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Département d'Architecture
جامعة عبد الرحمان ميرة – بجاية
كلية التكنولوجيا
قسم الهندسة المعمارية

PROJECT THEORY 2 COURSE

2023/2024

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Document structuration

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Presentation of the Syllabus

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<tr><td>1st year</td><td colspan="3">Project theory 2</td><td colspan="2">2023/2024</td></tr>
<tr><td>Teaching place</td><td colspan="2">Teaching Unit</td><td>HHV (H)</td><td colspan="2">Coefficient</td></tr>
<tr><td>Amphi 12– Campus El-Kseur</td><td colspan="2">Fundamental Teaching Unit</td><td>22h30</td><td colspan="2">02</td></tr>
<tr><td rowspan="4">Responsible for the subject</td><td>Mrs</td><td colspan="3">Soundouss Ismahane TALANTIKITE</td><td>Subject team members</td></tr>
<tr><td>Grade</td><td colspan="3">MAB</td><td rowspan="3"></td></tr>
<tr><td>Professional email</td><td colspan="3">Soundoussismahane.talantikite@univ-bejaia.dz</td></tr>
<tr><td>Tel (optional)</td><td colspan="3">0698886912</td></tr>
<tr><td>Description</td><td colspan="5">The project theory course for first-year architecture students holds paramount importance, as it serves as a fundamental foundation for developing their reasoning skills and providing them with essential theoretical, conceptual, and methodological tools for architectural project design.

This course aims primarily to initiate students into a profound reflection on the various aspects surrounding the realization of an architectural project. It enables them to explore and analyze existing architectural composition theories, key concepts, as well as different approaches and design methods. By acquiring these solid theoretical foundations, students are able to develop their own conceptual approach and create coherent and relevant architectural projects.</td></tr>
</table>

General objective of the teaching subject	➢ Introduction of the architectural project through the Vitruvian triad: utility, solidity, and beauty. ➢ Acquisition of fundamental knowledge regarding the interpretation of architectural space and its components (form, structure, function). ➢ Study of the interaction and interdependence between the elements of the triad: form, function, and structure in the architectural design process.
Learning Objectives	➢ Acquire a profound understanding of the concepts of utility, solidity, and beauty within the context of the Vitruvian triad. ➢ Develop the ability to analyze architectural space by considering key components such as form, structure, and function. ➢ Understand how form, function, and structure interact in an interdependent manner in the architectural design process. ➢ Develop analytical skills to evaluate the functionality, solidity, and aesthetics of an architectural design.
Prerequisites	- Project Theory 1 course, Workshop 1
Indicative overview of the exemption program	1/ Architectural Space ▪ Perception of Architectural Space ▪ Representation of Architectural Space 2/ Function in Architecture ▪ The Use of Space ▪ The User and the Space ▪ The Relationship between Form and Function

<table>
<tr><td></td><td colspan="5">3/ Structure in Architecture

▪ Structure and Architecture (frameworks, coverings, tensile structures)
▪ The Relationship between Form, Function, and Structure

4/ Introduction to Project Formulation

▪ Ergonomics and Architecture
▪ Basic Programming Concepts</td></tr>
<tr><td>Mandatory equipment</td><td colspan="5">Lecture course that does not require any specific materials for its proper execution.</td></tr>
<tr><td rowspan="2">Organization of the Subject</td><td>Cours
H</td><td>T.D
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H</td><td>Study outing
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<tr><td>Rating system</td><td>Scheduled exam :
100% exam</td><td colspan="4">Continuous chechks :</td></tr>
<tr><td rowspan="5">Forward planning for semester 1</td><td colspan="5">Stop : courses / workshops/ TD :</td></tr>
<tr><td colspan="5">Renderings: TD/ display workshops :</td></tr>
<tr><td colspan="5">Exam period :</td></tr>
<tr><td colspan="5">Holiday dates :</td></tr>
<tr><td colspan="5">End of semester 2 :</td></tr>
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Teaching schedule	Date	Course title & TD & TP
WEEK 01	Lundi 05/02/2024	Syllabus presentation
WEEK 02	12/02/2024	Architectural Space and its Delimitation
WEEK 03	19/02/2024	The Relationship between Form and Space
WEEK 04	26/02/2024	Perception of Architectural Space
WEEK 05	04/03/2024	Spatial Representations (Technical Drawing, Coded Drawing)
WEEK 06	11/03/2024	The Relationship between Usage and User of Space (Function)
WEEK 07	18/03/2024	Relationship between Form and Function
WEEK 08	08/04/2024	Introduction to Structure
WEEK 09	15/04/2024	Structure and Architecture (frameworks, coverings, tensile structures)
WEEK 10	22/04/2024	Structure and Materials
WEEK 11	29/04/2024	The Relationship between Form, Function, and Structure
WEEK 12	06/05/2024	Coordination of the Triptych and its Implications in Project Design
WEEK 13	13/05/2024	Ergonomics and Architecture
WEEK 14	20/05/2024	Introduction to Basics of Architectural Programming
WEEK 15		
References from existing	- BelmonT J., *Les 4 fondements de l'architecture*, Le Moniteur, 1987. Ching F-DK, Architecture: form, space and order, Hardcover, 1979.	

books in the university library	Cousin J., *L'espace vivant*, Le Moniteur, 1980. Kerboul F., Initiation à l'architecture, ENAG, 1997. Van Meiss P., De la forme au lieu, une introduction à l'étude de l'architecture, EPUL. , 1973. Zevi B., *Apprendre à voir l'architecture*, Éditions de Minuit, 1973
Book References to Suggest for Future Acquisition	- Ching, F. D. K. (2014). Form, Space, and Order. John Wiley & Sons. ISBN: 978-1118745083. -Ramsey, Charles George, and Sleeper, Harold Reeve. (2016). Architectural Graphic Standards. John Wiley & Sons. ISBN: 111890950X. Ramsey, Charles George, and Sleeper, Harold Reeve. (2016). Architectural Graphic Standards. John Wiley & Sons. ISBN: 111890950X.
Advice for Students	- Note-taking methods - Successful attitudes and behaviors during class - Group work / Tutorials - Exam preparation
Observations	This proposal may be modified during the semester following discussions among the department head, the unit teaching coordinator, and the studio coordination supervisor.

Nous, étudiants du palier licence 1 pour année universitaire 2023/2024, attestons que nous avons consulté le syllabus de la matière Project theory 2, et que nous avons été informés sur le contenu, le déroulement des enseignements et le mode d'évaluation.

Chapter 01: Architectural space

Course 01: Architectural Space

Course structure

1. Definition of the space

The term space can have several definitions according to the context. The term "Space" can be used in several domains such as: astronomy, geography, mathematics, urban planning and architecture.

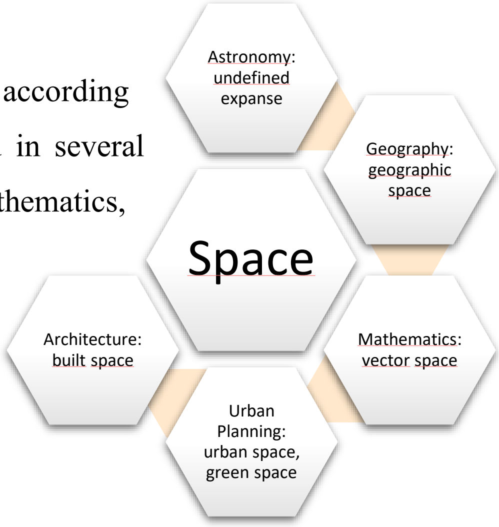

Figure 1: Domains where the term space can be used.

According to Larousse[1] the definition of the term space can be defined as:

- Property particular to an object that causes it to occupy a certain extent, a certain volume within an area, necessarily larger than itself and that can be measured.
- Space, surface, or volume needed around oneself: Lacking space in a too-small room.
- Portion of the extent occupied by something or distance between two things, two points: Leaving a space of 2 meters between the two elements. Synonyms: gap - spacing - interstice - interval.
- Extent, surface, region: Flying over vast desert spaces. Synonyms: field - expanse.
- Surface, extent, volume intended for a particular use: The kitchen becomes a living space. Synonyms: area - surface.
- Domain in which certain activities take place: European judicial space.
- Set of industrial activities related to the exploration or exploitation of this environment.

[1] https://www.larousse.fr/dictionnaires/francais/espace/31013#:~:text=1.,dans%20une%20chambre%20trop%20petite.

- Extraterrestrial environment (in science fiction): Man from space.
- **Anatomy:** Term given to certain regions, openings, or interstices (epidural space, clavipectoral space, intercostal space, subarachnoid space).
- **Geometry:** Set of points whose position is defined by three coordinates.
- **Mathematics:** Set upon which a structure (algebraic and/or topological) has been defined.
- **Music:** Distance between two neighboring lines on a staff.

To summarize space is an expanse with both material and immaterial limits.

2. Space in Architecture

Definitions:

According to Furetière's Universal Dictionary (1690), space "generally means an infinite extension of place: 'divine power fills an infinite space' [...].

For Françoise CHOAY, Space is specifically used for a determined place, extending from one point to another, whether it is filled or empty[2].

P. Von Meiss said that **"Architecture is the art of voids; it is defined both from the inside and the outside...** An architectural work conceived or considered only from the outside ceases to be architecture and becomes scenography. Conversely, the reduction to its spatial characteristics alone evades the concrete signs and symbols underpinned by its materiality." - P. Von Meiss

2Françoise CHOAY http://www.universalis-edu.com/imprim_CL.php?nref=G970410

Figure 2: Space design based of the art of voids

That means that architecture is not just the external appearance of a building; it is also the void it generates, the living space.

Architecture stems from two levels of interpretation:

➔ The solid: the building with its ornamentation

➔ The void: the volume and sensations it generates.

The container should not be dissociated from the content. Architecture is considered beautiful when its internal space attracts and spiritually captivates us. It will be deemed ugly when it tires or repels us. (Bruno Zevi, Learning to See Architecture)

Also, Space defined by the rules of geometry and by the floor, ceiling, and walls

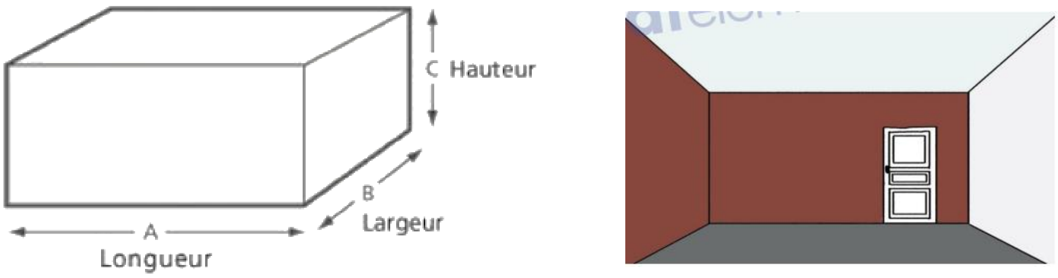

Figure 3: Space definition based on rules of geometry

3. Human within its space

The human is not confined to the physical volume of their body alone; thus, thinking that the human body ends at the surface of the skin is inaccurate (Hall, 1971).

In fact, the human possesses a non-physical boundary located in close proximity to the body (Cousin, 1980). This boundary acts in the form of a bubble encompassing the being, as if protected at all times.

The bubble, as mentioned by Hall, becomes an extension of the human in space. It consists of one or more layers, taking the form of 'a small protective sphere' (Hall, 1971: 150) revolving around the human."

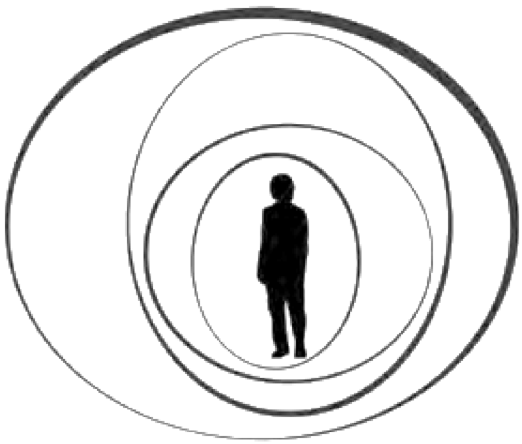

Figure 4: Interpretation of the human bubble (Jean cousin)

One must envision the human with numerous spheres of variable dimensions, changing as they move through different spaces. These variations are an important aspect to consider as they influence the behavior and how the human utilizes and appropriates space

In addition to changing throughout spatial journeys, it can also vary based on the bodily movements of the individual. This personal space has neither specific dimensions nor a particular form. Generally, it envelops the body at a certain distance but can expand, widen, or compress depending on the context (Cousin, 1980: 28)

4. The Space, the User, and their Landmarks

In architecture, space refers to the physical environment within and around a structure. Good space planning is a process that results in an efficient and aesthetically pleasing organization of areas to meet the specific needs and desires of the users, while ensuring functionality, comfort, and safety[1]. It involves laying out and determining the intended uses of a space (or several spaces) in any architectural project1. It's all about making oneself, as a designer, invisible: when the users live the space, they should be able to do it in a fluid and intuitive way[3].

