



Design

Human-Computer Interaction Lecture

Slides adapted from hci-lecture.org (A. Schmidt, N. Henze, K. Wolf, V. Schwind), Image from: <https://pxhere.com/de/photo/956874>

Learning Goals

- Understand ...
 - › what design is about
 - › principles of aesthetics
 - › the complexity of design
 - › design methods
 - › basics of composition, color, and shapes
- Be able to explain ...
 - › how to apply design methods
 - › how to derive interface and interaction designs

Defining Design

- **Design is**

- › **a plan of the construction** of an artifact and the implementation of a design process and the activity of designing (“Gestaltung”)
 - › The research around planning is referring to the **exploration of design spaces**
- › **or the result of that plan** with a form of an object or system (“Gestalt”) e.g., a product, implementation, or prototype
 - › The research around the results is referring to the **exploration of design prototypes**

- There are two dominant but **different views** of the design process

- › **Rational model**: the problem-solving view (e.g., in industry and research)
- › **Action-centric model**: the design process is improvised, and the designer only uses creativity and emotions (e.g., in art and play)

Rational Model



Image Source Image Source <https://www.flickr.com/photos/kotomi-jewelry/12274531886> by Kotomi_
<https://www.pexels.com/de-de/foto/menschen-arbeiten-fenster-gluecklich-3182804/> by fauxels

Action-Centric Model



Images from <https://pxhere.com/de/photo/975666>, <https://pxhere.com/de/photo/1291811>

Boredom & Despair



Images from: <https://pxhere.com/de/photo/1153737>, <https://pxhere.com/de/photo/1263739>

Contemplation & Despair

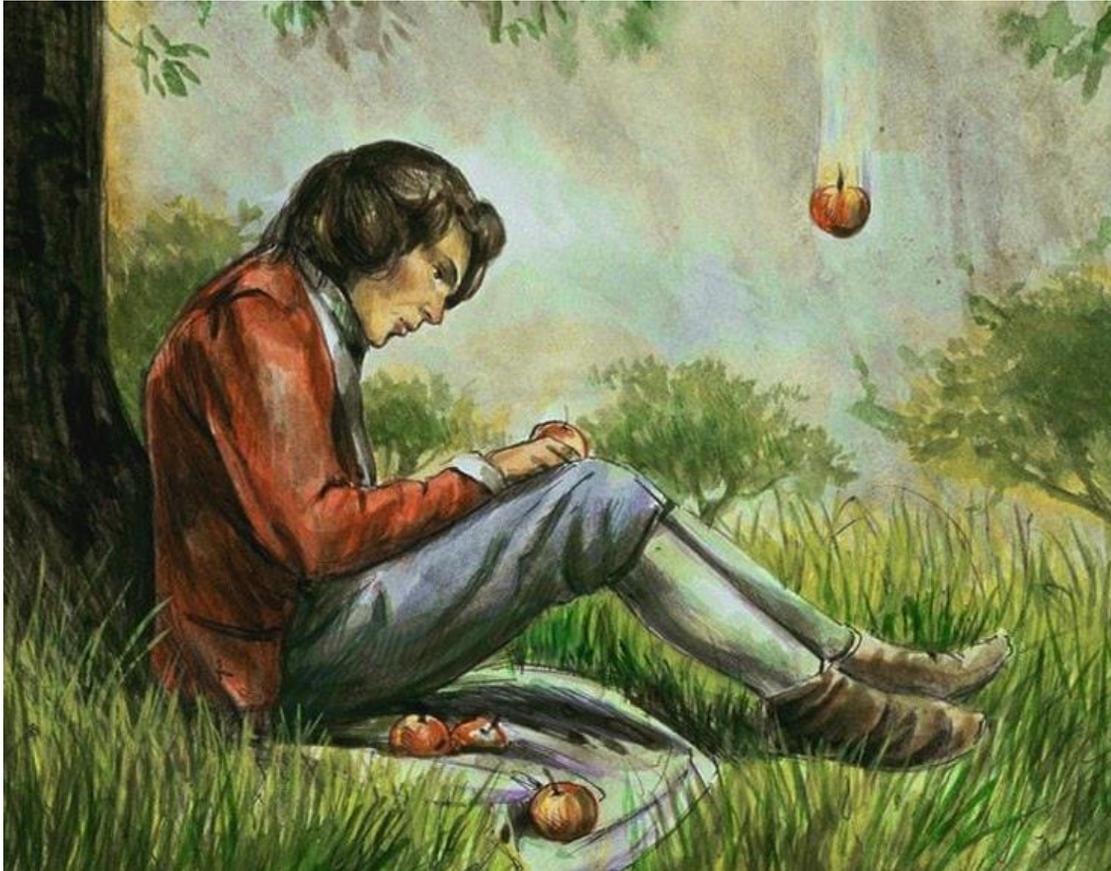
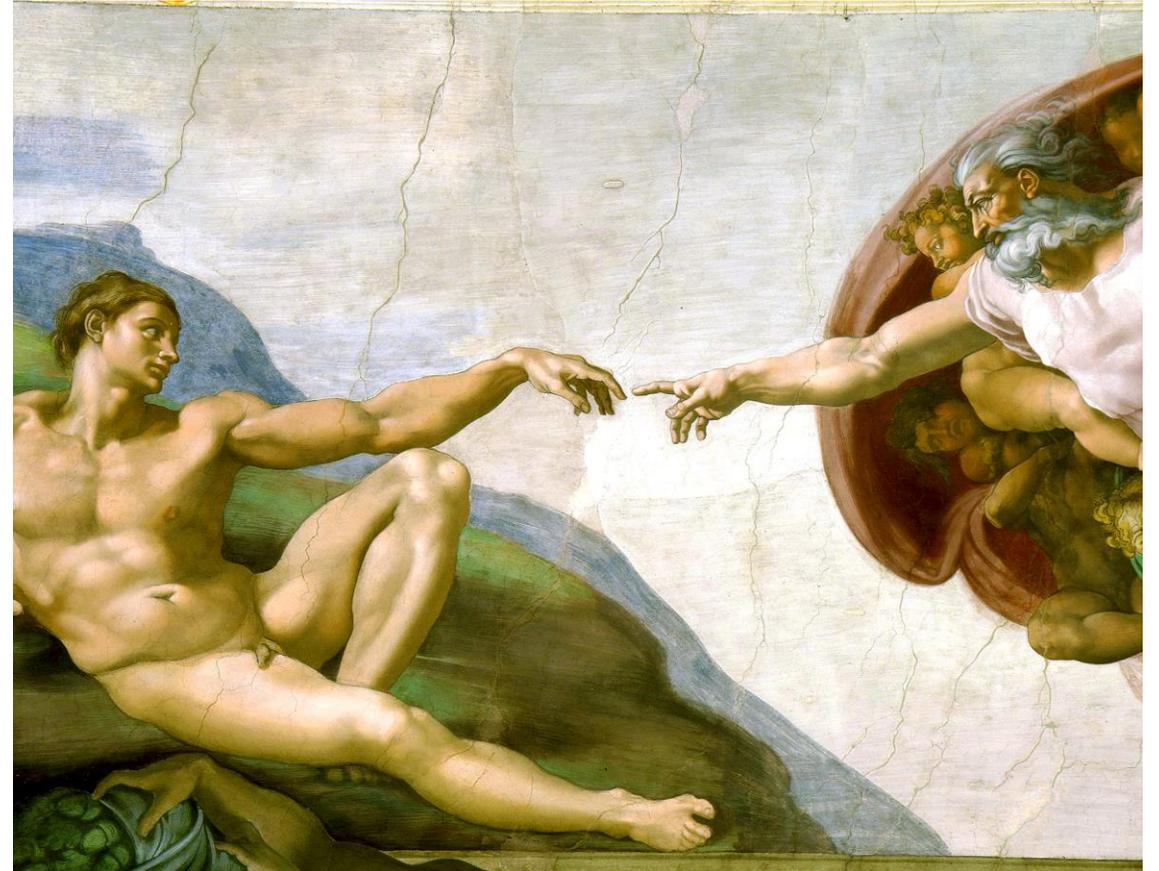


Image from: Johann Brandstetter/akg-images, Von Bundesarchiv, Bild 1011-621-2930-32 / Walther / CC-BY-SA 3.0, CC BY-SA 3.0 de, <https://commons.wikimedia.org/w/index.php?curid=5413118>

Love & Belief

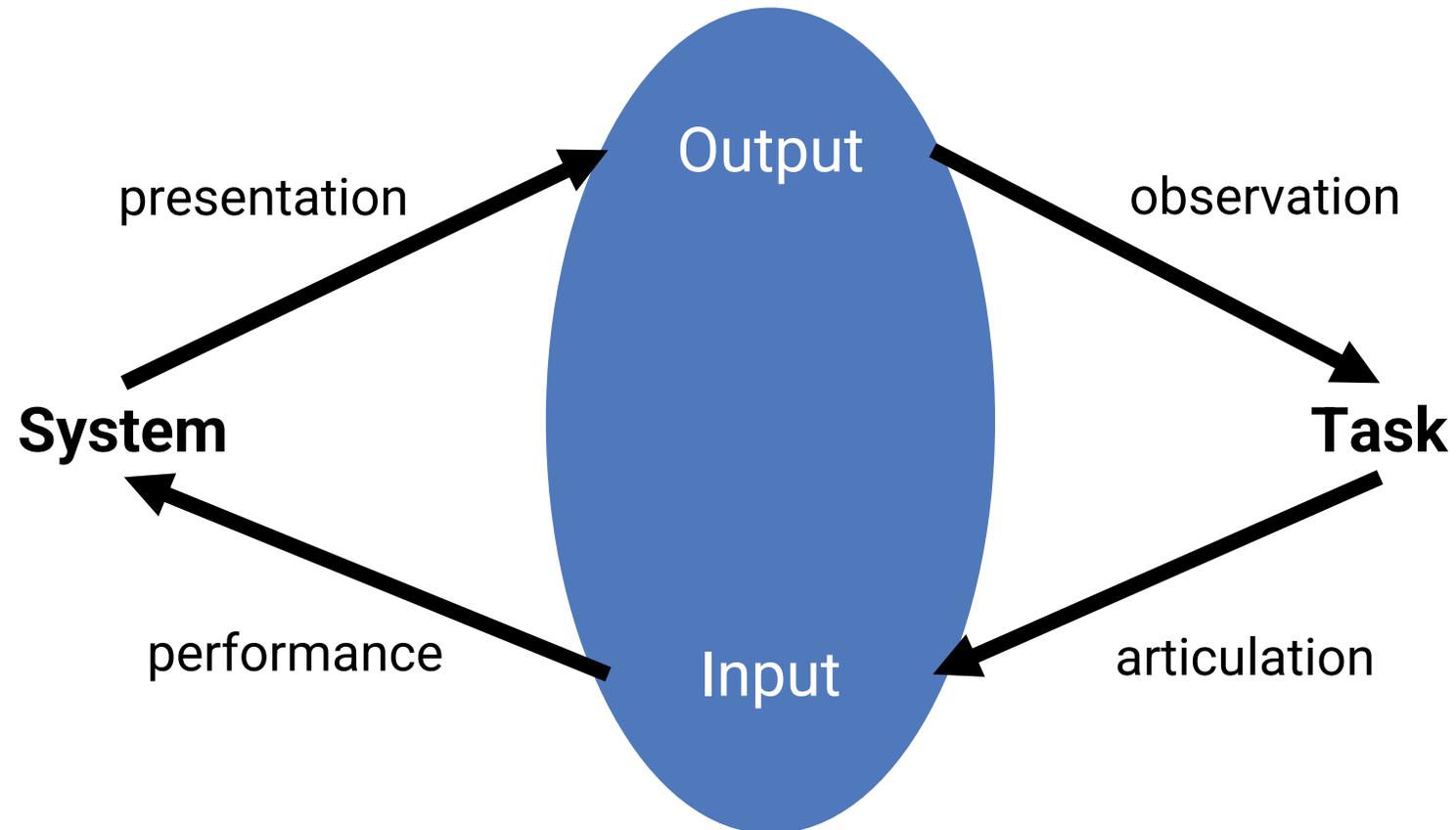


Images from: <https://pxhere.com/de/photo/835669>, https://commons.wikimedia.org/wiki/File:Creaci%C3%B3n_de_Ad%C3%A1m.jpg

Dimensions of Interaction Design

- **Words:** They should communicate information to the user but not too much information. e.g., taglines, paragraphs, slogans etc.
- **Visual representation:** It includes all graphical elements like images, emojis, icons etc.
- **Physical objects or space:** It includes portability and flexibility of the applications.
- **Time:** It refers media that changes With time. For e.g. Animation, Sound, Videos etc.
- **Behavior:** It includes How do user perform actions on websites? How do users operate the product? It includes reactions and feedbacks of the user.

Interaction Framework



Graphic by <https://de.slideshare.net/VrushaliDhanokar/human-computer-interaction-interaction-design>

WIMP Interface Design

■ Window

- › Single Document Interface (SDI): e.g., one document open at a time (Word)
- › Multiple Document Interface (MDI): e.g., multiple documents open at a time (Excel)
- › Tabbed Document Interface (TDI): e.g., multiple tabs open at a time (Browser)

■ Icons

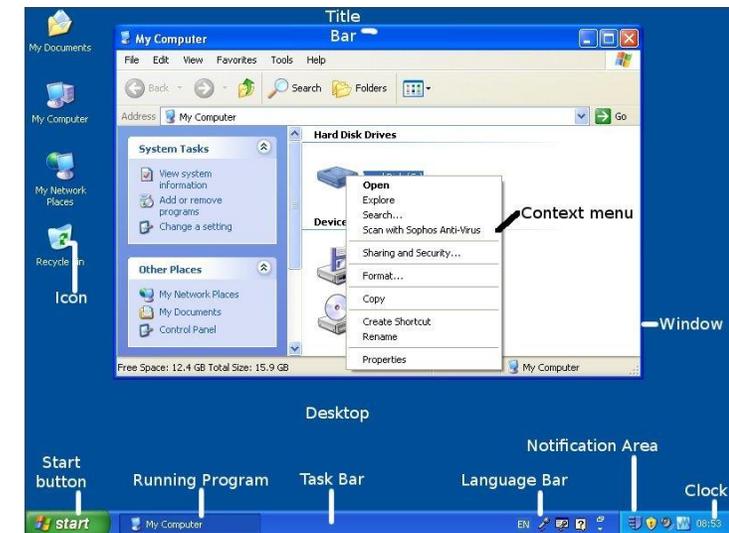
- › Graphical Representation: Warnings, Errors, Status, Volume, WiFi, Speaker,...

■ Menu

- › Single: Confirmation Dialogue
- › Sequential/Linear Menu: Dropdown Menu
- › Simultaneous Menu: Multiple Radio Buttons
- › Function/Hierarchical Menu: Context menu (right click in Windows)

■ Pointer

- › The cursor



Della Silva, C. (2015). TactiForm : a touch sensitive actuated shape display as a dynamic interactive user interface for geospatial visual analytic systems. ResearchGate. Retrieved from https://www.researchgate.net/publication/290180604_TactiForm_a_touch_sensitive_actuated_shape_display_as_a_dynamic_interactive_user_interface_for_geospatial_visual_analytic_systems/figures?lo=1&utm_source=google&utm_medium=organic

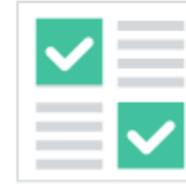
Design Systems



COLORS



TYPOGRAPHY



IMAGES



LAYOUT



ICONS



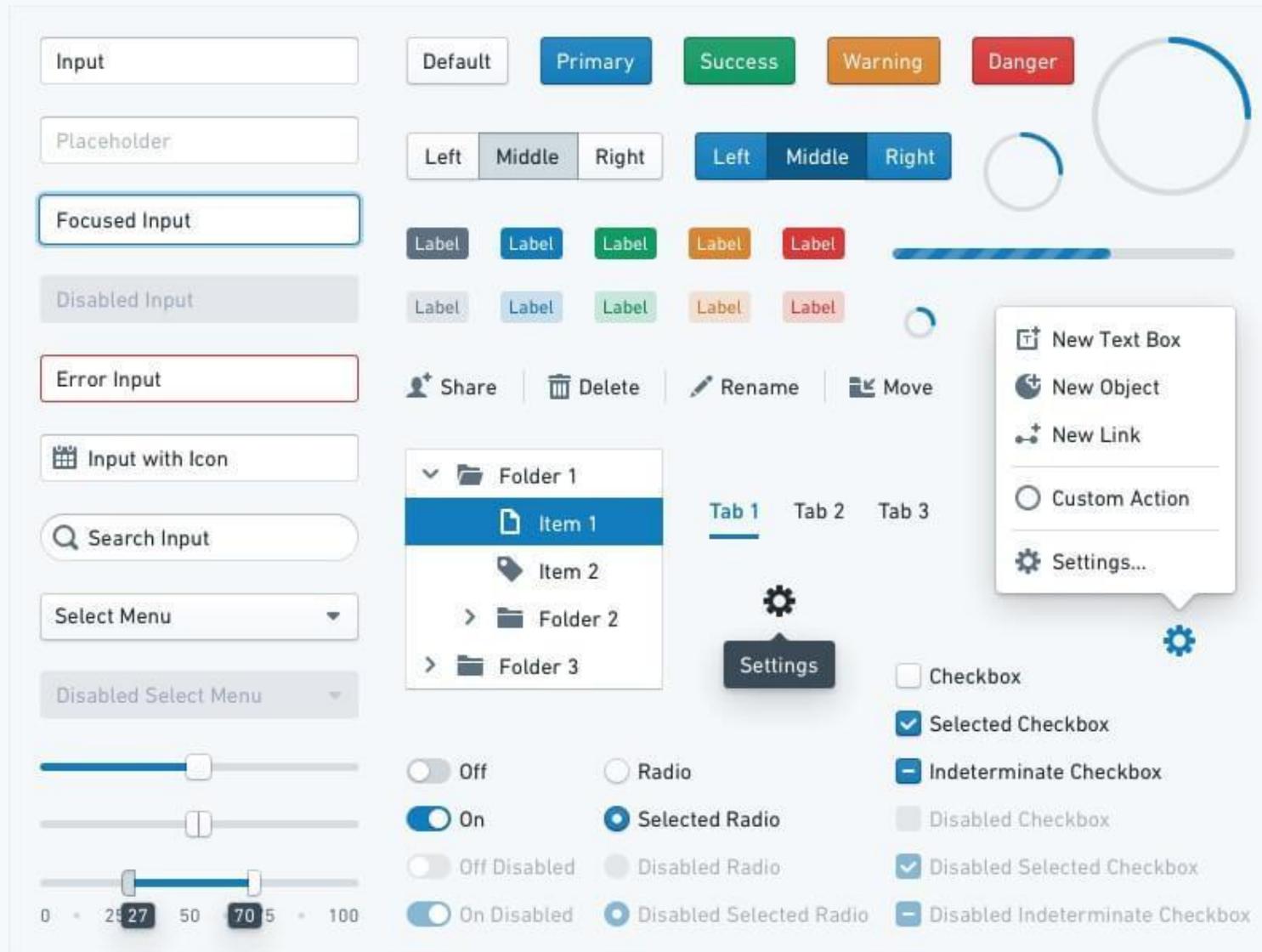
ANIMATION



COPY



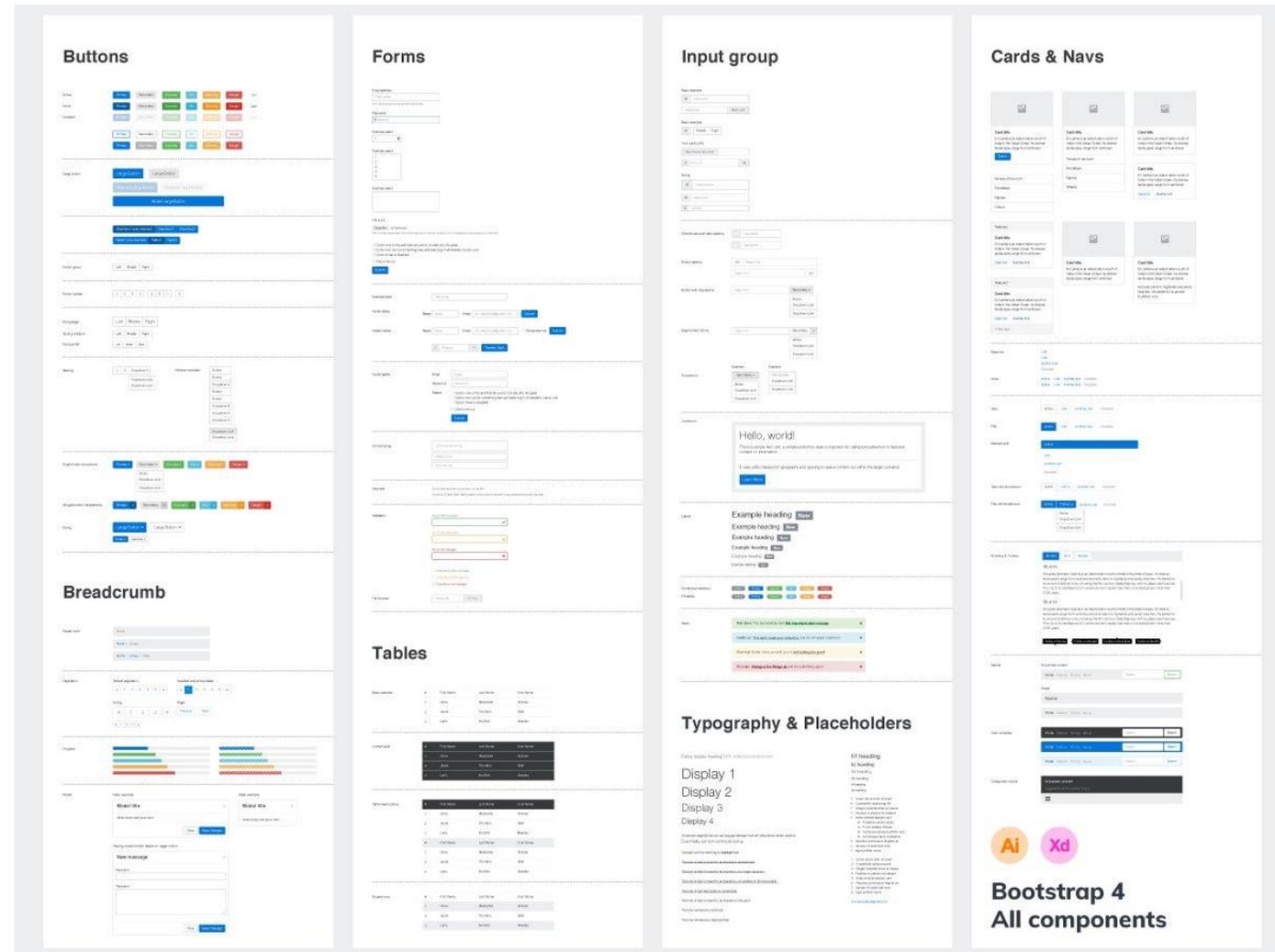
ILLUSTRATION



https://best10.club/category.php/ui+library+for+react/?v=bc_v2_4

Front-End: Bootstrap

- Powerful, extensible, and feature-packed frontend toolkit for web (JavaScript/HTML/CSS)
- Design templates for typography, forms, buttons, navigation, and other interface components
- Mobile-friendly/“Mobile-first”



