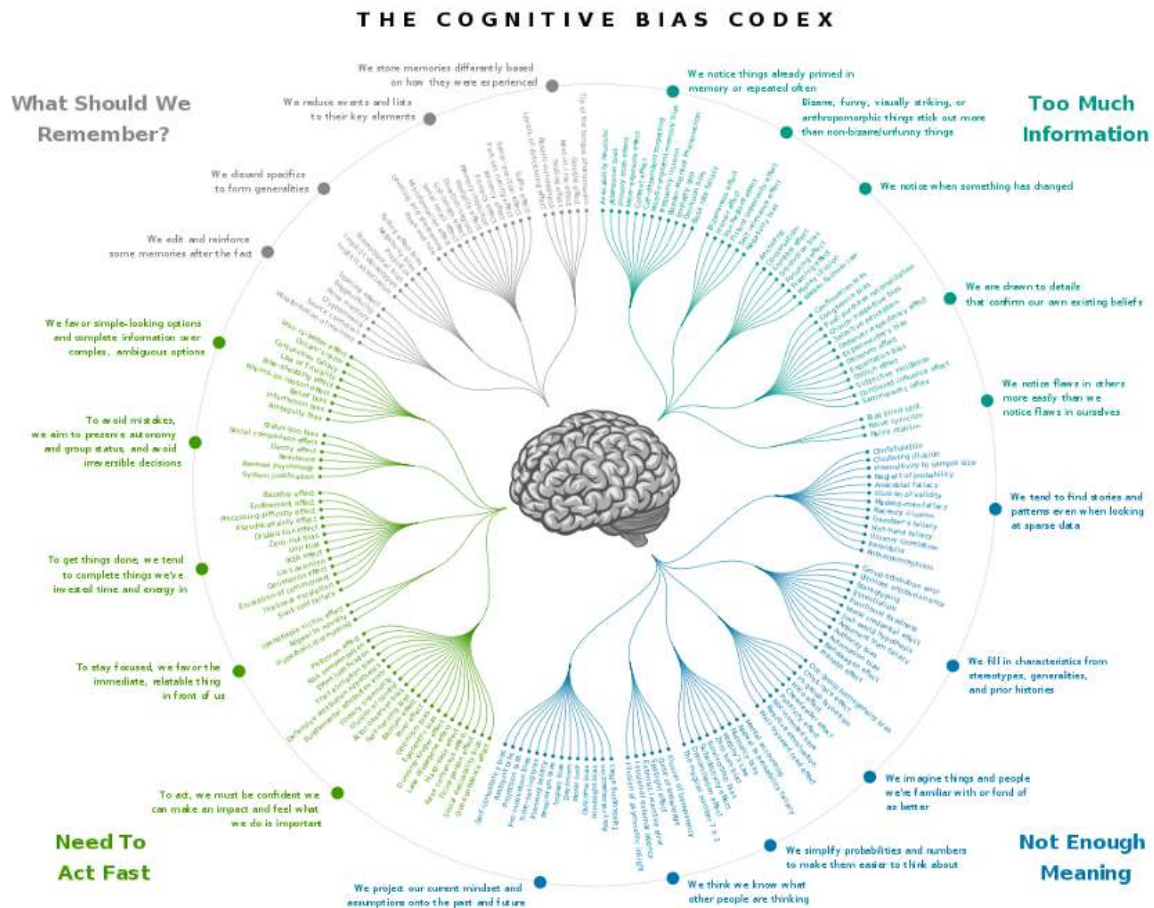


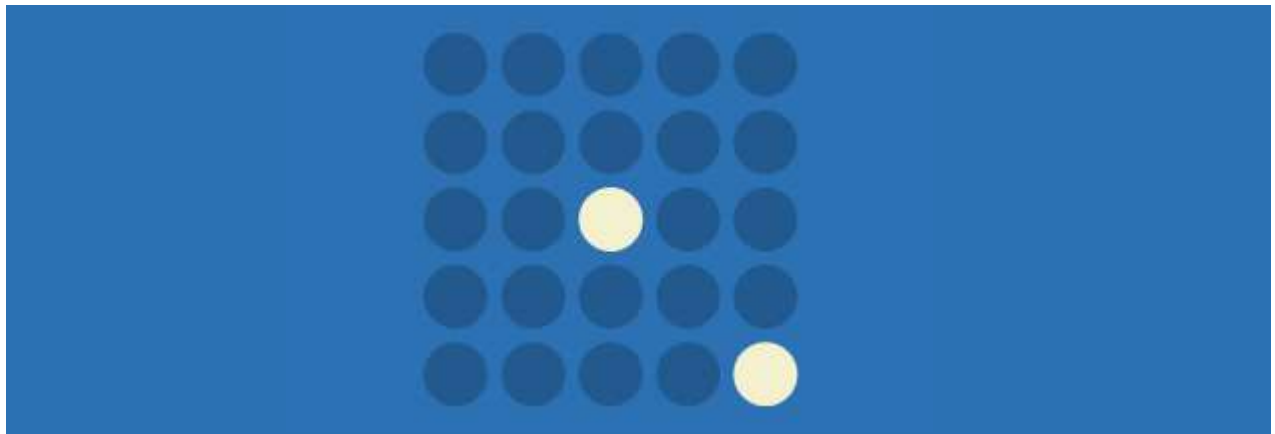
IMPORTANT UX PRINCIPLES

COGNITIVE BIAS



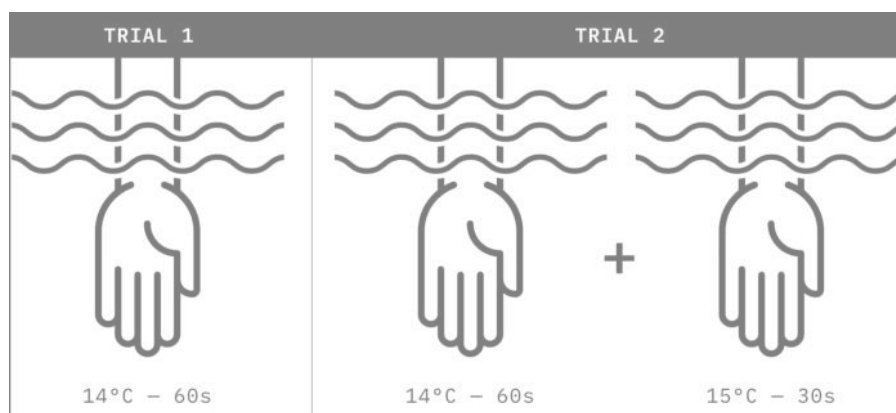
Cognitive biases are systematic **errors of thinking** or **rationality** in judgment that **influence our perception** of the world and our decision-making ability.

