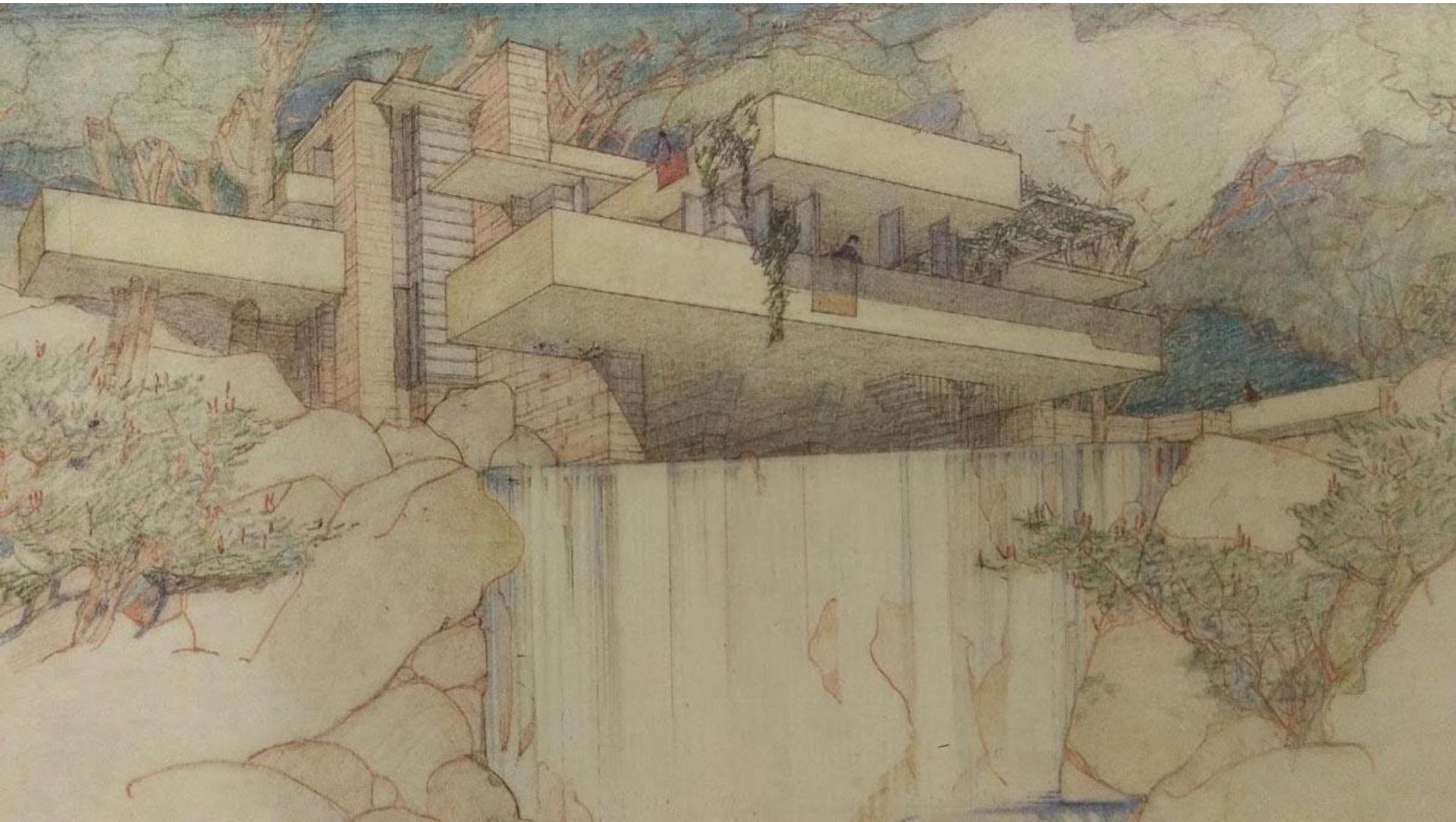


INTD 25 Module 1- Form and Space

Based on Chapters 1,2- Architecture: Form, Space, Order by Francis DK Ching

Frank Lloyd Wright, Falling Water, Illustration John H Howe 1937



OVERVIEW OF OBJECTIVES:

Terminology:

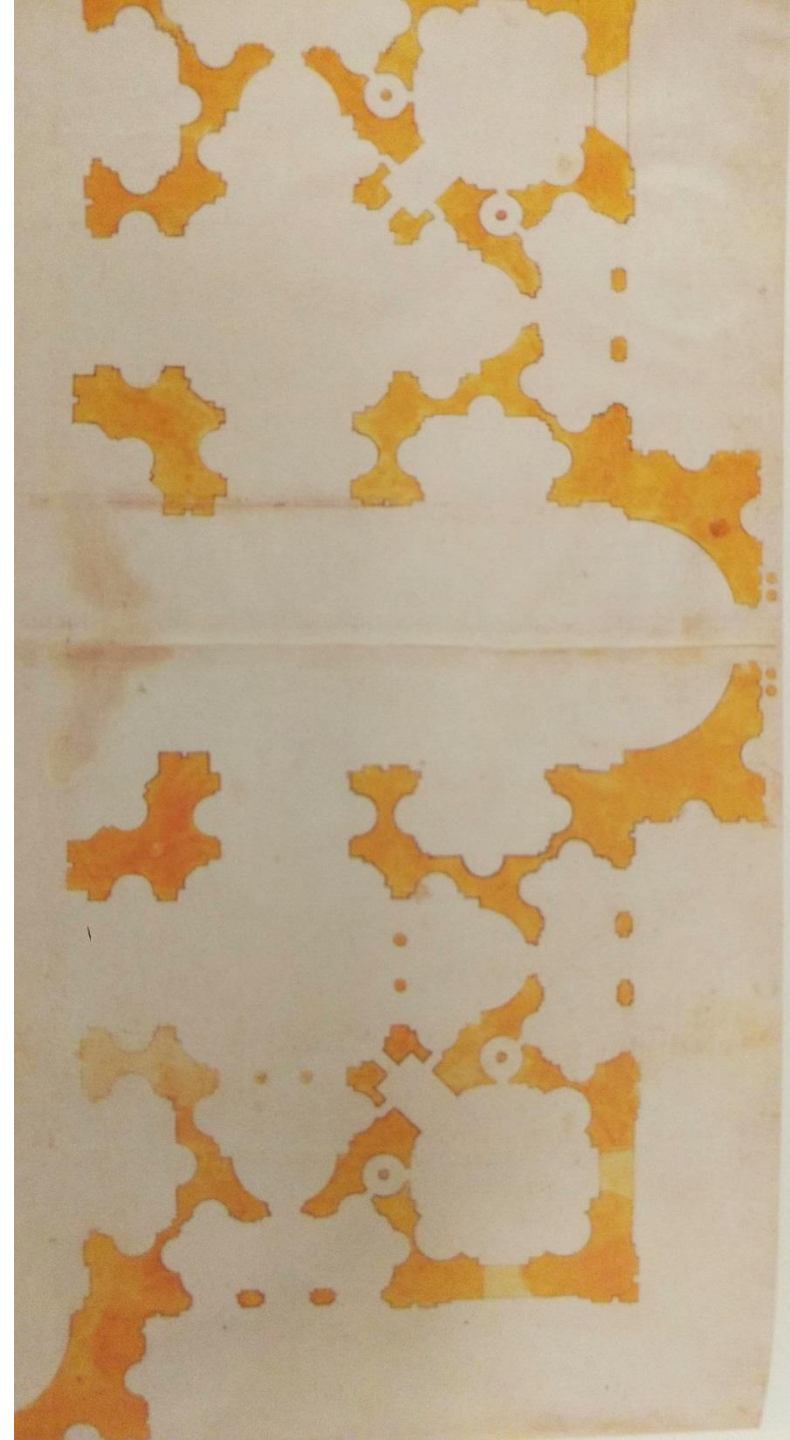
- POINT
- LINE
- PLANE
- VOLUME

CONSTRUCTION OF
FORM

- SHAPE
- SIZE
- REGULARITY
- TRANSFORMATION
- SUBTRACTIVE
- ADDITIVE
- MASS/VOID

QUALITIES OF FORM

Solid and Void Drawing in Plan by Donato Bramante St. Peter's Basilica 1505

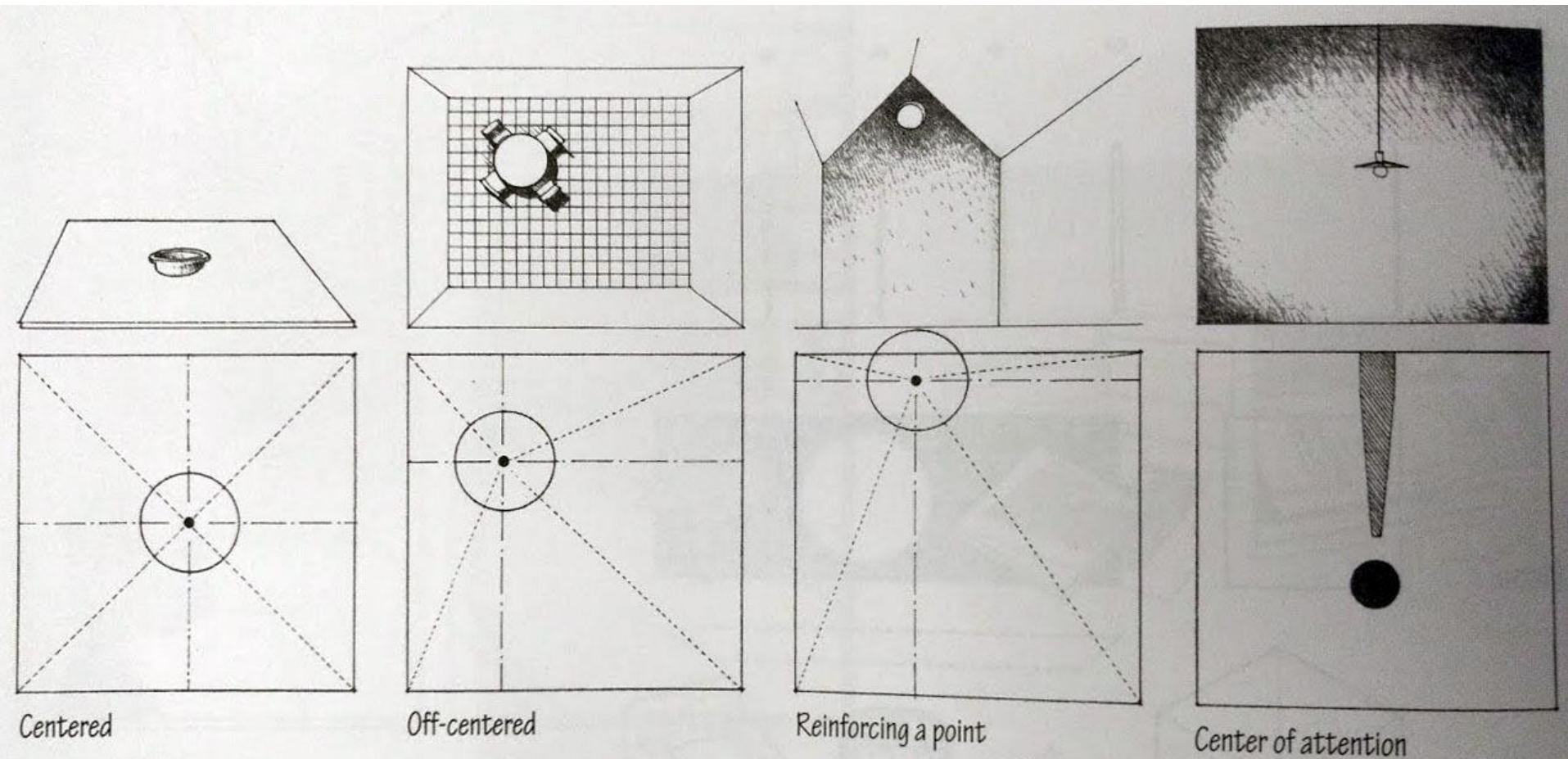


POINT

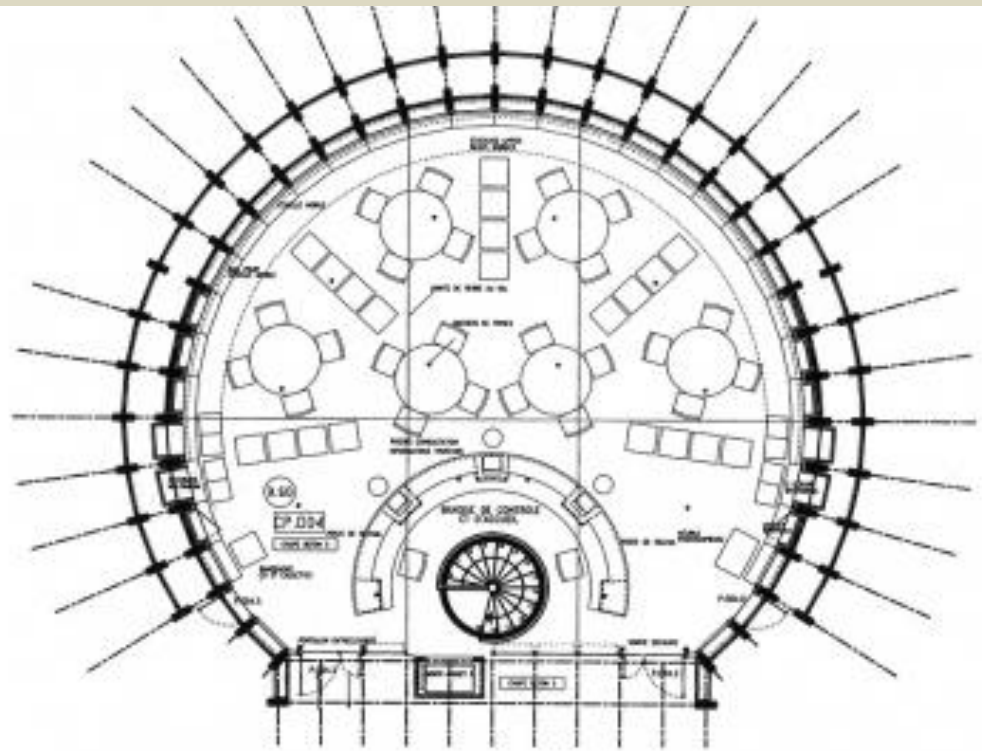
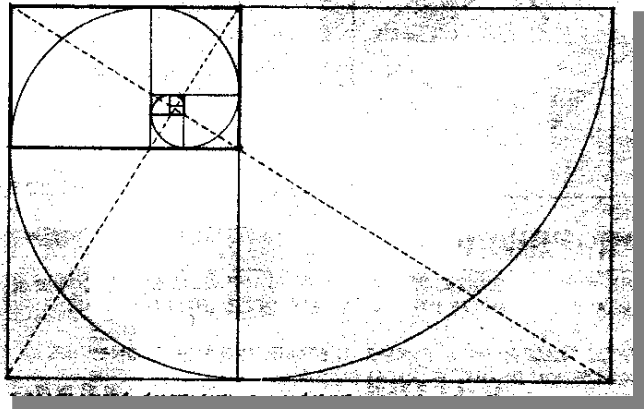
Points mark a location in space.

When at the center it is stable and at rest.

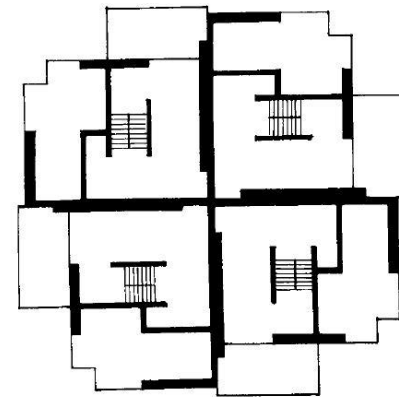
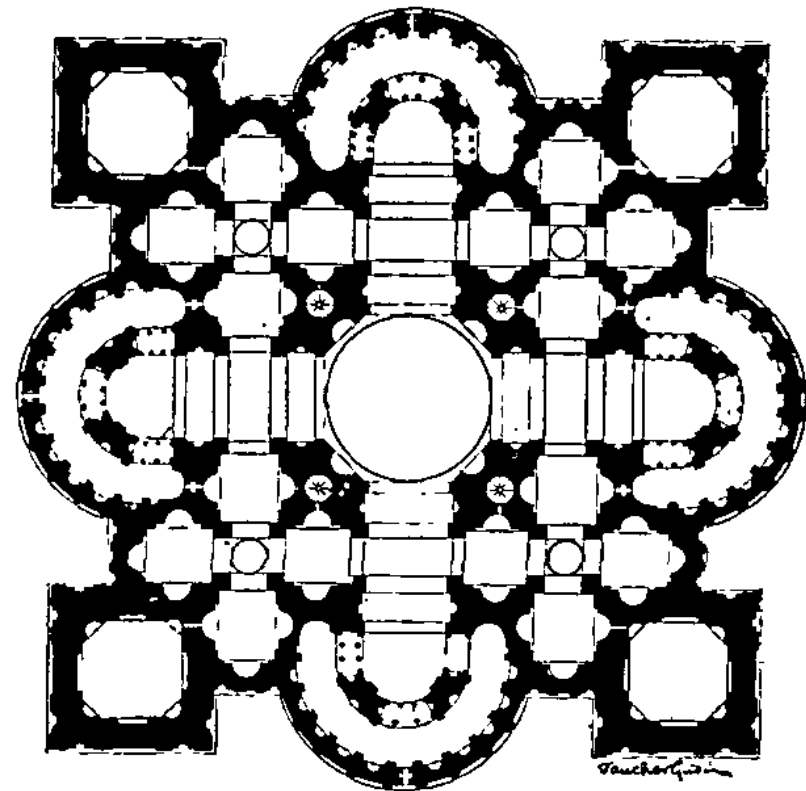
As it moves off center it becomes more dynamic.



POINT IN PLAN



Centre Culturel Jean-Marie Tjibaou / Renzo Piano



POINT IN ELEVATION



Invisible points in the sky→



LINE

Lines are created by the connection of two or more points.

Expresses movement, direction and growth. Vary in weight, contour and texture. Define shapes, can create patterns, can be implied by volumes.

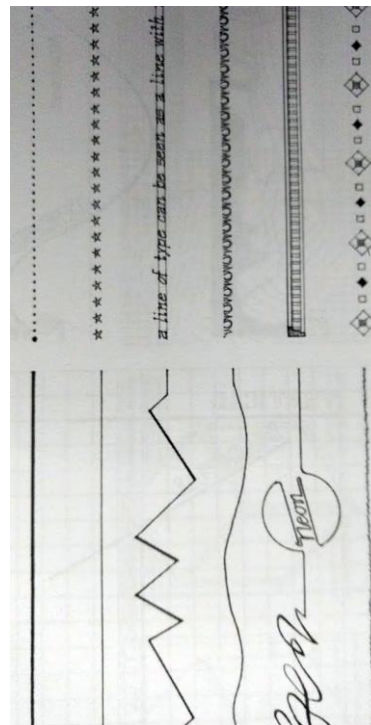
Horizontal lines- stability, repose

Vertical lines- equilibrium with gravity

Diagonal lines- dynamic, active

Curved lines- gentle movement, playful, energy, patterns of biological growth.

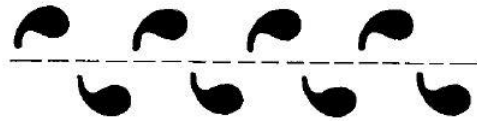
LINES IMPLIED ON
THIS SCULPTURE
BY RICHARD SERRA



LINE IN PLAN

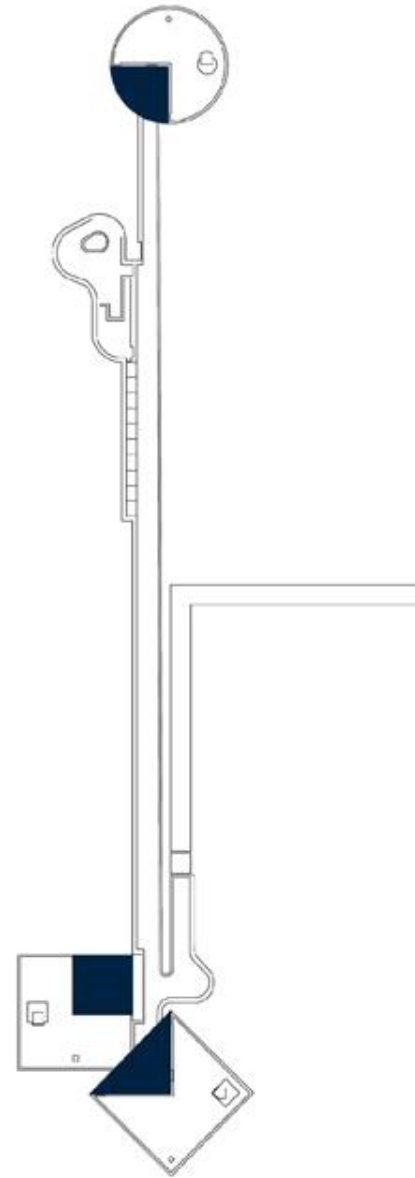
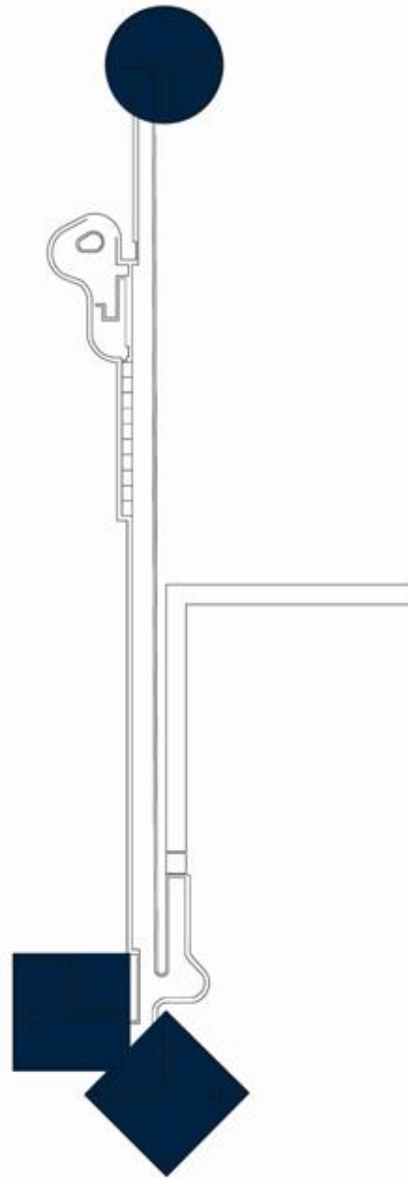


t



tg

House 10 and Diamond House B by John Hejduk



LINE IN ELEVATION



[Jouin Manku](#)'s ground-up annex for the Hôtel des Berges in Illhaeusern, France, 2017



<https://www.dezeen.com/2019/02/04/shigeru-ban-shishi-iwa-house-boutique-hotel-japan/>
Shigeru Ban Shishi Iwa Hotel