The user is the individual or group who will be utilizing the space. The user's needs and desires are paramount in the design process. The overall activities that will take place in a certain area will determine choices such as lighting, access to other rooms, interior and exterior entrances, among many others[1]. The user-centric approach ensures that the space is designed with the user's comfort, safety, and functionality in mind[4].

Users can orient themselves in architectural space using various spatial terms and landmarks. some common terms and concepts used for orientation:

Cardinal Directions: North, South, East, and West are the four main directions on a compass and are used to describe the orientation of a place relative to other places.

Relative Directions: Terms like left, right, forward, backward, up, and down describe the direction relative to the observer's orientation.

Distance Terms: Near, far, close, distant, within walking distance, a stone's throw away, etc., are used to describe the proximity of one location to another.

Behind, In Front Of, Beside, Between: These prepositions describe the relative position of one place to another.

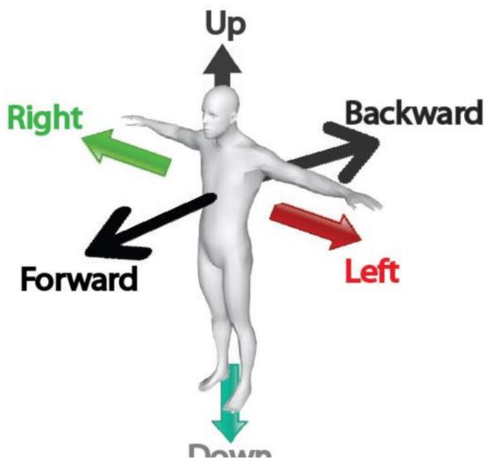

Figure 5: User orientation and land marks Rayhan Kabir

[3] https://www.archisoup.com/space-planning-in-architecture
4 https://www.archisoup.com/space-planning-in-architecture

There are some specifications according to the space scale**:**

In a **building** or an architectural scale, a user can orient themselves using various spatial terms and features. Here are some common terms and concepts used for orientation:

Floors: The level of a building is often the first point of reference. Ground floor, first floor, second floor, and so on.

Rooms: Specific rooms or areas like the lobby, conference room, kitchen, restrooms, etc., can serve as reference points.

Corridors and Hallways: These are pathways that lead to different rooms or areas within a building.

Stairs and Elevators: These are used to move between different floors of a building.

Entrances and Exits: These are crucial for understanding the layout of a building.

Windows and Orientation: The direction a window faces (North, South, East, West) can help with orientation.

Signage: Signs can provide information about the location of different rooms, directions to exits, and other useful information.

In a city or urban scale, we can use:

Landmarks: These are prominent features in a city that help users orient themselves. They could be natural (like a river or a hill) or man-made (like a building or a bridge).

Street Names and Numbers: Streets and their corresponding numbers are often used for orientation in cities.

Neighborhoods or Districts: Cities are often divided into neighborhoods or districts, each with its own unique characteristics. These can also serve as points of reference.

Transit Stops: Bus stops, metro stations, and other transit points can also serve as landmarks for orientation.

In conclusion, the concepts of space, user, and landmarks are interconnected in the field of architecture. The space is designed with the user in mind, and landmarks serve as points of reference and inspiration. Together, they contribute to the creation of meaningful and functional architectural designs.

Course 02: Space Perception

Course structure

1. Elements of space definition
    1.1. Vertical elements
    1.2. Horizontal elements
2. Relationship between Spaces
    2.1. Space Within a Space
    2.2. Nested Spaces
    2.3. Interlocking Spaces
    2.4. Overlapping Spaces

1. Elements of space definition

Architectural space emerges from the relationship between objects or between boundaries and planes that define limits. These limits can be more or less explicit, forming surfaces that create a continuous boundary or, conversely, establishing only a few landmarks that the observer interprets as boundaries.

- Horizontal Elements
- Vertical Elements
- Boundaries
- Openings

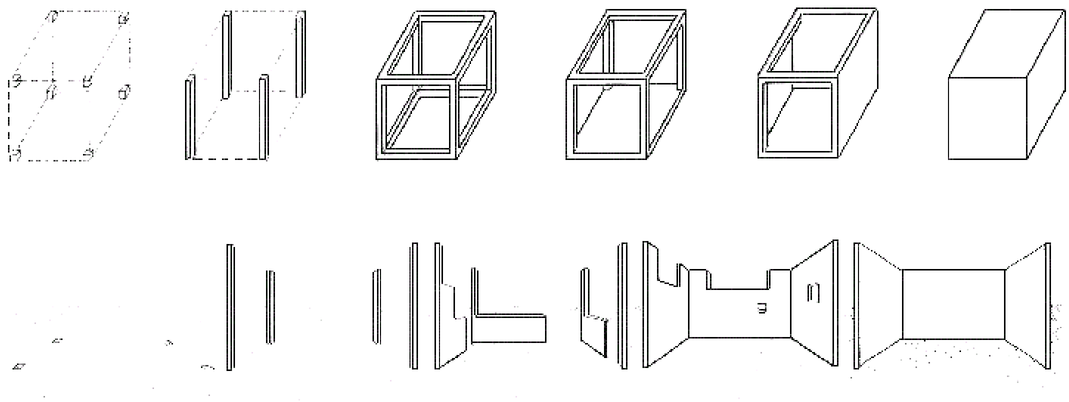

Figure 6: Elements of space definition. Source: Francis Ching, Form space and order, John Wiley & Sons 2007, 450 p.

1.1. Horizontal Elements

Architecture is the science of planning environments that balance aesthetics and utility, not only the art of construction. Using horizontal features, which are essential to a building's general structure and spatial arrangement, is one of the core principles of architectural design. These components are important for defining the user experience inside the constructed environment as well as for maintaining the stability of the structure. The numerous horizontal architectural features are examined in this dissertation, along with their sorts, purposes, and effects on a building's aesthetic appeal and structural stability.

These horizontal elements can be in the following forms:

1.1.1. Flat surface: A simple flat surface placed directly on the ground.

⇨ It delimits a portion of space

Figure 7: Examples of designs that feature flat surfaces

1.1.2. Elevated flat surface: A simple flat surface raised above the ground.

⇨ The vertical surfaces on the sides enhance the perception of the separation of the delimited area from the rest of the space

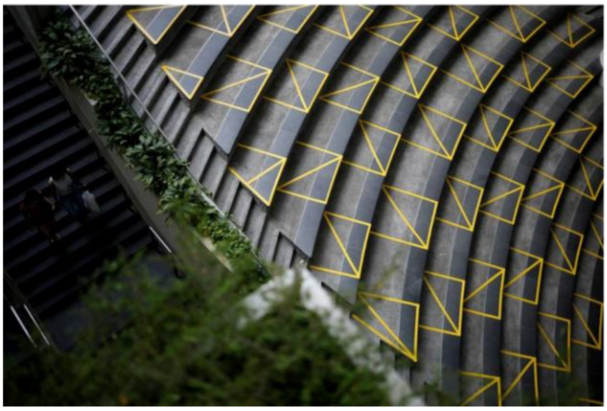

Figure 8: Examples of designs that feature elevated surfaces

1.1.3. Recessed flat surface: A simple flat surface lowered below the ground.

⇨ The vertical surfaces define a volume


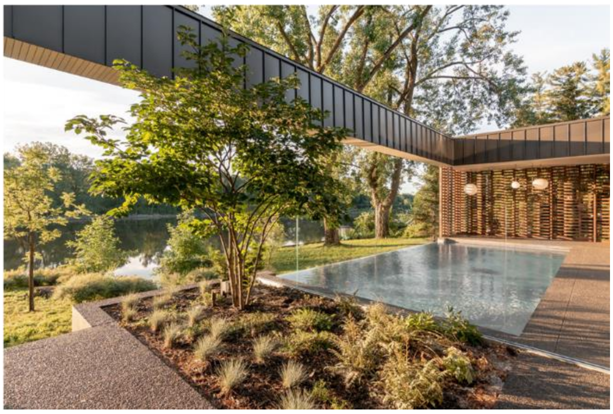

Figure 9: Examples of designs that feature recessed flat surfaces

1.1.4. Two superimposed planes: Two flat surfaces, one above the other.

⇨ They define a clearly delineated portion of space



Figure 10: Examples of designs that feature two superimposed flat planes

1.2. Vertical Elements

Vertical elements in architecture are fundamental to the structural integrity and spatial organization of buildings. These elements not only support the weight of horizontal structures like floors and roofs but also contribute to the aesthetic and functional aspects of architectural design. This dissertation delves into the various vertical elements in architecture, exploring their roles, types, and the significance they hold in both traditional and contemporary architectural practices.

1.3.1. Linear vertical elements: They define the vertical surfaces of the volume


Figure 11: Examples of designs that feature linear vertical elements

1.3.2. A vertical plane: They articulate the space in front of them


Figure 12: Examples of designs that feature vertical plane

1.3.3. L-shaped plan: They produce a space generated from the corner outward along the diagonal

Figure 13: Examples of designs that feature L-shaped plan

1.3.4. Parallel planes: They generate a well-defined space between them, extending to the open limits

Figure 14: Examples of designs that feature parallel vertical planes

1.3.5. U-shaped planes: They generate a space oriented towards the opening

Figure 15: Examples of designs that feature U-shaped vertical planes

1.3.6. Four closed planes: They establish the boundaries of an introverted space and influence the space around the closure

Figure 16: Examples of designs that feature four closed vertical planes

2. Relationship between Spaces

In architecture, the relationship between spaces is fundamental to how a building is experienced and functions. Understanding these spatial relationships helps in designing environments that are both aesthetically pleasing and functionally effective. Here are some key spatial relationships:

2.1. Space Within a Space

This relationship occurs when one space is completely enclosed within another larger space. The smaller space may serve a specific function distinct from the larger space, creating a sense of hierarchy and intimacy. For example, a private office within an open-plan workspace or a reading nook within a larger living room are instances where a smaller, defined space is nested within a larger one.

Design Implications: This arrangement can create a focal point within the larger space, enhance privacy, or serve as a special area for specific activities. It can also generate a sense of protection or enclosure, which can be comforting or intimate.

2.2. Nested Spaces

Nested spaces refer to a series of spaces that are embedded within each other in a hierarchical order. Each subsequent space is contained within the previous one, often with increasing levels of privacy or specialization. An example of this might be a sequence of spaces moving from a public living room to a semi-private dining area and finally to a private bedroom.

Design Implications: Nested spaces can create a journey or progression through a building, guiding movement from public to private areas. This relationship is often used in residential design to structure different levels of privacy and functionality.

2.3. Adjacent Spaces

Adjacent spaces are positioned next to each other, sharing a common boundary or wall. This spatial relationship allows for easy access and interaction between the spaces, making it ideal for areas that need to be functionally connected, such as a kitchen and dining area or a bedroom and bathroom.

Design Implications: Adjacency promotes a smooth flow between spaces, enhancing functionality and accessibility. The connection can be emphasized with open-plan designs or subtly indicated through partial walls, changes in flooring, or other design elements.

2.4. Interlocking Spaces

Interlocking spaces share parts of their volume with each other, creating a spatial overlap that can blend the functions and experiences of both areas. This relationship can blur the boundaries between spaces, allowing for multifunctional areas within a building.

Design Implications: Interlocking spaces can create dynamic, flexible environments where activities and functions flow into one another. This approach is often used in modern, open-plan designs to create fluid, adaptable spaces.

2.5. Overlapping Spaces

Overlapping spaces occur when two spaces intersect, sharing part of their areas while retaining distinct identities. This relationship creates a transitional space that can serve as a connector or buffer between different zones.

