Tishk International University
Engineering Faculty
Architecture Department

Theory of Architecture I

Lecture 5:

Transformation of Form

1st Grade

Instructor: Dr. Salem Mokhtar

Introduction

This lecture is about transformation of form and formal collisions of geometry.

At the end of this lecture, the students will have basic knowledge about these topics.

Transformation of Form

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

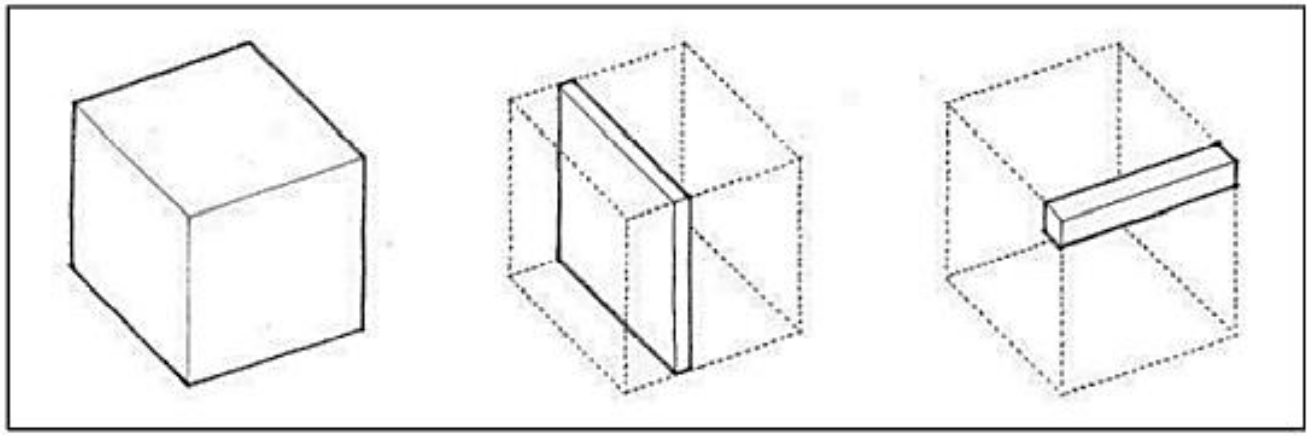
1. Dimensional Transformation

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 (separate) changes in height, width, or length.
- It can be compressed into a planar form or be stretched out into a linear one.