PEAK-END RULE



People judge an experience largely based on how they felt at its peak and **at its end**, rather than the total sum or average of every moment of the experience

- 1- Pay close attention to the most intense points and the **final moments** (the “end”) of the user journey.
- 2- Identify the moments when your product is most **helpful, valuable, or entertaining** and design to delight the end user.
- 3- Remember that people recall negative experiences more vividly than positive ones.



When given the choice of which experience they would repeat, participants were more willing to repeat the second trial, despite it being a longer exposure to the uncomfortable water temperatures.

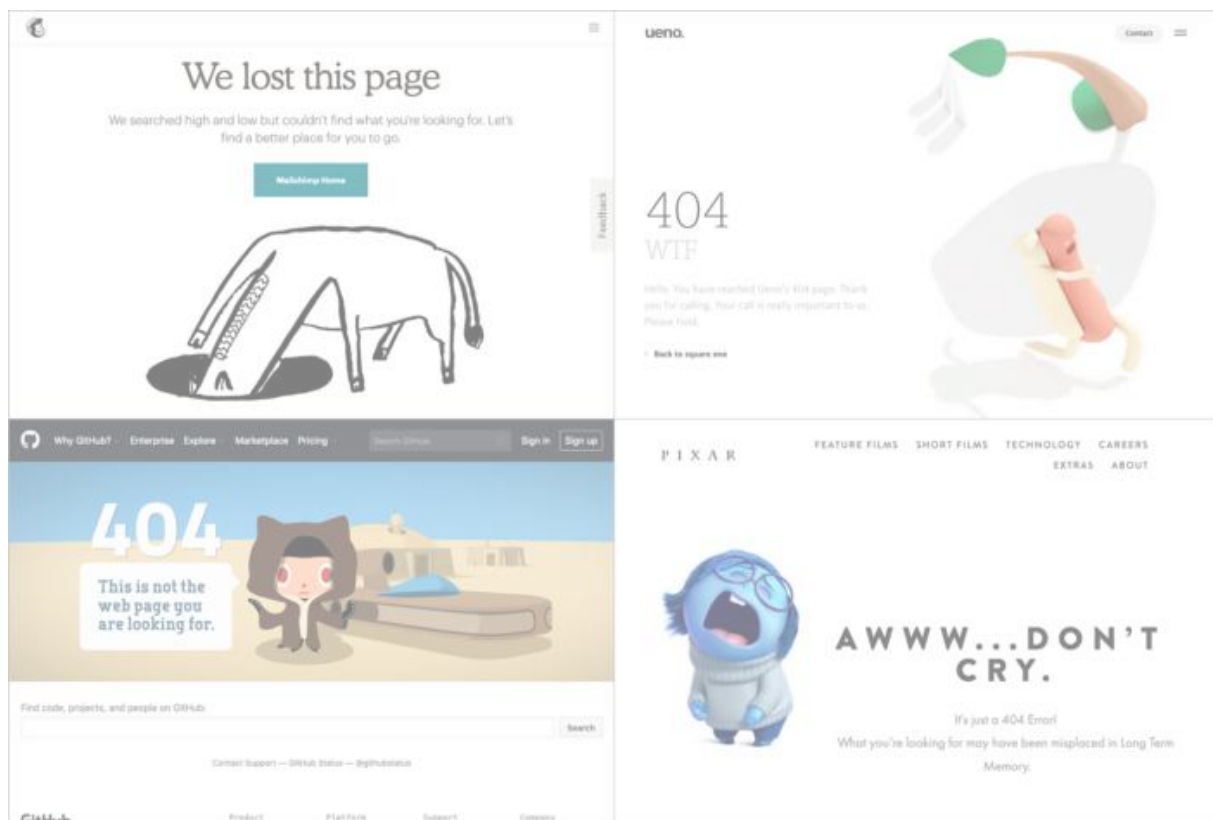
The peak-end rule is known as a *memory bias* because it impairs the recall of a memory. We remember **intensely emotional events** more than **less emotional events**, and this has an effect on how we perceive an experience: we recall not the sum of how we felt throughout the experience but the average of how we felt during the peak emotional moments and at its end. The peak-end rule is related to another cognitive bias known as the **recency effect**, which states that items near the end of a sequence are the easiest to recall.

Positive events aren't the only things that have an impact on how people feel about a product or service. **Negative events** also provide **emotional peaks** and can contribute to a user's

lasting impression of an experience. **Wait times** can have a profound effect on how people perceive a product or service.

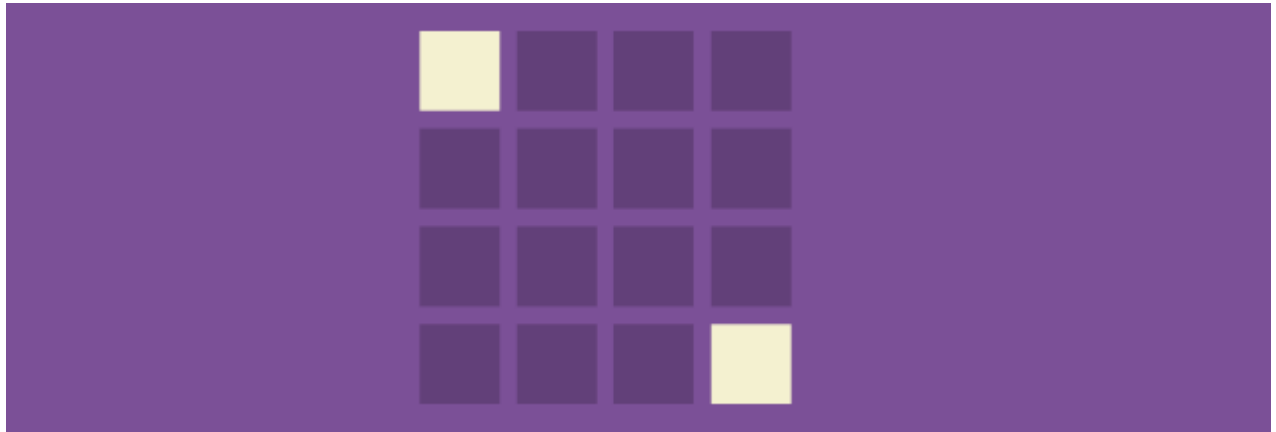
TOOL: One handy tool for **identifying the emotional peaks** of end users throughout an experience is **journey mapping**. This qualitative exercise is invaluable for visualizing how people use a product or service through the narrative of accomplishing a specific task or goal.

NEGATIVE PEAKS: It is inevitable that at some point in the lifespan of a product or service something will go wrong. There might be a **server failure** that has a ripple effect and leads to service outages, or a **bug** might open up a security vulnerability, or a design decision might be made that fails to consider all customers and leads to some **unintended consequences**. All of these types of situations can have an emotional effect on the people that use your product, and ultimately inform their overall impression of the experience. Such setbacks can also be **opportunities**, however, if the right fallbacks are in place. Some companies use this as an opportunity to **create a rapport** with their customers and **enforce their brand personality** by leveraging some good old-fashioned humor for example.