Design Implications: Overlapping spaces can be used to create a sense of continuity between different areas while maintaining their individuality. This can be particularly effective in public or communal spaces, where a blend of functions is desired.

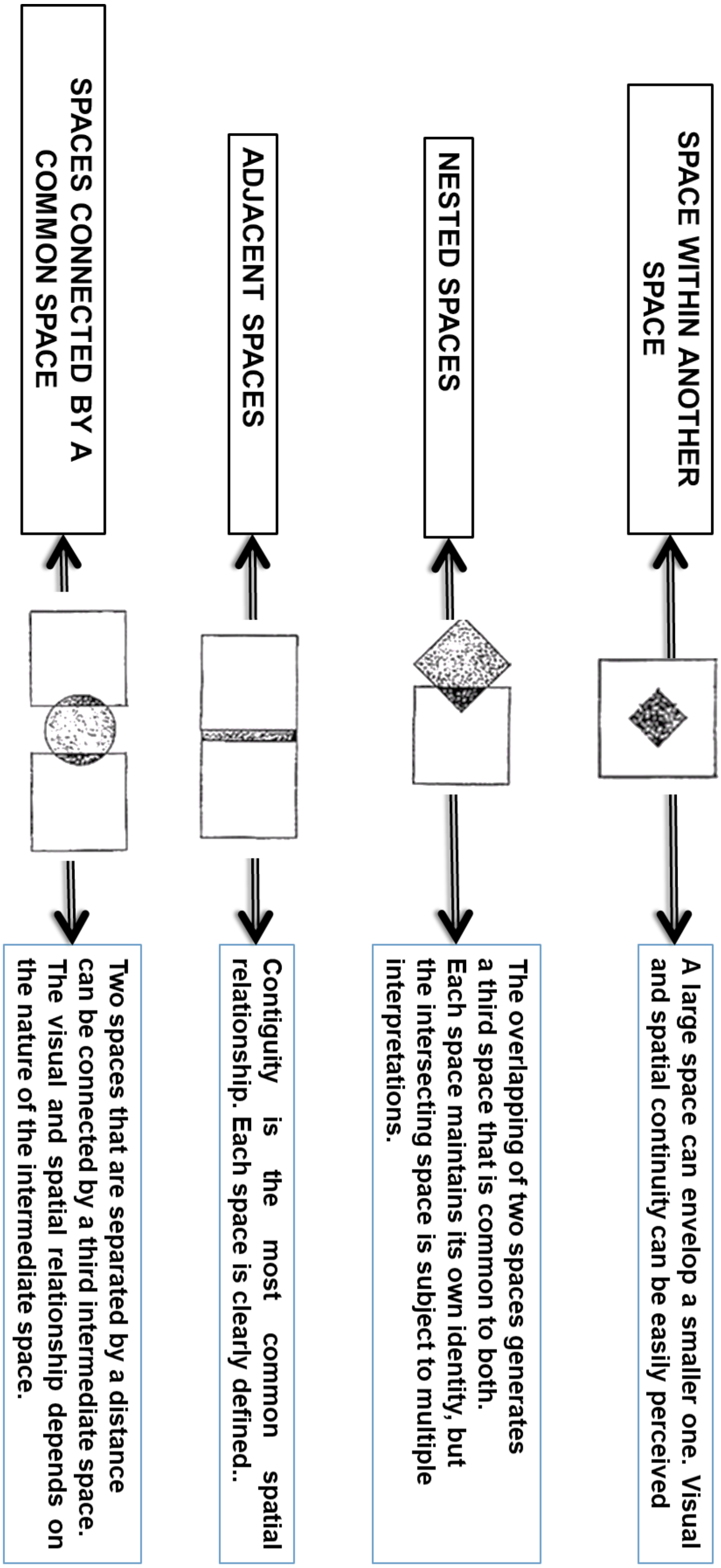

Figure 17: Relationship between Spaces

Course 03: Movement and Crossing

<u>Course structure</u>

1. Motion in architectural space
2. Space and transitions
3. The intermediate space
4. Spatial sequences
5. Spatial continuity
6. Spatial Transition

1. Motion in architectural space

1.1. The Relationship Between Types of Space and motion

Heidegger categorizes space into three types: path, threshold, and destination. According to Norberg-Schulz, territory is 'what we frequent,' path is 'what we follow,' threshold is 'what we traverse,' and destination is 'what we reach.'[5]

• **The path** unfolds in the horizontal plane, with the typical example being the street, defined as 'varied continuity.' It takes various forms such as passages, corridors, loggias, galleries, and porticoes. One can traverse paths without a specific goal, strolling, letting the mind wander, except in geometrically determined streets, as seen in American cul-de-sacs.

• **The threshold** is the transitional space (arch, porch, narthex, Egyptian pylon, baroque courtyard, portal, etc.). It emphasizes arrival rather than departure.

• As for the **destination**, it turns out to be the goal, often a peaceful place for gatherings and encounters, polygonal or circular like the market square or the space under the dome (representing, in this case, the celestial vault)."

1.2. Rudolf Laban method of movement transcription

Rudolf Laban (1879–1958) established a method of movement transcription known as Labanotation, which he considered to be the embodiment of a world in motion. Beginning his career with architectural studies at the Beaux Arts in Paris in 1907, he became interested in the relationship between human movement and the surrounding space.

His artistic studies laid the foundation for the architectural perspective on movement and the body that he developed throughout his career. Subsequently, he shifted his focus to the art of movement and expressive dance.

In parallel with his practice as a dancer-choreographer, in 1928, he pioneered a system for movement notation called Labanotation or kinetography in France, Labanotation in the United States, and Kinetography in the United Kingdom.

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[5] 1, Christian Norberg-Schulz. L'art du lieu. Architecture et paysage, permanence et mutations. Page 134. Traduction française. Paris : le Moniteur, 1997.)

"This notation enables the reading, writing, analysis, and contemplation of movement." Rudolf Laban (1879–1958)

- Human movement and the space that surrounds it

- The direction of movement: forward – backward – left – right – diagonals – stationary
- Its height: high – low – intermediate
- Its duration: indicated by the length of space
- The body part involved in the movement

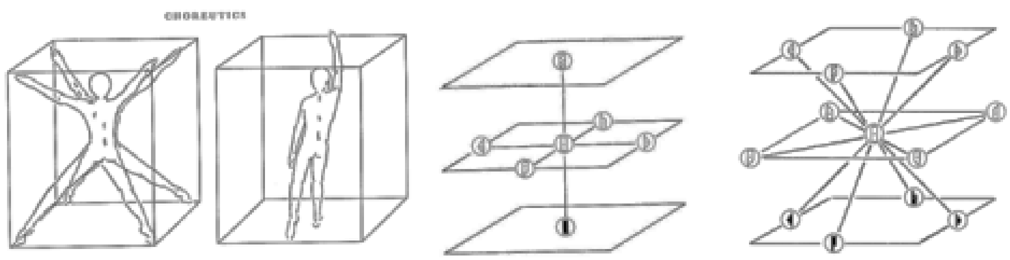


Figure 18: Laban Cube

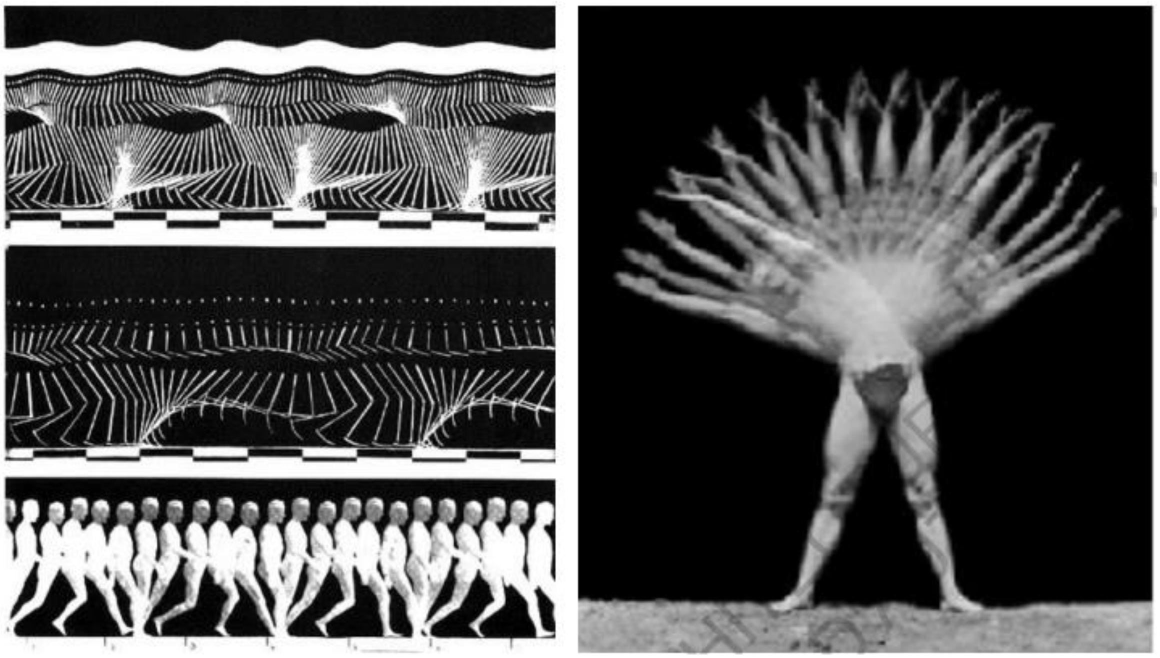


Figure 19:Rudolf Laban (1879-1958): principe of libanisation

2. Space and transitions

It is possible to discern two distinct types of spaces: a positive space and a negative space.

Positive Space

Cousin defines positive space as a place, on a human scale, possessing a center where the individual generally feels drawn. This all-encompassing space is limited to the perceptible visual field of humans. (Cousin, 1980)

Negative Space

Negative space is the space that remains after the recognition of positive space. It is, therefore, a vast environment without visual limits. (Cousin, 1980)

➔ "Positive space thus corresponds to our bubble and its extension around us" (Cousin, 1980: 45), and what remains automatically becomes negative."

Figure 20: recognition of positive spaces nearby, source: Cousin 1980 p 71

The transitional space is an area situated between an interior volume and another exterior to it. It facilitates the movement of individuals through spaces with distinct characteristics.

Donald D. Winnicott (David, 2003) defines this zone as a creator of illusions; it leads one to presume that it is part of both the interior space of the dwelling and the exterior part, while in fact, this place seems to correspond to, nor belong to either of these two spaces.

Winnicott (David, 2003: 211) characterizes the transition as a 'space floating between two worlds.

The transition can become a space in itself; it can be thin or voluminous. The transition is established as an uncertain boundary between two giants, which are the interior and the exterior, the public and the private.

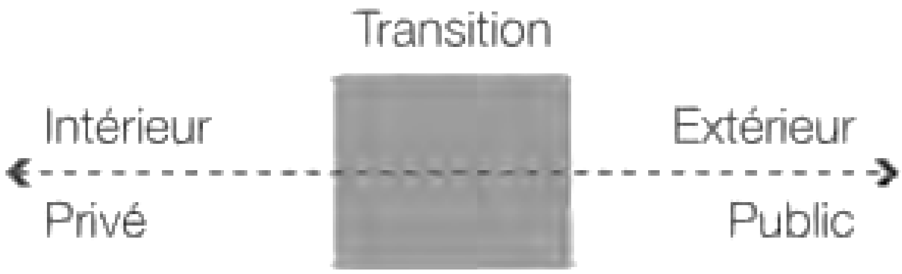


Figure 21: location of public/privet and interior/ exterior space, source: Von Meiss,2007

The fact of being inside or outside does not necessarily indicate whether spaces are covered or uncovered, or whether they are enclosed or open. (von Meiss, 2007) Various types of transitions can apply.

Moreover, the transitions made are not necessarily interior or exterior, private or public; von Meiss (2007) asserts that once inside an environment, there is always the possibility of reaching even more interior spaces.

It is possible to make transitions within the same space, for example, interior to interior, private to private.