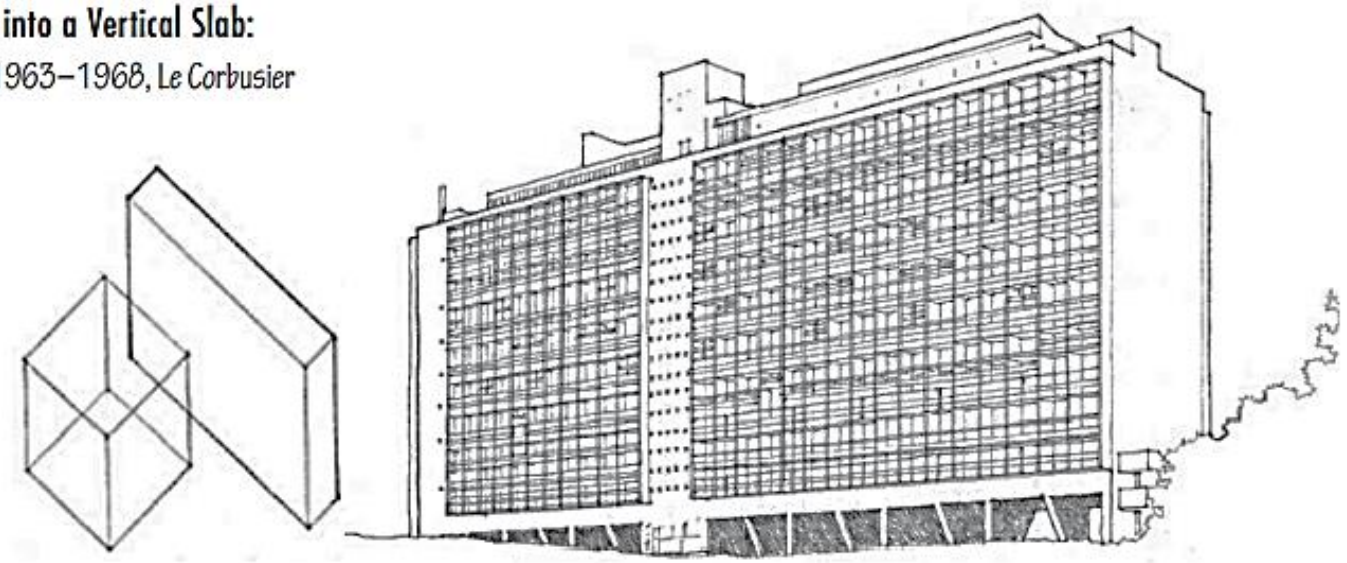


Transformation of Form

1. Dimensional Transformation

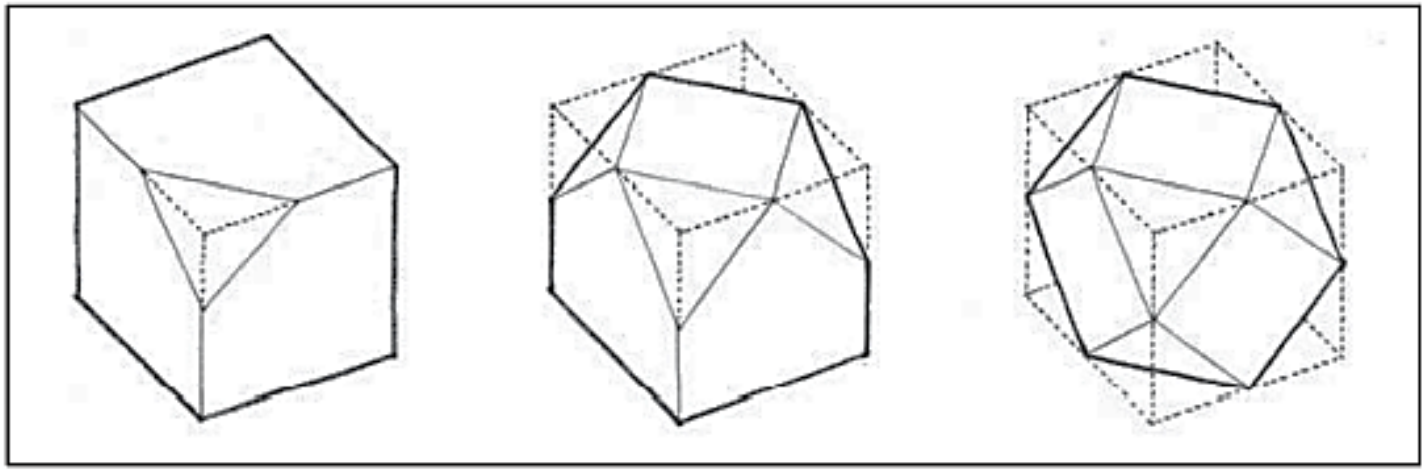
Dimensional Transformation of a Cube into a Vertical Slab:

Unité d'Habitation, Firminy-Vert, France, 1963–1968, Le Corbusier



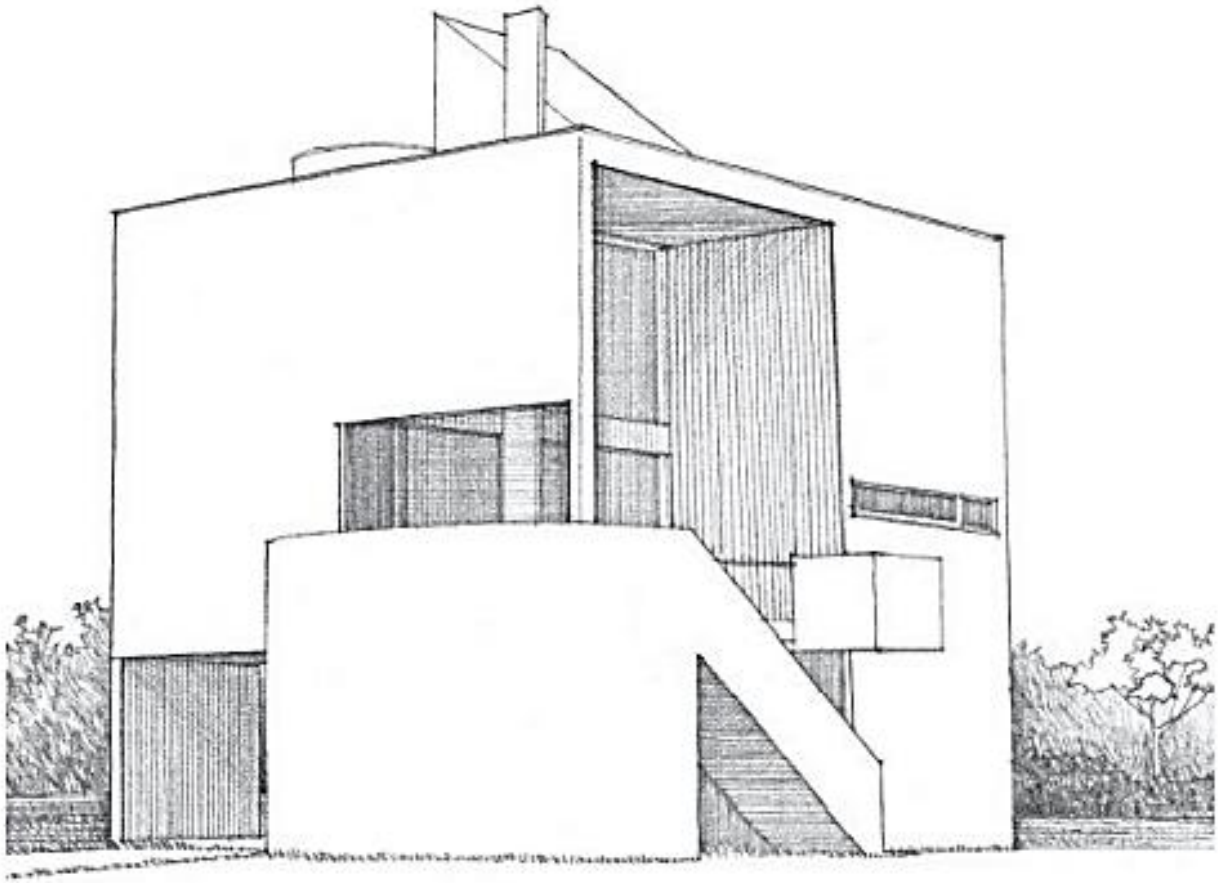
2. Subtractive Transformation

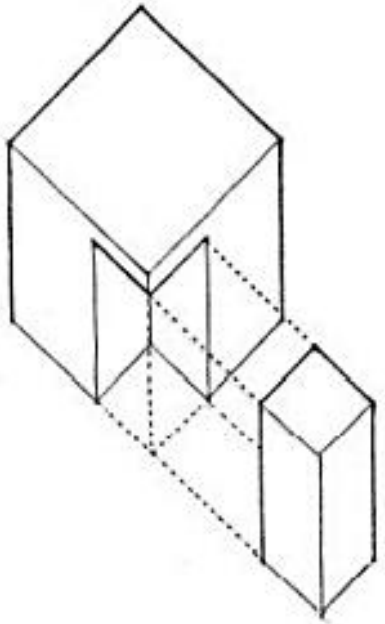
- A form can be transformed by subtracting a portion of its volume.
- Depending on the extent of the subtractive process, the form can retain its initial identity or be transformed into a form of another family.
- For example, a cube can retain its identity as a cube even though a portion of it is removed,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



Transformation of Form

2. Subtractive Transformation





Subtractive Transformation Creating Volumes of Space:

Gwathmey Residence, Amagansett, New York, 1967,

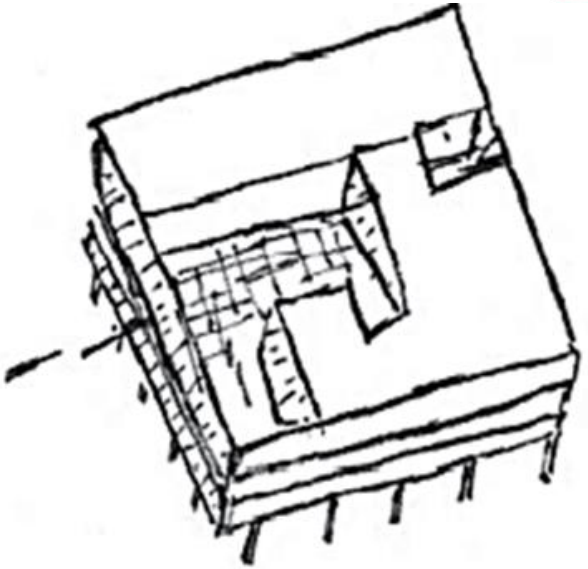
Charles Gwathmey/Gwathmey Siegel

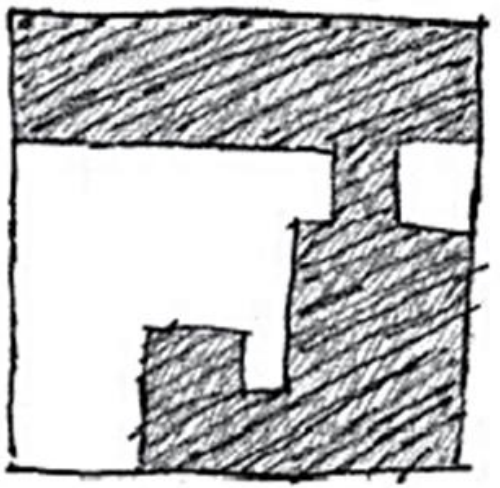
Transformation of Form

2. Subtractive Transformation

"Subtractive Form

- very generous
- on the exterior an architectural will is confirmed
- on the interior all functional needs are satisfied (light penetration, continuity, circulation)"