PLANE

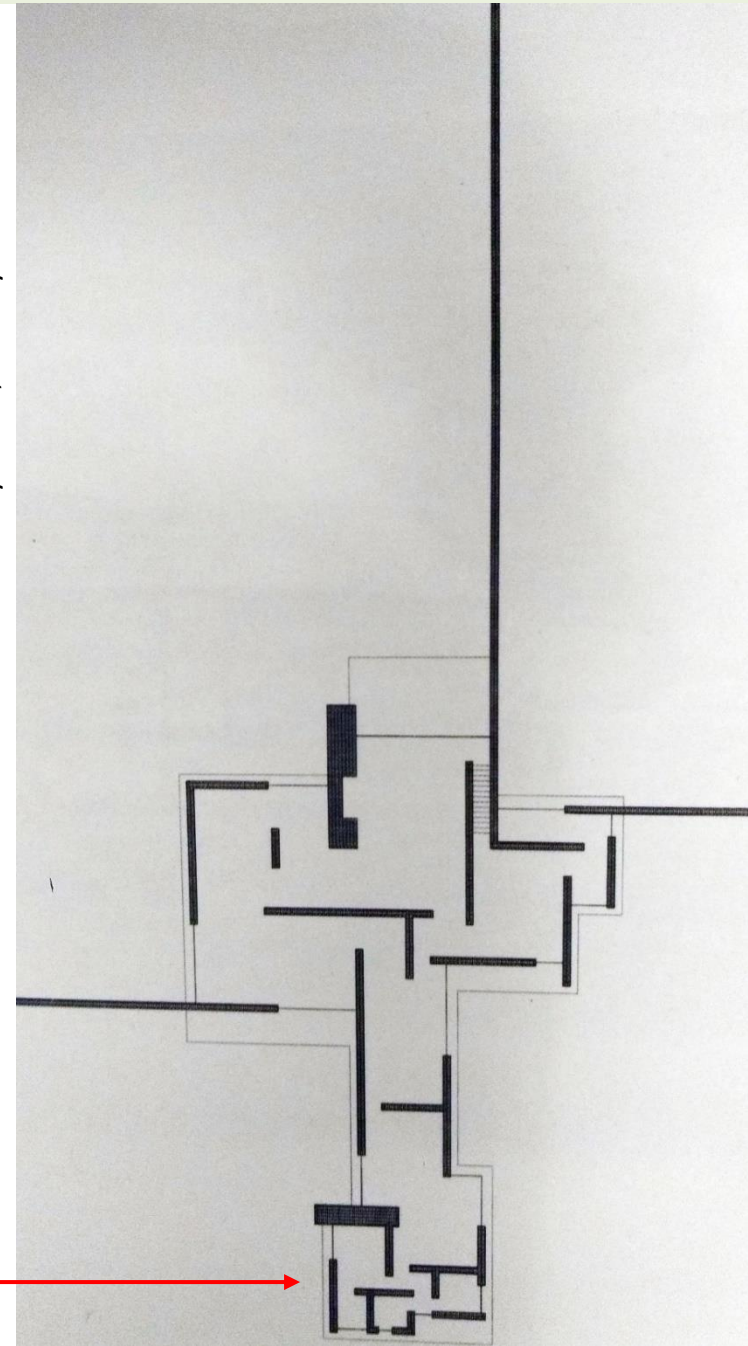
Plane is dimensional elements with width and height, but no PERCEPTABLE depth. Primary planes are usually floors, walls, ceilings and they begin to describe **ENCLOSURE**

Orthogonal- 90 degrees to the ground, each other, and usually distinguishable

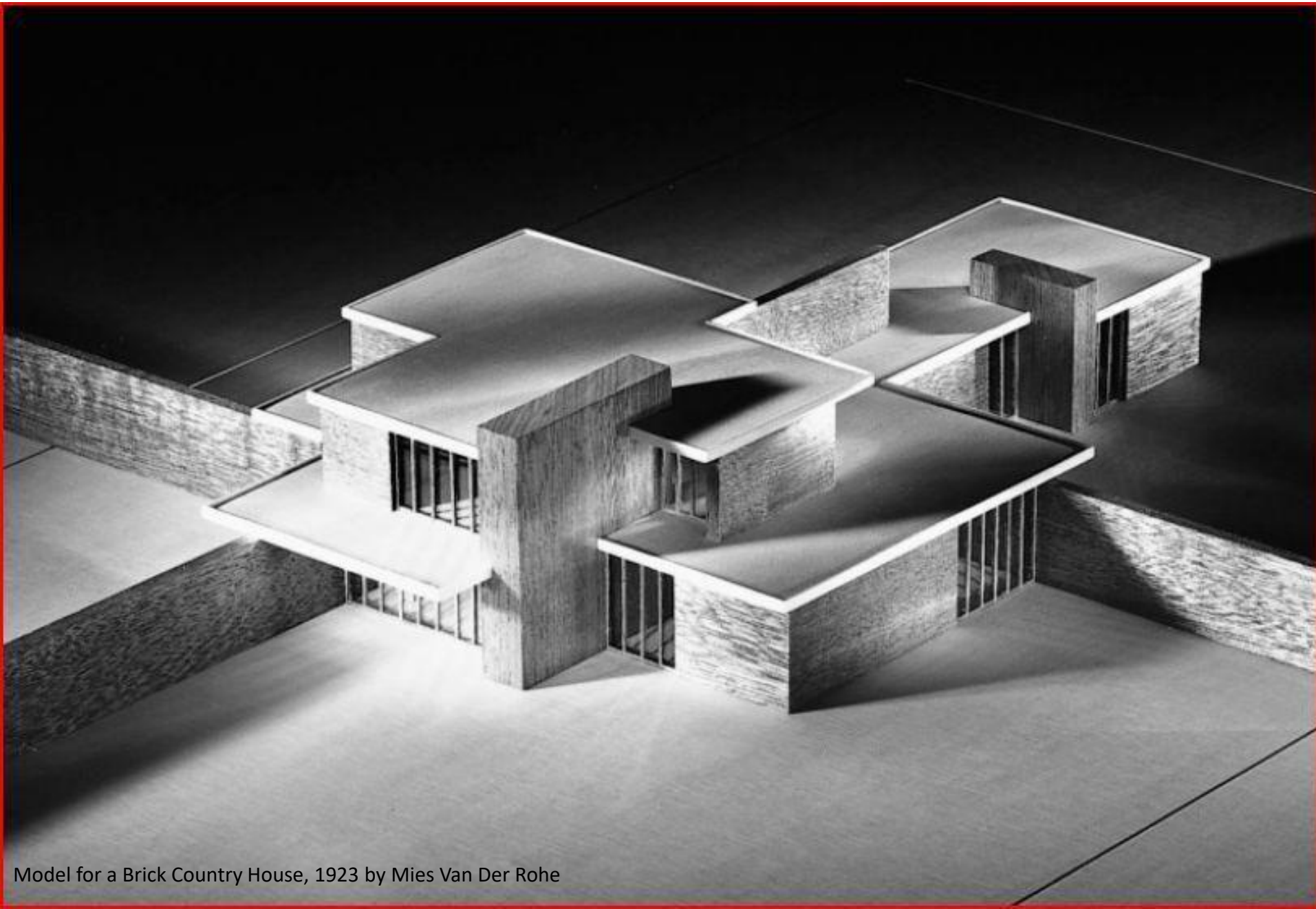
Curvilinear and Wrapping- elements of floor, ceiling and wall all blended together to create enclosure

Planes in PLAN can read as lines

Plan for a Brick Country House, 1923 by Mies Van Der Rohe

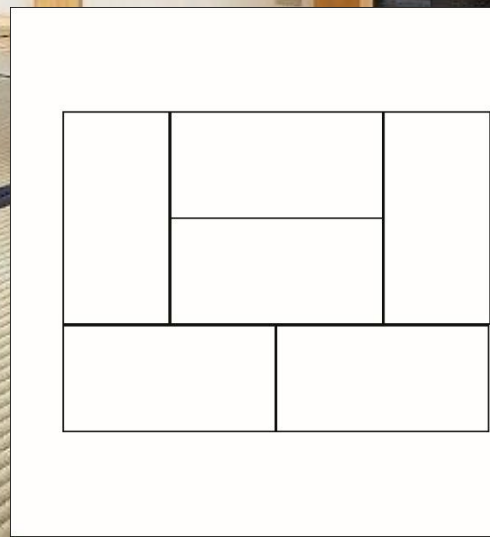


PLANE-WALL



Model for a Brick Country House, 1923 by Mies Van Der Rohe

PLANE- FLOOR



PLANE- CEILING



Farnsworth House, Mies van der Rohe, 1951

PLANE- WALL, FLOOR AND CEILING!?



<https://www.designboom.com/architecture/new-images-of-heydar-aliyev-center-by-zaha-hadid-11-14-2013/>

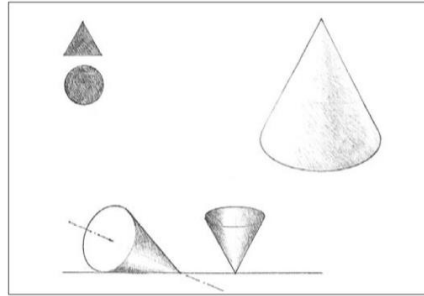
VOLUME

- Volume is a plane extended in the third dimension to make a form in 3D- length, width and depth
- Form is the primary identifying characteristic
- Duality: A volume can either be a portion of space defined by building elements **or** the quantity of space displaced by the entire mass of the building.

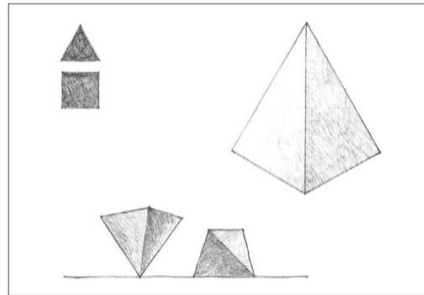


Primary Solids

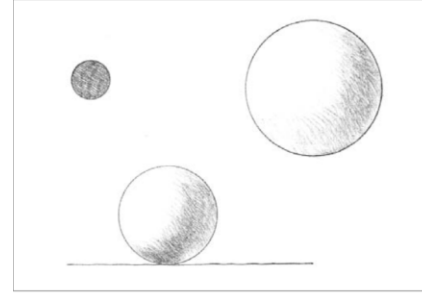
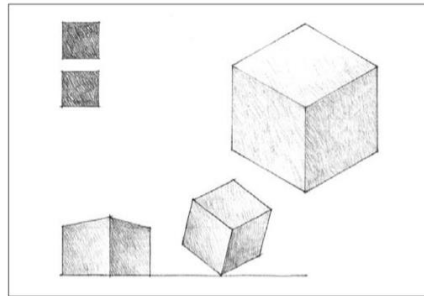
Cone A solid generated by the revolution of a right triangle about one of its sides. Like the cylinder, the cone is a highly stable form when resting on its circular base, and unstable when its vertical axis is tipped or overturned. It can also rest on its apex in a precarious state of balance.



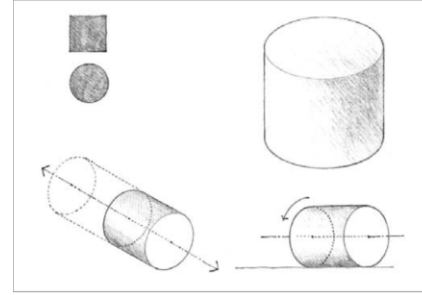
Pyramid A polyhedron having a polygonal base and triangular faces meeting at a common point or vertex. The pyramid has properties similar to those of the cone. Because all of its surfaces are flat planes, however, the pyramid can rest in a stable manner on any of its faces. While the cone is a soft form, the pyramid is relatively hard and angular.



Cube A prismatic solid bounded by six equal square sides, the angle between any two adjacent faces being a right angle. Because of the equality of its dimensions, the cube is a static form that lacks apparent movement or direction. It is a stable form except when it stands on one of its edges or corners. Even though its angular profile is affected by our point of view, the cube remains a highly recognizable form.



Sphere A solid generated by the revolution of a semicircle about its diameter, whose surface is at all points equidistant from the center. A sphere is a centralized and highly concentrated form. Like the circle from which it is generated, it is self-centering and normally stable in its environment. It can be inclined toward a rotary motion when placed on a sloping plane. From any viewpoint, it retains its circular shape.