Since we judge past experiences not based on how we felt throughout the whole duration of the event but on the average of how we felt at the peak emotional moments and the end, it is **vital** that these moments make a lasting **good impression**. By paying close attention to these key moments of an experience, we can ensure users recollect the experience as a whole positively.

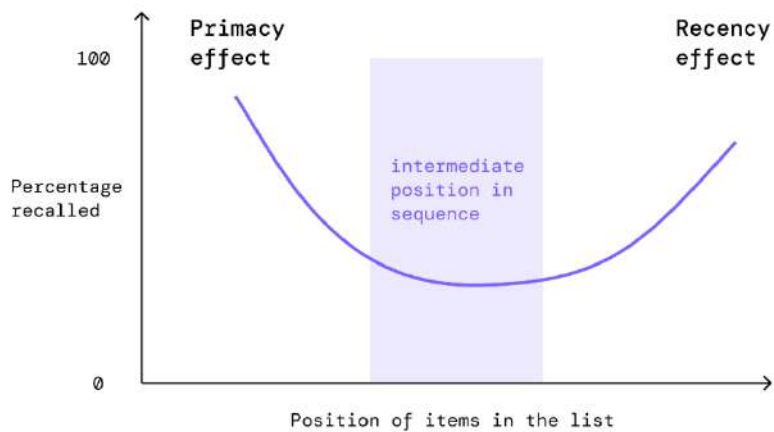
SERIAL POSITION EFFECT



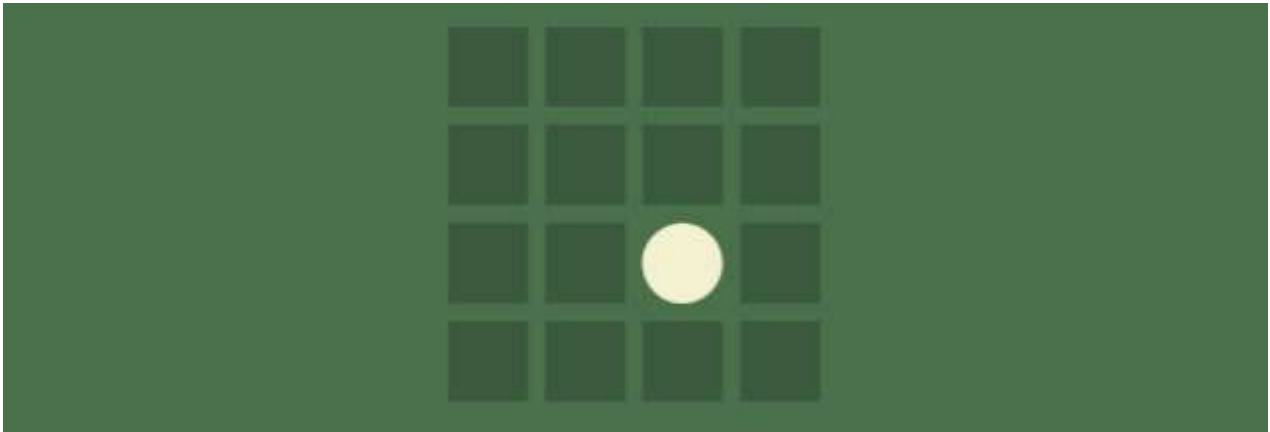
Users have a propensity to best remember the **first** and **last** items in a series.

- 1- Placing the least important items in the middle of lists can be helpful because these items tend to be stored less frequently in long-term and working memory.
- 2- Positioning key actions on the far left and right within elements such as navigation can increase memorization.

The tendency to recall earlier words in a list is called the *Primacy Effect*; and the tendency to recall the later words is called the *Recency Effect*.



VON RESTORFF EFFECT



The Von Restorff effect, also known as **The Isolation Effect**, predicts that when multiple similar objects are present, the one that differs from the rest is most likely to be remembered.

- 1- Make **important information** or **key actions** visually distinctive.
- 2- Use **restraint** when placing emphasis on visual elements to avoid them competing with one another and to ensure salient items don't get mistakenly identified as ads.
- 3- Don't exclude those with a **color vision deficiency** or **low vision** by relying exclusively on color to communicate contrast.
- 4- Carefully consider users with **motion sensitivity** when using motion to communicate contrast.

ZEIGARNIK EFFECT



People remember **uncompleted** or **interrupted tasks** better than completed tasks.

- 1- Invite **content discovery** by providing clear signifiers of additional content.
- 2- Providing **artificial progress towards a goal** will help to ensure users are more likely to have the motivation to complete that task.
- 3- Provide a **clear indication of progress** in order to motivate users to complete tasks.

Whenever a task is incomplete/in progress, it bothers us, and it keeps popping in our head until it's complete, creating task tension.

But that tension is relieved as soon as we complete the task. Hence, people are more **driven** and **motivated** to complete the **already on-going task**. We all want the satisfaction of seeing that "100% Complete" or that huge green tick mark at the end of completion.

PICTURE SUPERIORITY EFFECT



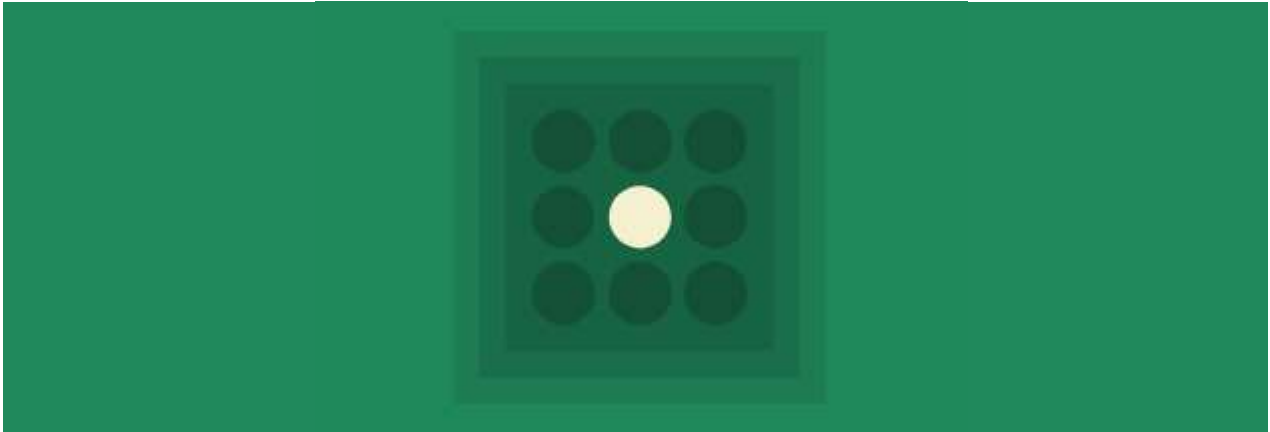
The Picture Superiority Effect, or pictorial superiority effect refers to the phenomenon in which **pictures** and images are more likely to be remembered than words.