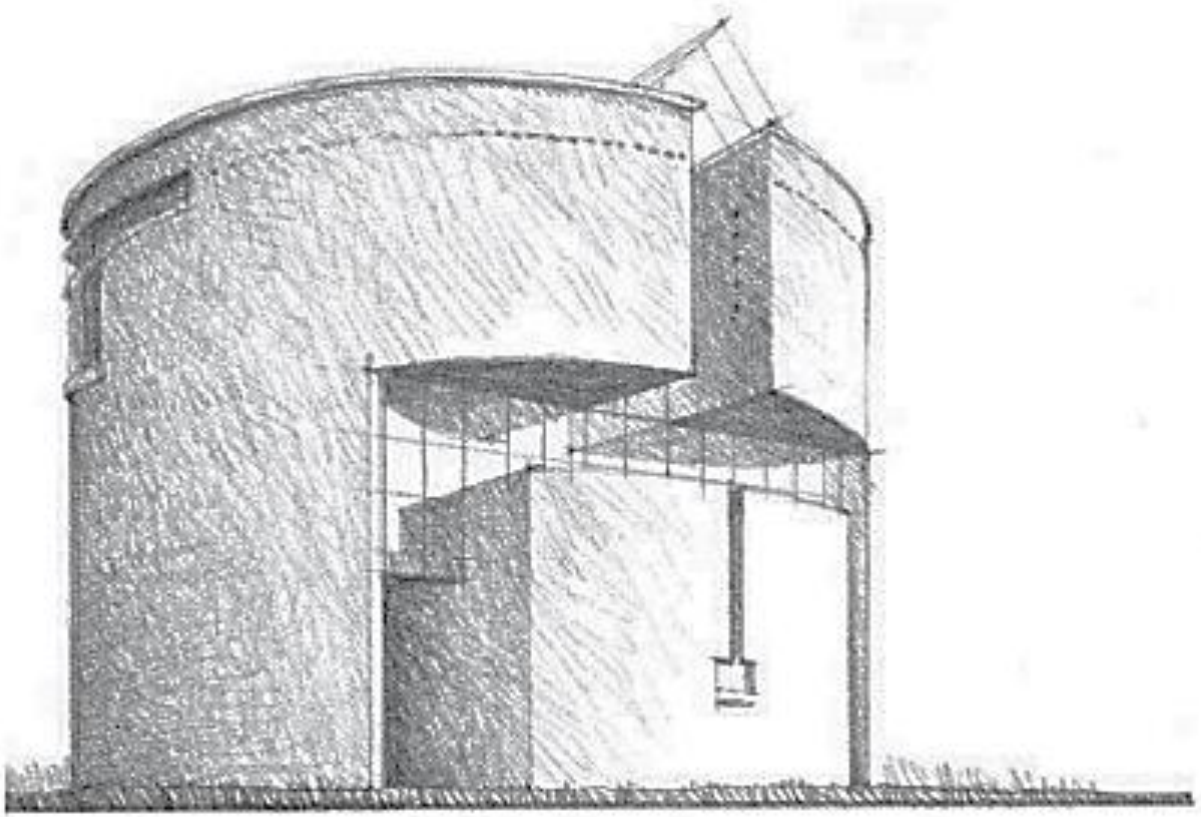




House at Poissy

Transformation of Form

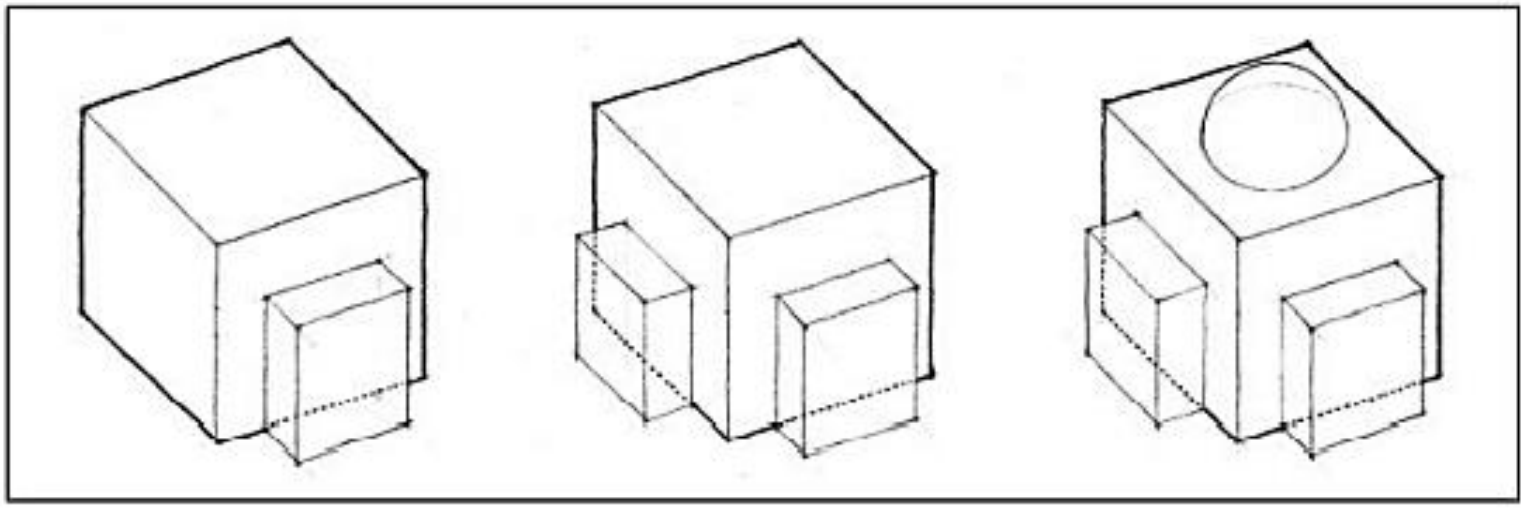
2. Subtractive Transformation



House at Stabio, Ticino, Switzerland, 1981, Mario Botta

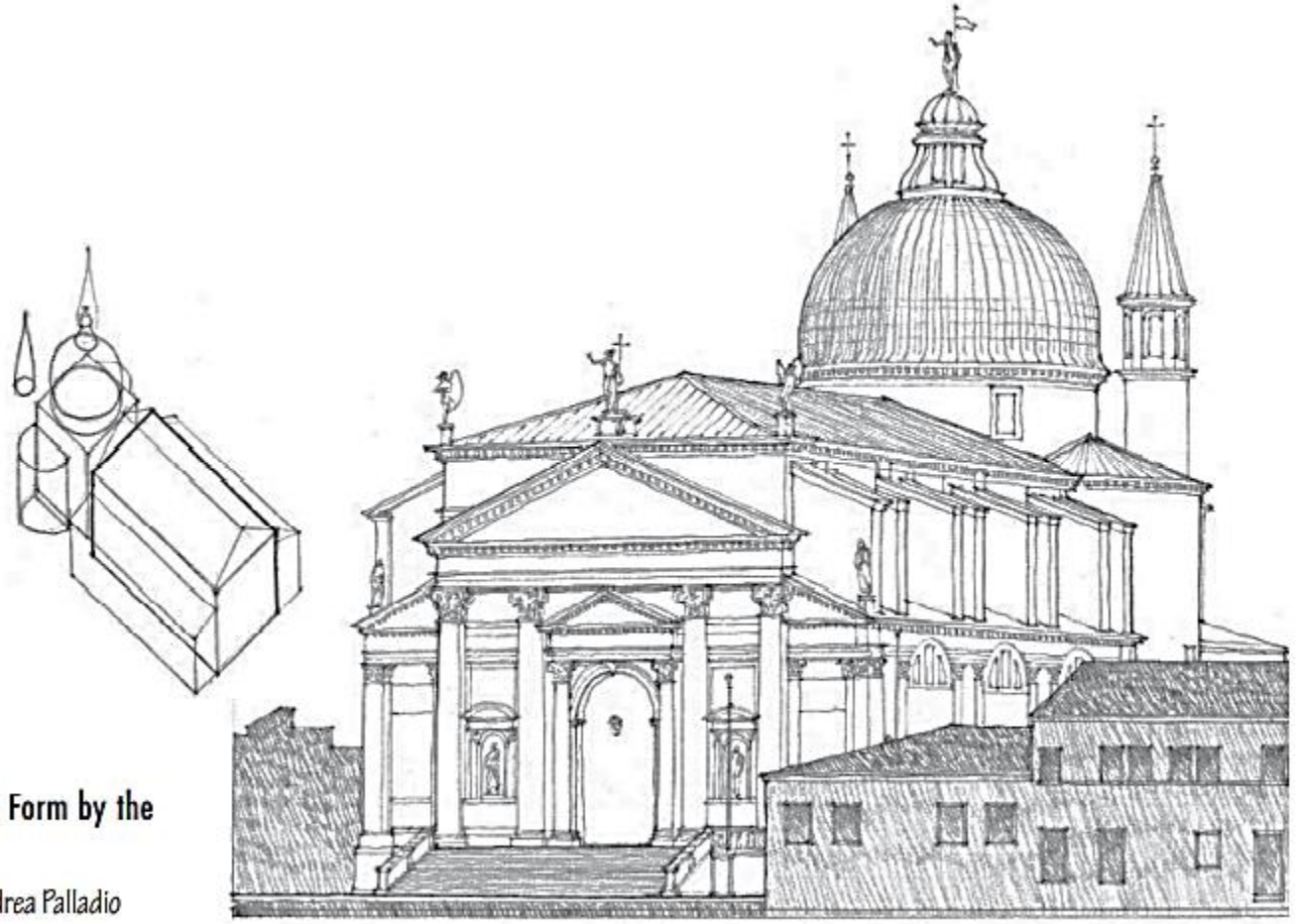
3. Additive Transformation

