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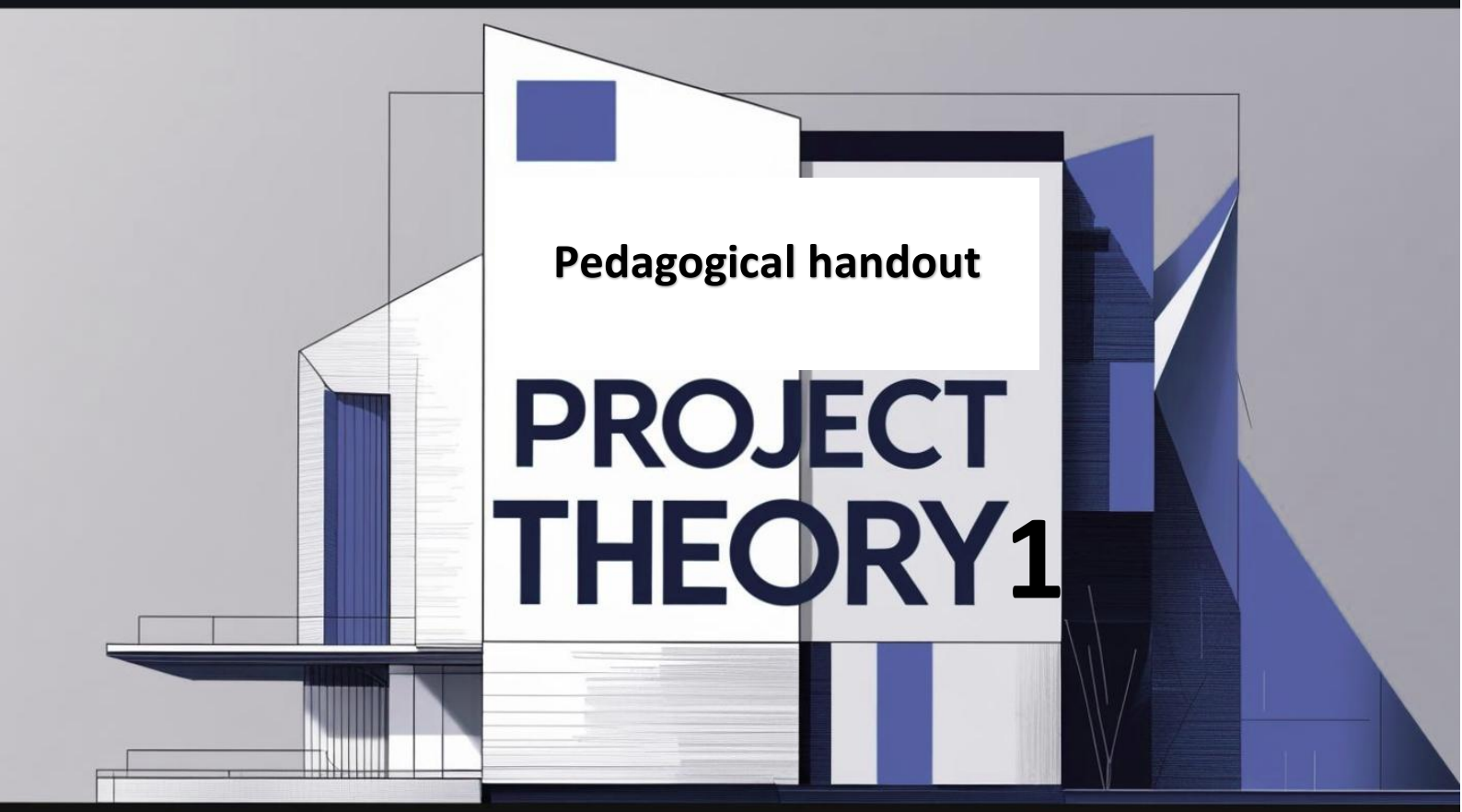
DEPARTMENT OF ARCHITECTURE



Pedagogical handout

PROJECT THEORY 1

1ST YEAR
1ST SEMESTER

SPECIALITY:
ARCHITECTURE

BY:
DR. HANA SALAH-SALAH

ASSOCIATE PROFESSOR A

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Foreword

This pedagogical handout is intended for students beginning their first year of architectural training. The objective is to develop students' abilities in spatial perception and design. Through regular and progressive learning, students will acquire foundational theoretical knowledge, practical skills, and an appreciation for form and space.

General Objective:

To cultivate abilities in spatial perception and design. This course provides structured and progressive learning, enabling students to build a strong foundation in theoretical concepts, practical skills, and an appreciation for the beauty and complexity of architectural form and space.

Specific Objectives:

- Understand and Remember: Acquire foundational knowledge and comprehend key concepts in the field. Familiarize with architectural language.
- Applying and Analyzing: Develop practical skills in organizing and composing elements to create coherent compositions.
- Evaluating: Critically evaluate and reflect on the aesthetics of form and spatial design.

Recommended Prior Knowledge:

A basic understanding of geometry and general knowledge is recommended. These foundational skills will support learning and help students grasp more complex architectural concepts and practices.

This handout is designed to guide students through the foundational year of architectural training, focusing on the transformation of ideas into tangible forms that shape the built environment.

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- Chapter 2 : Laws of Vision and Coherence Factors
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Unit 1 : Composition in Architecture

Objectives:

By the end of the course, students will be able **to remember** the basic rules of architectural composition, **understand** how design can be combined, **use** design theories to make coherent proposals**, analyse** existing works to find compositional strategies, **judge** the usefulness of different design solutions to meet functional and aesthetic needs, and **make** original architectural compositions that combine the principles learned with new approaches

Unit introduction

To compose means grouping together elements to form a homogeneous and complete whole, in such a way that no part can be self-sufficient, but that all are subordinated to a common element of interest, the centre and raison d'être of the composition. (Le Cobusier, 1968)

The chapters of the unit will first address the **laws of vision and factors of coherence**, which form the foundation of architectural perception and how forms are perceived in space. Next, the **laws of composition and essential concepts** will provide a theoretical framework for analyzing and developing structured architectural projects.

The course will also focus on the **primary elements of form**, emphasizing the fundamental components that define architecture. Finally, the section on **generation and transformation of form**, as well as **modes of association**, will explore the methods by which forms can be created, modified, and combined to design innovative spaces.

Through theoretical discussions, case studies, and practical work, this course aims to equip students with the necessary skills to develop their own architectural language and prepare them to approach projects in a creative and thoughtful manner.

Chapter 1: Primary Elements of Form

Introduction

This chapter introduces the primary elements of form as the fundamental concept in architecture and design. These elements shape spatial compositions, influencing scale, proportion, and orientation.

Understanding the unique properties of primary elements of form allows learners to understand their practical use in architecture.

1.About Primary Elements in geometry

Architects often start with basic elements—point, line, plane, and volume—to create a variety of spaces. By using these primary elements, they can develop both simple and complex formal systems to design spaces.

The process involves transforming these fundamental forms through various techniques such as scaling, rotating, intersecting, or layering, leading to a wide range of architectural expressions. (Ching, F. D. K., 1979)

- The point**:** indicates a position in space.
- The extension of points forms a line characterized by its:
  - -Length
  - -Direction
  - -Position
- The extension of lines forms a surface characterized by:
  - - Length and width
  - - Shape
  - - Surface area
  - - Position
  - - Orientation

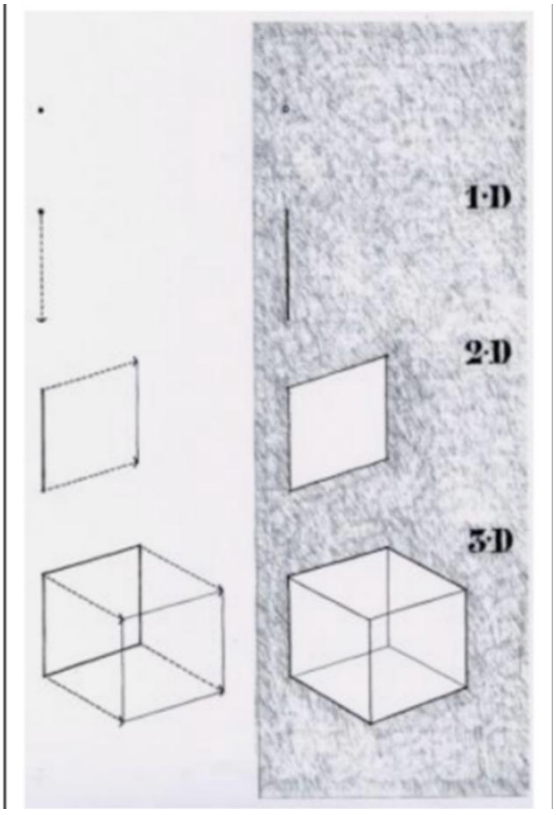


Figure 1: Primary Elements in geometry

(Ching, F. D. K., 1979)

- By extension, flat surfaces become volumes with the following characteristics:

  - Length, width, depth

  -Shape

  -Surface area

  -Position

  -Orientation

2. Interpretation of primary geometric elements in Architecture

2.1Interpterion of the point

Conceptually, a point is dimensionless and static, serving as a marker of centrality.

It can manifest as the vertical projection of a column, an obelisk, or a tower.

As the first element of the formal vocabulary, the point can be used as :

- ✓ Line boundaries
- ✓ Intersection of two lines
- ✓ Meeting of lines at the corners of a surface
- ✓ The center of a surface or volume

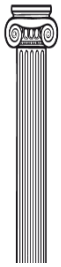


Figure 3: Architectural materialization of a point

2.2Interpterion of lines

Architectural composition involves the arrangement and interaction of different types of lines, which serve as the building blocks for creating forms and defining spaces.

Each time a line changes shape, it alters the message it conveys.

- **Straight lines**

Straight lines, are the shortest distance between two points, representing qualities like strength and clarity. They suggest continuity and stability, helping to create order in architectural designs while guiding the viewer's eye for a pleasing visual experience.

Horizontal lines evoke calm, vertical lines symbolize height, and oblique lines add dynamism to architectural compositions.

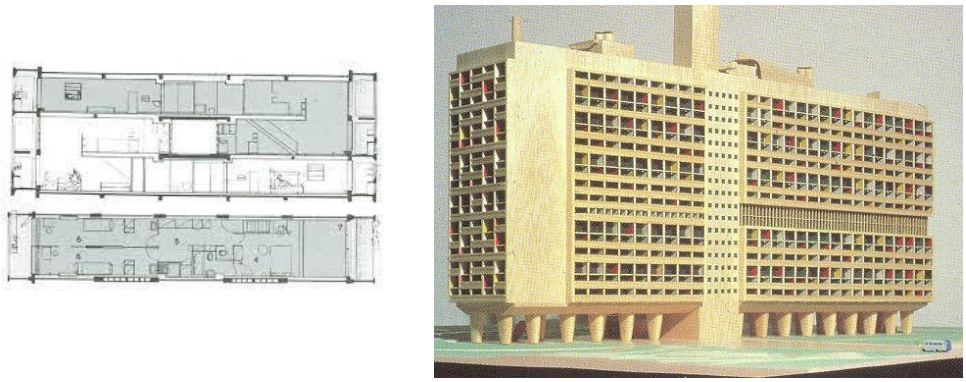


Figure 5: La cité radieuse Marseille. France by le Corbusier

https://lecorbusier-worldheritage.org/

- **Curved lines**

Curved lines, create a feeling of movement and smoothness, allowing for flow between shapes. They add qualities like flexibility and ease, making architectural designs more welcoming. The soft, flowing nature of curved lines encourages viewers to interact with the space in a dynamic and enjoyable way.

Figure 6: The curved line in the Cultral center Heydar-Aliyev/ Bakou Azrabidjan By Zaha Hadid *https://www.archdaily.com/448774/heydar-aliyev-center-zaha-hadid-architects*

- **Broken lines**

Broken lines lack straightness and continuity, giving them a more intense and expressive quality. They can convey feelings of agitation and confusion, suggesting instability and movement. This irregularity adds a sense of speed and energy to designs, making them feel dynamic and alive.

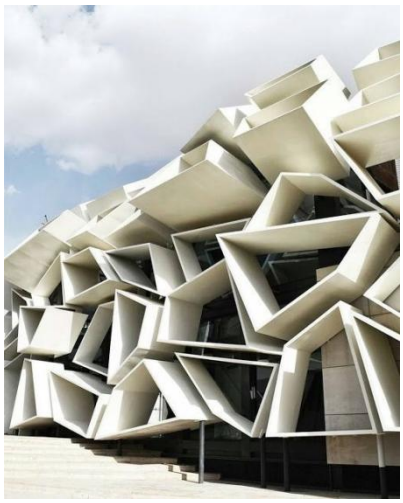


Figure 7: The broken line Gallery of Greenland convention Center, Iran by Mehrdad Iravanian Architects / *https://www.archdaily.com/professional/mehrdad-iravanian-architects*

3.Surfaces and their interpretation

Surfaces in architecture are closely related to primary shapes, such as squares, circles, triangles, and polygons, which serve as the foundational forms for creating spatial boundaries. These primary shapes provide the basic structure from which surfaces emerge, giving them defined edges and planes.

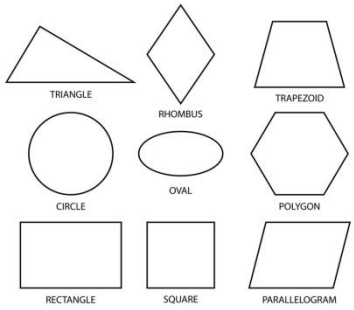


Figure 8:2D geometrical shapes

Polygons, as multi-sided shapes, play a significant role in architectural design due to their versatility and ability to generate complex forms. These shapes, defined by three or more straight sides, can range from simple triangles and quadrilaterals to more intricate pentagons, hexagons, and beyond. Their geometric properties allow for various configurations that can be used to create unique patterns, structural frameworks, and spatial divisions.

In architecture, the angles of polygons play a significant role in shaping spatial experiences:

- Acute angle**:** the form tends to close in on itself, and the viewer, actively called upon, is drawn in, trapped.
- Obtuse angle: The viewer is slightly drawn in and held back.
- Right angles: The most stable.

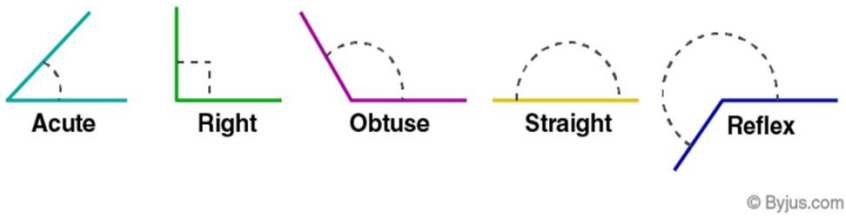


Figure 9: Different angles in Geometry

In architecture, surface elements define three fundamental types of plans:

- **The Roof:** Acts as the upper boundary, providing shelter and influencing the building's form and aesthetics.
- **Walls:** Enclose and delineate space, supporting the structure while defining room layouts and circulation paths.
- **The Base:** represents the lower surface that supports the building, establishing its footprint and connection to the ground.