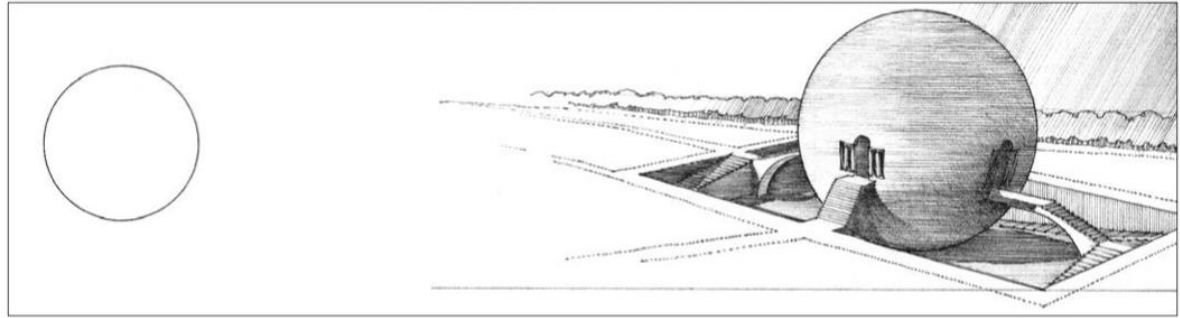
Cylinder A solid generated by the revolution of a rectangle about one of its sides. A cylinder is centralized about the axis passing through the centers of its two circular faces. Along this axis, it can be easily extended. The cylinder is stable if it rests on one of its circular faces; it becomes unstable when its central axis is inclined from the vertical.

VOLUME ELEMENTS

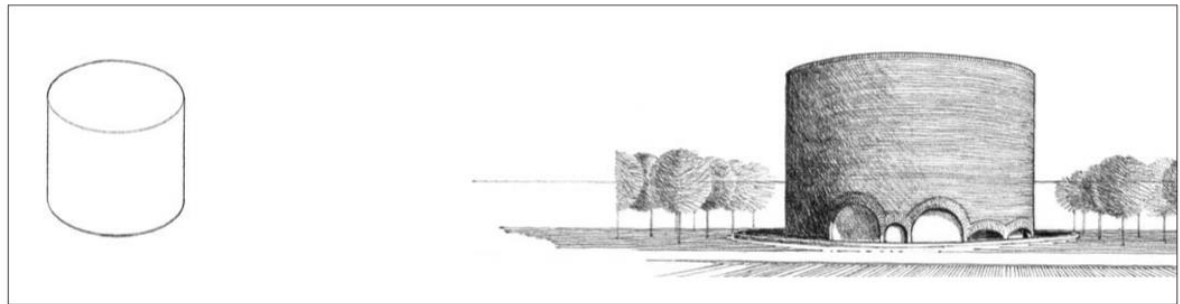
SPHERE

CYLINDER

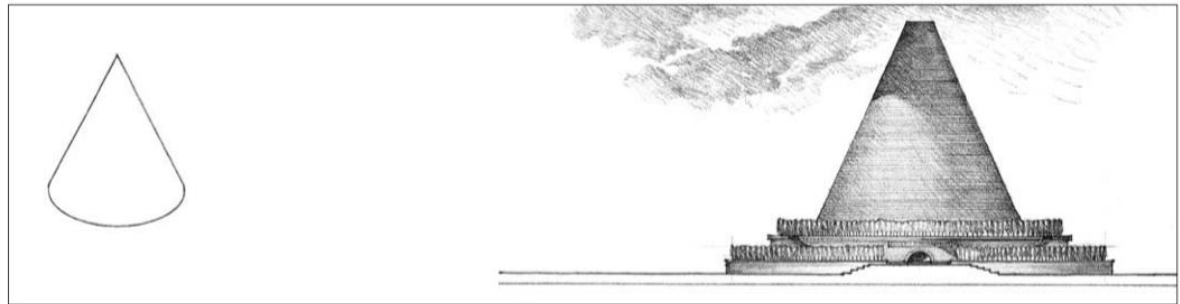
CONE



Maupertius, Project for an Agricultural Lodge, 1775, Claude-Nicolas Ledoux



Chapel, Massachusetts Institute of Technology, Cambridge, Massachusetts, 1955, Eero Saarinen and Associates

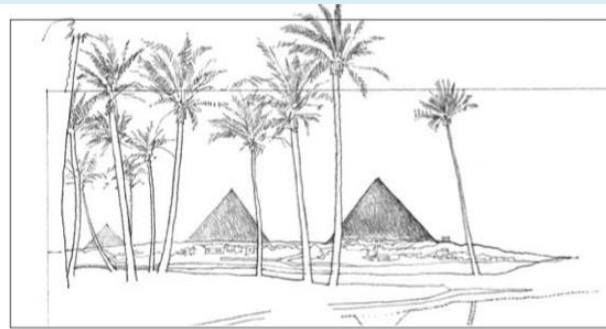


Project for a Conical Cenotaph, 1784, Étienne-Louis Boulée

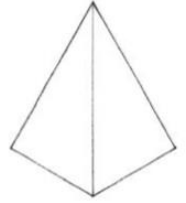
VOLUME ELEMENTS

PYRAMID

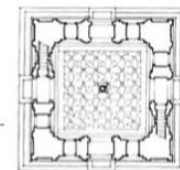
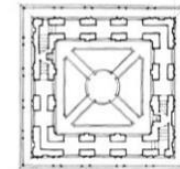
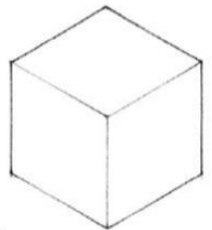
CUBE



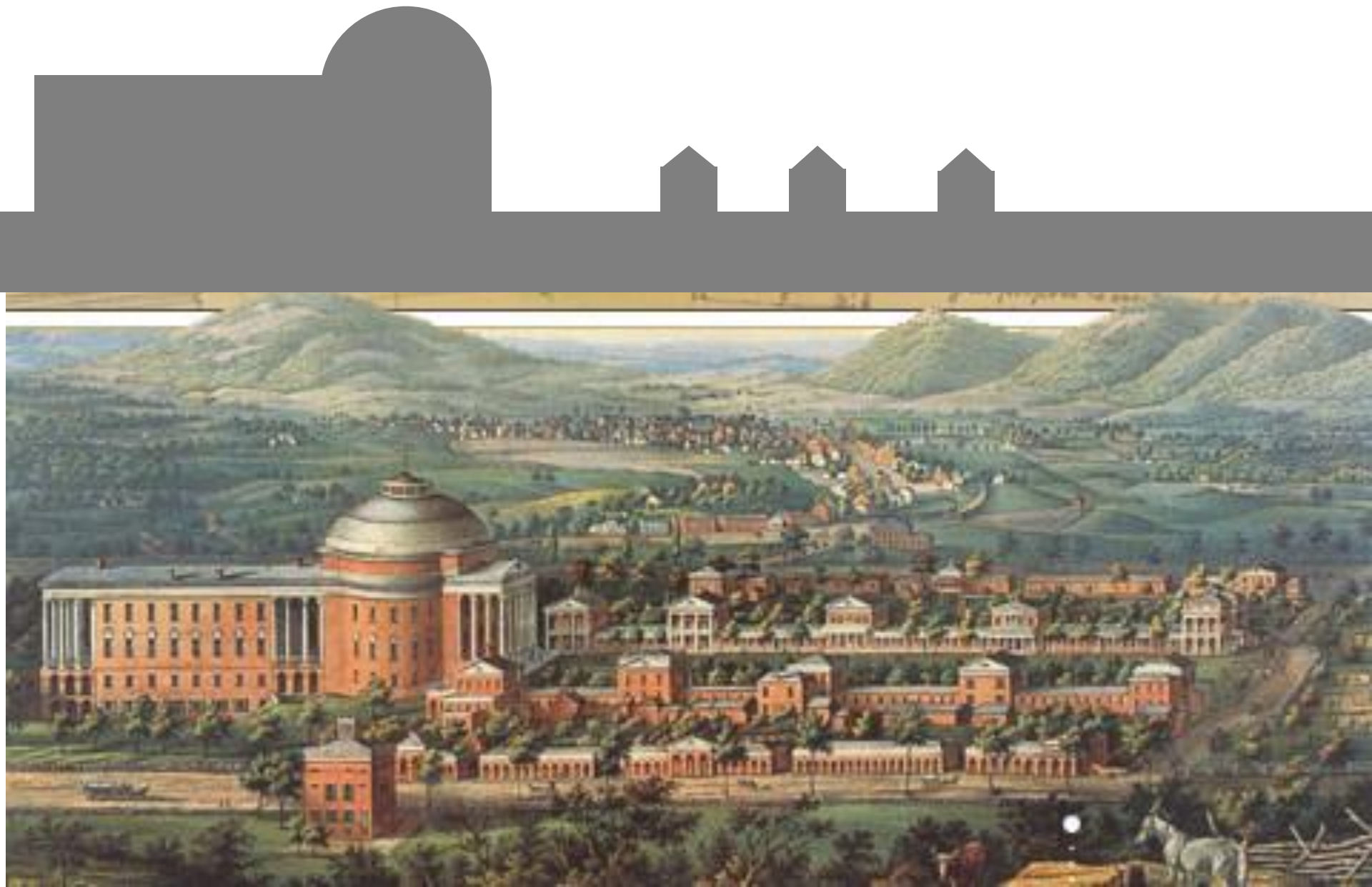
Pyramids of Cheops, Chephren, and Mykerinos at Giza, Egypt, c. 2500 B.C.



Diwan-i-Khas, Fatehpur Sikri,
Palace Complex of Akbar the Great
Mogul Emperor of India, 1569–74



VOLUME IN A LANDSCAPE



MASS + VOID

The unity of opposites that shapes architecture

Mass/Solid/Figures/Dark- **POSITIVE SPACE**

structure
furniture
walls

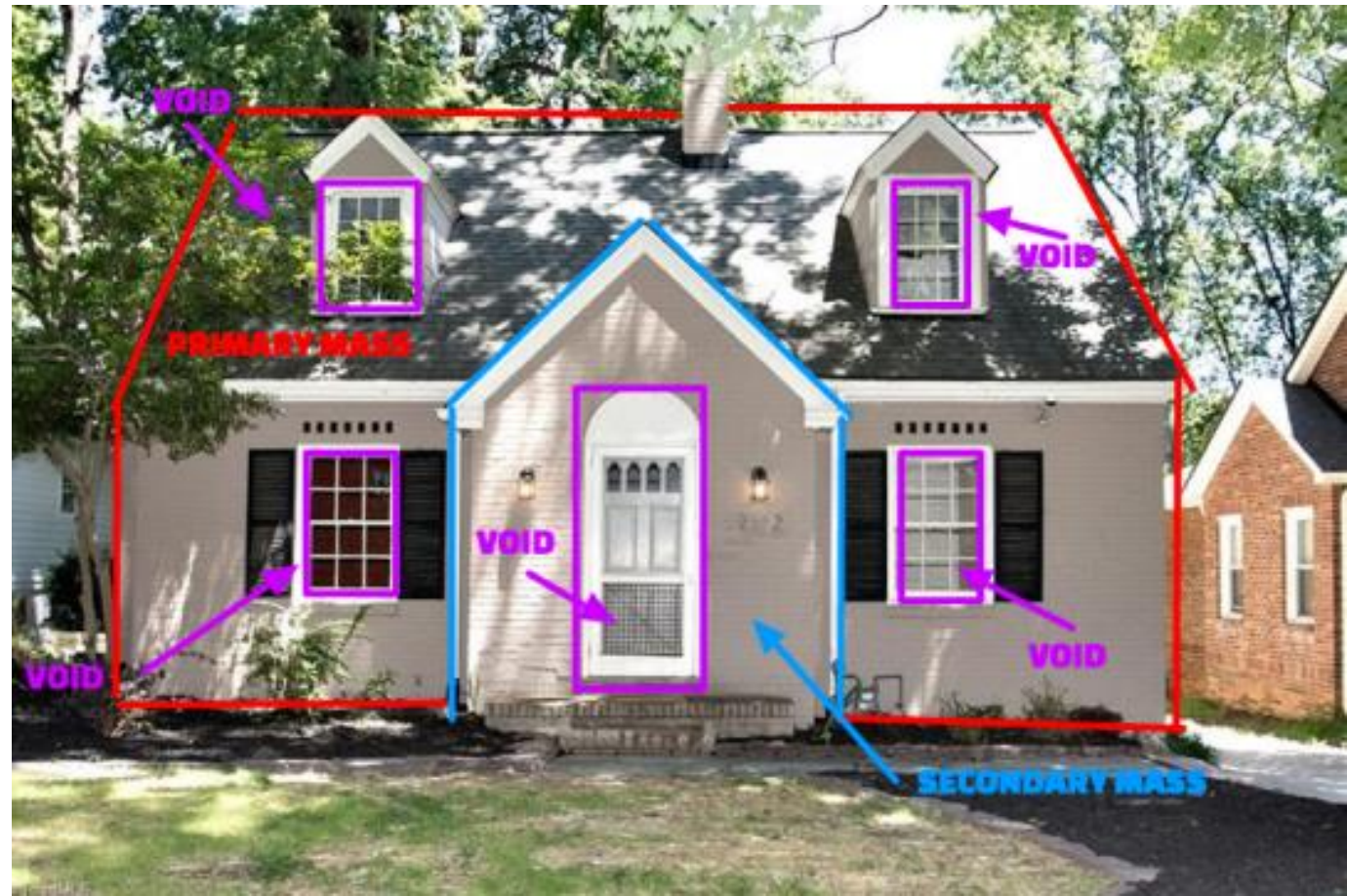
The space that envelops...

