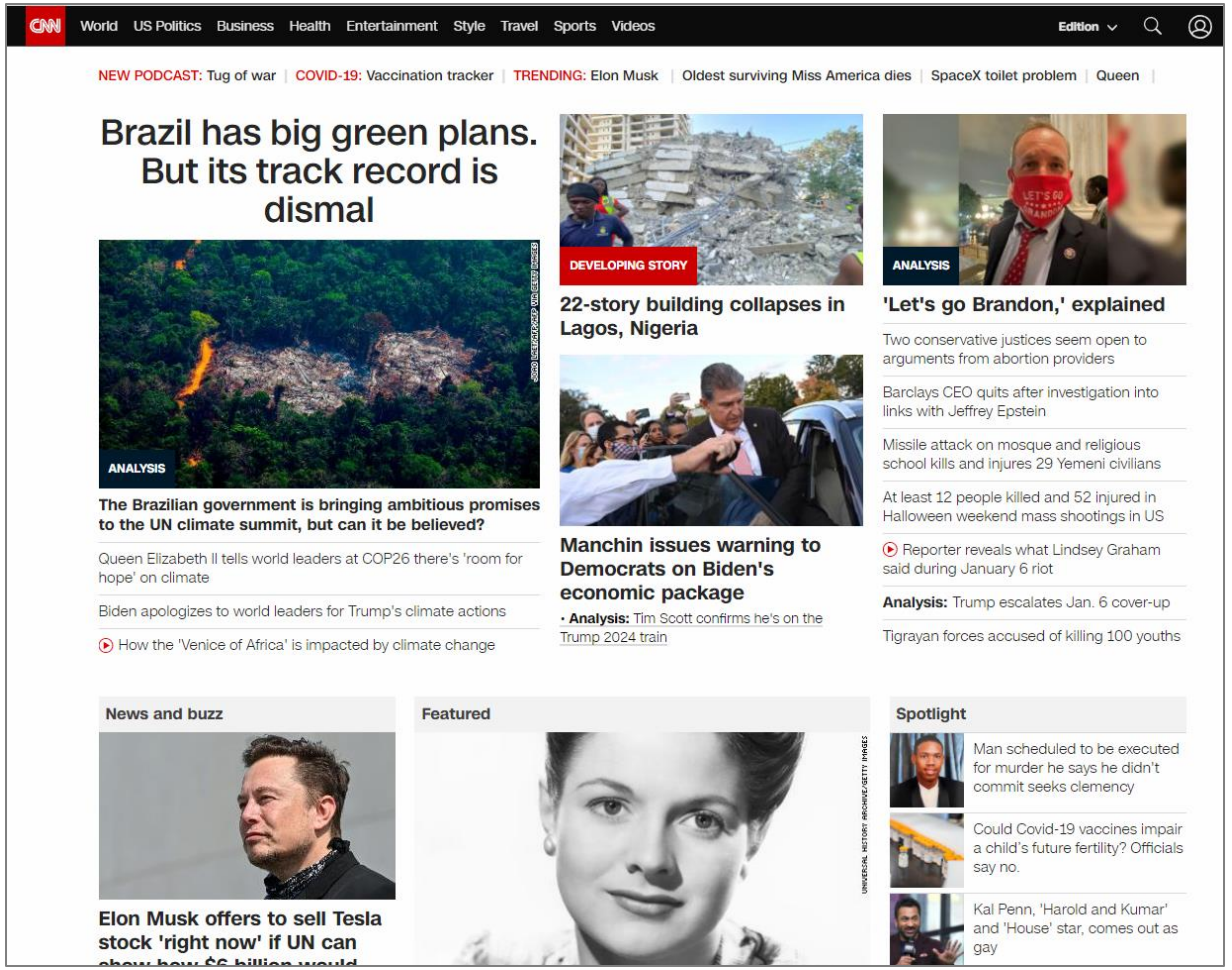

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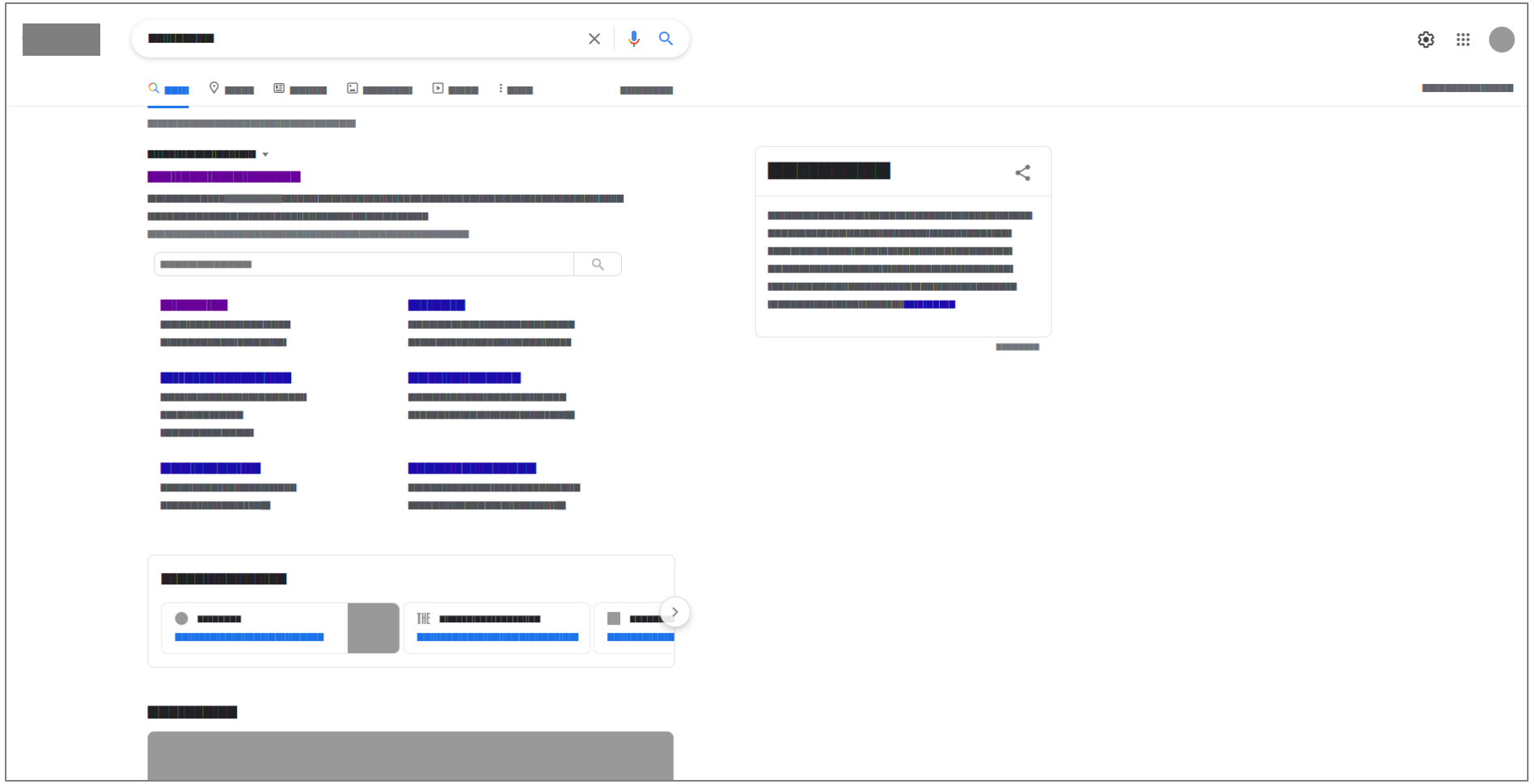

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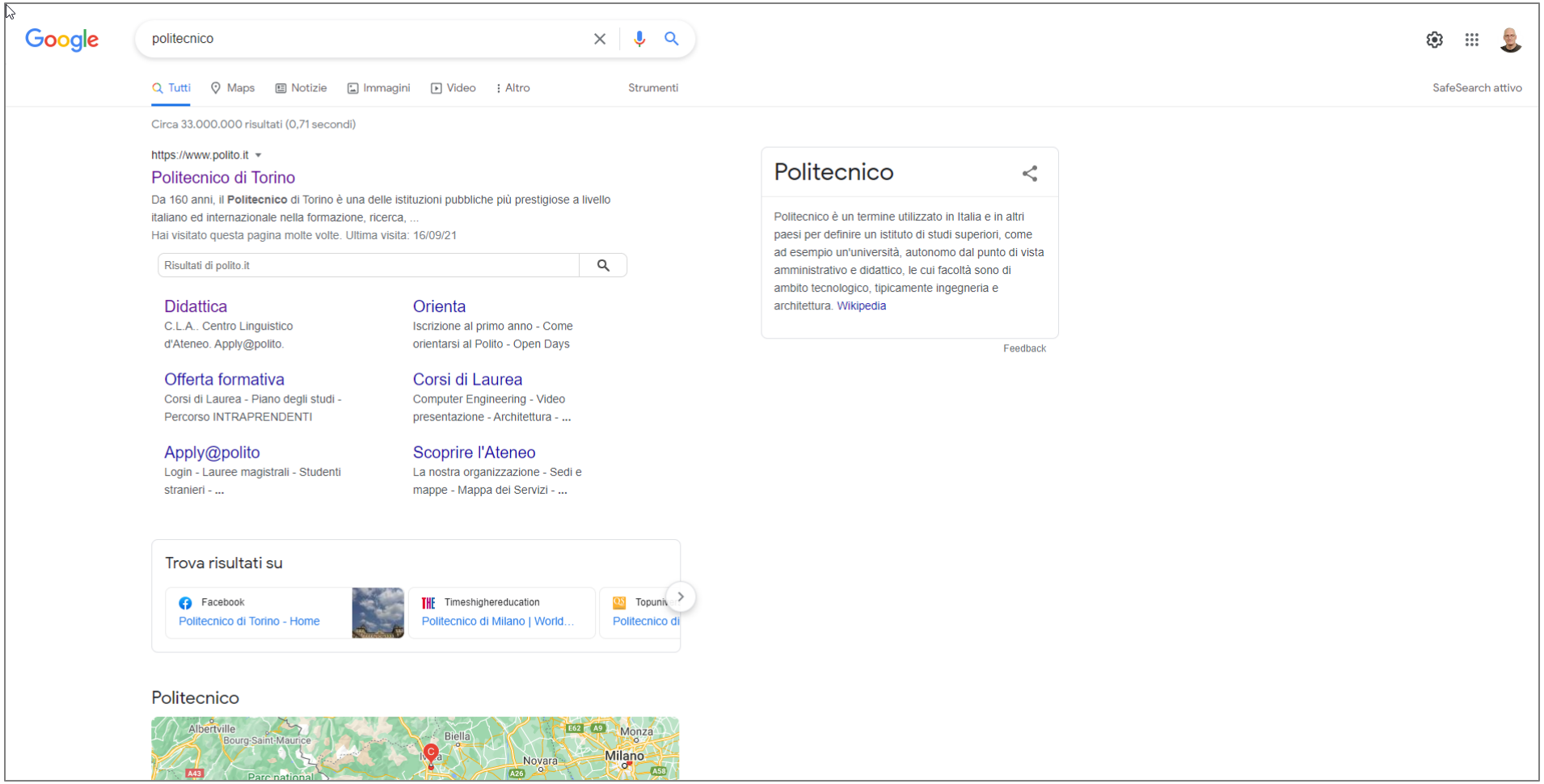
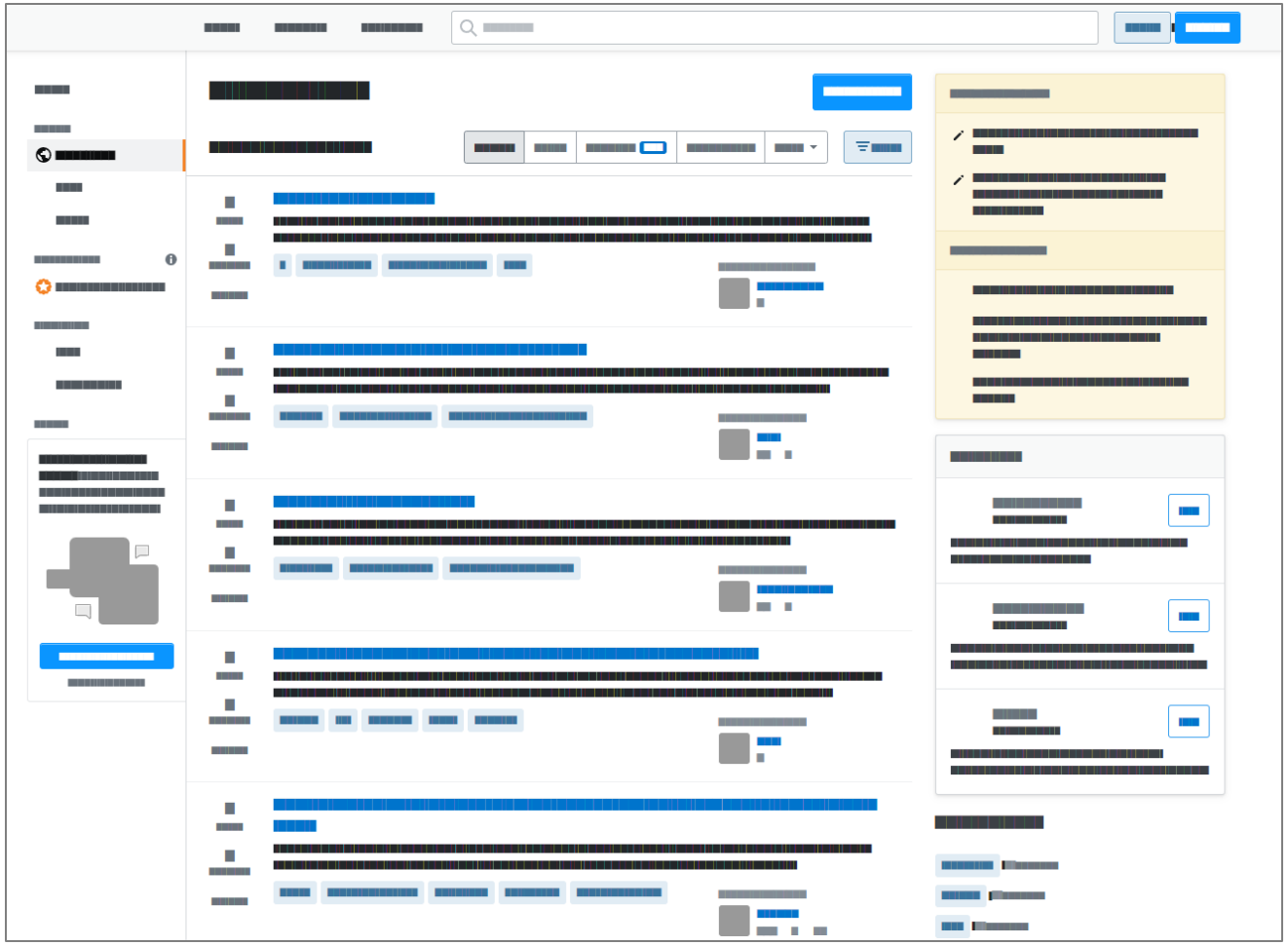
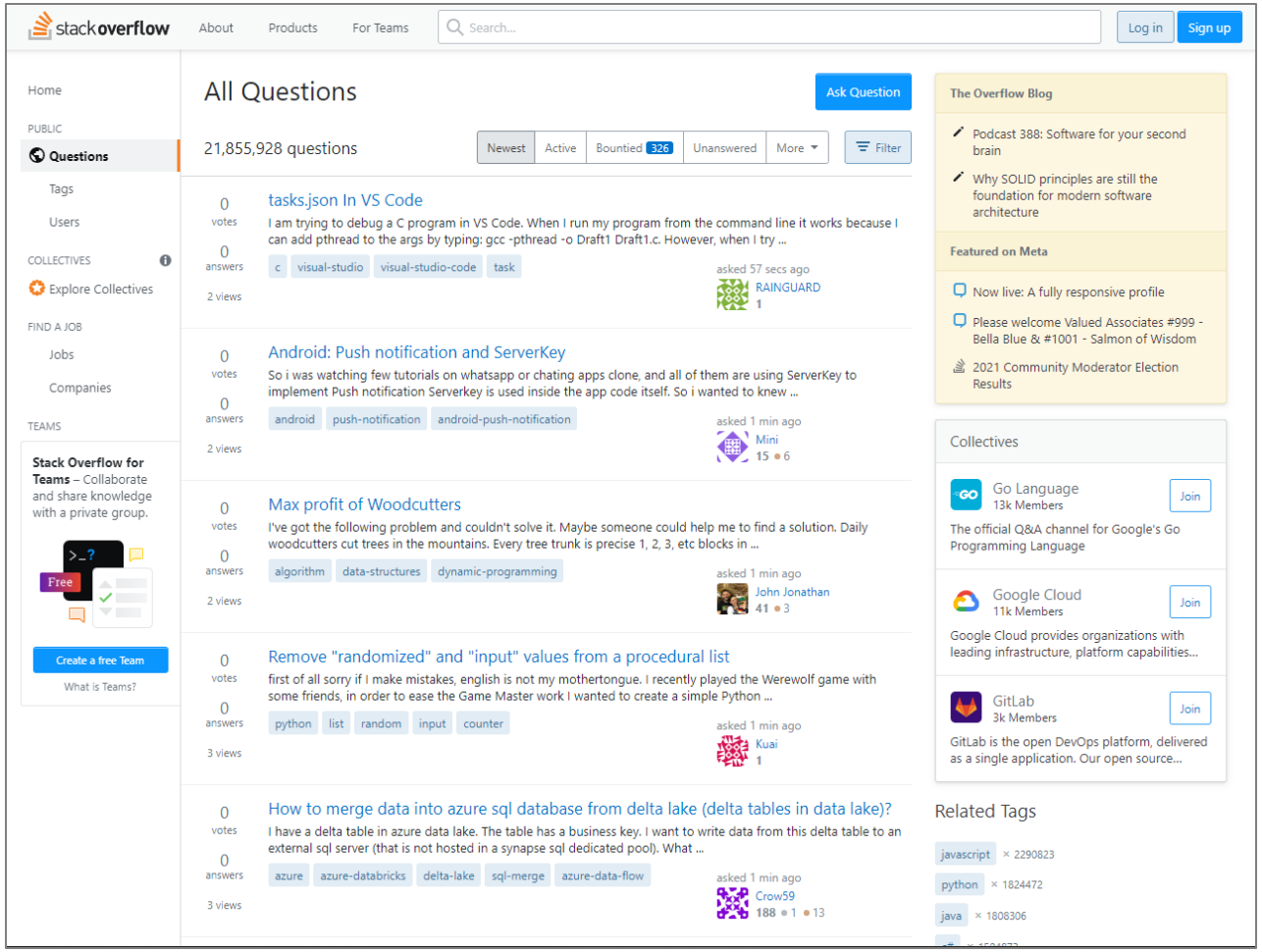


# Recognizable Page Structure



# Recognizable Page Structure



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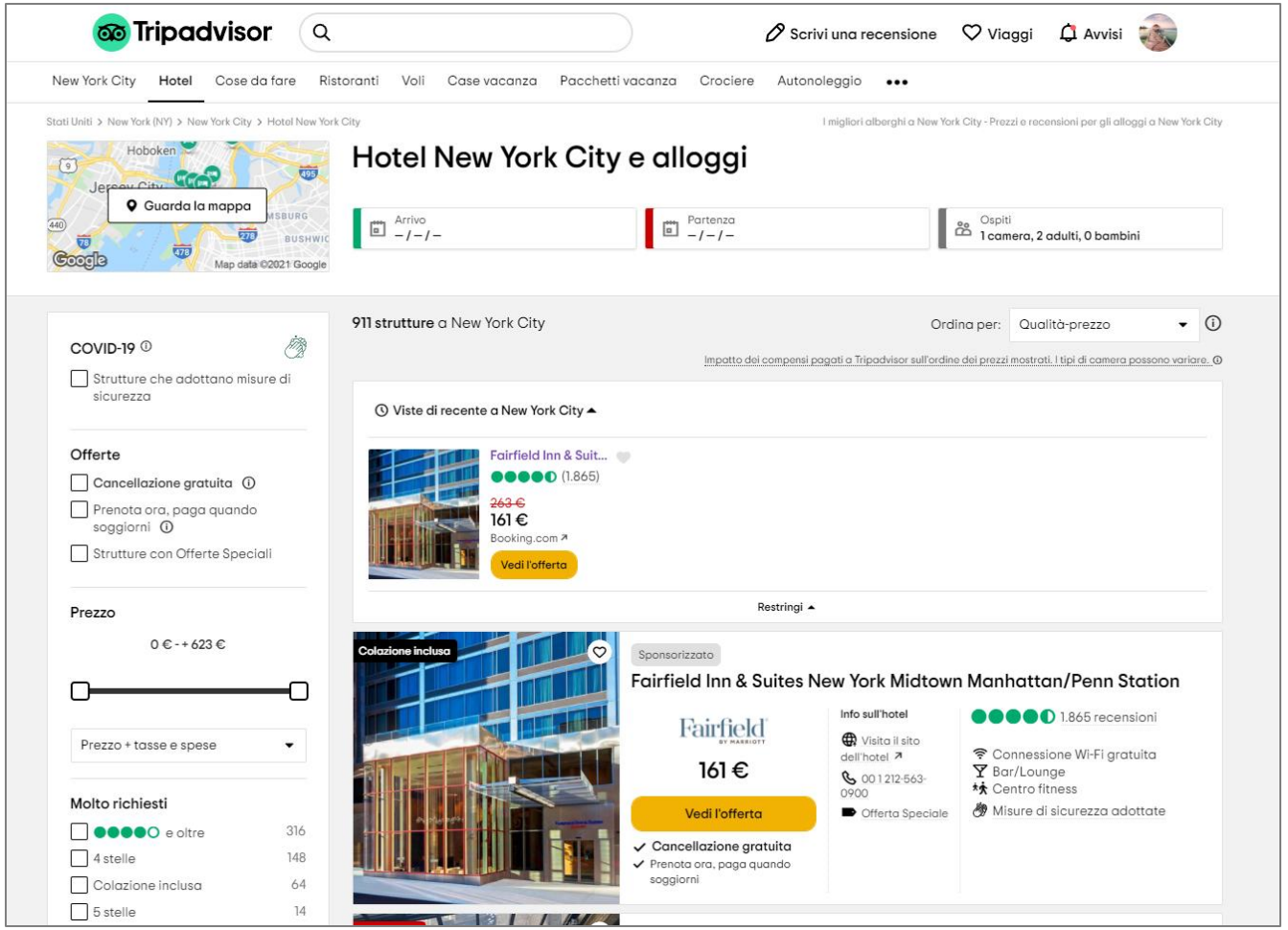
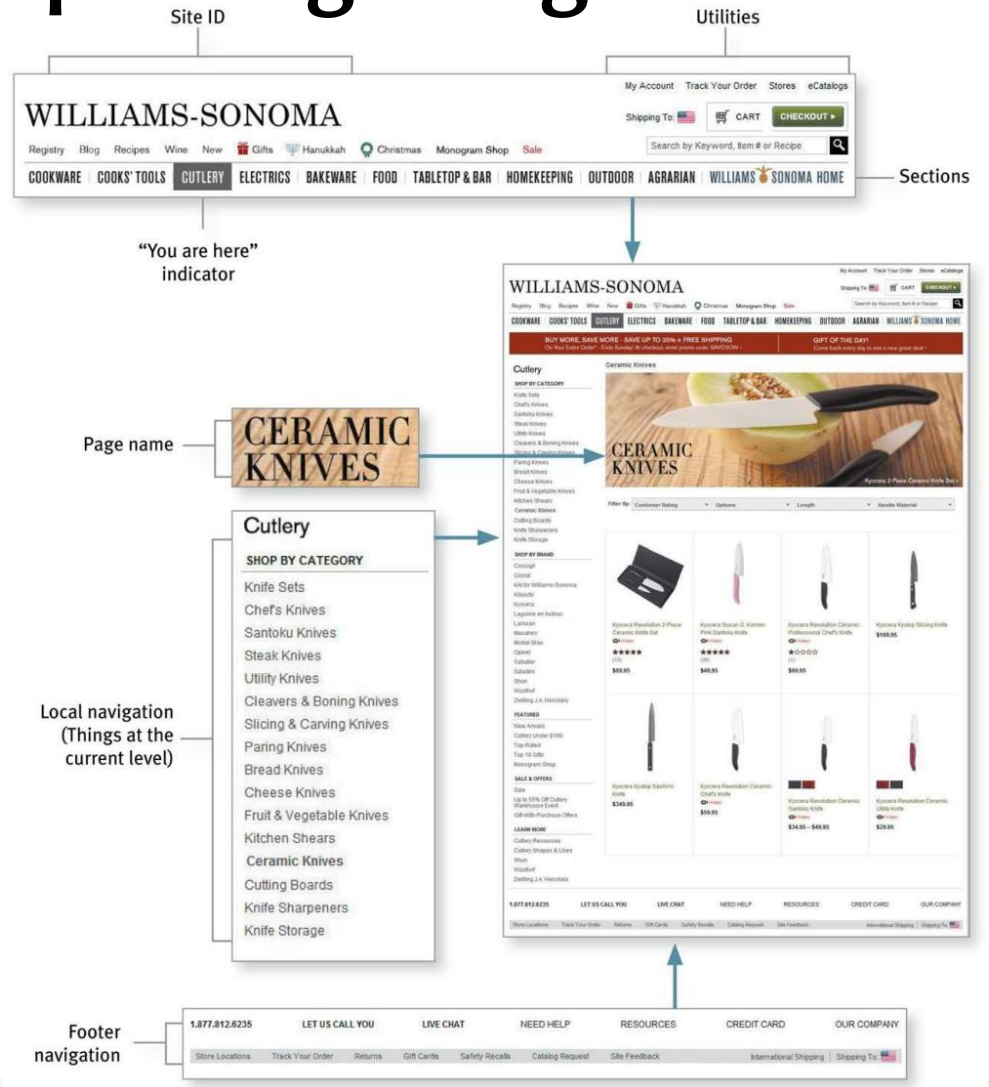