- 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

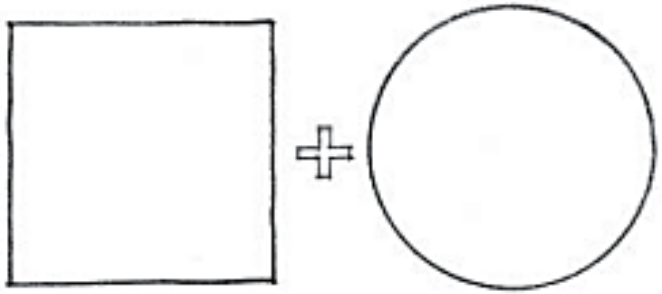
3. Additive Transformation



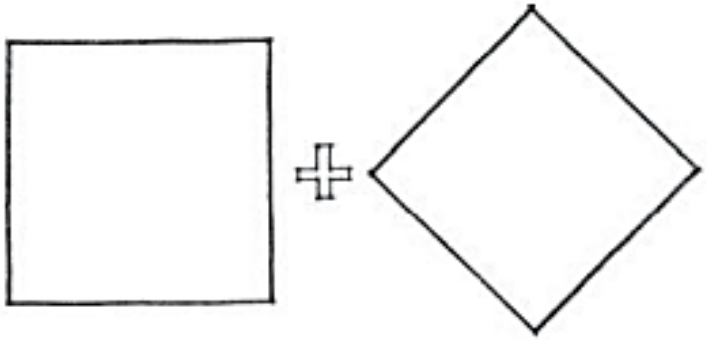
Additive Transformation of a Parent Form by the Attachment of Subordinate Parts:
Il Redentore, Venice, 1577–1592, Andrea Palladio