Void/Space/Ground/Light-
NEGATIVE SPACE

windows
doors
Attics

The space we inhabit...

www.mcmansionhell.com

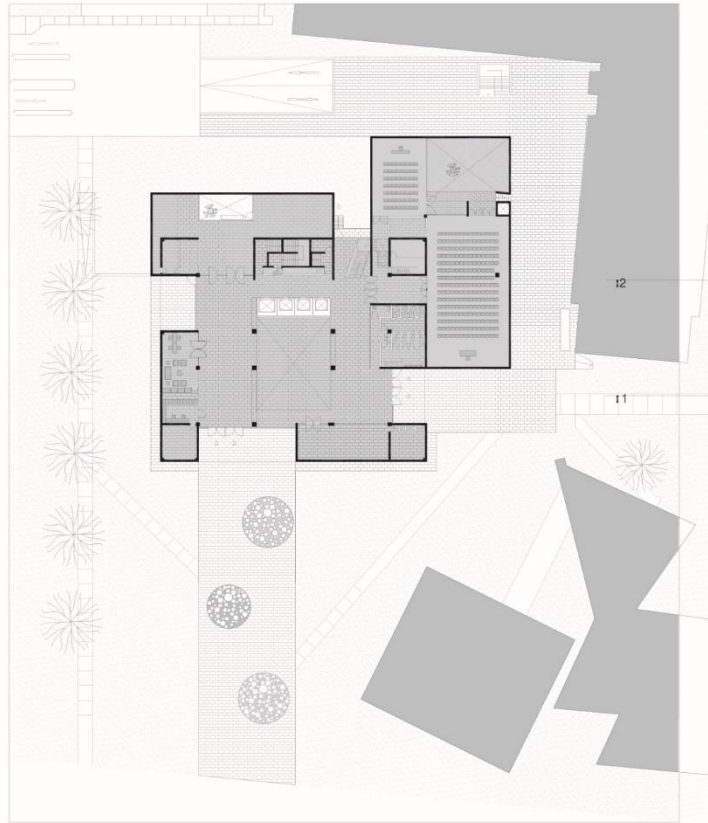


MASS + VOID



Luis Barragan, Barragan House, Mexico City

MASS + VOID



GROUND FLOOR PLAN - 1/500



[Elemental - alejandro aravena](#)

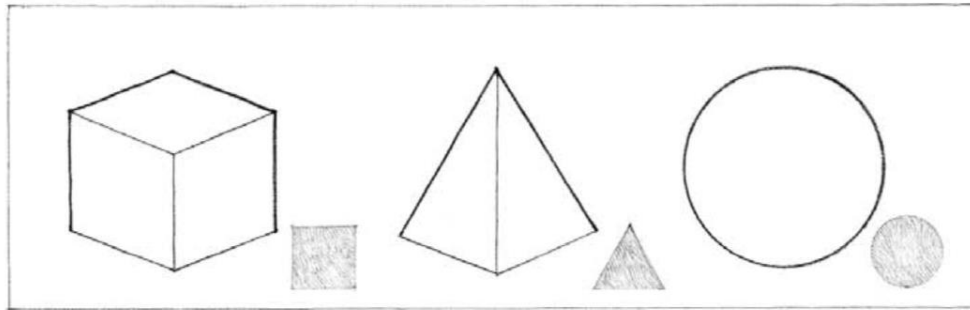
Centro de innovación uc anacleto angelini

MASS + VOID

Artist Michael Heizer



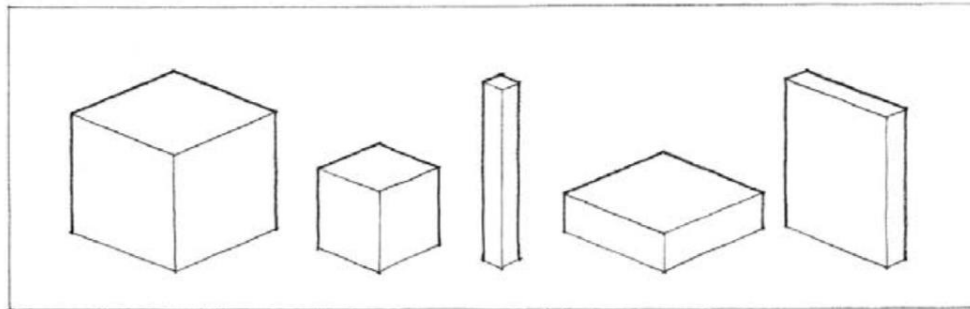
Form



Shape

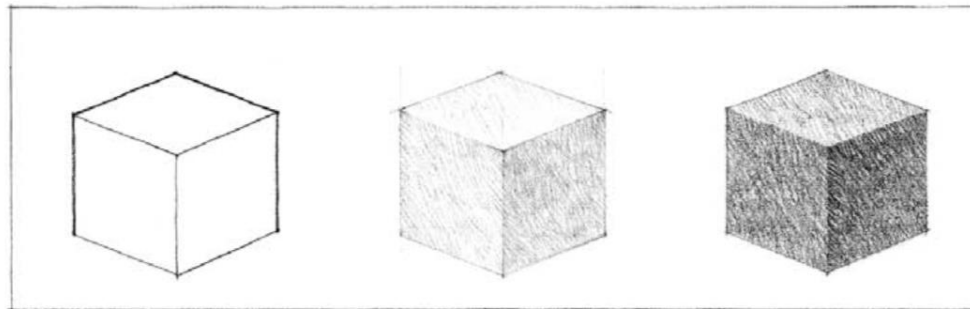
The characteristic outline or surface configuration of a particular form. Shape is the principal aspect by which we identify and categorize forms.

In addition to shape, forms have visual properties of:



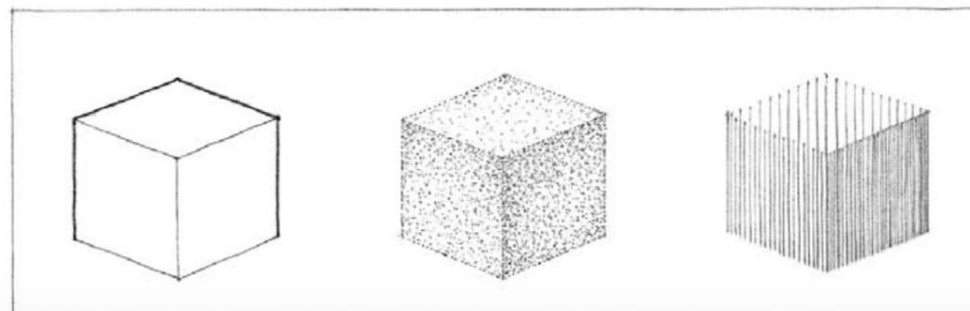
Size

The physical dimensions of length, width, and depth of a form. While these dimensions determine the proportions of a form, its scale is determined by its size relative to other forms in its context.



Color

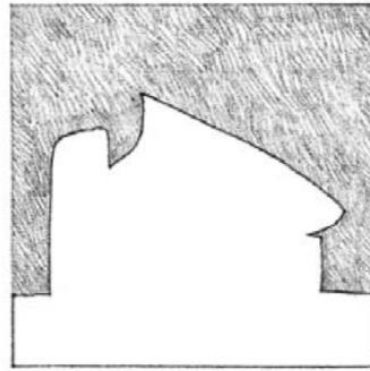
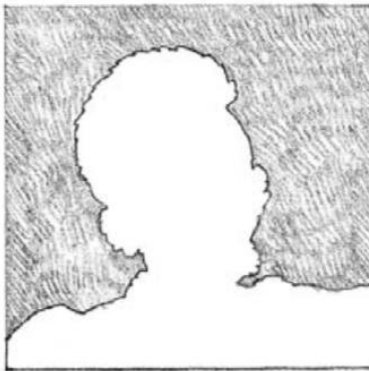
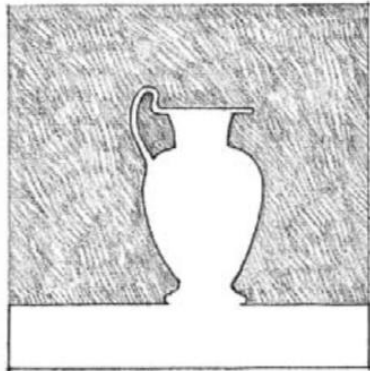
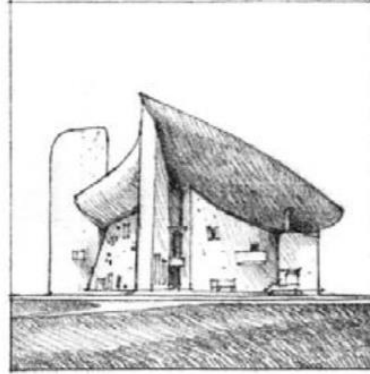
A phenomenon of light and visual perception that may be described in terms of an individual's perception of hue, saturation, and tonal value. Color is the attribute that most clearly distinguishes a form from its environment. It also affects the visual weight of a form.



Texture

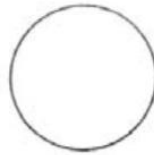
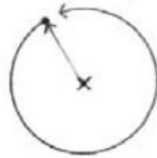
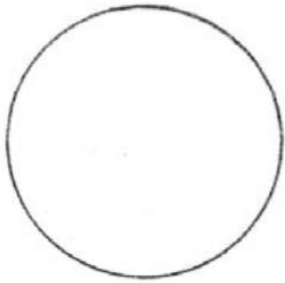
The visual and especially tactile quality given to a surface by the size, shape, arrangement, and proportions of the parts. Texture also determines the degree to which the surfaces of a form reflect or absorb incident light.

Shape



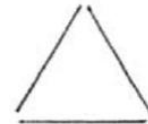
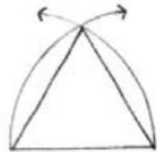
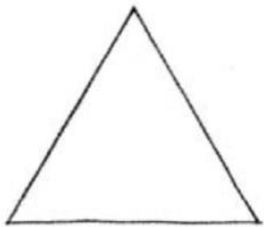
Shape refers to the characteristic outline of a plane figure or the surface configuration of a volumetric form. It is the primary means by which we recognize, identify, and categorize particular figures and forms. Our perception of shape depends on the degree of visual contrast that exists along the contour separating a figure from its ground or between a form and its field.