# Conventions Help Recognizing Structure



# ‘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*

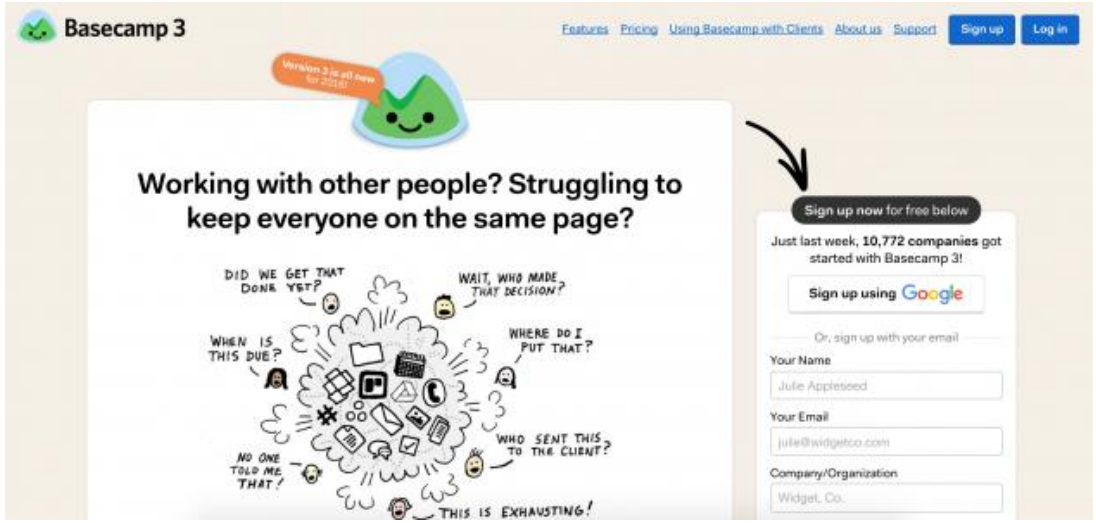
https://www.interaction-design.org/literature/topics/gestalt-principles

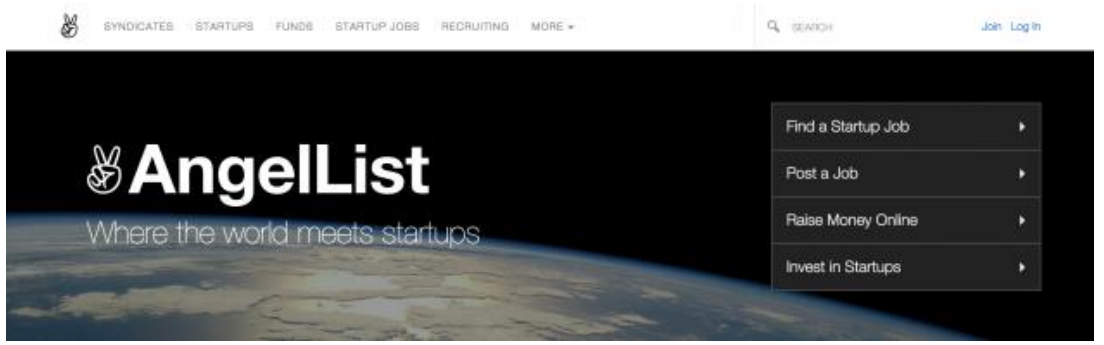
https://www.usertesting.com/blog/gestalt-principles/

# 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.

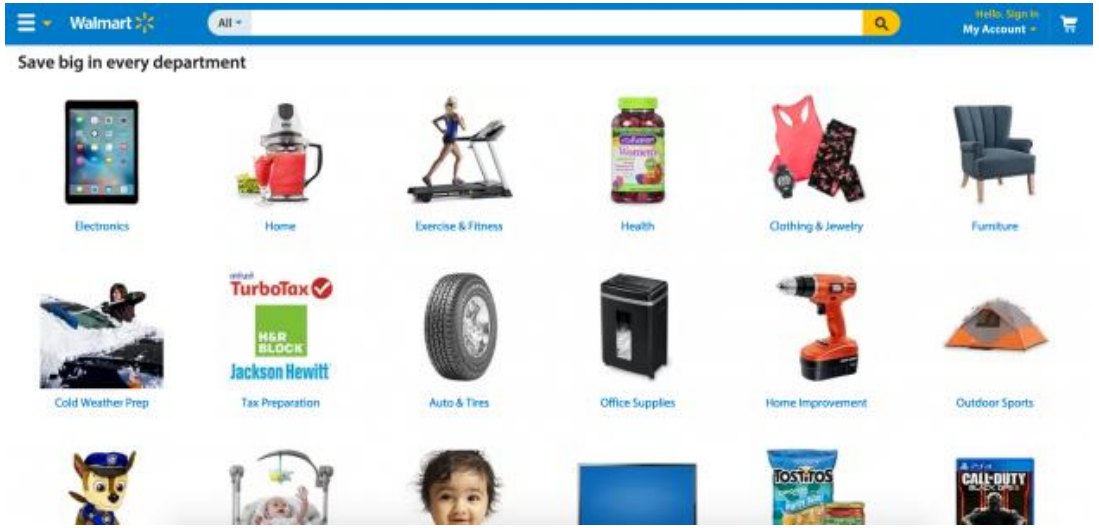
# Examples: Figure-ground

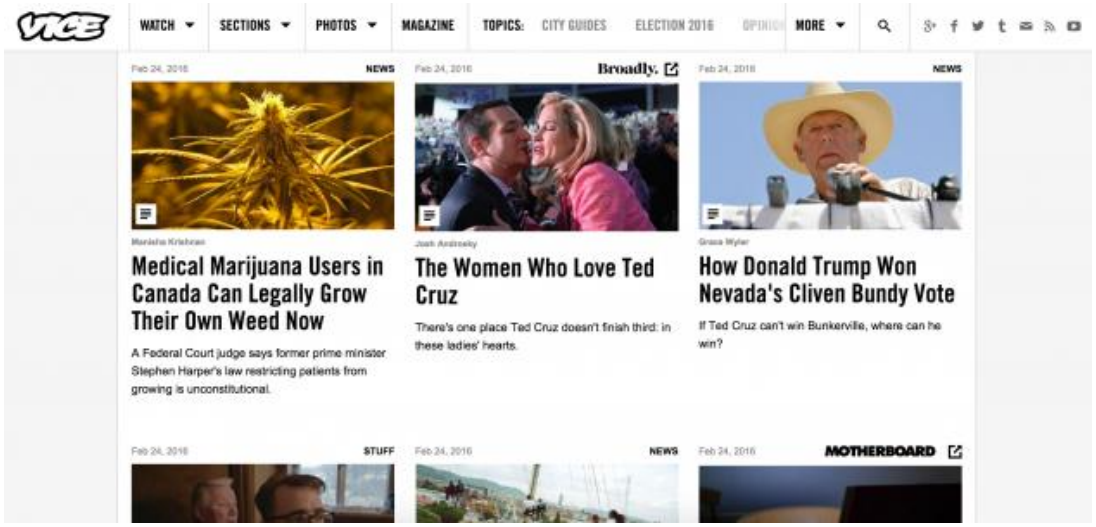


# Examples: Similarity

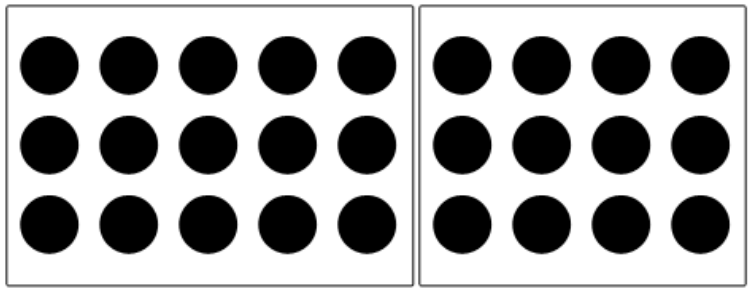
# Examples: Proximity

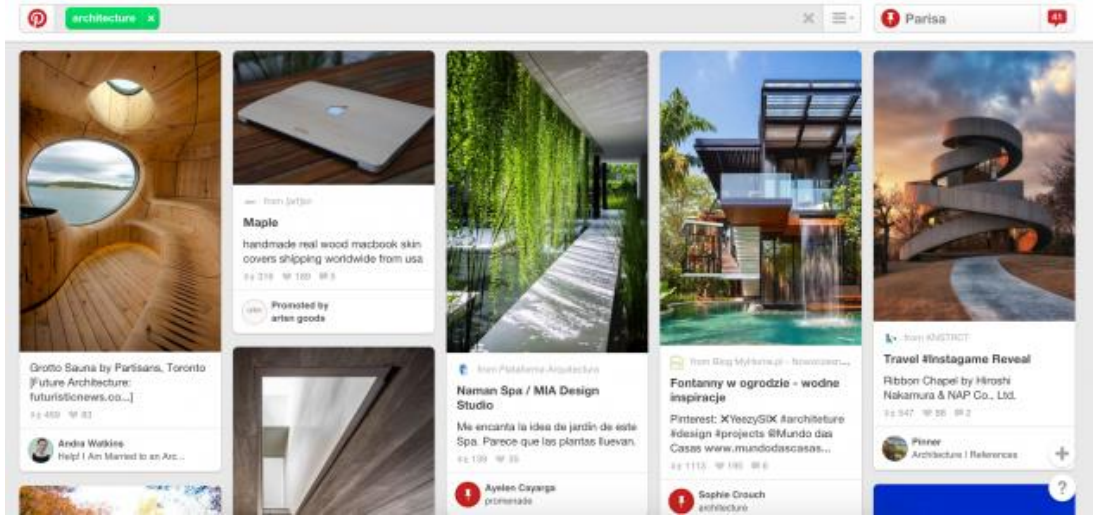


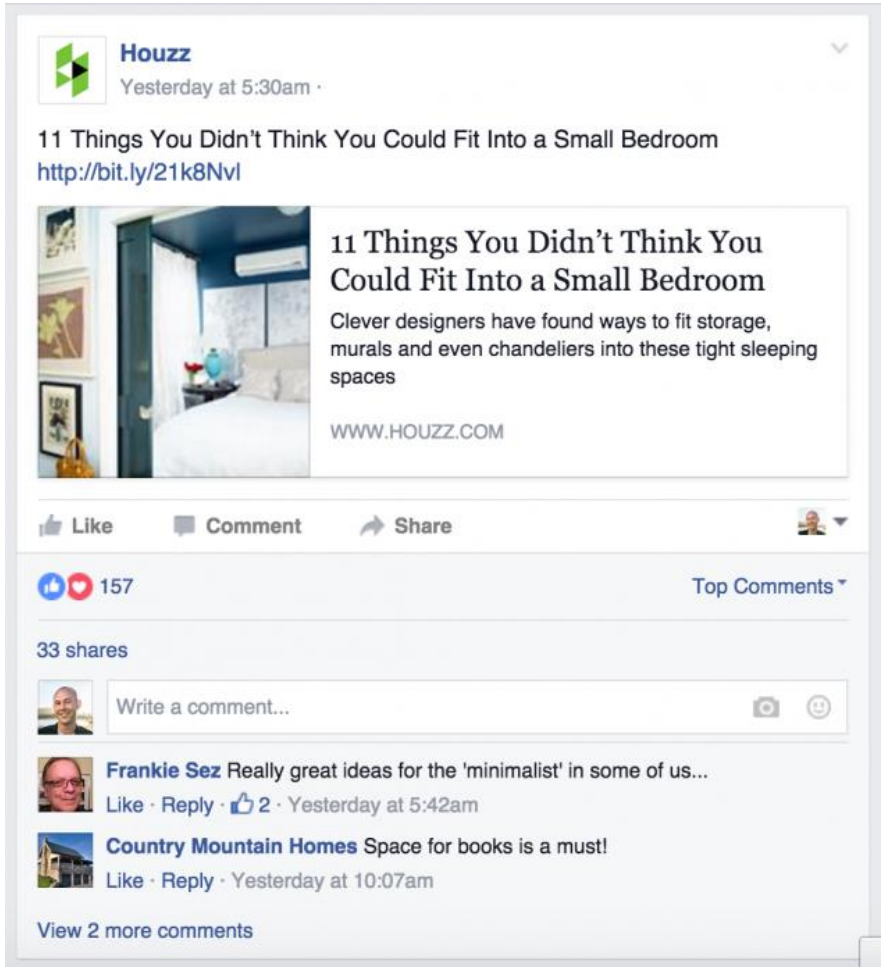




https://www.usertesting.com/blog/gestalt-principles/

# Examples: Common Region

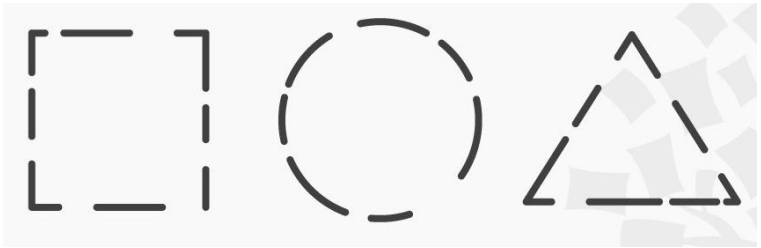




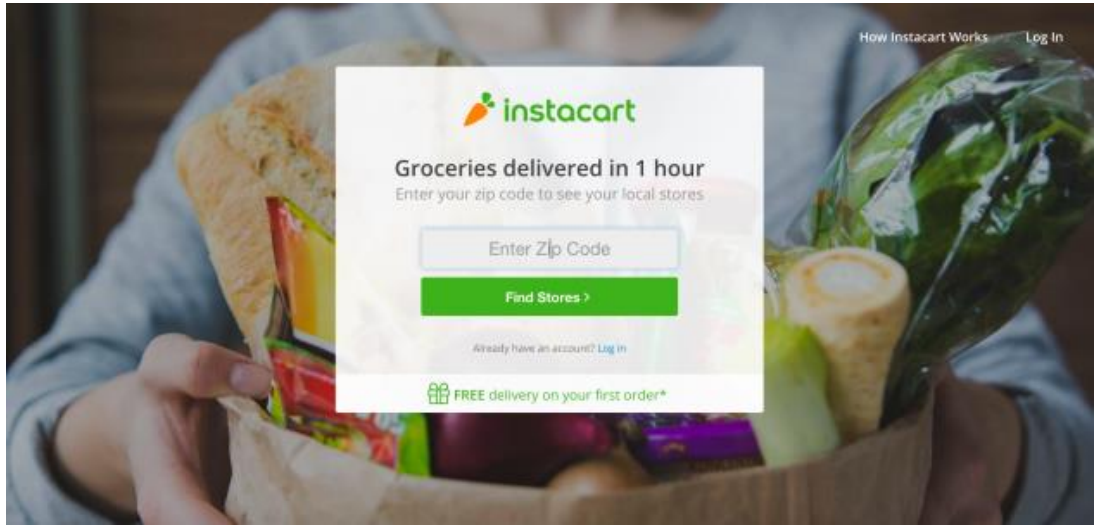



# Examples: Continuity

# Examples: Closure



# Examples: Focal Point

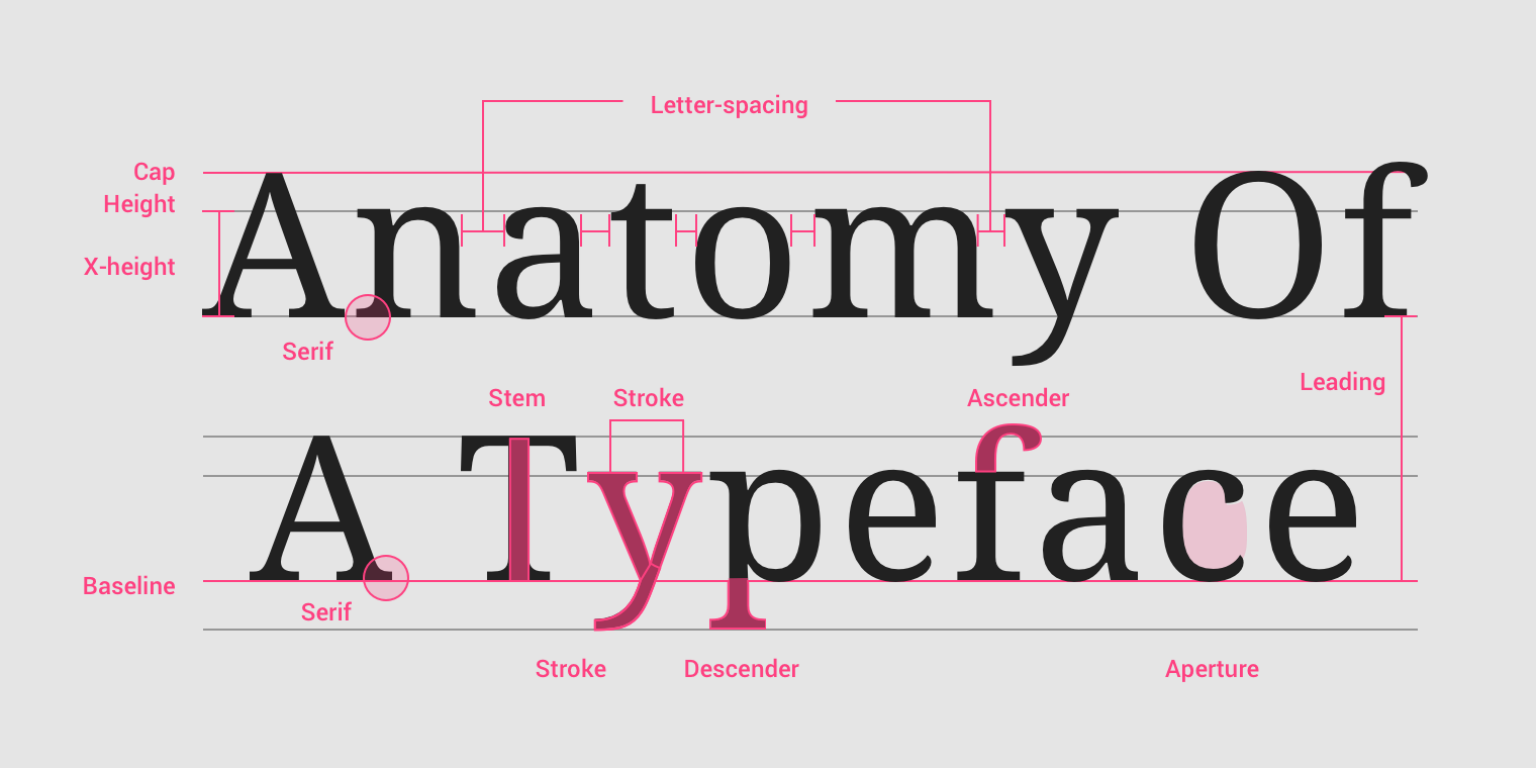


# Typography

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

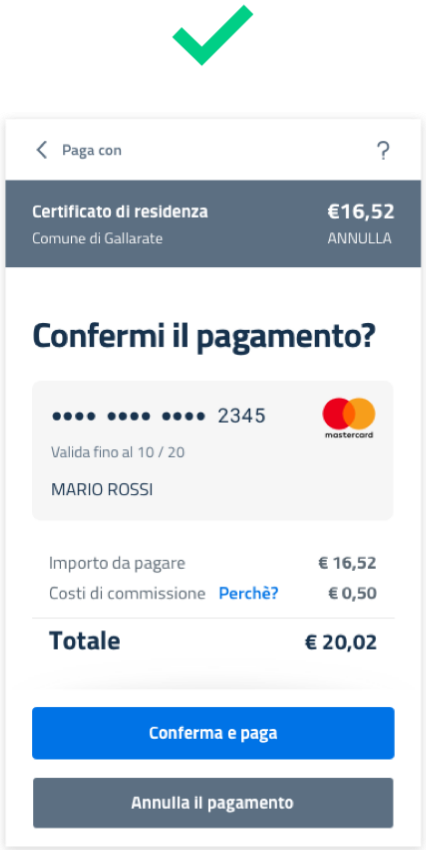
Reusable categories of text, each with an intended application and meaning

