Tishk International University
Engineering Faculty
Interion Design Department

LECTURE 3: TRANSFORMATION OF FORM

1ST STAGE

SPRING SEMESTER

INSTRUCTOR: JENAN SABAH ALI

M.SC. ARCHITECTURAL DESIGN

jenan.sabah@tiu.edu.iq

07503864986

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TRANSFORMATION OF FORM

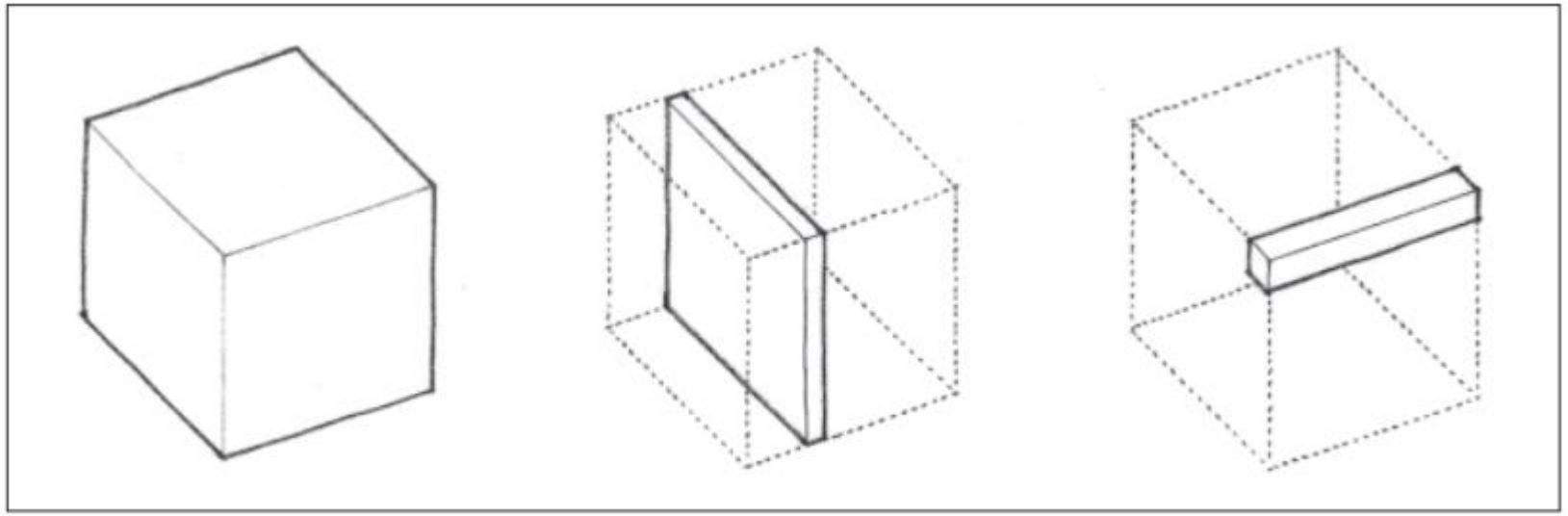
All other forms can be understood to be transformations of the primary solids, variations that are generated by the manipulation of one or more dimensions or by the addition or subtraction of elements.

Typed of form transformation:

1. Dimensional Transformation
2. Subtractive Transformation
3. Additive Transformation

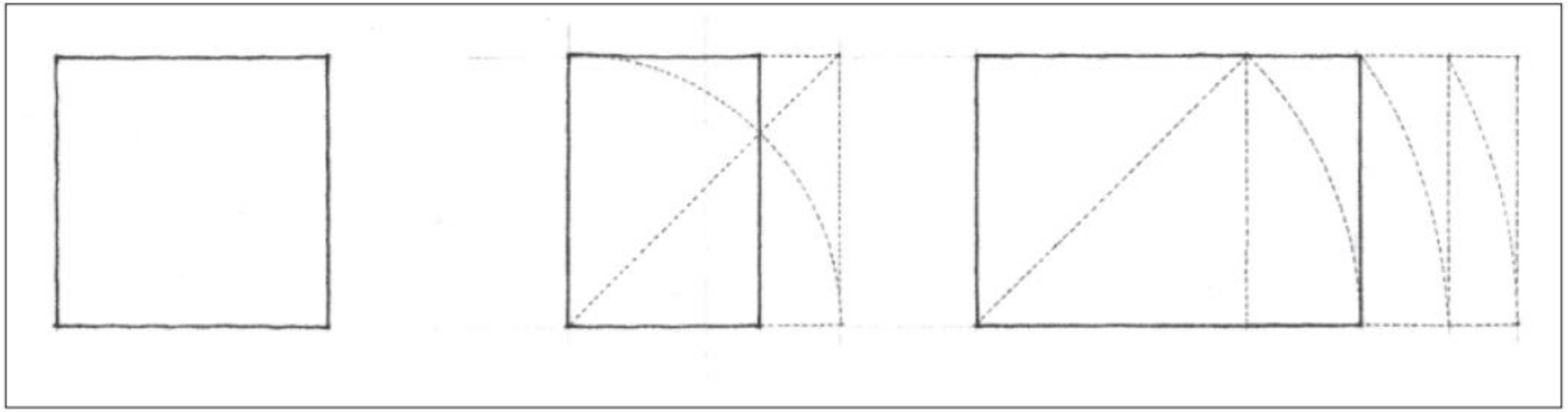
1. Dimensional Transformation

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.



1. Dimensional Transformation

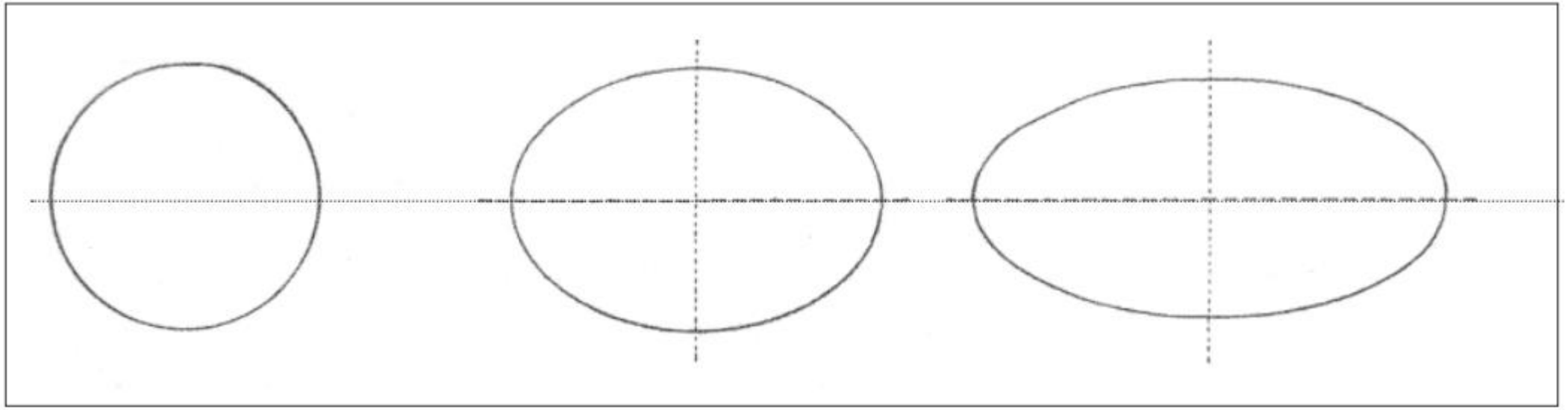
A cube can be transformed into similar prismatic forms by shortening or elongating its height, width, or depth