Primary Shapes



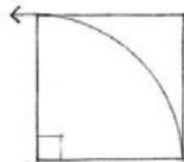
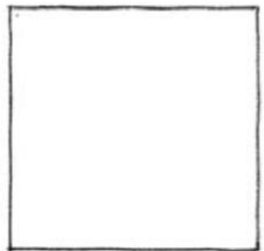
Circle

A plane curve every point of which is equidistant from a fixed point within the curve



Triangle

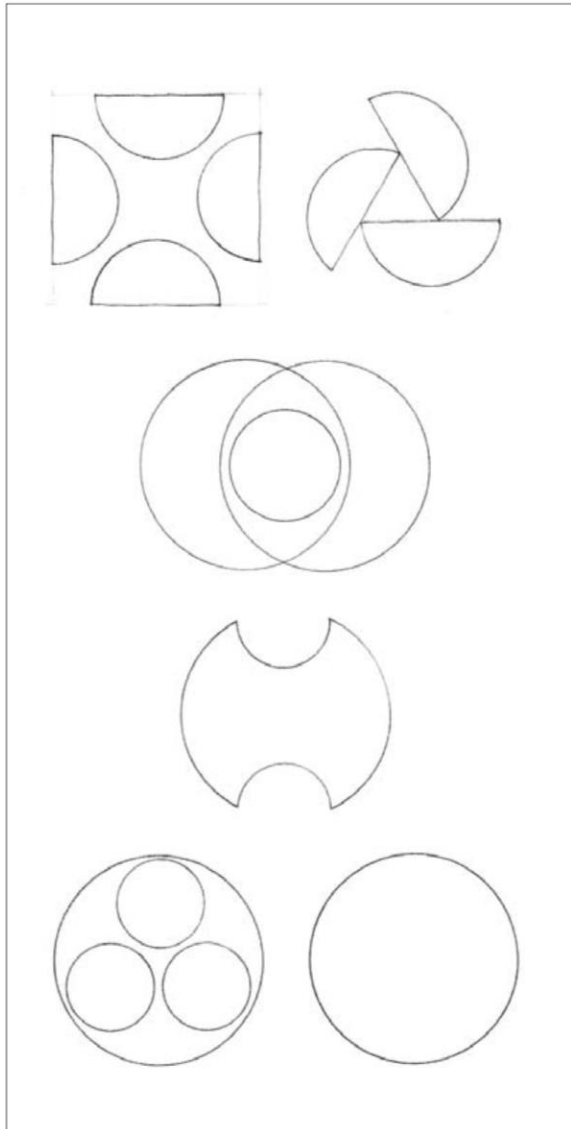
A plane figure bounded by three sides and having three angles



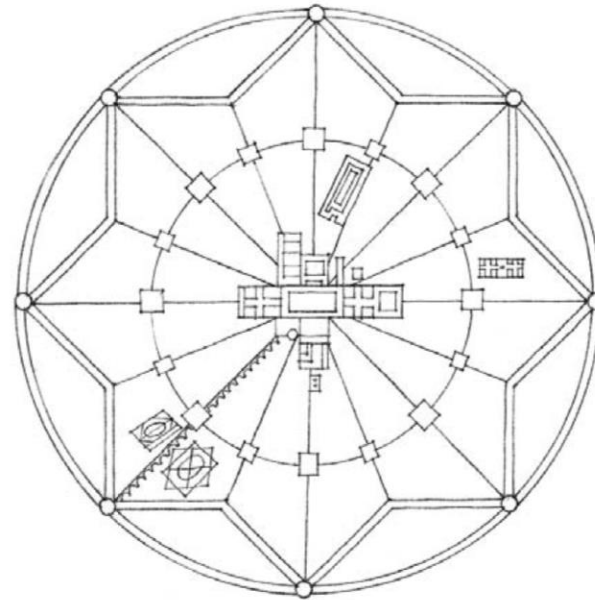
Square

A plane figure having four equal sides and four right angles

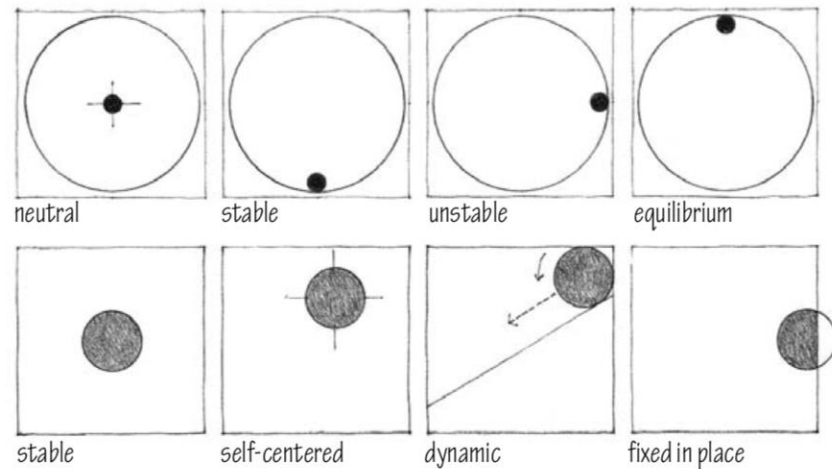
Circle



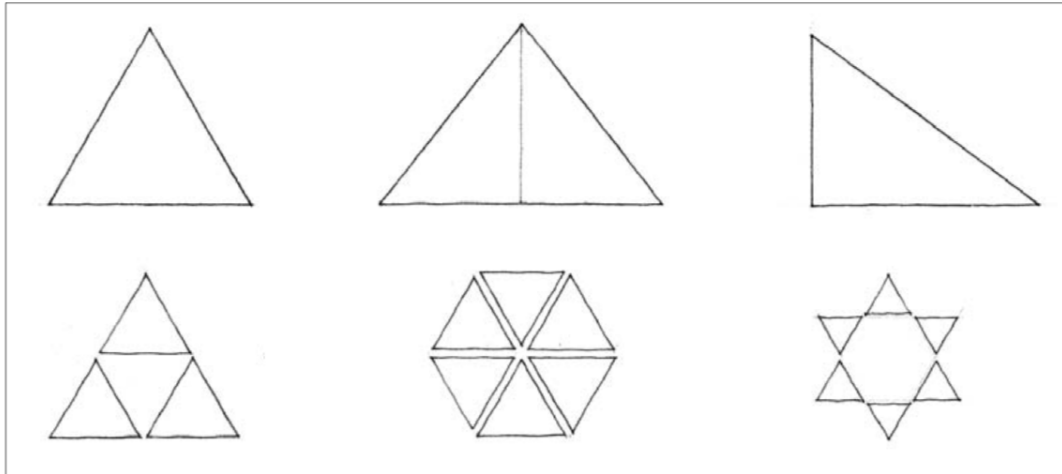
Compositions of circles and circular segments



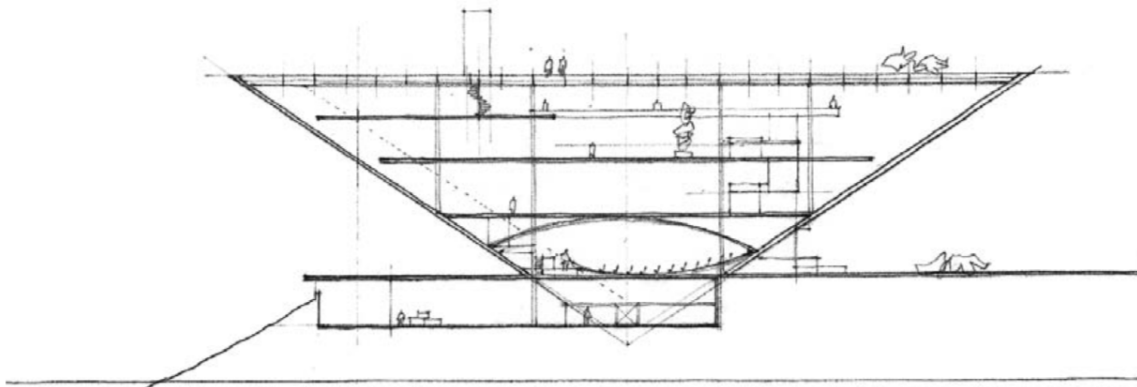
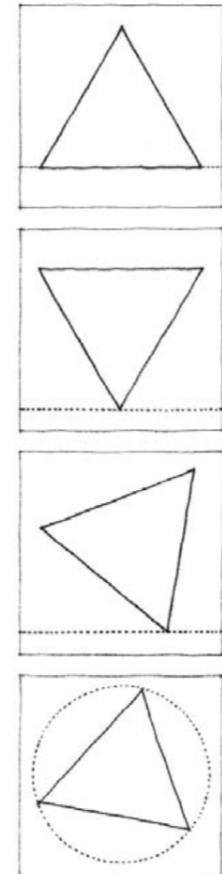
Plan of the Ideal City of Sforzinda, 1464, Antonio Filarete



Triangle

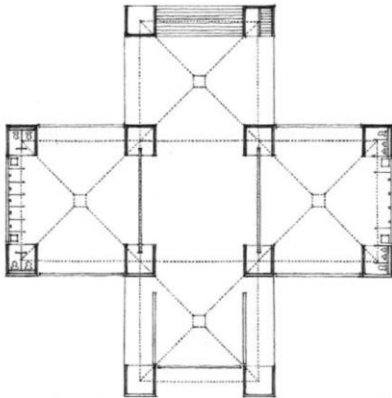


The triangle signifies stability. When resting on one of its sides, the triangle is an extremely stable figure. When tipped to stand on one of its vertices, however, it can either be balanced in a precarious state of equilibrium or be unstable and tend to fall over onto one of its sides.

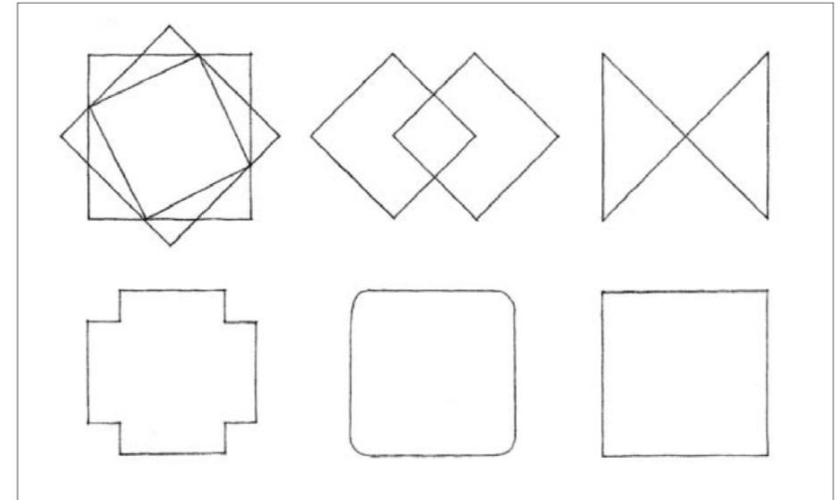
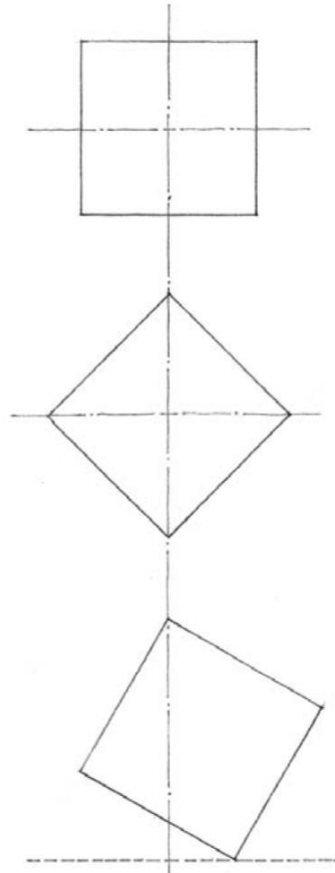


Modern Art Museum, Caracas, Venezuela, 1955, Oscar Niemeyer

Square



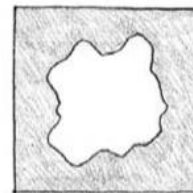
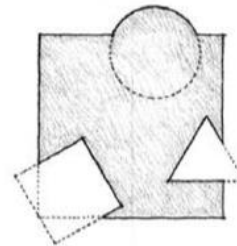
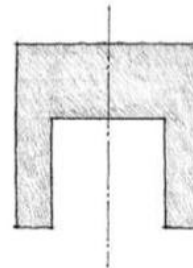
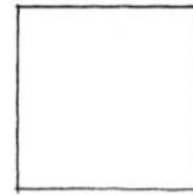
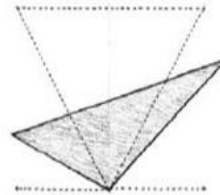
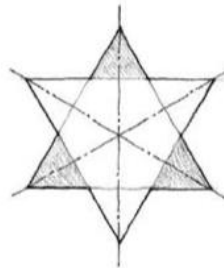
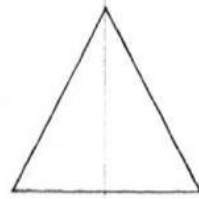
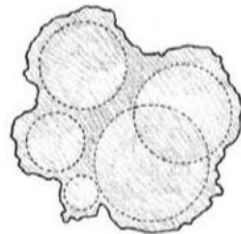
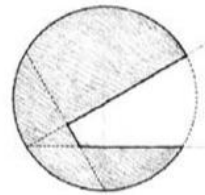
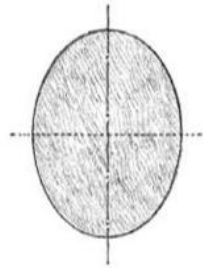
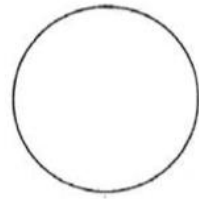
Bathhouse, Jewish Community Center, Trenton, New Jersey,
1954–59, Louis Kahn



Compositions resulting from the rotation and modification of the square

The square represents the pure and the rational. It is a bilaterally symmetrical figure having two equal and perpendicular axes. All other rectangles can be considered variations of the square – deviations from the norm by the addition of height or width. Like the triangle, the square is stable when resting on one of its sides and dynamic when standing on one of its corners. When its diagonals are vertical and horizontal, however, the square exists in a balanced state of equilibrium.