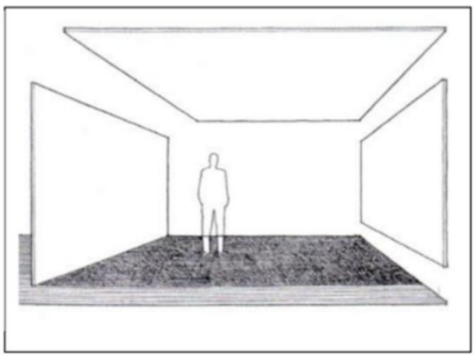


Figure 10: Fundamental types of plans

CHING, F. D. K.,(1979)

Conclusion

The manipulation of primary elements of geometry allows for innovative design solutions that respond effectively to both functional needs and aesthetic considerations. This exploration naturally leads to the concept of the laws of vision, which will be developed in the next chapter.

Chapter 2 : laws of Vision and coherence factors

Introduction

In architecture, understanding how people perceive and interact with spaces is crucial for creating pleasing environments. The concepts of **vision laws** and **coherence factors** help us understand how visual elements are arranged in a space and how they affect our experience within that space.

1. Laws of Vision and Legibility in Architectural Composition

The laws of vision play a critical role in establishing legibility within architectural compositions. It is closely linked to the laws of vision, which can be categorized into two key principles:

1.1 Physiological Mechanisms

Physiological mechanisms relate to the biological aspects of vision, influencing how users perceive architectural elements. Key points include:

- Ocular Stereometry: Depth perception from binocular vision informs spatial design.
- Retinal Sensitivity: Light detection affects visibility; effective lighting enhances legibility.
- Iris Adaptation: Iris adjustments to light levels require balanced lighting to prevent glare.
- Viewing Angle: Perspective influences engagement; strategic element placement enhances visual interest.

1.2 Psychological Principles

Perception is the psychological aspect of vision, where the brain interprets and makes sense of what the eyes see. It involves using sensory information to understand the world around us. This process helps us experience and organize our environment in meaningful ways.

One important idea for understanding perception is Gestalt theory

2.Gestalt theory

Gestalt theory, which originated in Germany in the early 20th century, aims to explain how we perceive the world around us by focusing on the idea that we naturally organize sensory information into unified wholes. Instead of seeing a collection of separate details, our minds tend to group elements together to form a complete picture.

For example, when we look at a landscape, we don't just see individual trees, hills, and clouds; we see an entire scene. This way of perceiving helps us simplify complex visual information and make sense of it more easily.

Figure 11: The overall perception of a shape precedes the details

[illustration, artist not attributed]

2.1Law of Pragnanz (Simplicity)

also called the "Law of Simplicity," means that we see things in the simplest way possible. When we look at complex or confusing pictures, our brain tries to organize them into simple and easy-to-understand shapes. It helps us make sense of what we see quickly and without much effort.

Caption: The **duck-rabbit illusion** is a good example that relates to the **Law of Pragnanz**. In this image, you can see either a duck or a rabbit, depending on how you look at it. The brain tries to simplify the picture by seeing one clear shape at a time, either a duck or a rabbit, even though the drawing could represent both.

Figure 12: Duck-rabbit illusion. Law of Pragnanz

[illustration, artist not attributed]

2.2 Law of Proximity

Elements that are close to each other are perceived as being part of the same group. For instance, when we see dots that are close together, we naturally group them as clusters rather than individual points.

2.3 Law of Similarity

Objects that are similar in shape, color, size, or other attributes are perceived as belonging together. For example, we tend to group similar colors or shapes even if they are interspersed with different ones.

2.4 Law of Continuity

Our eyes prefer to follow continuous lines or curves rather than disconnected or disjointed shapes. This means we perceive smooth, flowing forms instead of a series of broken parts.

2.5 Law of Closure

The brain tends to fill in missing parts of a visual image to create a complete, recognizable pattern. For example, when a shape is incomplete, we can still perceive it as a whole, such as seeing a circle even if a segment is missing.

2.6 Law of Figure-Ground

We tend to separate visual fields into a figure (the object of focus) and a ground (the background). This allows us to distinguish objects from their surroundings, such as recognizing a shape against a contrasting backdrop.

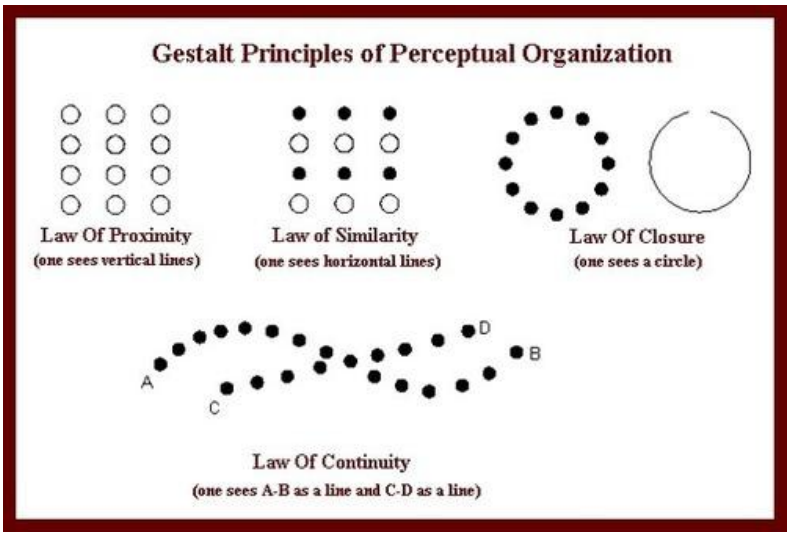


Figure 13: Gestalt principles: proximity, similarity, continuity, closure,

https://quizlet.com/486535574/working-with-clients-flash-cards/

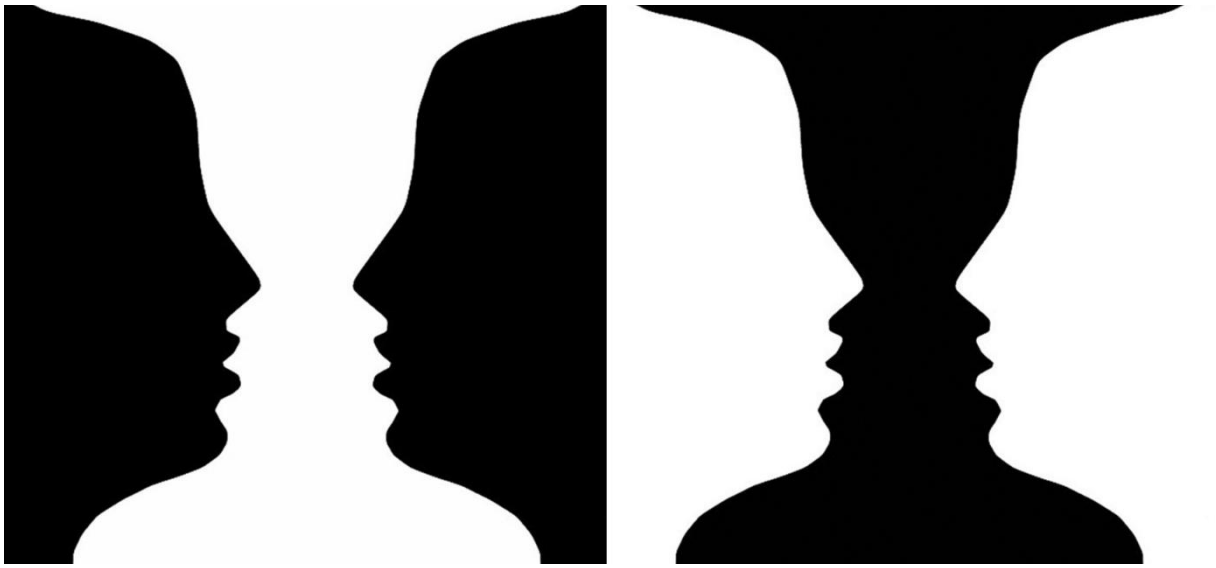


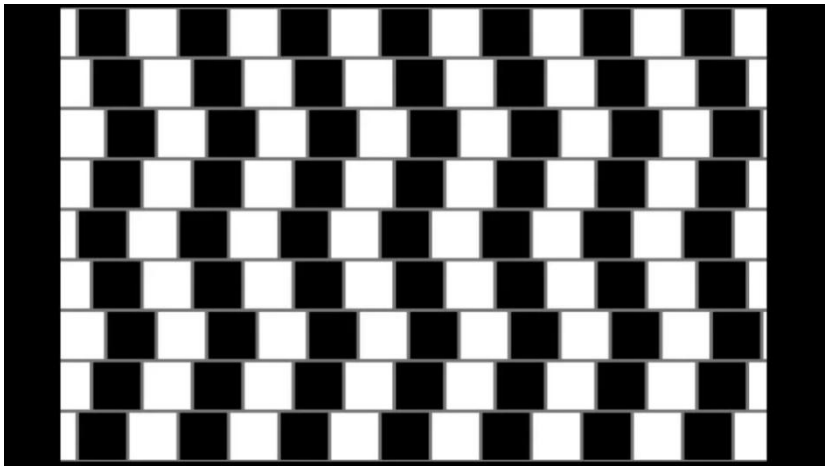
Figure 14: Law of Figure-Ground

[illustration, artist not attributed]

3.Optical illusion

3.1 Trompe l'oeil

An optical illusion is a visual perception that contradicts the reality we may experience otherwise
When viewing an optical illusion, it is not the eye that is malfunctioning; instead, it is the brain's interpretation that is incorrect.



Caption: They appear to be slanted, but these lines are perfectly parallel. This effect is called the illusion of parallelism or parallel lines illusion .

Figure 15: Coffee wall illusion [Fibonacci]

https://en.wikipedia.org/wiki/Caf%C3%A9_wall_illusion#/media/File:Caf%C3%A9_wall.svg

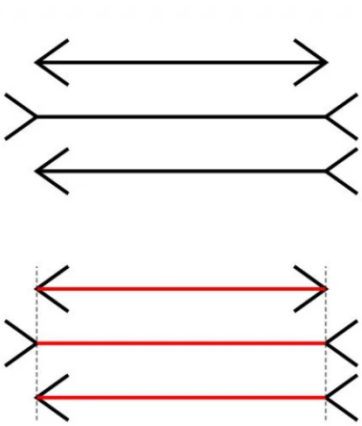


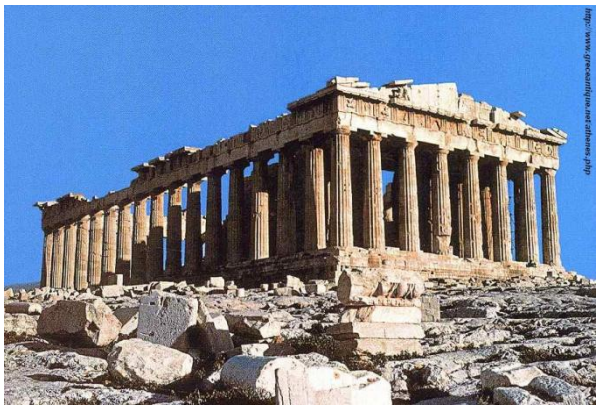
Figure 16:Müller-Lyer illusion.

https://fr.wikipedia.org/wiki/Illusion_de_M%C3%BCller-Lyer#/media/Fichier:M%C3%BCller-Lyer_illusion.svg

3.2 Optical illusion in architecture

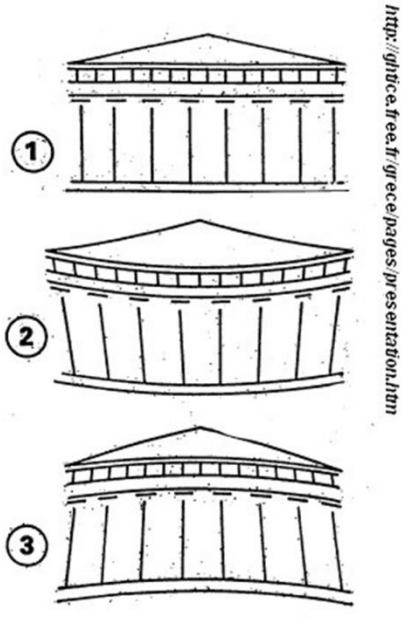
We can encounter trompe l'oeil effects in the architecture of certain buildings.

Sometimes, this is done for the sake of balance and proportions, as seen in the Parthenon which employs a unique architectural approach to adhere to classical ideals.



Caption: The Parthenon is an ancient temple on the Acropolis of Athens, dedicated to the goddess Athena. Built in the 5th century BCE during the Athenian Empire's height, it exemplifies classical Greek architecture with its Doric style and stunning sculptures, including a famous statue of Athena by Phidias..

Figure 17: The Parthenon on Athens



Caption :

1. How the temple appears
2. How the temple would look if it had been built completely vertically and horizontally.
3. How the temple **was actually built**. The columns are curved inwards. The base, steps, architecture and pediment are convex.

Figure 18: The use of trompe-l'œil in the parthenon

Figure 19: The use of trompe-l'œil in contemporary architecture

Conclusion

In conclusion, the laws of vision provide insights into how visual perception works and how visual information is interpreted. These principles illustrate the ways in which the mind organizes visual elements. The subsequent chapter will examine the laws of composition, focusing on how these perceptual principles guide the arrangement and organization of elements in design and art, ultimately leading to balanced and effective compositions.

Chapter 3: Laws of composition

Introduction

This chapter presents the fundamental principles for creating architectural compositions, focusing on how different elements can be arranged to achieve a clear design. It also examines key concepts that influence the perception and experience of visual works, establishing a foundation for mastering composition across various design fields such as: Harmony, Balance the rhythm, The focus, The recall and The hierarchy.

1.Harmony

Harmony in architectural composition is achieved through the balanced relationship between all elements of a design, such as shapes, volumes, and lines.

It involves creating a dominant and recessive aesthetic interaction, where each component contributes to a unified whole. As the ultimate goal of architectural composition, harmony ensures that all parts of the design work together.

Tools like the Golden ratio play a fundamental role in achieving this balance, guiding the proportions and relationships within the composition to create a visually pleasing and coherent design.