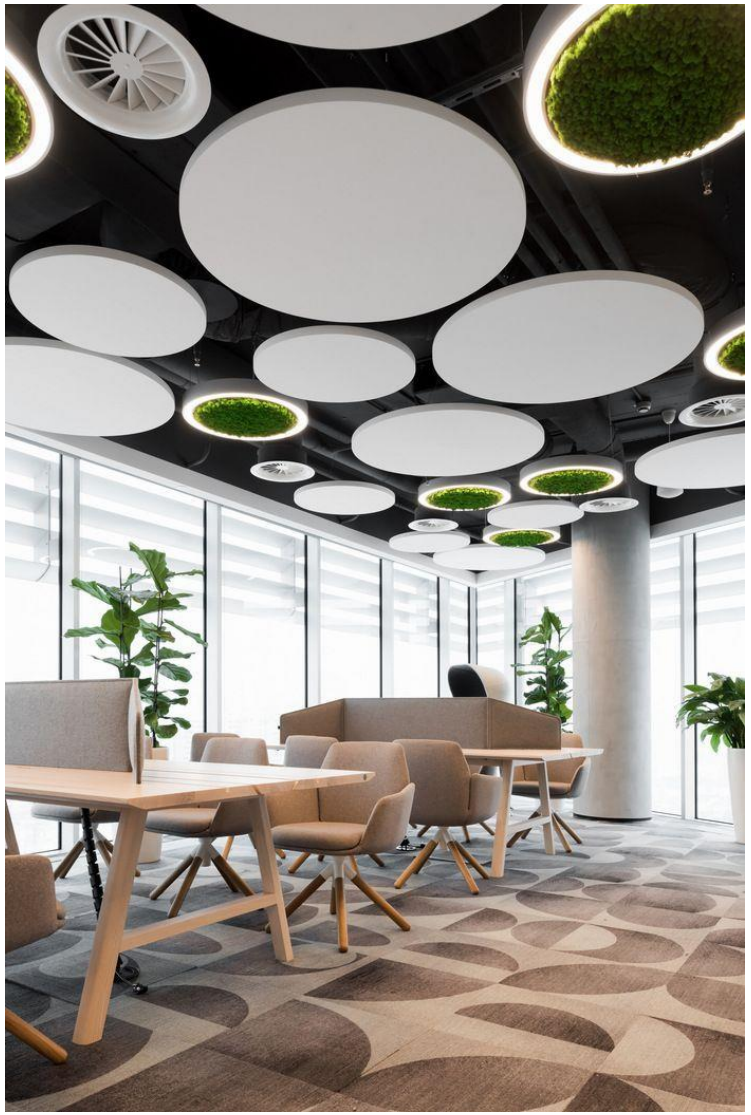


1. Dimensional Transformation

1. Dimensional Transformation

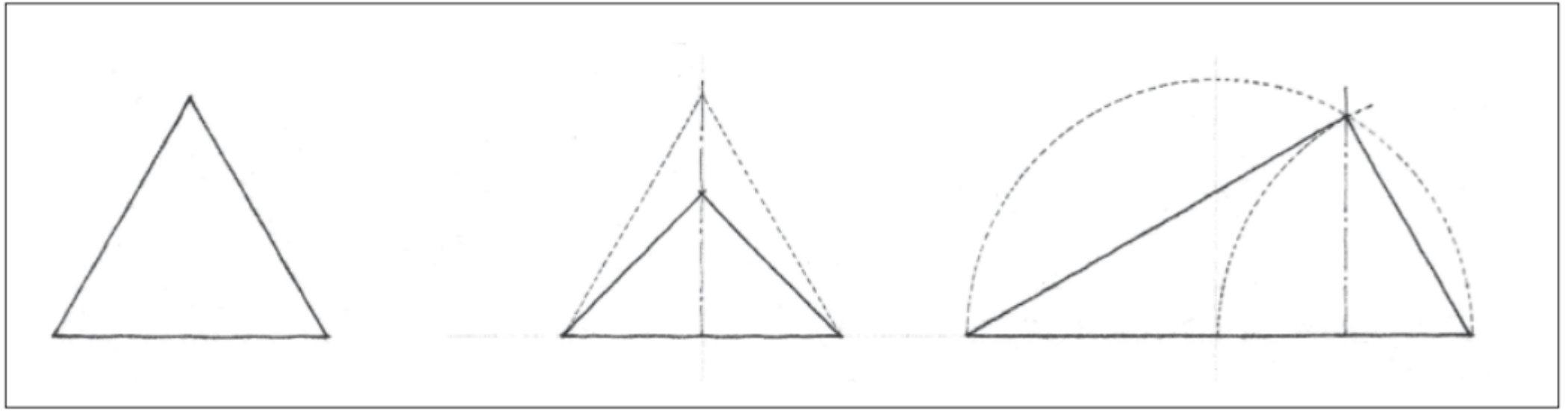
A sphere can be transformed into any number of ovoid or ellipsoidal forms by elongating it along an axis