| 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

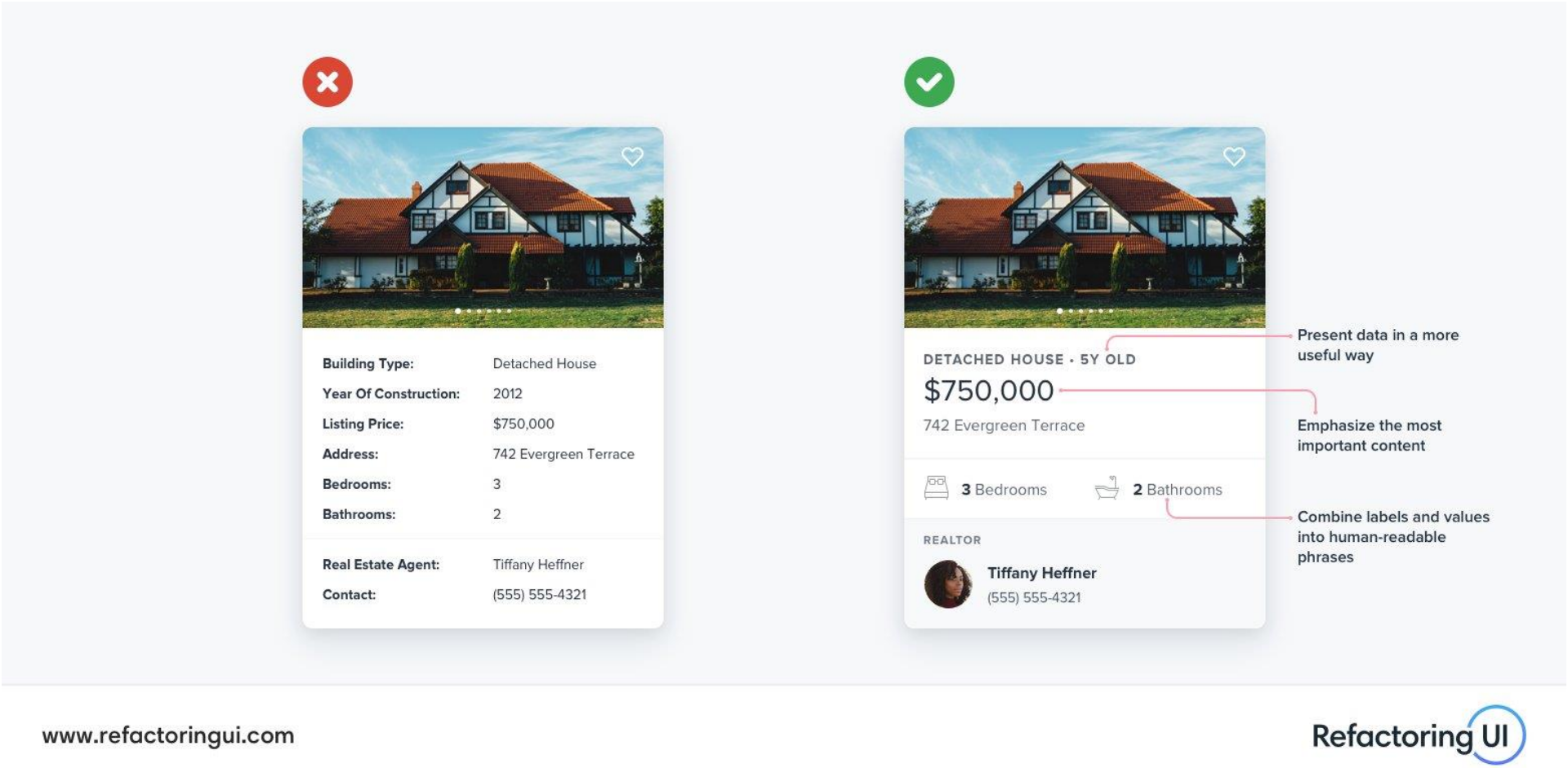
# Text

- 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



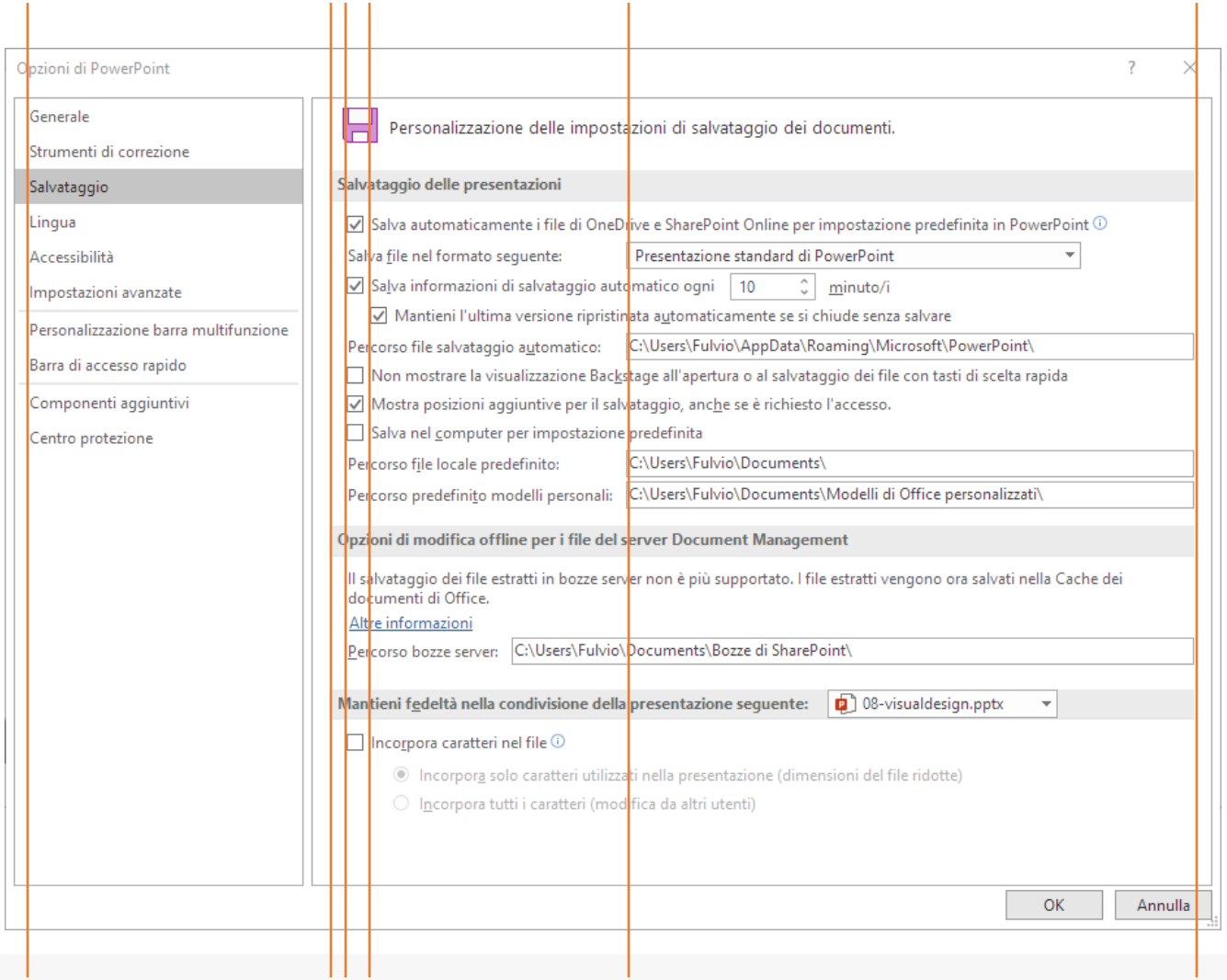
# Grids and Alignment

Exploiting grouping and alignment to convey content, at different levels

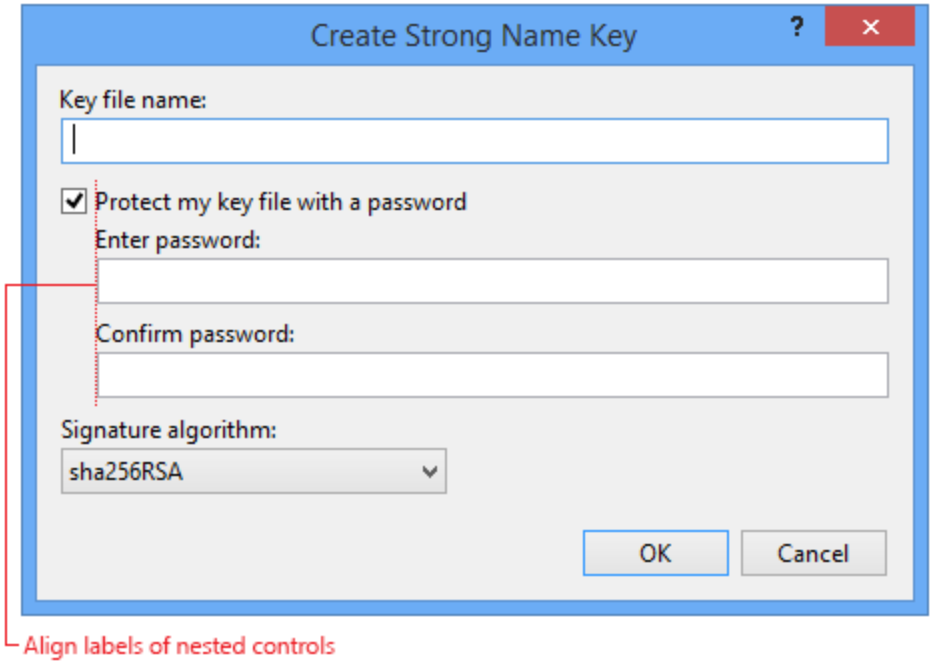
# Alignment

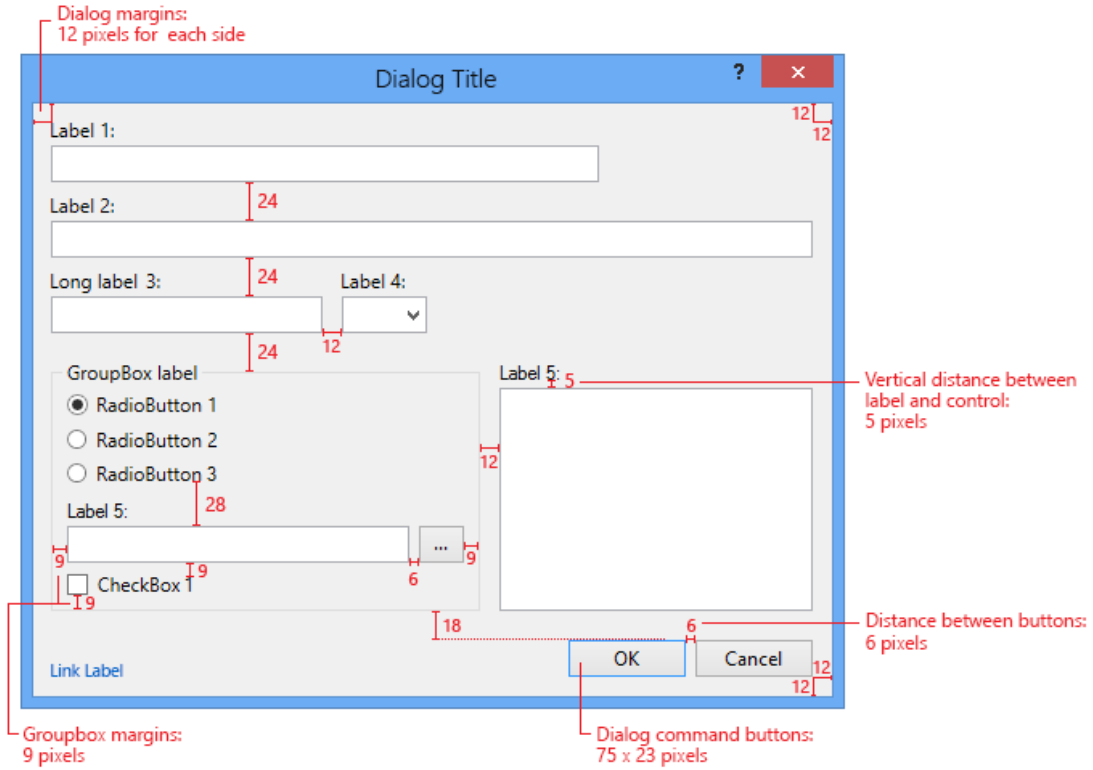
- Invisible lines that run through the interface and “attract” the left- or right-edge of a widget control
  - Vertical
  - Horizontal

# Example


Opzioni di PowerPoint
Generale
Strumenti di correzione
Salvataggio
Lingua
Accessibilità
Impostazioni avanzate
Personalizzazione barra multifunzione
Barra di accesso rapido
Componenti aggiuntivi
Centro protezione
Personalizzazione delle impostazioni di salvataggio dei documenti.
Salvataggio delle presentazioni
Salva automaticamente i file di OneDrive e SharePoint Online per impostazione predefinita in PowerPoint
Salva file nel formato seguente:
Presentazione standard di PowerPoint
Salva informazioni di salvataggio automatico ogni
10
minuto/i
Mantieni l'ultima versione ripristinata automaticamente se si chiude senza salvare
Percorso file salvataggio automatico:
C:\Users\Fulvio\AppData\Roaming\Microsoft\PowerPoint\
Non mostrare la visualizzazione Backstage all'apertura o al salvataggio dei file con tasti di scelta rapida
Mostra posizioni aggiuntive per il salvataggio, anche se è richiesto l'accesso.
Salva nel computer per impostazione predefinita
Percorso file locale predefinito:
C:\Users\Fulvio\Documents\
Percorso predefinito modelli personali:
C:\Users\Fulvio\Documents\Modelli di Office personalizzati\
Opzioni di modifica offline per i file del server Document Management
Il salvataggio dei file estratti in bozze server non è più supportato. I file estratti vengono ora salvati nella Cache dei documenti di Office.
Altre informazioni
Percorso bozze server:
C:\Users\Fulvio\Documents\Bozze di SharePoint\
Mantieni fedeltà nella condivisione della presentazione seguente:
08-visualdesign.pptx
Incorpora caratteri nel file
Incorpora solo caratteri utilizzati nella presentazione (dimensioni del file ridotte)
Incorpora tutti i caratteri (modifica da altri utenti)
OK
Annulla

# Examples




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

# 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

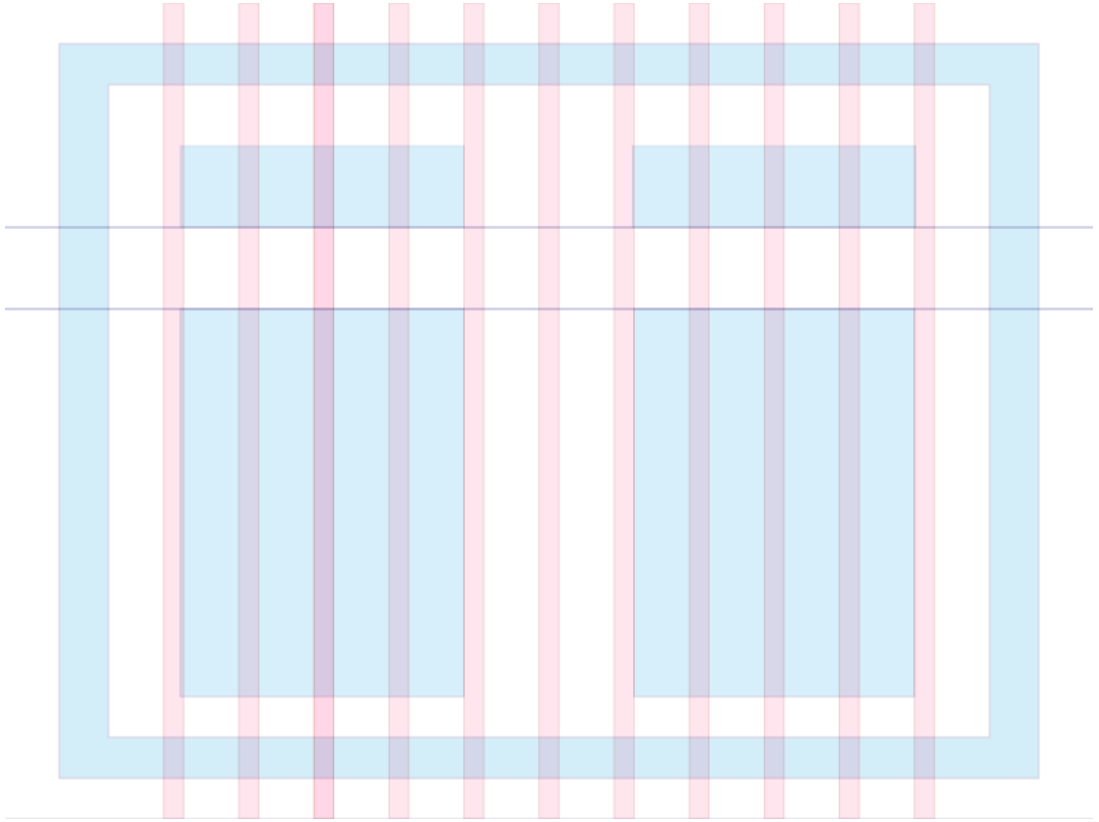
## Margins



## Columns & Gutters

# Grid Layout Ingredients

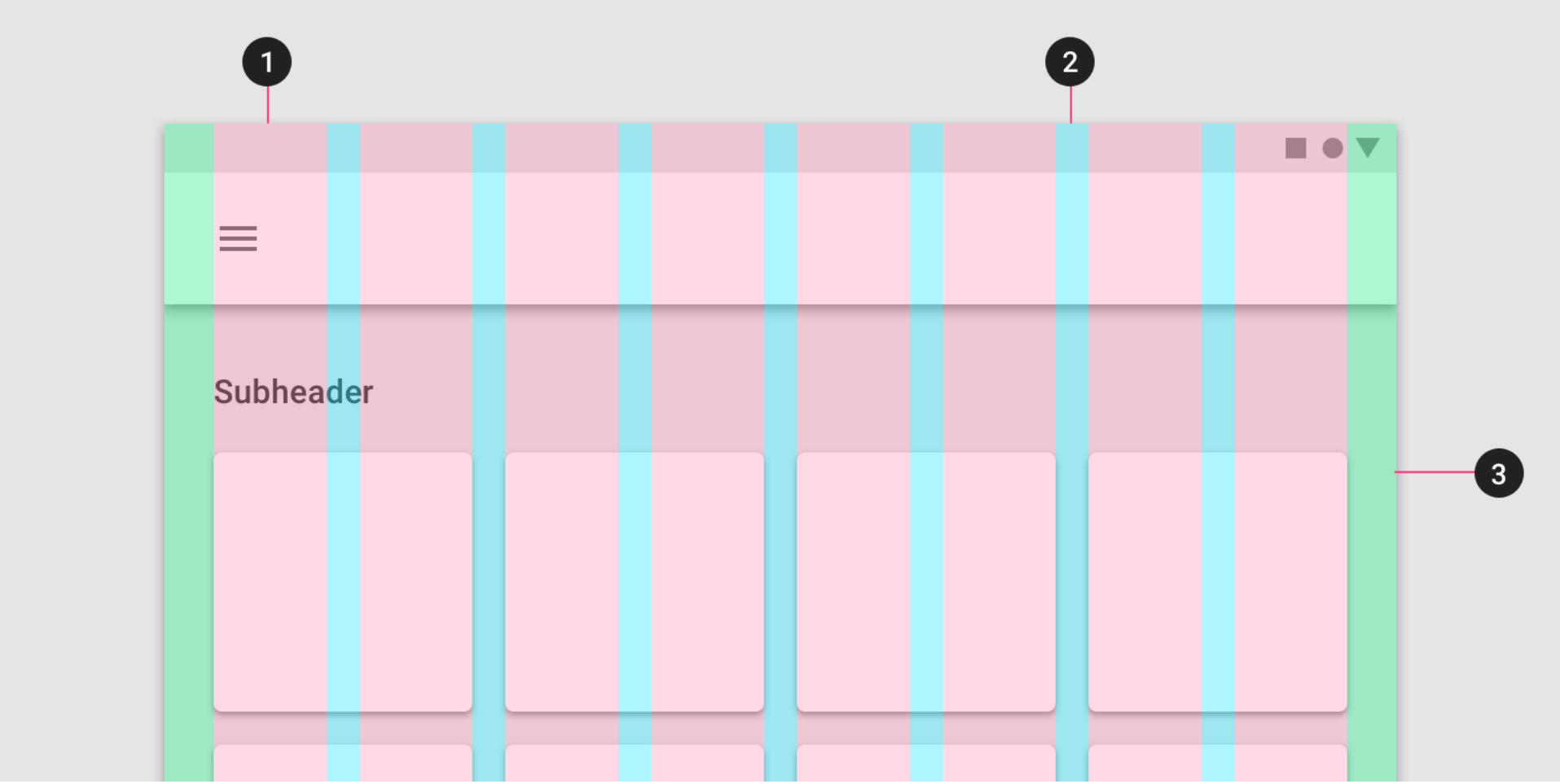
## Hanglines and Baselines



## Baseline Grids

# Example Grid-based layout

1. Columns
2. Gutters
3. Margins




https://material.io/design/layout/responsive-layout-grid.html#columns-gutters-margins

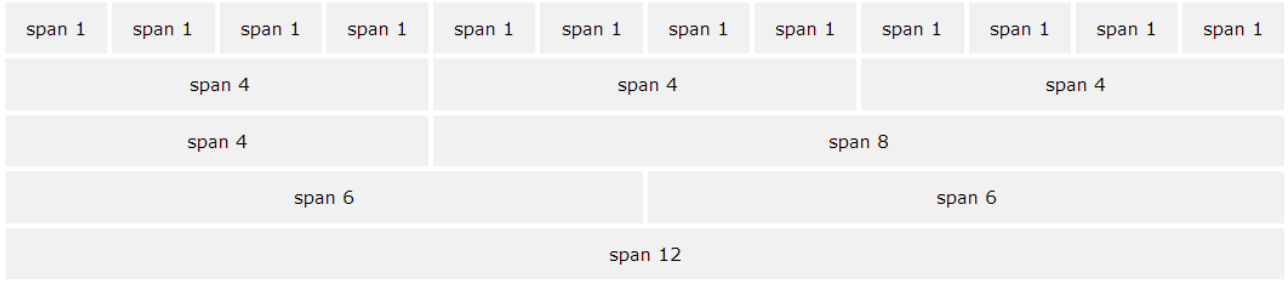
# Example: Bootstrap grid

Always 12 columns in total

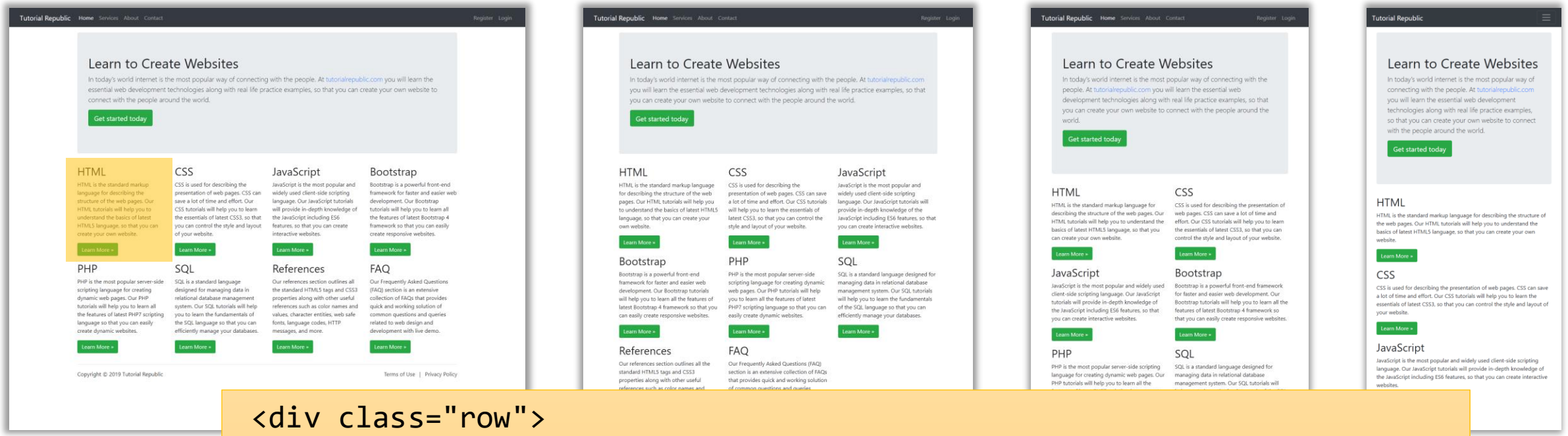
May choose to span a group of columns

Each column is tagged according to the screen size:

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



# Responsive Grid Layout

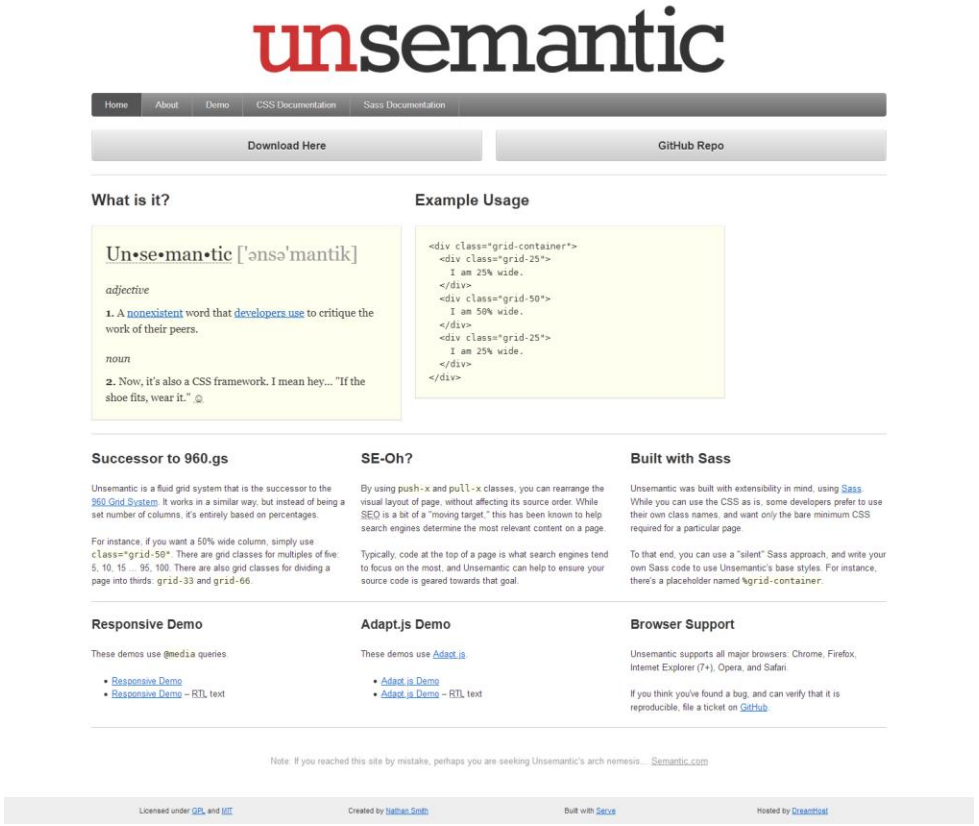



```
<div class="row">
        <div class="col-md-6 col-lg-4 col-xl-3">
            <h2>HTML</h2>
            <p>...</p>
            <p><a href="..." class="btn btn-success">...</a></p>
        </div>
```

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

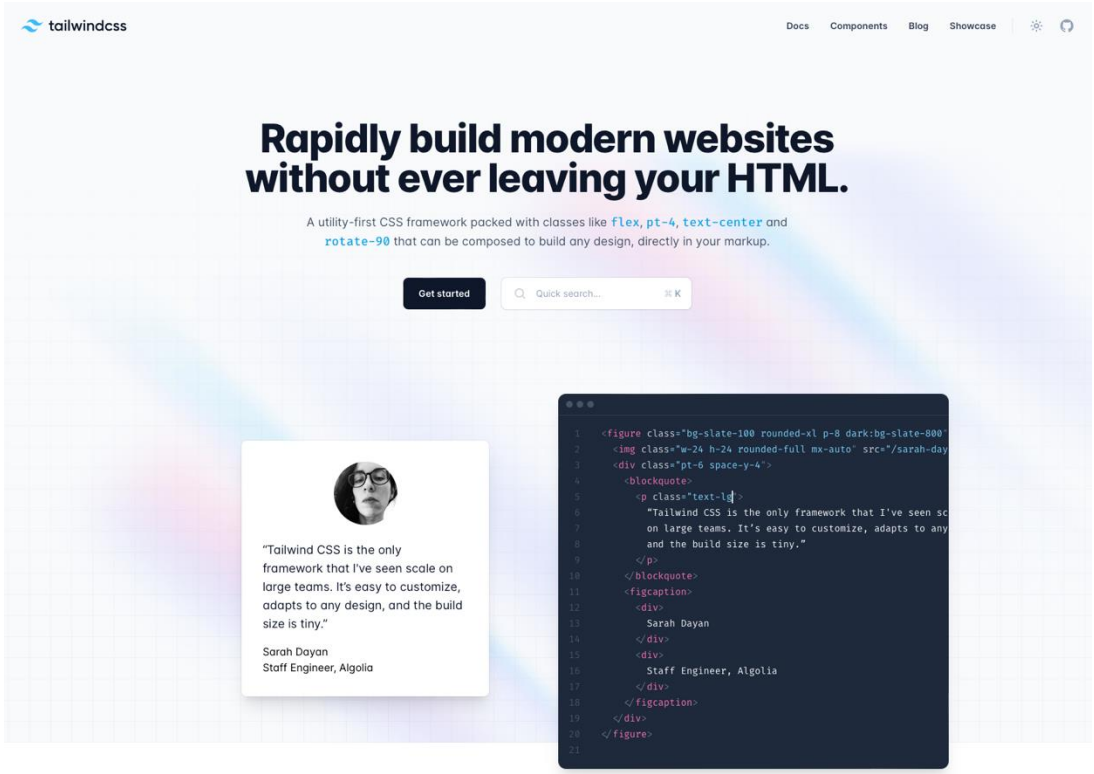
# Other Grid Systems

## Unsemantic (responsive, based on %)




https://unsemantic.com

## tailwindcss (responsive, flexible)




https://tailwindcss.com

# Grid Structure

Main body:
Mix of 2x and 3x columns

Alternating row types

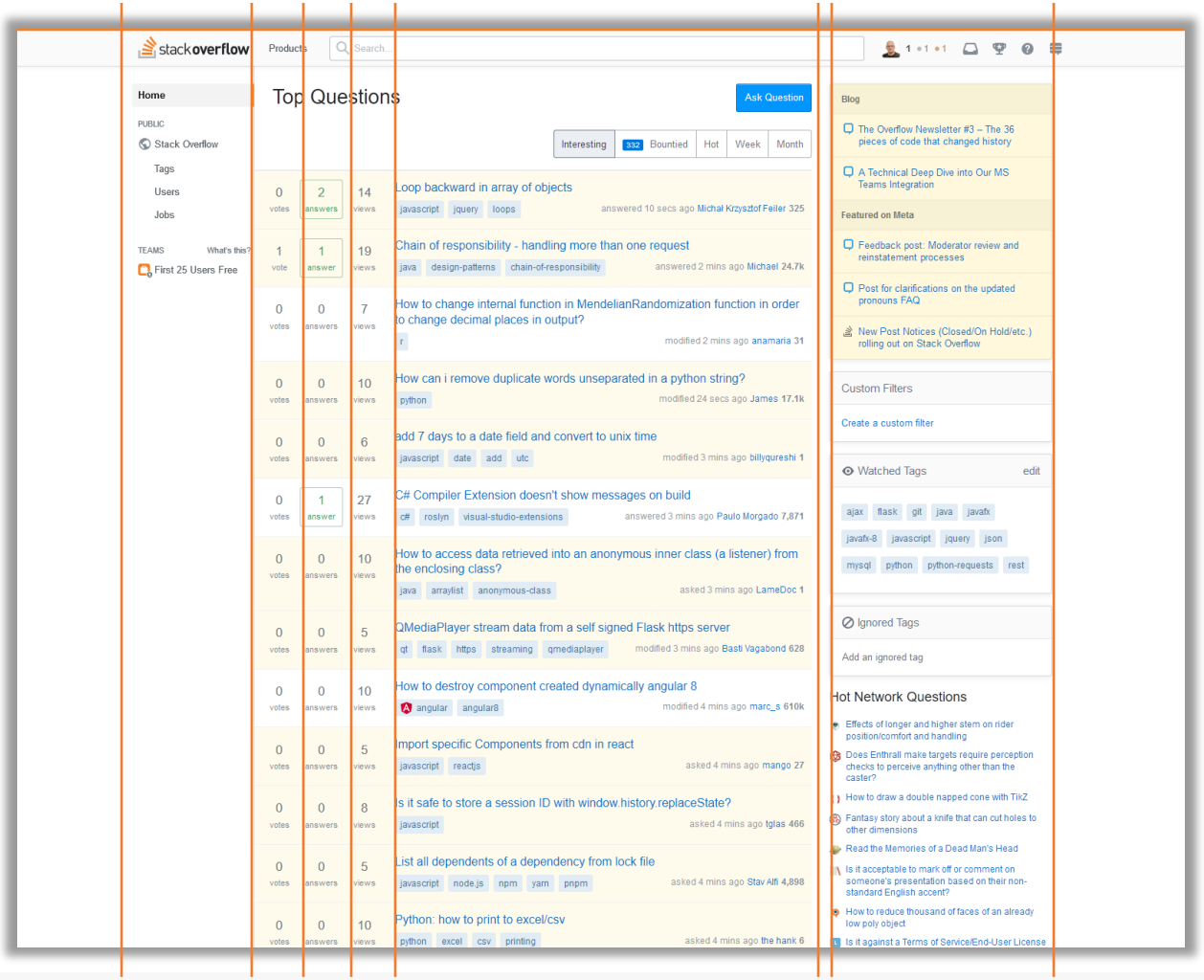
Title area outside the grid

Right column for other types of articles

# Grid Structure

Main content
(center, wide)

Navigation
(left, smaller)




Related content
(right, smaller)

# Example (2019)

**Software** Top

**1° anno**

| Periodo | Codice | Lingua | Insegnamento | Crediti | Docente | Note | Vincoli |
|---|---|---|---|---|---|---|---|
| 1 | 01PDWOV | | Information systems<br>ING-INF/05 (6) | 6 | M. Morisio | | |
| 1 | 02GOLOV | | Architetture dei sistemi di elaborazione<br>ING-INF/05 (10) | 10 | P. Bernardi<br>E. Sanchez Sanchez | | |
| | | | *Oppure* | | | | |
| 1 | 02LSEOV | | Computer architectures<br>ING-INF/05 (10) | 10 | P. Montuschi | | |
| 1 | 01SQJOV | | Data Science and Database Technology<br>ING-INF/05 (8) | 8 | S. Chiusano | | |
| | | | *Oppure* | | | | |
| 1 | 01SQMOV | | Data Science e Tecnologie per le Basi di Dati<br>ING-INF/05 (8) | 8 | E. Baralis | | |
| 1 | 01OTWOV | | Computer network technologies and services<br>ING-INF/05 (6) | 6 | M. Baldi | | |
| | | | *Oppure* | | | | |
| 1 | 02KPNOV | | Tecnologie e servizi di rete<br>ING-INF/05 (6) | 6 | G. Marchetto | | |
| 2 | 02JEUOV | | Formal languages and compilers<br>ING-INF/05 (6) | 6 | R. Sisto | | |
| 2 | 05BIDOV | | Ingegneria del software<br>ING-INF/05 (8) | 8 | G. Bruno | | |
| | | | *Oppure* | | | | |
| 2 | 04GSPOV | | Software engineering<br>ING-INF/05 (8) | 8 | M. Morisio | | |
| 2 | 01UDFOV | | Applicazioni Web I<br>ING-INF/05 (6) | 6 | E. Masala | | |
| | | | *Oppure* | | | | |
| 2 | 01TXYOV | | Web Applications I<br>ING-INF/05 (6) | 6 | F. Corno | | |
| 2 | 02GRSOV | | Programmazione di sistema<br>ING-INF/05 (10) | 10 | G. Cabodi | | |
| | | | *Oppure* | | | | |
| 2 | 01NYHOV | | System and device programming<br>ING-INF/05 (10) | 10 | S. Quer | | |

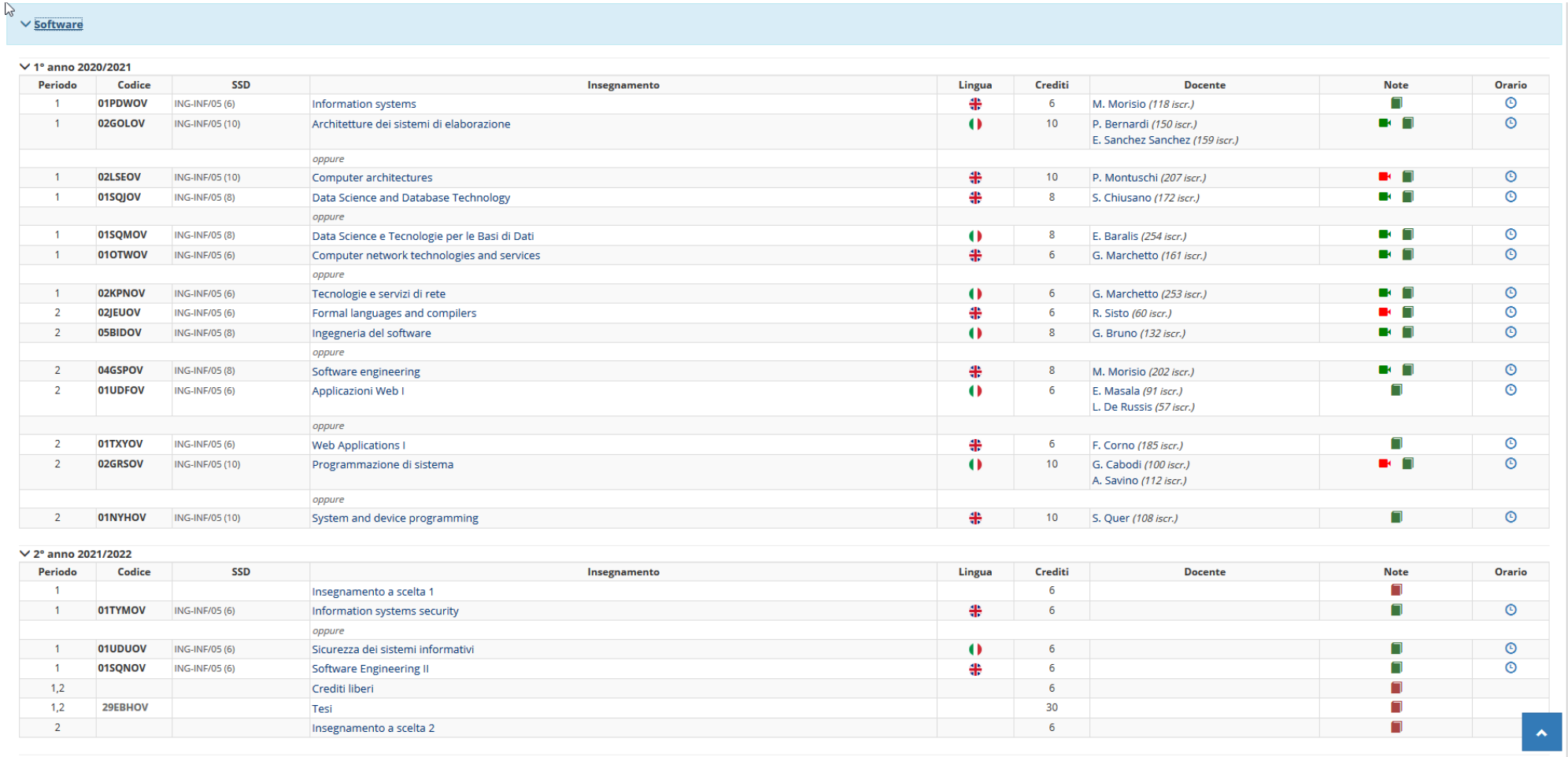
**2° anno**

| Periodo | Codice | Lingua | Insegnamento | Crediti | Docente | Note | Vincoli |
|---|---|---|---|---|---|---|---|
| 1 | | | Insegnamento a scelta 1 | 6 | | | |
| 1 | 01TYMOV | | Information systems security<br>ING-INF/05 (6) | 6 | | | |
| | | | *Oppure* | | | | |
| 1 | 01UDUOV | | Sicurezza dei sistemi informativi<br>ING-INF/05 (6) | 6 | | | |
| 1 | 01SQNOV | | Software Engineering II<br>ING-INF/05 (6) | 6 | | | |
| 1,2 | | | 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 | | Cloud Computing<br>ING-INF/05 (6) | 6 | | | |
| 1 | 01PDCOV | | Digital control technologies and architectures<br>ING-INF/04 (6) | 6 | | | |
| 1 | 01TXZOV | | Distributed systems programming<br>ING-INF/05 (6) | 6 | | | Si |
| 1 | 01NWPOV | | Elaborazione dell'audio digitale<br>ING-INF/05 (6) | 6 | | | |
| 1 | 01UDGOV | | Energy management for IoT<br>ING-INF/05 (6) | 6 | | | Si |
| 1 | 02JSKOV | | Human Computer Interaction<br>ING-INF/05 (6) | 6 | | | |
| 1 | 01SQIOV | | Machine Learning and Artificial Intelligence<br>ING-INF/05 (6) | 6 | | | |
| 1 | 01PDXOV | | Modern design of control systems<br>ING-INF/04 (6) | 6 | | | |
| 1 | 01OUVOV | | Optimization methods and algorithms<br>MAT/09 (6) | 6 | | | |

# Example (same page in 2020)



Software

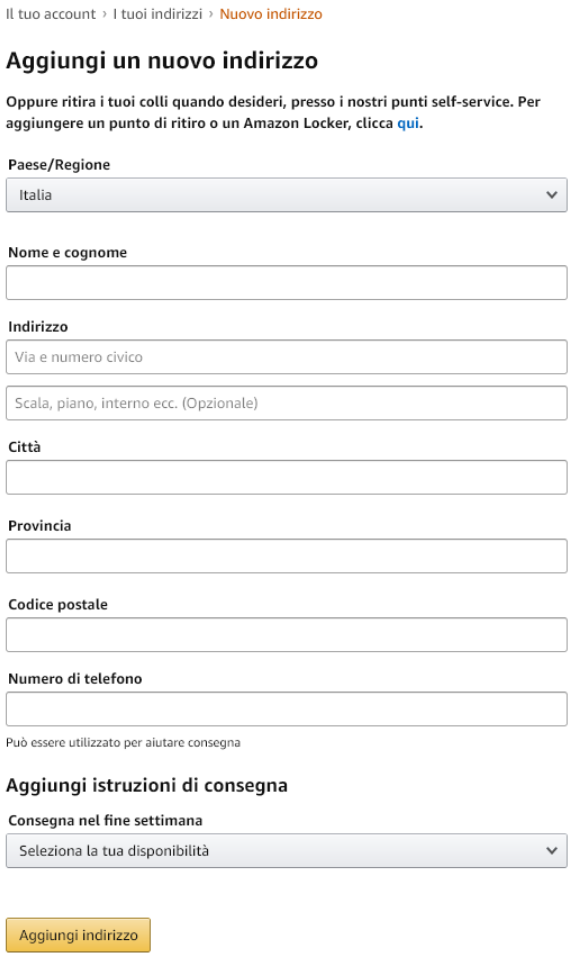
1° anno 2020/2021

| Periodo | Codice | SSD | Insegnamento | Lingua | Crediti | Docente | Note | Orario |
|---|---|---|---|---|---|---|---|---|
| 1 | 01PDWOV | 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.)*<br>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 | 01OTWOV | ING-INF/05 (6) | Computer network technologies and services | | 6 | G. Marchetto *(161 iscr.)* | | |
| | | | *oppure* | | | | | |
| 1 | 02KPNOV | ING-INF/05 (6) | Tecnologie e servizi di rete | | 6 | G. Marchetto *(253 iscr.)* | | |
| 2 | 02JEUOV | ING-INF/05 (6) | Formal languages and compilers | | 6 | R. Sisto *(60 iscr.)* | | |
| 2 | 05BIDOV | 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.)*<br>L. De Russis *(57 iscr.)* | | |
| | | | *oppure* | | | | | |
| 2 | 01TXYOV | 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.)*<br>A. Savino *(112 iscr.)* | | |
| | | | *oppure* | | | | | |
| 2 | 01NYHOV | 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 | 01TYMOV | ING-INF/05 (6) | Information systems security | | 6 | | | |
| | | | *oppure* | | | | | |
| 1 | 01UDUOV | 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)



# 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 form 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
LINGsCARS.com
Leader of the Pack - The UK's favorite car leasing website!
Contract hire cars from Ling Valentine, LINGsCARS is the UK's favourite car leasing website - On 2016 I leased over £85 million in cars!
I AM LING YOU CAN TRUST ME
Menu
Home
Cars
Vans
Customers
About Ling
Fun stuff
Free stuff
Live staff
CARS A-Z
ABARTH
124 Spider
Convertible
595 Convertible
595 Hatchback
695 Convertible
ALFA ROMEO
Giulia Saloon
Giulietta
Stelvio Estate
AUDI
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
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!
Facebook
Twitter
500 IDEAS!
Fiat 500
1.2 Pop 8v (69bhp) (4 seats) Hatchback 3dr 1242cc Petrol Manual (5 Speed)
RENT NEW £127/mth including VAT
3 year cheap car leasing
9+35
NICOLE...PAPA!
Renault Clio
0.9 TCE Iconic 12v (90bhp) Hatchback 5dr 898cc Petrol Manual (5 Speed)
RENT NEW £152/mth including VAT
3 year cheap car leasing
6+35
MEGA-HATCH!
Citroen C3
1.2 PureTech 12v (83bhp) Flair Hatchback 5dr Manual 1199cc
RENT NEW £157/mth including VAT
2 year cheap car leasing
6+23
Petrol
Car Leasing Online Service Response Times
Quote > Proposal > Order > Delivery
75 CUSTOMERS IN 'PROPOSAL'
Ling replies in... 0:03 07
129 CUSTOMERS IN 'ORDER'
Ling replies 0:05 03
1 DELIVERY TODAY
Ford Ka+
Arthur
ATTLEBOROUGH,NR17
21 DELIVERIES IN LAST WEEK
Renault Captur
Cath
PONTEFRACT , WF81
Mercedes GLC Coupe
Bill
BEDLINGTON, NE22
BMW 2 Series Convert...
Pingu
DERBY, DE56
Nissan Qashqai
Arlene
GLASGOW , G11
Volvo XC60 Estate
Saif
MILTON KEYNES, MK8
Seat Leon
Ben
BARNSLEY, S70
Skoda Kodiaq Estate
Hannah
HAY-ON-WYE , HR3
Renault Clio
Paul
MIDDLEBROUGH , TS7
Renault Clio
Paul
MIDDLEBROUGH , TS7
Seat Arona
Steve
LONDON, SE18
Seat Leon
Adam
HATFIELD, AL10
Audi A3 Sportback
Chris
WYMONDHAM , NR18