<https://getbootstrap.com/> and <https://www.uplabs.com/posts/bootstrap-4-all-components>

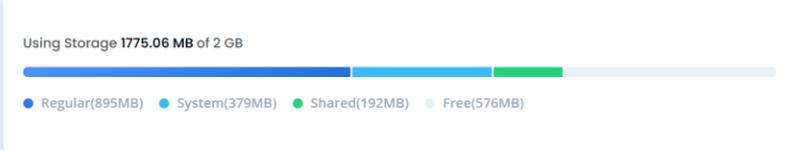
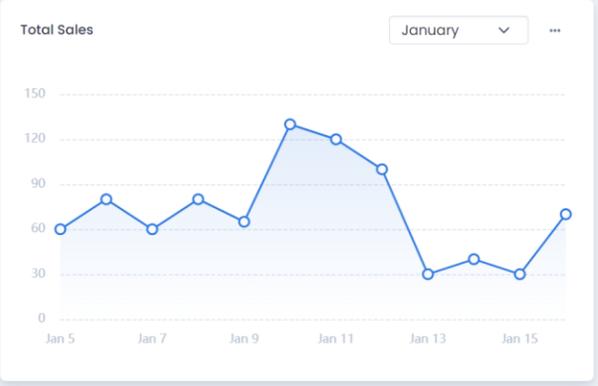
- Dashboard
 - Default
 - Analytics
 - CRM
 - E commerce
 - LMS New
 - Management
 - SaaS
 - Support desk New
- App
- Calendar
- Chat
- Email
- Events
- E commerce
- E learning New
- Kanban
- Social
- Support desk
- Pages
- Starter
- Landing
- Authentication
- User
- Pricing
- Faq
- Errors
- Miscellaneous
- Layouts
- Modules
- Forms
- Tables
- Charts
- Icons
- Maps
- Components



Running Projects Working Time

F Falcon	38%	12:50:00
R Reign	79%	25:20:00
B Boots4	90%	58:20:00
R Raven	40%	21:20:00
S Slick	70%	31:20:00

[Show all projects >](#)



Running out of your space?

Your storage will be running out soon. Get more space and powerful productivity features.

[Upgrade storage >](#)

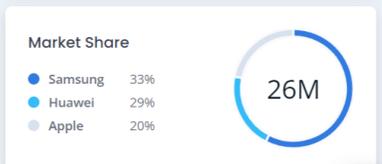
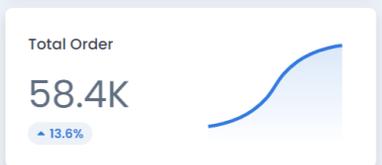
Best Selling Products

	Revenue (\$3333)	Revenue (%)
Raven Pro Landing	\$1311	39%
Boots4 Portfolio	\$860	26%
Falcon Admin	\$539	16%
Slick Builder	\$343	10%
Reign Pro Agency	\$280	8%

Last 7 days View All

Shared Files View All

apple-smart-watch.png	Antony Just Now
iphone.jpg	Antony Yesterday at 1:30 PM
Falcon v1.8.2	Jane 27 Sep at 10:30 AM
iMac.jpg	Rowen 23 Sep at 6:10 PM
functions.php	John 1 Oct at 4:30 PM

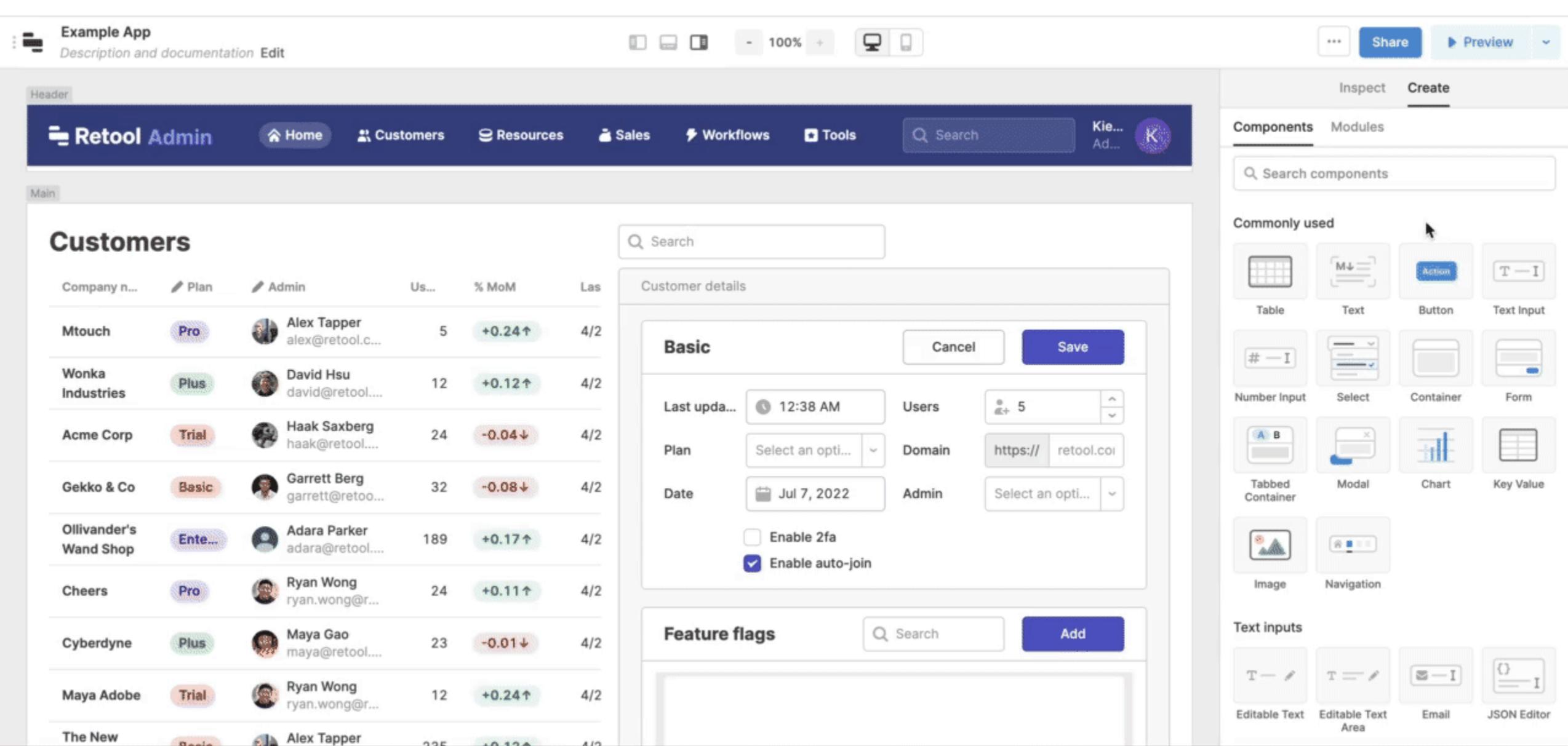


Running Projects Working Time

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[Show all projects >](#)

Image from: <https://getbootstrap.com/>



Animation from: <https://retool.com/>



Aesthetics

Usability and the Signs of Beauty

Slides adapted from hci-lecture.org (A. Schmidt, N. Henze, K. Wolf, V. Schwind), Image from: <https://pxhere.com/de/photo/956874>

Aesthetics

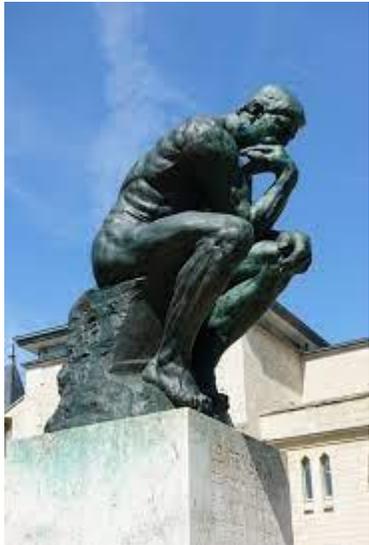
- **Aesthetics are strongly tied to emotions**
 - › e.g., the emotion of disgust has been evolved in order to avoid several harmful actions such as infectious diseases due to contact with spoiled foods, feces, and decaying bodies.
- Human societies have some **form of art**
 - › The universality of strong emotions associated with art suggests that art is related to evolutionary adaptations
- Emotion from behavior such as pleasure from sex, eating sweets, fatty foods, the fear of spiders, snakes, or the dark are all related to **evolutionary aesthetics**
- There are assumptions that certain **aesthetic properties from nature are perceived as (visually) appealing** across all species (e.g., high energy food, the color blue, ...)



What is Aesthetics?



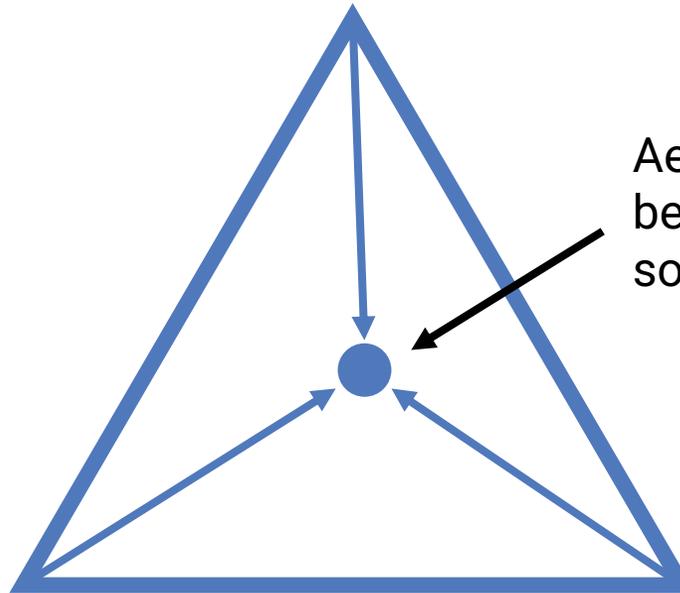
<https://pxhere.com/de/photo/108654>
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Human Factors /
Personal Preferences

Functionality



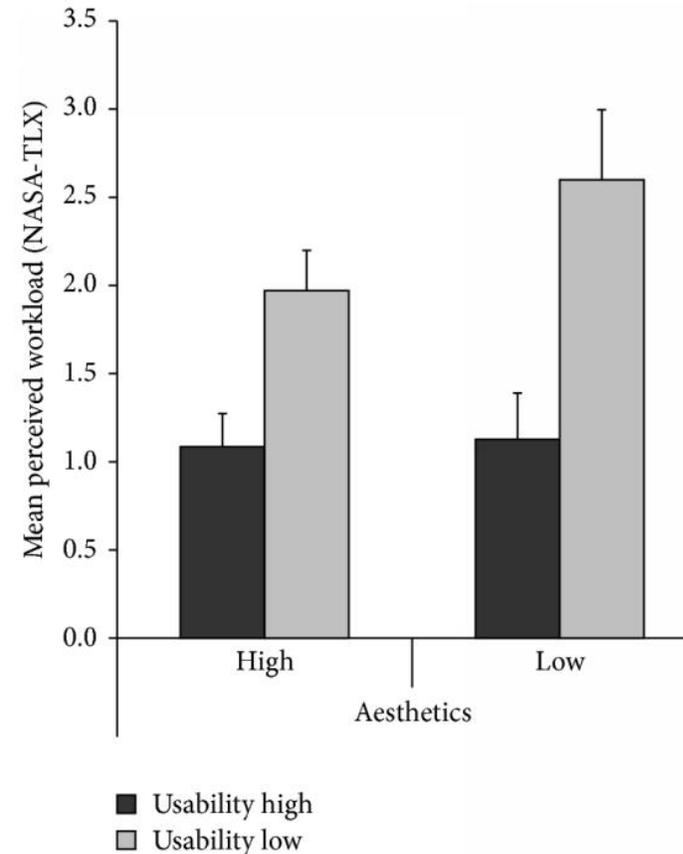
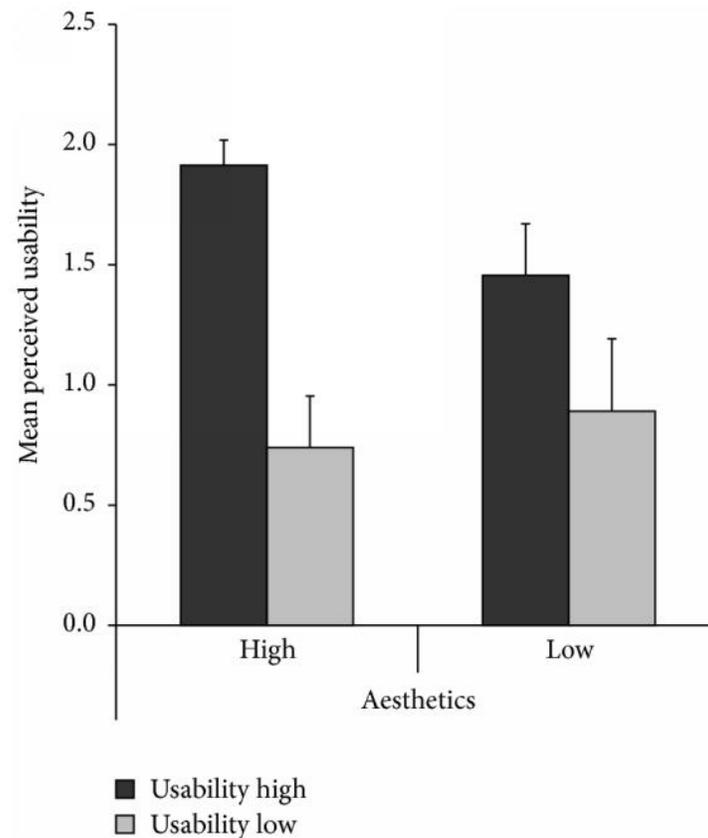
Aesthetics can
be found
somewhere here

Emotions



<https://pxhere.com/de/photo/1013318>

Interplay between Usability and Aesthetics

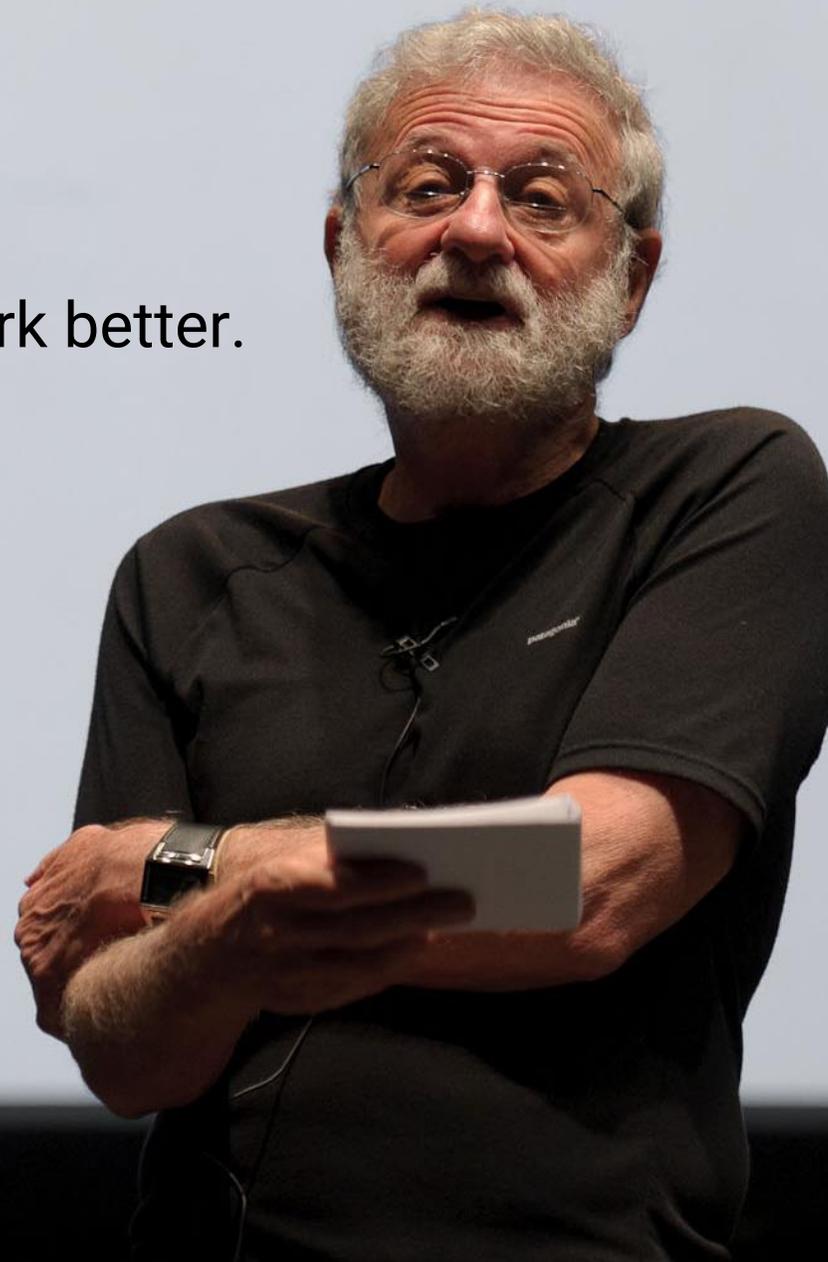


Hamborg, K. C., Hülsmann, J., & Kaspar, K. (2014). The interplay between usability and aesthetics: More evidence for the *What Is Usable Is Beautiful*™ Notion, 2014.

Aesthetics

- **Aesthetic design can improve usability** by creating a positive first impression, reducing perceived complexity, and increasing user satisfaction (“aesthetic–usability effect”).
- **Aesthetics can evoke emotions** that contribute to a positive (or negative) experience and user satisfaction.
- **Visually pleasing designs can make users more tolerant** of minor usability issues.
- Users often perceive aesthetically pleasing designs as **more usable**.
- Aesthetic interfaces can be **more engaging** and can encourage **longer interaction times**
- Aesthetic interfaces **are perceived as more attractive**.

Attractive things work better.



Attractiveness and Usability

- The **design elements** such as color, layout, typography, imagery, and **overall composition** contribute to the **attractiveness** of an interface
- **Attractiveness and usability** are the two most important **factors** in assessing the **overall user experience**
- Attractiveness **is inherently subjective** and can **vary from person to person**
- Personal preferences, experiences, and expectations can all influence an individual's perception of attractiveness.
 - › However, it highly depends on **the cognitive style** of a person



Kurosu, Masaaki; Kashimura, Kaori (1995). "Apparent Usability vs. Inherent Usability: Experimental Analysis on the Determinants of the Apparent Usability". *Conference Companion on Human Factors in Computing Systems*. CHI '95. New York, NY, USA: ACM: 292–293. doi:10.1145/223355.223680. ISBN 978-0-89791-755-1.

Images from: <https://mimoucadesign.com/kitchen-design/>
https://www.tripadvisor.es/LocationPhotoDirectLink-g187309-d19446819-i439562817-Ha_Vietnamese_Cuisine-Munich_Upper_Bavaria_Bavaria.html

Cognitive Style

- **Cognitive style** or **thinking style** is a concept used in cognitive psychology to describe the way how individuals think, perceive, and remember information
- Cognitive styles analysis (CSA) by Richard J. Riding can measure of cognitive styles and proposes a two-dimensional model:
 - › The **Wholistic-Analytical Dimension (W-A)** is how an individual will organize and structure incoming information. The wholistic style approaches new information with an overall view, seeing information as a complete picture in contrast to the analytical style which takes apart information in order to process it
 - › The **Verbal-Imagery Dimension (V-I)** focuses on how an individual thinks about information, their mental processes and their memory. The verbaliser sees information and thinks about it in terms of words while an imager thinks of information visually, with an image or picture in mind.

Riding, R.J., and Cheema, I. "Cognitive styles - An overview and integration", *Educational Psychology* (11:3/4) 1991, pp 193–215.

Riding, R.J., and Sadler-Smith, E. "Type of instructional material, cognitive style and learning performance", *Educational Studies* (18:3) 1992, pp 323–340.