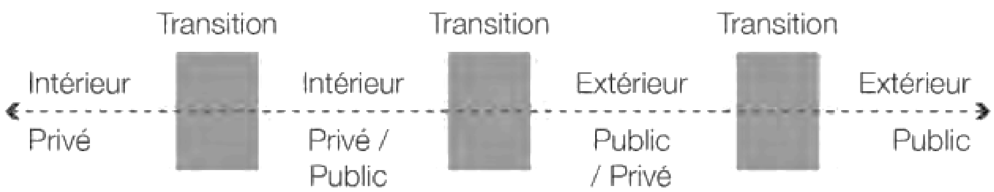


Figure 22: Proposition of public/privet and interior/ exterior space, source: Von Meiss,2007

3. The intermediate space

The foundation of the intermediate space consists of a static environment that does not encourage any movement.

According to David, the intermediate nature involves the concept of the human habituation of space: 'It is a space where one stops a little to acclimate oneself to the new conditions one will face in the universe one is about to enter.' (David, 2003: 199)

The place encourages individuals to take a pause and become aware of the environmental change they are participating in.

The effective method to achieve this is to 'block a natural axis' (Cousin, 1980: 79) of the human, thus eliminating all movement. It is necessary to erect a physically impassable element in the direction taken, to interrupt the spatial or visual journey of the individual.

4. Spatial sequences

The way in which the succession and placement of transitional and intermediate spaces occur in the architectural journey holds particular significance for user behavior. '[...] Spaces are undoubtedly, in turn, positive and negative, static and dynamic, depending on volumetric changes or movements of our bodies, transforming our awareness. This is what makes architecture alive.' (Cousin, 1980: 49)

The objective of transitions is to enhance the spatial qualities of the served environments. The nature of contrasts used in transitions is variable, even limitless. They can be experienced abruptly or gradually by the individual in their journey. To achieve this, a sequence in the organization of these different places must be established.

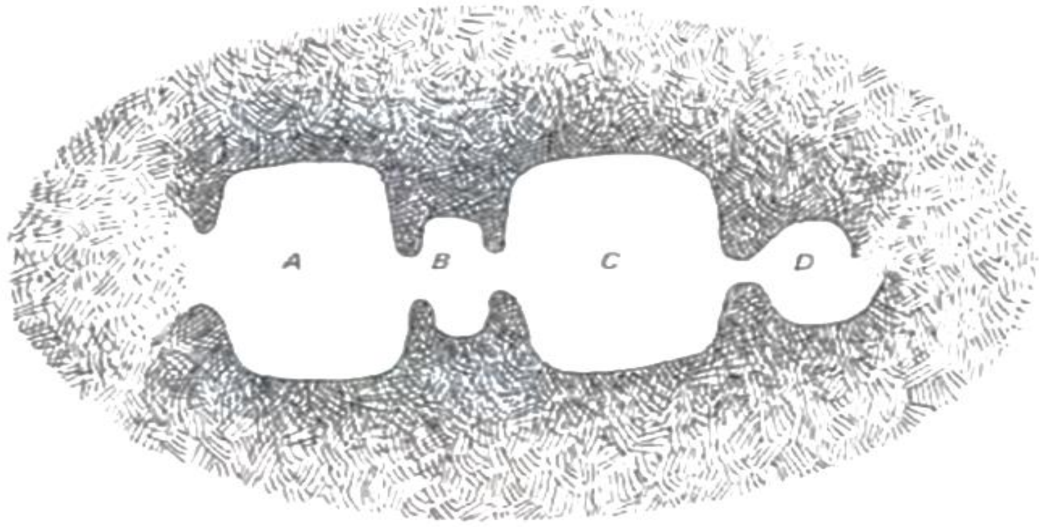


Figure 23: 4. Spatial sequences, source: Cousin, 1980 p 214)

However, the direction taken in the user's journey through spaces influences their perception. (Cousin, 1980) The act of entering or exiting will have a significantly different meaning in each direction.

5. Spatial continuity

"Spatial interpenetration achieves the continuity from one space to another the moment an important defining element, a wall, a ceiling, a floor, visibly belongs to two or more spaces." (von Meiss, 2007: 122)

Tapio Periainen (Cousin, 1980) specifies that the relationship between one space and another, whether intermediate or transitional, is expressed through the distance between these spaces, their degree of openness towards the boundary that separates them, and the continuity from one space to another.

"The theme of spatial continuity evokes a dynamic principle of passages and stops, with plans that guide and hint at what comes next, creating surprises through the ambiguity between the hidden and the visible, the present and the future." (von Meiss, 2007: 123). Reactions will vary while moving from one space to another.

Cousin (1980) highlights the changes between positive and negative spaces.

➔ Moving from one positive environment to another similar one instills confidence in individuals: it's a familiar space where one feels secure.

The transition can be abrupt or gradual, but the encompassing nature of spaces, one after another, keeps the user in control.

- ➔ On the contrary, when moving from one negative space to another, there is a kind of ambiguity because these infinite and continuous places are difficult to appropriate. 'There may also be a juxtaposition of negative spaces, but without real and simultaneous knowledge by the observer.' (Cousin, 1980: 218)

As for the transition from a positive space to a negative one, it involves a change in scale.

Example: Moving from an enveloping environment to a vast space, the act of exiting towards somewhere.

Note: It can be unpleasant for the user if the change is too abrupt.

- ➔ Conversely, outdoors, a person may find it challenging to immerse themselves in a negative space. The moment they move towards a delimited space, no matter how small, the individual becomes integrated into the space.

Example: Here, it's the act of entering a new environment.

Note: Again, the change in scale is significant; the individual moves towards a more encompassing, more secure place.

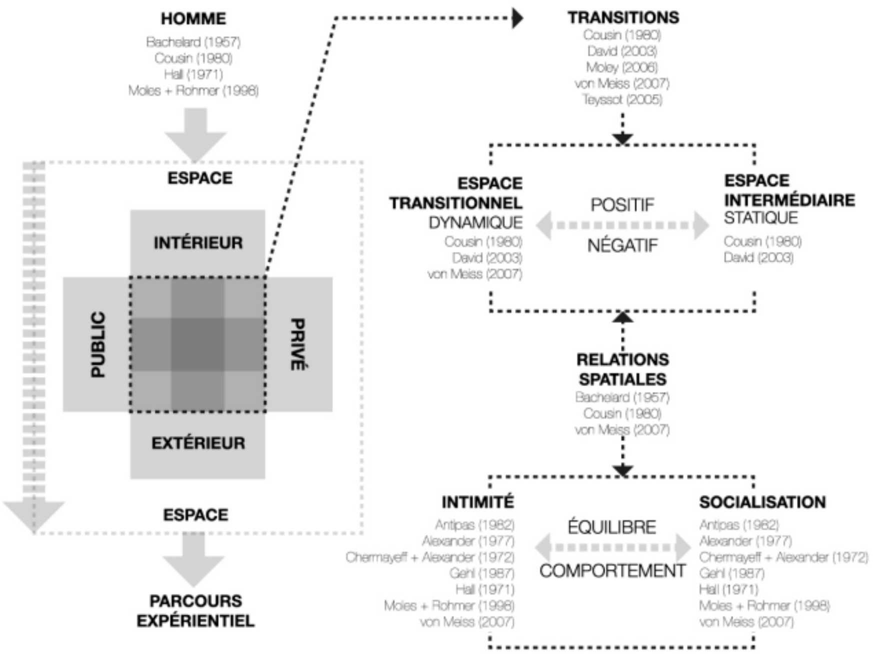


Figure 24Diagram of spatial transition concepts, source: Mahdi Feki, 2019.

6. Spatial Transition

According to the book 'Espace Vivant' by Jean Cousin, the spatial relationship between two spaces depends on three parameters:

- The distance between the two spaces
- The degree of openness of the boundary surface
- The continuity from one space to another"

The spatial transition between two spaces can take four (04) main forms:

- Be Able to cross and able to see: one can cross the common boundary between spaces in some way and see into the other space.
- Be Able to cross without seeing: crossing the common boundary does not seem to pose a challenge, but vision is, in some way, impossible to exercise directly.
- Be Able to see without crossing: vision is not obstructed towards the other space, but it seems impossible to cross the common boundary.
- Unable to see or cross: there is an impossibility to see directly into the other space, even if one can somehow appreciate its presence, and an impossibility to cross the common boundary between the two spaces.

Course 04: The Relationship between Form and Space

<u>Course structure</u>

1. The Relationship Between Form and Space

   1.1. The Relationship Between Form and Space through Openings and Circulation

2. Circulation/Pathway

2. vertical circulation: The staircase

   2.1. Staircase, Comfort, and Safety

1. The Relationship Between Form and Space

The Relationship Between Form and Space, Interior and Exterior - the Concept of continuity. The appreciation of this relationship is highly subjective.

1.1. The Relationship Between Form and Space through Openings and Circulation

In the interior-exterior relationship, openings play an essential role:

- **Their size (dimensions):** determines the amount of light entering the space.
- **Their nature:** determines the type of continuity chosen
  - Physical: a door allows the passage of a person.
  - Visual: a window allows the passage of sight.
  - Both physical and visual.

- Their geometric shape

- Their position in the plane (horizontal or vertical)

These properties influence:

- The perception of space
- The quantity and quality of light.

• They can contribute to animating the space and improving comfort.

• They can cause nuisances

- Glare.

- Excessive heat (greenhouse effect)

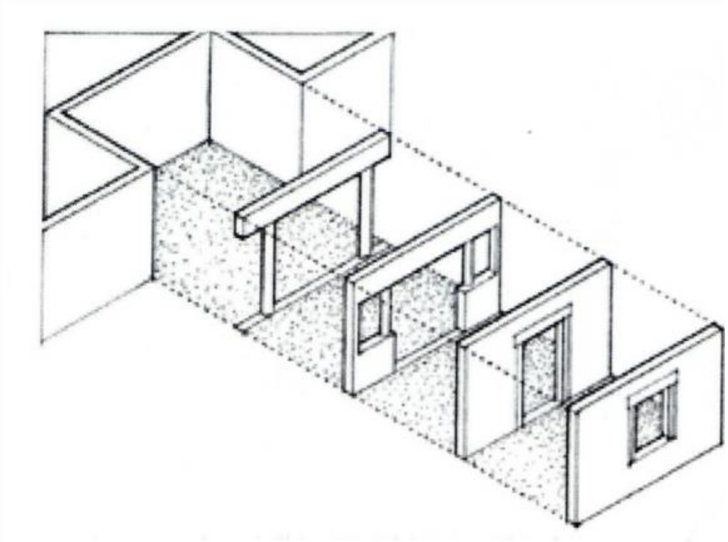


Figure 25: Relationship between interior-exterior through openings. Francis Ching, Form space and order, John Wiley & Sons 2007

2. Circulation/Pathway

When we move move in architectural or urban space

- We spend time,
- We traverse sequences,
- We move through spaces

And in this path, there is two phases:

- **Before ENTRY:**

- Before entering the building.
- The transition from the exterior to the interior (how to approach the structure).

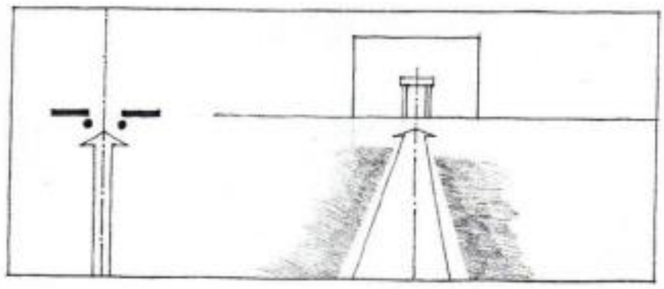
- **After ENTRY:**

- Inside the building, the pathway takes on a specific configuration.
- Linear, radial, spiral, gridded, etc.
- Circulation is a SPACE either integrated or excluded from the served space.

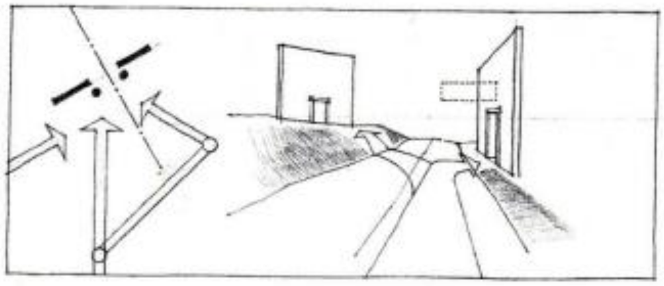
There is different configurations of the pathway, and the entrance from the outside to the inside is defined by the way we approach the building and the relationship between space and pathway.