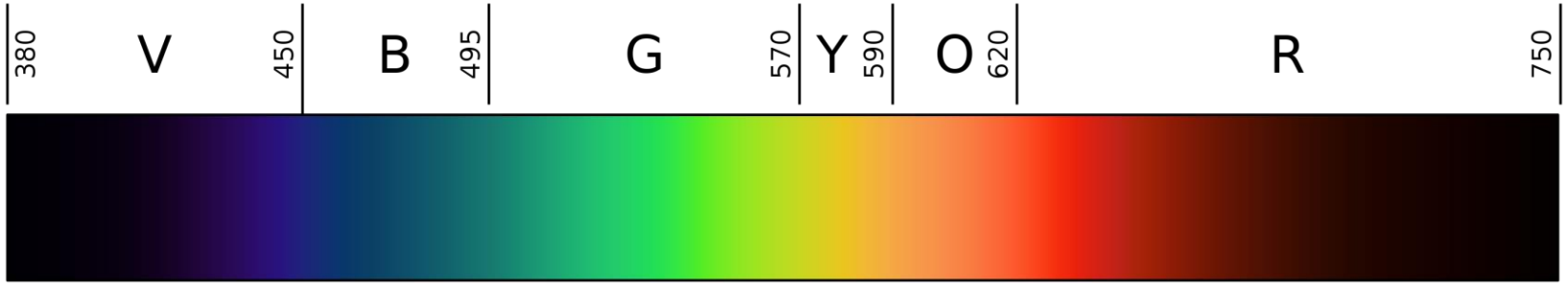
# Colors

- 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

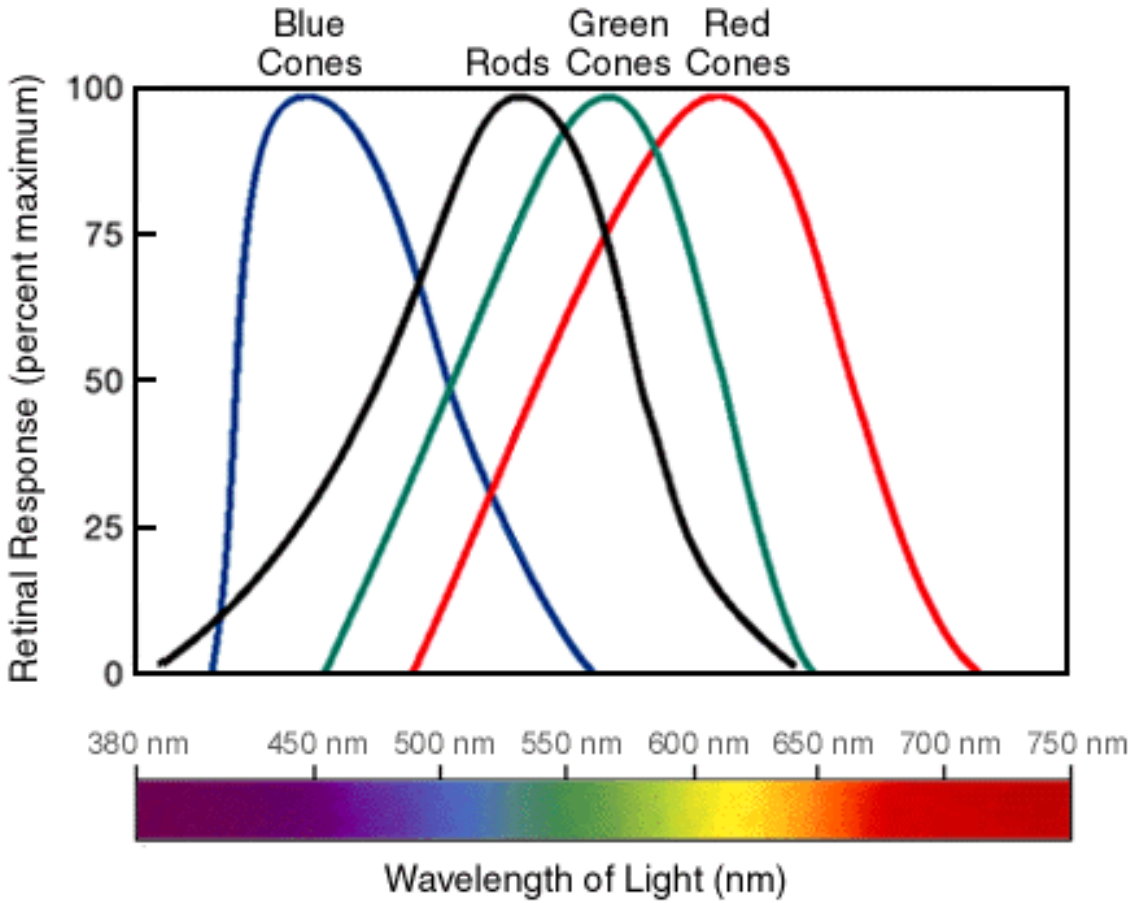



- UV spectrum ends on the left, IR starts on the right
- Wavelenghts are in nm
- Source: https://commons.wikimedia.org/wiki/File:Linear_visible_spectrum.svg

# Human Vision

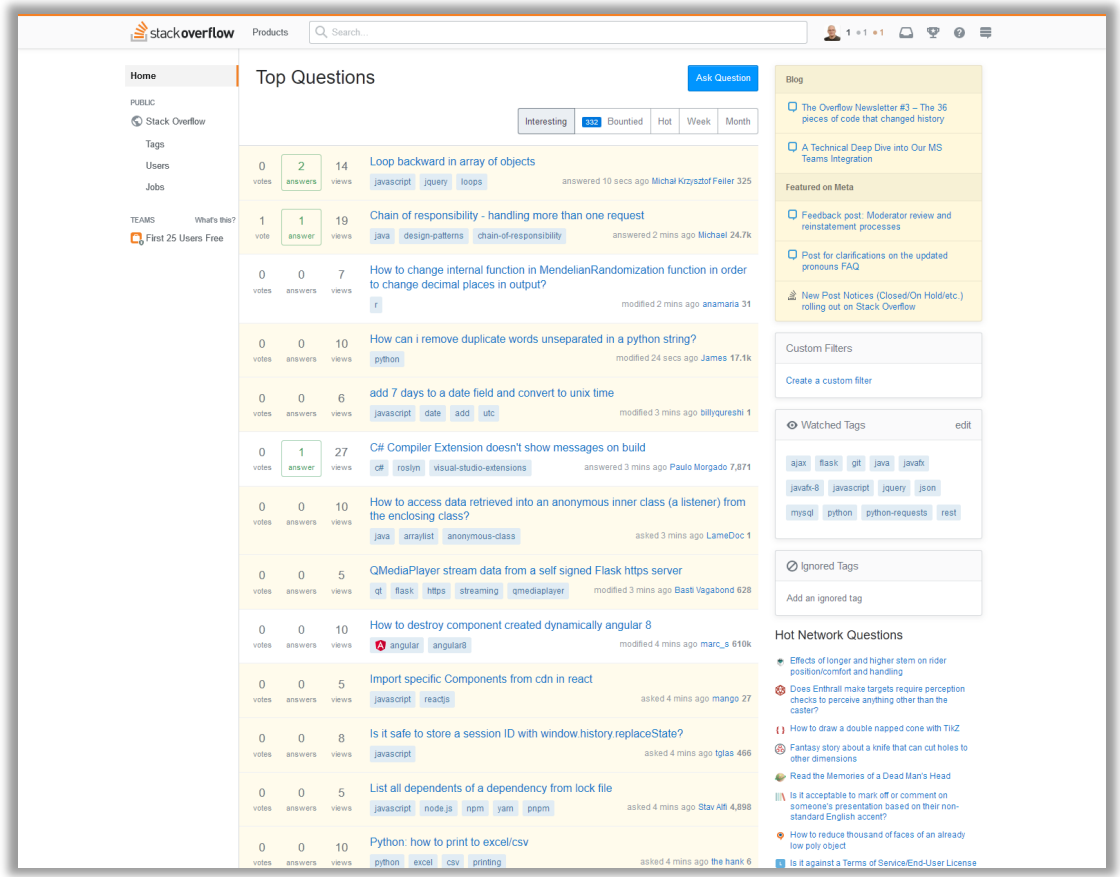
- **Human vision**: a highly complex activity, often the main source of information about the world
- The **eye**: a mechanism for receiving light and transforming it into electrical energy
  - light reflected from objects in the world and their image is focused upside down on the back of the eye
  -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

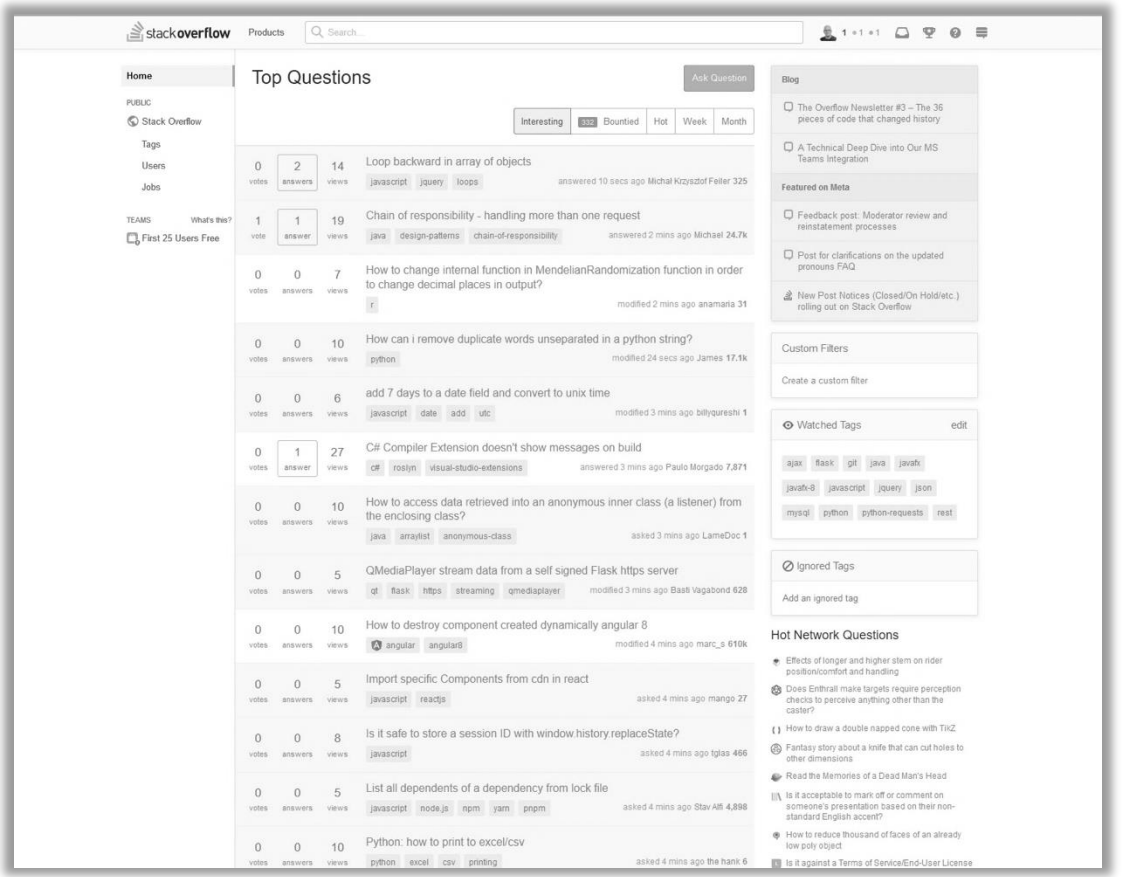
# Color Sensitivity of the Eyes




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

# Example


stackoverflow
Products
Home
PUBLIC
Stack Overflow
Tags
Users
Jobs
TEAMS
First 25 Users Free
Top Questions
Ask Question
Interesting
Bountied
Hot
Week
Month
Loop backward in array of objects
Chain of responsibility - handling more than one request
How to change internal function in MendelianRandomization function in order to change decimal places in output?
How can i remove duplicate words unseparated in a python string?
add 7 days to a date field and convert to unix time
C# Compiler Extension doesn't show messages on build
How to access data retrieved into an anonymous inner class (a listener) from the enclosing class?
QMediaPlayer stream data from a self signed Flask https server
How to destroy component created dynamically angular 8
Import specific Components from cdn in react
Is it safe to store a session ID with window.history.replaceState?
List all dependents of a dependency from lock file
Python: how to print to excel/csv
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
edit
Ignored Tags
Add an ignored tag
Hot Network Questions


stackoverflow
Products
Home
PUBLIC
Stack Overflow
Tags
Users
Jobs
TEAMS
First 25 Users Free
Top Questions
Ask Question
Interesting
Bountied
Hot
Week
Month
Loop backward in array of objects
Chain of responsibility - handling more than one request
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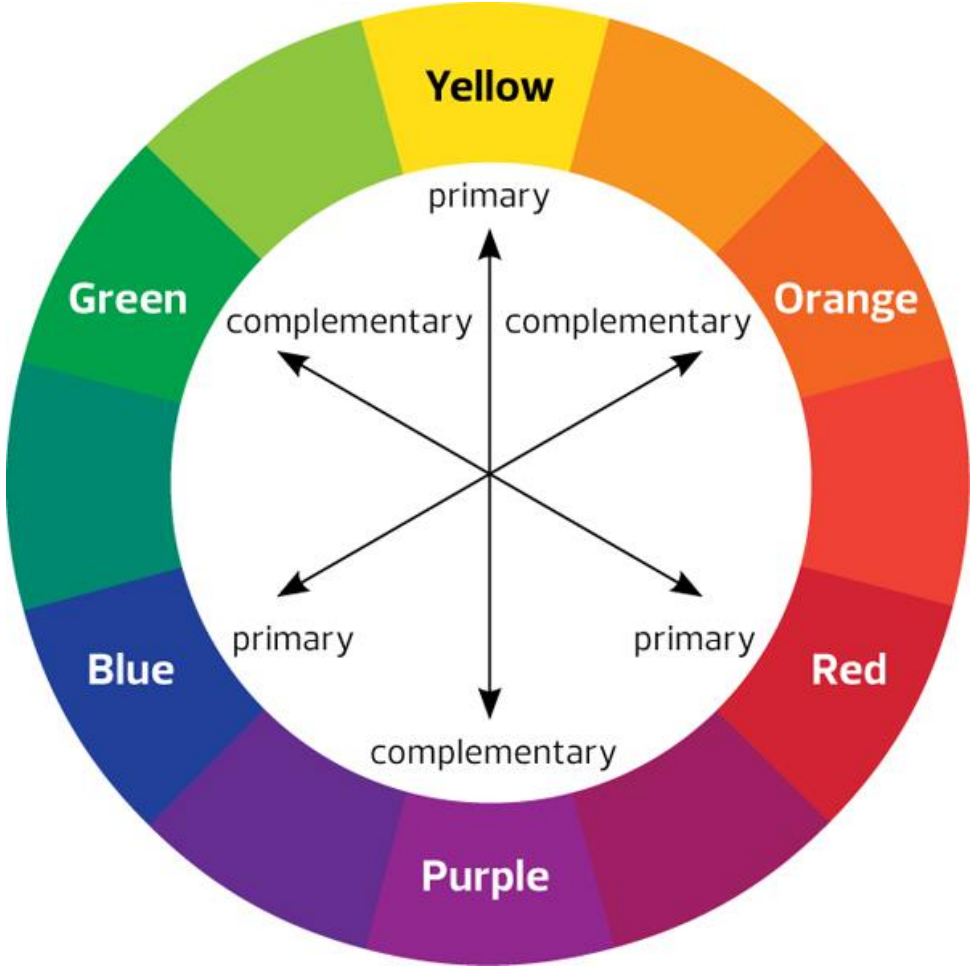
A Technical Deep Dive into Our MS Teams Integration
Featured on Meta
Feedback post: Moderator review and reinstatement processes
Post for clarifications on the updated pronouns FAQ
New Post Notices (Closed/On Hold/etc.) rolling out on Stack Overflow
Custom Filters
Create a custom filter
Watched Tags
edit
Ignored Tags
Add an ignored tag
Hot Network Questions

# The Color Wheel

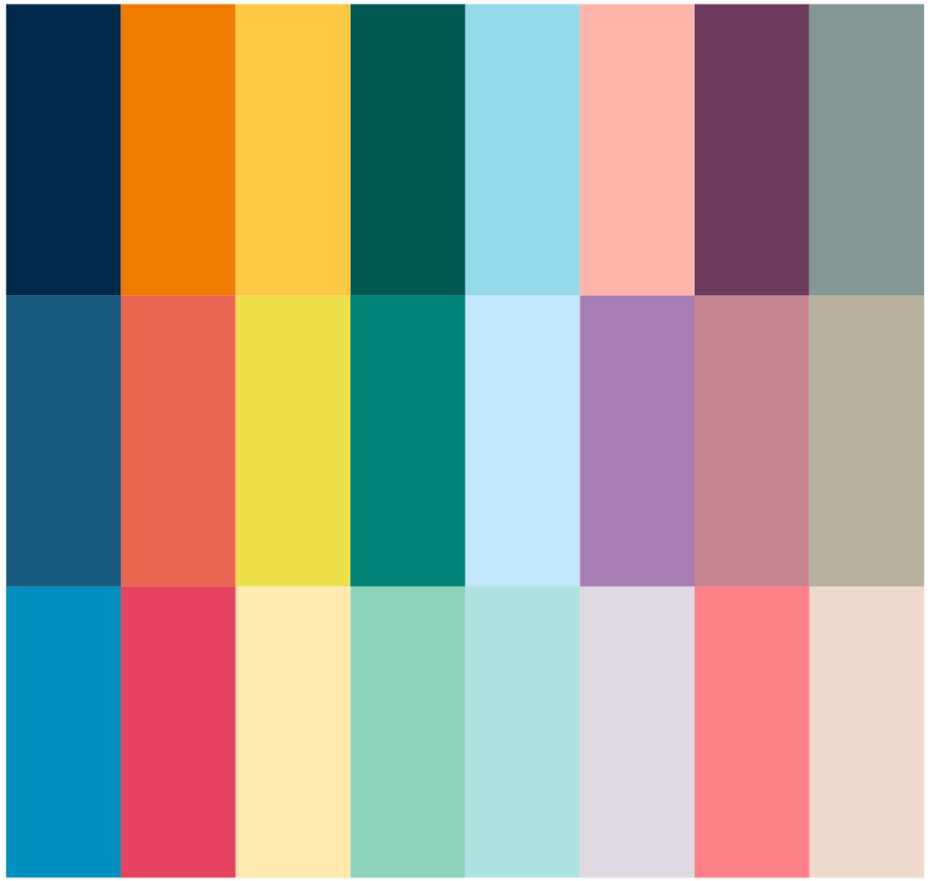
- Aka the Hue Circle
- Pick non-adjacent colors
- Opponent colors go well together
  - Complementary colors




- Read more at https://www.canva.com/colors/color-wheel/

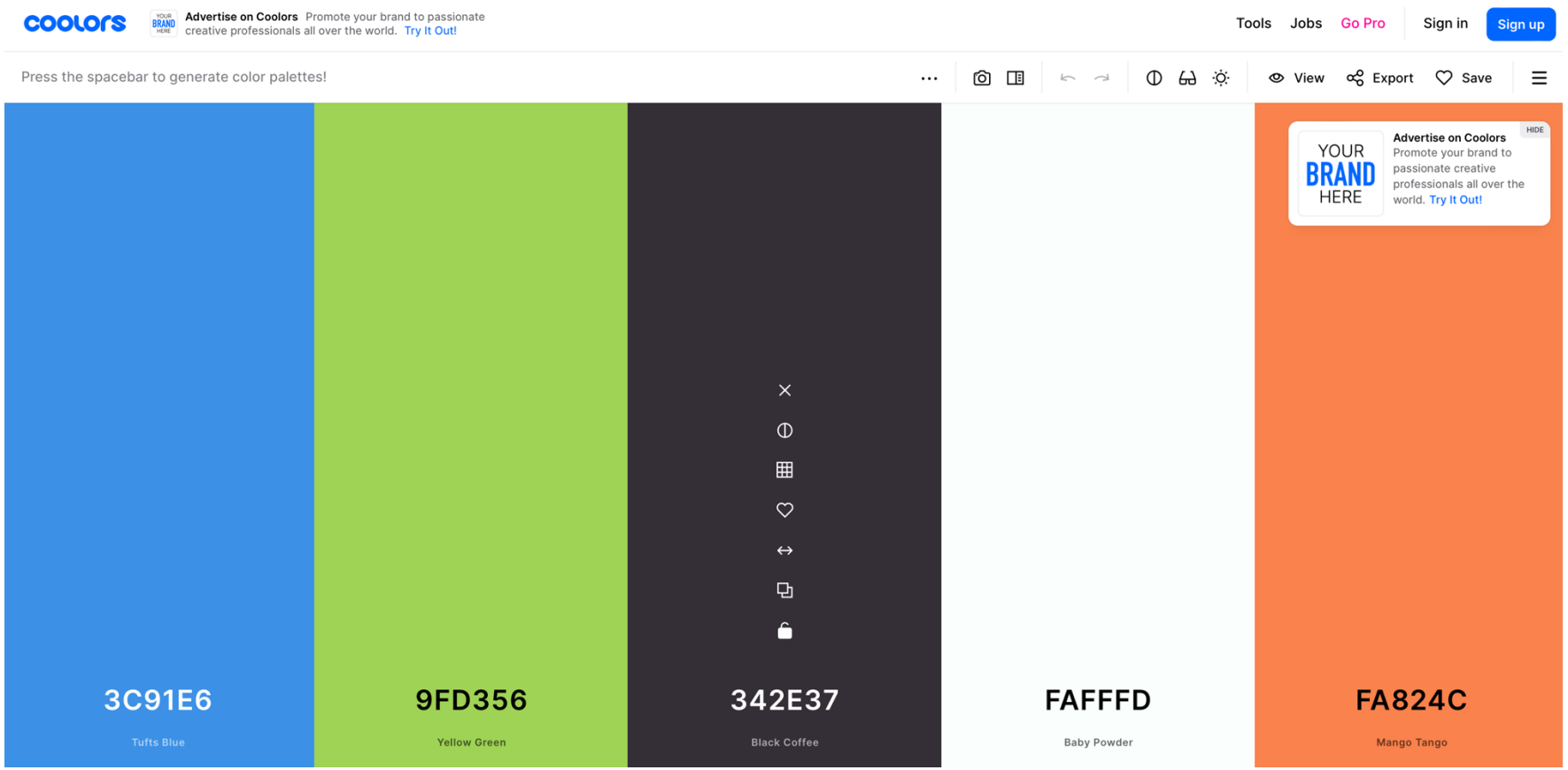
# Palettes - PoliTo

GERARCHIA COLORI



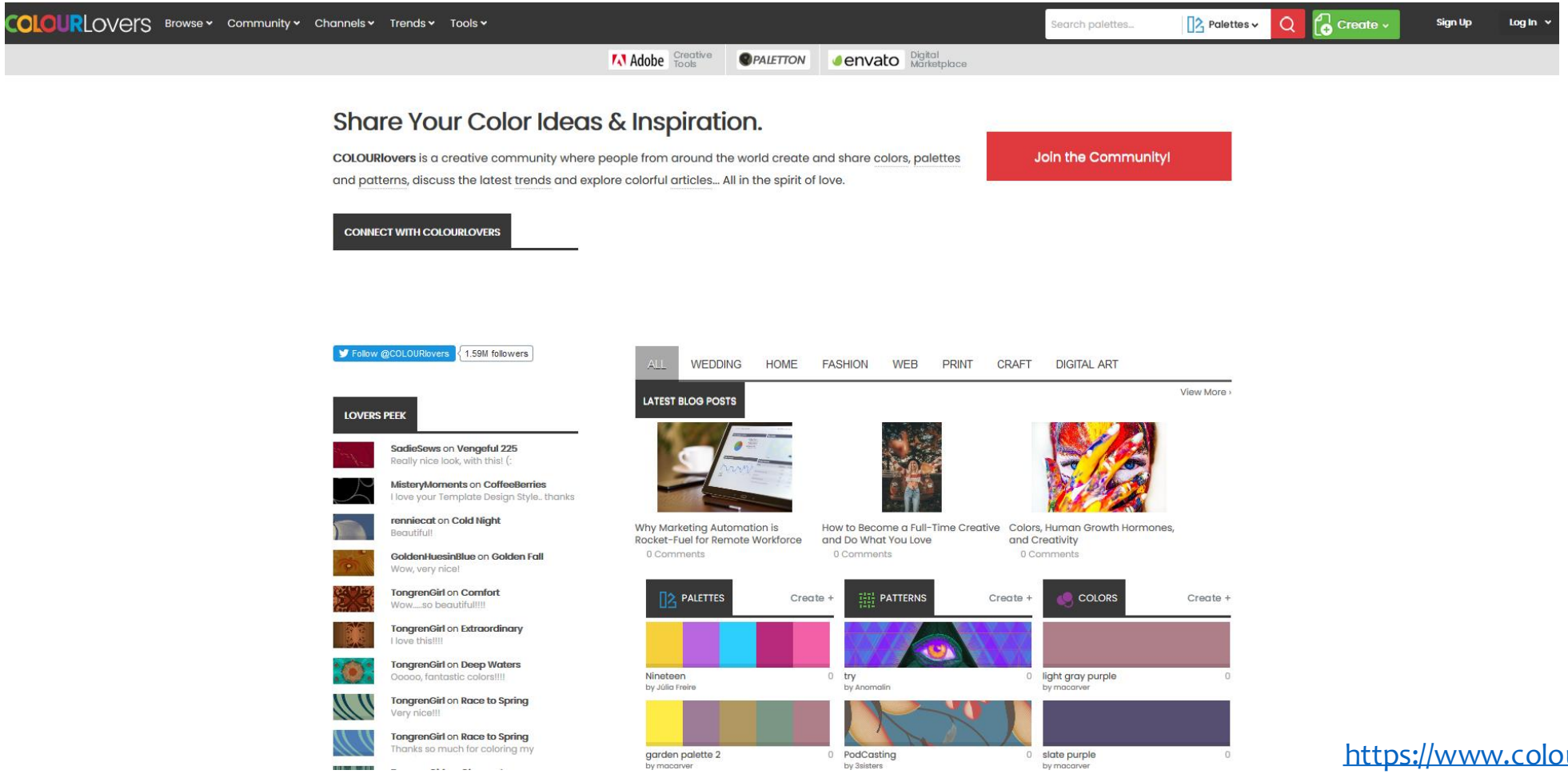
https://www.politocomunica.polito.it/en/corporate_image/brand_and_visual_identity