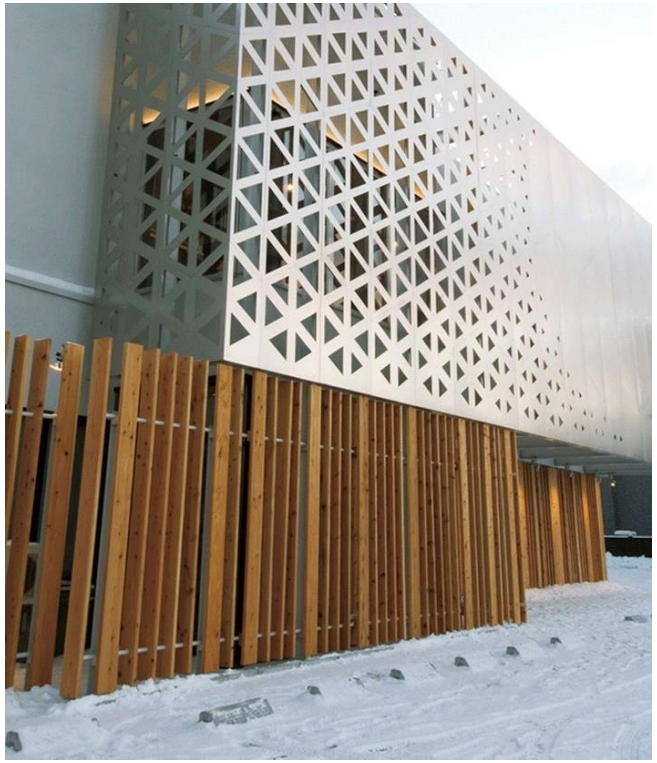


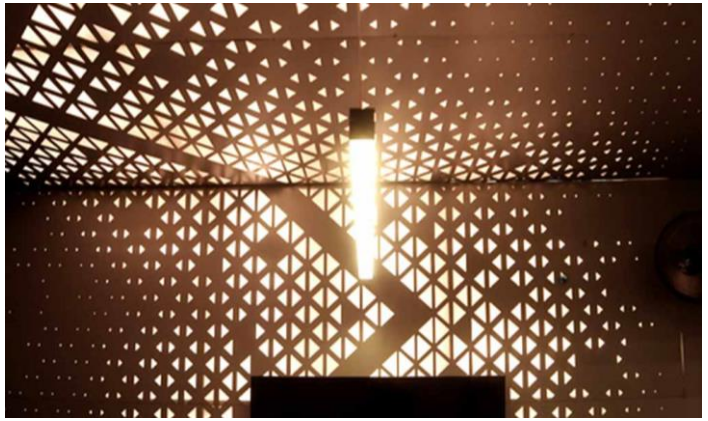


1. Dimensional Transformation

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



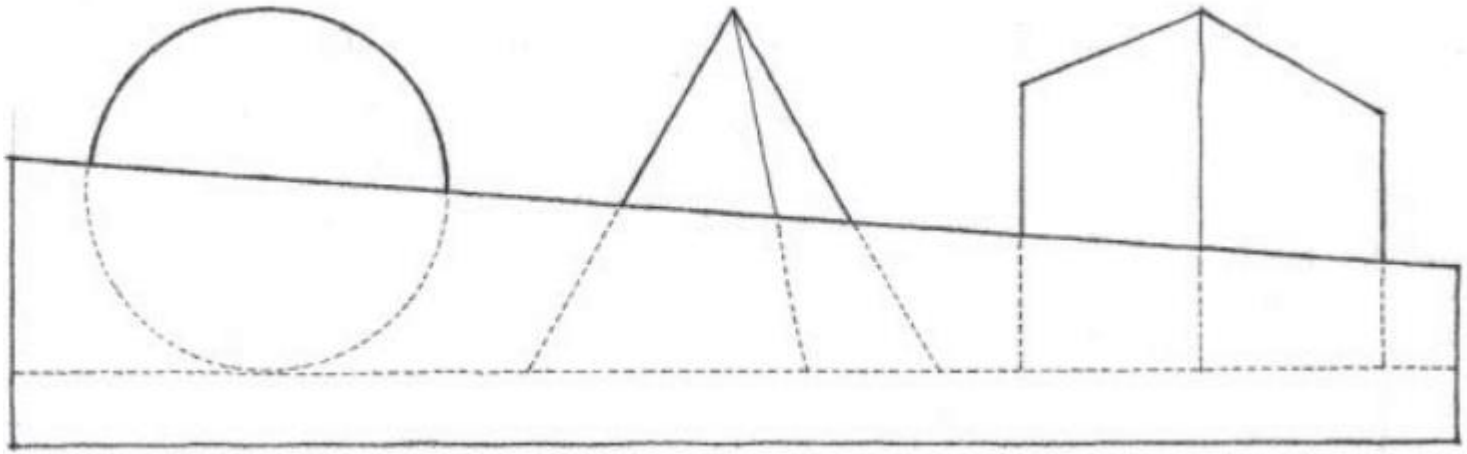




1. Dimensional Transformation

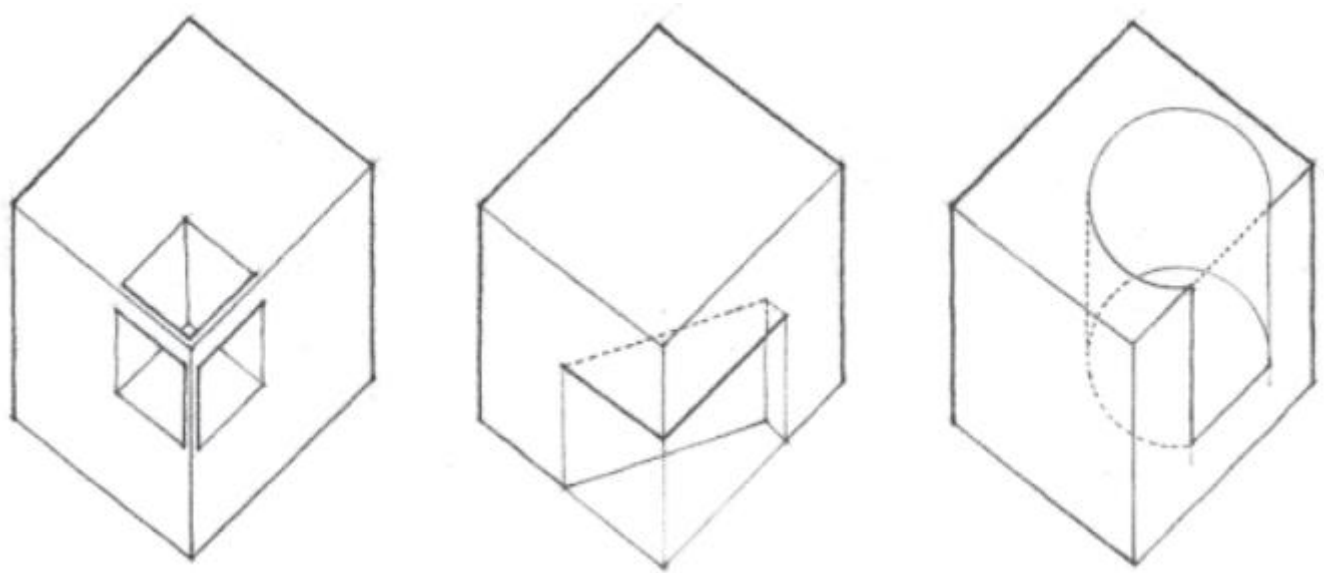
2- SUBTRACTIVE FORM

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.