The CSA Test

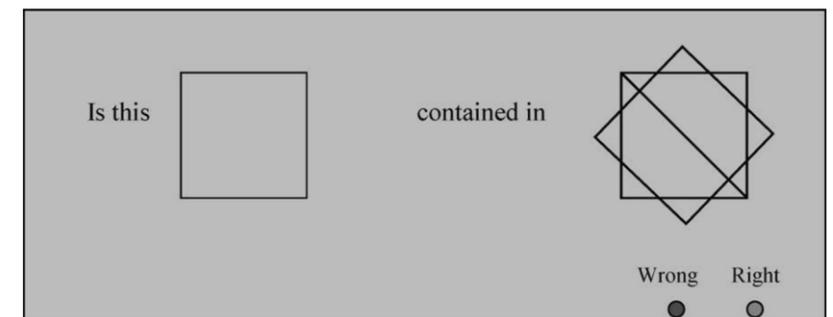
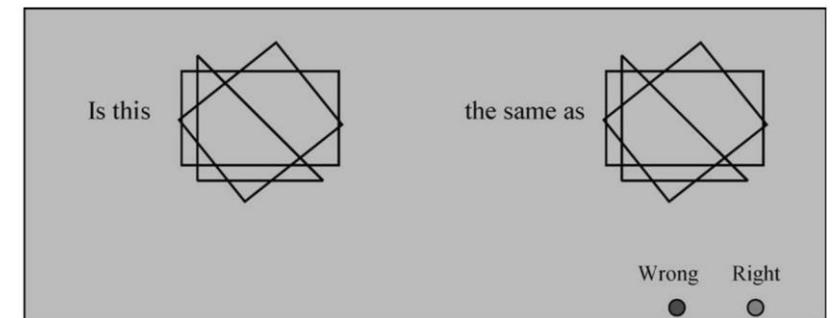
- A computer records the latency of responses
- The **first sub-test** (about 12 min) assesses the Verbal-Imagery ratio by presenting 48 statements, one at a time, to be judged true or false
 - › A low ratio indicates a Verbalizer and a high ratio, an Imager person.
- The **second sub-test** (3 mins) presents twenty items containing pairs of complex geometric figures that the individual is required to judge as either the same or different
- The **third sub-test** (3 mins) presents twenty items, each comprising a simple geometrical shape (e.g., a square or triangle) and a complex geometrical figure
 - › A low ratio in the 2nd and 3rd sub-test corresponds to a Wholist and a high ratio to an Analytic person.

On the screen you will be presented with statements one at a time. Some will be right while others will be wrong. You have to "mark" the statements right or wrong. Press the RED key for RIGHT and the BLUE for WRONG.

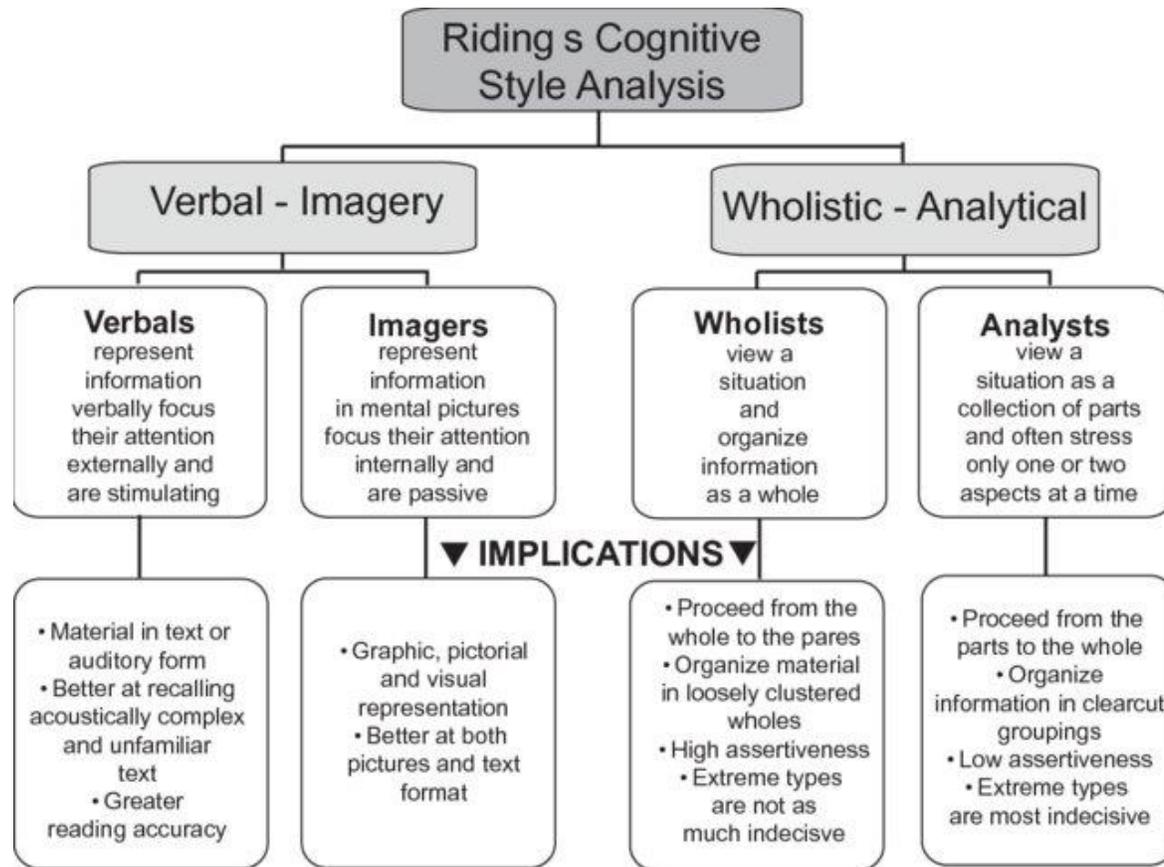
Here are some examples:

The statement "OAK and BEECH are the same TYPE" is right because they are both TREES
"CARROT and PLATE are the same TYPE" is wrong because they are not both VEGETABLES.

Wrong Right



Cognitive Styles Analysis



Analytic	>1.35	Analytic Verbaliser	Analytic Bimodal	Analytic Imager
Intermediate	>1.02 & ≤1.35	Intermediate Verbaliser	Intermediate Bimodal	Intermediate Imager
Wholistic	≤1.02	Wholistic Verbaliser	Wholistic Bimodal	Wholistic Imager
		≤0.98	>0.98 & ≤1.09	>1.09
		←	Bimodal	→
		Verbaliser		Imager

https://www.researchgate.net/publication/260147015_Towards_Modelling_Web_Search_Behaviour_Integrating_Users%27_Cognitive_Styles/figures?lo=1

The Six Universal Aesthetics

1. **Expertise**: Humans cultivate, recognize, and admire technical artistic skills
2. **Nonutilitarian pleasure**: People enjoy art for art's sake, and do not demand that it keep them warm or put food on the table
3. **Style**: Artistic objects and performances satisfy rules of composition that place them in a recognizable style
4. **Criticism**: People judge, appreciate, and interpret works of art
5. **Imitation**: With a few important exceptions like abstract painting, works of art simulate experiences of the world
6. **Special focus**: Art is set aside from ordinary life and made a dramatic focus of experience

Denis Dutton, 'Aesthetic Universals', in The Routledge Companion to Aesthetics, edited by Berys Gaut and Dominic Mclver Lopes, (2001), London and New York: Routledge, pp.

Evolutionary Aesthetics

- **Aesthetic preferences evolved** to enhance survival and reproductive success
- **Color** preference, **shapes**, **emotional** ties with objects and animals, preferred mate body **ratios** and many other aesthetic aspects **but not all** can be explained with **reference to human evolution**
- Such **evolutionary based preferences are not necessarily static** but may vary **depending on environmental cues** and **food resources**. Some examples:
 - › **Availability of food** influences...
 - › which **body size** is attractive which may **have evolutionary reasons**
 - › high food availability → low BMI preferences
 - › low food availability → high BMI preferences
 - › which environment we instinctively prefer





Image from Microsoft: Windows XP official bliss wallpaper.



<https://www.pinterest.de/pin/830491987531944864/>



<https://funnyjunk.com/Where-is-waldo/skuhMfx/>



Image from: <https://pxhere.com/en/photo/875404>

Symmetry, Simplicity, and Self-Similarity

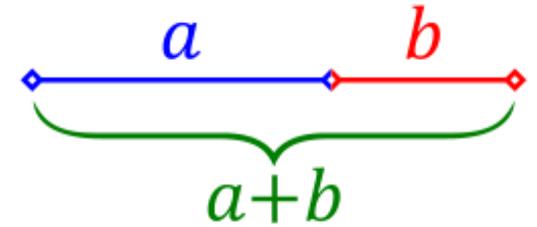
- **Symmetry:** Symmetrical objects and designs are often perceived as beautiful.
 - › Symmetry can convey balance, harmony, and order
- **Simplicity:** Simple designs that are not mentally demanding are frequently seen as more aesthetically pleasing
 - › Aligned with the minimalist design principle that “less is more”
- **Self-Similarity:** Signs of self-organization (created by lowest-energy configurations or non-entropical systems), are perceived as pleasant
 - › Typically found in nature, fractals, or natural proportions



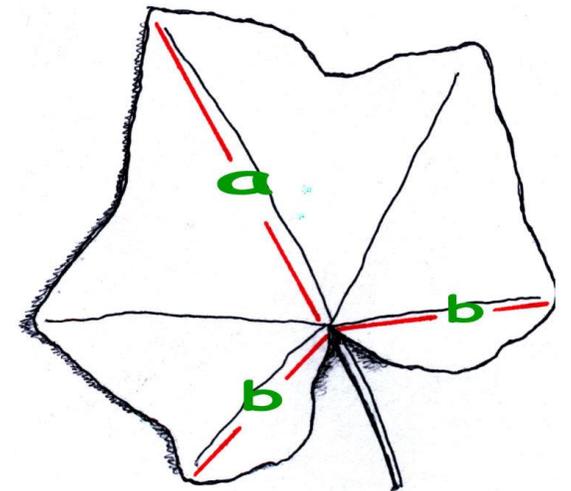
Image from: cyclonebill, CC BY-SA 2.0 via Wikimedia Commons

Golden Ratio

- Also called φ , the **golden mean** or **golden section**.
- In mathematics, two quantities are in **the golden ratio** if their ratio is the same as the ratio of their sum to the larger of the two quantities.
- Some argue that the golden ratio is a **universal law of structure** and **visual harmony**
- Studies by **psychologists found a preference for** rectangle ratios centered on **the golden ratio**
- Later attempts to test such related hypotheses remain inconclusive
- **Artists and designers consider** the ratio to be aesthetically pleasing and as a **sign of beauty**



$$\frac{a+b}{a} = \frac{a}{b} = \varphi = \frac{1+\sqrt{5}}{2} = 1.618$$



Von Der ursprünglich hochladende Benutzer war Galilea in der Wikipedia auf Deutsch - Übertragen aus de.wikipedia nach Commons durch Esculapio mithilfe des CommonsHelper., CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=6937601>

Golden Ratio

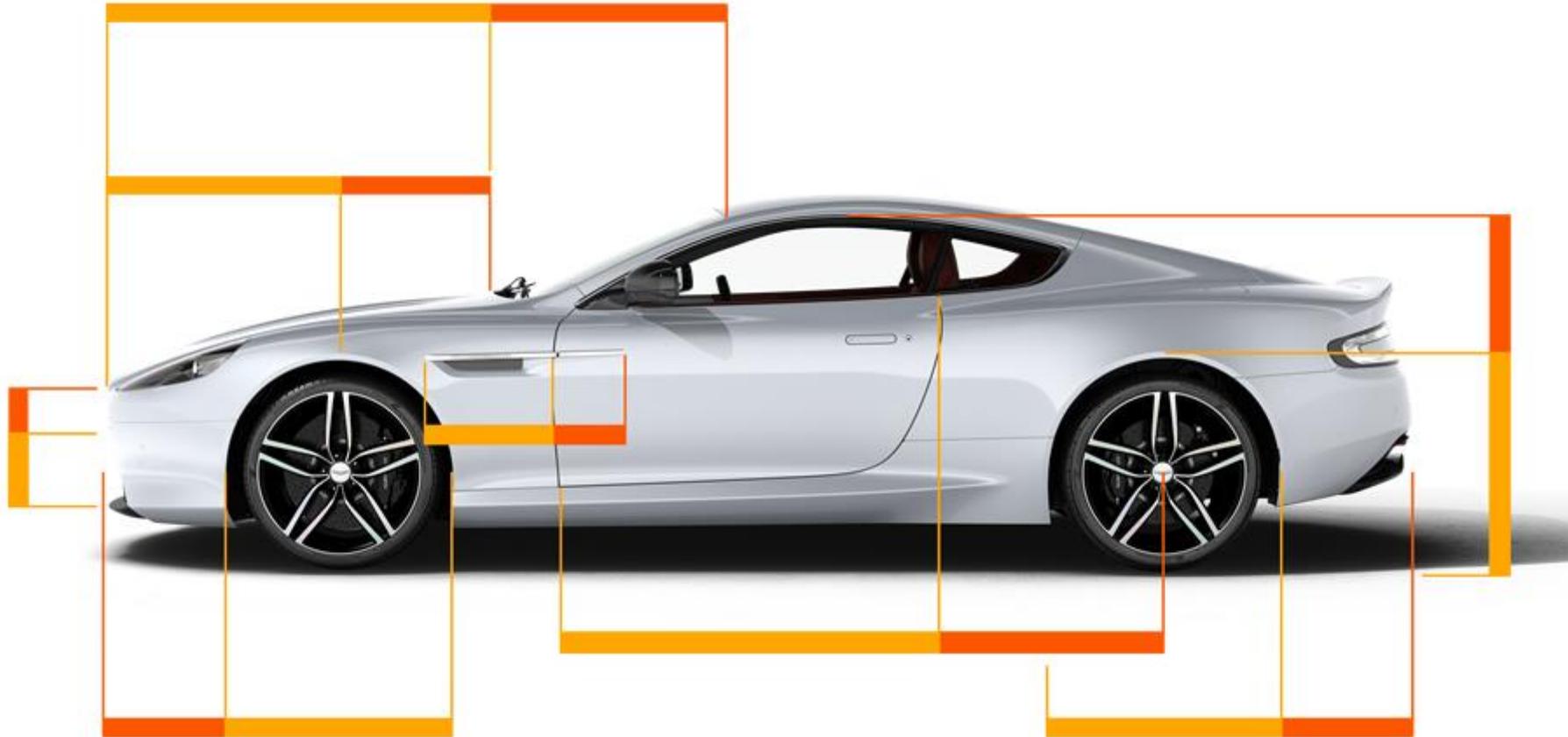


Image from: CarThrottle.com <https://static.carthrottle.com/workspace/uploads/memes/aston-martin-db9-golden-ratio-54e8a82f86165.jpg>

Composition and Shapes

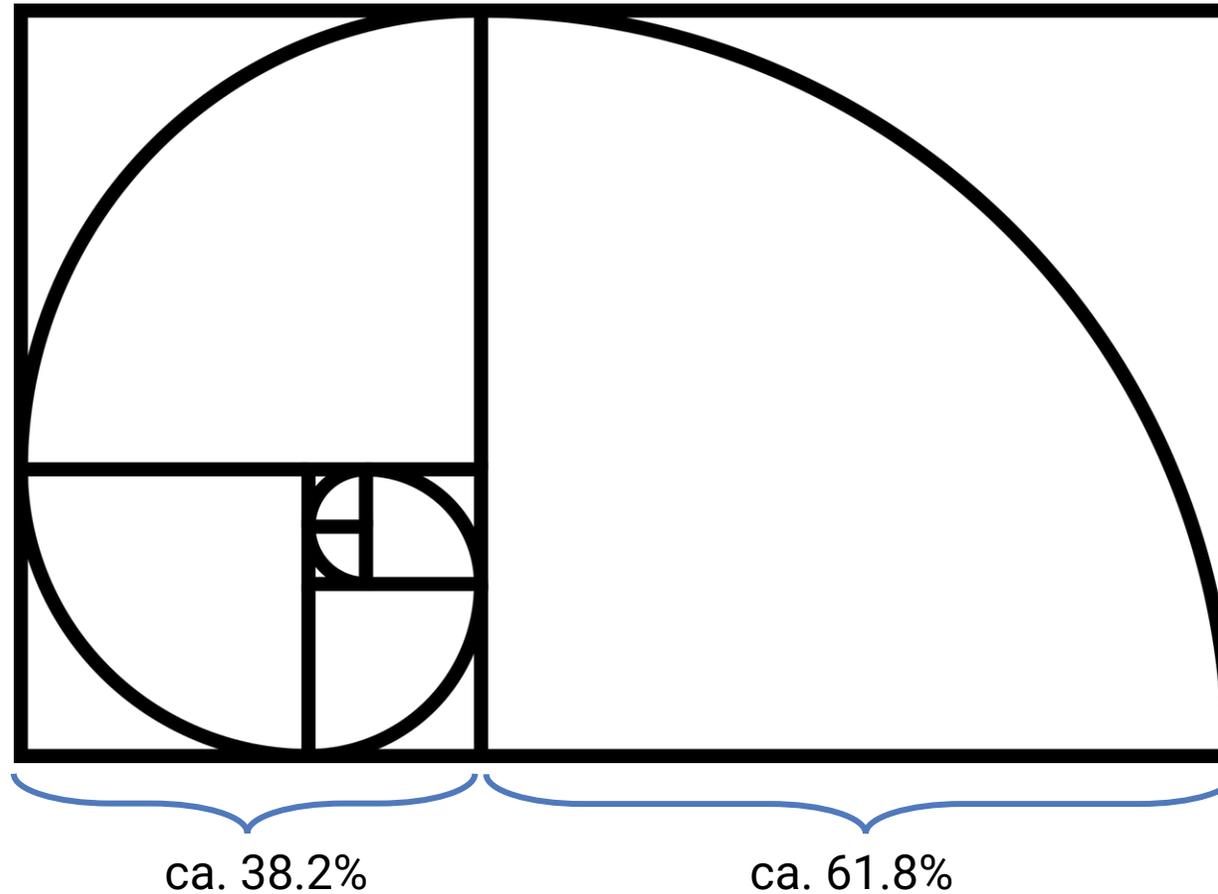
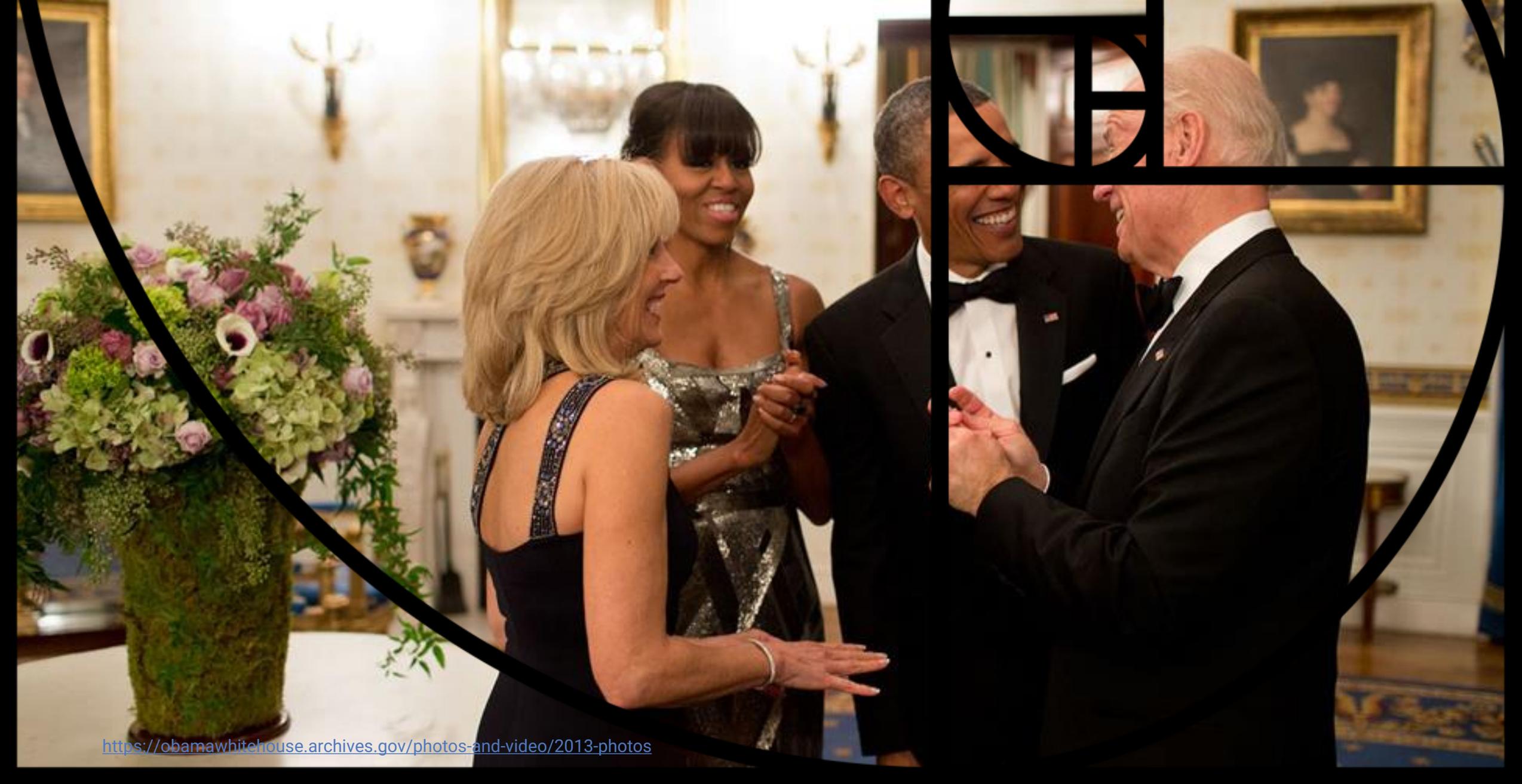


Image Source <https://www.needpix.com/photo/710589/fibonacci-spiral-science-golden-ratio-nature-math-mathematics-sequence>

