

26 Geometric Aesthetics

Monday, April 17, 2023

Today:

Ari Matrajt | Achille Castiglioni Industrial Design

- Geometric Aesthetics
 - Symmetry
 - Area Alignment
 - Rule of Thirds
 - Fibonacci
 - Golden Ratio

Yes, we'll take an eclipse break at 12:28.

Geometric Aesthetics

Classical Composition

Much comes from classical painting composition, dating far back. These rules are made to be broken.

Rules are empirical, not supported by science.

https://en.wikipedia.org/wiki/Composition_%28visual_arts%29

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3	Compositional techniques
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Modern implementation in 2D graphic design, part of **Human-Computer Interface (HCI)** research
Ware, Colin. *Visual Thinking For Design*. Morgan Kaufmann, 2010. Whole pdf in our AesDes Zotero library

Table of contents: http://www.amazon.com/Visual-Thinking-Kaufmann-Interactive-Technologies/dp/0123708966#reader_0123708966

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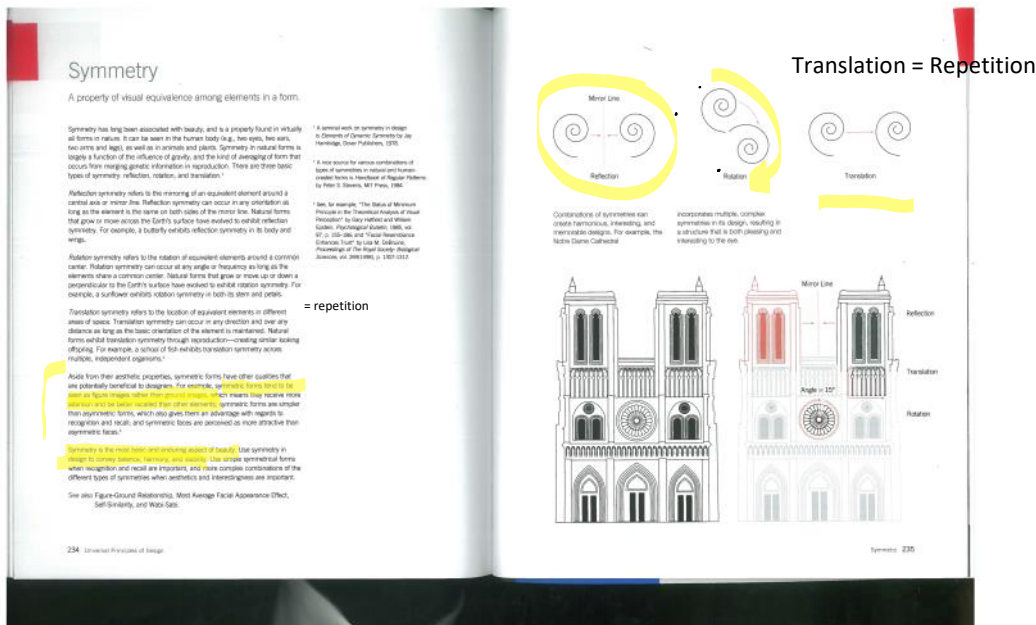
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Universal Principles of Design topics



Good symmetry works. Asymmetry works. Broken symmetry is tricky.

Area Alignment

Alignment based on the area of elements versus the edges of elements.

With the advent of professional design and engineering software, elements in a design can be aligned with exacting precision. However, the alignment accepted by software is based on the edges of elements—including center alignment, which calculates a center based on the edges. This method works well when elements are relatively uniform and symmetrical, but less well when the elements are ununiform and asymmetrical. In those latter cases, it is preferable to align based on the visual weight or area of the elements, a technique that must be performed using the designer's own judgment. Using edge alignment when area alignment is called for is one of the most common errors in graphic design.

A satisfactory area alignment can be achieved by positioning an object along the axis of alignment such that an equal amount of area or visual weight hangs on either side—if the object had mass, it would be balanced on the axis. Unlike the straight edge achieved by left- or right-aligning similar elements based on their edges, alignment based on area invariably creates a tapered edge. This means that parts of elements hang in the gutters or margins when aligned with strongly rectangular elements, but it represents the conceptual (and/or perceived) alignment that can be achieved for morphologically dissimilar elements.

The principle applies to text as well as graphical elements. For example, the horizontal center of a left-aligned text column with a right-aligned edge, based on its area, would be to the left of a horizontal center based on its width—area alignment calculates the horizontal center in consideration of the reduced area of the tapered right edge, moving the horizontal center to the left, whereas edge alignment simply calculates the horizontal center as though the text chunk were a rectangle, with the right edge being closer to the right margin. Other common text examples include pull quotes, which should be aligned based on the text edge and not on the subheader margin, and numbered or bulleted items, which should be aligned based on the text edge and not on the numbers and bullets, unless the specific intent is to subordinate the bulleted items.