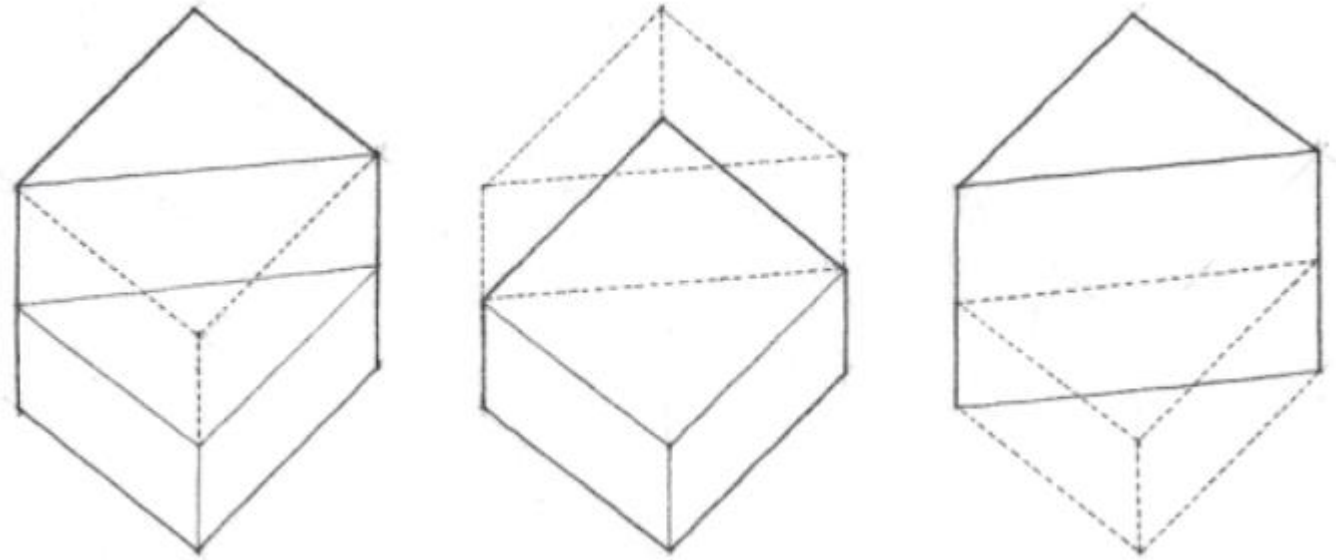
2- SUBTRACTIVE FORM

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



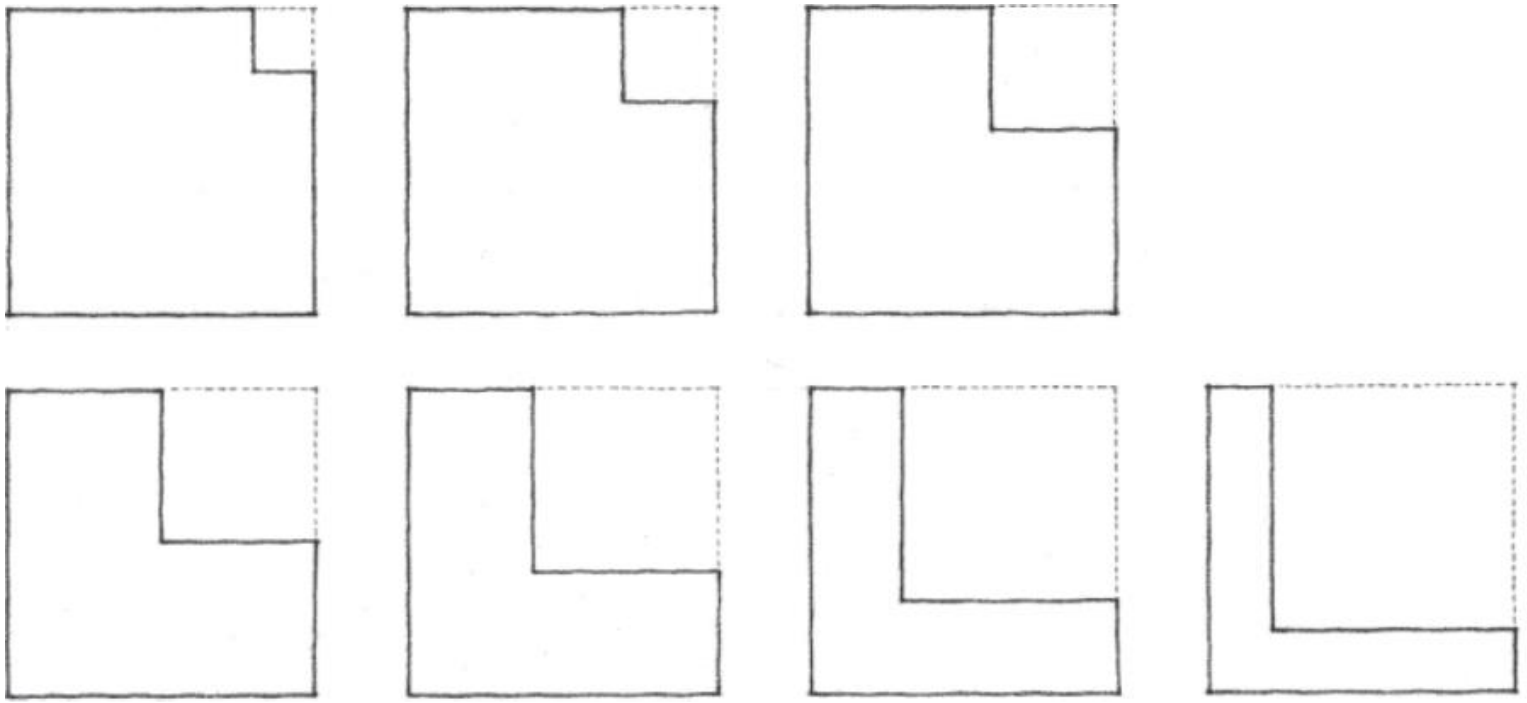
2- SUBTRACTIVE FORM

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.



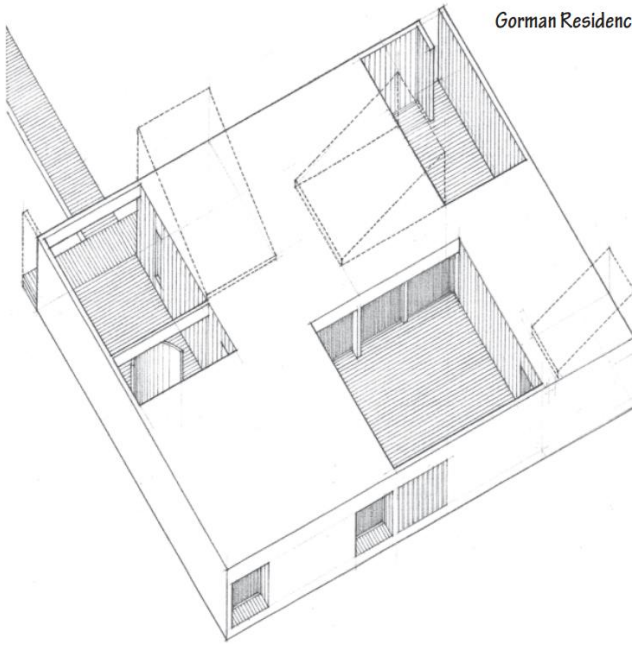
2- SUBTRACTIVE FORM

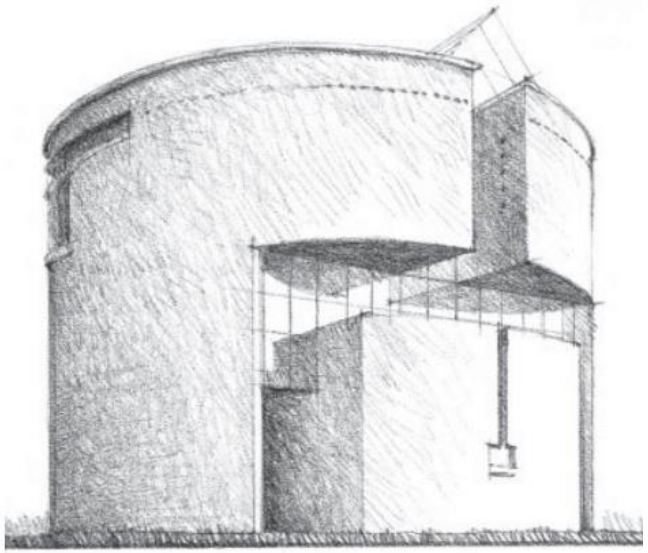
In this series of figures, at what point does the square shape with a corner portion removed become an L- shaped configuration of two rectangular planes?



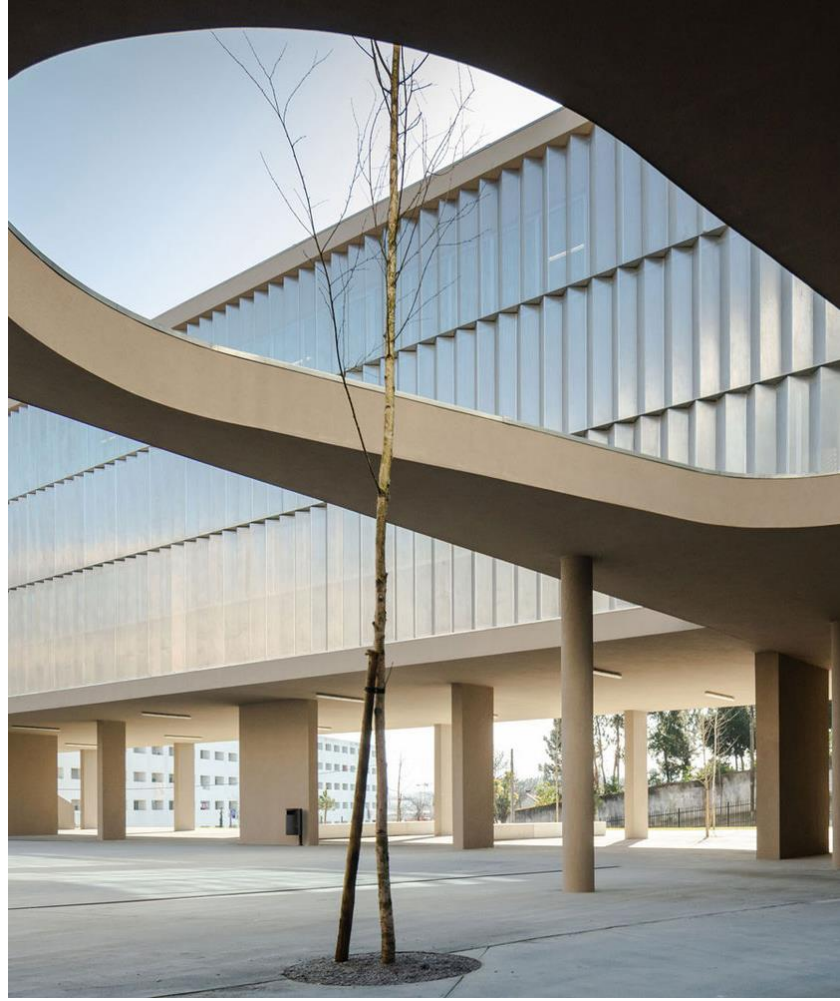
2- SUBTRACTIVE FORM

Spatial volumes may be subtracted from a form to create recessed entrances, positive courtyard spaces, or window openings shaded by the vertical and horizontal surfaces of the recess