Formal collisions of geometry

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



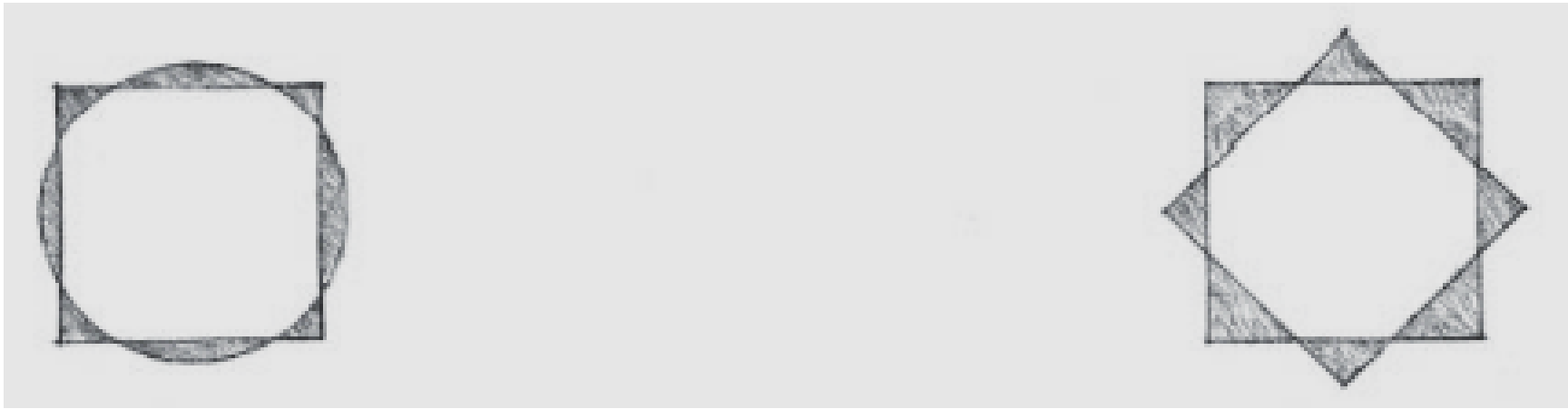
Circle and Square

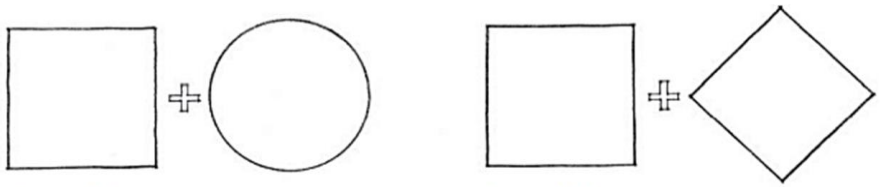


Rotated Grid

Formal collisions of geometry

1- The two forms can subvert (damage or deform) their individual identities and merge to create a new composite form.



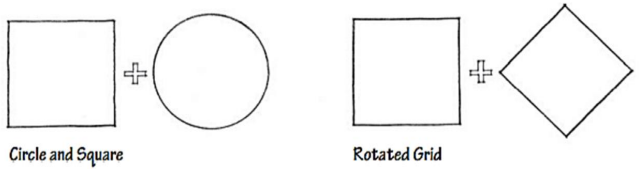


Circle and Square

Rotated Grid

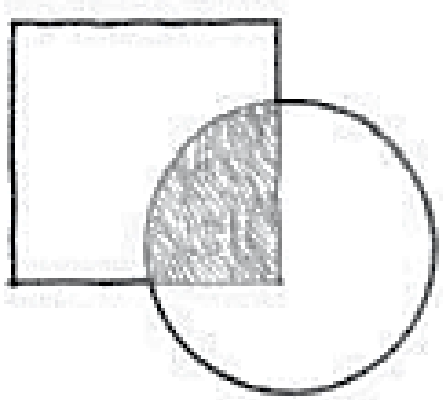
Formal collisions of geometry

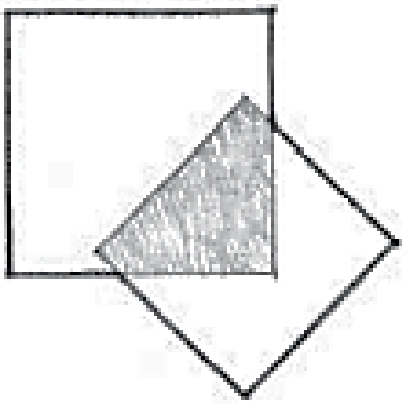
2- One of the two forms can receive the other totally within its volume

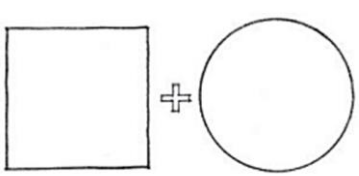


Formal collisions of geometry

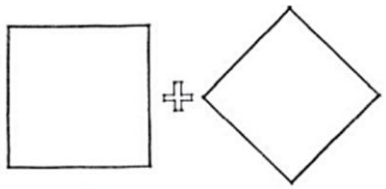
3- The two forms can retain their individual identities and share the interlocking portion of their volumes.