Before the entry the approach of building can be:

- Frontal or perpendicular to the entrance ➔



- Oblique ➔



- In a spiral ➔

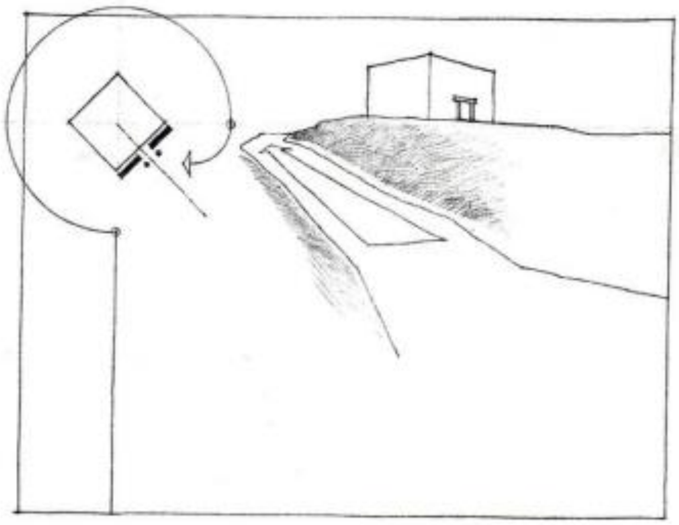


Figure 26: different configurations of the pathway, Francis Ching, Form space and order, John Wiley & Sons 2007

The choice of the approach will affect the perspective we have of the building (form and space).

Also, the pathway can have different configuration as shown in the figure below.

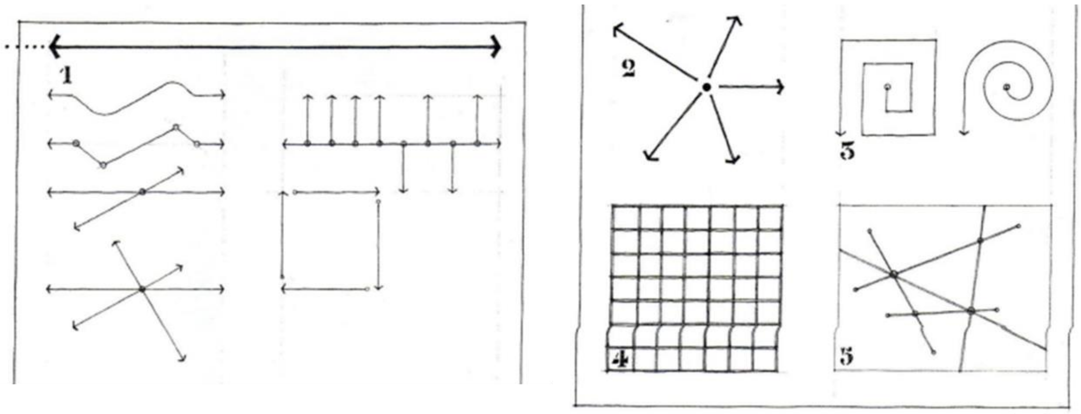


Figure 27: Pathway possible configurations

We can also have different forms of circulation space (volume and space) depending in nature and needs of the building.

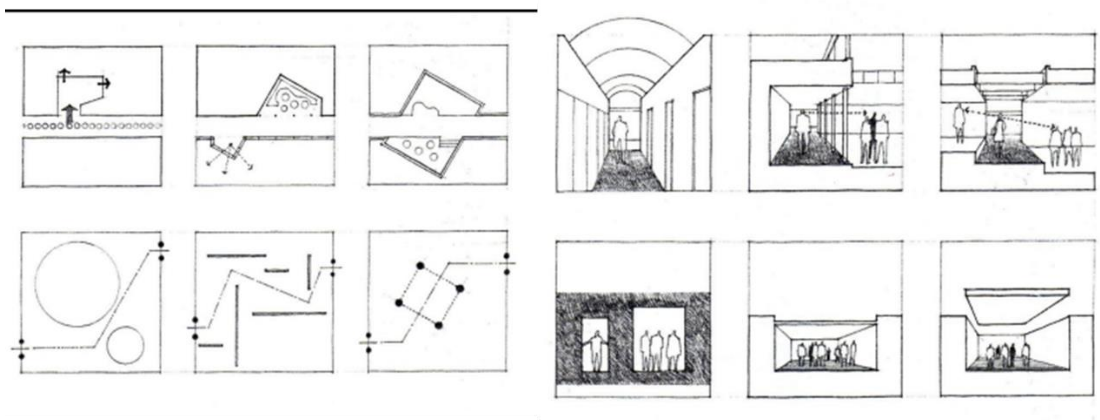


Figure 28: circulation space, Francis Ching, Form space and order, John Wiley & Sons 2007

3. vertical circulation: The staircase

The staircase is an architectural element that allows the perception of space through movement in three dimensions and a space generator. The staircase creates both a connection and a separation, continuity and interruption

Besides changing levels, depending on its shape and position, the staircase serves to:

- Reinforce the direction of the pathway
- Interrupt this pathway
- Change the direction of the pathway
- Conclude the journey

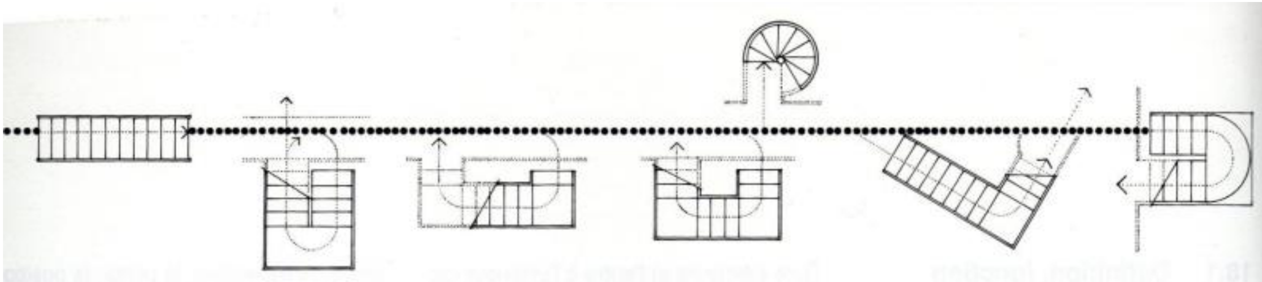


Figure 29: vertical circulation: The staircase

3.1. Staircase, Comfort, and Safety

Staircases are essential elements in architectural design, providing vertical circulation within a building. Their design significantly impacts both the comfort and safety of users.

Adherence to local building codes and regulations is essential for safety. Codes specify minimum requirements for step dimensions, handrails, and other features to ensure that staircases are safe for use.

The dimensions of stair treads (the horizontal part) and risers (the vertical part) are crucial for comfort. Standard dimensions are designed to accommodate natural walking patterns. Variations in these dimensions can affect ease of use and user comfort.

Also, **handrails** provide support and can enhance comfort by offering a secure grip, especially for individuals with mobility issues. They should be positioned at a height that is comfortable for users and be designed to accommodate various hand sizes.

Comfort involves making staircases accessible to all users, including those with disabilities. Features such as contrasting step edges, wider treads, and gentle gradients can enhance accessibility. In addition, the materials used for stair treads should have non-slip properties to prevent accidents, especially in wet or high-traffic areas. Textured or coated surfaces can enhance grip and reduce the risk of slipping.

Figure 30: Components of staircase

Following some orientations about staircase design:

- **Capacity:** Depends on its width.
- **Gradient:** The steeper the staircase, the more fatiguing it is, but it occupies less space. A standard staircase has a gradient between 24 to 45 degrees, with a maximum value of 40 degrees in public areas and 45 degrees in residential settings. The common (and thus most comfortable) value is around 30 degrees.
- **Clearance:** Minimum 1.90 meters.
- **Landing:** Position and dimensions.
- **Tread:** Dimensions and material**.**
- Handrail.

- **Fire:** The staircase is not only a functional element but also a crucial evacuation route. Therefore, it should be designed as a fire-resistant compartment, specifically F90, especially for load-bearing construction components

There is also different typologies of starecases. The choice is made according to :

- The position in the building.
- **The number of flights:** one, two, three, or four flights.
- The footprint.
- The gradient.
- **The material:** wood, metal, stone, reinforced concrete.

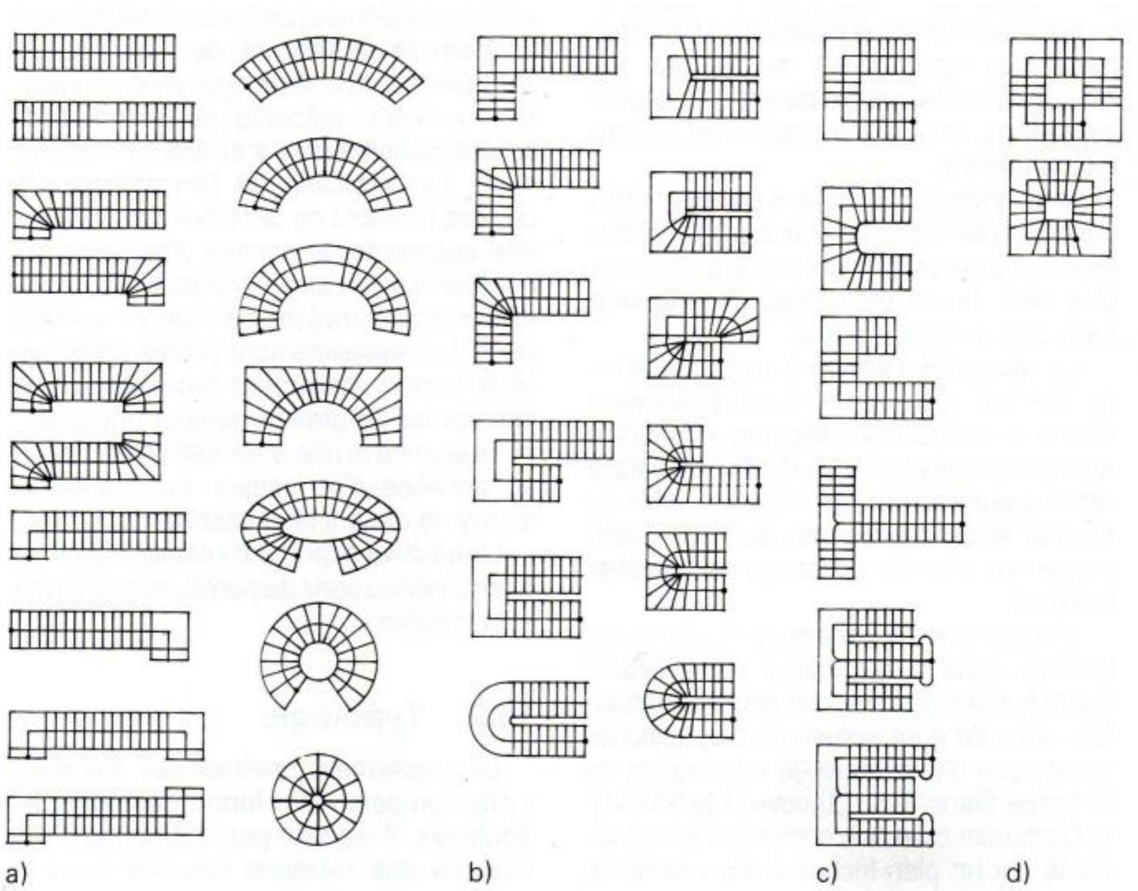


Figure 31: different typologies of staircase (vertical circulation)

Chapter 02: The function in Architecture

Course 01: The use and the user in architecture

Course 02: Spatial organization and distribution principle in buildings

Course 03: The relationship between form and function

Course 01: The use and the user in architecture

Course structure

Introduction:

Every stage of our life is framed by spaces (matrix, house, street, school, university, factory, garden, etc.),

Whatever space you encounter, it is always a matter of appropriating it and sharing it with others

1. The relationship between the User and the Space

1.1. What is architectural Space?

In the first chapter we had several definitions of space, then we focused on the definition of architectural space.

In this course we will introduce the user of this space, so it comes out with several space definitions according to the use and the user space: perceived space, the designed space and the lived space.

- **Perceived space (abstract space):** it is the representation of the user of his space. It is influenced by the culture of the people. Space is perceived differently according to age, social category, and standard of living.
- **The designed space :** It is the space created by professionals in the field: urban planners, developers, and architects. It is produced based on specific knowledge and after conducted studies..
- **The lived space (concrete space):** it is the theatre of the conflict between the perceived space and the conceived space. These three spaces must be studied simultaneously. (Lefebvre, 1971).