Experiments shown that in human memory recall, pictures outperform text dramatically. When information is presented orally, after 3 days, people will only remember 10% of it.

GESTALT

LAW OF COMMON REGION

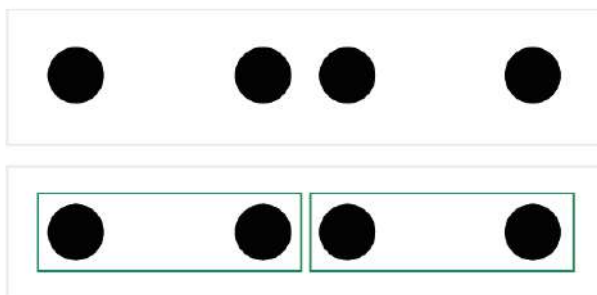


Elements tend to be perceived into groups if they are sharing an area with a clearly defined boundary. Containers create groupings.

- 1- Common region creates a **clear structure** and **helps users** quickly and effectively understand the relationship between elements and sections.
- 2- Adding a **border** around an element or group of elements is an easy way to create common region.
- 3- Common region can also be created by defining a **background** behind an element or group of elements.

When users land on a webpage or open an app, they make **fast, automatic judgements** about where to look to complete their task. Designs that have distinct, organized sections make it easy to recognize the basic structure of the interface and to determine what areas of the UI to interact with.

People rely on **visible boundaries** in the page body to understand what information or UI elements are related.



Creating a clear boundary is a **strong visual cue that can overpower other grouping principles** such as proximity or similarity. Thus, it is a powerful tool to use when needing to contain several different types of UI elements, or when adjusting the amount of whitespace between objects isn't possible.

Showing a common region can also aid perceiving **multiple groupings at a time**. For example, in a comparison table it's important to distinguish both the column (for each product or service) and the row (for each characteristic). "Zebra" stripes, where alternating rows have a colored background, are a common method of uniting horizontal elements while whitespace or another border distinguishes each column.

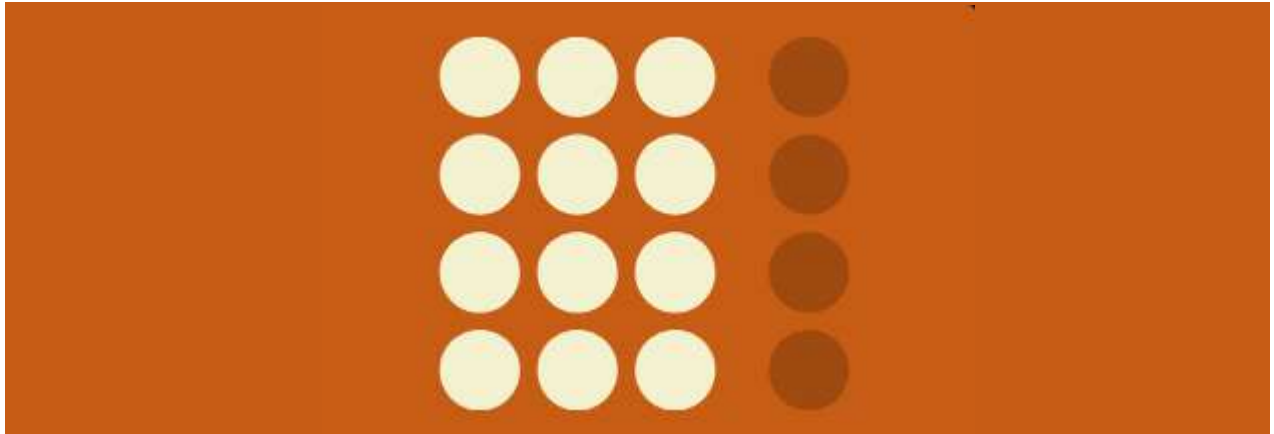


WARNING: When possible, using **whitespace** alone to create clear groupings **reduces the visual complexity** of a design. Borders are often added in an abundance of caution, to ensure that groupings are clear; however, this approach can result in busy, cluttered designs and in many situations it's enough to rely on proximity for grouping.

Apart from being unnecessary visual elements, segmenting a page into distinct sections can create **false floors**, and may prevent users from scrolling down the page because they think they've hit the end. This issue is especially common when borders extend the full width of the screen. Why keep scrolling if you've reached the end of what you were reading?

TIPS: Before adding more borders and backgrounds to a design, consider: are they necessary to understand the grouping? Can I communicate this grouping by simply adding or removing whitespace? Do I need to signal that these elements are related to each other, but not related to other, nearby elements? Were users confused during usability testing when the boundaries were not present?

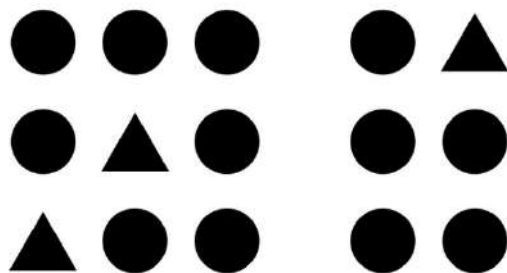
LAW OF PROXIMITY



Objects that are **near**, or **proximate** to each other, tend to be grouped together.

- 1- **Proximity** helps to establish a relationship with nearby objects.
- 2- Elements in close proximity are perceived to **share similar functionality** or traits.
- 3- Proximity helps users understand and organize information faster and more efficiently.