# Palettes Generator



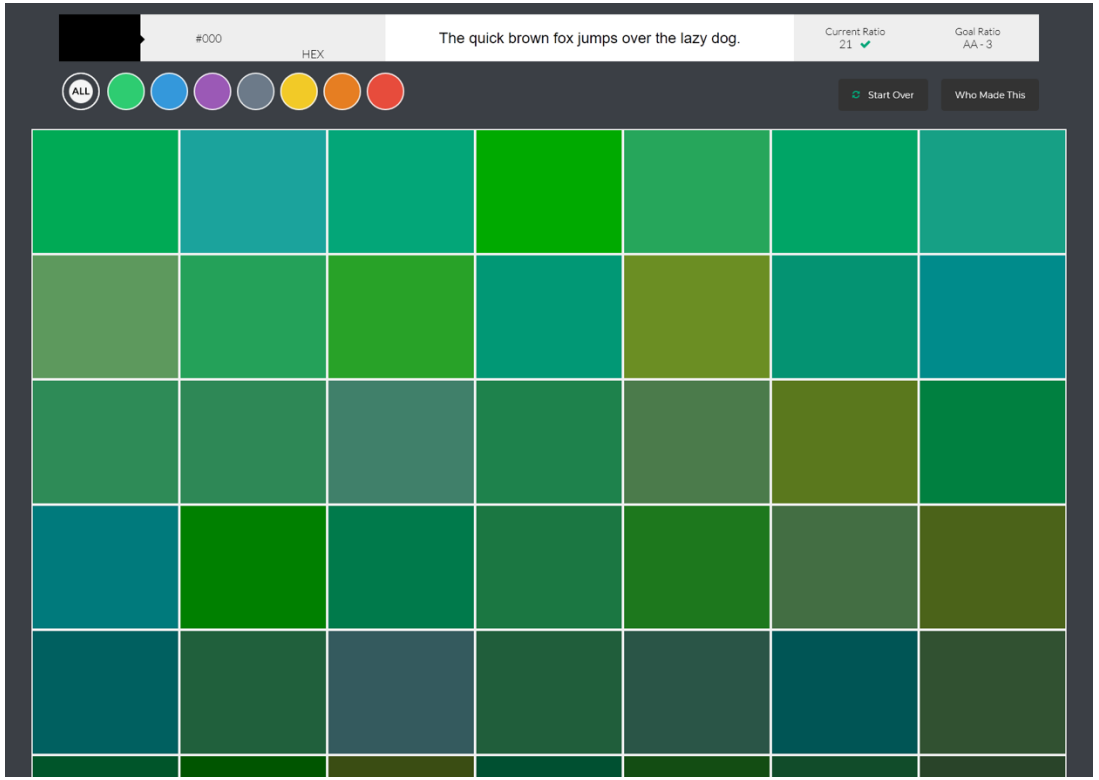

https://coolors.co

# ColourLovers

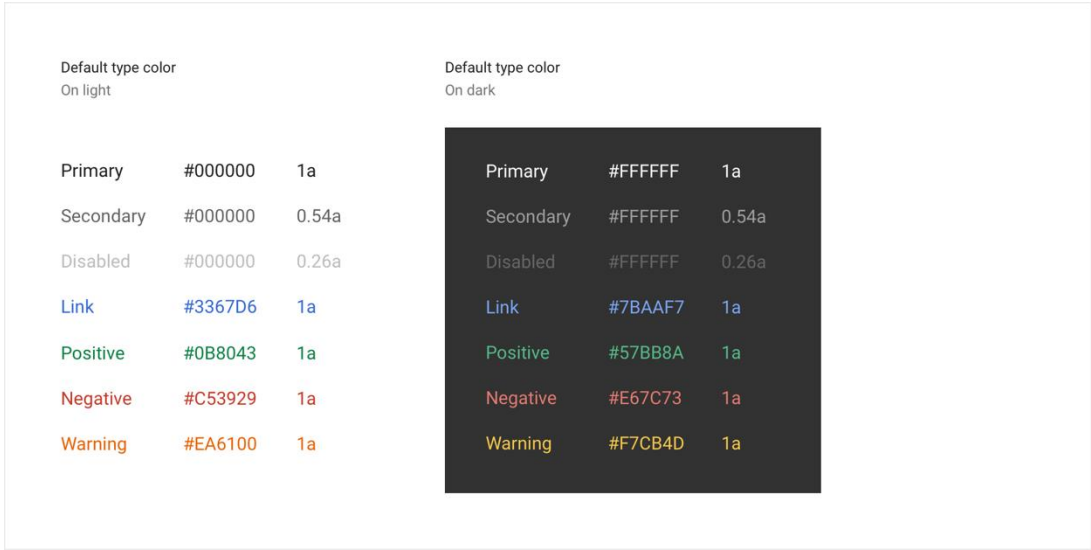



https://www.colourlovers.com/

# Color Contrast



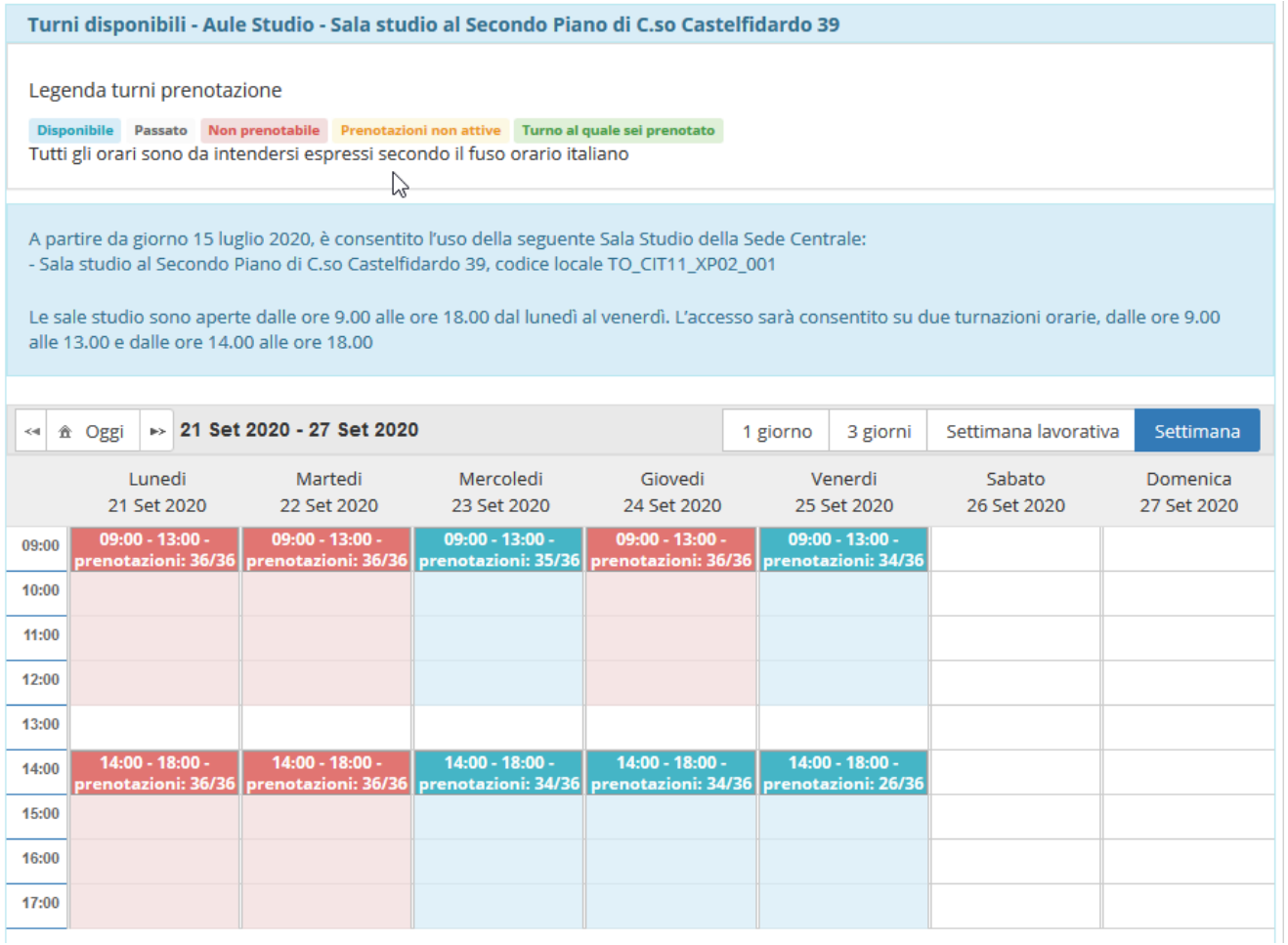

http://colorsafe.co/




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”



# Reading and Navigating

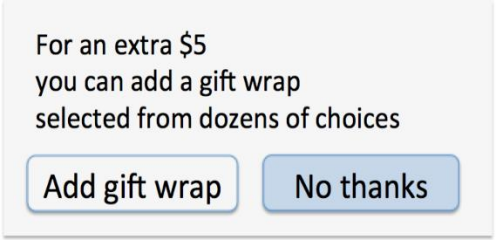
«Informavores» must quickly find the information they need

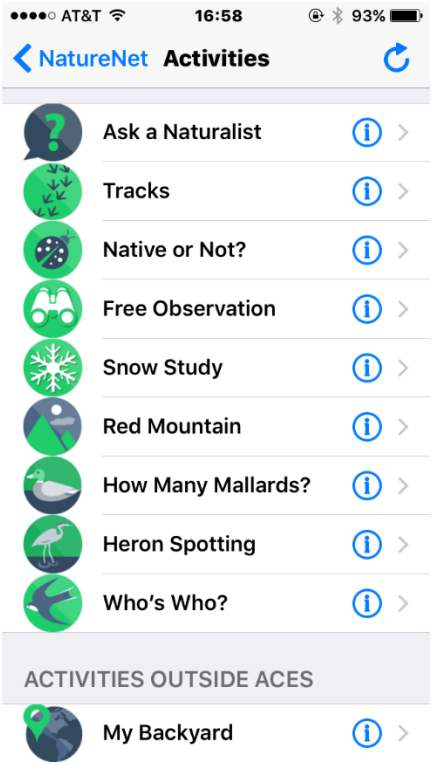
# Navigation

- 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

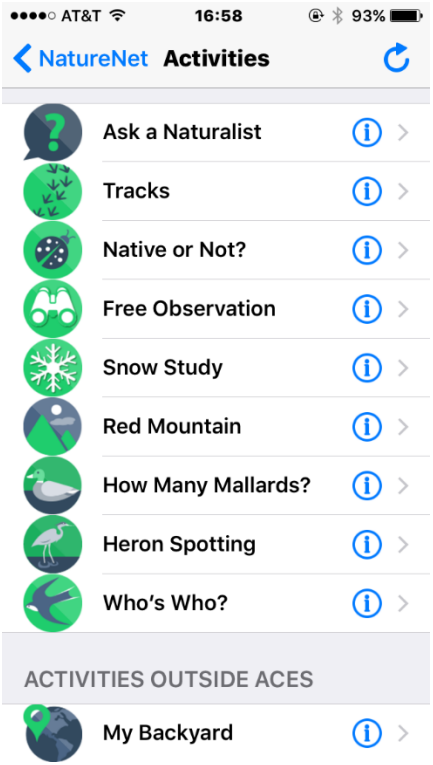




# Navigation By Selection

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

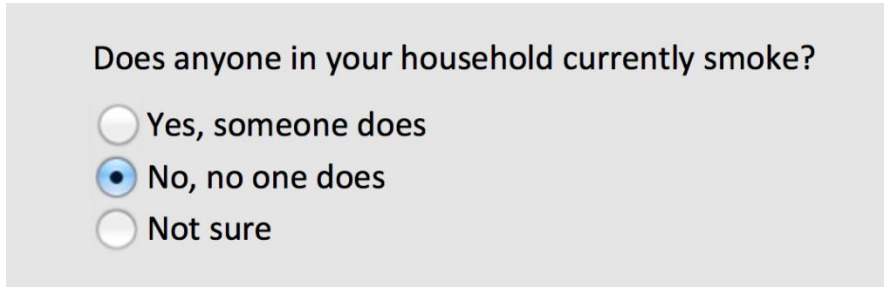
- Tap
- Long press
- Double tap
- Small swipe
- Large swipe
- Rapid swipe (fling)
- Pinch and spread
- 2-finger swipe
- …

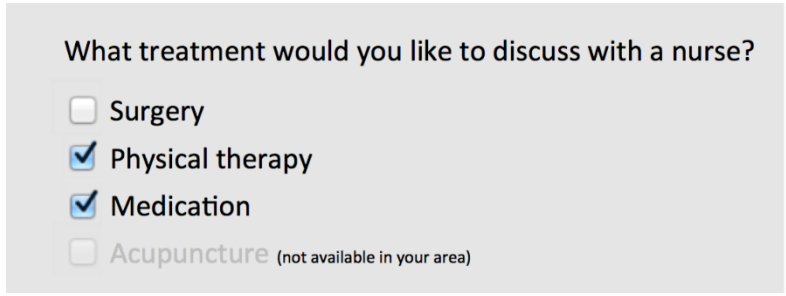


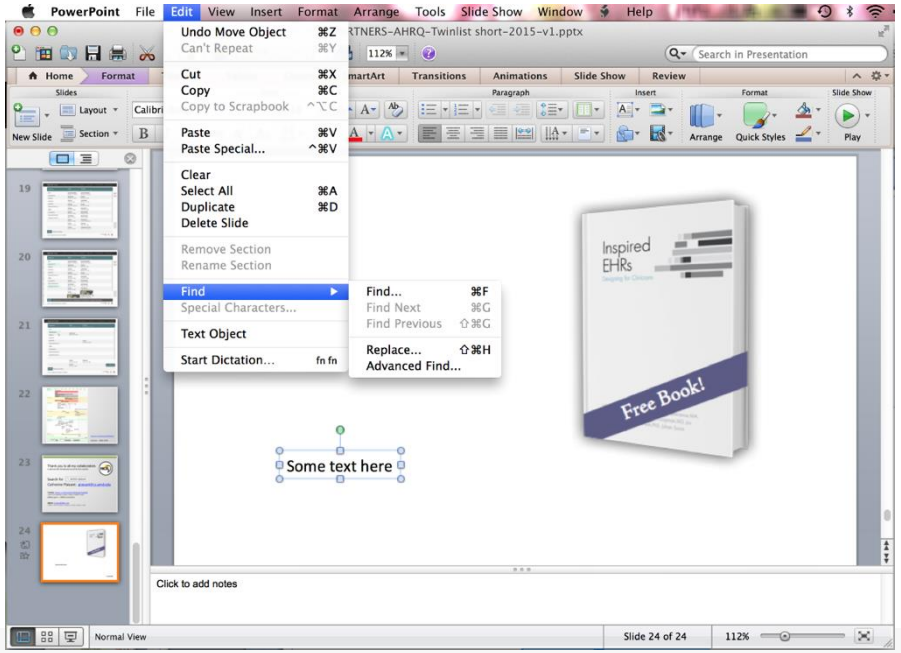
# Navigation By Selection

- Radio Buttons and Checkboxes

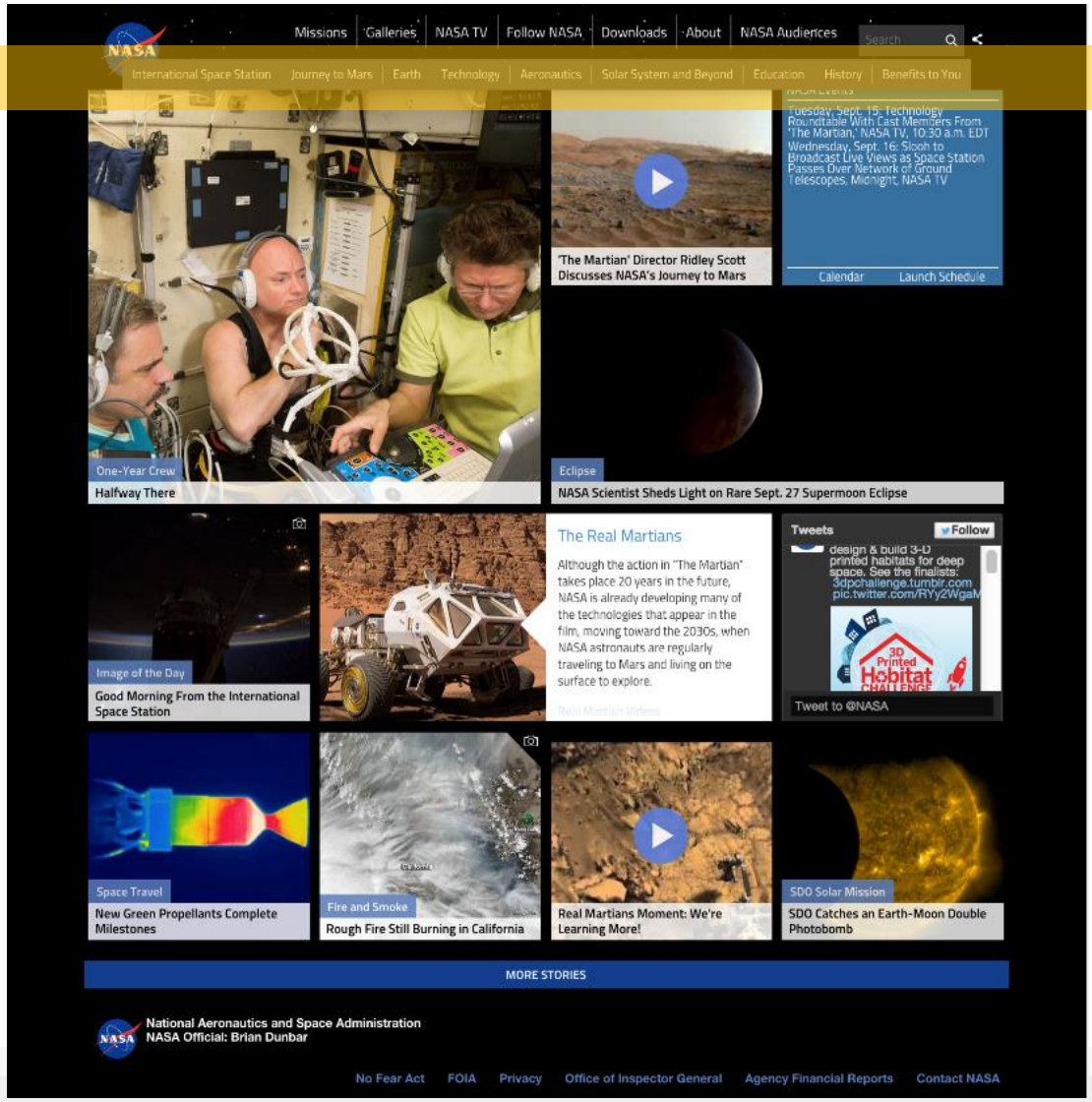
- Menu bars, pop-up menus, toolbars, palettes and ribbons



# Menus


Missions
Galleries
NASA TV
Follow NASA
Downloads
About
NASA Audiences
Search
International Space Station
Journey to Mars
Earth
Technology
Aeronautics
Solar System and Beyond
Education
History
Benefits to You
'The Martian' Director Ridley Scott Discusses NASA's Journey to Mars
Tuesday, Sept. 15: Technology Roundtable With Cast Members From 'The Martian,' NASA TV, 10:30 a.m. EDT
Wednesday, Sept. 16: Sioob to Broadcast Live Views as Space Station Passes Over Network of Ground Telescopes, Midnight, NASA TV
Calendar
Launch Schedule
One-Year Crew
Halfway There
Eclipse
NASA Scientist Sheds Light on Rare Sept. 27 Supermoon Eclipse
Image of the Day
Good Morning From the International Space Station
The Real Martians
Although the action in "The Martian" takes place 20 years in the future, NASA is already developing many of the technologies that appear in the film, moving toward the 2030s, when NASA astronauts are regularly traveling to Mars and living on the surface to explore.
Tweets
Follow
design & build 3-D printed habitats for deep space. See the finalists:
3dpchallenge.tumblr.com
pic.twitter.com/RYy2WgaM
3D Printed Habitat CHALLENGE
Tweet to @NASA
Space Travel
New Green Propellants Complete Milestones
Fire and Smoke
Rough Fire Still Burning in California
Real Martians Moment: We're Learning More!
SDO Solar Mission
SDO Catches an Earth-Moon Double Photobomb
MORE STORIES
National Aeronautics and Space Administration
NASA Official: Brian Dunbar
No Fear Act
FOIA
Privacy
Office of Inspector General
Agency Financial Reports
Contact NASA

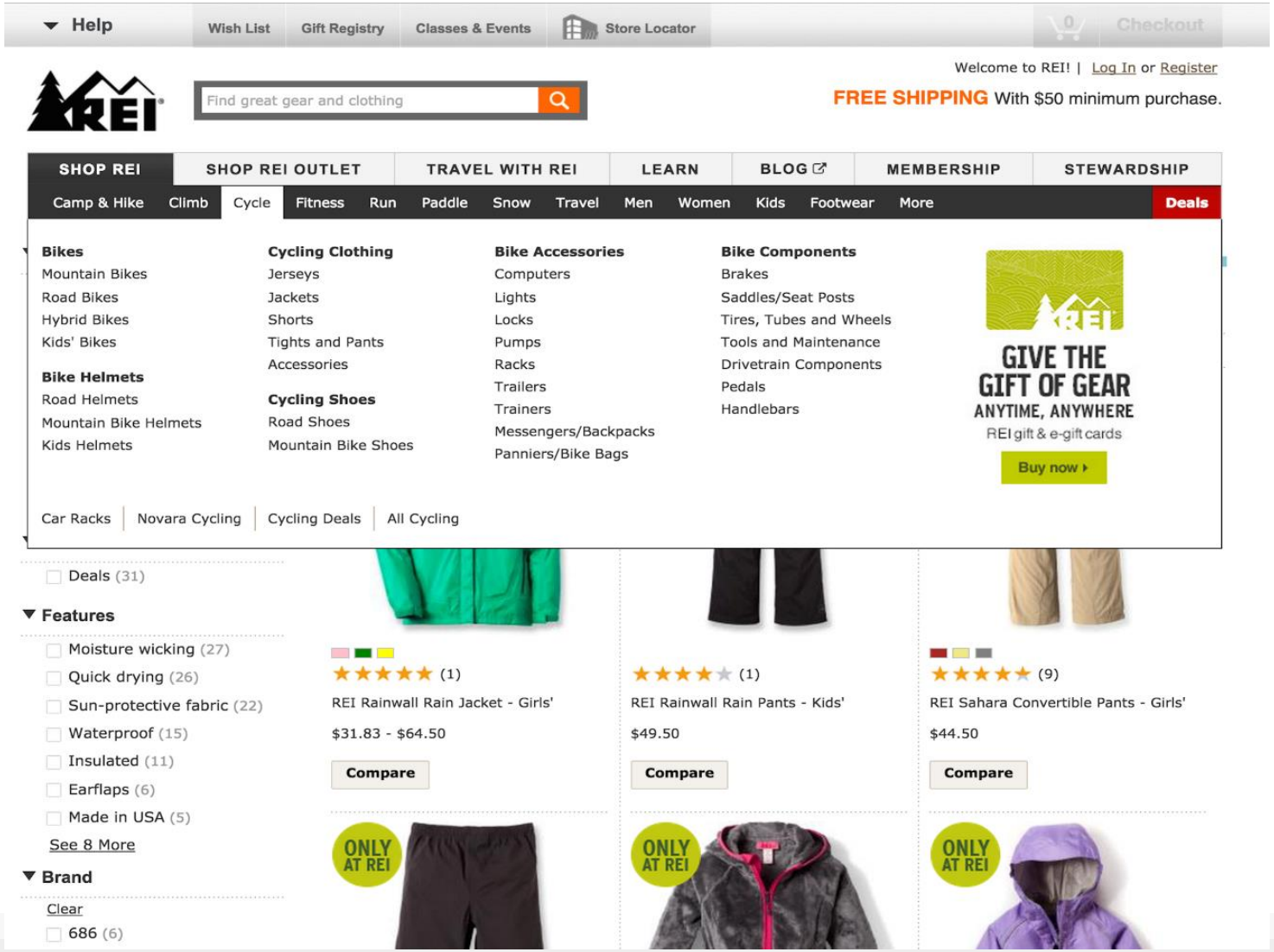
www.nasa.gov
NASA TV
One-Year Crew
Halfway There