1.1The Golden Ratio

Also known as the golden section or divine proportion, is a fundamental tool for creating harmony in architectural composition. It is a geometrically defined proportion where the ratio of two quantities is the same as the ratio of their sum to the larger of the two quantities. Mathematically, this ratio is approximately equal to 1.618 and is often represented by the Greek letter φ (phi).

The Golden Ratio can be expressed with the formula:

$$(a + b)/a = a/b$$

The ration a/b is equal to the Golden Ratio: φ = 1,6180339887

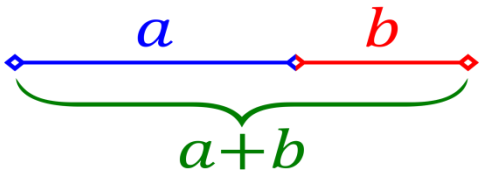
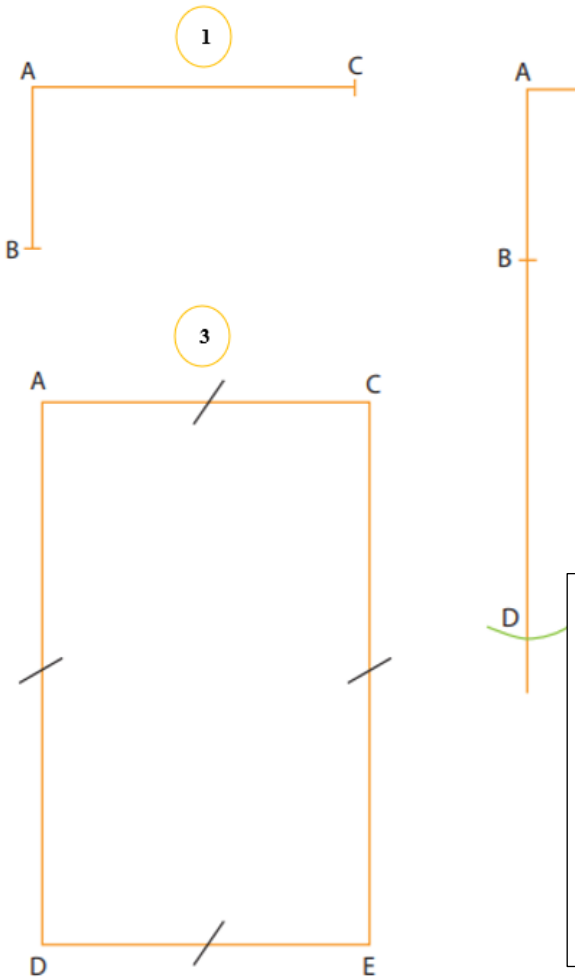


Figure 20: The golden ratio

This proportion has been used throughout history to create aesthetically pleasing and balanced designs, as it naturally appears in various forms in nature and has been applied in iconic works of architecture and art to achieve visual harmony.

Examples of golden shapes

The golden rectangle



Caption:
1.Start by constructing two perpendicular segments [AB] and [AC] such that the length of [AC] is twice that of [AB].

2.Draw an arc of a circle with center B and radius BC, this radius intersects the half-line [AB) at D.

3.Complete your rectangle by drawing the segment parallel to [AD] and of the same length, and the segment parallel to [AC] and of the same length.

Figure 21: The golden Rectangle

To obtain the Phibonacci Spiral **(Golden spiral)**

1. Start by constructing a golden rectangle in which you draw a large square with sides the width of the rectangle.
2. In this smallest rectangle, build a new square with sides the width of the rectangle.
3. Continue as shown below.

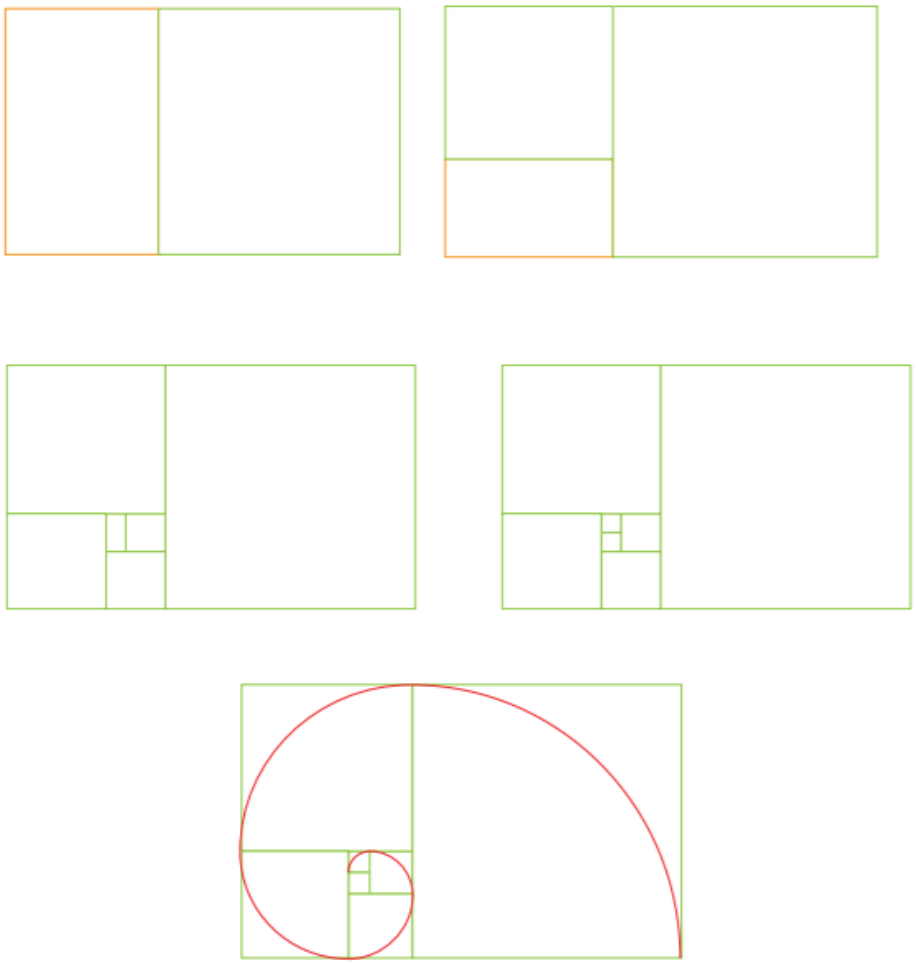


Figure 22: The Golden spiral

1.2 The golden ration and the human proportion

When applied to human proportions, the Golden Ratio can be seen in various measurements of the body.

The Golden Ratio is linked to Leonardo da *Vinci's Vitruvian* Man, which shows ideal human proportions based on Vitruvius's[1] ideas. The figure is drawn inside a square and a circle, representing harmony between the human body and shapes. The ratios in the drawing match the Golden Ratio, showing how human form can reflect beauty and balance in nature, art, and architecture.

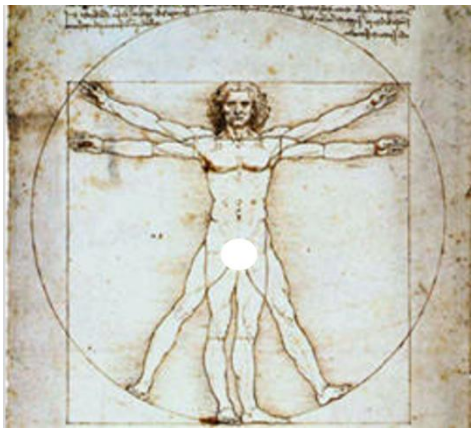


Figure 23: The Golden Ratio and Vitruvian Man

Similarly, architect Le Corbusier used the Golden Ratio in his design system called the Modulor. Modulor" is a word composed of 'modulus' and 'golden ratio'. This system focuses on human measurements and uses the Golden Ratio to create spaces that look good and work well.

For example, the ratio between height (1.83 m) and average navel height (1.13 m) is equal to 1.619, the golden ratio to the nearest thousandth.

The standard human height of 1.83 m is based on the observation of traditional European architecture and the use of the proportions of this unit to create architectural harmony.

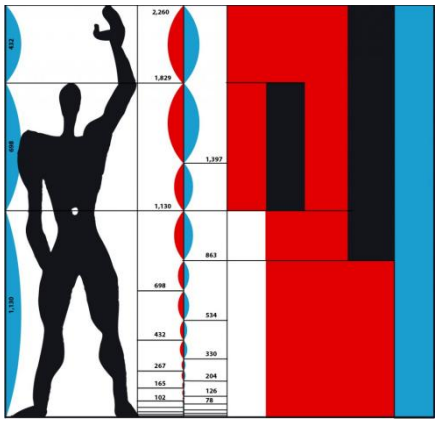


Figure 24: The modulor by le Corbusier

Le Corbusier (1986)

[1] *Vitruvius* was an ancient Roman architect and engineer known for his work *De Architectura*,

1.3 The use of golden ratio in architecture

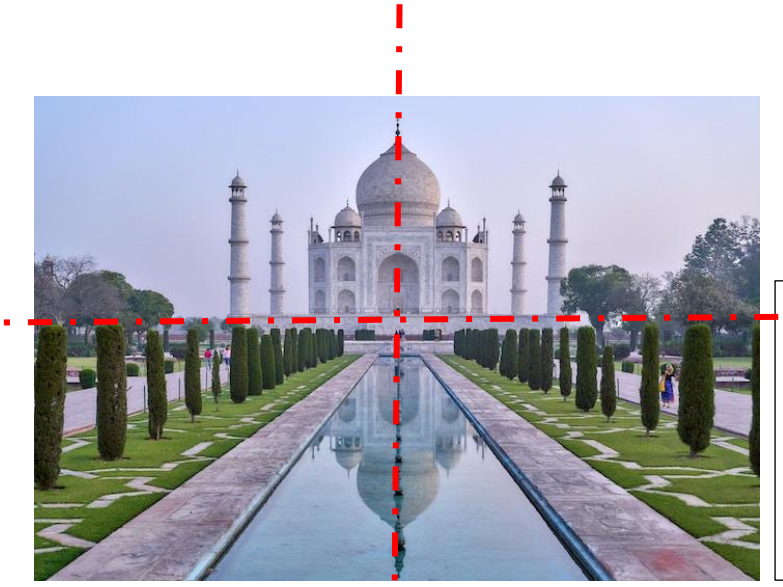
The Golden Ratio is often used in architecture to create balanced and attractive designs. It helps in deciding the proportions of different parts of a building, such as the height and width of walls, the size of windows, or the layout of rooms. By following this ratio, architects can make sure that all parts of a structure fit together in a pleasing way.

Many famous buildings, like the Parthenon in Greece and the Notre-Dame Cathedral in Paris, have used the Golden Ratio in their design. Even today, architects use it to create spaces that look more elegant and well-proportioned. Its use helps buildings feel naturally beautiful and harmonious.

2.The balance

Balance is based on the principle of compensating masses, shapes, colors, light and shadow in relation to the center of interest. It creates a sense of harmony, ensuring that no part appears too dominant or overwhelming.

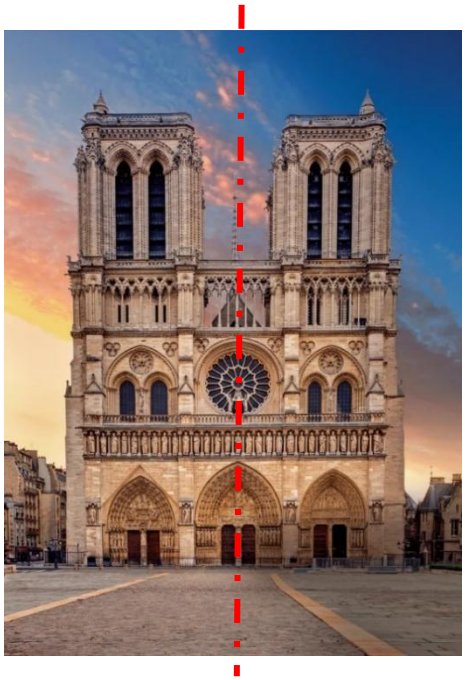
Balance is often linked to symmetry: “In elementary Euclidean geometry, axial or reflection symmetry is a geometric transformation of the plane that models a ‘folding’ or ‘mirror effect’.



Caption: The Taj Mahal is a stunning mausoleum located in Agra, India, built by Mughal Emperor Shah Jahan in memory of his beloved wife, Mumtaz Mahal. Construction began in 1632 and was completed in 1653, making it a prominent example of Mughal architecture, which combines elements of Persian, Indian, and Islamic styles.

Figure 25: The Taj Mahal in Agra India

https://whc.unesco.org/fr/list/252/ readapted by author



Caption:
Notre-Dame de Paris is a historic Gothic cathedral in Paris, France. Built between 1163 and 1345. The cathedral has significant historical importance

Figure 26: Cathedral 'Notre Dame de Paris

https://www.nationalgeographic.fr/histoire/2019/04/notre-dame-de-paris-800-ans-dune-histoire-complexe

3.Rhythm

The repetition of identical elements, their succession, can create a rhythm that energizes the composition and sets it in motion. Rhythm can also be achieved by alternating different elements, like mixing large and small shapes or using varying colors. This kind of contrast adds variety and keeps the design interesting while still giving it a sense of flow.

Rhythm through alternation is created by using different elements in a repeated sequence, such as varying shapes, sizes, colors, or textures. This kind of rhythm brings contrast and variety to a design, keeping it interesting while still providing a sense of flow.

Figure 27: Rhythm through repetition of elements

https://www.archdaily.com/472733/princess-alexandra-auditorium-associated-architects-llp/52eafd15e8e44e2dbe000077

Rhythm through repetition is achieved by repeating the same elements, such as shapes, lines, colors, or patterns, throughout a design. This repetition creates a steady and predictable flow that guides the viewer's eye across the composition.

Figure 28: Rhythm created by alternating elements

https://www.brique.be/realisations/revue-terre-cuite-et-construction/3033/lignes-de-force-couleurs-et-rythme-4-2020/

4.The focus (the center of interest)

The focus, or center of interest, is the main part of a design that grabs attention. It stands out because of its position, shape, color, or contrast with other things around it.

By placing the focus at the center, the design guides the viewer’s eyes to the most important part, making it the main feature of the composition.

Figure 29: La Villette Paris parc, Eye-catching

https://www.lageode.fr/

Figure 30:Le Louvre Museium Paris, Center of interest by contrast

https://presse.louvre.fr/le-louvre-celebre-la-nuit-europeenne-des-musees/

5.The Recall

The recall is an element similar to the focal point but with a softer tone or intensity. It acts like an echo of the main focal point, creating a weaker repetition to maintain balance in the composition.

By using the recall, the design adds subtle harmony and supports the focal point, giving depth without distracting from the main focus.