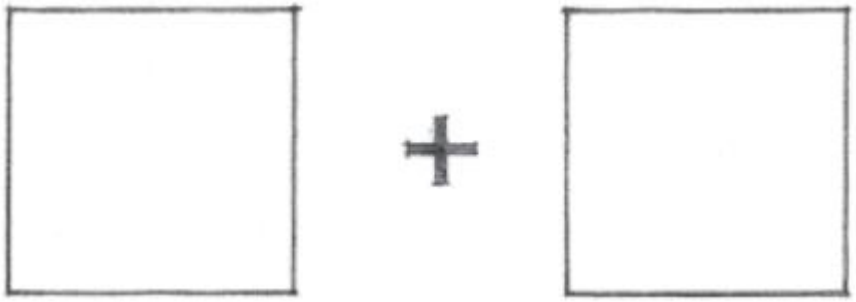




2- SUBTRACTIVE FORM

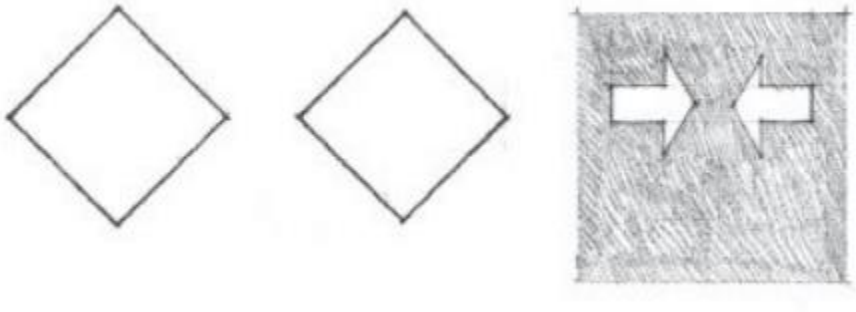
3- ADDITIVE FORM

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:

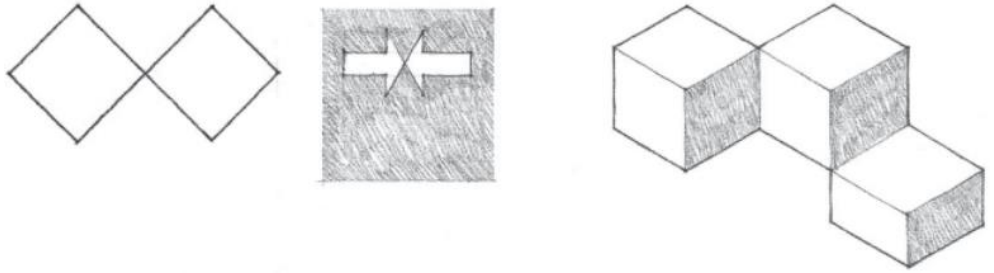
A. **Spatial Tension:** This type of relationship relies on the close proximity of the forms or their sharing of a common visual trait, such as shape, color, or material.



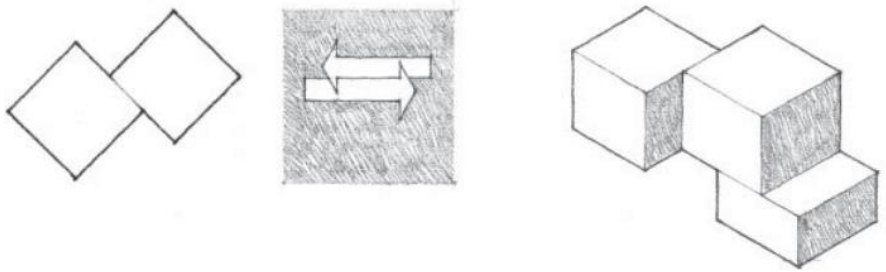
Spatial relation

3- ADDITIVE FORM

B- Edge-to-Edge Contact In this type of relationship, the forms share a common edge and can pivot about that edge



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

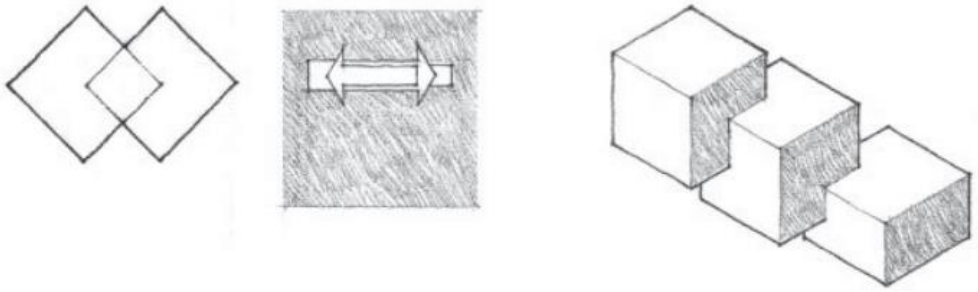


Face-to-face connection

edge-to-edge connection

3- ADDITIVE FORM

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



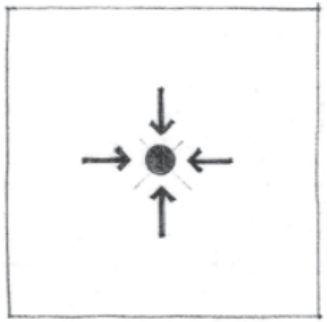
Additive forms resulting from the accretion of discrete elements can be characterized by their ability to grow and merge with other forms. For us to perceive additive groupings as unified compositions of form—as figures in our visual field—the combining elements must be related to one another in a coherent manner.