1.2. Appropriation of space by the user

Taking possession of space is the first gesture of the living and especially of men. The first proof of man's existence is to occupy space in order to assert his identity:

- **Identity as a biological human being:** which distinguishes itself from the physical, mineral, plant and animal world.
- **Identity as a member of a social group:** in which he shares and discusses values.

- **Identity as an individual:** which preserves a margin of freedom and personal responsibility by distinguishing oneself from the group and all others. Each person is unique, original, and autonomous on a psychological level.

Figure 32:Students' appropriation of the space in their library

1.3. The individual /space relationship

- Our space is oriented, and this orientation comes from the existence of dynamic axes in the human being, it in turn conditions the modalities of our judgment as to possible displacement in this space (Cousin, 1980).

The first relations that bring order in space are of topological type. There are three relationships:

- Location relationship: In/Out
- Position Relationship: Inclusion/Intersection
- Orientation relationship: Verticality: up/down
  - Horizontality: Right/Left
  - Perspective: Forward/Backward
  - Cardinality: East/West/North/South

If we are relative to the body, then we must distinguish the three types of space:

- Physical space outside of me (designed space).
- Perceived space, space built by the brain. It is a space that allows us to act in physical space.
- Lived space (own body space).

> We can't separate these three spaces. "Space is not a concept outside the human brain, it is perceived and experienced. (Berthoz, 2002)

The relationship between physical space and psychological space can be understood through the particular characteristics of humans that are linked to the development of a certain number of stimuli that are necessary for their learning, such as:

- **Sensory stimuli** such as vision, hearing, touch and smell.
- **Cognitive stimuli** such as assimilation, accommodation and adaptation, memory, personality, culture, type of transmission and message also play the role of stimuli.
- **Emotional stimuli** such as emotions, feelings and impulses.

Psychologists differentiate what surrounds us on three levels:

- **The level of reality:** It is described from the physical characteristics of an object, an environment; it details what constitutes it. These are objective, reasoned and logical facts.
- **The level of the imagination:** It ignores reality and ignores the laws of nature and the laws of reality.
- **The level of the symbolic:** it brings back to the meaning of words, representations.

It is important to clearly define two concepts frequently used in space psychology that are **perception** of **representation**. What differentiates them is that perception is based on **reality,** while representation comes from the **imagination**.

2. The relationship between the Use and the Space

2.1. The usage (function) of space

A building is constructed to provide a well-defined set of indoor and outdoor spaces.

It is designed based on a specific program defining the properties of its spaces (shape, location, ambiance, openness, sunlight, etc.) according to the functions that will be accommodated there.

2.2. The typology of spaces

Brodeschi asserts that the built environment can serve different functions depending on its physical configuration or the activities carried out within it [Brodeschi 2015].

A space can accommodate one or multiple activities. Each activity requires a specific ambiance (e.g., a bedroom should facilitate activities such as resting, playing, reading, sleeping, etc.).

- ➔ Therefore, to design such a space, the architect first defines the types of activities that will take place there.
- ➔ Then, they proceed to determine the ambiances that promote the execution of each activity.

This highlights the significance and role of space typology.

During its design, a space is governed by a set of programming requirements based on the type of space to which it belongs, following topological preferences or according to the activity that will take place there.

Qualitative requirements (such as lighting, acoustics, etc.) can also be associated with a type of space.

Thus, each space must adhere to common requirements related to the type of space it belongs to. The requirements related to the topology of the space define the nature of its relationships with the rest of the spaces in the building (e.g., communication or proximity between two spaces, openness or extension to the exterior, views, etc.).

These requirements can be either fixed or variable. Fixed requirements refer to specifications regarding certain specific structures governed by specific specifications and charters (e.g., hospitals, courthouses, museums, etc.). Other requirements may vary from one project to another, even if they have the same purpose.

These requirements depend on the choice of the designer or the demand of the future user. They are subjective and vary according to the culture of the users, as well as the thermal and geographical conditions of the project, etc. (e.g., requirements for nighttime spaces in a residential building).

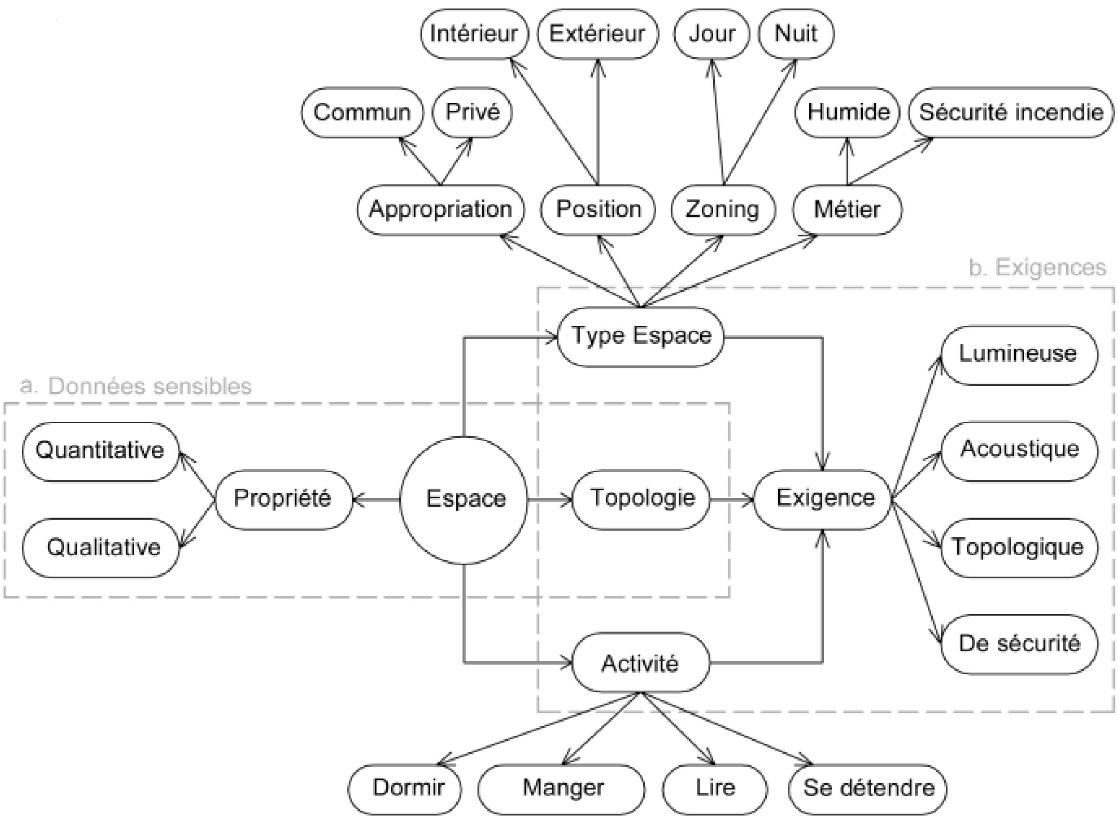


Figure 33: Analysis of data and spatial requirements

2.3. Space usage:

When discussing usage or social practices, they pertain to both biological and social needs (for example, inside and outside the home):

- **Indoors:** Eating, sleeping, washing, gathering, hosting guests, etc.
- **Outdoors:** Meeting friends, gathering, playing, walking, etc.

Usage varies according to:

- **Temporalities:** (day/night, summer/winter, weekday/weekend, daily life/events, etc.).

- **Users:** Children, youth, adults, elderly, men, women.

How different users practice space, and what factors influence their behavior and habits?

Inside the home:

- Individually or collectively;
- Among family members or with guests.

Outside the home : (Gehl, 1996)

- Necessary use: working, shopping, walking.
- Optional use: walking, playing, sitting.
- social use: meeting friends, gathering, etc.

Course 02: Spatial Organization and Principles of Distribution in Buildings

Course structure

Introduction

1. Principle of distribution and Spatial organization
2. The Circuits of Use
3. Spatial organization
    3.1. Think of spatial organization as a comprehensive journey
    3.2. Interior pathways
4. Overall distribution principle of the building
    4.1. Efficiency: rationality of the internal layout of the building (principle of efficient distribution)
    4.2. Safety
    4.3. Quality and comfort for all

Introduction

The architect's primary objective is to design a building that serves a specific function. This involves creating a harmonious balance between aesthetics and utility. The architect must consider the needs of the future occupants, the environmental impact, and the context of the surrounding area. The result is a structure that not only meets its intended purpose but also enhances the quality of life for its users and contributes positively to its environment. This is the art and science of architecture.

1. Principle of distribution and Spatial organization

In architectural design, the building is the starting point. It's a complex entity that can be broken down into two main components: the envelope and the spaces within.

The envelope is the physical barrier that separates the interior from the exterior. It's more than just walls, roof, and floor. It's an interface that controls the indoor environment and contributes to the building's overall aesthetic. It's the first layer of interaction between the user and the building, and it plays a crucial role in the user's perception of the space.

Within the envelope are the spaces. These are the areas that are designed for specific uses. They can be separate or connected, arranged, and articulated to meet the needs of the users. The arrangement of these spaces is critical to the functionality and flow of the building. It's here that the user interacts with the building on a more intimate level.

Emerging from these spaces is the principle of distribution or spatial organization. This is the logic that guides how spaces are organized and distributed within the building. It's a principle that takes into account factors such as the flow of movement, accessibility, and the relationship between different spaces. It's the principle that ensures the building is not only aesthetically pleasing but also functional and user-friendly.

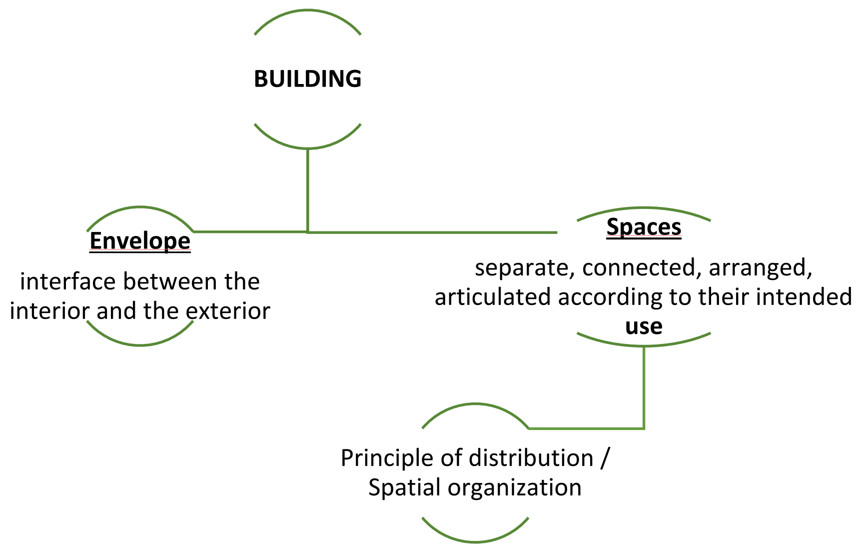


Figure 34: 1. Principle of distribution and Spatial organization

2. The Circuits of Use

Circuits of use" in architecture refers to the paths and patterns of movement that people naturally follow within a built environment. These circuits are influenced by the spatial organization and distribution of different areas within a building.

For instance, in a residential building, the circuit of use might start at the entrance, lead to the living room, then to the kitchen, and finally to the bedrooms. In a commercial building, the circuit could involve paths from the entrance to different departments, meeting rooms, or facilities.

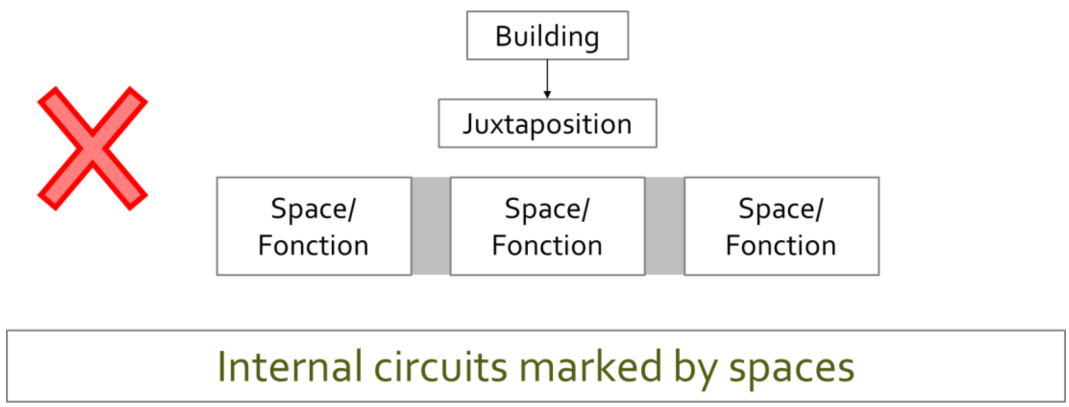


Figure 35: Incorrect approaches to design circuits

Understanding these circuits is crucial for architects as it helps them design spaces that are not only aesthetically pleasing but also functional and efficient. By considering the circuits of use, architects can ensure smooth flow of movement, enhance accessibility, and improve the overall user experience within the building. This understanding can also inform the placement of furniture, equipment, and amenities, further optimizing the use of space.