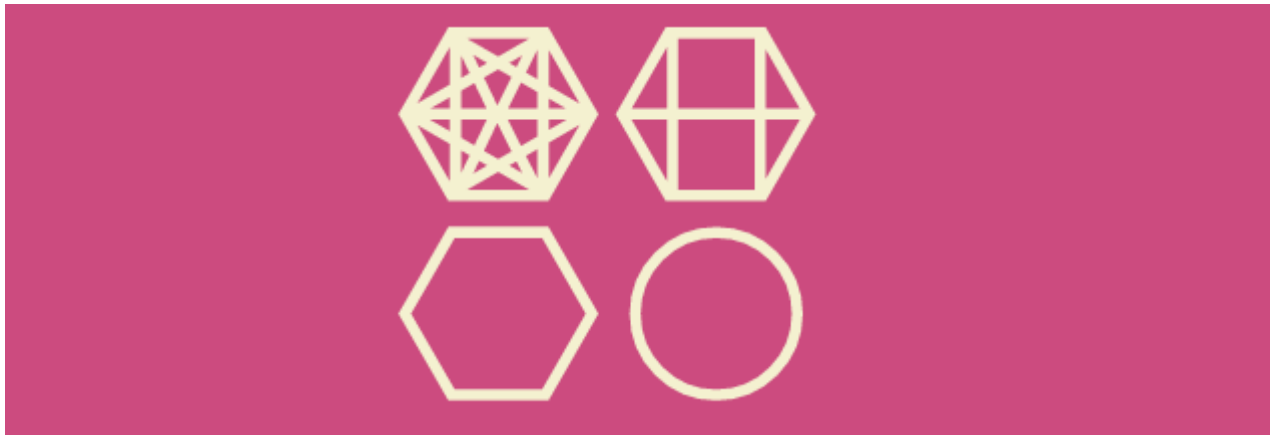
Proximity is one of the most important grouping principles and can overpower competing visual cues such as similarity of color or shape. The practice of **placing related elements close together** and **separating unrelated elements** can be seen almost everywhere in UI design.



Using **varying amounts of whitespace** to either **unite or separate elements** is key to communicating meaningful groupings.

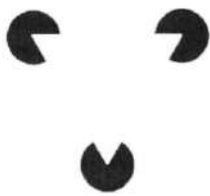
When users completely miss a link, button, or piece of information even though it's right in front of them, proximity (or rather, the lack of it) is often to blame. Because elements separated by whitespace are perceived as being less related, **far-away items** can be easily overlooked by **task-focused users** who expect all relevant information and interactive elements to be placed close together. This behavior is sometimes described as "**tunnel vision**:" users selectively attend to certain areas of the screen as they complete their task and miss things "in plain sight" because they are outside this focal area.

LAW OF PRÄGNANZ



People will **perceive** and **interpret** ambiguous or complex images as the simplest form possible, because it is the **interpretation** that requires the least cognitive effort of us.

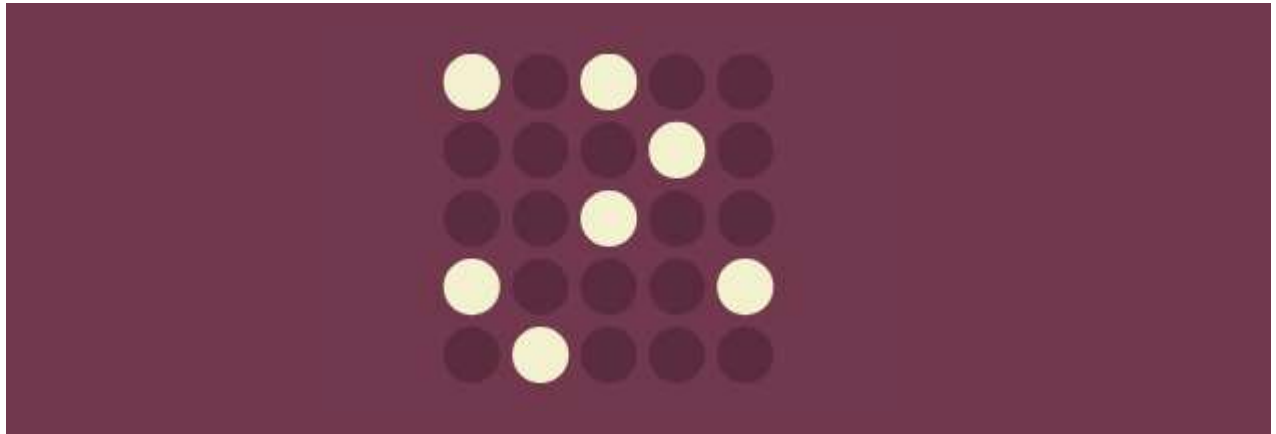
- 1- The human eye likes to find **simplicity** and **order** in complex shapes because it prevents us from becoming **overwhelmed** with information.
- 2- Research confirms that people are better able to visually process and remember simple figures than complex figures.
- 3- The human eye simplifies complex shapes by transforming them into a single, unified shape.



You should see a white triangle even though the image is actually comprised of three black Pac-Man-like shapes.

The key to closure is providing enough information so the eye can fill in the rest. If too much is missing, the elements will be seen as separate parts instead of a whole. If too much information is provided, there's no need for closure to occur.

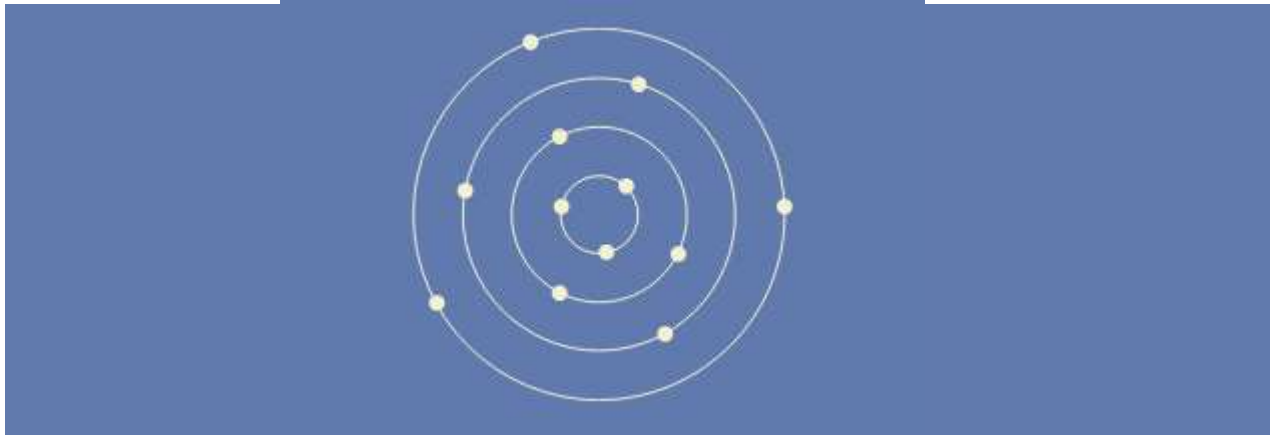
LAW OF SIMILARITY



The human eye tends to perceive **similar elements** in a design as a complete picture, shape, or group, even if those elements are separated.

- 1- Elements that are visually similar will be perceived as related.
- 2- **Color, shape, and size, orientation and movement** can signal that elements belong to the same group and likely share a common meaning or functionality.
- 3- Ensure that **links** and **navigation systems** are visually differentiated from normal text elements.