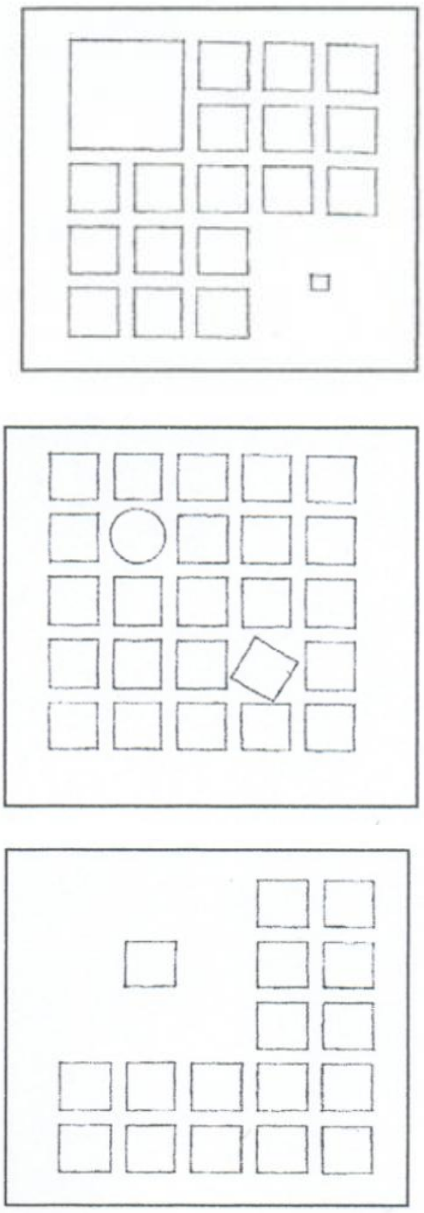
Figure 31: The recall in the Cultral center Heydar-Aliyev/ Bakou Azrabidjan, by Zaha Hadid

https://www.azernews.az/culture/56527.html adpted by author

6.The hierarchy

Hierarchy refers to the relative importance of elements within a design. It indicates how elements are prioritized, distinguishing between primary and secondary components.

This system of ranking establishes a relationship of dependency among the elements, guiding the viewer's attention and helping to organize the composition effectively. By using hierarchy, designers can create a clear structure that highlights the most important features while providing context for the secondary ones.



Hierarchy by Shape:
Different shapes can convey varying levels of importance.

Hierarchy by Size:
Size plays a crucial role in hierarchy. Larger elements naturally attract more attention and are often seen as more important.

Hierarchy by Arrangement:
The arrangement of elements in a composition also affects hierarchy. Placing a key element at a prominent position draws immediate attention.

Figure 32: Different ways to have hierarchy

HAMMOU A.,2010

Conclusion

This chapter provides practical insights and techniques that can be applied to develop well-structured and aesthetically pleasing designs. Using these techniques, designers can create compositions that are not only visually appealing but also effective in communicating their intended message.

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Chapter 4: Association modes

Introduction

By association modes, we refer to the different spatial arrangements that allow primary elements to be organized effectively within a composition.

The main modes of association are:

- Centralized organization
- Linear organization
- Radial organization
- Clustered organization
- Gridded organization

1.Centralized organization

This association mode features a stable, concentrated composition made up of elements that are grouped around a central space. This layout creates a sense of focus and unity, allowing the viewer's eye to be drawn toward the central area.

By organizing elements in this way, designers can emphasize the importance of the central space while maintaining a harmonious balance among surrounding components.

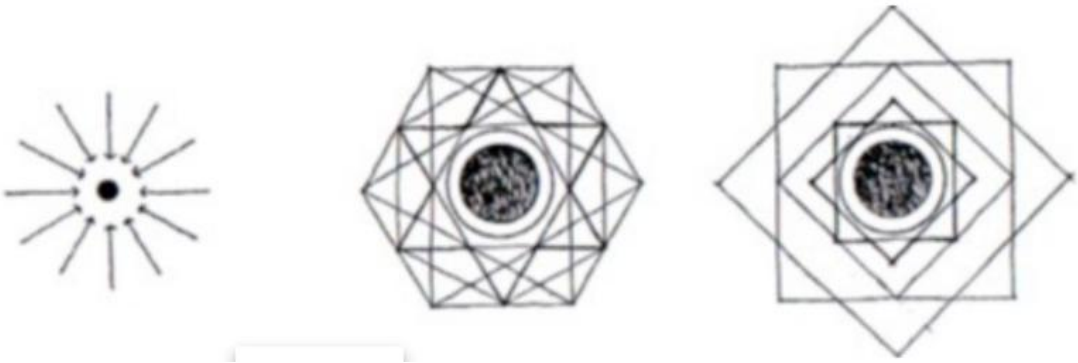
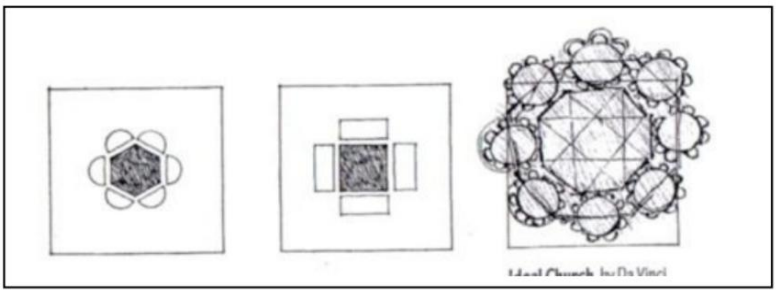


Figure 33: Centralized organization

CHING, F. D. K. (1979)

This layout can be either symmetric or asymmetric, but it generally creates a sense of focus and unity, drawing the viewer's eye toward the central area. Centralized organization is often seen as introverted.

Symmetric



Asymmetric

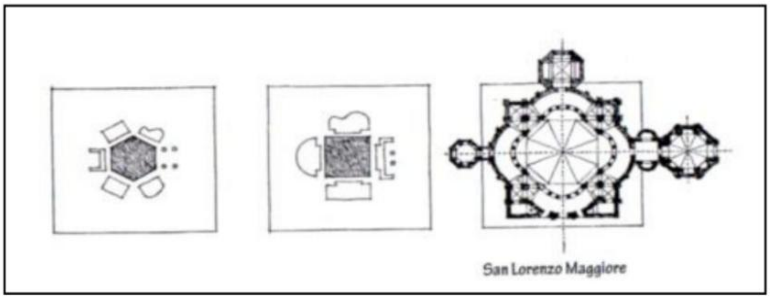


Figure 34: Symmetric/Asymmetric centralized composition

CHING, F. D. K. (1979)

2.Linear organization

A linear organization is essentially the repetition of a series of spaces similar in function, form or dimension.

The most important spaces from a functional or symbolic point of view may occupy a particular position in this composition: in the center, at the edge, set back, etc.

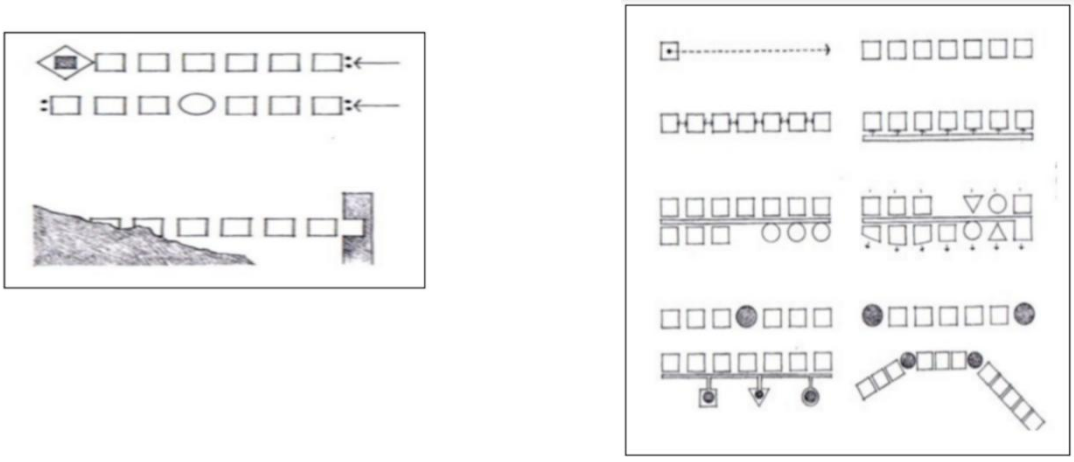


Figure 35: Linear composition

CHING, F. D. K. (1979)

The linear structure of this organization expresses direction, movement, extension and growth. To avoid this growth, the linear organization can be limited.

3.Radial organization

It combines linear and central association modes results in a composition characterized by an extraverted approach. In this layout, elements are arranged around a central point while extending outward, creating a dynamic flow that encourages interaction with the surrounding environment.

This arrangement allows for a balanced focus on the central element while inviting the viewer to engage with the space around it. By promoting this outward movement, the design fosters a sense of openness and connection, making it suitable for compositions that aim to integrate with their surroundings or encourage viewer participation.

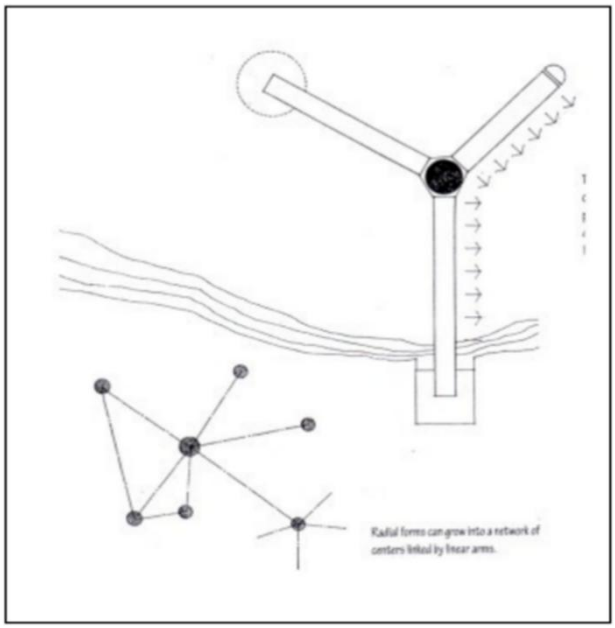


Figure 36: The radial composition

CHING, F. D. K. (1979)

The arms of this composition can differ in shape and length to address specific functional needs or contextual constraints.
This flexibility enables the creation of dynamic and adaptable spaces while preserving a sense of unity around the central focal point.

4.Modular/Gridded organization

4.1Modular

The concept of basic module repetition refers to a construction system where a specific unit or module is repeated multiple times to create larger structures. This method is commonly used in the design and construction of severel types of buildings : Hotels, Office Buildings, Floor plans, Residential Complexes, Commercial Spaces...etc.

Figure 37: Modular composition

Generated by AI

The module can have several origins:

- The human dimension
- Construction method/materials
- A choice made by the architect: aesthetics, etc.

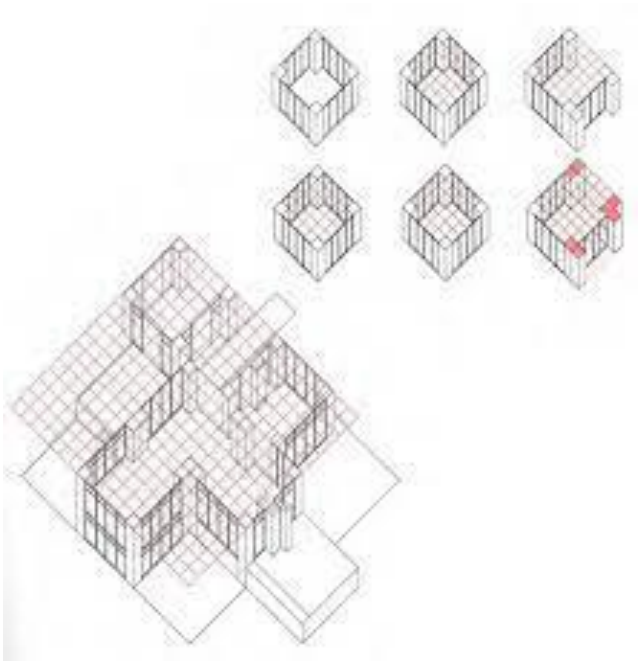


Figure 38: Louis Kahn Adler House 1955

CHING, F. D. K. (1979)

4.2 Gridded and triangulation:

It describes different approaches to spatial organization in architectural and urban design

- **Gridded (The Grid)**

A grid is a network of orthogonal lines that organizes space into regular, rectangular or square units, promoting order and predictability. It simplifies planning and construction with a clear, logical structure, making it widely applicable in urban planning, such as Manhattan's street grid, and in architectural layouts for organizing floor plans and façades.

Triangulation is a spatial organization based on oblique lines, forming triangular or diagonal arrangements that bring dynamism and complexity to designs. This approach offers flexibility for creating irregular and innovative layouts, often adapting to natural landscapes or producing unique visual effects.

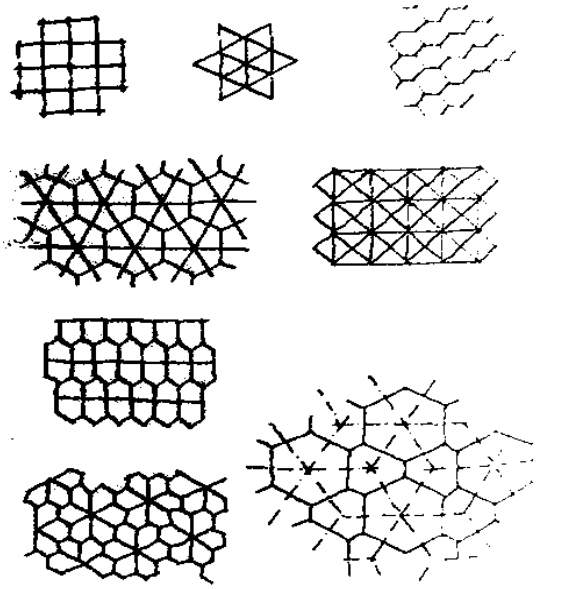


Figure 39: Examples of grid and triangulation

HAMMOU A.,2010

1.1Clustered organization

A cluster organization relies on physical proximity to link its spaces together.

It may include spaces that are similar or dissimilar in size, form and function,

Spaces are organized according to **visual ordering** devices such as: symmetry or an axis.

Cluster organization is flexible and can accept growth and change without affecting its character.