Consider area alignment when incorporating dissimilar elements into a composition. When objects are simple and symmetrical, edge-based alignment on their edges, otherwise, align based on their areas. Unless there is some extraordinary overriding consideration, when using pull quotes, hang numbers and bullets when using items, except when the intent is to subordinate.

See also Alignment, Good Continuation, and Uniform Connectedness.

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Centers aligned based on edges

Centroid aligned



The left column is center aligned based on the edges of the subjects. The right column is center aligned based on the areas of the subjects. Note the improvement achieved by using area alignment.

Area Alignment 31

Rule of Thirds

A technique of composition in which a medium is divided into thirds, creating aesthetic positions for the primary elements of a design.

The rule of thirds is a technique derived from the use of early grid systems in composition. It is applied by dividing a medium into thirds both vertically and horizontally, creating a grid of nine rectangles and four intersections. The primary elements within a design is then positioned on an intersection of the grid. The aesthetics of the resulting composition is interesting to look at, and generally agreed to be aesthetic.

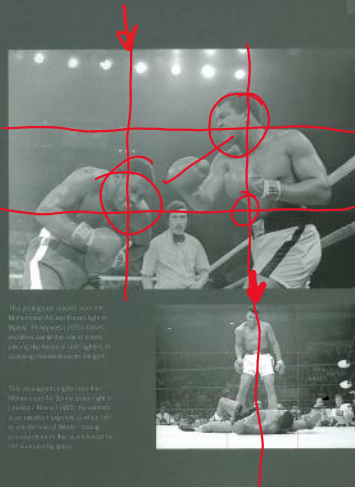
The technique has a long following in design circles due to its use by the Renaissance masters and its rough relationship to the golden ratio. Although making a design into thirds yields a ratio different from the golden ratio (i.e., the 2/3 section = 0.666 versus golden ratio = 0.618), the users of the technique may have decided that the simplicity of its application compensated for its rough approximation.

The rule of thirds generally works well, is easy to apply, and should be considered when composing elements of a design. When the primary element is so strong as to overwhelm the composition, consider centering the element rather than using the rule of thirds—especially when the strength of the primary element is reinforced by the surrounding elements or space. If the surrounding elements or space do not reinforce the primary element, use the rule of thirds and add a secondary element (shown as a counterpoint) to the opposing intersection of the primary element to bring the composition to balance. In designs where there is a strong vertical or horizontal element, it is common practice to align the element along one of the grid lines of corresponding orientation.

See also Alignment, Golden Ratio, and Symmetry.

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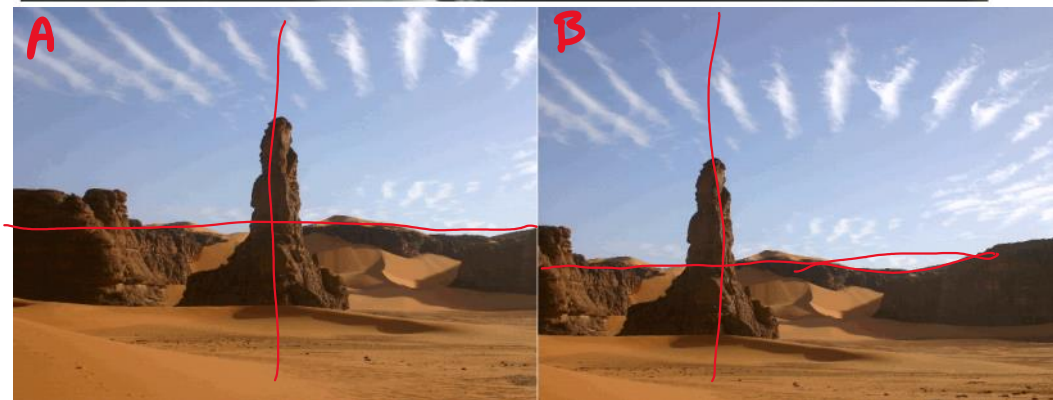
1 See *Principles of Gestalt Psychology*.
2 See *Introduction to Composition*.
3 *Design and Composition* by Herbert A. Gregory, Prentice-Hall, 1963.