# 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)

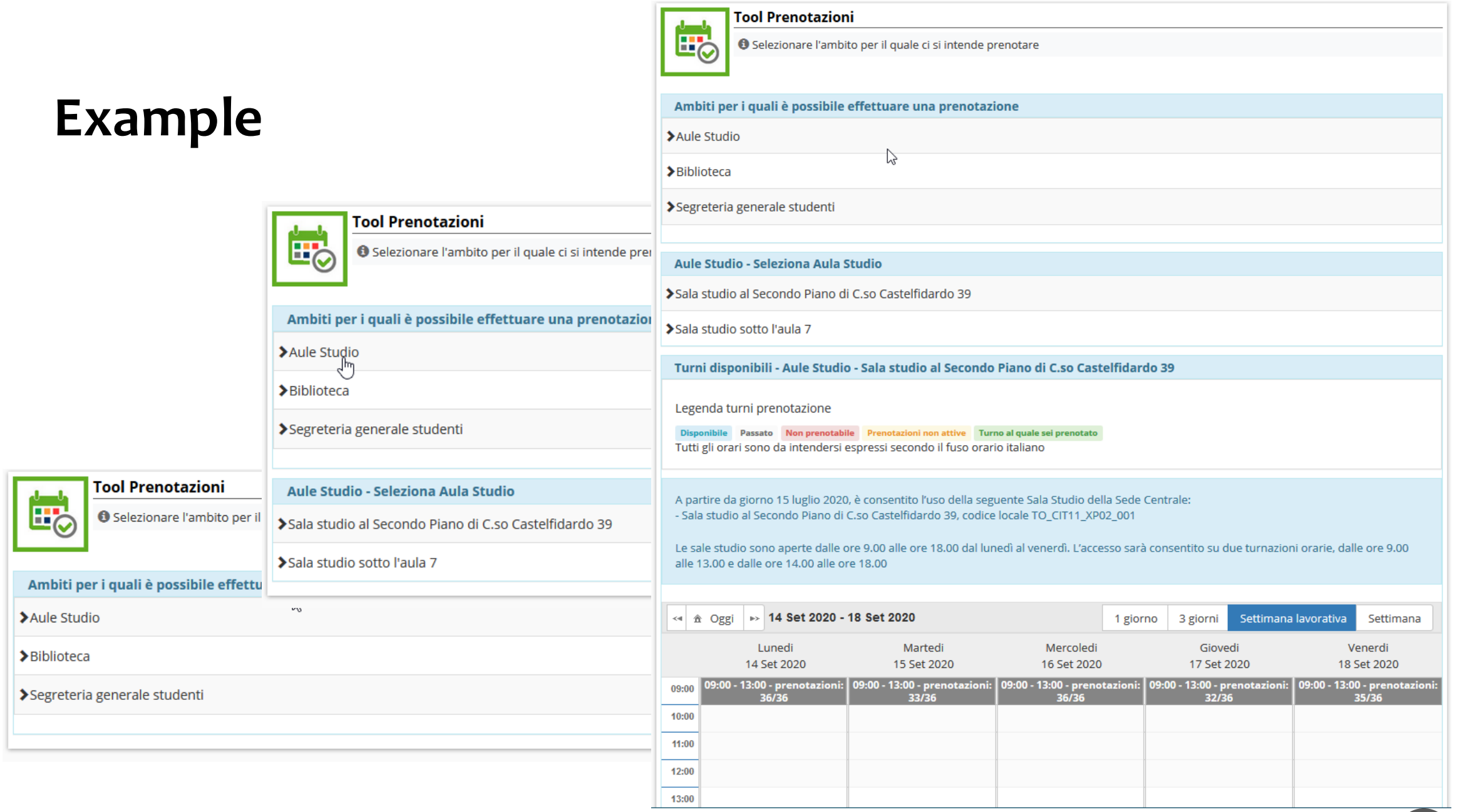
# Tree-like Content Organization



# Rules for Tree-like Organization

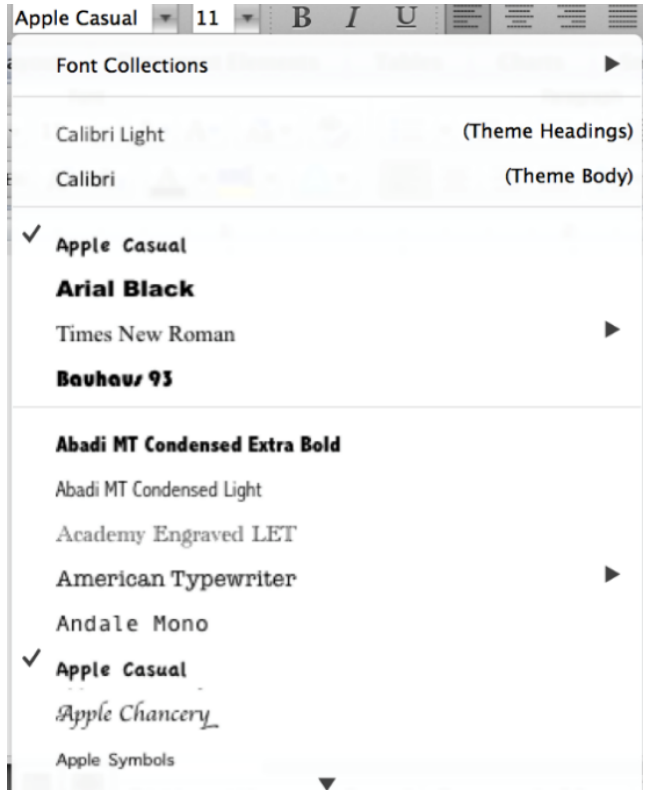
- Use **task semantics** to organize menus
- Limit the **number of levels** (i.e., prefer broad–shallow to narrow–deep)
- Create groups of **logically similar** items: e.g., Level 1: countries, Level 2: states, Level 3: cities
- Form groups that **cover all possibilities**: e.g., Age ranges: [0–9] [10–19] [20–29] and [>= 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
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
Oggi
14 Set 2020 - 18 Set 2020
1 giorno
3 giorni
Settimana lavorativa
Settimana
Lunedi 14 Set 2020
Martedi 15 Set 2020
Mercoledi 16 Set 2020
Giovedi 17 Set 2020
Venerdi 18 Set 2020
09:00
10:00
11:00
12:00
13:00
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

# 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

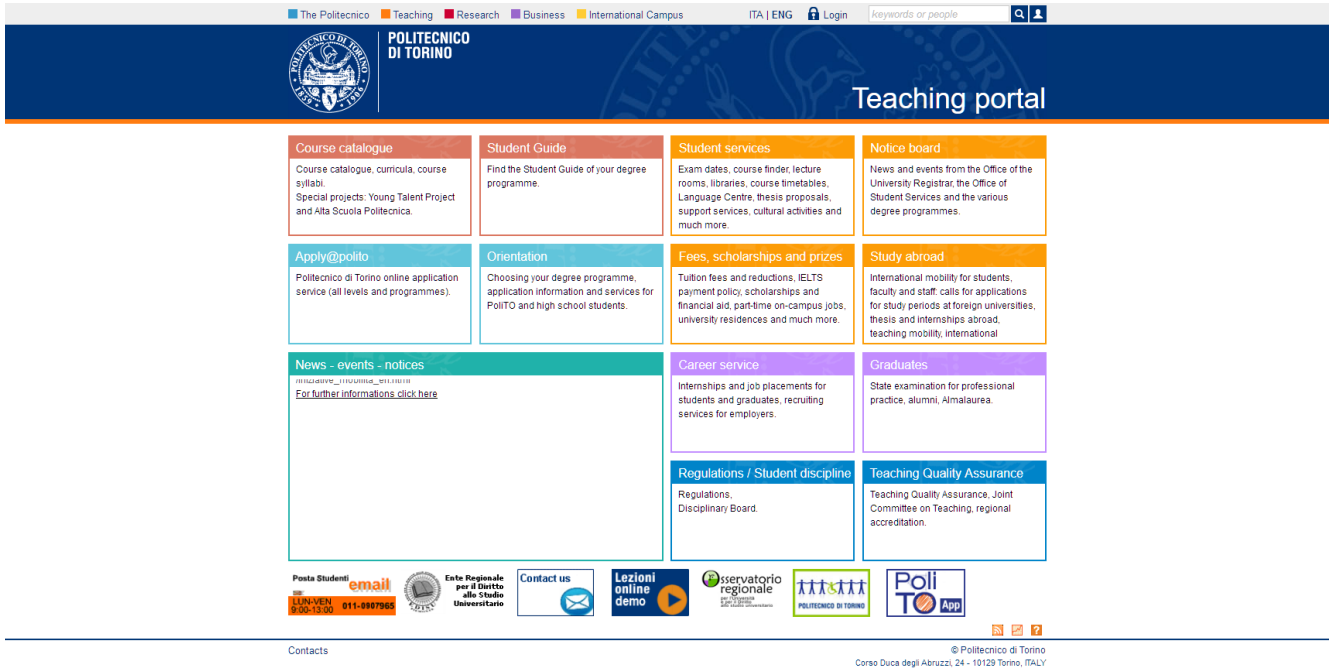
- Informavores orient themselves using *information scent*
- How can we figure out how to get the information we want?
- Do we realize what options are available to us?
- Web pages (and UIs general) provide *cues* to suggest where to find information
  - Icons, Menus, Breadcrumbs, Color coding, …

*Informavore*, an organism that consumes information

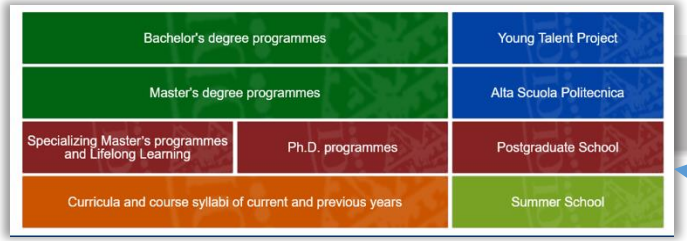
# Poor Information Scent

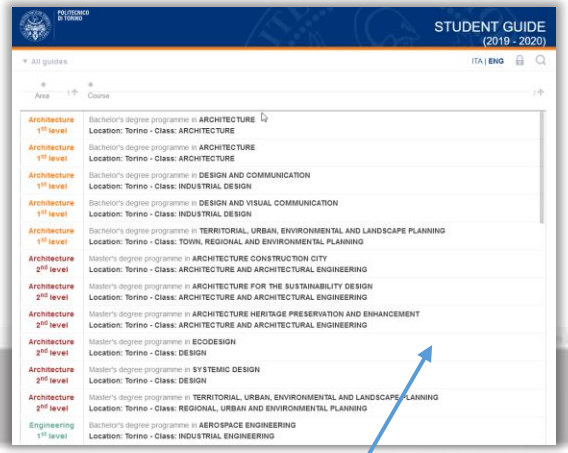
- Users flailing around…
  - Do not know where to go
- Low confidence
  - Users are not sure of their actions, both before executing it and after they see its effects
- Back button
  - When it’s used too often…

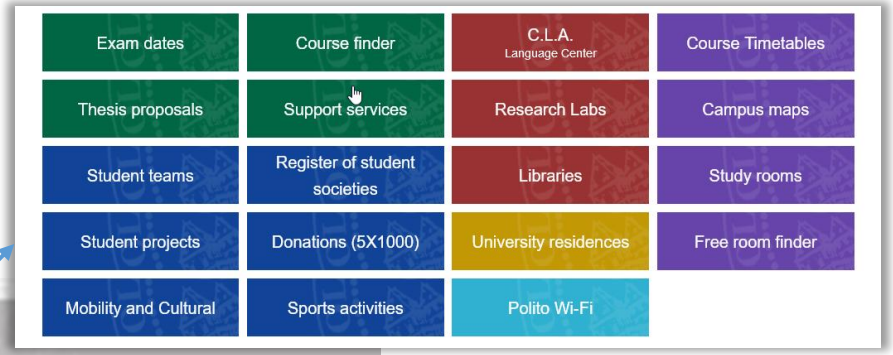
# Example


The Politecnico
Teaching
Research
Business
International Campus
ITA | ENG
Login
keywords or people
POLITECNICO
DI TORINO
Teaching portal
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.
Posta Studenti email
LUN-VEN 9.00-13.00 011-0907965
Ente Regionale per il Diritto allo Studio Universitario
Contact us
Lezioni online demo
Osservatorio regionale
POLITECNICO DI TORINO
Poli TO App
Contacts
© Politecnico di Torino
Corso Duca degli Abruzzi, 24 - 10129 Torino, ITALY

# Example

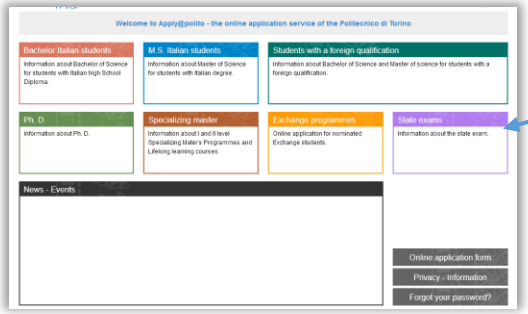

Bachelor's degree programmes
Young Talent Project
Master's degree programmes
Alta Scuola Politecnica
Specializing Master's programmes and Lifelong Learning
Ph.D. programmes
Postgraduate School
Curricula and course syllabi of current and previous years
Summer School

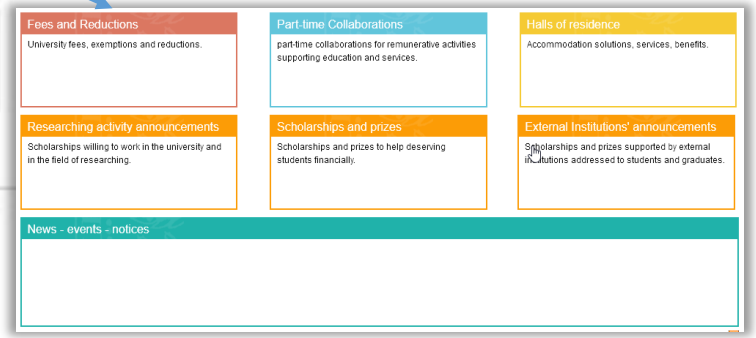

STUDENT GUIDE
(2019 - 2020)


Exam dates
Course finder
C.L.A.
Language Center
Course Timetables
Thesis proposals
Support services
Research Labs
Campus maps
Student teams
Register of student societies
Libraries
Study rooms
Student projects
Donations (5X1000)
University residences
Free room finder
Mobility and Cultural
Sports activities
Polito Wi-Fi

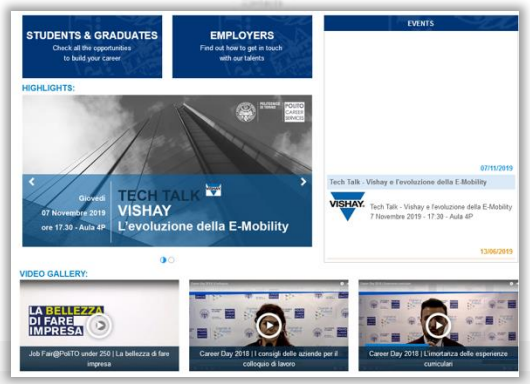
Teaching portal

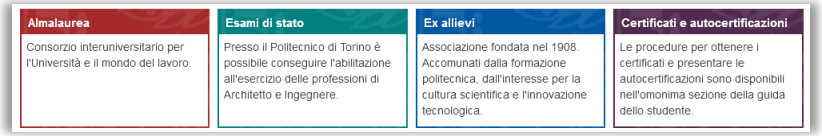
Generale
Studenti
Area dell'Architettura
Corsi di Laurea di 1° livello
Area dell'Architettura
Corsi di Laurea Magistrale
Area dell'Ingegneria
Corsi di Laurea di 1° livello
Area dell'Ingegneria
Corsi di Laurea Magistrale


Welcome to Apply@polito - the online application service of the Politecnico di Torino
Bachelor Italian students
M.S. Italian students
Students with a foreign qualification
Ph. D.
Specializing master
Exchange programmes
Stale exams
News - Events
Online application form
Privacy - Information
Forgot your password?


Fees and Reductions
University fees, exemptions and reductions.
Part-time Collaborations
part-time collaborations for remunerative activities supporting education and services.
Halls of residence
Accommodation solutions, services, benefits.
Researching activity announcements
Scholarships willing to work in the university and in the field of researching.
Scholarships and prizes
Scholarships and prizes to help deserving students financially.
External Institutions' announcements
Scholarships and prizes supported by external institutions addressed to students and graduates.
News - events - notices

Home
Come orientarsi al Polito
Iscrizione al primo anno
Materiale informativo
Attività con le scuole medie superiori
Registrazione ad apply@polito
Consulta le graduatorie per l'ammissione all'a.a. 2019/20


STUDENTS & GRADUATES
EMPLOYERS
EVENTS
HIGHLIGHTS:
TECH TALK
VISHAY
L'evoluzione della E-Mobility
VIDEO GALLERY:


Almalaurea
Consorzio interuniversitario per l'Università e il mondo del lavoro.
Esami di stato
Presso il Politecnico di Torino è possibile conseguire l'abilitazione all'esercizio delle professioni di Architetto e Ingegnere.
Ex allievi
Associazione fondata nel 1908. Accomunati dalla formazione politecnica, dall'interesse per la cultura scientifica e l'innovazione tecnologica.
Certificati e autocertificazioni
Le procedure per ottenere i certificati e presentare le autocertificazioni sono disponibili nell'omonima sezione della guida dello studente.

# 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 toungue.
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
Like it? Donate to LimeSurvey

# Common Problems

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

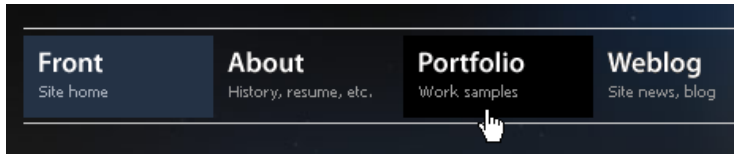
# Icons

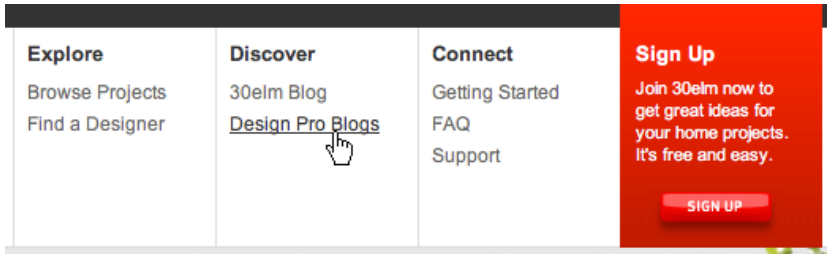
- Icons facilitate recognition over recall
  - When they are consistently used, and frequently visible
- Redundant coding helps recognition and memorization
  - Icon + Text + Tooltip + Context

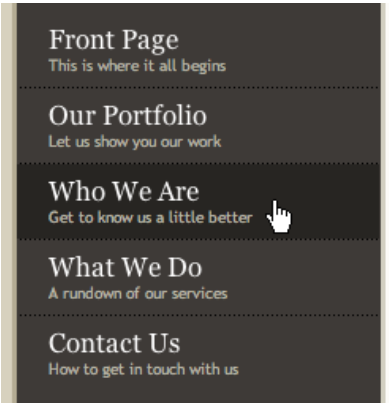
# Links

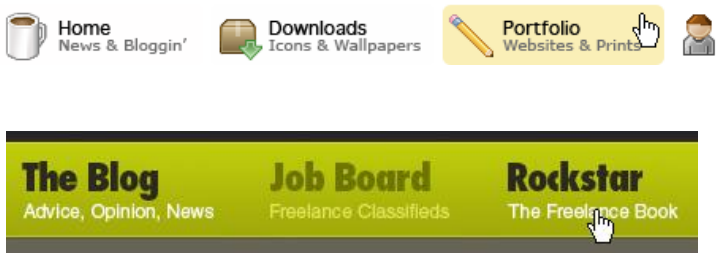
- Always use multi-word links
  - Download the next assignment template
  - Assignment template: click here
- Straight language, not jargon
  - Scor-o-matic download
  - Download the spreadsheet for computing scores