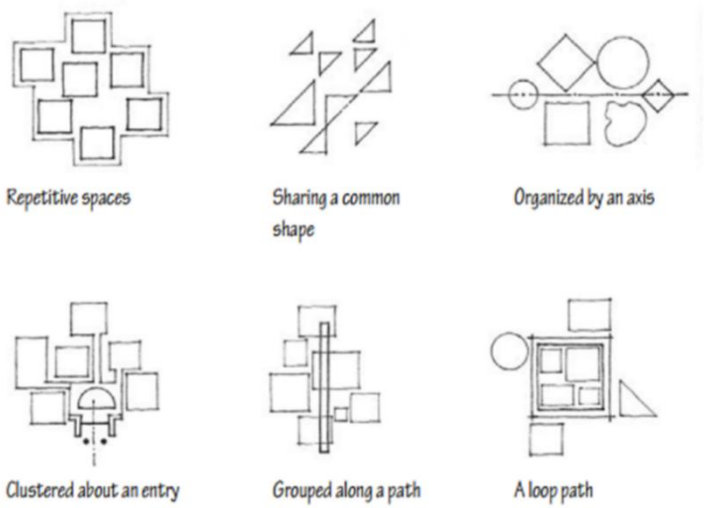


Figure 40: Examples of clustered organization

CHING, F. D. K. (1979)

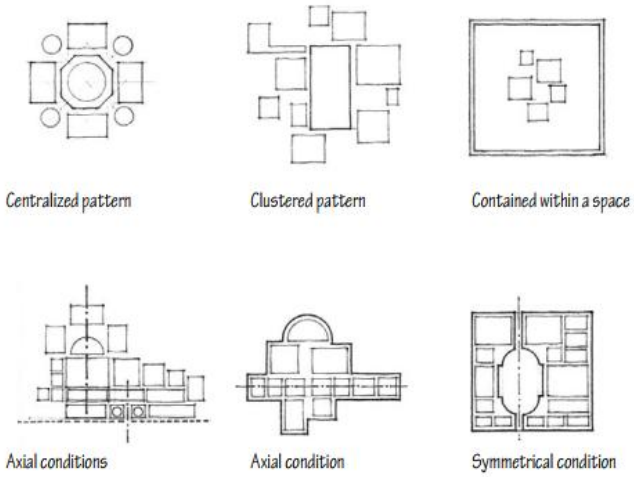


Figure 41: Examples of clustered organization combined with other modes

CHING, F. D. K. (1979)

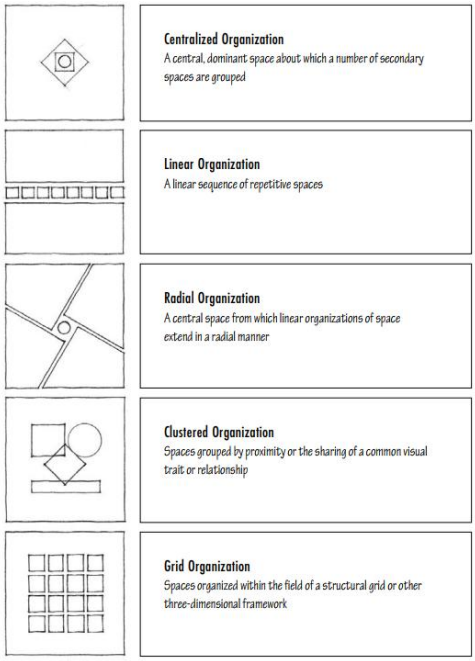


Figure 42: Summary of the different types of association modes

CHING, F. D. K. (1979)

Conclusion

The association modes discussed in this chapter play a crucial role in establishing relationships between elements within a design. They guide the viewer's perception and help them understand the overall composition.

Chapter 5: Volumes' Generation and Fo

Introduction

Volumes are essential in architectural composition, by beeing the visual part. They have properties which influence design aesthetics and functionality. Form generation creates these volumes from concepts, while form transformation adapts them to meet specific design needs.

1.Volumes in architectural composition

Volumes are the essential 3D forms that define and shape spaces in architectural design.
They interact through their properties: size, proportion, scale, and texture.
In architectural composition, Volumes can be categorized based on their stability:

- **Stable shapes:** such as cubes, straight polygonal prisms, pyramids, cylinders, and cones, inherently maintain their balance and structural integrity.
- **Unstable shapes:** like spheres, ellipsoids, and cylinders or cones at an angle require thoughtful composition to achieve a sense of equilibrium in the design.

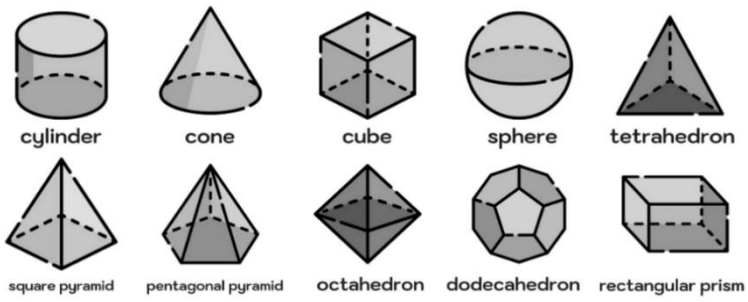


Figure 43: Some frequent volumes used in architectural composition

All these primary elements are combined according to the modes and laws of composition developed in previous courses.

2.The Properties of Volumes

By "form," we mean the external and internal appearance or configuration that allows a building to be recognized.

This form is primarily created by volumes generated by the architect and possesses certain properties, including **geometric, dimensional, color and texture, positional, orientational, and visual inertia** characteristics.

- **Geometry:** Geometry determines the shape of a volume, whether it is regular (like a cube or a sphere) or irregular.
- **Dimension:** Proportions determine the relationships between the dimensions of different parts of a volume or between multiple volumes.
- **Color:** When applied to a volume, color can alter its visual weight, highlight specific features, and affect how it is perceived in relation to its surroundings.
- **Texture:** Volumes are perceived in architecture as they affect the visual and tactile qualities of a surface. They influence the way light interacts with a volume and shape the overall impression of the form.
- **Visual Inertia:** It refers to the degree of concentration and stability of a form and depends on its geometry, orientation, and center of gravity.

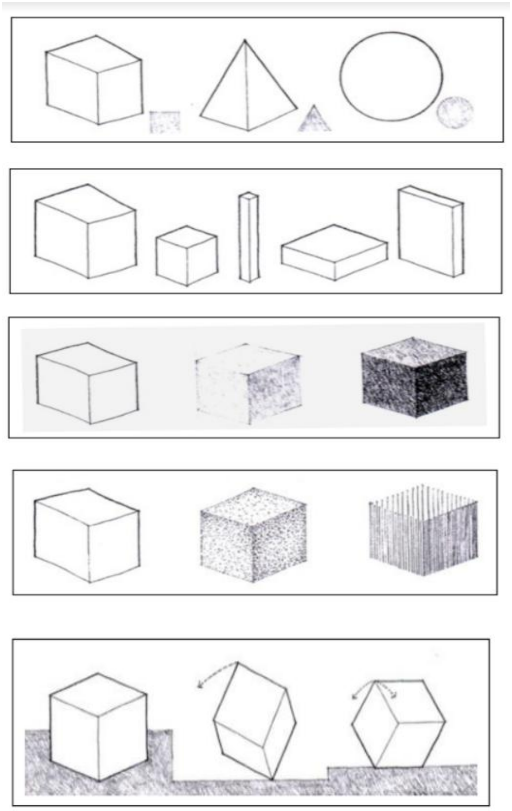


Figure 44: The Properties of Volumes

CHING, F. D. K. (1979)

3.Form generation and transformation

The pure shapes, such as the square, the circle, and the triangle, as well as the solids (volumes) that can derive from them, are combined with each other by manipulating their dimensions and through operations o**f addition and subtraction.**

3.1Dimensional Transformation

A form undergoes transformation by altering its dimensions while maintaining its identity as part of the primary structure.

Here are some key techniques:

- **Scale Transformation:** Adjusting the volume's size by increasing or decreasing dimensions (width, height, depth) either uniformly keeping the shapes proportions or non-uniformly, which can distort the original shape.

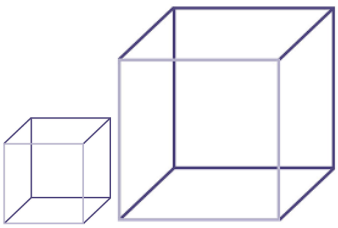


Figure 45: Scale Transformation on a cube

- **Stretching and compression :** Focusing on one dimension (e.g., stretching a cylinder vertically), these transformations alter the volumes appearance, useful for adjusting structural elements to fit specific spaces.

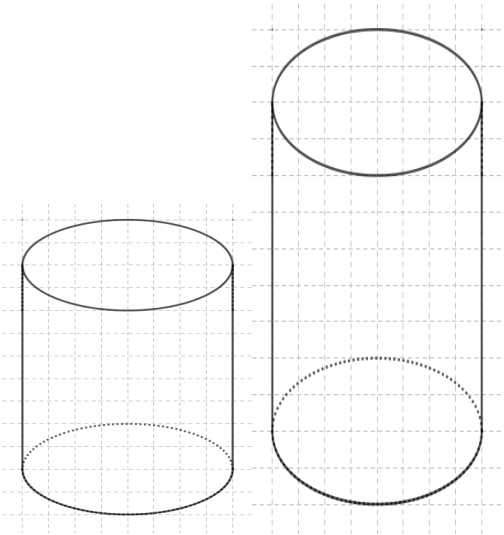


Figure 46: Compression transformation on a cylinder

- **Expansion and Reduction (Volumetric Dilation or Contraction)**: In volumetric dimensional transformation, isotropic expansion or reduction can be applied, increasing or decreasing all dimensions simultaneously. This proportionally changes the total volume.

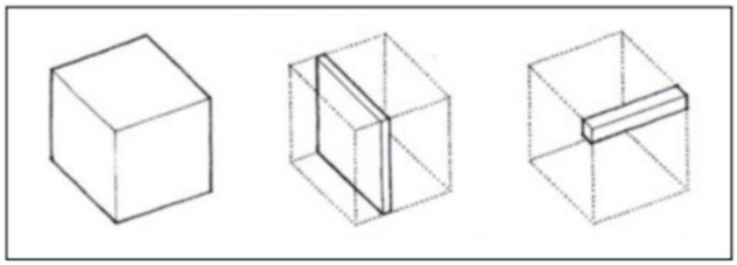


Figure 47: Volumetric contraction on a cube

CHING, F. D. K. (1979)

- **Dimension Changes in Split Spaces:** Dividing a volume into sub-volumes that are transformed differently, such as expanding only one section to meet specific needs like lighting or circulation, while keeping overall integrity intact.

Figure 48: Saint Pierre church in Firminy (Rhone-Alpes) Le Corbusier, 1965
The cone is truncated by decreasing the height at the top.
https://www.archdaily.com/108054/ad-classics-church-at-firminy-le-corbusier

3.2 Additional transformation (addition)

Additional transformation (addition) refers to the process of integrating new elements into an existing structure or design to enhance or expand its functionality and aesthetics. Here are some key aspects of this concept:

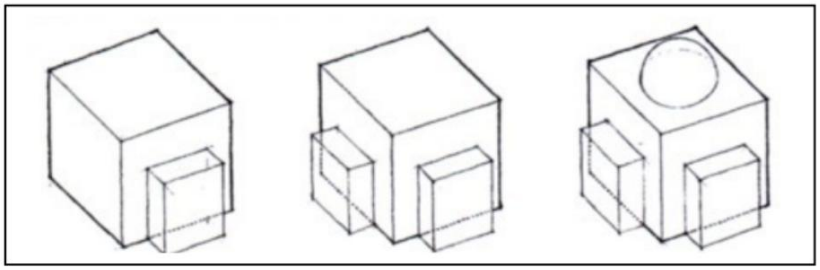


Figure 49: Additional transformations

CHING, F. D. K. (1979)

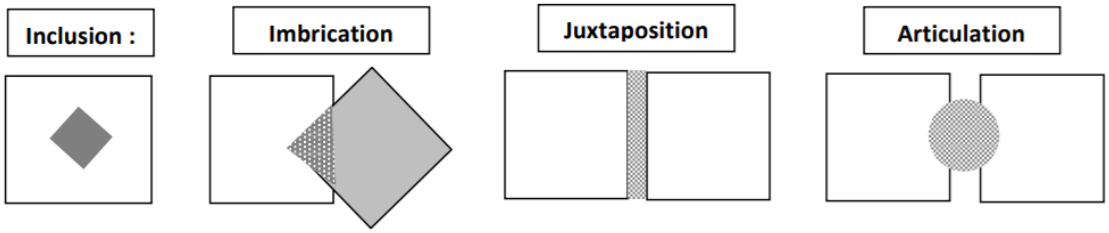


Figure 50: Types of additional transformations

CHING, F. D. K. (1979)

- **Inclusion** : A space can envelop another space through its larger volume.
  The contained space may share the same form as the container, but be oriented differently. Alternatively, the contained space can adopt a different form than the container to reinforce its image as an autonomous volume (figure..)

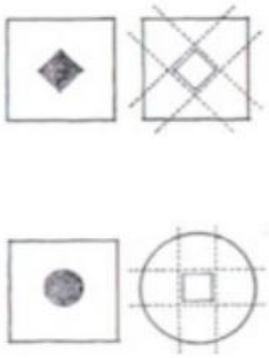


Figure 51: Inclusion in composition

CHING, F. D. K. (1979)

- **Imbrication**: Imbrication occurs when a relationship is formed through the overlapping of a part belonging to two spaces. This shared part becomes the common element between the two spaces, integrating and connecting them.

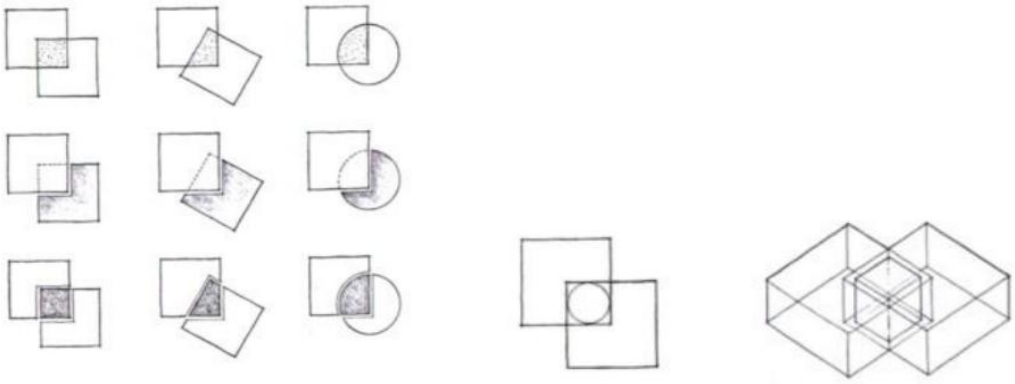


Figure 52: Somes types of imbrications

CHING, F. D. K. (1979)

- **Juxtaposition** : The degree of visual and spatial continuity created between two adjacent spaces depends on the nature of the separating space.