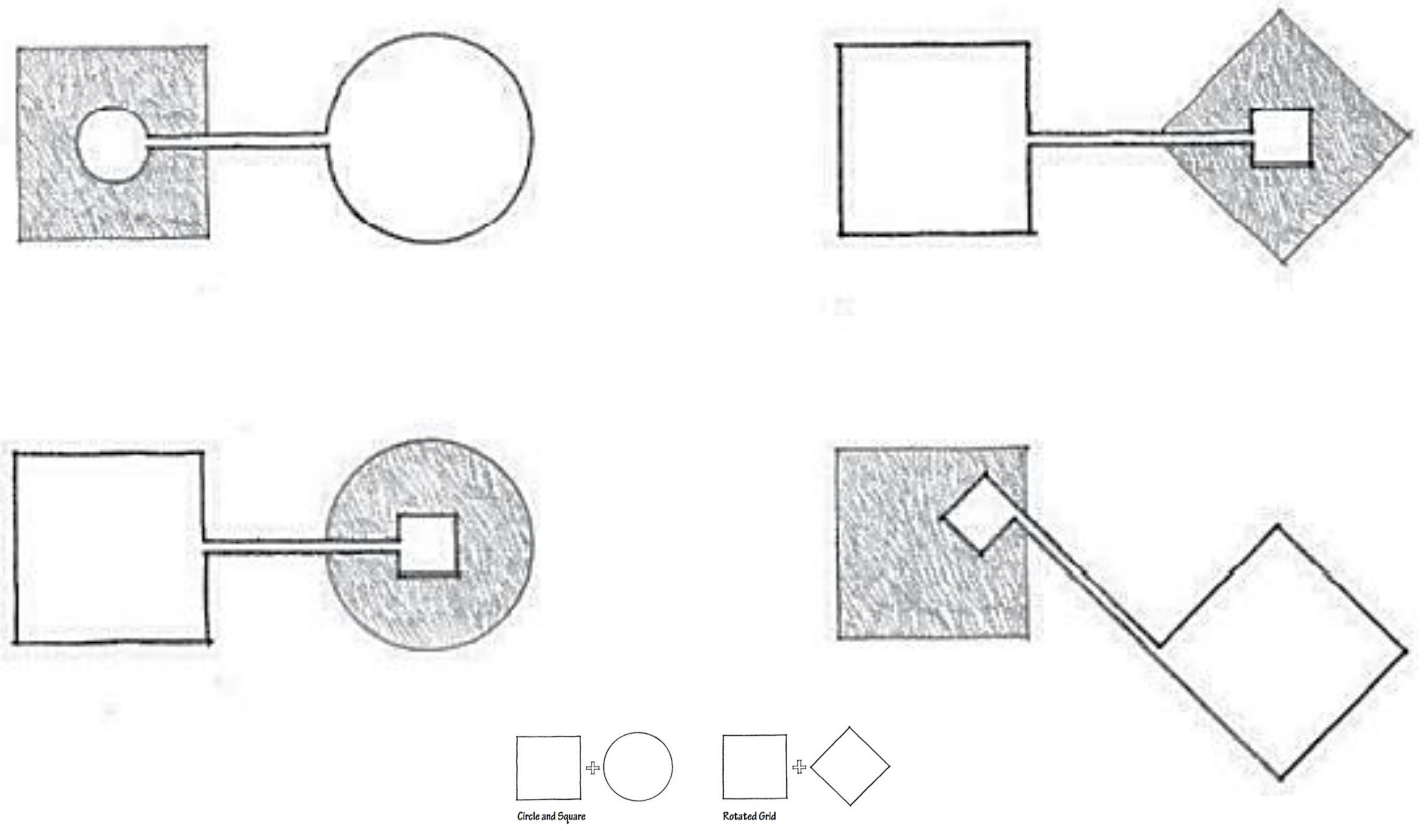
Circle and Square



Rotated Grid

Formal collisions of geometry

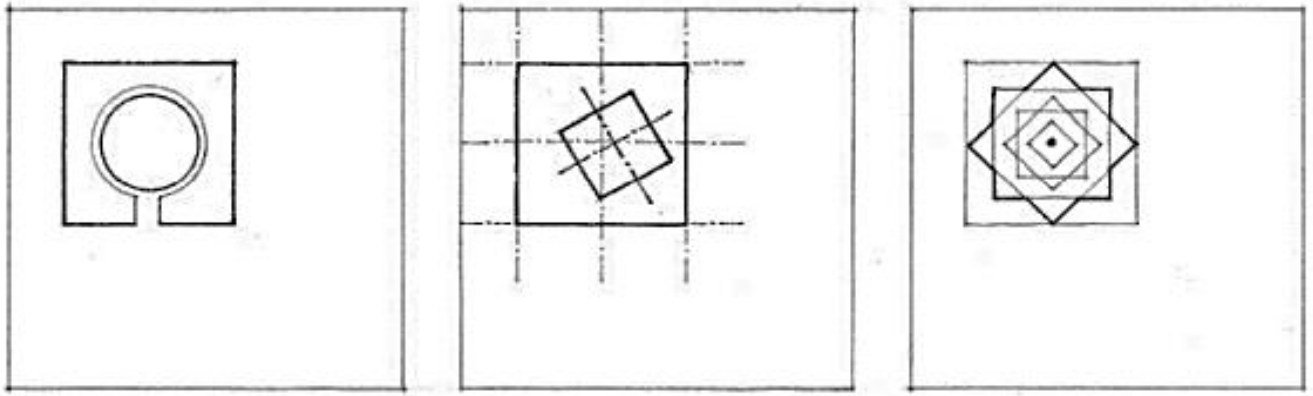
4- The two forms can separate and be linked by a third element that recalls the geometry of one of the original forms.



Reasons of forms differing in geometry or orientation

Forms differing in geometry or orientation may be incorporated (combined) into a single organization for any of the following reasons:

1- To accommodate or accentuate the differing requirements of interior space and exterior form.
2- To express the functional or symbolic importance of a form or space within its context.
3- To generate a composite form that incorporates the contrasting geometrics into its centralized organization.