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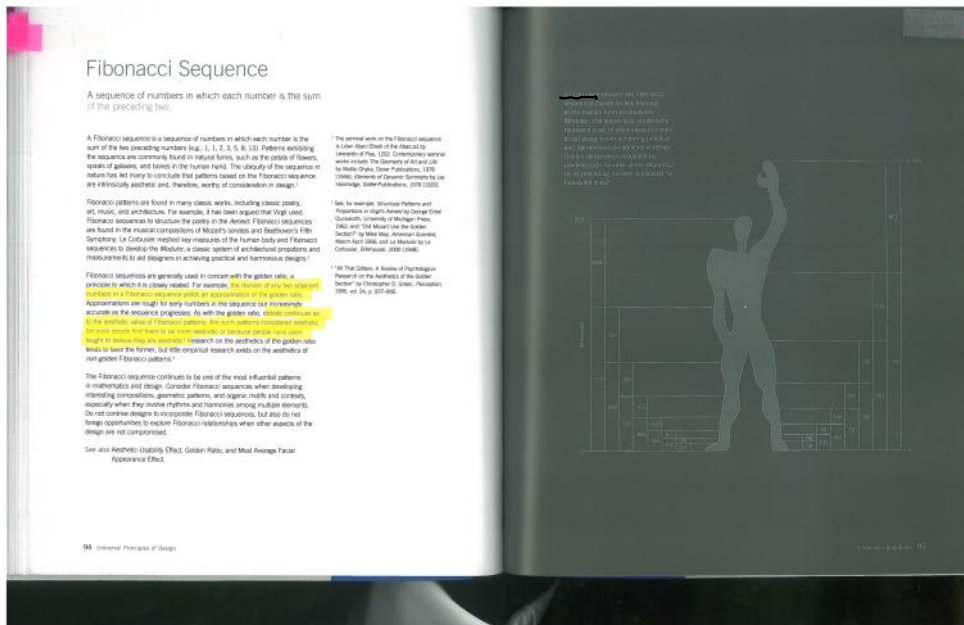
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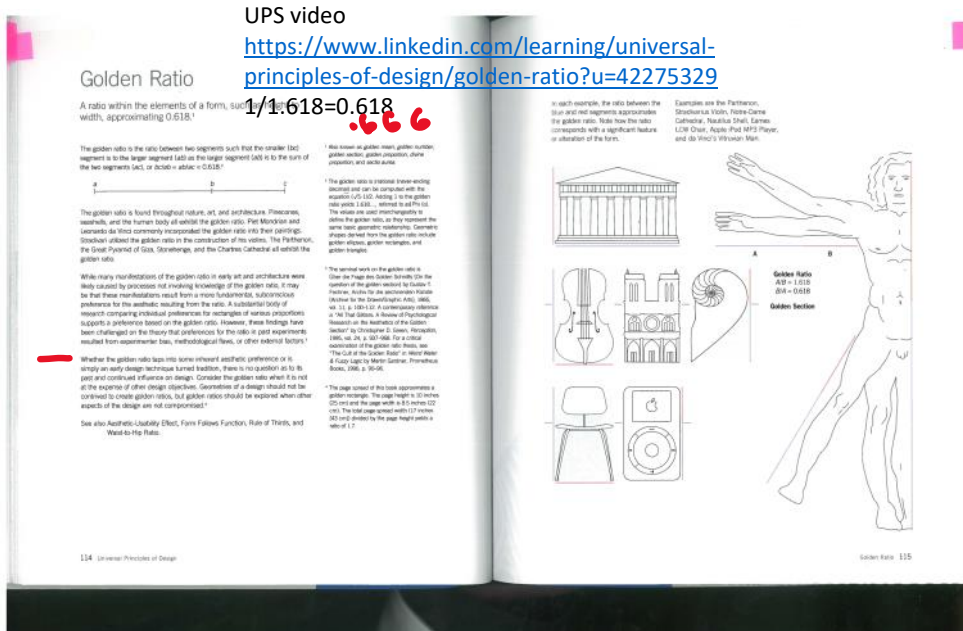
https://en.wikipedia.org/wiki/Rule_of_thirds#/media/File:RuleOfThirds-SideBySide.gif

The rule of thirds was first written down by John Thomas Smith in 1797.



<https://soundcloud.com/robertinventor/fibonacci-rhythm-no-bar>
<https://www.facebook.com/david.canright.1/videos/vb.1534748873/10205137603829769/?type=2&theater> Music with both pitches and rhythm determined by Fibonacci series

<https://www.youtube.com/watch?v=RjM8AaNSjH&index=1&list=PLC1VCzU4q6ohKrlZAscdjylx-gimPul2x> How to draw a Fibonacci spiral



UPS video
<https://www.linkedin.com/learning/universal-principles-of-design/golden-ratio?u=42275329>

$1/1.618 = 0.618$



In each example, the ratio between the blue and red segments approximates the golden ratio. Note how the ratio corresponds with a significant feature or dimension of the form.

Examples are the Parthenon, Stravinsky's Violin, Pierre Curie Cathedral, Neutro Chair, Lamesa, L'Or Chair, Apple iPod MP3 Player, and Da Vinci's Vitruvian Man.

The golden ratio is rational because dividing the ratio of the golden ratio by the golden ratio yields 1.000, which is a rational number. The ratio is also irrationally to define the golden ratio, as they represent the same basic geometric relationship. Geometric shapes based on the golden ratio include golden ellipses, golden rectangles, and golden spirals.

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Golden Ratio
 $AB/BC = AC/AB$
 $AB = 0.618$
 $BC = 0.618$

Golden Section

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