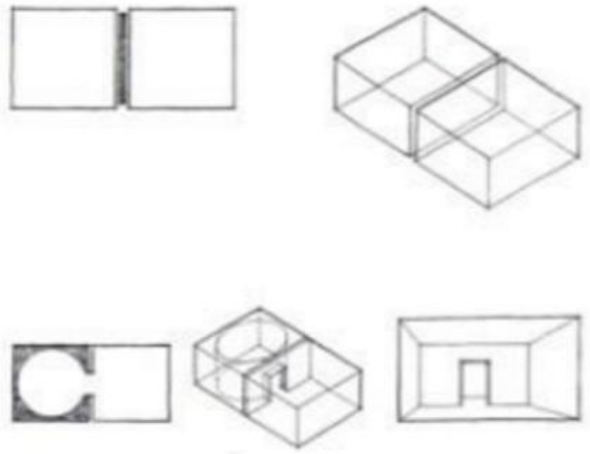


Figure 53: Juxtaposition of spaces

CHING, F. D. K. (1979)

- **Articulation:** Two spaces separated by a distance can be connected by a third intermediate element.

  This intermediate space or 'articulation' can be different in shape and orientation in relation to the two spaces in order to express its articulation role.

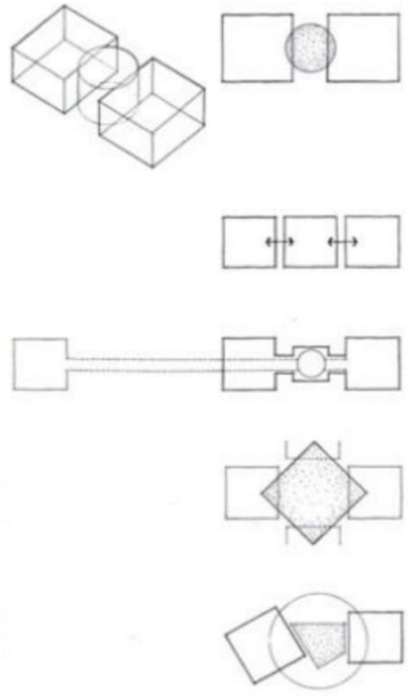


Figure 54: Articulation in architecture

CHING, F. D. K. (1979)

3.3 Subtractive transformation

Subtractive transformation refers to the process of creating forms and spaces by removing parts of a larger volume.

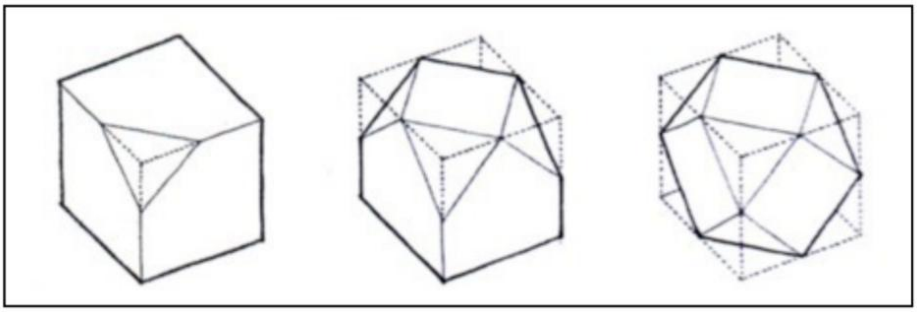


Figure 55: Subtractive transformation

CHING, F. D. K. (1979)

Caption: A subtraction is made on the cylinder to create a recessed entry in a positive exterior space. Additionally, a window is formed through the vertical opening of the volume

Figure 56: Casa Rotonda, stabio. by Mario Botta

https://www.archdaily.com/964065/architecture-stands-out-because-it-has-something-to-say-to-its-context-in-conversation-with-mario-botta/60d9a58bf91c8190d100001e-architecture-stands-out-because-it-has-something-to-say-to-its-context-in-conversation-with-mario-botta-image

Conclusion

Through the processes of form generation and transformation, architects can create and adapt these volumes to address specific design requirements. Understanding and manipulating volumes allows architects to design spaces that are aesthetically pleasing and highly functional.

Chapter 6: Matter (color texture and light in composition)

Introduction

In composition, color, texture, and light are fundamental elements of matter that collectively shape the sensory and spatial experience of a building. Each element contributes uniquely to the perception and atmosphere of a space, influencing mood, functionality, and the overall ambiance.

1.Color in architectural composition

Color is not just a hue, a lightness, and a saturation. It is also a material and a light. Color enhances walls, floors, and objects, serving more than just decoration in architecture. It alters the perception of space, its light, and atmosphere.

1.1What is color?

Color is defined as the visual sensation resulting from the impression produced on the eye by the radiation of light received either directly or After reflection on a body.

Color perception requires three elements: a light source, an object, an observer.

1.2 Color classification

- **Primary colors** are the foundational colors from which other colors can be mixed.):Red yellow, Blue

  The Phenomenon of Contrasting Colors: Contrasting colors create a visual effect that occurs when two opposite or very different colors are placed next to each other. This contrast enhances their vibrancy and creates visual interest, making elements stand out more distinctly.

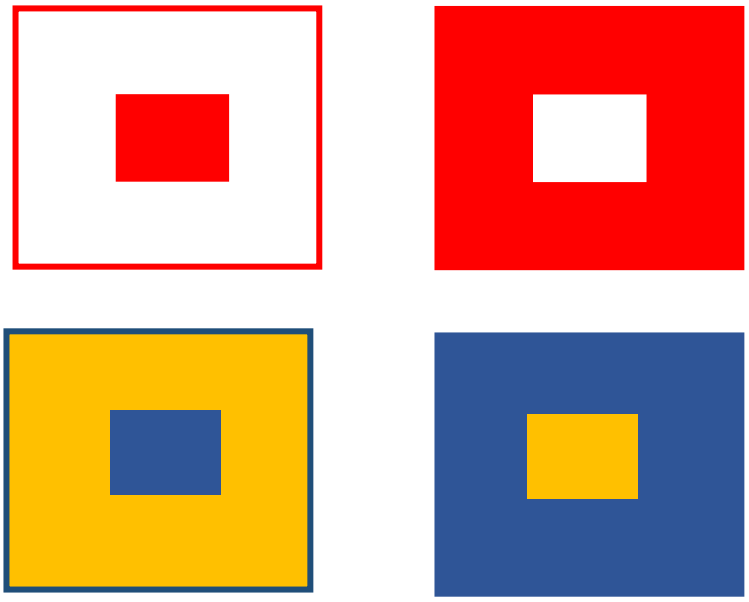


Figure 57: Illustration of the phenomenon of contrasting colors

- **Secondary colors or derived tones**

Those which are obtained by superimposing two primary colors:

- Orange = yellow + red
- green = yellow + blue
- purple = red + blue.

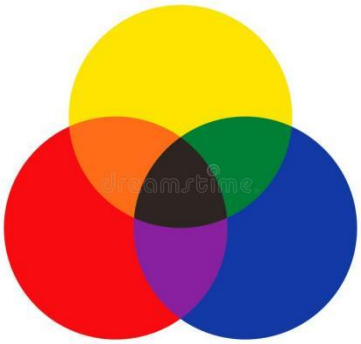


Figure 58: Secondary colors

- **Tertiary colors**

Which are located between the primary and secondary colors.

Figure 59: Colors wheel

Figure 60: Generation of the Chromatic wheel

- **Neutral colors or tones: Black, White, Gray**

Neutral colors: black (superposition of all colors), white (absence of color reflection), and gray (mix of black and white)

- **Median tones**: result from mixing chromatic wheel colors withneutral tones.

e.g., adding black to yellow creates brown.

1.3 Classification related to human sensation

Color classification is based on the sensations they evoke in our conscious and subconscious minds:

- **Warm tones:** These include colors like red, orange, and brown. They tend to create a sense of warmth and comfort.
- **Cool tones:** These encompass colors such as blue and green. They generally evoke a sense of calm and tranquility.
- **Light shades:** These are more cheerful and uplifting, including pastel colors like light blue, soft pink, and pale yellow.

1.4 Color and architecture

Color changes the perception of space. It is able to enlarge or reduce a shape.

The white volume appeared larger than the same black volume.

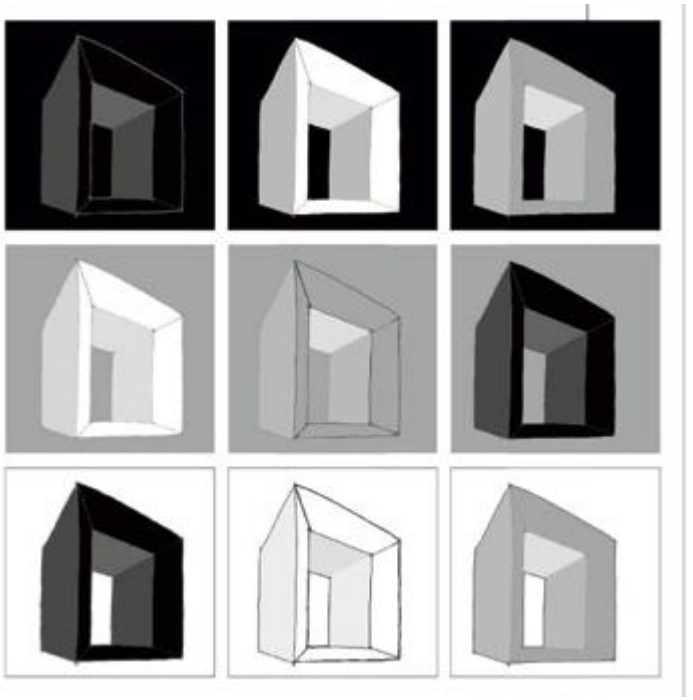


Figure 61: Impact of neutral tones in architecture

https://www.editionsalternatives.com/site.php?type=P&id=512

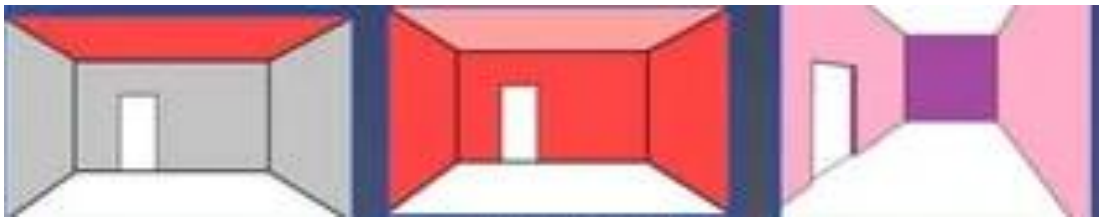
The cool tones to push things back, while red tends to push things forward.

Light or dark colors change the perception of space. Light colors appear open and expansive, while dark colors seem to limit or close off space.

The dark color of the ceiling gives the impression of heaviness. The room will look lower.

The light color of the ceiling gives an impression of lightness. The room appears taller.

Long rooms appear shorter when the transverse walls that limit them are strongly felt (dark).



1 **2** **3**

Figure 62: Colors in interior spaces

2.Texture

Another device that adds variety to architecture is texture. Texture has various meanings:

2.1Types of texture in architecture

2.1.1Optical texture

Could be given by the organization of architectural elements, such as windows, doors, solids or voids.

The repetition of elements creates a pattern that is observed as an optical texture.

Figure 63: Optical texture (pattern): Secretariat Building at Chandigarh, India, by Le Corbusier
https://lecorbusier-worldheritage.org/

2.1.2Tactile texture

It could be given by building materials, such as concrete, brick, stone, glass, steel etc.

Smooth materials, such as glass, create a smooth and soft texture, whereas rough materials such as stone, brick or concrete, create a rough and hard texture.

Therefore, there are three tendencies in architecture in terms of the use of tactile texture:

- The use of rough textures,
- The use of smooth textures
- The use of both of these textures to create contrast.

In all of them however, the texture appears as the outcome of different materials.

- **In Unite d'Habitation by Le Corbusier:**

Figure 64: Unite d'Habitation in Marseilles, by Le Corbusier

https://lecorbusier-worldheritage.org/

-Bold optical and tactile textures are highlighted.

-Concrete surfaces emphasize texture through their roughness.

-Rough timber molding forms were used for concrete pouring; The bold pattern of the timber was left on the concrete.

Figure 65: Different use of texture by manipulation concrete.
Unité d'Habitation in Marseilles, by Le Corbusier.
https://lecorbusier-worldheritage.org/

- **In Palazzo Medici in Florence**, the architect has used three different materials with three different textures in the façade that goes from the roughest to the smoothest. By using these texture differences, he has created a visual variation in the façade.

Figure 66: strong contrasts between very different textures in In Palazzo Medici in Florence

https://www.feelflorence.it/fr/node/16341

- **In falling Water House by Frank Lloyd Wright,**

He has used here two very contrasting materials, which are the rough stones of the vertical masonry piers and the smooth concrete of the floor slabs.

Caption: The stone for the vertical masonry piers was sourced from the house site and laid in a rough, random manner. In contrast, the concrete used for the cantilevered balconies and floors was polished to a smooth finish, emphasizing the difference. This created a striking contrast between the dark, rough vertical piers and the light, smooth horizontal floors.

Figure 67: Contrasting Elements in the falling Water House : The Harmony of Rough and Smooth

https://franklloydwright.org/site/fallingwater

2.2Materials in tactile texture

2.2.1 Concrete

Concrete has very much potential to create a tactile and optical texture, because it takes shape of the molding form to which it was poured into and it also takes the texture of the material of that molding form.

In addition to that, between the successive pours of concrete, there appears joints appear that mark different pours of concrete. Architects can give special attention to those joints and use them to create a texture.

- **In Salk Institute (at La Jolla) by Louis Kahn**

In Salk Institute (at La Jolla) by Louis Kahn for example, the joints of concrete are used to create texture.

Figure 68: Salk Institute (at La Jolla) by Louis Kahn: The joints of concrete are used to create texture.

https://www.archdaily.com/61288/ad-classics-salk-institute-louis-kah

- **In Art and Architecture Building at Yale University,**

The architect Paul Rudolph tried to give texture to concrete by making a special molding form.