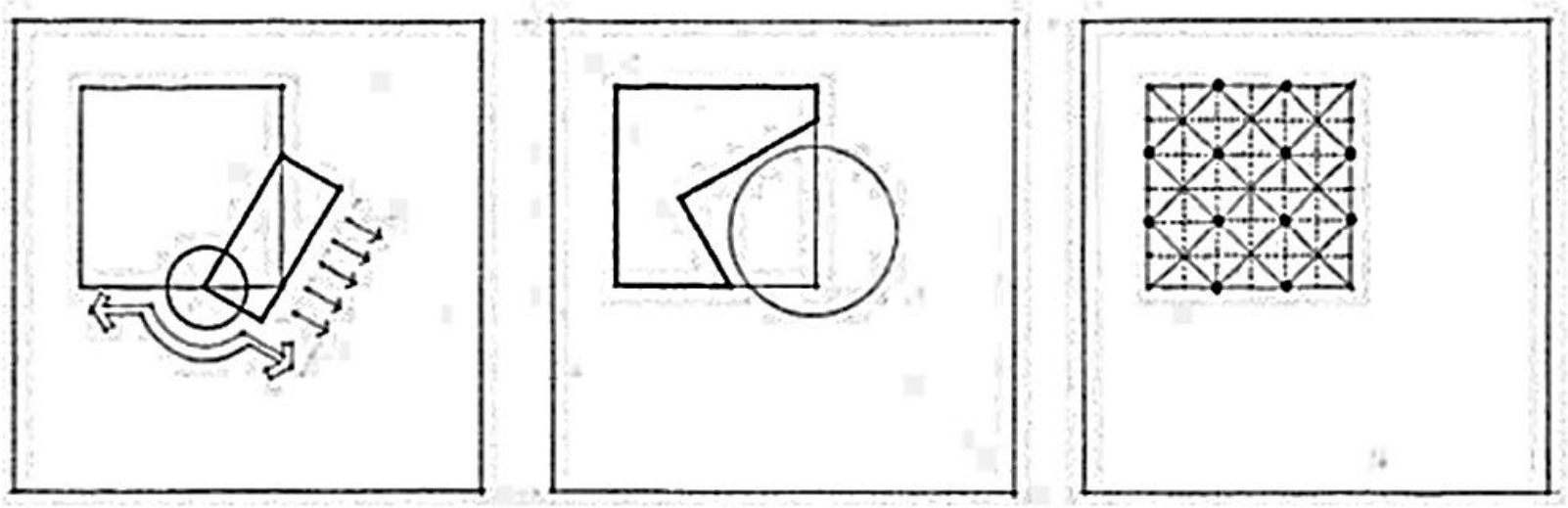


Reasons of Forms differing in geometry or orientation

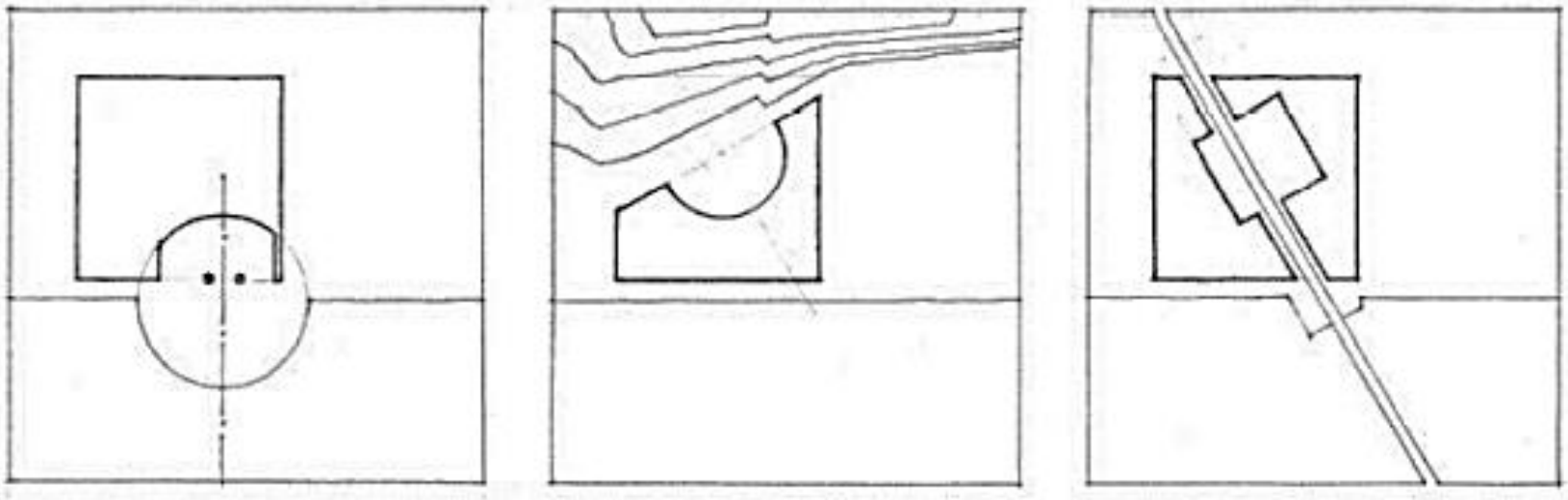
4- To inflect a space toward a specific feature of a building site.

5- To carve a well-defined volume of space from a building form.

6- To express and articulate the various constructional or mechanical systems that exist within a building form.



7- To reinforce a local condition of symmetry in a building form.
8- To respond to contrasting geometrics of the topography, vegetation, boundaries, or existing structures of a site.
9- To acknowledge an already existing path of movement through a building site.



In conclusion, This lecture was about transformation of form and formal collisions of geometry. It presented three types of Transformation; dimensional Transformation, subtractive Transformation and, additive Transformation. Also, it presented formal collisions of geometry.

- Ching, Frank, (2015). Architecture form, space and order.

Thank you