Interlocking relation

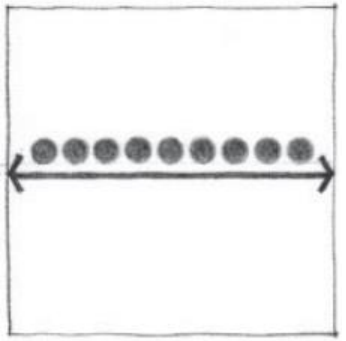
3- ADDITIVE FORM

These diagrams categorize additive forms according to the nature of the relationships that exist among the component forms as well as their overall configurations

- **Centralized Form:** A number of secondary forms clustered about a dominant, central parent-form

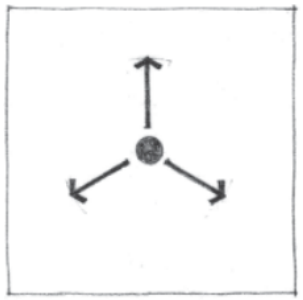


- **Linear Form**: A series of forms arranged sequentially in a row



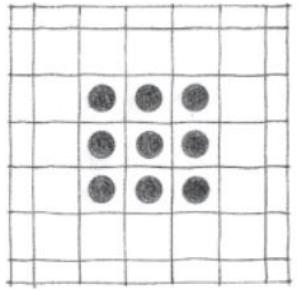
3- ADDITIVE FORM

Radial Form: A composition of linear forms extending outward from a central form in a radial manner



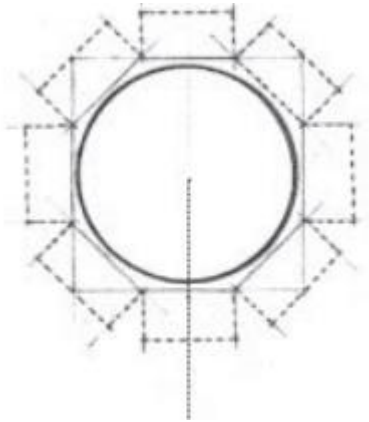
Clustered Form: A collection of forms grouped together by proximity or the sharing of a common visual trait

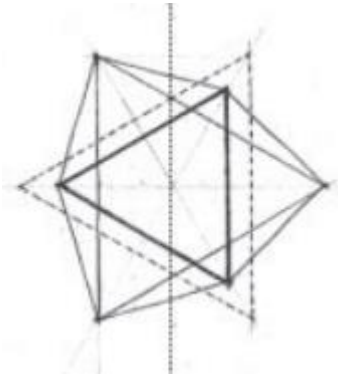
Grid Form: A set of modular forms related and regulated by a three-dimensional grid

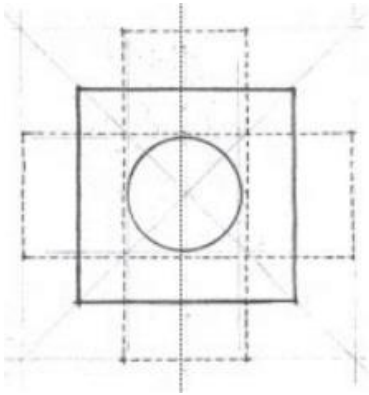


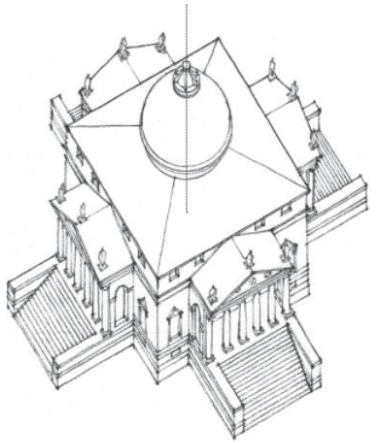
CENTRALIZED FORM

Centralized forms require the visual dominance of a geometrically regular, centrally located form, such as a sphere, cone, or cylinder. Because of their inherent centrality, these forms share the self-centering properties of the point and circle. They are ideal as freestanding structures isolated within their context, dominating a point in space, or occupying the center of a defined field. They can embody sacred or honorific places, or commemorate significant persons or events.





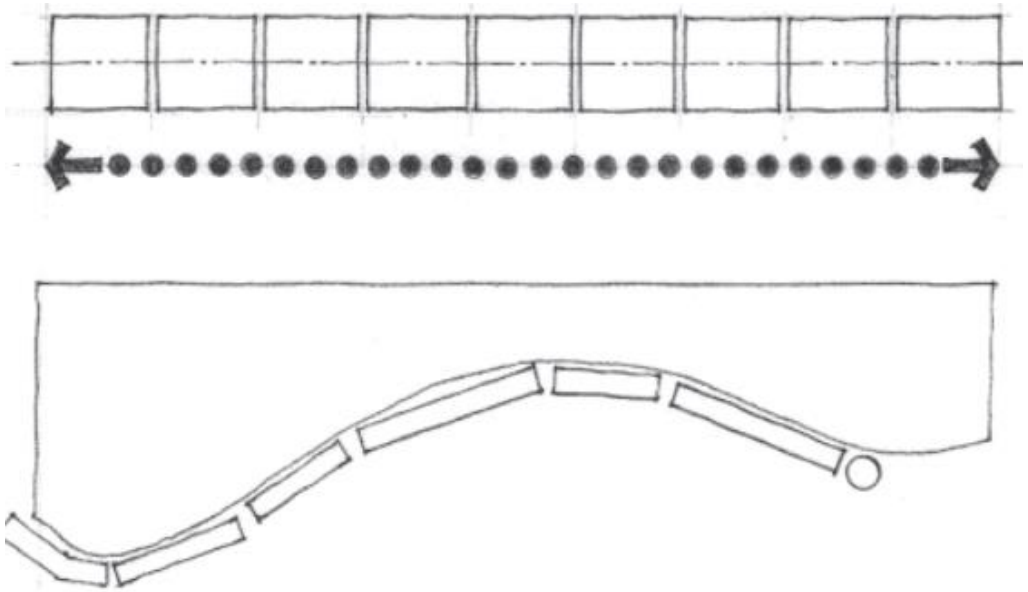




LINEAR FORM

A linear form can result from a proportional change in a form's dimensions or the arrangement of a series of discrete forms along a line. In the latter case, the series of forms may be either repetitive or dissimilar in nature and organized by a separate and distinct element such as a wall or path.

A linear form can be segmented or curvilinear respond to topography, vegetation, views, or other features of a site.



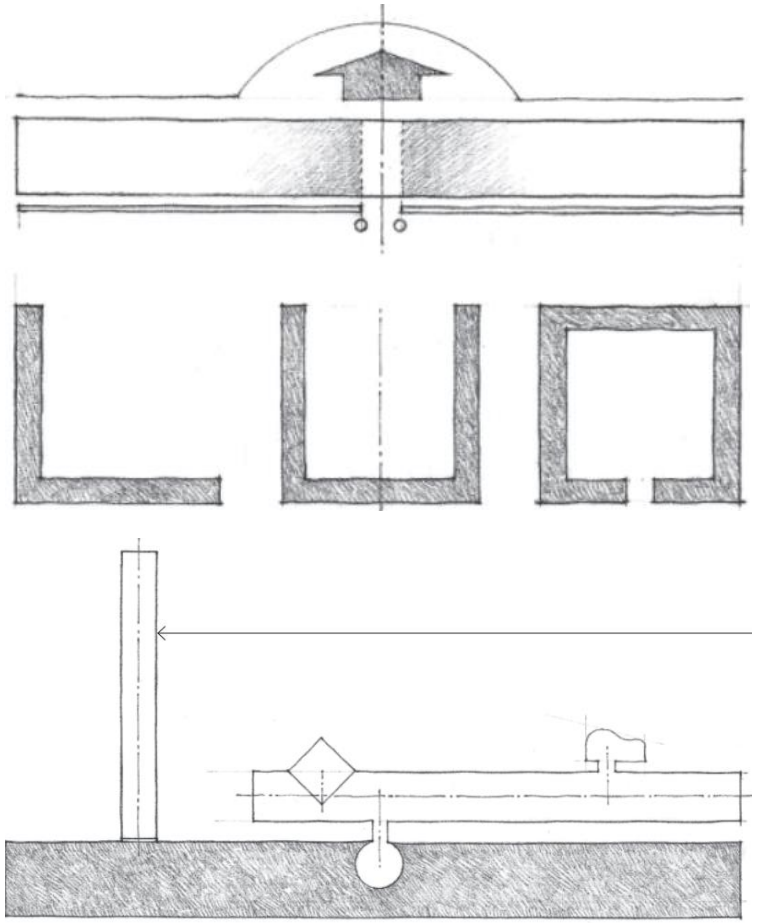
LINEAR FORM

A linear form can front on or define an edge of an exterior space, or define a plane of entry into the spaces behind it.