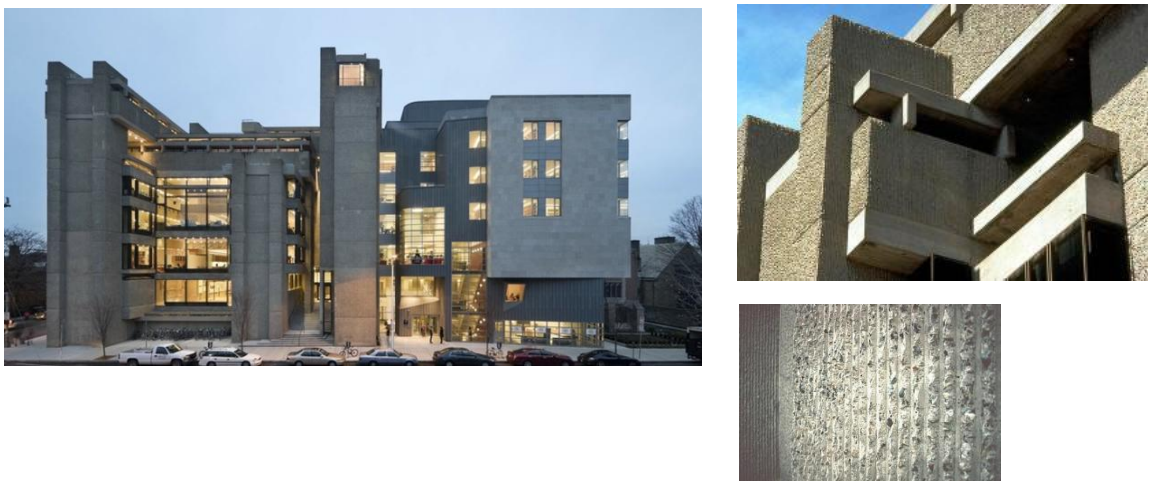


Figure 69: Art and Architecture Building at Yale University

https://www.archdaily.com/123171/yale-art-architecture-building

2.2.2 The brick

- **In Baker House**, in addition to a visual rhythm, Alvar Alto has used rough clinker brick to be able to give the building a tactile texture.

Figure 70: Baker house by Alvar Alto

https://www.archdaily.com/61752/ad-classics-mit-baker-house-dormitory-alvar-aalto

He arranged the bricks in a random pattern to add visual texture and enhance the building's overall aesthetic.

Figure 71: Arangement of brick in the baker house

https://www.archdaily.com/61752/ad-classics-mit-baker-house-dormitory-alvar-aalto

2.2.3 Steel and glass

Mies van der Rohe is renowned for his innovative use of steel and glass, creating textures that are both visually striking and functionally significant.
Mies van der Rohe's S.R. Crown Hall

Figure 72:Steel and glass: Mies van der Rohe's S.R. Crown Hall

https://www.miessociety.org/mies-buildings/blog-post-title-two-793r4-yjaj6-fm4kw-2krsa-shmmd-6z38e-4ejzw

Conclusion:

Incorporating thoughtful color schemes and textures can transform a simple structure into a visually engaging and meaningful space.

By understanding and skillfully applying these elements, architects can create environments that resonate with occupants, evoke desired emotional responses, and enhance the overall experience of the built environment.

Unit Conclusion

In this unit on architectural composition, the fundamental principles of vision, the laws of composition, the modes of association, as well as the basic principles of volumetric structures, color, and texture were explored to create harmonious and aesthetically pleasing structures.

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Unit 2 : Introduction to architecture

Objectives:

By the end of this unit on "Introduction to Architecture," students will understand what architecture is, including its historical and cultural significance. They will describe the roles and responsibilities within the architect profession and identify key architectural tools.

Unit introduction

Architecture is the art and science of designing and building structures. It combines creativity with technical knowledge to create functional and beautiful environments.

Architects are professionals who plan, design, and oversee the construction of buildings and other structures. They ensure their designs are safe, useful, and meet the needs of the people who use them. Architects also consider how their designs affect the environment and society.

To do their work, architects use various tools. These include traditional drawing tools like pencils and rulers, as well as advanced software for computer-aided design. These tools help architects visualize their ideas, create detailed plans, and communicate their designs to clients and builders.

This unit introduces architecture by explaining what it is, describing the role of architects, and exploring the tools they use in their profession

Chapter 7: What is architecture?

Introduction

The act of building has its origins in humanity's earliest history, driven primarily by the need for shelter against natural hazards and dangers. As human needs evolved, so did building practices, reflecting changes in society, technology, and culture. This evolution highlights how architecture has adapted to meet the demands of safety, comfort, and functionality throughout time.

1.Evolution of Human Needs and the Act of Building

As human needs have evolved over time, so has the way we build.

Early shelters focused on basic protection, but as societies advanced, buildings began to reflect social status, community, and technology.

New materials like steel, concrete, and glass have revolutionized construction, allowing for more innovative designs. Today, sustainability and environmental concerns are shaping greener, more energy-efficient buildings. This evolution in building practices highlights the close relationship between our needs and the way we shape our environment.

2.Architecture: Definition and Scope

Dual Nature: Architecture combines art and science in the design of buildings and spaces.

2.1 Artistic Elements

Artistic elements in architecture focus on aesthetics, aiming for beauty, harmony, and emotional impact. Architects use design principles to create forms that are not only functional but also visually compelling.

Wolfgang von Goethe[2] described architecture as "frozen music," capturing its ability to evoke emotions and create harmony through its structure.

Similarly, Le Corbusier[3] stated, "Architecture is the skilful, correct and magnificent interplay of volumes assembled under light," highlighting the importance of light, form, and proportion in creating stunning architectural designs.

[2] Johann Wolfgang von Goethe (1749-1832) was a renowned German writer, poet, and philosopher

[3] Le Corbusier was an architect, town planner, decorator, painter, sculptor, Swiss author and naturalised French citizen who was one of the main founders of the modern movement.

Therefore, architecture is not just about building structures; it's about creating art that enhances the human experience through thoughtful and beautiful design.

2.2 Technical (Science) Elements

According to Vitruvius, an ancient Roman architect and engineer, architecture is a science that combines practice and theory. This means that while hands-on experience is crucial, understanding the theoretical foundations is equally important for an architect.

Vitruvius believed that architects must possess a wide range of knowledge to be effective in their profession. This includes:

- **Geometry:** Understanding shapes, dimensions, and spatial relationships is fundamental for designing structures that are both functional and aesthetically pleasing.
- **Drawing:** The ability to create detailed drawings and plans is essential for visualizing ideas and communicating them to builders and clients.
- **History:** Knowledge of architectural history helps architects draw inspiration from past styles and understand the evolution of architectural techniques.
- **Mathematics:** Mathematics is crucial for calculating measurements, ensuring structural integrity, and solving complex design problems.
- **Optics:** Understanding light and its behavior is important for creating well-lit spaces and incorporating natural light effectively into designs.

3.Some classifications in architecture

In architecture, we often add a qualifier to the overall style to specify its characteristics. These qualifiers can indicate various aspects such as:

- **Style:** Refers to the general aesthetic or design approach, e.g., Gothic architecture, Baroque architecture.
- **Usage:** Describes the purpose or function of the buildings, e.g., Residential architecture, Industrial architecture.
- **Period:** Indicates the historical time frame, e.g., Renaissance architecture, Victorian architecture.

- **Material:** Specifies the primary building materials, e.g., Brick architecture, Concrete architecture.

Examples:

- **Military Architecture:** Structures designed for defense and military use, such as forts and bunkers.

- **Islamic Architecture:** Islamic Architecture refers to the architectural style developed in regions where Islam is the dominant religion. It is characterized by specific elements like domes, minarets, large courtyards, and intricate tile work.

Figure 73: Bleu Mosque Istanbul . Islamic architecture

https://www.archdaily.com

- **Modern Architecture:** A style characterized by clean lines, minimalism, and the use of modern materials like steel and glass.

Figure 74: Villa Savoya. Modern Architecture

https://www.archdaily.com

4.The Purpose of Architecture

- **Functionality**: Ensures that buildings serve their intended purpose effectively, providing practical and comfortable spaces for occupants. This includes everything from the layout of rooms to the integration of essential services like heating, plumbing, and electricity.
- **Aesthetics:** Enhances the visual appeal of structures, creating spaces that are not only functional but also pleasing to the eye. Thoughtful design can elevate the user experience, making places enjoyable and inspiring.
- **Environmental Responsibility:**
    - **Sustainability**: Incorporates materials and techniques to minimize the environmental footprint. This includes using renewable resources, recycling materials, and employing energy-efficient technologies.
    - **Eco-friendly designs:** Designs that promote energy efficiency, water conservation, and reduce waste. Examples include green roofs, solar panels, and rainwater harvesting systems.
- **Social Impact:**
    - **Community Enhancement:** Creating public spaces like parks, plazas, and community centers to foster social interaction and a sense of belonging. Addressing Societal Needs.
- **Cultural Expression:** Definition: Reflecting cultural identity, values, and traditions in design.

5.Architecture as an Expression of Culture

Malek Benabi: "Civilisation is not just a pile of things, but a construction, an architecture**".**

Architecture is more than just the creation of buildings and spaces.

It is a profound reflection of the cultural, social, and historical contexts from which it emerges.

It acts as a mirror, representing the values, beliefs, and traditions of the people who create and inhabit it.

- 3050 - 900 BC: Ancient Egypt

The shape of the pyramid was a marvel and a feat of engineering that enabled the Egyptians to build megastructures.

- 3050 - 900 BC: Ancient Egypt

- Latin America 3000 BC

When we think of the Maya, we obviously think of temples, pyramids and cities that were literally swallowed up by the vegetation of the tropical forest.

Figure 75: Man's determination to assert his presence on earth

Here’s an exploration of how architecture serves as a cultural expression:

- **Historical Context and Identity**

Architecture reflects the time and place of its creation, showing the technology, economy, and aesthetics of that era.

It also preserves cultural identity through traditional elements, local materials, and historical influences.

Buildings tell the stories of their societies, asserting their presence and maintaining their heritage, making them both functional and culturally significant.

- **Symbolism and Meaning**

Architecture carries deep symbolism and meaning, reflecting cultural, historical, and social contexts.

It goes beyond functionality, often representing beliefs and values. Religious structures like cathedrals and mosques symbolize spiritual beliefs and serve as community centers.

Architecture can commemorate historical events, celebrate cultural heritage, and express a society's identity and aspirations, making it both functional and rich in cultural significance.

- **Material and Technique**

Architecture uses local resources and skills, incorporating materials like timber, stone, and clay, and traditional craftsmanship, reflecting the local culture.
Innovative techniques, such as using steel, glass, and sustainable materials, showcase a society's progress and adaptability. These advancements enhance functionality and aesthetics.

- **Preservation Heritage**

Preserving historic buildings and sites is an effort to maintain cultural continuity and educate future generations about their heritage.

6. Fundamental principals

Vitruvius classical triad: are the three qualities necessary for architecture:

- ***Firmitas* (Solidity):** Represents stability, strength, and adequacy. Ensures that a building is structurally sound and durable.

- ***Utilitas* (Utility):** Focuses on functionality and practicality. Ensures that spaces are adapted to meet the needs of their users effectively.

- ***Venustas* (Beauty):** Emphasizes visual aesthetics, including colors, scale, and rhythm. Aims to create structures that stimulate the senses and are pleasing to the eye.

Conclusion

Architecture can be seen as a binary language, encompassing both the "container" and the "content."

The container represents the physical structure, providing the necessary space and form.

The content, on the other hand, includes everything within the structure, from furniture and decorations to the people and activities that bring it to life. This relationship between container and content highlights the interdependence essential for creating meaningful and functional architecture.

Chapter 8: The Profession of Architect

Introduction

The profession of an architect is a rich and multidisciplinary field that combines art, science, and technology. Architects help shape cities and homes, making them better places to live. They come up with creative designs and careful plans that improve how we experience our surroundings.

1.Who is the architect?

The word architect comes from the Greek "*architecton*" which is composed of «*arkhos*» : chief or master and of «*tekton*» which means carpenter.

The architect is the practitioner who is in charge of design buildings and of direct their construction.

He is artist in the same way as technician, its activity is both intellectual and manual. He asks for some creativity of the technical knowledge and the meaning of the responsibility.

2.Areas of intervention of the architect

The architect intervenes in the act of building:

- **Build new buildings.**

Architects are responsible for building new structures, designing everything from homes and offices to schools and hospitals. Their work involves creating functional and attractive buildings that meet the needs of the people who will use them. Architects consider various factors such as safety, sustainability, and aesthetics to ensure that their designs are both practical and beautiful.

- **In town planning**

Architects play a crucial role in town planning which involves designing and organizing urban spaces. They are responsible for land use planning, determining the allocation of residential, commercial, and industrial zones.

They also design infrastructure, such as roads and public transportation systems, to ensure efficient urban growth.

Additionally, architects create public spaces like parks and squares, incorporating green areas and sustainable practices to minimize environmental impact.

- **Fixing old buildings**

Rehabilitation in architecture means fixing up old buildings so they can be used again.
This can be for homes, offices, factories, or shops.
The process includes repairing damage, updating systems like plumbing and electricity, improving energy efficiency, and making the building look better.
The goal is to keep the original charm of the building while making it safe and useful for today's needs.

- **Interior decoration**

Architects plan interior spaces to maximize functionality and flow, ensuring the design complements the overall architecture of the building.
They select materials that are beautiful and durable, design effective lighting schemes, and may create custom furniture and fixtures.

- **Development of programs**

Architectural programming aims to describe the project's content clearly, identifying its purpose and scope.
This process involves defining the meaning and requirements of the project, ensuring that all elements are understood before design begins.
Architects establish the project's components, such as the spatial layout, ensuring each space serves its intended function.

- **Monitoring of work**

One of the architect's missions is to ensure rigorous and organized site monitoring in the construction sector. This involves conducting regular inspections, maintaining quality control, managing safety protocols, tracking project progress, and keeping detailed records of all activities.

- **Advice and expertise**

The architect is able to practice:

  - Private expertise, for an individual;
  - Amicable expertise at the request of two parties;
  - Mediation (if he has followed specific training);
  - Insurance expertise, subject to independence;
  - Technical assistance for legal expertise.

- **Scientific research and teaching**

Architects also contribute significantly to scientific research and education within their field.

3.Where the profession is practiced?

-The architect can work privately or in a public institution: As a civil servant in an administration such as the urban planning departments (DU), Housing Department (DL), Technical Services (APC),

-In the private sector, the profession of architect can be practiced in several ways, the most important of which is the architectural firm or Technical design office (BET).

In Algeria: The profession of architect is regulated by laws (see: Ministerial decree of May 15, 1988, official journal of October 26, 1988 and legislative decree of May 18, 1994, that of May 25, 1994).

4.The Architect's Role

The architect plays a pivotal role in the building process, particularly as a project manager.

As the designer of the project, the architect is responsible for translating the client's vision into a tangible and workable design.