Regular & Irregular Forms



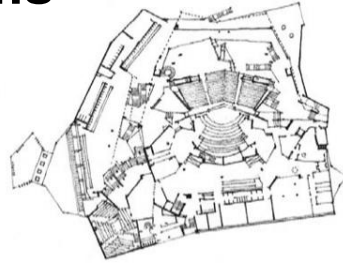
Regular forms refer to those whose parts are related to one another in a consistent and orderly manner. They are generally stable in nature and symmetrical about one or more axes. The sphere, cylinder, cone, cube, and pyramid are prime examples of regular forms.

Forms can retain their regularity even when transformed dimensionally or by the addition or subtraction of elements. From our experiences with similar forms, we can construct a mental model of the original whole even when a fragment is missing or another part is added.

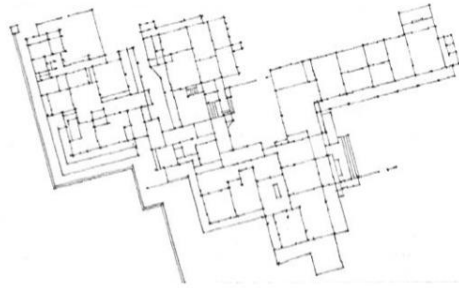
Irregular forms are those whose parts are dissimilar in nature and related to one another in an inconsistent manner. They are generally asymmetrical and more dynamic than regular forms. They can be regular forms from which irregular elements have been subtracted or result from an irregular composition of regular forms.

Since we deal with both solid masses and spatial voids in architecture, regular forms can be contained within irregular forms. In a similar manner, irregular forms can be enclosed by regular forms.

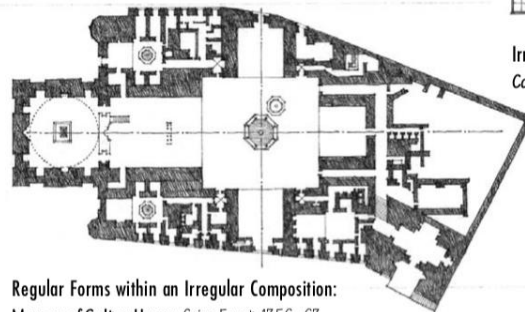
Regular & Irregular Forms



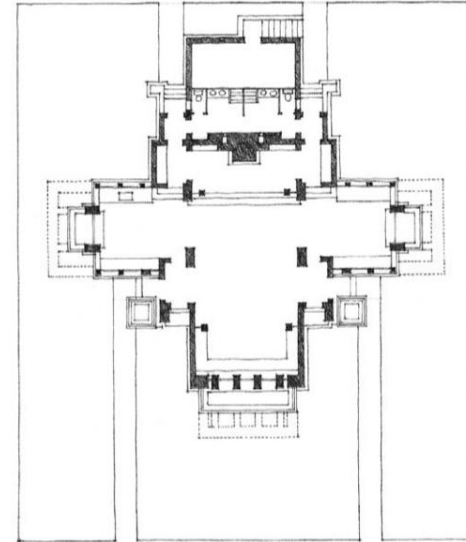
Irregular Forms:
Philharmonic Hall, Berlin, 1956–63, Hans Scharoun



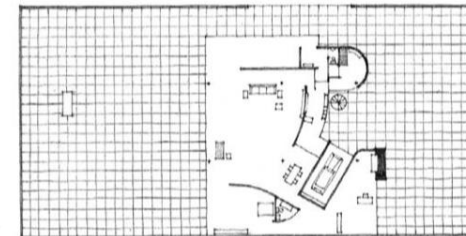
An Irregular Composition of Regular Forms:
Katsura Imperial Villa, Kyoto, Japan, 17th century



Regular Forms within an Irregular Composition:
Mosque of Sultan Hasan, Cairo, Egypt, 1356–63

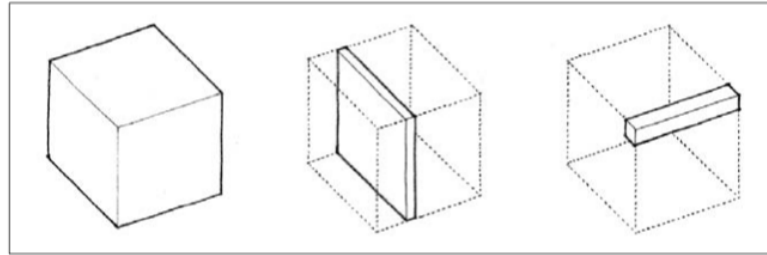


A Regular Composition of Regular Forms:
Coonley Playhouse, Riverside, Illinois, 1912, Frank Lloyd Wright



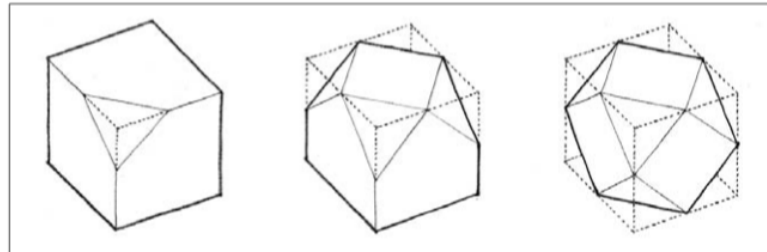
Irregular Forms within a Regular Field:
Courtyard House Project, 1934, Mies van der Rohe

Transformation of Form



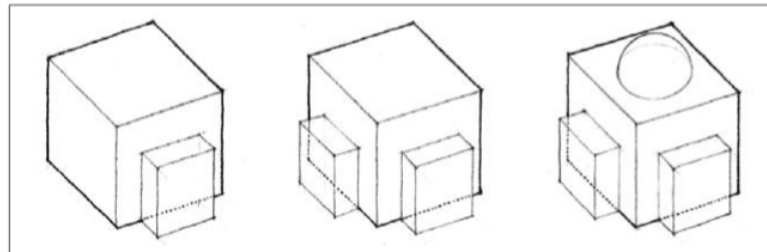
Dimensional Transformation

A form can be transformed by altering one or more of its dimensions and still retain its identity as a member of a family of forms. A cube, for example, can be transformed into similar prismatic forms through discrete changes in height, width, or length. It can be compressed into a planar form or be stretched out into a linear one.



Subtractive Transformation

A form can be transformed by subtracting a portion of its volume. Depending on the extent of the subtractive process, the form can retain its initial identity or be transformed into a form of another family. For example, a cube can retain its identity as a cube even though a portion of it is removed, or be transformed into a series of regular polyhedrons that begin to approximate a sphere.

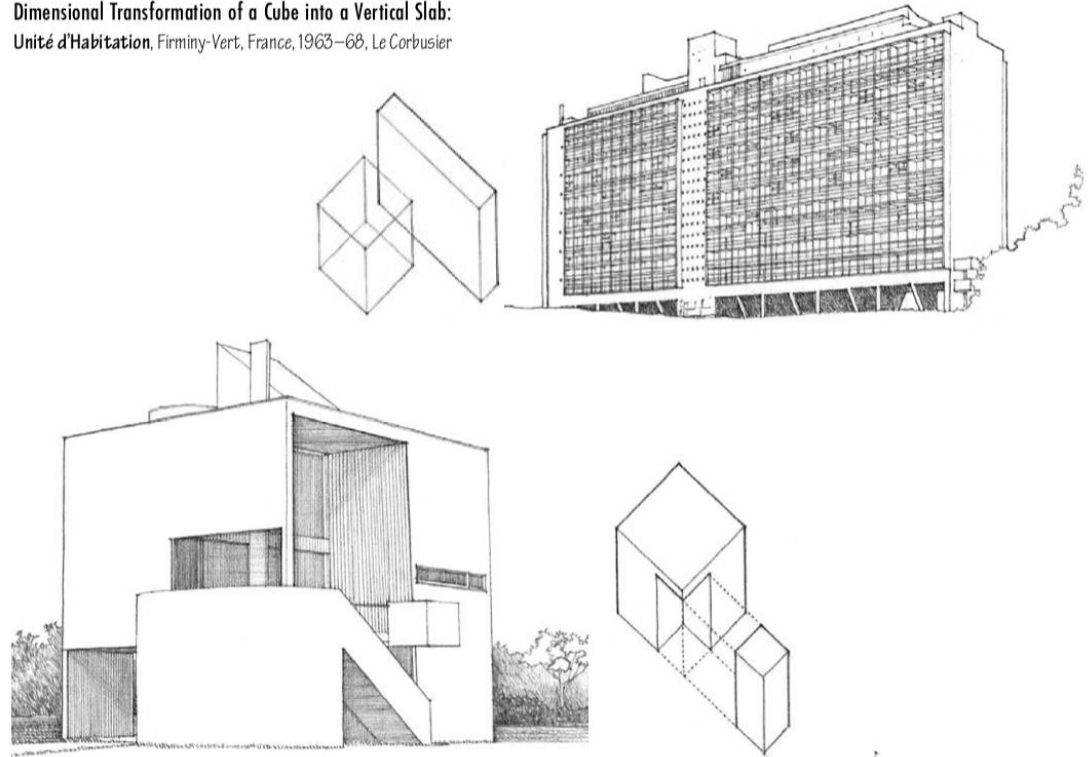


Additive Transformation

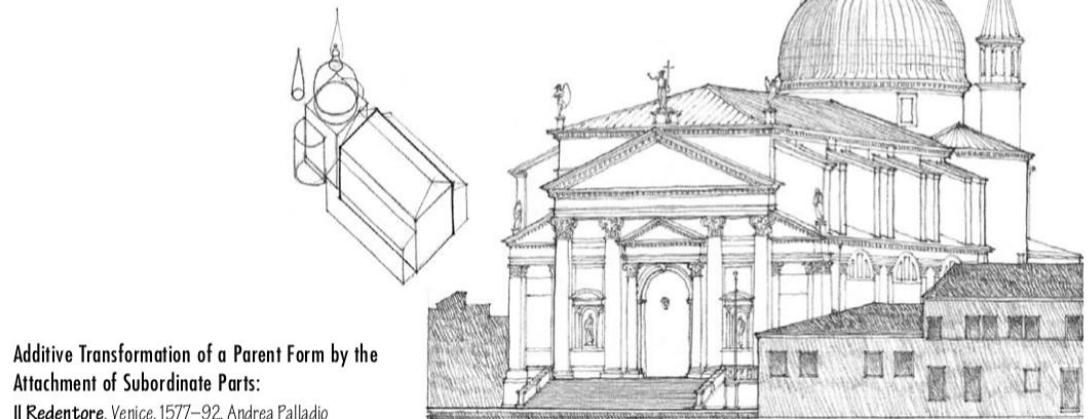
A form can be transformed by the addition of elements to its volume. The nature of the additive process and the number and relative sizes of the elements being attached determine whether the identity of the initial form is altered or retained.