LAW OF UNIFORM CONNECTEDNESS

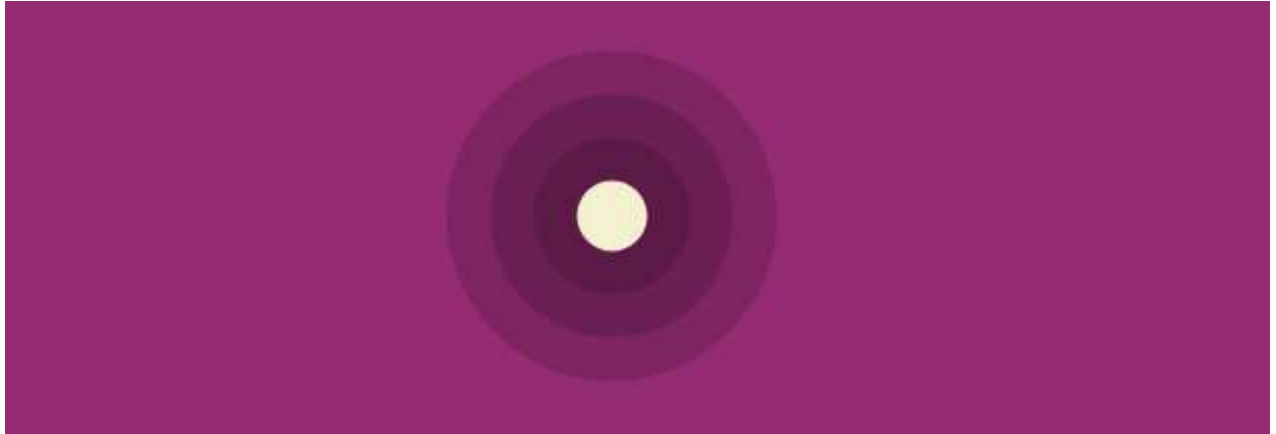


Elements that are **visually connected** are perceived as more related than elements with no connection.

- 1- Group functions of a similar nature so they are visually connected via **colors, lines, frames, or other shapes**.
- 2- Alternately, you can use a **tangible connecting reference** (line, arrow, etc) from one element to the next to also create a visual connection.
- 3- Use **uniform connectedness** to show **context** or to emphasize the **relationship** between similar items.

PRINCIPLES

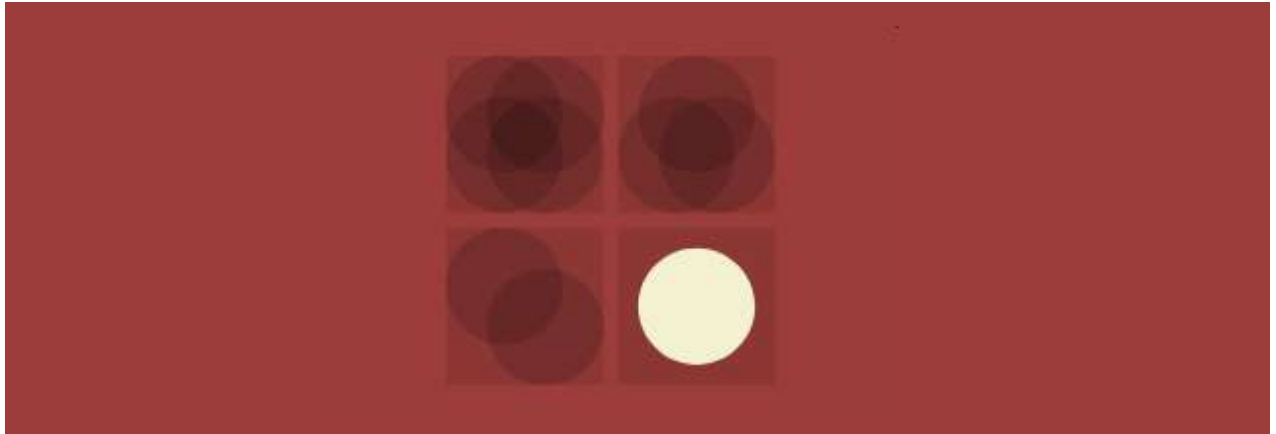
DOHERTY THRESHOLD



Productivity soars when a computer and its users interact at a pace ($<400\text{ms}$) that ensures that neither has to wait on the other.

- 1- Provide system feedback within **400 ms** in order to keep users' attention and increase productivity.
- 2- Use **perceived performance** to improve response time and reduce the perception of waiting.
- 3- **Animation** is one way to visually engage people while loading or processing is happening in the background.
- 4- **Progress bars** help make wait times tolerable, regardless of their accuracy.
- 5- **Purposefully adding a delay** to a process can actually increase its perceived value and instill a sense of trust, even when the process itself actually takes much less time.

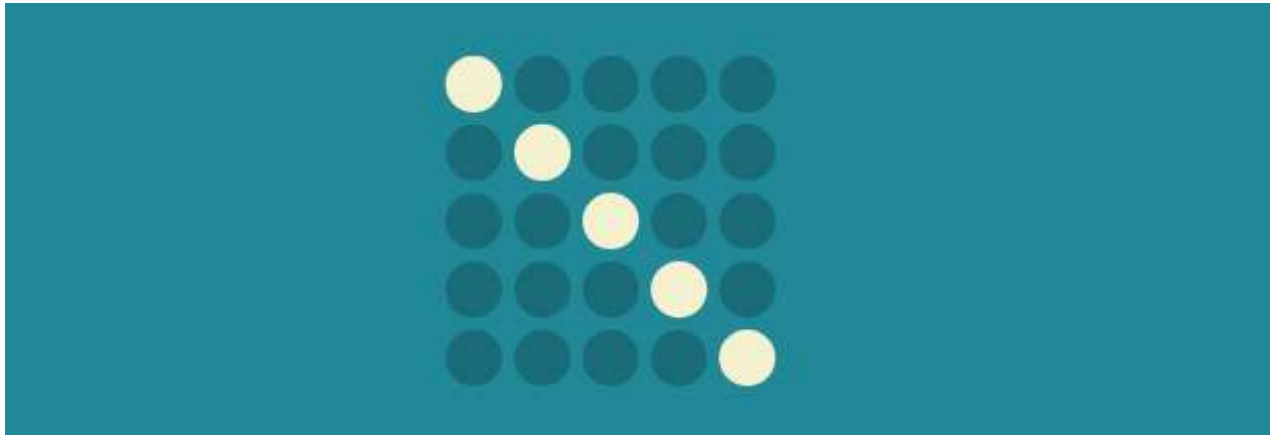
OCCAM'S RAZOR



Also named « Ockham's razor » or « principle of parsimony ». It's a philosophical principle who says that among competing hypotheses that predict equally well, the one with the **fewest assumptions** should be selected. The simplest is the better.

- 1- The best method for reducing complexity is to **avoid it** in the first place.
- 2- Analyze each element and **remove** as many as possible, without compromising the overall function.
- 3- Consider completion only when no additional items can be removed.