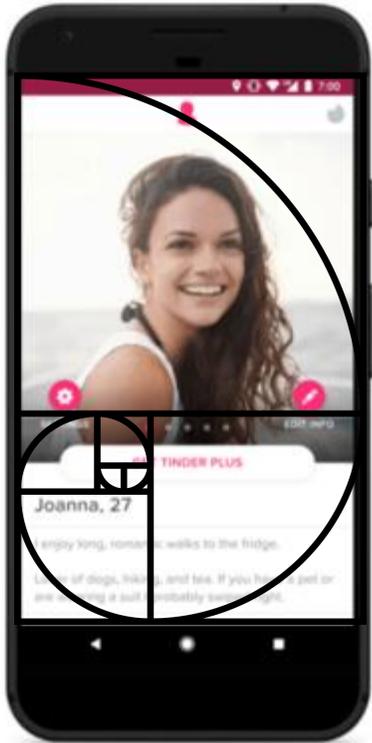


<https://obamawhitehouse.archives.gov/photos-and-video/2013-photos>



<https://obamawhitehouse.archives.gov/photos-and-video/2011/09/29/110929-photos>

Golden Ratio in Products



Images from tinder.com, apple.com, harley-davidson.com

Influence of Composition

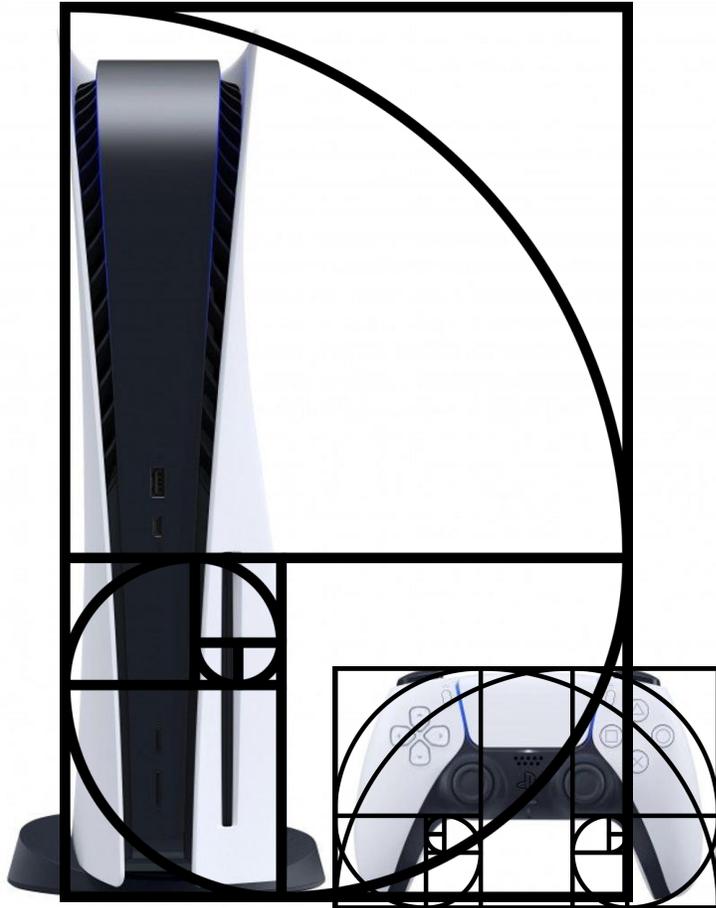
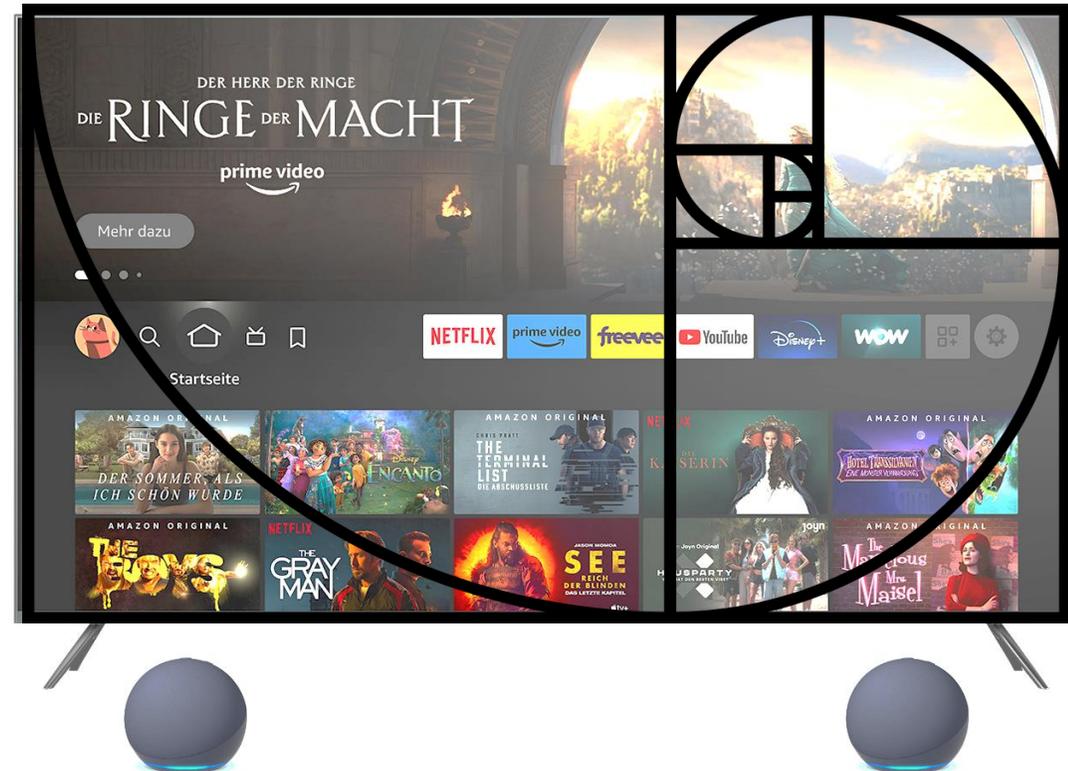
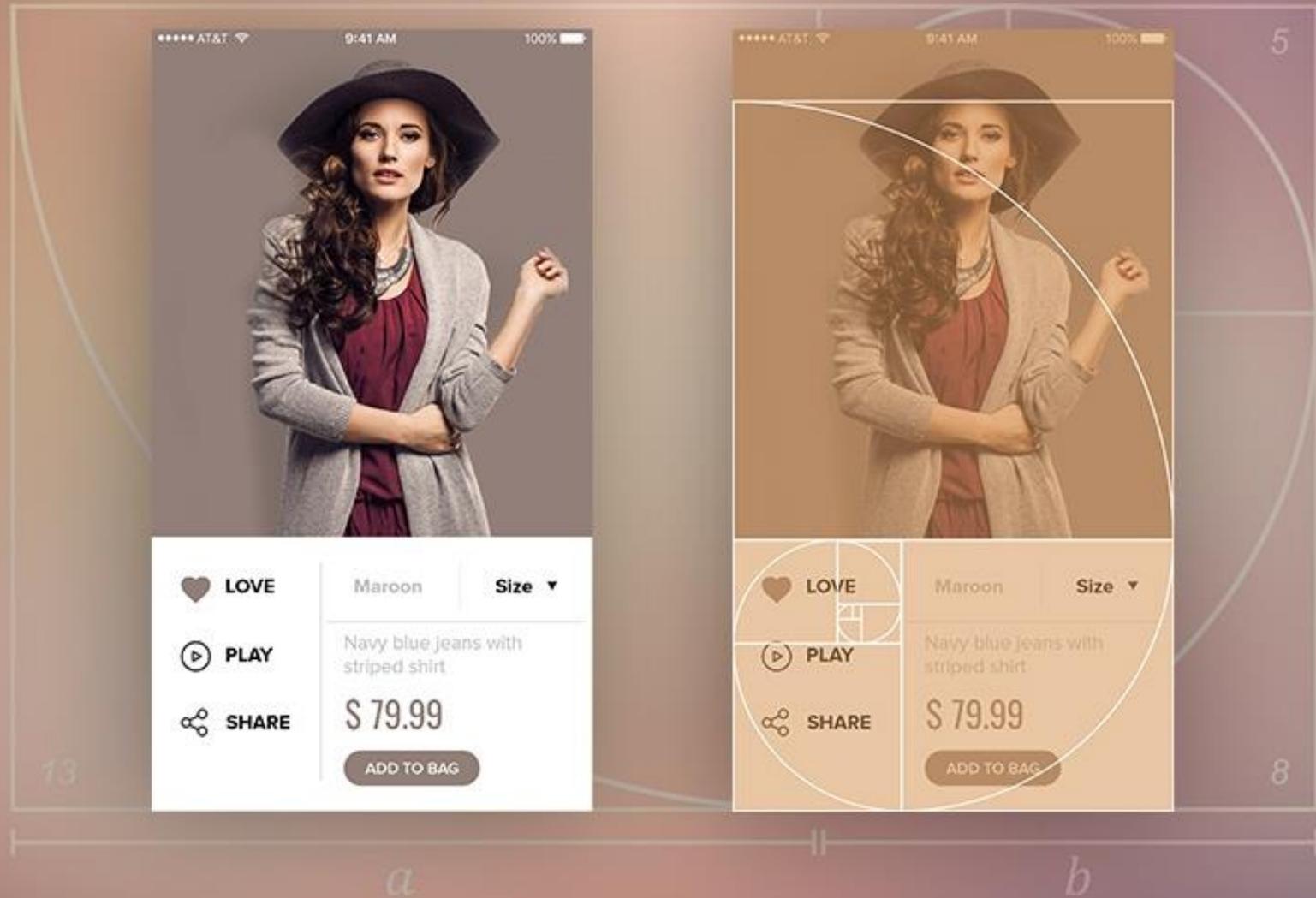


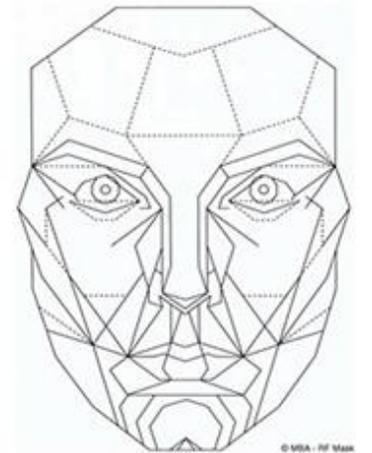
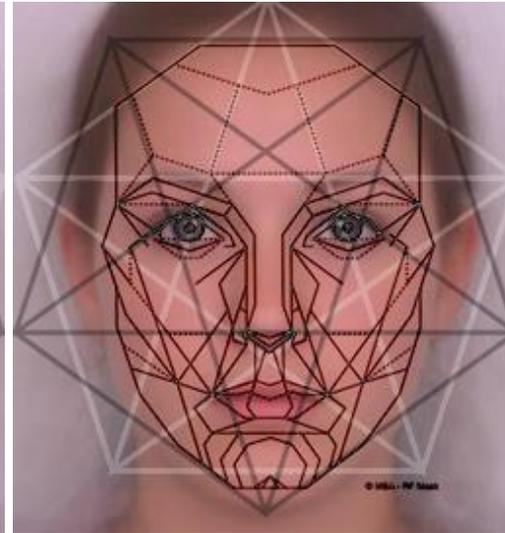
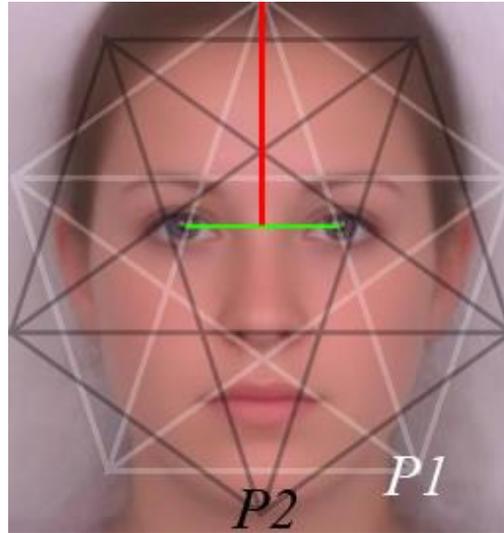
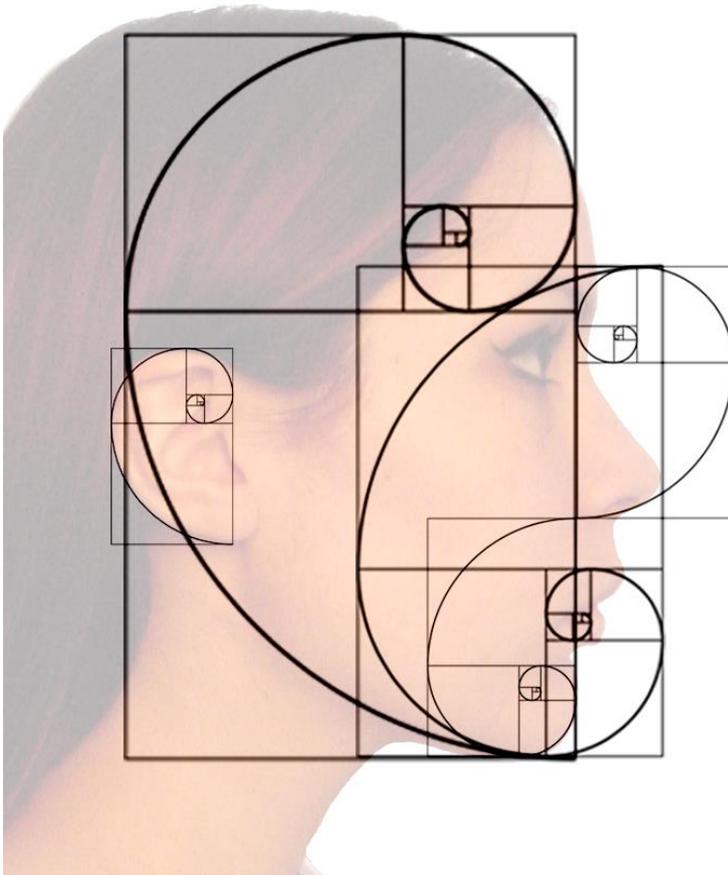
Image from: Sony



GOLDEN RATIO $\frac{a+b}{a} = \frac{a}{b} = \phi = 1,61803$



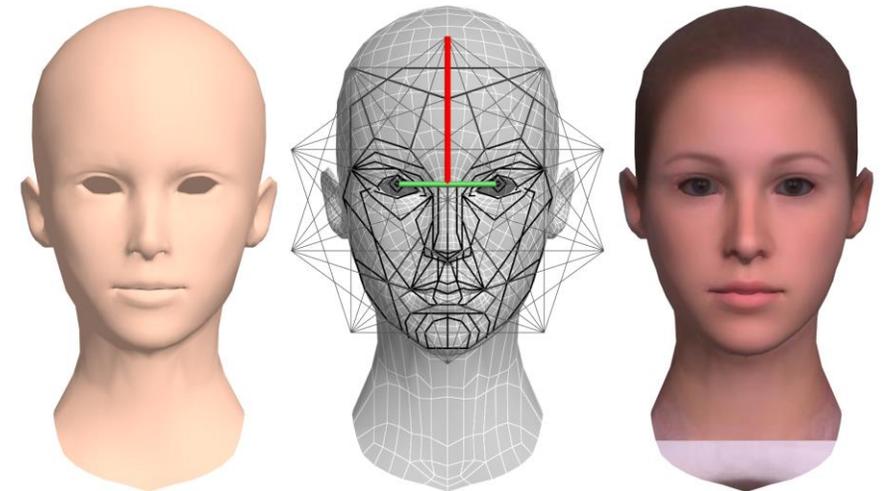
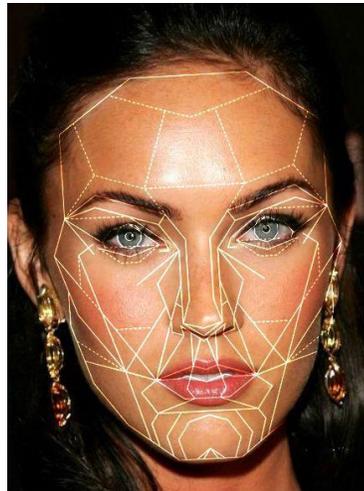
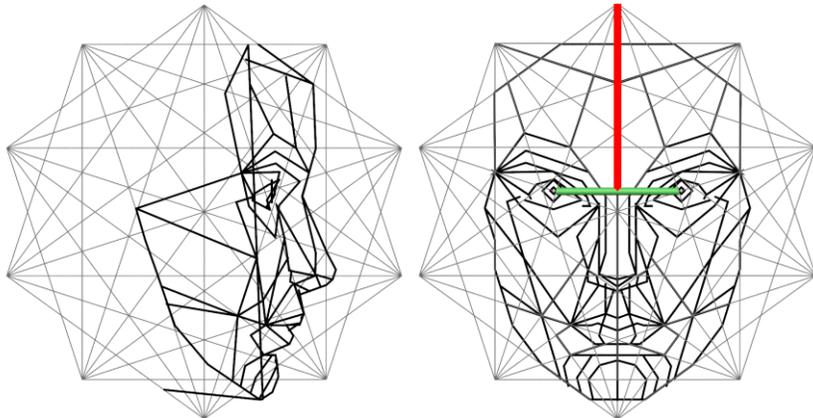
Golden Ratio and the Human Face



Images from http://www.beautyanalysis.com/index2_mba.htm

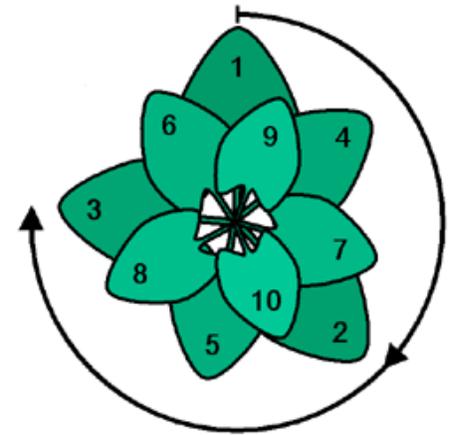
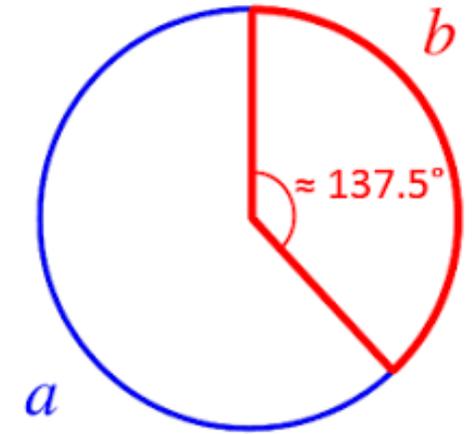
Marquardt's Golden Phi Mask

- The basic framework of the human face is a golden decagon matrix
- 42 “secondary” Golden Decagons, are mathematically and geometrically uniquely positioned
- Regardless of the race or gender, the masks fit attractively perceived faces



Golden Angle and Spiral

- In geometry, the golden angle is the smaller of the two angles created by **sectioning the circumference of a circle according to the golden ratio**
 - › Algebraically, let $a+b$ be the circumference of a circle, divided into a longer arc of length a and a smaller arc of length b
- **The Golden Spiral** is a special type of **a logarithmic spiral** whose growth factor is φ , the golden ratio
 - › The length of the side of one square divided by that of the next smaller square is the golden ratio.

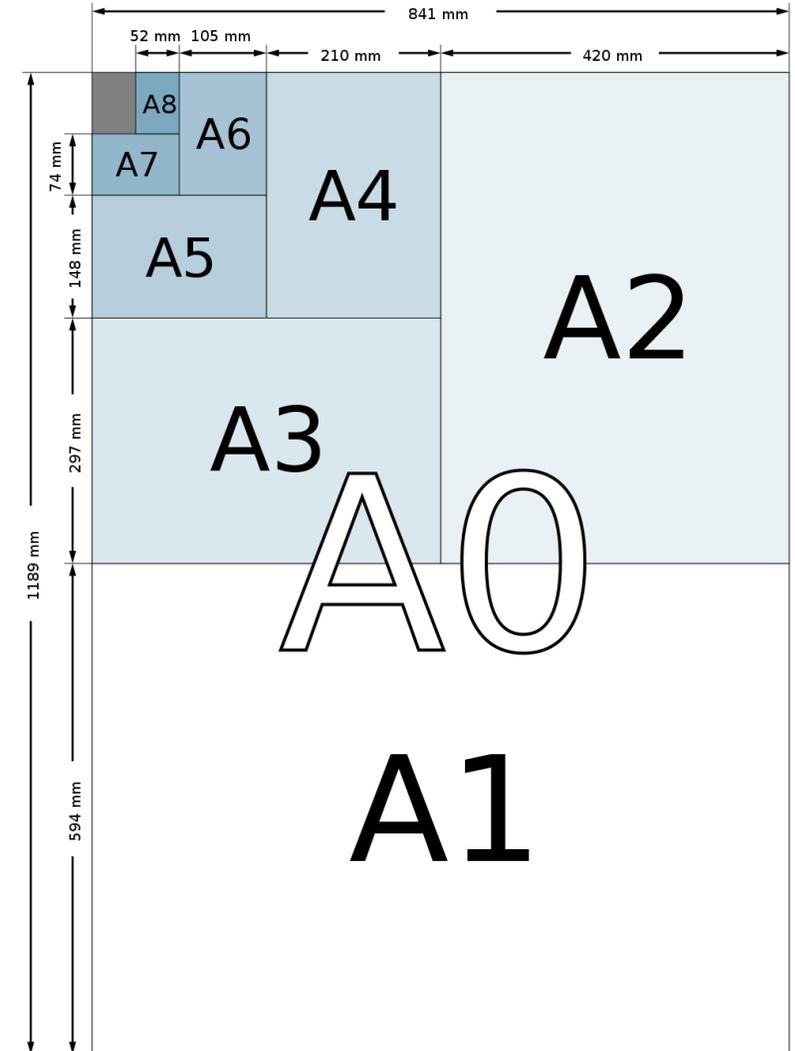


End-on view of a plant stem in which consecutive leaves are separated by the golden angle. The original uploader was Wolfgangbeyer at German Wikipedia.