A linear form can be manipulated to enclose a portion of space.

A linear form can be oriented vertically as a tower element to establish or denote a point in space.

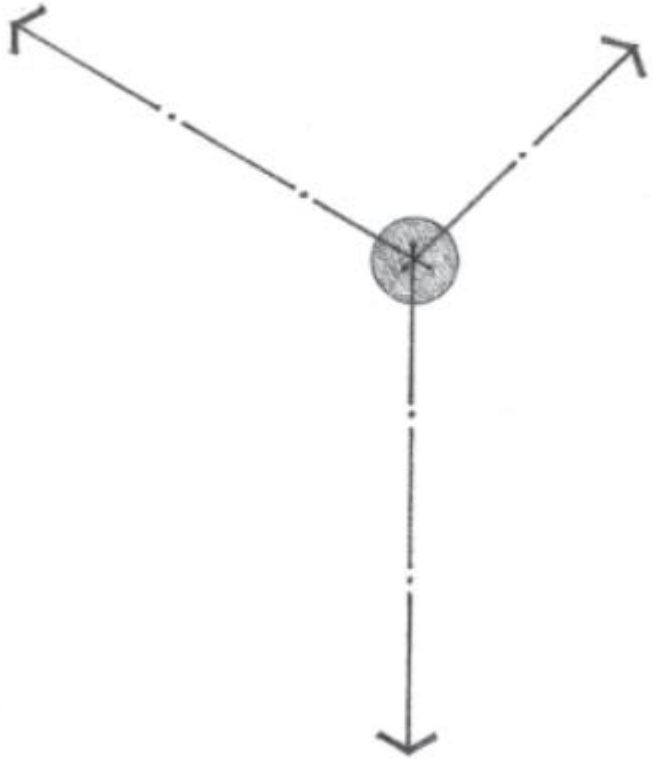
A linear form can serve as an organizing element to which a variety of secondary forms are attached



RADIAL FORM

A radial form consists of linear forms that extend outward from a centrally located core element in a radiating manner. It combines the aspects of centrality and linearity into a single composition.

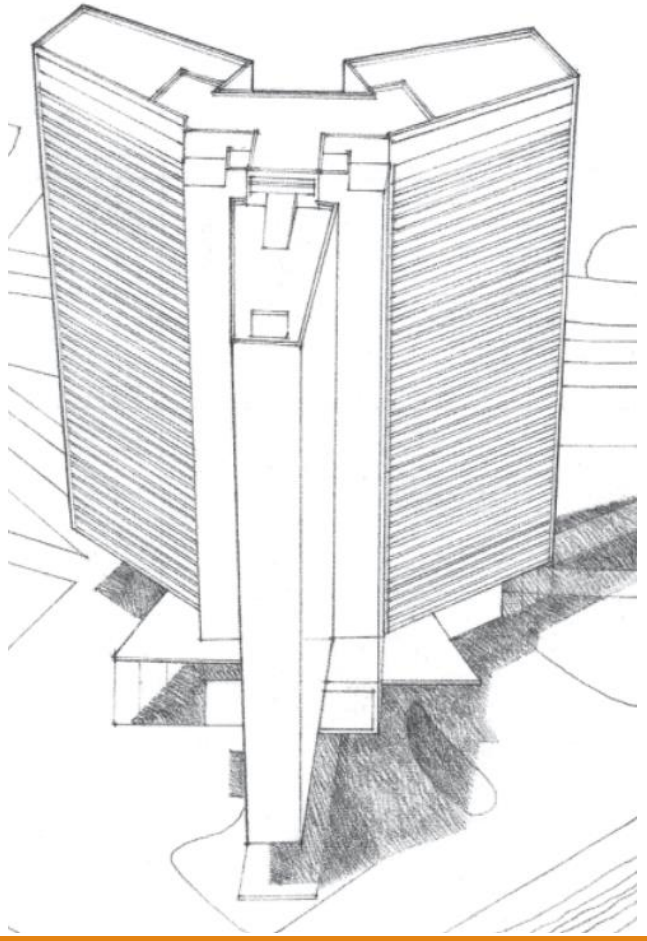
The core is either the symbolic or functional center of the organization. Its central position can be articulated with a visually dominant form, or it can merge with and become subservient to the radiating arms.



RADIAL FORM

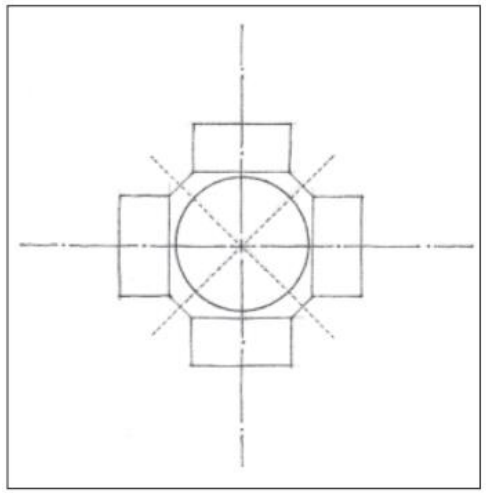
The radiating arms, having properties similar to those of linear forms, give a radial form its extroverted nature. They can reach out and relate to or attach themselves to specific features of a site. They can expose their elongated surfaces to desirable conditions of sun, wind, view, or space.

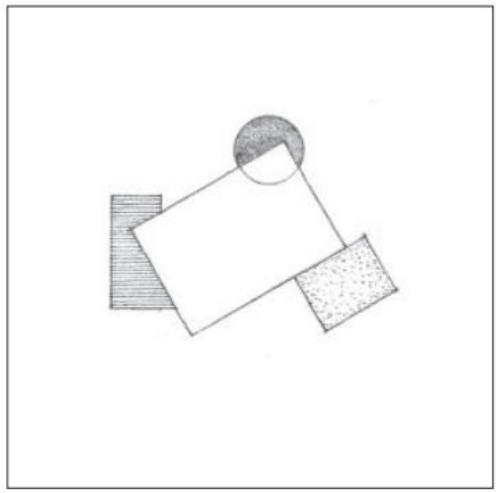
The organization of a radial form can best be seen and understood from an aerial viewpoint. When viewed from ground level, its central core element may not be clearly visible and the radiating pattern of its linear arms may be obscured or distorted through perspective foreshortening



CLUSTERED FORM

While a centralized organization has a strong geometric basis for the ordering of its forms, a clustered organization groups its forms according to functional requirements of size, shape, or proximity. While it lacks the geometric regularity and introverted nature of centralized forms, a clustered organization is flexible enough to incorporate forms of various shapes, sizes, and orientations into its structure

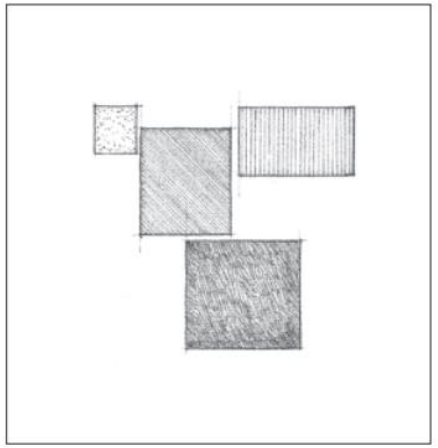


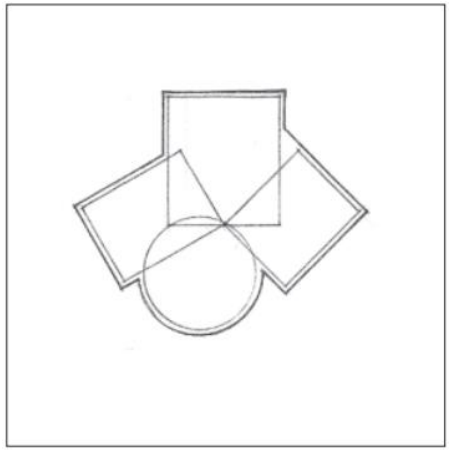


CLUSTERED FORM

Considering their flexibility, clustered organizations of forms may be organized in the following ways:

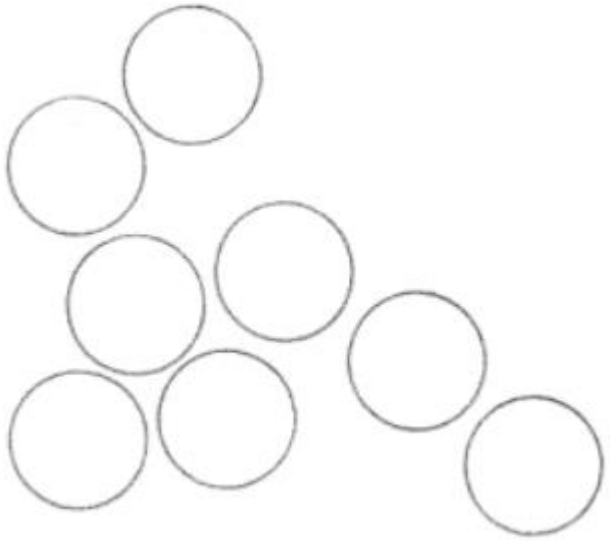
- They can be attached as appendage to a larger parent form or space.
- They can be related by proximity alone to articulate and express their volumes as individual entities.
- They can interlock their volume and merge into a single form having a variety of faces

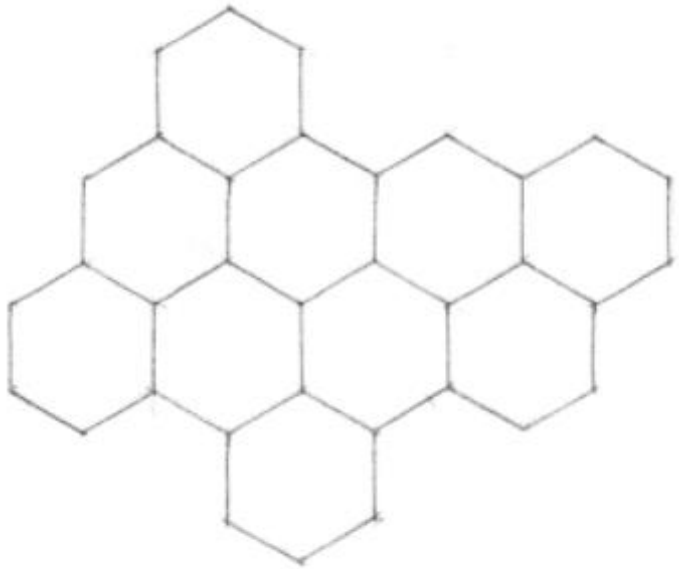




CLUSTERED FORM

A clustered organization can also consist of forms that are generally equivalent in size, shape, and function. These forms are visually ordered into a coherent, nonhierarchical organization not only by their close proximity to one another, but also by the similarity of their visual properties.





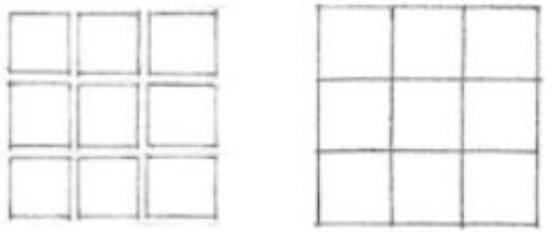
CLUSTERED FORM

GRID FORM

A grid is a system of two or more intersecting sets of regularly spaced parallel lines. It generates a geometric pattern of regularly spaced points at the intersections of the grid lines and regularly shaped fields defined by the grid lines themselves.

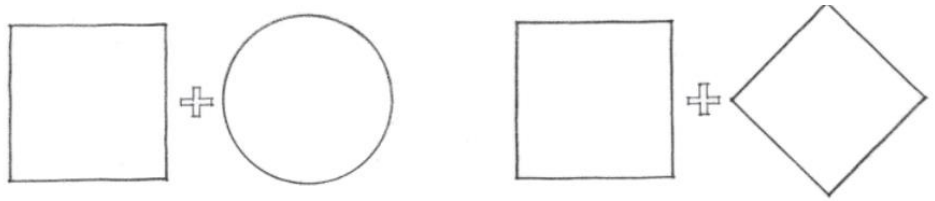
The most common grid is based on the geometry of the square. Because of the equality of its dimensions and its bilateral symmetry, a square grid is essentially nonhierarchical and bidirectional. It can be used to break down the scale of a surface into measurable units and give it an even texture. It can be used to wrap several surfaces of a form and unify them with its repetitive and pervasive geometry.

The square grid, when projected into the third dimension, generates a spatial network of reference points and lines. Within this modular framework, any number of forms and spaces can be visually organized



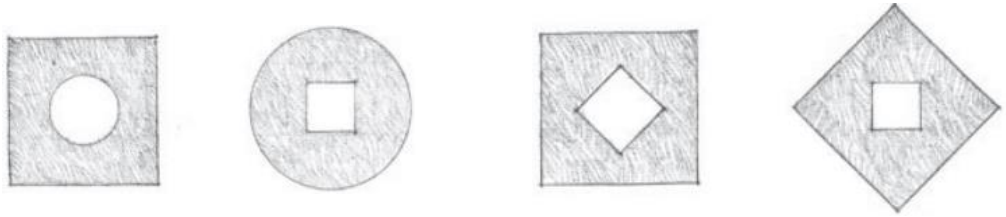
FORMAL COLLISIONS OF GEOMETRY

When two forms differing in geometry or orientation collide and interpenetrate each other's boundaries, each will vie for visual supremacy and dominance. In these situations, the following forms can evolve:



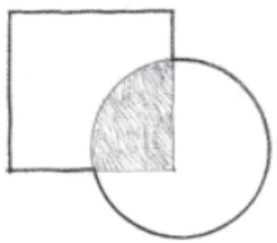
The two forms can subvert their individual identities and merge to create a new composite form.

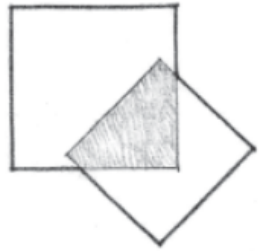
One of the two forms can receive the other totally within its volume.



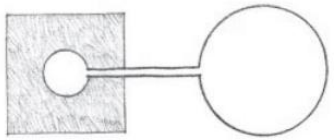
FORMAL COLLISIONS OF GEOMETRY

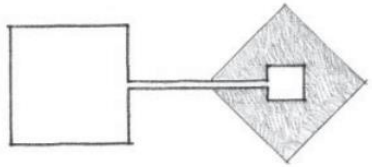
The two forms can retain their individual identities and share the interlocking portion of their volumes.

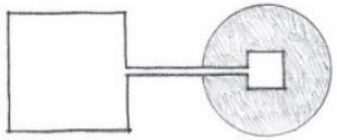


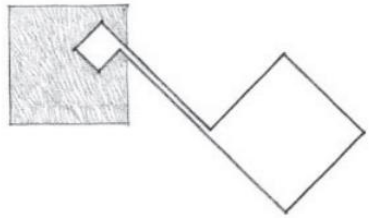


The two forms can separate and be linked by a third element that recalls the geometry of one of the original forms









Reference

Ching, Frank, (1943). Architecture form, space and order

THANK YOU