This designed project is regarded as a significant piece of work, reflecting the architect's expertise and creativity.

Commissioned by the client, the architect ensures that all aspects of the building process are meticulously planned and executed, from the initial concept to the final construction.

This involves coordinating with various stakeholders, managing timelines and budgets, and ensuring that the project meets all regulatory and safety standards.

Conclusion

In conclusion, the profession of an architect encompasses a wide range of responsibilities and skills, from designing and planning to project management and site supervision. Architects play a crucial role in shaping our built environment.

Chapter 9 : Architects' representation mode

Introduction

In architecture, conveying ideas clearly is as important as creativity. Architects use various methods to share their designs and ensure they are understood and built correctly. This chapter explores the main ways architects represent and communicate their ideas, from hand sketches and technical drawings to digital renderings and virtual reality experiences.

1.Hand Drawings and Sketches

Hand drawings and sketches are fundamental tools in an architect's toolkit. They allow for quick, spontaneous expression of ideas and initial concepts. This mode of representation is particularly useful during the early stages of design when flexibility and creativity are paramount.

Techniques: Freehand sketching, Perspective drawing, Diagramming

1.1Freehand sketching

This technique involves drawing without the aid of tools, allowing for fluid and expressive representations of ideas. It's ideal for quick brainstorming sessions and initial concept explorations.

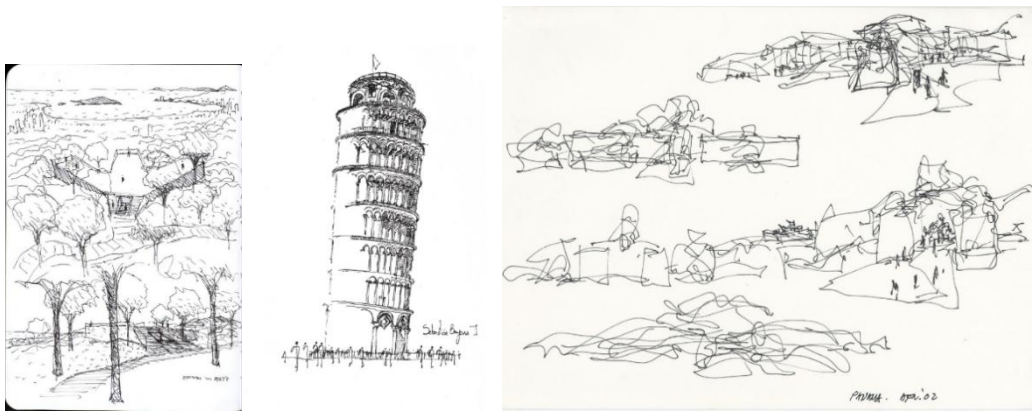


Figure 76: Freehand drawing representing architecture

www.archdaily.com/802337/the-importance-of-human-scale-when-sketching/58615c6ae58ece636c00047a-the-importance-of-human-scale-when-sketching-photo?next_project=no

1.2Perspectives and 3 D representations

Used to create three-dimensional views on a two-dimensional surface, perspective drawings help visualize spatial relationships and depth, giving a more realistic impression of the design.

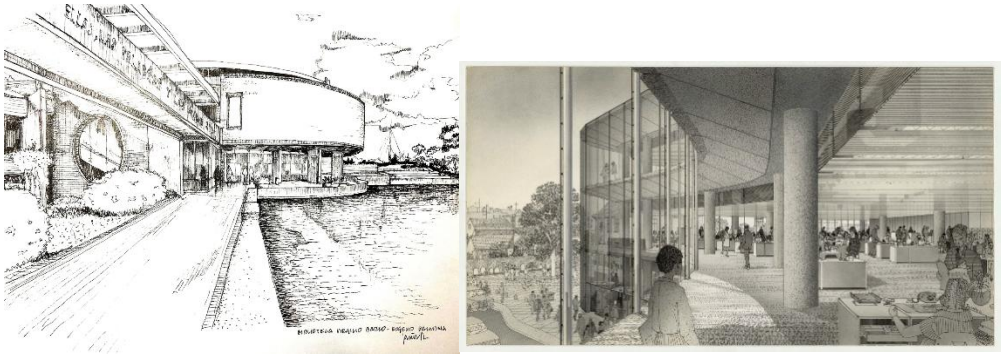
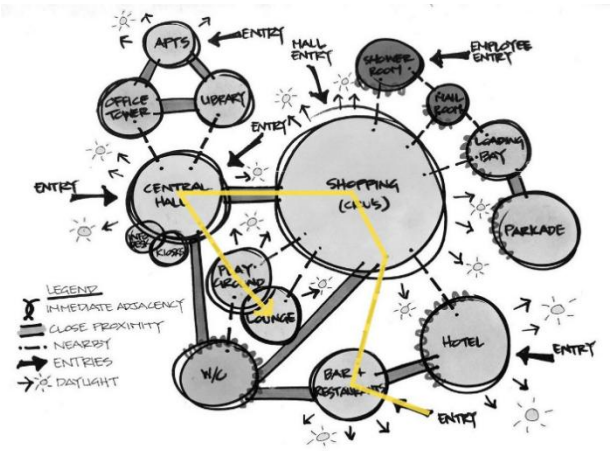


Figure 77: Architectural free hand perspectives

https://www.archdaily.com/949340/klaus-jan-philipp-explores-the-history-of-architectural-drawings-from-the-middle-ages-to-the-present?ad_campaign=normal-tag

1.3Diagramming

Simplifies complex ideas into basic shapes and lines, making it easier to understand and communicate design concepts. Diagrams are useful for planning spatial layouts and illustrating relationships between different elements.



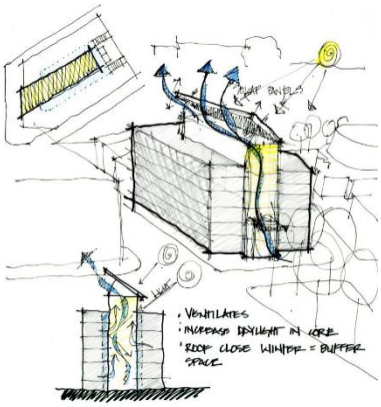


Figure 78: Examples of diagrams used in architecture.

https://www.arch2o.com/wp-content/uploads/2023/11/Arch2O-architectural-diagrams.jpg

2.Technical drawings

Technical drawing is a figurative language for representation, technical communication, design, and systemic analysis. It is a set of conventions for representing objects. These conventions ensure that the produced object is as imagined by the designer through the drawing.

Currently, two possibilities can be distinguished for the execution of building technical drawing:

2.1Hand technical Drawing

This traditional method involves using drawing tools such as pencils, rulers, compasses, and protractors to create precise technical drawings manually. This technique requires a high level of skill and precision, as each line and detail is meticulously crafted by hand.

2.2Digital Drawing

Utilizing computer-aided design (CAD) software, architects can create highly detailed and accurate technical drawings electronically. This method offers greater flexibility, efficiency, and the ability to easily modify and update designs.

Functions:

-Scale Control: Ability to control and adjust scale settings.

-Calculations (distances, dimensions, etc.): Tools for measuring and calculating various aspects of the design.

-Group Entities (blocks): Function to group multiple elements or objects into a single block for easier manipulation.

-Manipulate Text: Tools for adding, editing, and formatting text within the design.

-Copy, Move, Correct, Modify, etc.: Basic editing functions to copy, move, correct, and modify elements in the design.

-File Manipulations, Import; Export: Options for managing files, including importing and exporting data.

-Print, Publish, Transfer, Web, etc.: Functions to print, publish, and transfer designs, as well as integrate with web-based tools..

3.Architects' tools

3.1Architectural drawing

An architectural drawing is any type of drawing used in the field of architecture.

Typically, it serves as a technical representation of a building, providing essential details that, when combined with other drawings, offer a comprehensive understanding of the building's features. This applies whether the building is an existing structure or still in the design phase.

Thus, an architectural drawing is: An application of geometric principles, aesthetic considerations, and practical requirements; all framed by conventions.

- **Site plan drawings**

The site plan shows an overhead view of the building and its surrounding property. It may also include nearby buildings or roads. Site plans are important for showing the building's position relative to property boundaries. They also provide detailed information and measurements for landscaping features, driveways, patios, and other outdoor design elements.

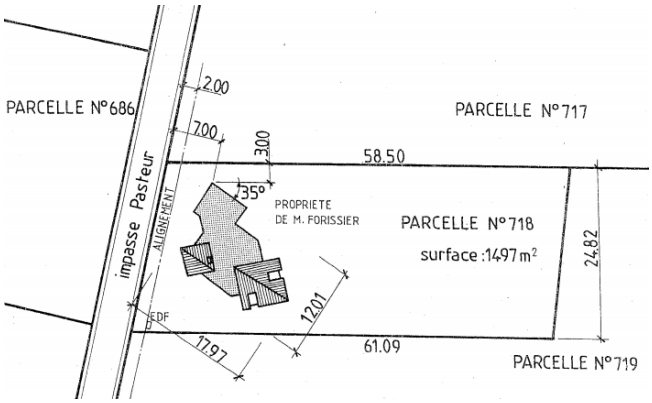


Figure 79: Example of a site plan

CALVAT, G., (1989)

- **Floor plan drawings**

Floor plan drawings show the internal layout of a structure. They come in different types based on how they'll be used. For example, some floor plans highlight specific design elements like electrical or plumbing systems.

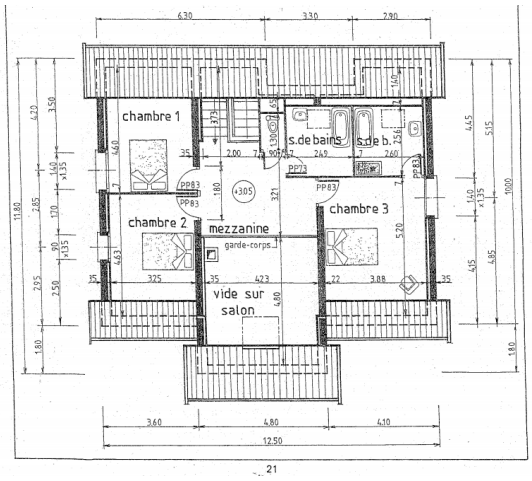


Figure 80: Example of floor plan

CALVAT, G., (1989)

Common residential floor plans show detailed measurements between walls, doors, and windows. They often include surface area calculations for each room. These drawings are crucial for making estimates and building homes as per the architect's specifications.

In the past, floor plans used to be limited to simple, black and white 2D layouts. But drawings like that are hard for a lot of clients to understand.

- **Sections**

Sections are 2-dimensional representations that reveal both visible and hidden elements of a building. Imagine slicing the building in half along a vertical plane and viewing the inside—this is a cross-section or sectional drawing.

These drawings are useful for illustrating how various parts of a building are constructed. They can show:

- The construction of walls
- How windows fit within wall sections
- Structural transitions between floors

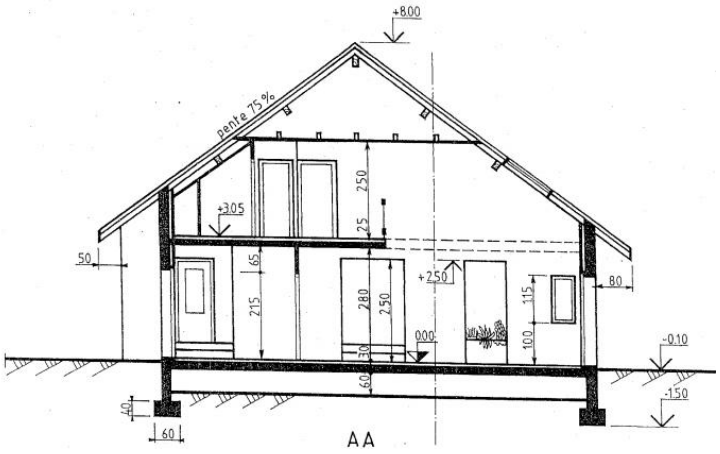


Figure 81: Example of a section

CALVAT, G., (1989)

- **Elevation (facade)**

An architectural elevation drawing is created from a vertical plane, providing a straight-on view of the building. The most common types of elevation drawings show the exterior of the building from the front, back, and sides.

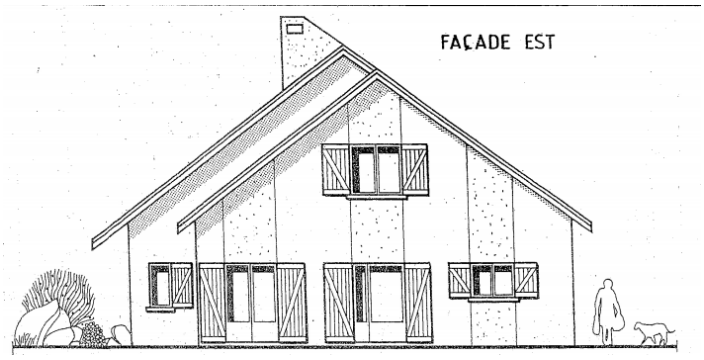


Figure 82: Exam of facades

CALVAT, G., (1989)

Architects can also create interior elevation drawings, similar to cross-sections, which show a vertical plane view of the interior.

3.2 3D representations

- **Physical Model Making**

Physical model making involves creating tangible, three-dimensional representations of architectural designs using materials such as foam boards, cardboard, wood, and 3D printers. These models are used for design exploration, client presentations, and architectural competitions.

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Figure 83: Architectural model

https://www.christmann-maquettes.com/references/urbanisme/

- **3D Modeling and Rendering Software**

Software like 3ds Max, Rhino, V-Ray, and Lumion is used to create realistic visualizations of architectural designs. These tools are essential for client presentations, marketing materials, and design validation.

Figure 84:Example of a 3D Model

https://www.archdaily.com/catalog/us/products/25777/sketchup-pro-3d-modelling-software-sketchup-sketchup/259365

Conclusion

Architects use a variety of representation and communication methods to convey their ideas, from hand drawings, technical plans, and 3D models to VR experiences, presentations, and physical models. These tools help them visualize designs, engage stakeholders, and ensure accurate execution of projects.

Unit Conclusion

Architecture stands at the intersection of art and science, blending creative vision with technical precision to craft spaces that serve both functional and aesthetic purposes. Architects play a pivotal role in shaping our built environment, ensuring that their designs are not only safe and practical but also resonate with the needs and aspirations of the people who use them.

The tools they employ, ranging from traditional drawing instruments to advanced computer-aided design software, are essential in transforming their innovative ideas into tangible realities. This unit has provided a foundational understanding of what architecture entails, the significant responsibilities of architects, and the critical tools they utilize in their profession.

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