Silver Ratio

- When the smaller of two quantities has the same the ratio of the larger quantity as the sum of the smaller quantity and twice the larger quantity.
- A rectangle whose aspect ratio is the silver ratio is sometimes called a silver rectangle.
- The paper sizes under ISO 216 are such rectangles. They have the property that by cutting the rectangle in half across its long side produces two smaller rectangles of the same aspect ratio.

$$A = 1 + \sqrt{2} \quad A = \frac{2a + b}{a} = \frac{a}{b}$$

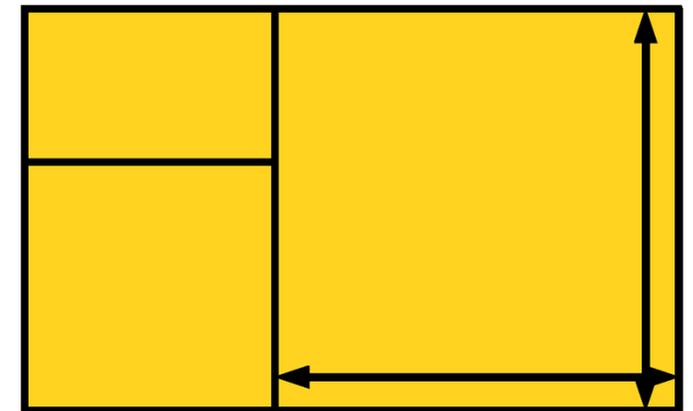
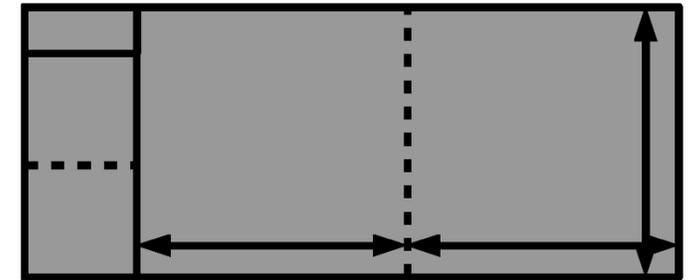
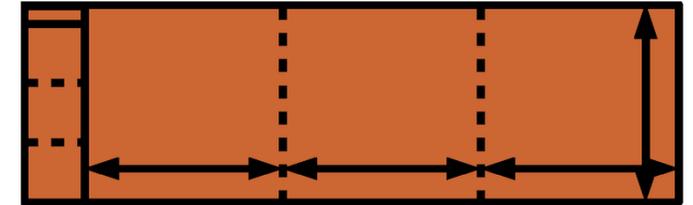


By User:Bromskloss - This is an improved version of A size illustration.svg., CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=1369452>

The Metallic Means

- The metallic means (also ratios or constants) of the successive natural numbers are the continued fractions:

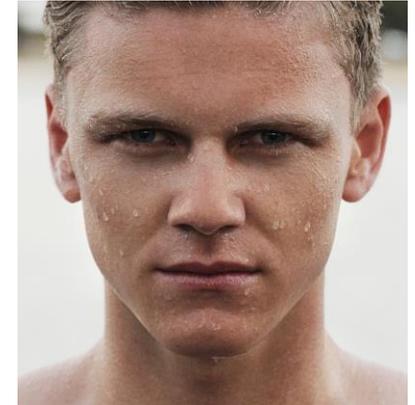
Metallic Means			Class
N	Ratio	Value	(Type)
0:	$0 + \sqrt{4}/2$	1	
1:	$1 + \sqrt{5}/2$	1.618033989	Golden
2:	$2 + \sqrt{8}/2$	2.414213562	Silver
3:	$3 + \sqrt{13}/2$	3.302775638	Bronze
4:	$4 + \sqrt{20}/2$	4.236067978	Copper
5:	$5 + \sqrt{29}/2$	5.192582404	Nickel
...	



Von Hyacinth - Eigenes Werk, Gemeinfrei,
<https://commons.wikimedia.org/w/index.php?curid=36691576>

Signs of Beauty in Humans

- **Symmetry:** Facial and body symmetry are often considered attractive because they are seen as indicators of health and genetic fitness.
- **Averageness:** Faces that are mathematically average, meaning they are a composite of many faces and thus represent the mean traits of a population, tend to be rated as more attractive.
- **Youthfulness:** Features that are associated with youth, such as smooth skin, full lips, and a certain body composition, are often considered beautiful because they can be indicators of fertility and health.
- **Clear Skin:** Smooth and clear skin is often a sign of health and is commonly perceived as attractive across various cultures.



Images from
<https://pxhere.com/de/photo/683599>
<https://pxhere.com/de/photo/661723>

Ecological Aesthetics

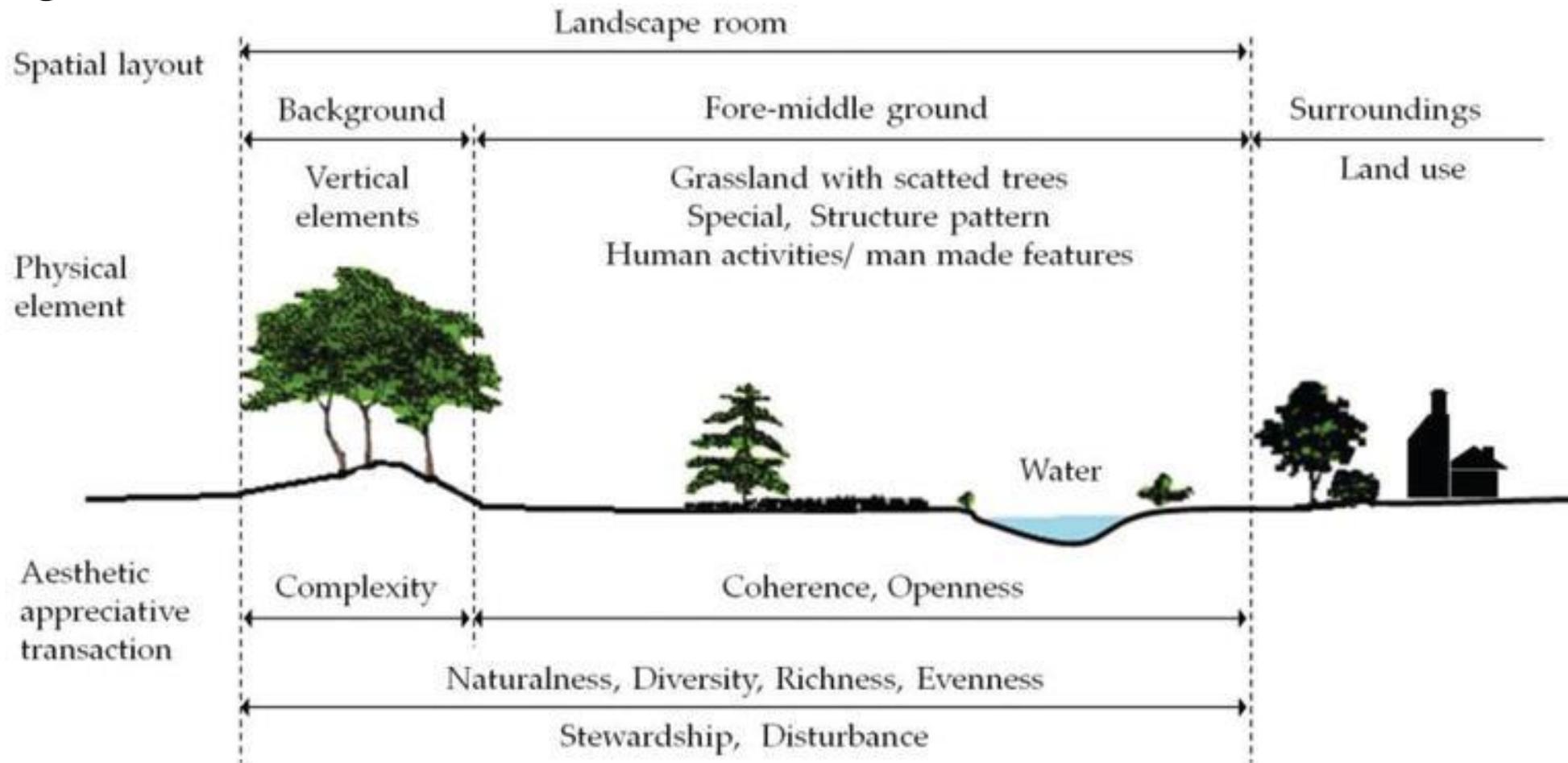
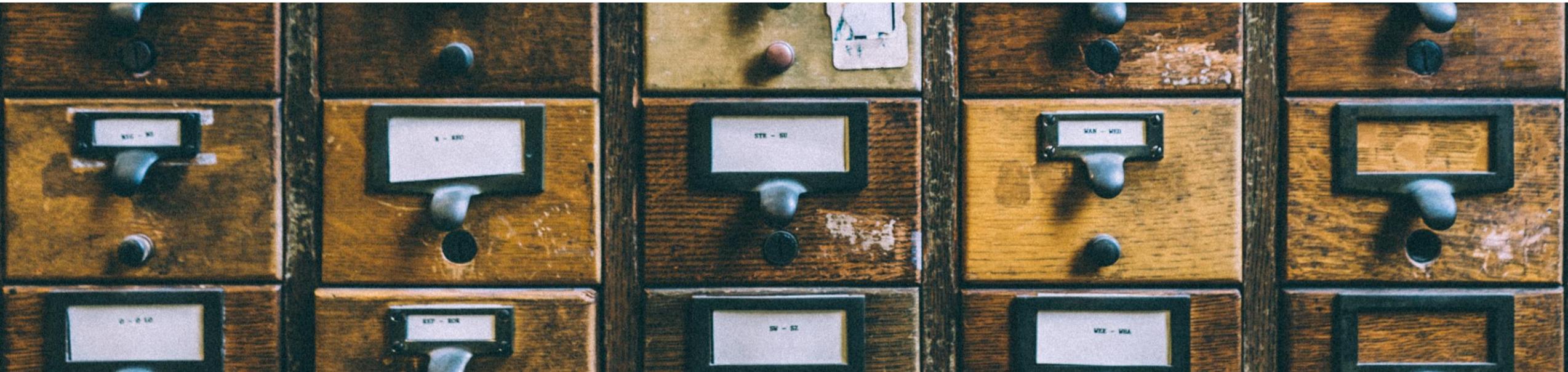


Image from: Lee Lee-Hsueh, Ecological Aesthetics: Design Thinking to Landscape Beauty with Healthy Ecology, DOI: 10.5772/intechopen.73615
<https://www.intechopen.com/chapters/59218>

Ecological Aesthetics

The construction of landscape and ecological characteristics		Aesthetic appreciation transaction characteristics
Physical elements	Spatial layout	
Vegetation	Landscape room	Coherence
Vegetable structure	Foreground	Openness
Vertical element	Middle ground	Complexity
Pattern/land cover	Back ground	Naturalness
Edge	Overall landscape	Diversity
Man-made feature/human activities	Surrounding environment	Richness
		Evenness
Water		Stewardship
Land use		Disturbance

Lee Lee-Hsueh, Ecological Aesthetics: Design Thinking to Landscape Beauty with Healthy Ecology, DOI: 10.5772/intechopen.73615



Gestalt Laws

Universal Principles of Design

Slides adapted from hci-lecture.org (A. Schmidt, N. Henze, K. Wolf, V. Schwind), Image from: <https://pxhere.com/de/photo/956874>



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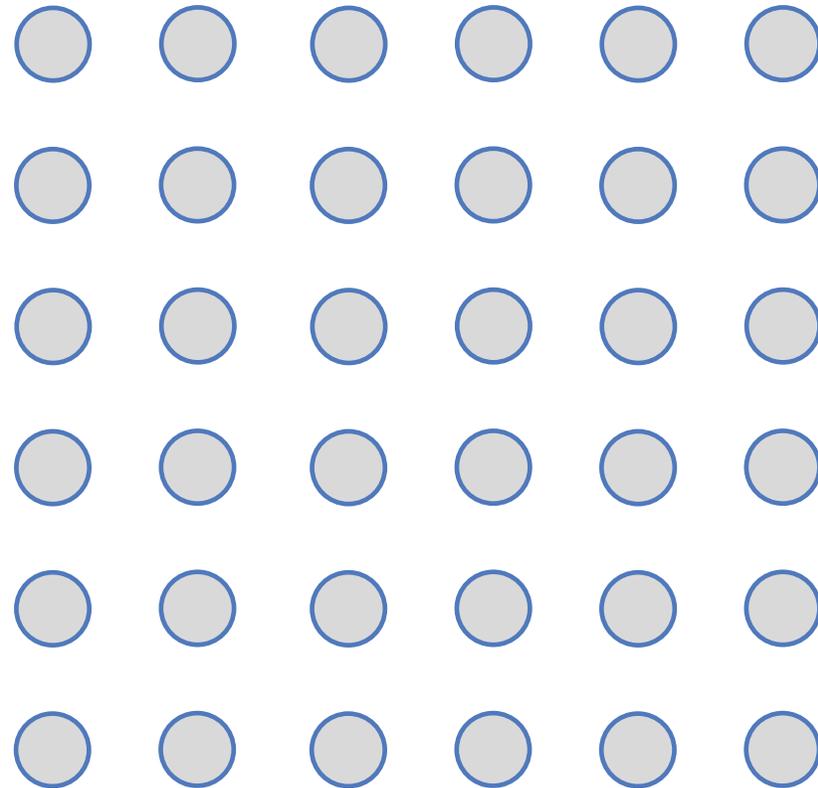
Gestalt Laws



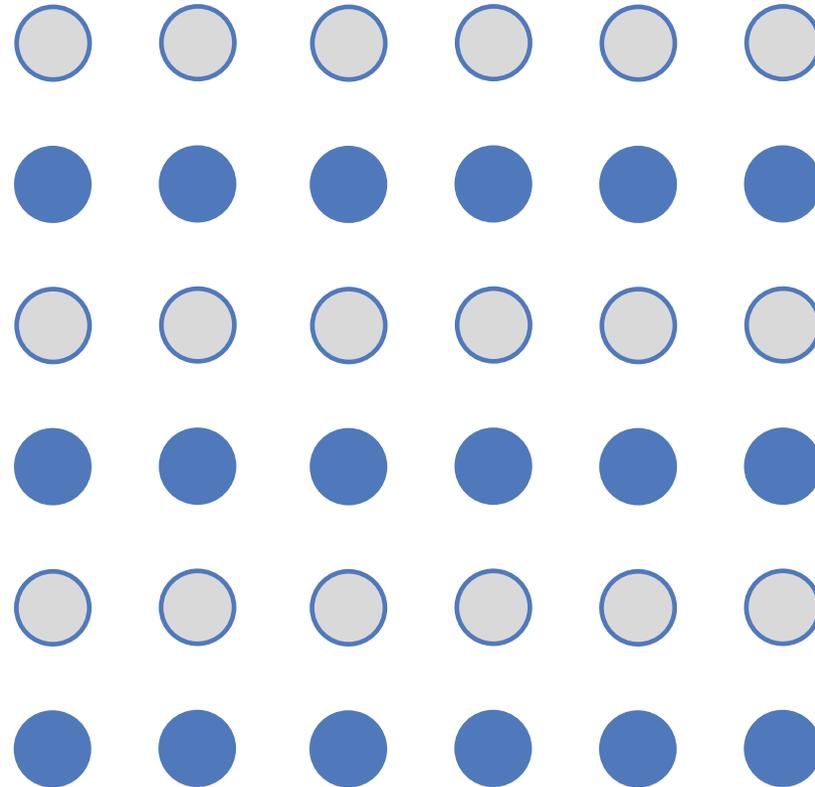
Gestalt Laws

- The German psychologists Max Wertheimer, Wolfgang Köhler, and Kurt Koffka found that **humans mentally configure patterns using multiple principles** (later known as the “Gestalt Principles” or “Gestalt Laws”)
- They proposed that intelligent organisms perceive patterns or configurations more easily than merely individual components
- Gestalt psychologists extended the list and found that they occur in all sensual experiences (e.g., music):
 - Proximity, Similarity, Simplicity (Good Form/Prägnanz), Continuation, Closure, Common fate, Common region, Concurrency / Simultaneousness, Connectivity, Past Experience