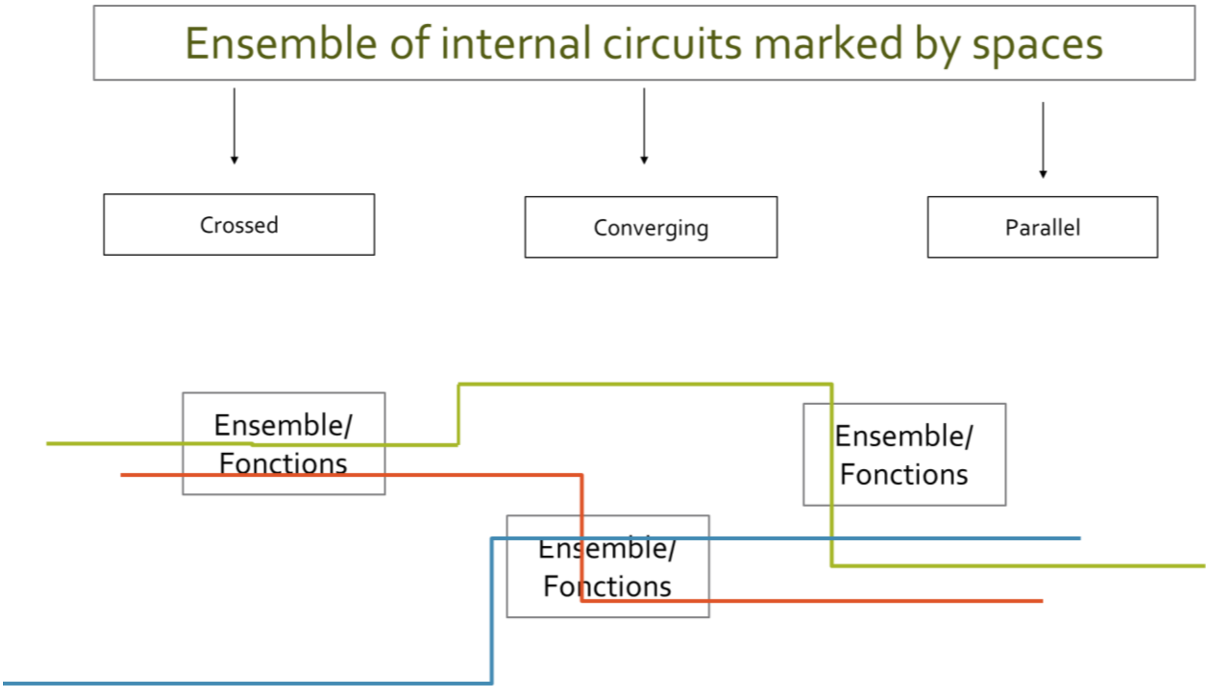


Figure 36: Correct approaches to designcircuits

3. Spatial organization

Spatial organization: is the way in which the different spaces of a building are arranged and articulated according to a hierarchy.

Spatial organization should be thought of dynamically and sequenced.

Figure 37: spatial orgnization

The principle of distribution (interior layout of a building) is **the backbone**, the nervous system of a structure.

3.1. Think of spatial organization as a comprehensive journey

Spatial organization in architecture can indeed be thought of as a comprehensive journey. It’s a dynamic process that involves the thoughtful arrangement and coordination of spaces based on their function, flow, and the needs of the users.

Just like a journey, spatial organization has a starting point (the entrance), a path (the circulation spaces like hallways and corridors), and destinations (the functional spaces like rooms or areas). The journey through the building should be intuitive and seamless, guiding the users through the space with ease.

Moreover, this journey isn’t just physical. It’s also a sensory and psychological experience. The spatial organization can influence how users feel, behave, and interact within the space. Therefore, architects must consider factors like light, color, texture, proportion, and scale, which can all impact the user’s journey through the space.

Depending on the uses, the way of entering a building varies:

The entrance to a building is often designed based on its intended use. For instance, the entrance of a residential building might be designed to create a sense of welcome and security. It could include elements like a porch or a small garden.

On the other hand, the entrance of a commercial building, like an office or a shopping mall, might be designed to handle a large flow of people. It could include features like automatic doors, wide pathways, and clear signage.

In a hospital, the entrance would be designed considering the needs of patients and medical staff. It might have separate entrances for emergencies, outpatients, and staff.

Similarly, educational buildings like schools and universities might have entrances that lead directly to a central gathering space or common area.

Figure 38: Buildings entries vary depending of the use

3.2. Interior pathways

Depending on the programmatic circuits (link between functions), **the interior pathway** of the building ensures the distribution and articulation between spaces according to a **hierarchy and successive filters.**

- Horizontal pathways: halls, galleries, landings, corridors...
- Vertical pathways: stairs, escalators, ramps, elevators...

→ Overall distribution principle of the building

4. Overall distribution principle of the building

The spatial organization of a building must be designed from the **user's** perspective (the human), considering several criteria at once:

1- Efficiency

2- Safety

3- Quality and comfort for all

4.1. Efficiency: rationality of the internal layout of the building (principle of efficient distribution)

Efficiency in architecture, particularly in the context of a building's internal layout, is a principle that focuses on the rational and effective distribution of spaces. This principle is often guided by the intended function of each space, the flow of movement, and the interactions between different spaces.

An efficient layout considers how users will move through and use the spaces. It aims to minimize wasted space and ensure that each area serves its intended purpose effectively.

Possibility for users to reach their destination directly and quickly without getting lost (immediate readability:

- optimal positioning of vertical circulations (central or symmetrical).
- Avoid unnecessary mazes and dead ends.
- Promote visual connections (seeing and being seen).
- public and private spaces might be separated for privacy
- spaces frequently used together might be placed close to each other for convenience

4.2. Safety

Safety distribution in a building refers to the strategic placement and management of safety measures and equipment throughout the structure. This includes fire safety systems, emergency exits, safety signage, first aid kits, and other safety-related elements.

For instance, fire extinguishers and fire alarms should be evenly distributed and easily accessible. Emergency exits should be clearly marked and unobstructed. Safety signage should be visible and informative, guiding occupants towards safety in case of emergencies.

Moreover, safety distribution also involves the consideration of load distribution, which ensures the safe and efficient transfer of forces throughout a building. This is crucial in maintaining the structural integrity of the building and ensuring the safety of its occupants.

In addition, safety distribution can also refer to the management of distribution boards in a building, which involves placing them away from potential compromise, such as areas prone to water exposure.

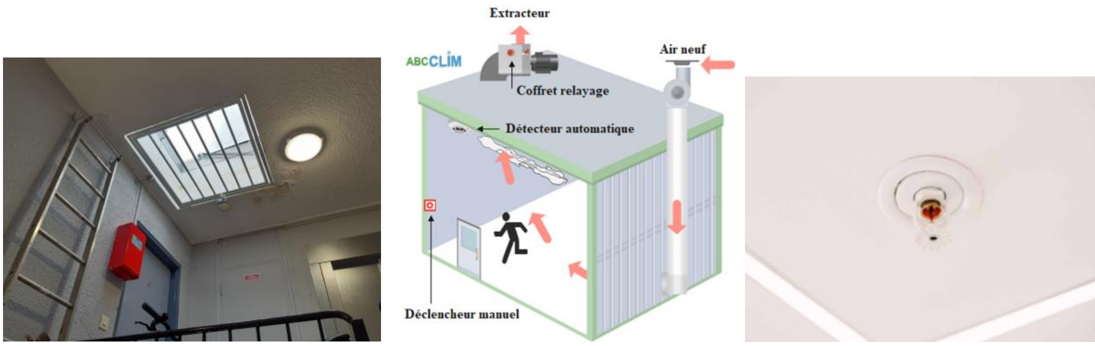


Figure 39: Safety systems used in a building

4.3. Quality and comfort for all

It underscores a key principle in architecture and building design. It emphasizes that every aspect of a building, from its design and construction to the distribution of its spaces, should aim for quality and comfort for all its users.

Quality in this context can refer to the use of durable materials, adherence to safety standards, and the overall craftsmanship of the building. It also involves creating a design that is aesthetically pleasing and fits well within its environment.

Comfort, on the other hand, is about ensuring that the building is user-friendly and meets the needs of its occupants. This could involve considerations like ensuring sufficient natural light, providing efficient heating and cooling systems, and designing spaces that are easy to navigate.

For the quality part: Internal circulation and distribution space (internal course) is the Soul and identity of the building, it can create a place of internal use by:

- -Strolling/architectural walk

-Meetings/Conviviality

-Relaxation and pleasure

-Various appropriations

Figure 40: design qualitative and comfortable spaces

- Spaces proportionate to the use and scale of the equipment: Halls, atriums, galleries, patios, corridors...

- Interior architecture: Identity, originality, emotions, specific atmospheres, marketing...

- Uses: Welcome, orientation and information; complementary services (WC, cloakrooms, security...).

For the comfort par the architect must pay attention in his design to:

➔ Physical and physiological comfort:

- Shapes and proportions of spaces

- Ambiance (acoustic, thermal, visual, and functional comfort)

➔ Psychological comfort (subjective)

- Perception of these physical and psychological states by the human mind (unconscious): well-being, discomfort, pleasure, joy...

To make a space efficient for all we have to consider People with reduced mobility (PRM) (disabled and elderly individuals) in our design by :

- Consider wheelchair access, strollers, etc.,:

- Avoid level differences and unnecessary obstacles;

-Ramps;

-Elevators;

-Taking into account the width of doors and corridors;

-Using accessible handles and control buttons;

-Disabled toilets

Figure 41: solutions made for wheelchare acces

For the visually impaired/blind people we can enhance our conception by thinking of:

-Rough textures to indicate potential hazards

-Audible signals

-Tactile paving

Figure 43: Tactile paving

Figure 42: Audible signals

Course 03: The relationship between form and function

Course structure

Introduction
1. Functionalism in architecture
   1.1. Fundamental Principles of functionalism
2. Louis Sullivan and the beginning of functionalism
3. Le Corbusier: A Bridge Between Functionalism and Modernism
   3.1. Functionalism
   3.2. Modernism
   3.3. Illustrative Works
4. Mies van der Rohe and Functionalism
   4.1. Distinction in Relation to Functionalism
   4.2. Illustrative Works
5. Legacy and Evolution
   5.1. Modernism
   5.2. Brutalism
   5.3. Minimalism
   5.4. Ecological Architecture
6. Relationship between Function proportion and Scale
   6.1. Proportion
   6.2. Scale
   6.3. Le Corbusier's Modulor
   6.4. Human Scale
   6.5. Characteristics of Human Scale
   6.6. Interconnection Between Functionalism and Human Scale
   6.7. Aesthetics as a Complement to Function
   6.8. Evolution of Architectural Standards

1. Functionalism in architecture

"Form follows function" or "functionalism" is a principle in architecture where form expresses use. This expression, first articulated in the early 20th century, comes from architect Louis Sullivan.

Functionalism emerged in the early 20th century in response to the social, technological, and industrial changes of the time. Modernist architects like Le Corbusier, Mies van der Rohe, and Walter Gropius were among the first to adopt and promote this concept.

Indeed, Sullivan became known for summarizing the functionalist principle, where the form of a building—its curves, size, mass, and overall architecture—is an expression of its uses.