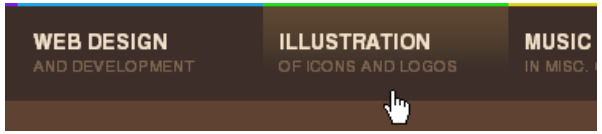
# “Speaking” block navigation

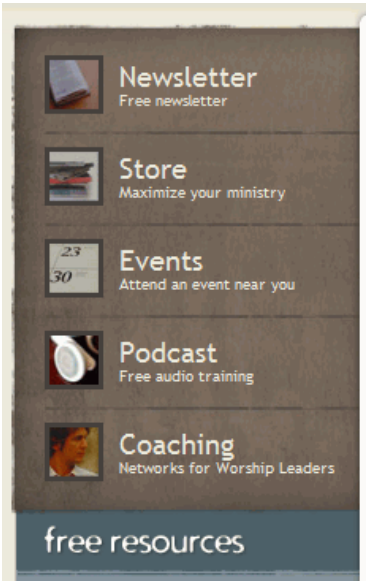


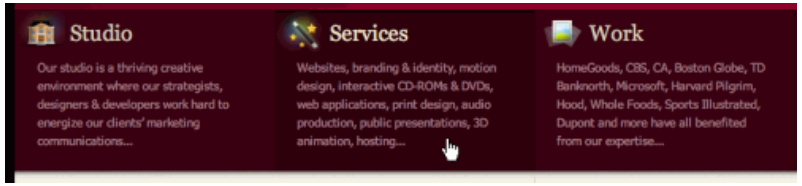



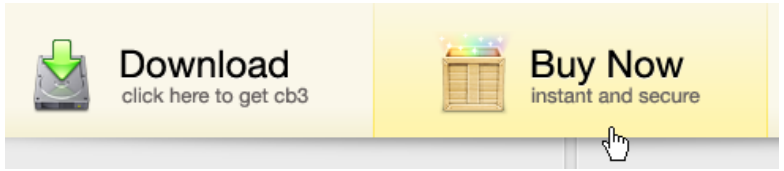





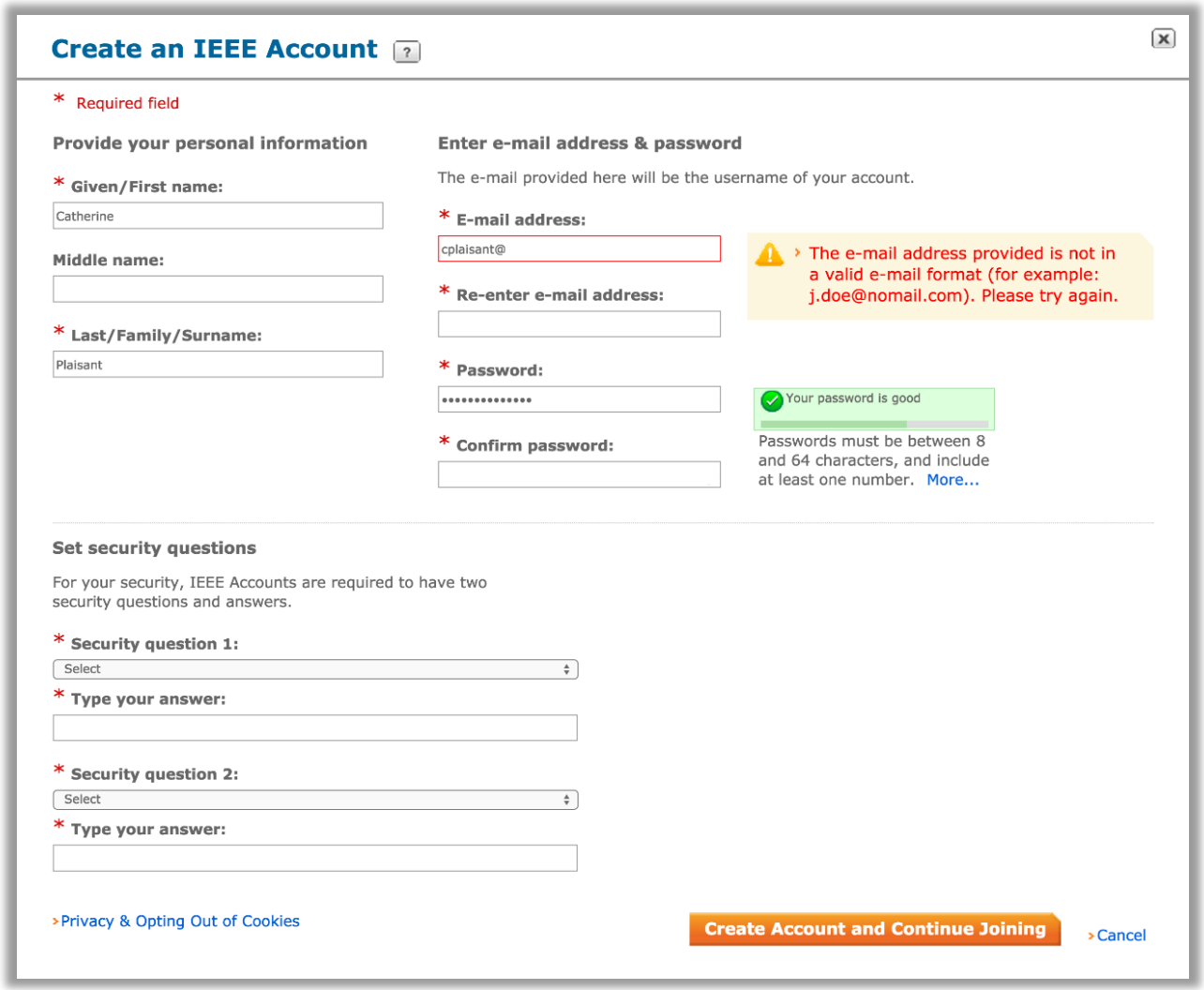



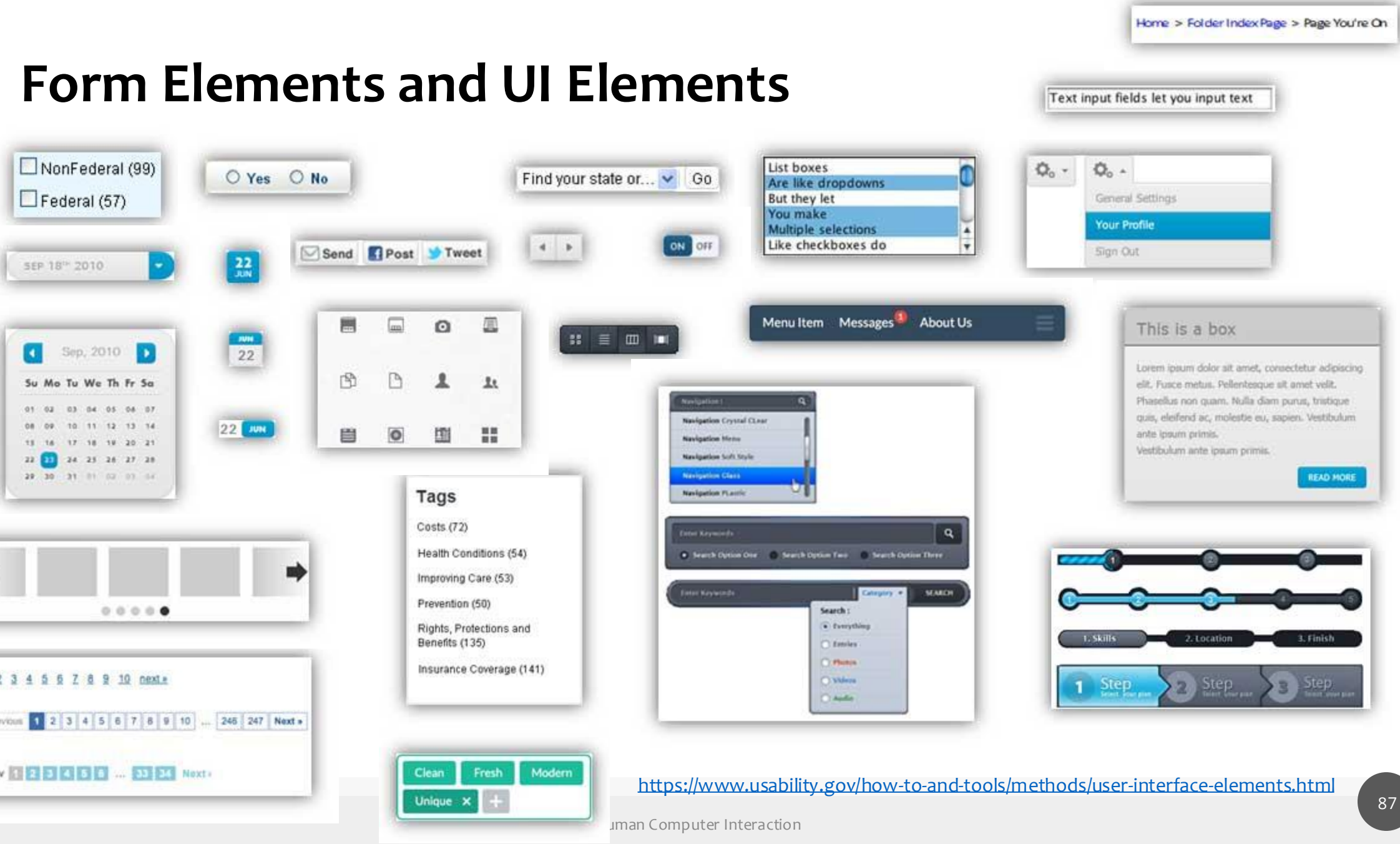

https://www.smashingmagazine.com/2008/02/navigation-menus-trends-and-examples/

# Forms

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

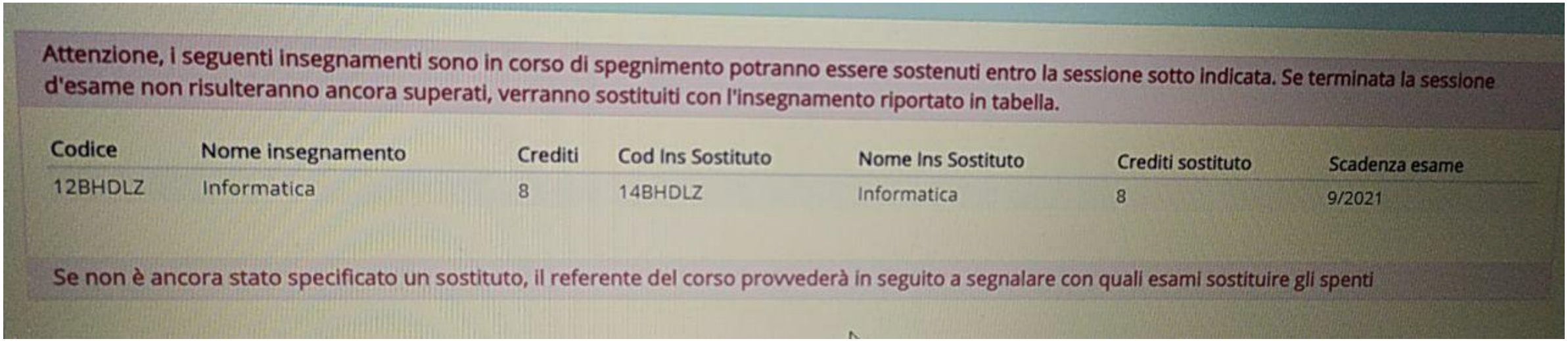


# Form Elements and UI Elements




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

# Example: Redesign This



Attenzione, i seguenti insegnamenti sono in corso di spegnimento 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

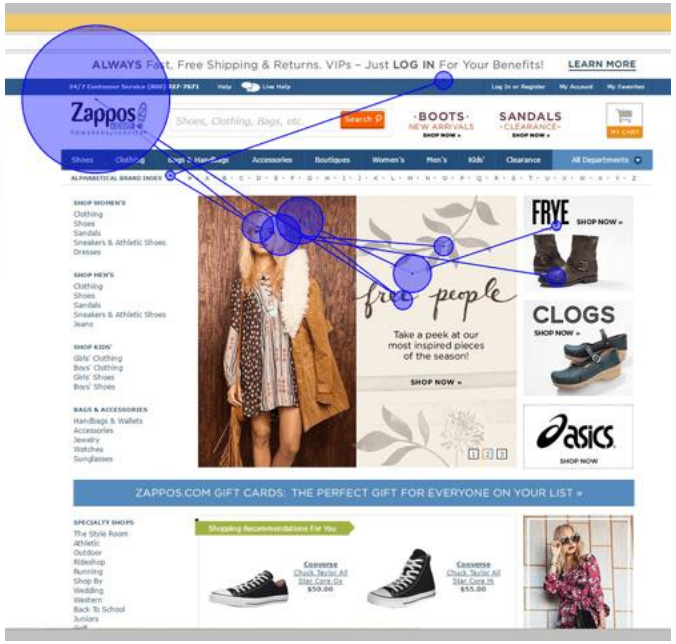
# Eye Tracker: How It Works

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.

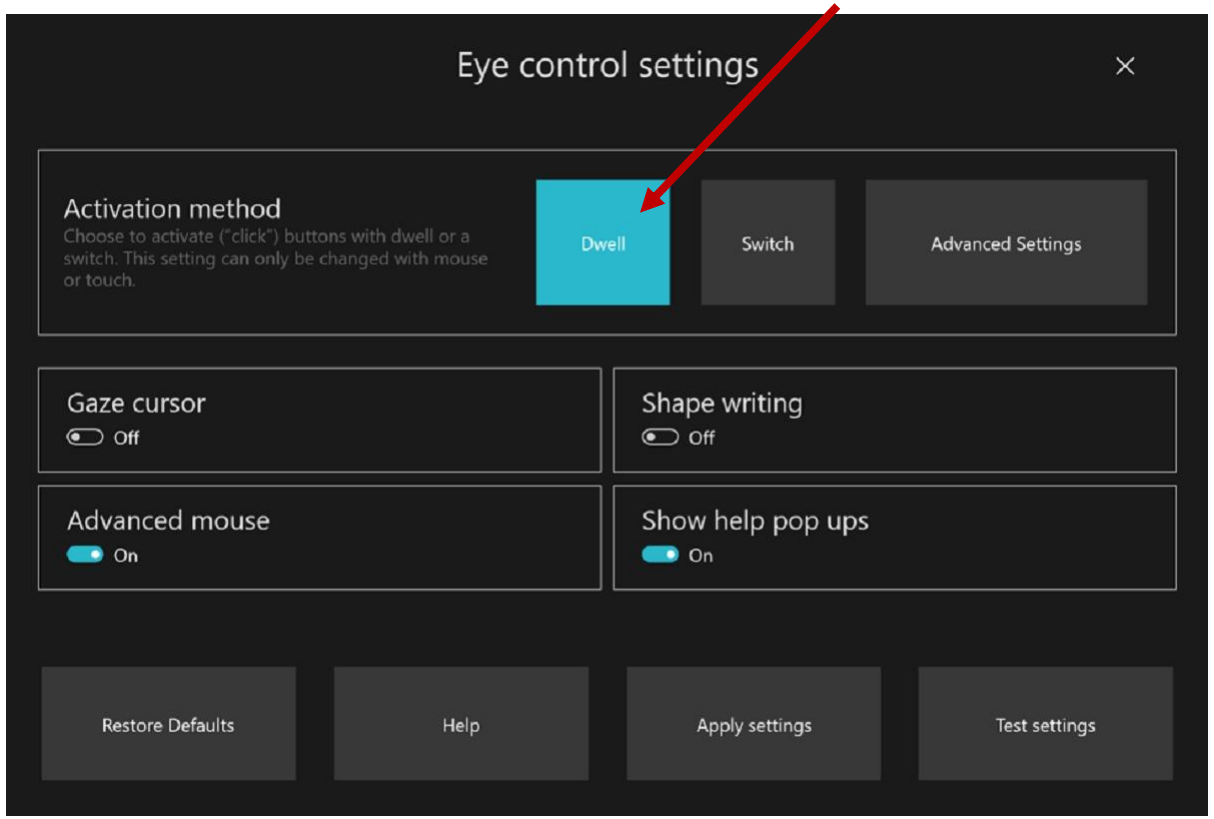
source: https://www.tobii.com/group/about/this-is-eye-tracking/

# Eye Tracker: Examples

Heatmap and
scan path analysis




**Beware the Midas' Touch!**




Windows 10 Eye Control Settings

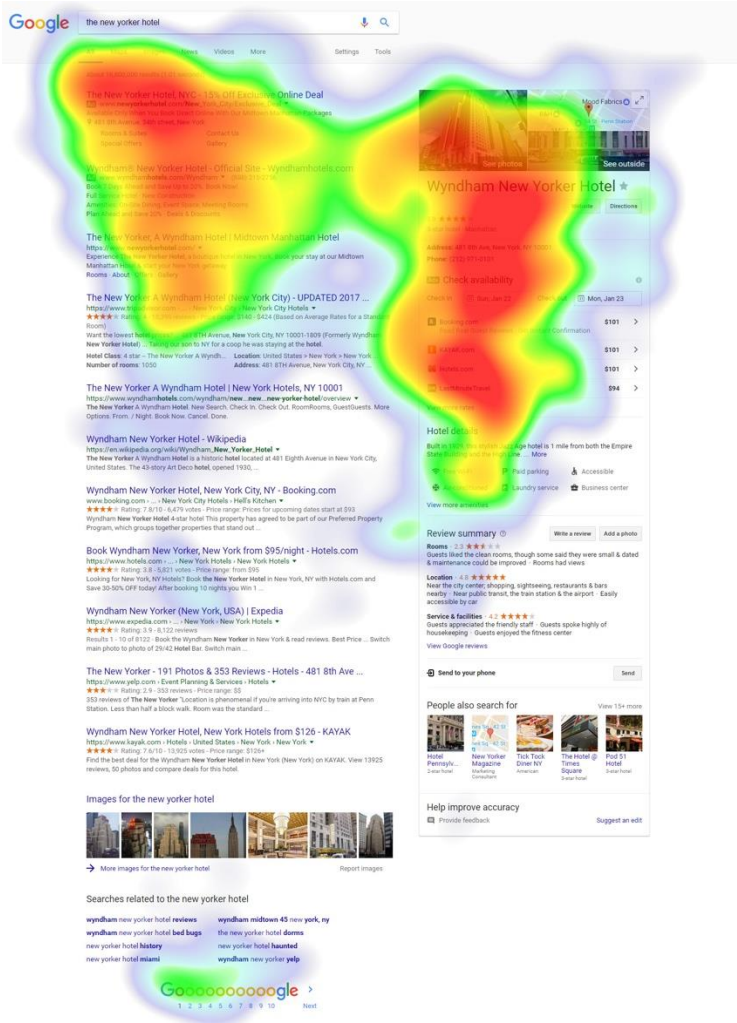
# Location on the Page

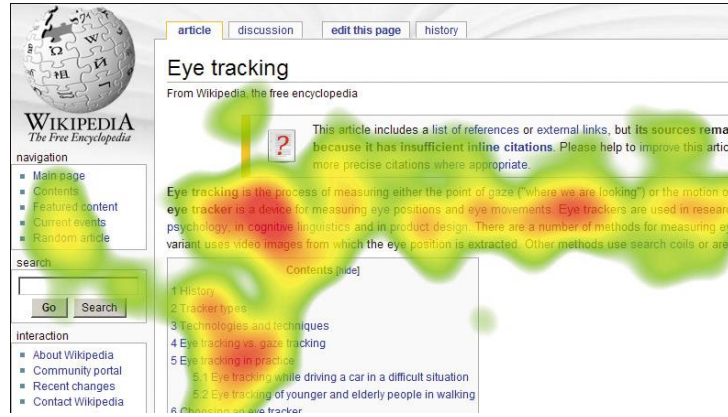
Eye tracking studies show where the users actually *look* on the page

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

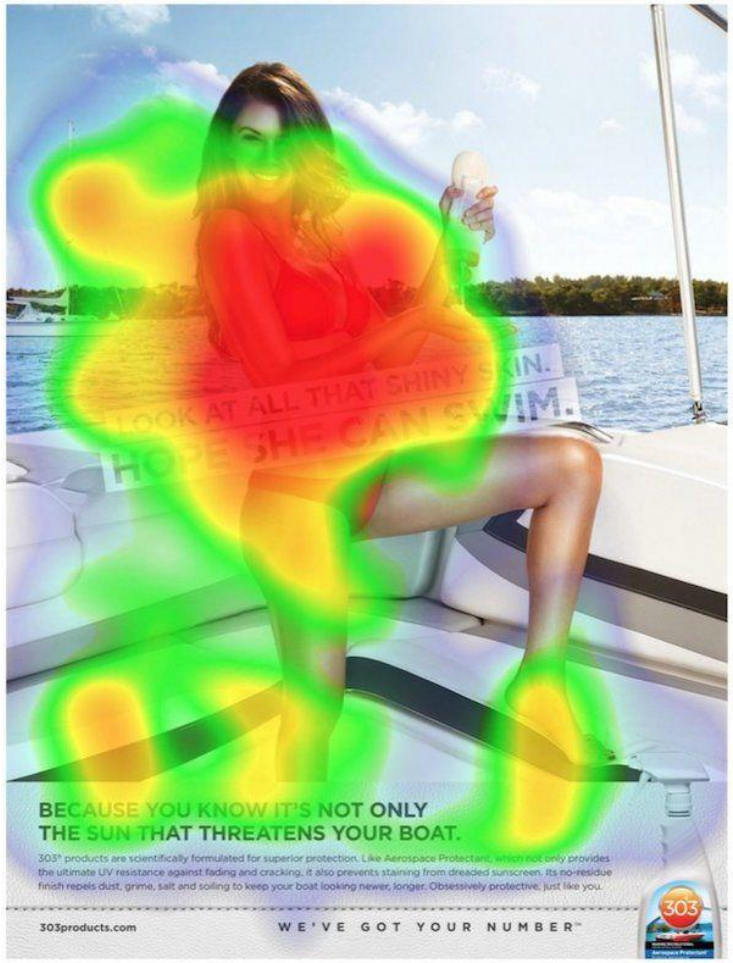
Users “glance” and spend limited amount of time on each page.

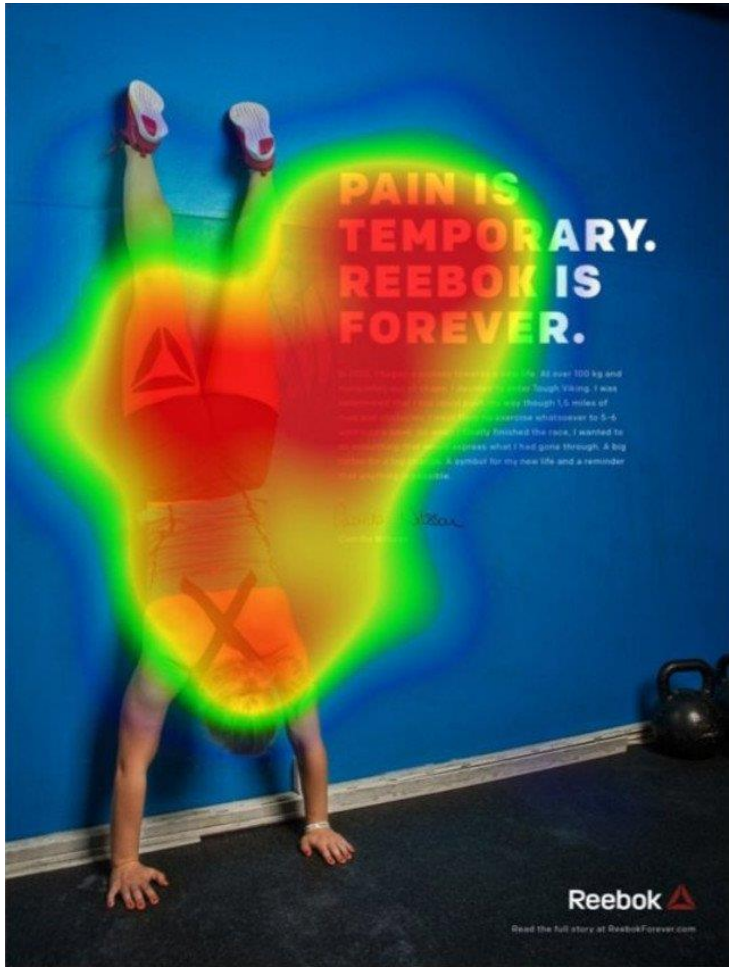
F-shaped pattern



# Did Anyone Ever Look at the Product Name?



# Scanning

WHAT DESIGNERS BUILD...
biztravel.com
Join Biztravel.com Now!
Book A Trip
Track My Miles
Book A Vacation
Plan A Meeting
Charter A Flight
Fast, easy booking of flights, hotel rooms, & rental cars
Automated Upgrades to help you fly First Class
Flight status updates sent to your pager
Exclusive travel deals for biztravel.com members
Tracking of your points and miles
Learn More
Join Now!
WHAT USERS SEE...
biztravel.com
Book A Trip
Book A Vacation
Fast, easy booking of flights, hotel rooms, & rental cars
Exclusive travel deals for biztravel.com members
I want to buy a ticket.
biztravel.com
Track My Miles
Tracking of your points and miles
How do I check my frequent flyer miles?

# Experiment

| Site Version | Sample Paragraph | Usability Improvement (relative to control condition) |
|---|---|---|
| **Promotional writing (control condition)** 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) |
| **Concise text** 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%** |
| **Scannable layout** using the same text as the control condition in a layout that facilitated scanning | 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:<br>•Fort Robinson State Park (355,000 visitors)<br>•Scotts Bluff National Monument (132,166)<br>•Arbor Lodge State Historical Park & Museum (100,000)<br>•Carhenge (86,598)<br>•Stuhr Museum of the Prairie Pioneer (60,002)<br>•Buffalo Bill Ranch State Historical Park (28,446). | **+47%** |
| **Objective language** 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%** |
| **Combined version** using all three improvements in writing style together: concise, scannable, and objective | In 1996, six of the most-visited places in Nebraska were:<br>•Fort Robinson State Park<br>•Scotts Bluff National Monument<br>•Arbor Lodge State Historical Park & Museum<br>•Carhenge<br>•Stuhr Museum of the Prairie Pioneer<br>•Buffalo Bill Ranch State Historical Park | **+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 Elmqvist, 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_nusHL_Mjt87THSTlgrsyJ
- Most of the slides are adapted from those used in the "Human Computer Interaction" course of Politecnico di Torino
  - http://bit.ly/polito-hci

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