Proximity



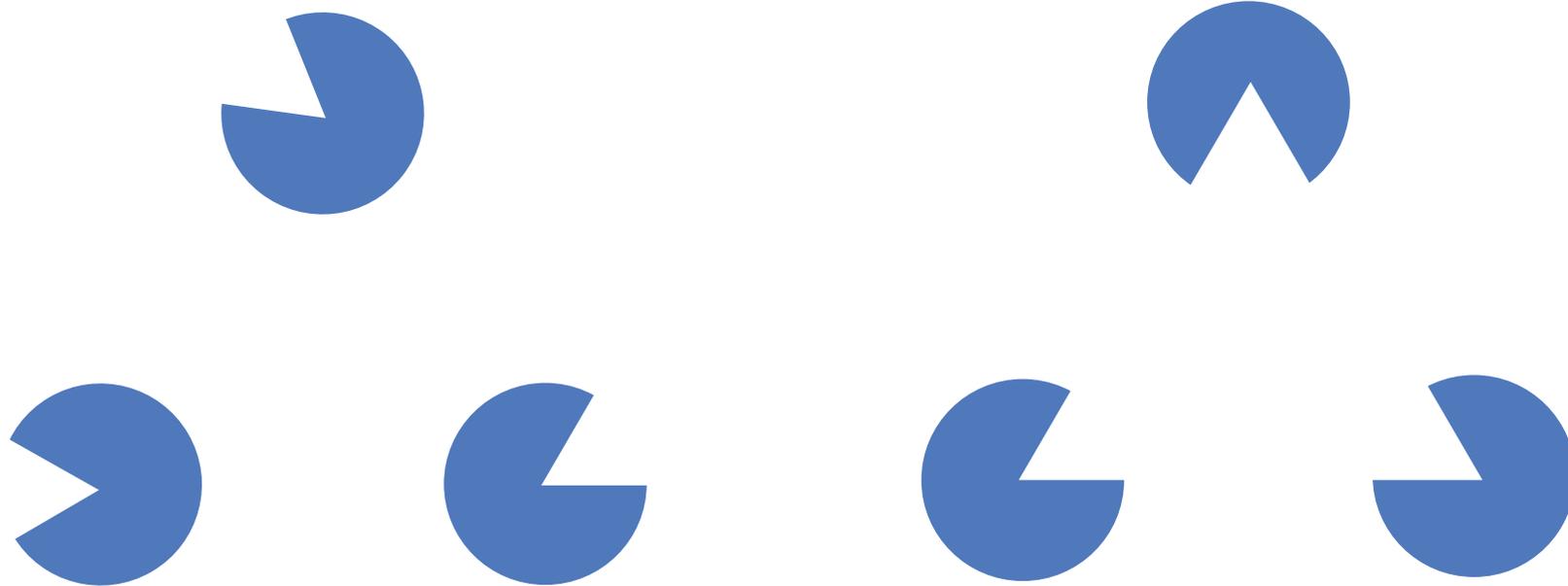
Proximity



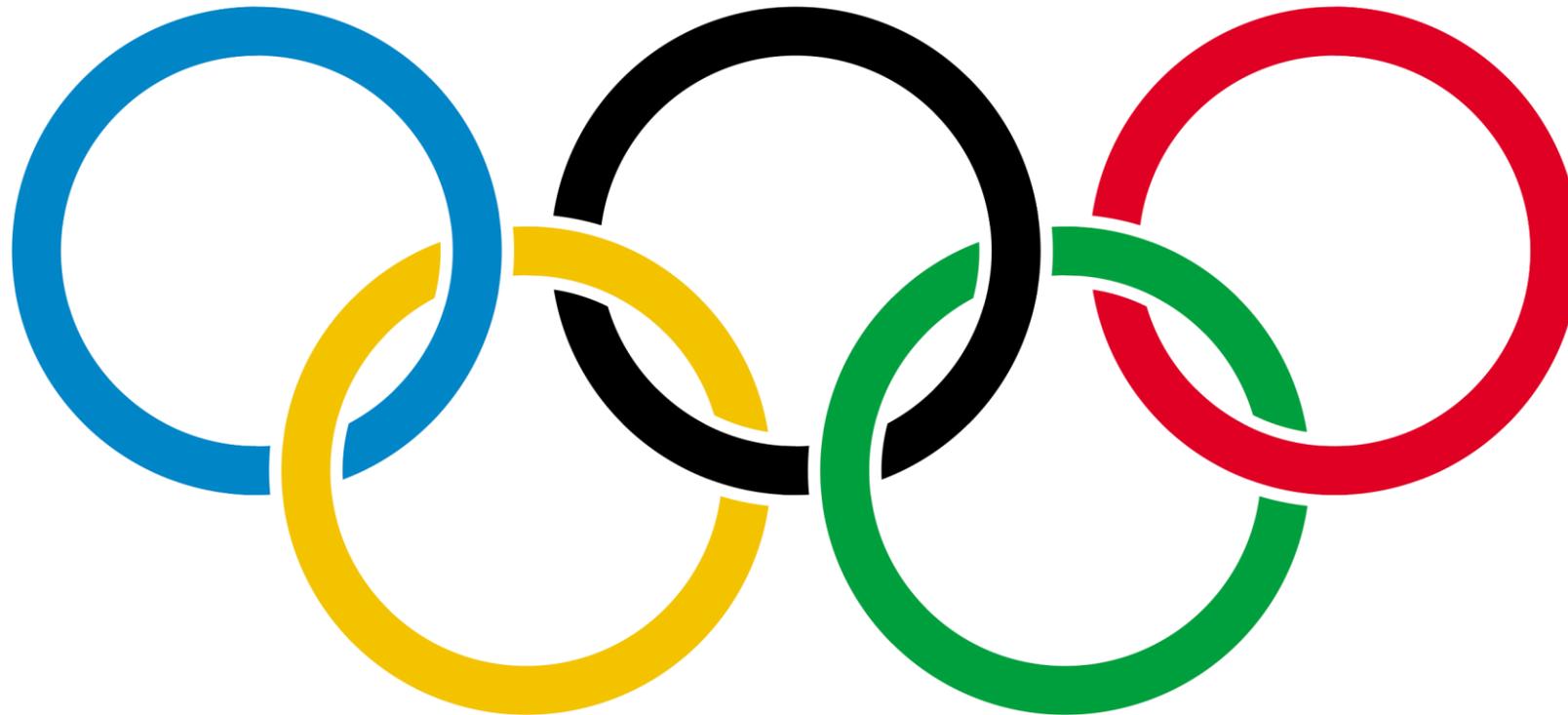
Gestalt Law Application



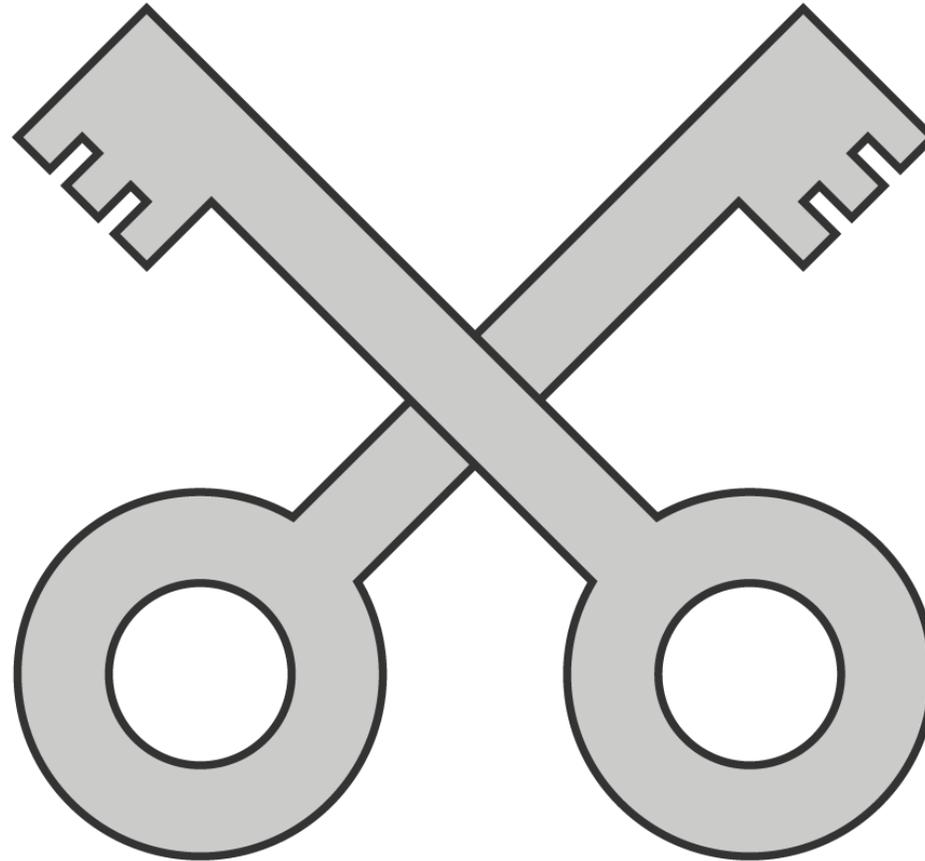
Simplicity



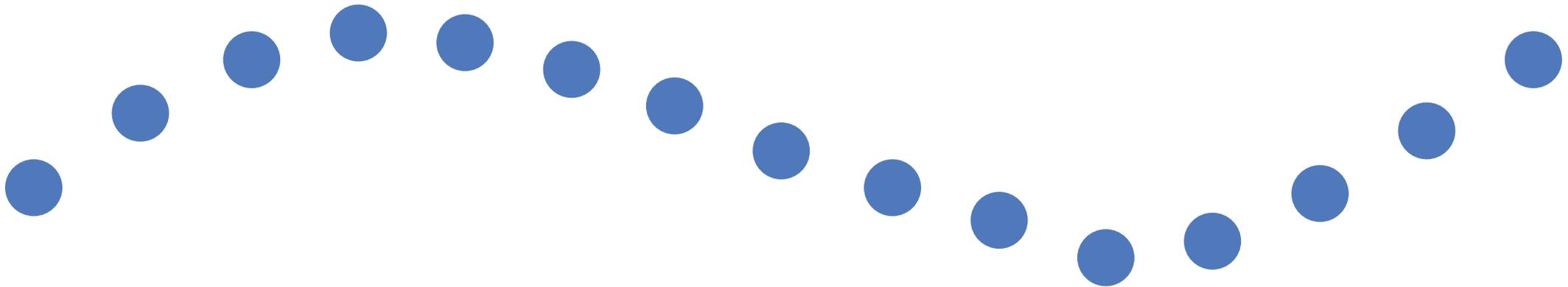
Prägnanz (Good Shape)