Transformation of Form

Dimensional Transformation of a Cube into a Vertical Slab:
Unité d'Habitation, Firminy-Vert, France, 1963–68, Le Corbusier

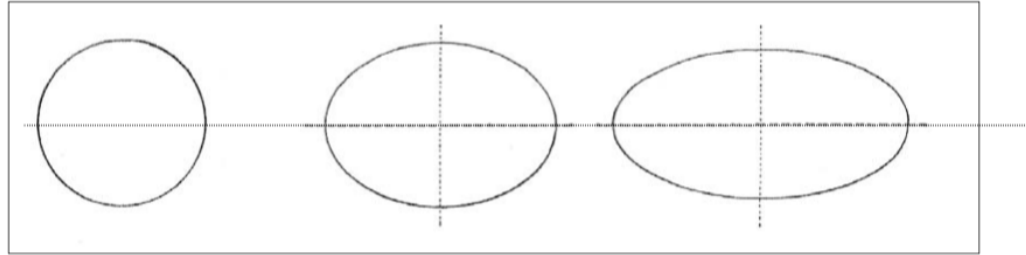


Subtractive Transformation Creating Volumes of Space:
Gwathmey Residence, Amagansett, New York, 1967,
Charles Gwathmey/Gwathmey Siegel

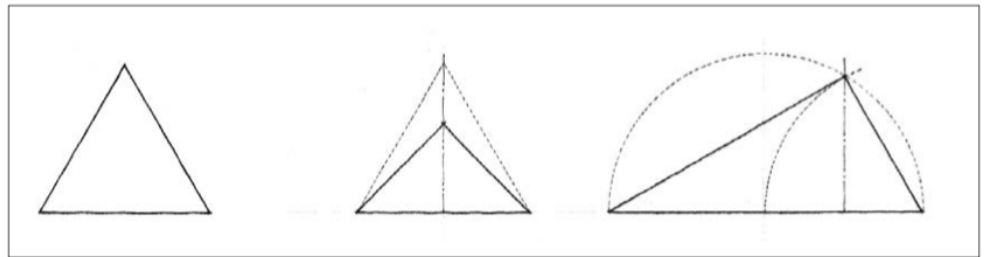


**Additive Transformation of a Parent Form by the
Attachment of Subordinate Parts:**
Il Redentore, Venice, 1577–92, Andrea Palladio

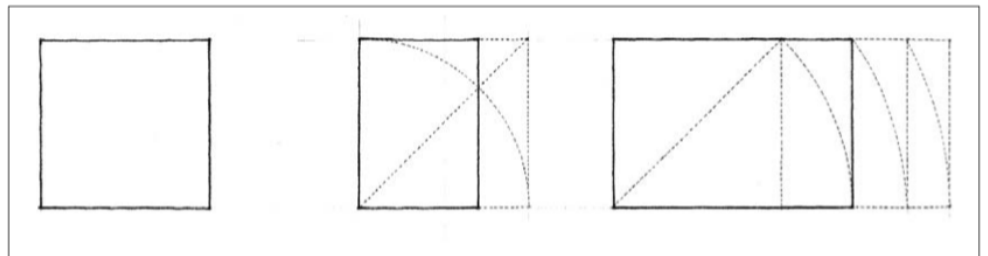
Dimensional Transformation



A sphere can be transformed into any number of ovoid or ellipsoidal forms by elongating it along an axis.

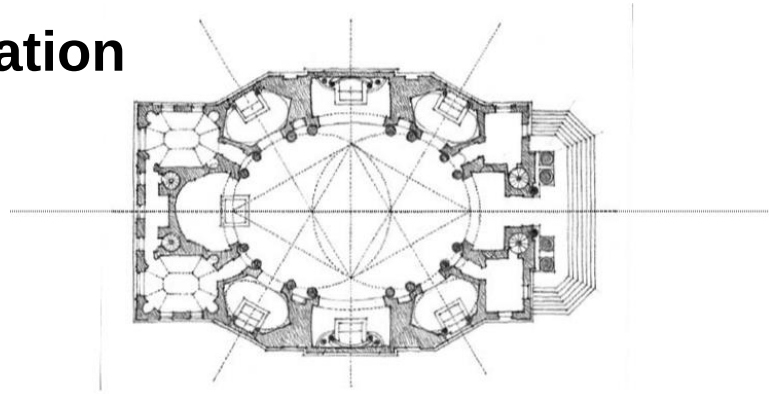


A pyramid can be transformed by altering the dimensions of the base, modifying the height of the apex, or tilting the normally vertical axis.

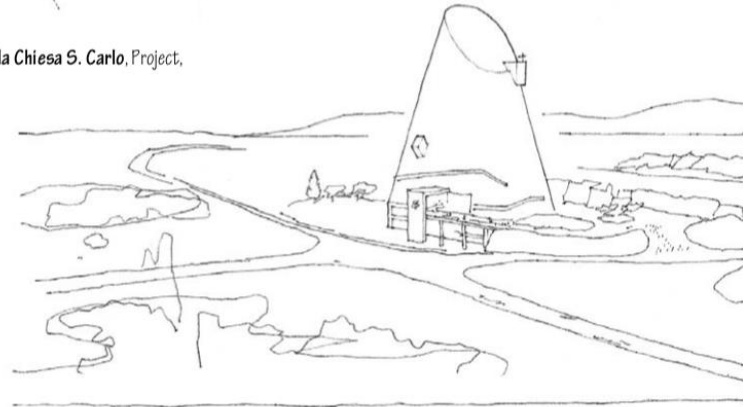


A cube can be transformed into similar prismatic forms by shortening or elongating its height, width, or depth.

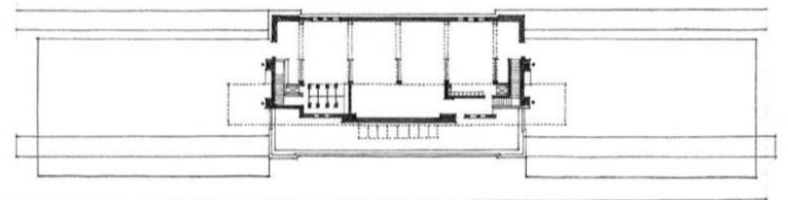
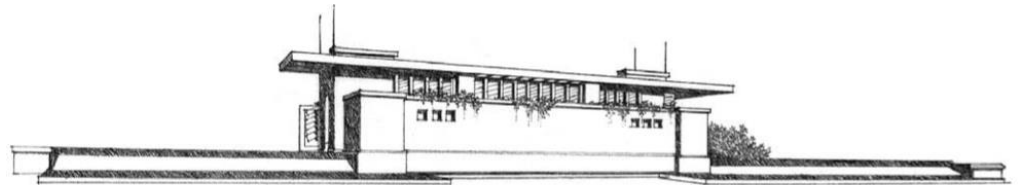
Dimensional Transformation



Plan of an Elliptical Church, *Pensiero Della Chiesa S. Carlo*, Project,
17th century, Francesco Borromini

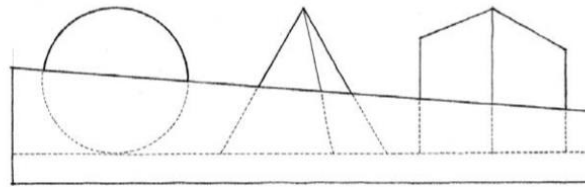


St. Pierre, Firminy-Vert, France, 1965, Le Corbusier

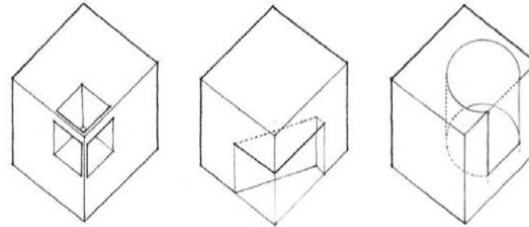


Project for Yahara Boat Club, Madison, Wisconsin, 1902, Frank Lloyd Wright

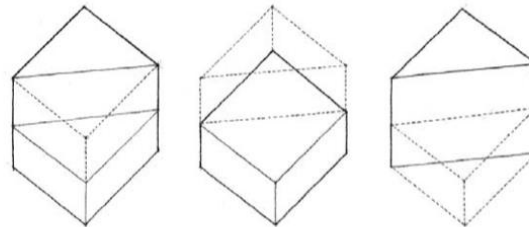
Subtractive Form



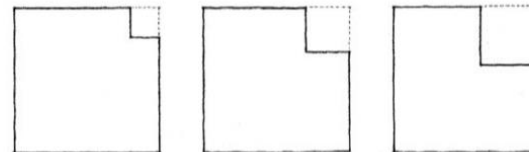
We search for regularity and continuity in the forms we see within our field of vision. If any of the primary solids is partially hidden from our view, we tend to complete its form and visualize it as if it were whole because the mind fills in what the eyes do not see. In a similar manner, when regular forms have fragments missing from their volumes, they retain their formal identities if we perceive them as incomplete wholes. We refer to these mutilated forms as subtractive forms.



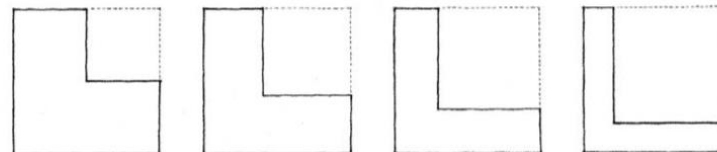
Because they are easily recognizable, simple geometric forms, such as the primary solids, adapt readily to subtractive treatment. These forms will retain their formal identities if portions of their volumes are removed without deteriorating their edges, corners, and overall profile.



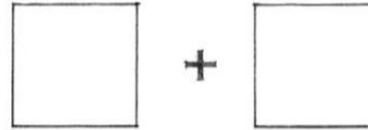
Ambiguity regarding the original identity of a form will result if the portion removed from its volume erodes its edges and drastically alters its profile.



In the series of figures below, at what point does the square shape with a corner portion removed become an L-shaped configuration of two rectangular planes?

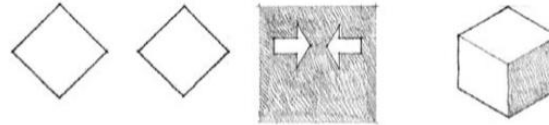


Additive Form



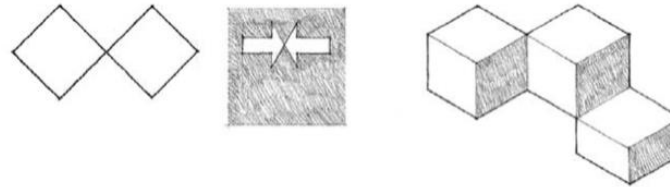
While a subtractive form results from the removal of a portion of its original volume, an additive form is produced by relating or physically attaching one or more subordinate forms to its volume.

The basic possibilities for grouping two or more forms are by:



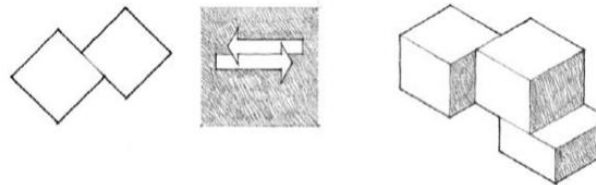
Spatial Tension

This type of relationship relies on the close proximity of the forms or their sharing of a common visual trait, such as shape, color, or material.



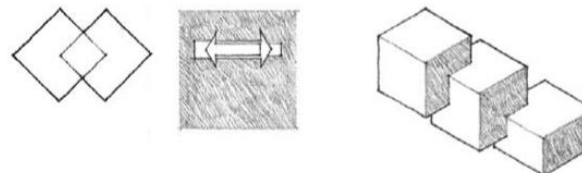
Edge-to-edge Contact

In this type of relationship, the forms share a common edge and can pivot about that edge.



Face-to-face Contact

This type of relationship requires that the two forms have corresponding planar surfaces which are parallel to each other.



Interlocking Volumes

In this type of relationship, the forms interpenetrate each other's space. The forms need not share any visual traits.