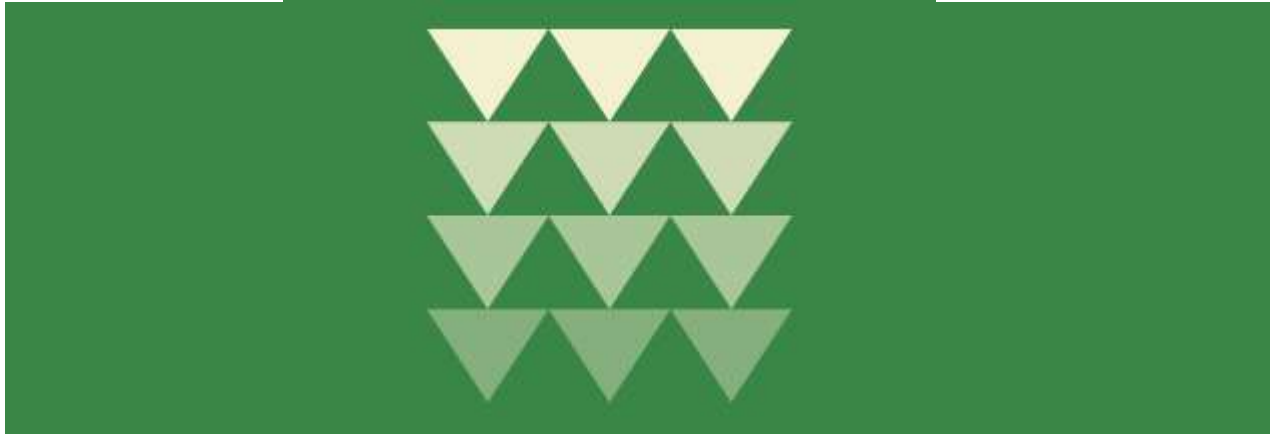
PARETO PRINCIPLE



The Pareto principle states that, for many events, roughly **80% of the effects** come **from 20% of the causes**.

- 1- Inputs and outputs are often not evenly distributed.
- 2- A large group may contain only a **few meaningful contributors** to the desired outcome.
- 3- Focus the majority of effort on the areas that will bring the **largest benefits** to the **most users**.

POSTEL'S LAW



Be “liberal” in what you accept, and “conservative” in what you do or send

- 1- Be **empathetic** to, **flexible** about, and **tolerant** of any of the various actions the user could take or any input they might provide.
- 2- Anticipate virtually anything in terms of **input**, **access**, and **capability** while providing a reliable and accessible interface.
- 3- The more we can anticipate and plan for in design, the more **resilient** the design will be.
- 4- Accept **variable** input from users, translating that input to meet your requirements, defining boundaries for input, and providing clear feedback to the user.

TESLER'S LAW



Tesler's Law, also known as The Law of Conservation of Complexity, states that for any system there is a certain amount of **complexity** which **cannot be reduced**.

- 1- All processes have a **core of complexity** that cannot be designed away and therefore must be assumed by either the **system** or the **user**.
- 2- Ensure as much as possible of the burden is lifted from users by dealing with inherent complexity during **design** and **development**.
- 3- Take care not to simplify interfaces to the point of **abstraction**.

HEURISTIC

AESTHETIC - USABILITY EFFECT



Users often perceive **aesthetically pleasing** design as design that's more **usable**.

- 1- An aesthetically pleasing design creates **a positive response** in people's brains and leads them to believe the design actually works better.
- 2- People are more **tolerant** of minor usability issues when the design of a product or service is aesthetically pleasing.
- 3- Visually pleasing design can mask usability problems and prevent issues from being discovered during usability testing.

FITTS'S LAW



The time to acquire a target is a function of the **distance** to and **size** of the target.

- 1- **Touch targets** should be **large** enough for users to accurately select them.
- 2- **Touch targets** should have ample **spacing** between them.
- 3- **Touch targets** should be placed in areas of an interface that allow them to be **easily acquired**.

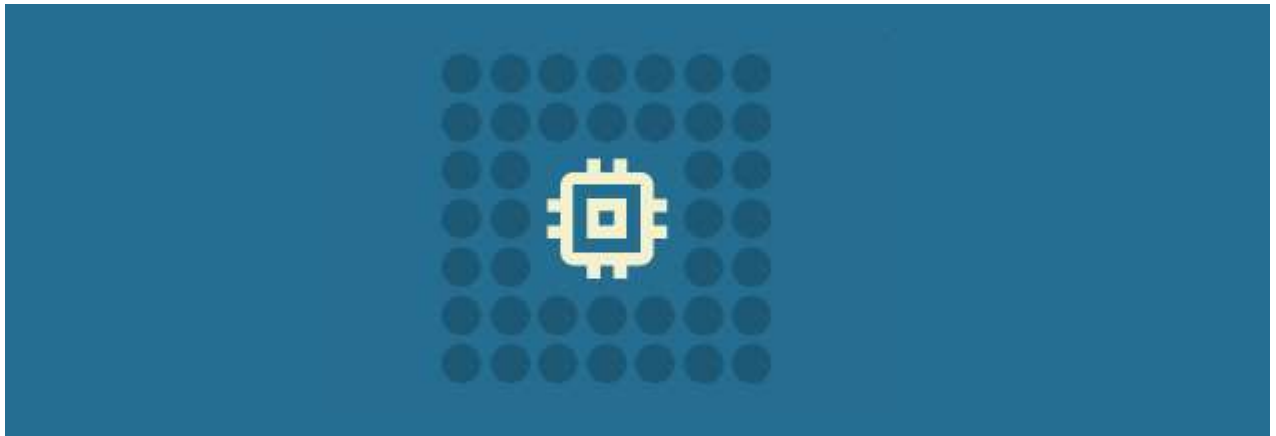
GOAL - GRADIENT EFFECT



The tendency to approach a goal increases with proximity to the goal. This effect is linked to the *Endowed progress effect*.

- 1- The **closer** users are to completing a task, the **faster** they work towards reaching it.
- 2- Providing **artificial progress** towards a goal will help to ensure users are more likely to have the motivation to complete that task.
- 3- Provide a **clear indication of progress** in order to motivate users to complete tasks.

HICK'S LAW



The time it takes to take a decision increases with the **number** and **complexity** of choices.

- 1- **Minimize** choices when response times are critical to increase decision time.
- 2- **Break** complex tasks into smaller steps in order to decrease cognitive load.
- 3- Avoid **overwhelming** users by highlighting recommended options.
- 4- Use **progressive onboarding** to minimize cognitive load for new users.
- 5- Be careful not to simplify to the point of **abstraction**.