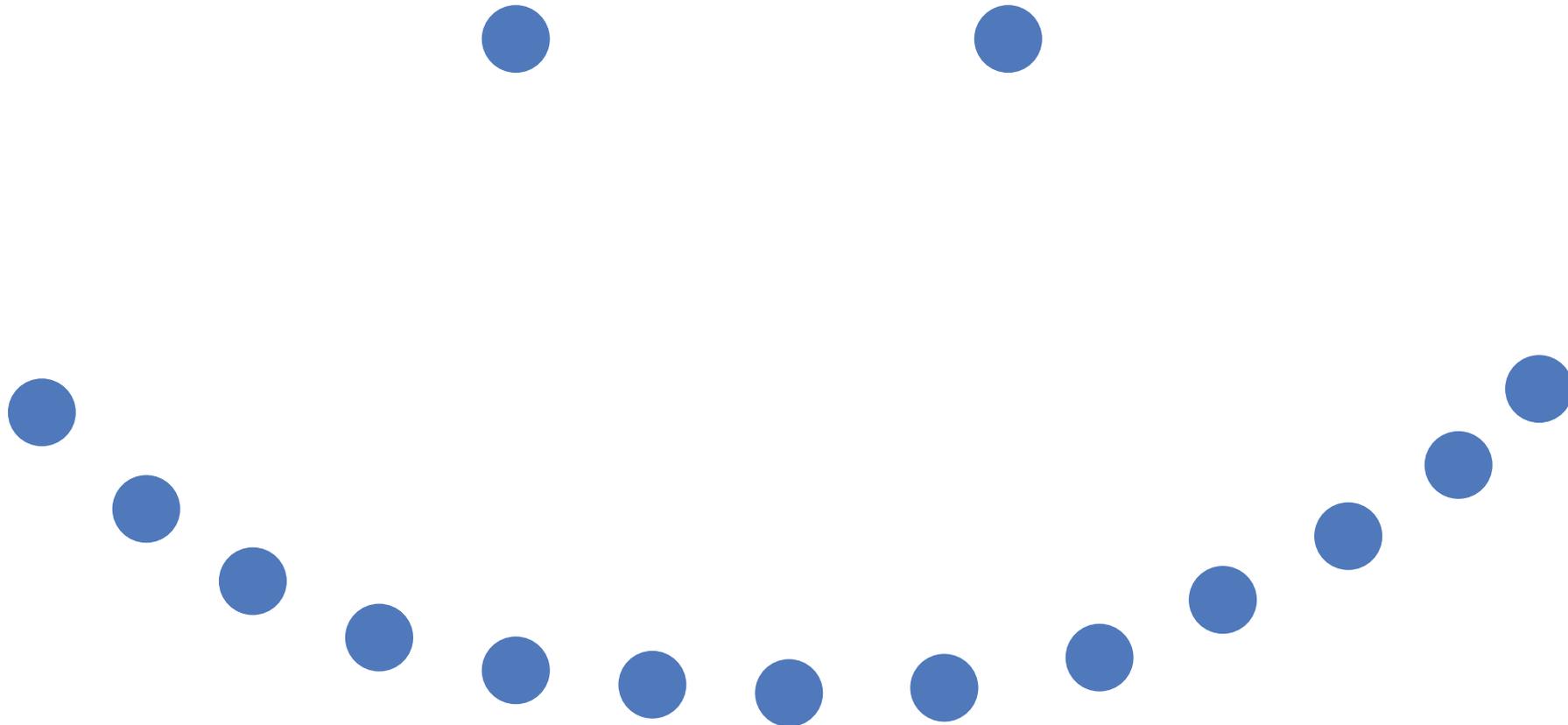
Continuation



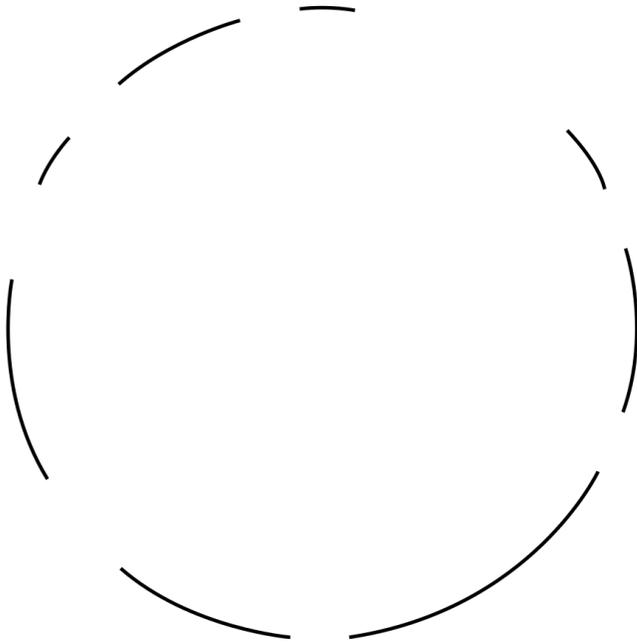
Continuation



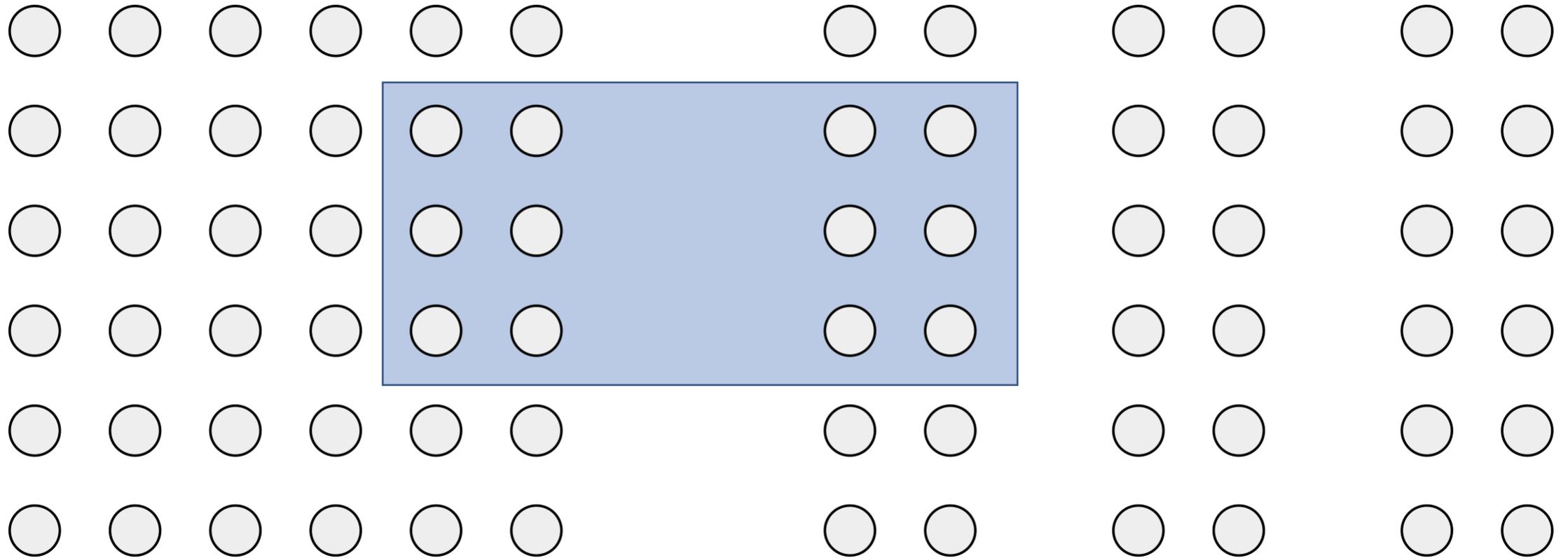
Continuation



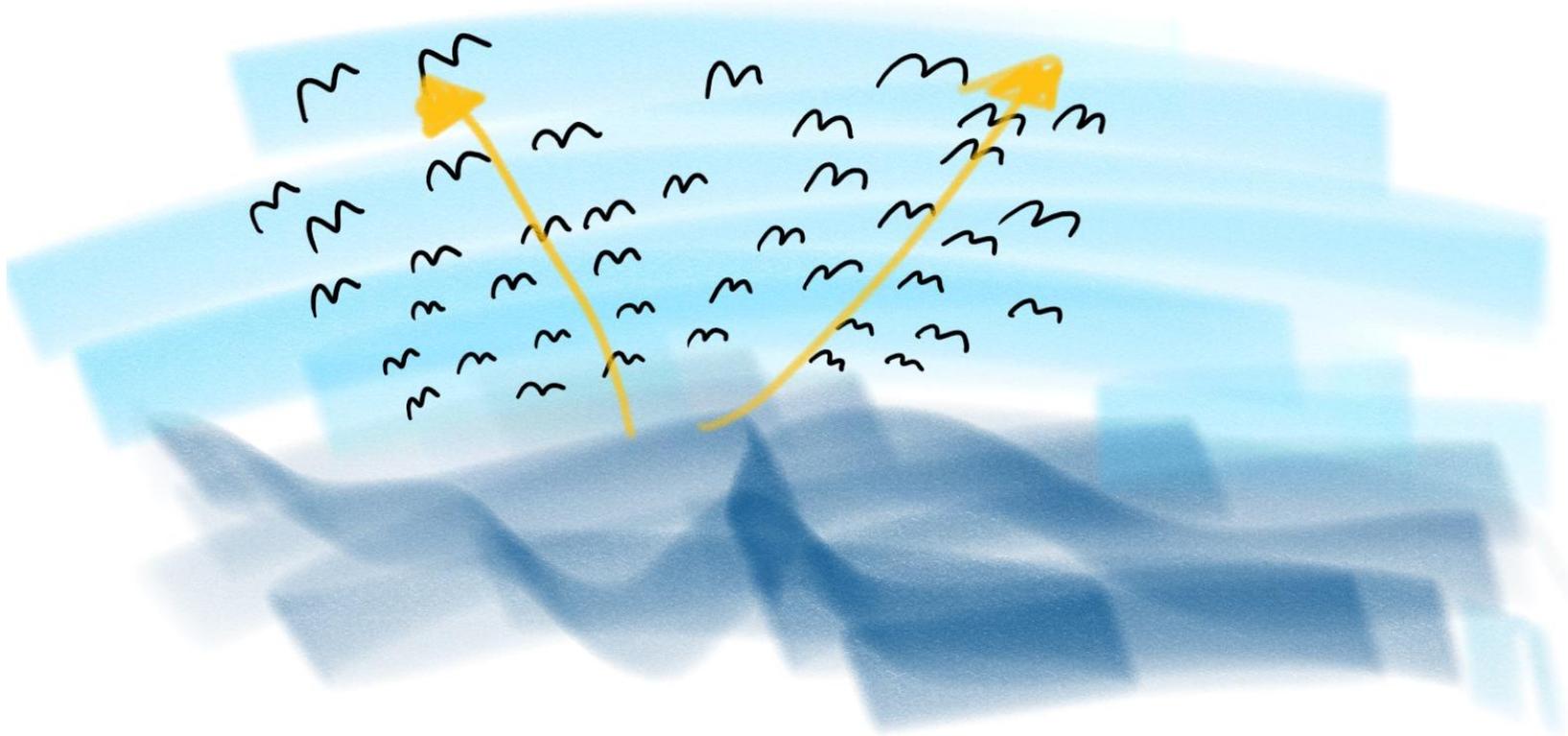
Closure



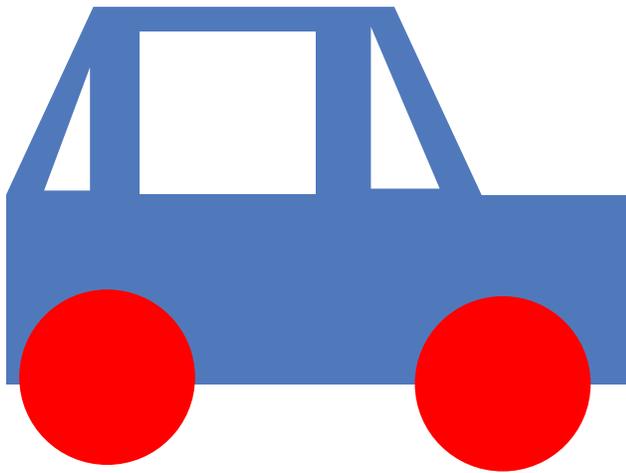
Common Region



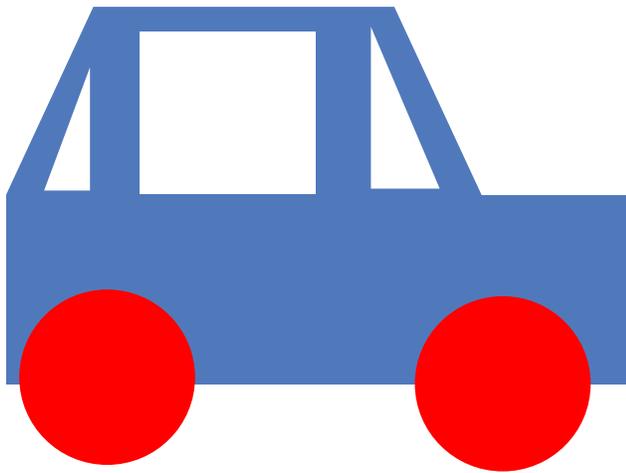
Common Fate



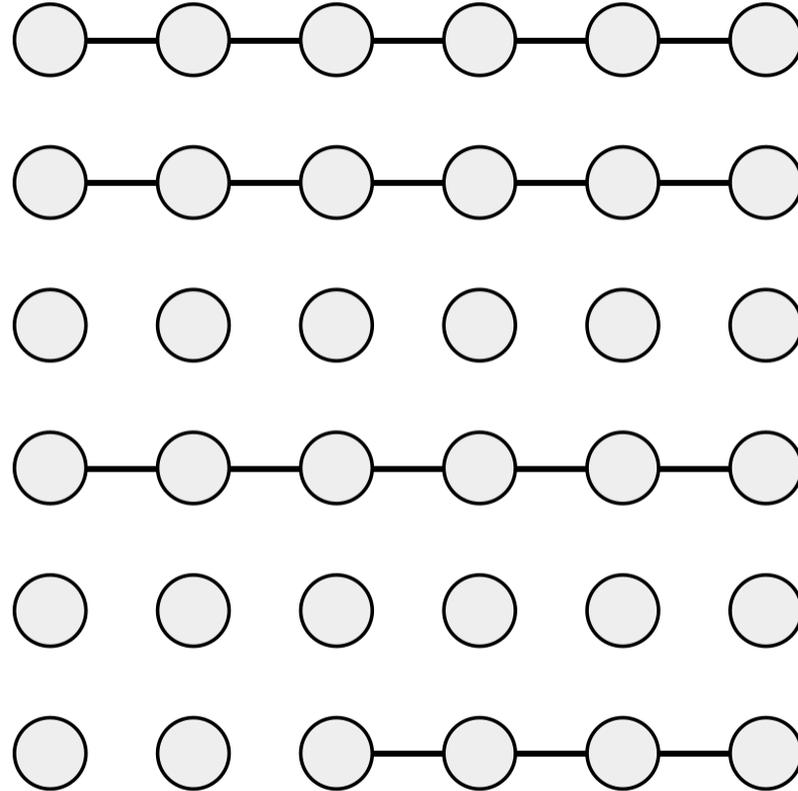
Concurrency



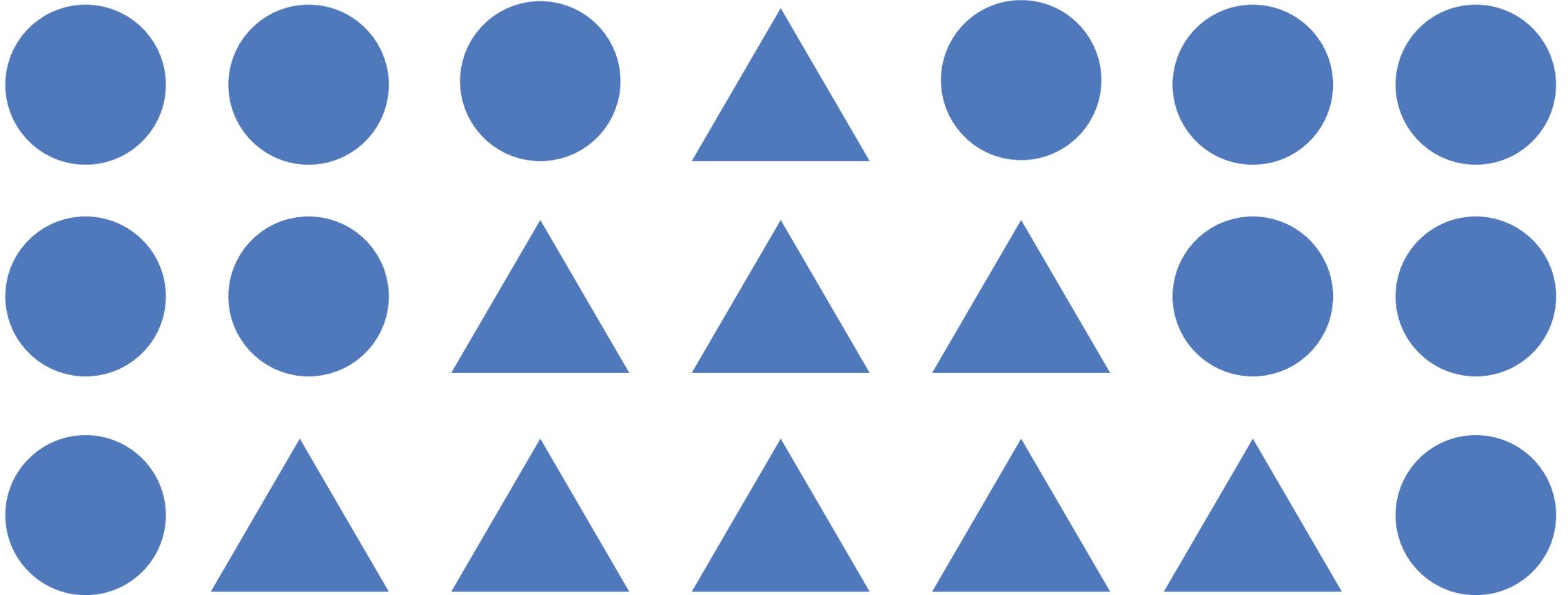
Concurrency



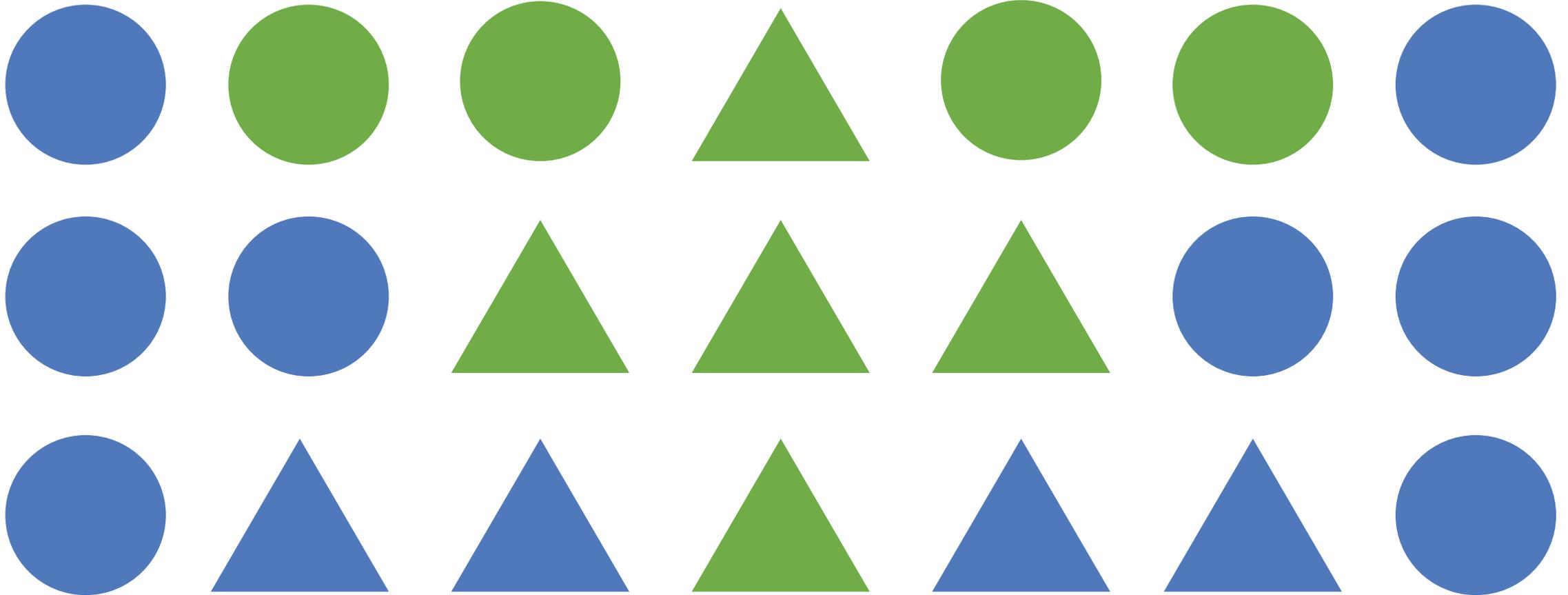
Connectivity



Similarity



Similarity





Computer



Papierkorb

Royal Revolt 2

Alles auf einen Blick

Spiele und mehr



All Applications

Accessories

Graphics

Internet

Office

Sound & Video

Administration

Preferences

Places

Recent Files

Accessibility

Account details

Advanced Network Configu...

Applets

Archive Manager

Backgrounds

Backup Tool

Bluetooth

Calculator

Calendar

Celluloid

Character Map



S

Skype

Sprachrekorder

Sticky Notes

Store

T

Tipps

Twitter

V

Verbinden

W

Wetter

Windows Defender Security Center

Windows Media Player

Windows PowerShell

Windows-System

Windows-Verwaltungsprogra...

Windows-Zubehör

WLAN- und Mobilfunkguthaben

X

Xbox

Kalender

Mail

Microsoft Edge

Fords

Leichter Regen

15° 18°
15°

Berlin

Skype

Facebook

Twitter

Store

MINECRAFT

Wetter

MINECRAFT

Windows Defender Security Center

Warum deutsche Populisten "enttäuschte..."

Windows Media Player

Nachrichten

Windows PowerShell

Office holen

Windows-System

OneNote

Windows-Verwaltungsprogra...

Xbox

Groove-Musik

Filme & TV

NETFLIX

Microsoft Solitaire Collection

Candy Crush...

Warum deutsche Populisten "enttäuschte..."

8

Castle Siege

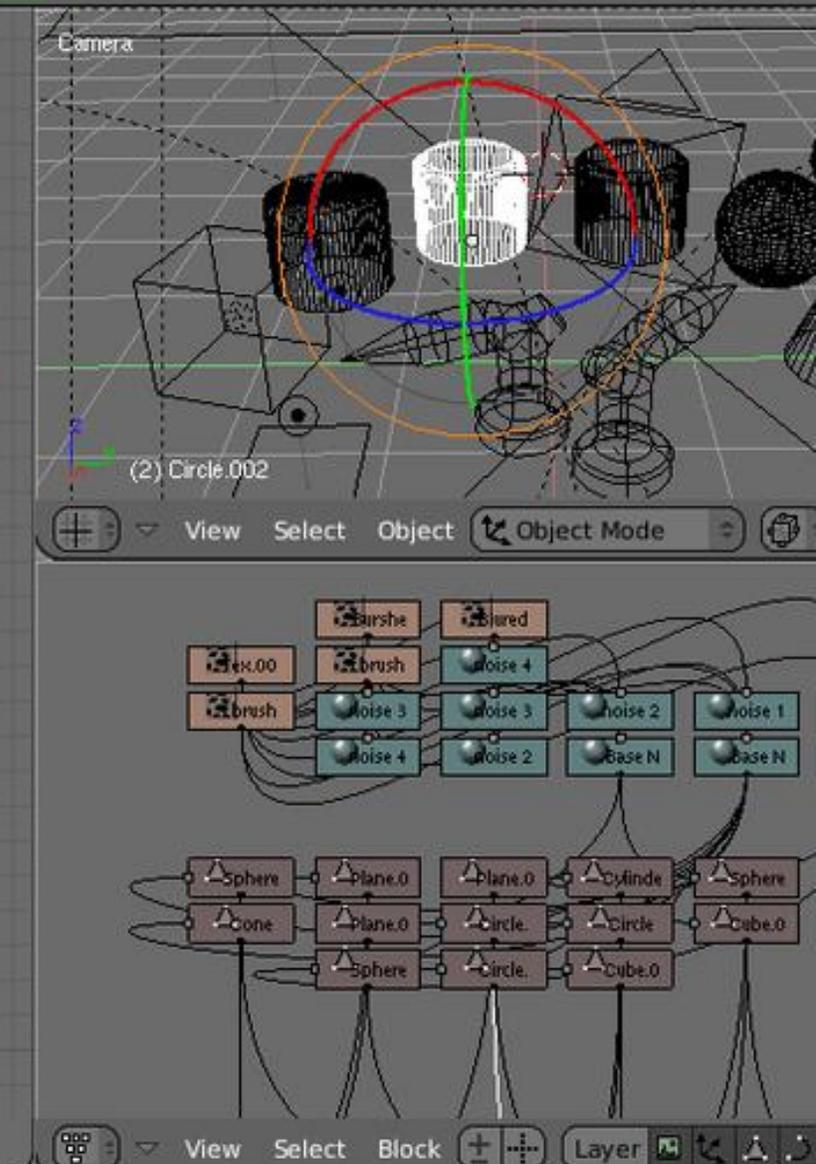
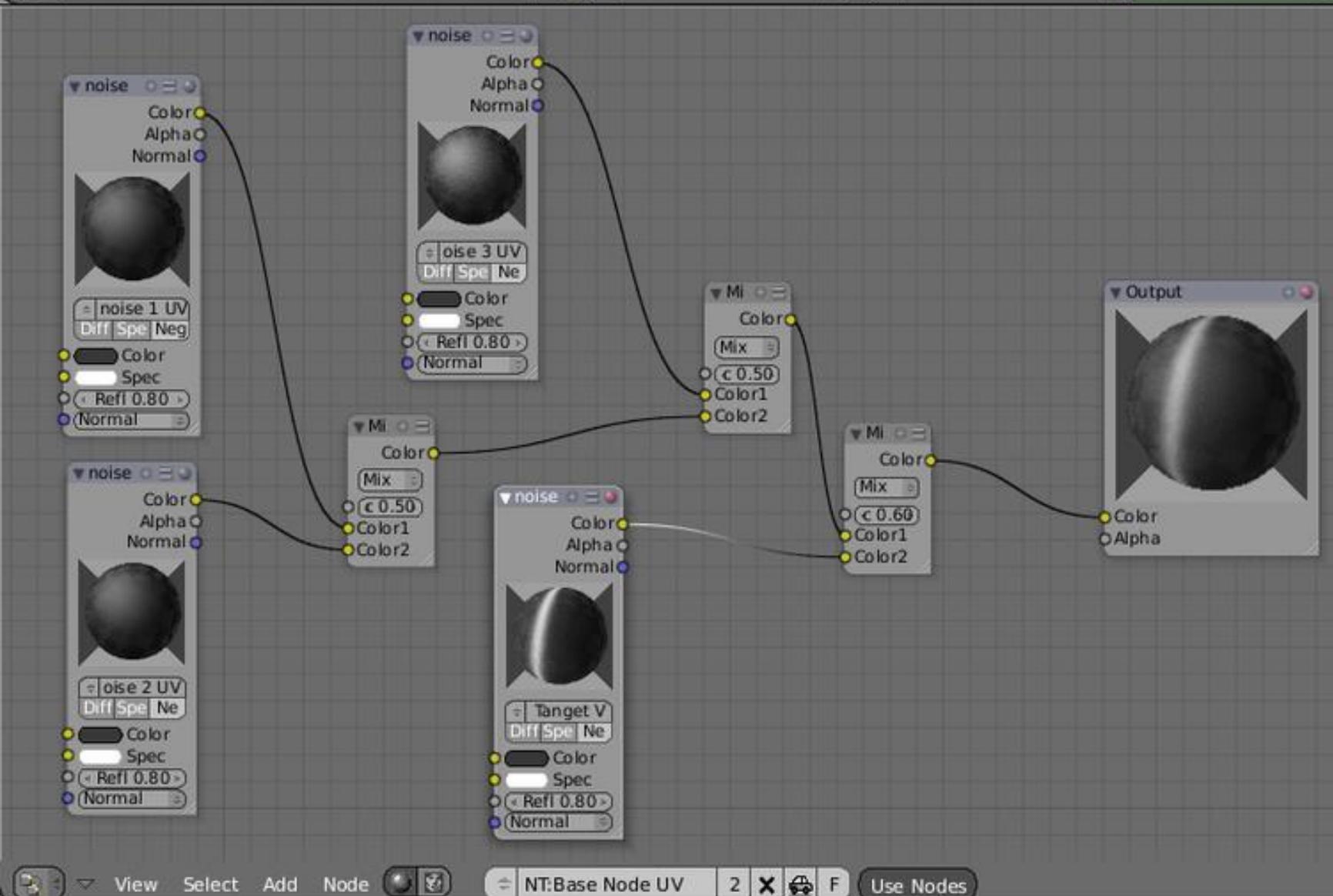
Royal Revolt 2

Office holen

OneNote

zur Suche Text hier eingeben







Shapes

Abstraction, Signs, and Ratios

Slides adapted from hci-lecture.org (A. Schmidt, N. Henze, K. Wolf, V. Schwind), Image from: <https://pxhere.com/de/photo/1028791>



Image from <https://pxhere.com/de/photo/479539>

Abstraction

- **Abstraction of shapes** is considered by anthropologists, archaeologists, and sociologists to be one of the key traits in modern human behaviour.
- Abstraction is **a compression process** where general rules, information or concepts are derived from signifiers, semantics, or other methods
 - › It encapsulates levels of detail with no loss of generality
 - › Cognitive mechanism unknown but related to language



2004-05



2005-09



2009-13



2013-17



2017-19



2019+

Image from: <https://www.soeren-hentzschel.at/firefox-klar/firefox-klar-logo-2021/>

Abstraction

- Communication about abstract shapes requires **a common experience between the communicator** (the designer) **and the communication recipient** (the perceiver)
- This is true for all verbal/abstract communication an emerged likely from language



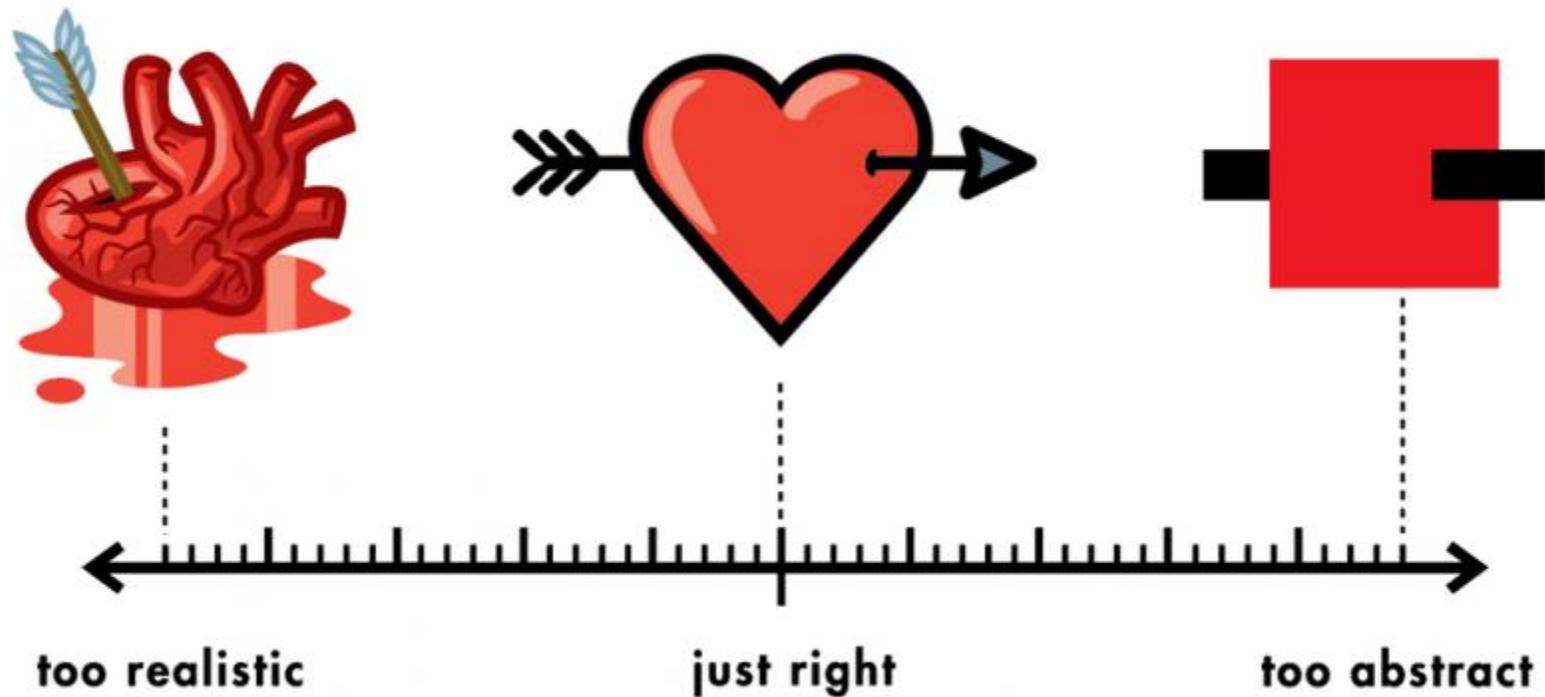


Abstraction

- Abstraction is a thought process where **meaning is distanced from objects**
- A **symbol transports meaning**
- Meaning ensures that **good symbols endure and are universally recognized**



Realism and Abstraction

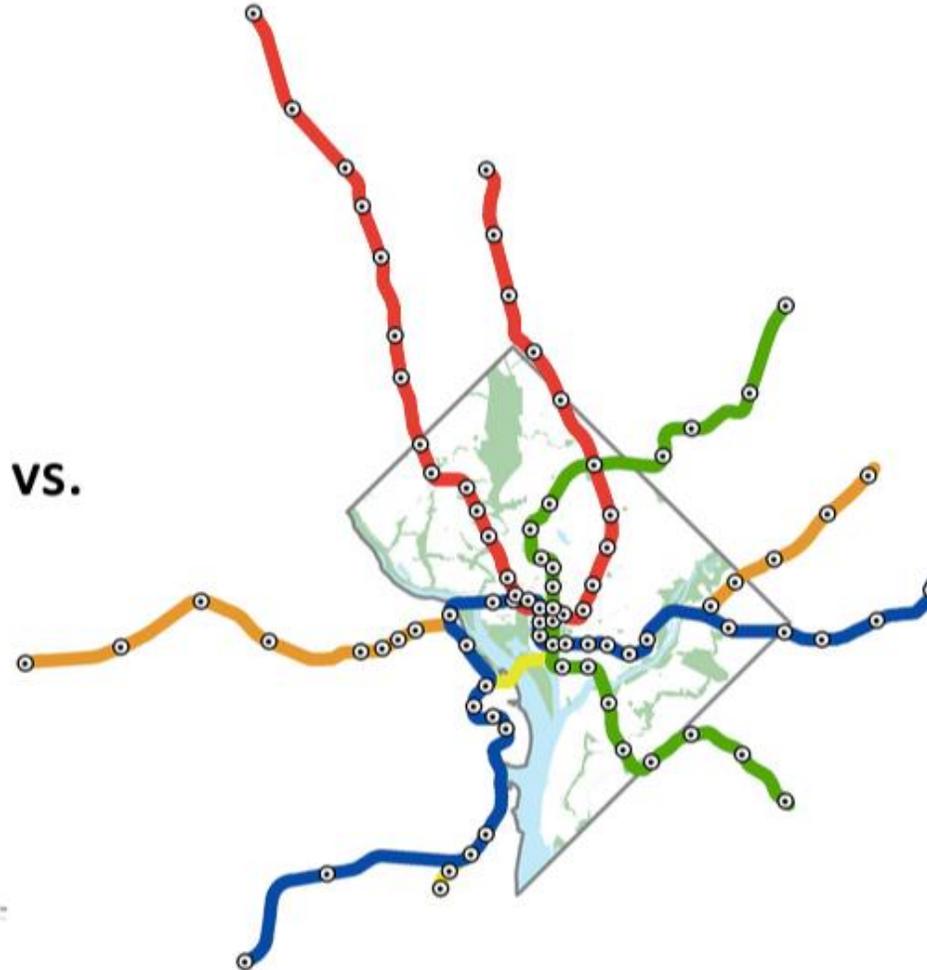


https://computersciencewiki.org/index.php/File:Abstract_heart.png Mr. MacKenty, Licensed under Creative Commons Attribution-NonCommercial-ShareAlike

Realism and Abstraction



VS.



https://computersciencewiki.org/index.php/File:Abstract_heart.png Mr. MacKenty, Licensed under Creative Commons Attribution-NonCommercial-ShareAlike



house



magnifying-glass



user



check



download



image



phone



bars



envelope



star



location-dot



music



wand-magic-sparkles



face-awesome



heart



arrow-right



circle-xmark



bomb



poo



camera-retro



xmark



cloud



comment



caret-up



truck-fast



pen-nib



arrow-up



hippo



face-smile



calendar-days



paperclip



shield-halved



file



bell



cart-shopping



clipboard



filter



circle-info



arrow-up-from-bracket



alarm-clock



bolt



raygun



car



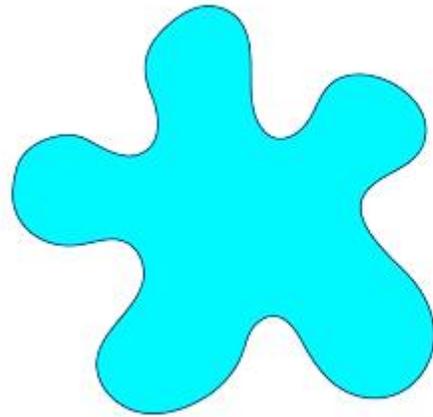
ghost



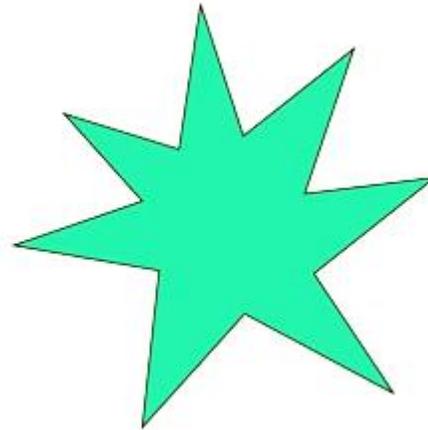
mug-hot

Bouba–kiki Phenomenon

- Link between the consonants 'b' and 'k' and round and sharp shapes: consistently found in different languages



„b“



„k“

Fitch, W. Sound and meaning in the world's languages. *Nature* 539, 39–40 (2016). <https://doi.org/10.1038/nature20474>

Shapes and Beauty



Images from Coca Cola: <https://www.facebook.com/photo/?fbid=494326922714498&set=pb.100064115830816.-2207520000>, <https://www.calculator.net/body-type-calculator.html>, <https://pxhere.com/de/photo/1024195>, MyLoveView.de ImageID: #211767939 <https://myloview.de/bild-single-continuous-line-drawing-of-luxury-butterfly-for-corporation-nr-C9F5283>, <https://pxhere.com/de/photo/1039652>, Brovchenko, Julia https://www.123rf.com/photo_29536977_seamless-pattern-from-sketches-of-different-shapes-shell-1.html