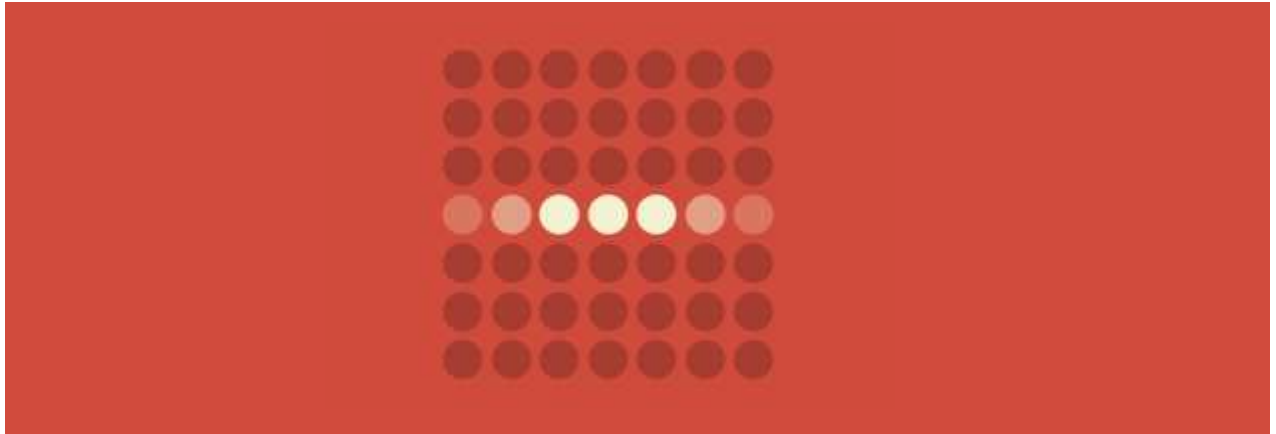
JAKOB'S LAW



Users spend most of their time on **other sites, using other products and software**. This means that users prefer your site / product / software to work the same way as all the other sites they already know.

- 1- Users will **transfer expectations** they have built around one familiar product to another that appears similar.
- 2- By leveraging existing mental models, we can create superior user experiences in which the users can focus on **their tasks** rather than on learning new models.
- 3- When making changes, minimize discord, confusion, trouble, complexity... by empowering users to continue using a familiar version for a limited time.

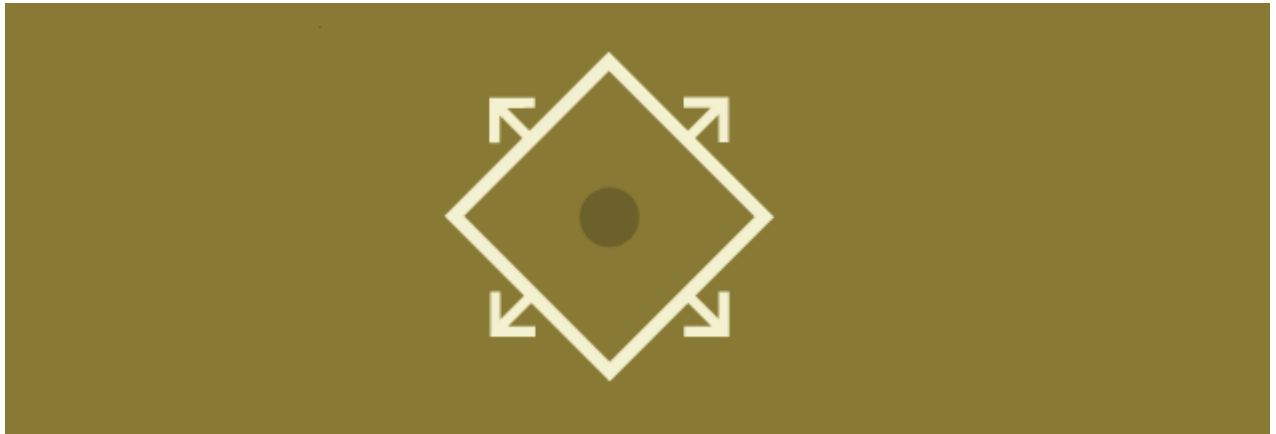
MILLER'S LAW



The average person can only keep 7 (plus or minus 2) items in their working memory.

- 1- Don't use the "magical number seven" to justify unnecessary design limitations.
- 2- Organize content into **smaller chunks** to help users process, understand, and memorize easily.
- 3- Remember that short-term memory capacity will vary per individual, based on their **prior knowledge** and **situational context**.

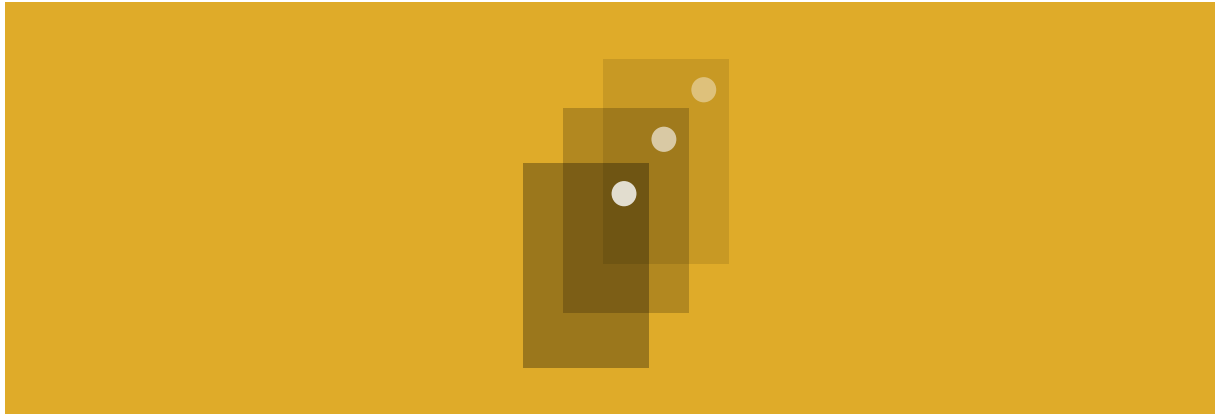
PARKINSON'S LAW



Any task will inflate until all of the available time is spent.

- 1- Limit the time it takes to complete a task to what users expect it'll take.
- 2- Reducing the actual duration to complete a task from the expected duration will improve the overall user experience.

SIMON & STROOP EFFECTS



Simon Effect refers to the finding that reaction times are usually faster, and reactions are usually more accurate, when the stimulus occurs in the **same relative location** as the response, even if the stimulus location is irrelevant to the task.

While **Stroop effect** occurs when a behavior or skill no longer requires direct interaction, cognitive psychologists say it is **automatized**.

In other words, when you first learned to tie your shoelaces, you needed to think carefully through each step of the process. Now, you probably do not even think about the steps, but simply initiate a series of movements that proceed without any further influence.