The Squircle

- A shape intermediate between a square and a circle based on a superellipse (or Lamé curve)
 - › A squircle centered on the origin ($a = b = 0$) has the minor radius $r = 1$ is defined by $x^4 + y^4 = 1$
- Mobile operating systems use **squircles as (app) icons**
 - › Apple uses an approximation of a quintic superellipse (exact formula unknown)



Shapes and Language

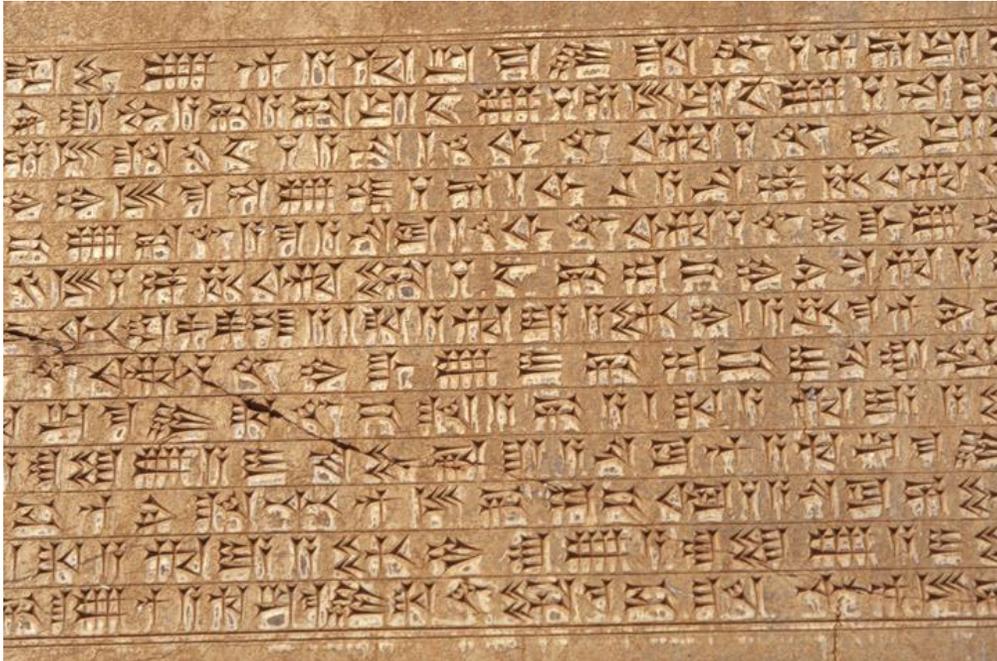
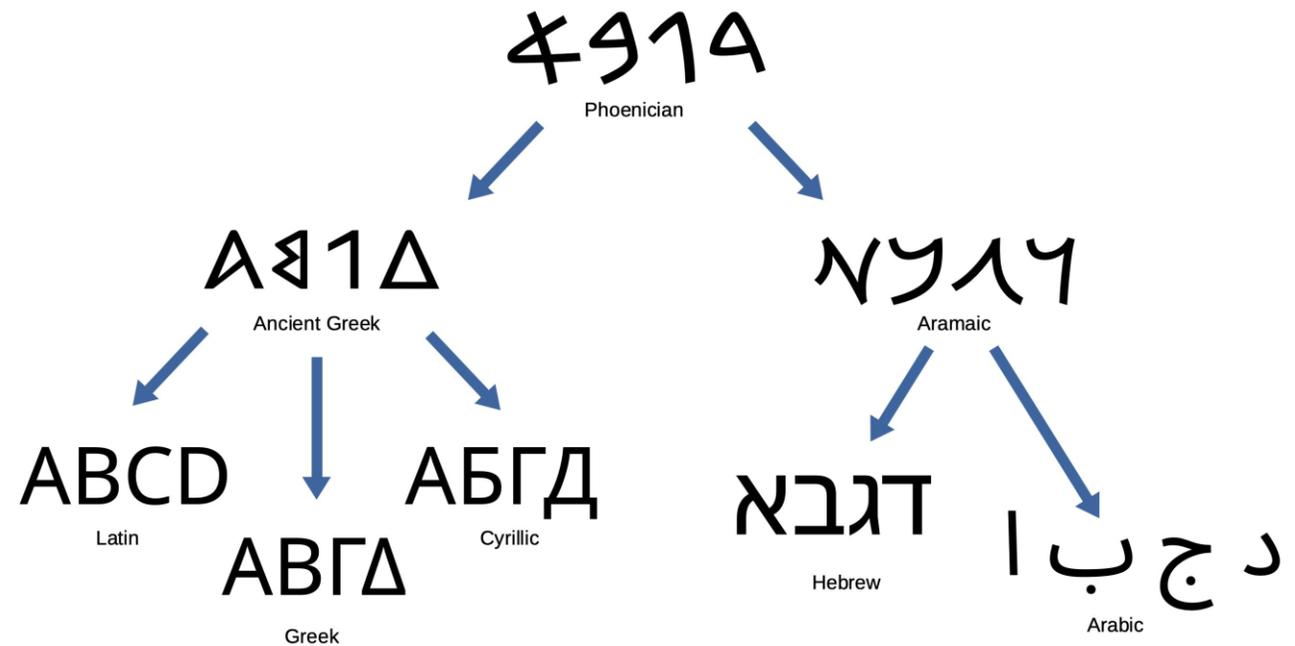


Image from Flickr by Nickmard Khoey at <https://www.flickr.com/photos/92126470@N00/2591671132>. Licensed under the terms of the cc-by-sa-2.0.



Fonts

- McCracken and Wolfe recommended not using **Georgia** or **Verdana** font styles intermixed in the body text of a website rather than **Times New Roman** or **Arial**



McCracken, Daniel D.; Wolfe, Rosalee J. (2004). User-centered Website Development: A Human-computer Interaction Approach. Prentice Hall. ISBN 9780130411617.

Typography

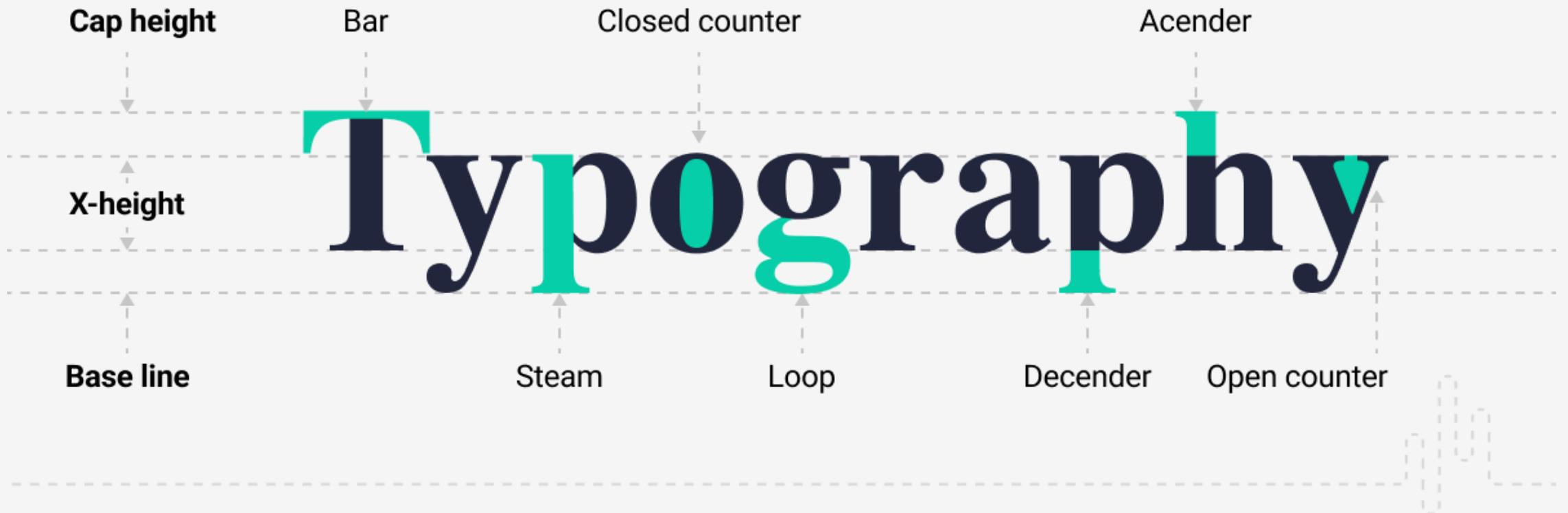
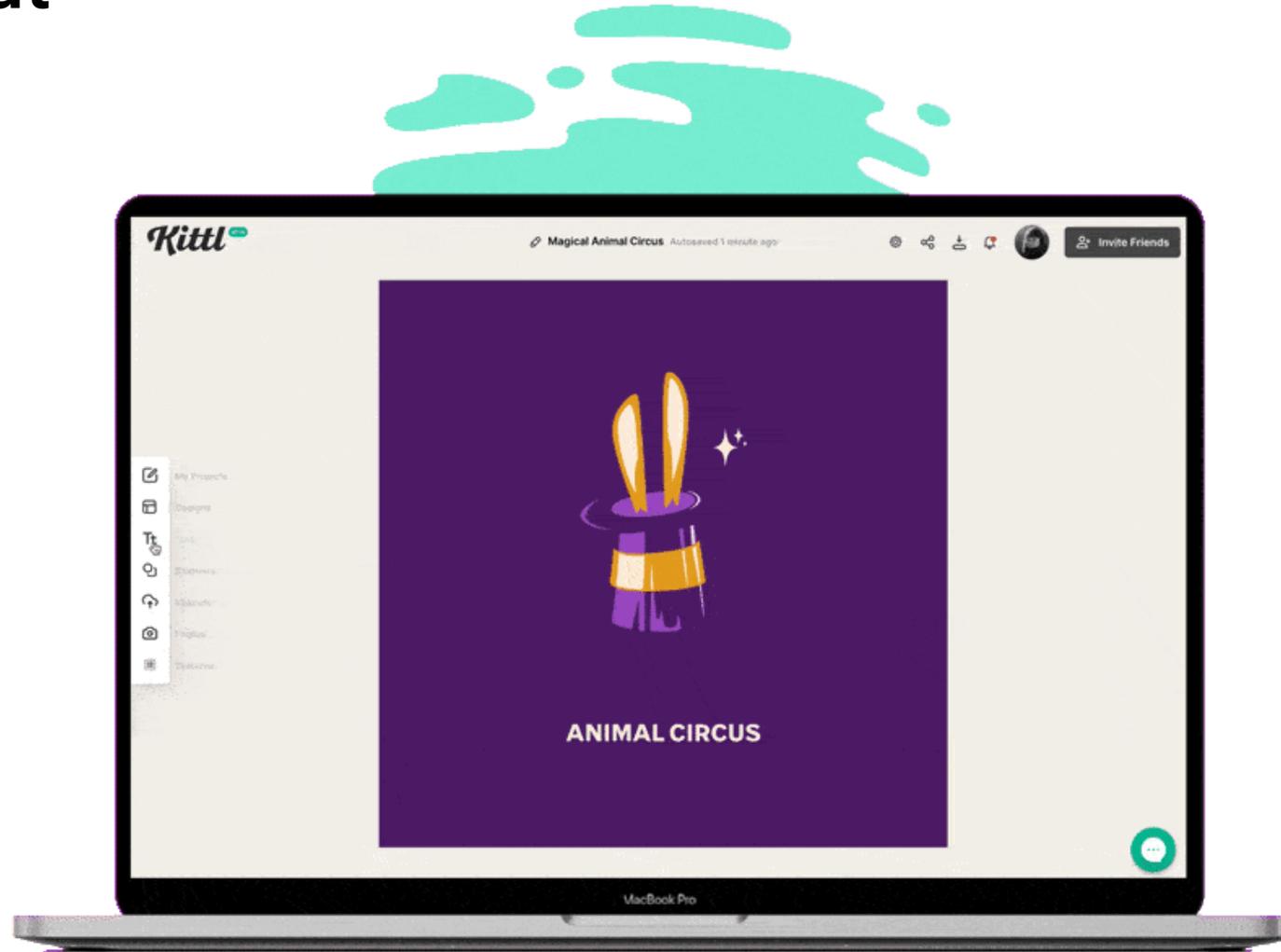


Image from: <https://uxplanet.org/ux-ui-tips-a-guide-to-ux-typography-d297a8e2653d>

Text Layout



Animation from: <https://www.kittl.com/feature/text-layouts>



Colors

The Power of Coloration

Slides adapted from hci-lecture.org (A. Schmidt, N. Henze, K. Wolf, V. Schwind), Image from: <https://pxhere.com/de/photo/956874>



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Image Source <https://www.wallpaperflare.com/blue-wall-city-and-urban-chair-chairs-color-colour-door-wallpaper-aziep> & after <https://www.pexels.com/photo/close-up-photography-of-body-of-water-1439227/> by Tim Mossholder Paper on color affects: Ho, Hsin-Ni. (2015). Color-temperature correspondence and its impact on object temperature perception.



Warning!

Do not enter water, due to high pH levels.

This can cause:

- .Skin and eye irritations
- .Stomach problems
- .Fungal infections such as thrush
- .Other infections such as rashes

Think! would you swim in ammonia (pH 11.5) or bleach (pH 12.6)?

Well these are similar to the
Blue Lagoon (pH 11.3)!



Blue

- **The color of action and cooperation**

- › Is associated with **openness, creativity, friendliness, approachability**
- › Blue light **increases alertness, concentration, performance and mood**

- **Delay the release of sleep-inducing melatonin**

- › Not good if you want to sleep or work with blue-toned displays
- › Blue releases dopamine in the eyes, which is **responsible for eye growing** (associated with myopia)



White

- **The color of peace**
 - › Associated with **moral goodness, security, passivity, and safety**
 - › **Gods, angels, and prophets** are often depicted draped and in light-colored clothes
- White products are perceived to be classy, timeless, and high-valued
- Placebo pills are perceived to be least potent



Black

- **The color of despair**

- › From a psychological perspective: the absence of color
- › From a neurological and psychological perspective (what the human brain recognizes): black and white are like any other colors

- Black is **associated with evil and foreboding** likely due to an association with darkness and vulnerability to nocturnal predators

- › Black signals aggression and dominance
- › Black and glossiness is perceived to be class, high-valued, and social power



Yellow

- The easiest color to see in all lighting conditions
- Reduce the risk of visibility-related accidents by 3x!



recommended by researchers



today mostly used

Yellow

- The preferred color for a firefighting vehicle depends highly on **emotions, individual needs, and traditions**
- Colors have a very subjective and emotional component
- **The color of fear**
 - › **Yellow** often evokes pleasant, cheerful feelings but men usually perceive yellow as a lighthearted or childish
 - › **Red** is highly emotional and a subjective sign of „danger“, „energy“, „strength“, and „power“ – everything a firefighter stands for!
- Objective and subjective methods are required to understand which is the best color for a firefighting vehicle!

Red

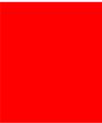
- **The color of desire**
 - › Red makes women appear more attractive to men (but not vice versa)
 - › Wearing red confers a small competitive advantage in sport contests
- Red is associated with courage, danger, power, dominance, blood, and love
- Red appear to impair problem solving and creativity
 - › It alerts the brain and create interference with high-order thinking





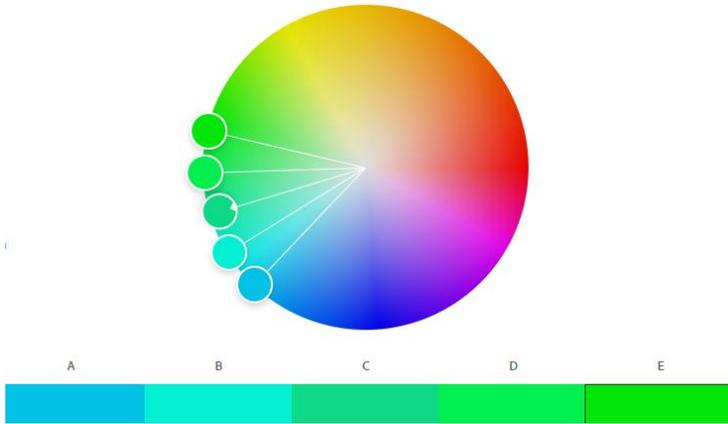
Image Source https://commons.wikimedia.org/wiki/File:Cherry_tomatoes_red_and_green_2009_16x9.jpg by WikiPedant

Colors

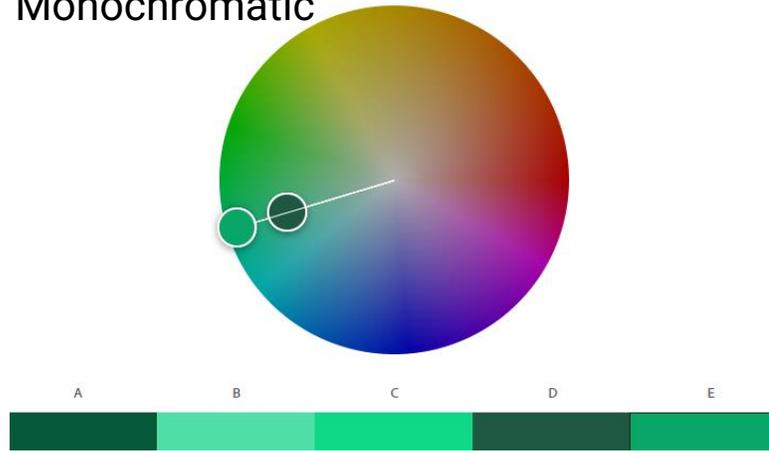
	Attention	Depth	Affection	Symbolic meaning
	Salient in contrast to dark	Objects appear larger & lighter	Neutral	Innocence (Western world), mourning (JP, CN), purity (Catholicism)
	Very salient	Objects appear closer	Warm, arousing	Passion, love, fire, blood, power (Renaissance)
	Salient	Obj. closer	Activating	
	Very salient	Obj. larger	Exhilarating	Sun, light, envy
	Little salient	Obj. further away	Calming	Spring, hope, paradise, ecology (lately)
	Very little salient	Obj. appear far away	Cool, depressing	Truth, air, water, loyalty, poverty (Renaissance)
	Little salient	Obj. smaller	Ceremonial	Magic, wealth (antiquity)
	Not salient			Earth, autumn, humbleness (Cath.)
	Salient in contrast to light colors	Objects appear smaller & heavier	Scaring	Mourning (West. W.), night, death, damnation, contempt for the world

Color Composition

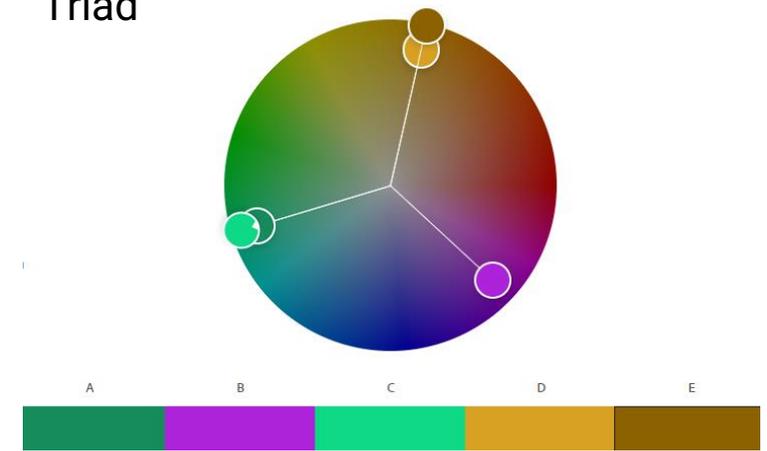
Similar



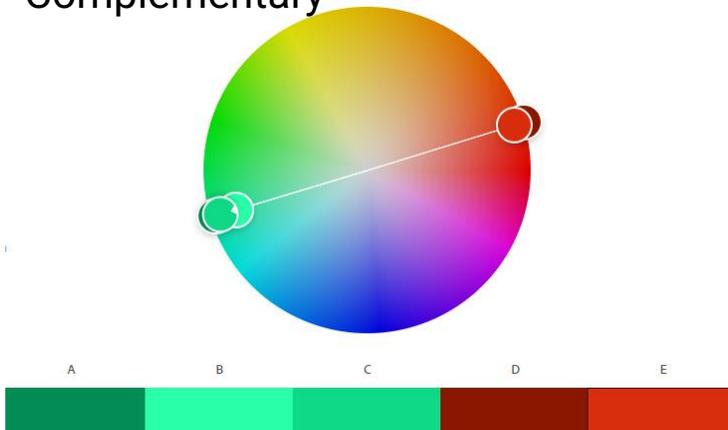
Monochromatic



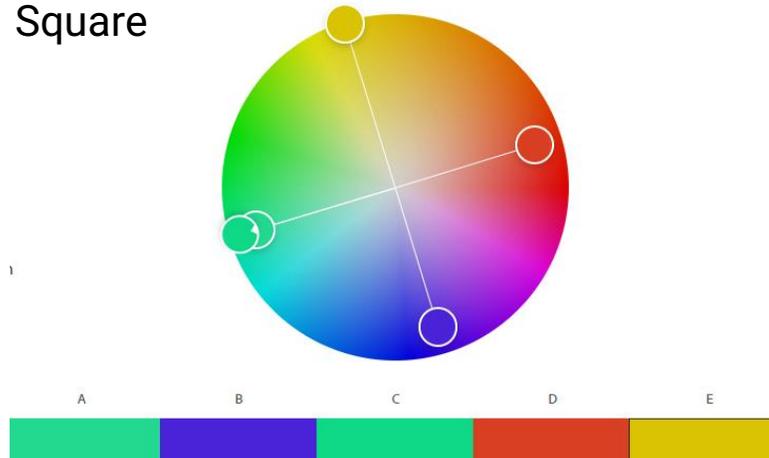
Triad



Complementary



Square



Shades