1.1. Fundamental Principles of functionalism

- **Form Follows Function:**
  Buildings are designed based on their primary purpose, with particular attention to how occupants will use the spaces.
- **Rationalization of Spaces:**
  Floor plans are simplified and optimized for efficient use, eliminating superfluous elements and promoting smooth circulation.
- **Simplicity and Clarity:**
  Spaces should be simple and clear, with clean lines and logical organization to facilitate occupants' understanding and use of the space.
- **Flexibility and Adaptability**
- **Use of Modern Materials and Construction Techniques**

2. Louis Sullivan and the beginning of functionalism

Functionalism is a principle in architecture that states that form is the expression of function. More concretely, the physical characteristics of a building (its mass, size, appearance) should be a perfect reflection of its use.

It is important to note that while functionalism is remarkable, it is centered on a principle of conformity and strict adherence to form according to function. This principle is sometimes criticized when it is too rigid and not viable depending on the nature of the business activities.


Figure 44: Louis Henry Sullivan, 1856-1924.

The 1891 Wainwright Building in St. Louis, Missouri, is a ten-story terracotta building designed by Dankmar Adler and Louis Sullivan between 1890 and 1891. It highlights Sullivan's ideas, emphasizing the skyscraper's height, which, by definition, must be tall in accordance with its function. As functional as it is stylish (offering a lot of space on a relatively small footprint due to its verticality for that time), this building is also filled with architectural symbolism, ranging from the simplest geometric forms to the most complex organic ornamentation. It is one of the architect's earliest works that embodies this principle.


Figure 45: Wainwright Building designed by Dankmar Adler and Louis Sullivan between 1890 and 1891.

Without a doubt, Louis Sullivan criticizes purely aesthetic design work whose primary objective is to shine, with the functional goal being secondary. For him, the aesthetics of a monument will naturally and necessarily derive from its function if, however, the latter is prioritized. Over the years, this idea has gained momentum and developed, aiming to create harmonious monuments where utility and beauty coexist.

2.1. statements of Frank Lloyd wright the disciple of Louis Sullivan about functionalism

The phrase "form follows function" was coined by architect Louis H. Sullivan in his 1896 essay "The Tall Office Building Artistically Considered."

The statement refers to the idea that a skyscraper's exterior design should reflect the different interior functions.

The Wainwright Building in St. Louis, Missouri, and the Prudential Building in Buffalo, New York, are two examples of skyscrapers whose form follows their functions.

“Form follows function—that has been misunderstood. Form and function should be one, joined in a spiritual union.”

—Frank Lloyd Wright

Figure 46: Guggenheim museum new york, USA, 1939.

As a young architect Frank Lloyd Wright worked for Louis Sullivan (1856–1924) in his Chicago-based architecture firm. Sullivan is known for steel-frame constructions, considered some of the earliest skyscrapers. Sullivan’s famous axiom, “form follows function,” became the touchstone for many architects. This means that the purpose of a building should be the starting point for its design. Wright extended the teachings of his mentor by changing the phrase to “form and function are one.”

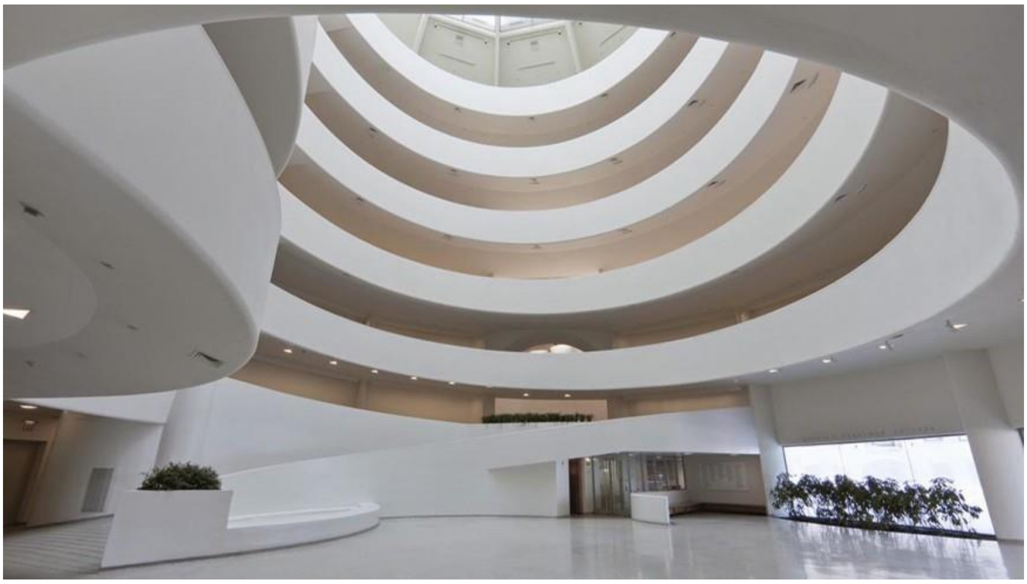


Figure 47: Guggenheim museum new york, USA, 1939.

This principle is thoroughly visible in the plan for the Guggenheim Museum. According to Wright's design, visitors would enter the building, take an elevator to the top and enjoy a continuous art-viewing experience while descending along the spiral ramp.

According to former Guggenheim Director Tom Krens, "great architecture has this capacity to adapt to changing functional uses without losing one bit of its dignity or one bit of its original intention. And I think that's the great thing about the building at the end of the day."[6]

"Yes, it is hard…to understand a struggle for harmony and unity between the painting and the building. No, it is not to subjugate the paintings to the building that I conceived this plan. On the contrary, it was to make the building and the painting a beautiful symphony such as never existed in the world of Art before."[7]

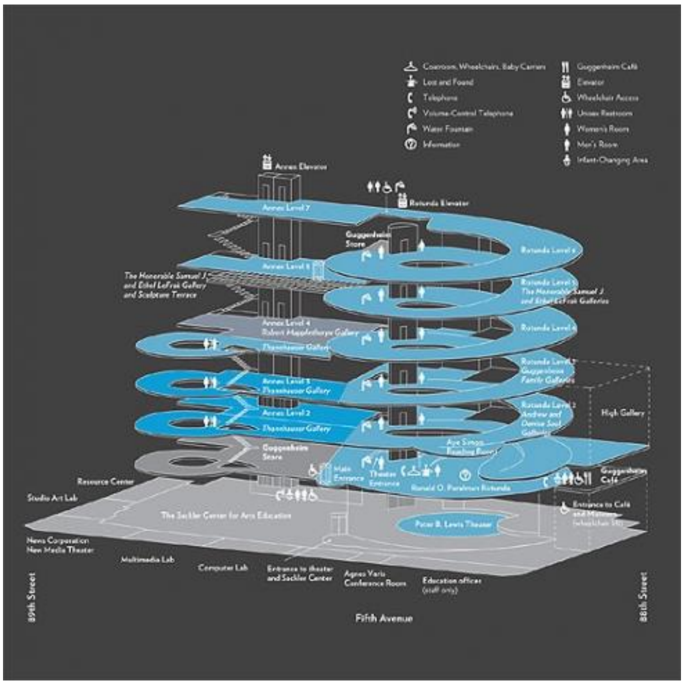


Figure 48: Guggenheim museum new york, USA, functional sketch 1939

[6] *Frank Lloyd Wright: From Within Outward* Audioguide (New York: Antenna Audio, Inc. and the Solomon R. Guggenheim Foundation, 2009)

[7] Frank Lloyd Wright to Harry Guggenheim, July 15, 1958. From *Frank Lloyd Wright: From Within Outward* (Exh. cat. New York: Solomon R. Guggenheim Foundation, 2009), p. 268

3. Le Corbusier: A Bridge Between Functionalism and Modernism

Le Corbusier is often seen as a pioneer of modernism, but he was also a strong advocate of functionalist principles. His works illustrate how these two movements can overlap:

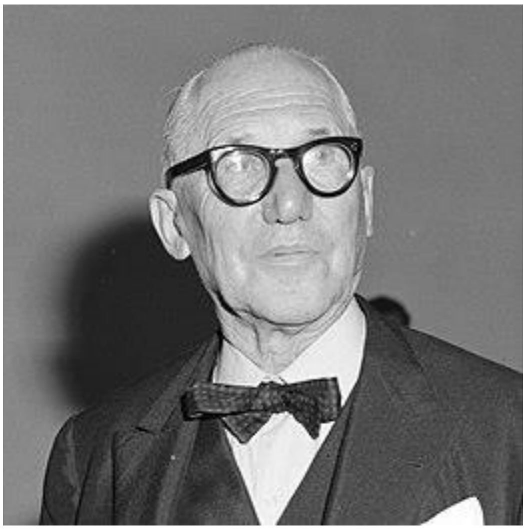


Figure 49: Charles-Édouard Jeanneret-Gris, dit Le Corbusier, 1887-1965.

- **Functionality:** His designs, such as the Unité d'Habitation, address practical needs while incorporating modernist elements.
- **Aesthetics:** Le Corbusier also sought to express a new modern aesthetic, using geometric forms and contemporary materials.

3.1. Functionalism

Functionalism, which Le Corbusier strongly supported, focuses on the idea that a building's form should derive from its function. This implies a pragmatic design approach, where every architectural element is justified by its utility. Le Corbusier applied this principle in his projects by creating spaces that meet the users' needs, as exemplified by his Unité d'Habitation, which integrates housing, commerce, and services in a single building to promote efficient community living.

3.2. Modernism

Modernism, on the other hand, is a broader movement that encompasses a break from traditional styles and an exploration of new forms and materials. Le Corbusier was a pioneer of this movement, integrating aesthetic elements and technical innovations. For example, his "Five Points of Modern Architecture"—pilotis (supports), roof garden, open floor plan, horizontal windows, and free façade—illustrate an architectural vision that goes beyond mere functionality to include an aesthetic and symbolic dimension.

3.3. Illustrative Works

- **La Cité Radieuse**

In the Radiant City, Le Corbusier combined functionalist principles with a modernist approach. The building is designed to be a self-sufficient living space, incorporating apartments, shops, and communal areas. However, it also employs bold geometric forms and modern materials, exemplifying his vision of architecture that is both functional and aesthetically innovative.

Figure 50: La Cité Radieuse, Marseille, France.

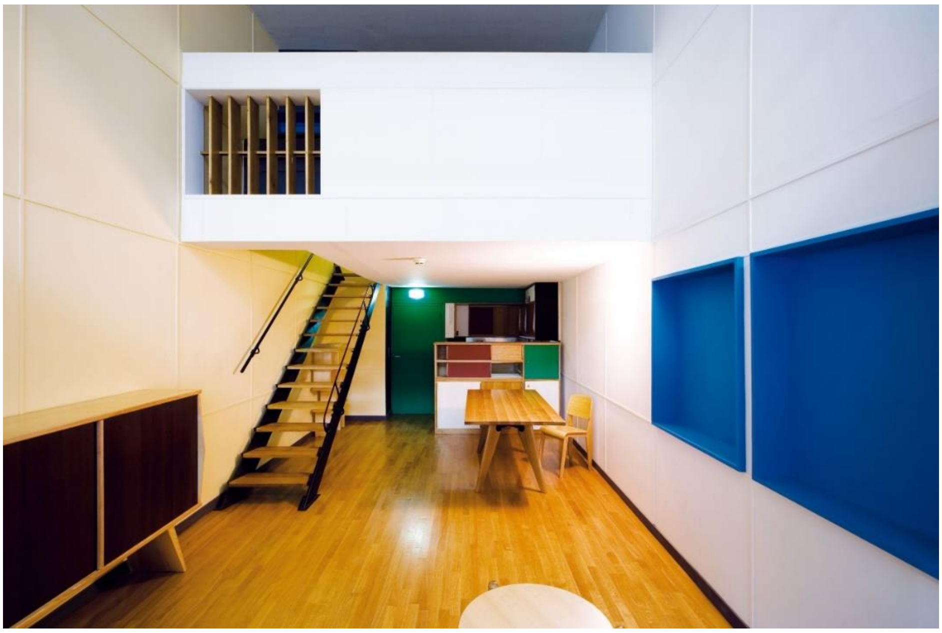


Figure 51: La Cité Radieuse Appartement, Marseille, France.

Figure 52: La cité radieuse kitchen, Marseille, France.

Figure 53: La cité radieuse interior street, Marseille, France.

4. Mies van der Rohe and Functionalism

Ludwig Mies van der Rohe is an iconic figure of the functionalist movement in architecture, and his work perfectly illustrates the principles of this trend. Here's how he integrated functionalism into his creations while distinguishing himself with a unique approach.

Figure 54: Ludwig Mies van der Rohe, 1886-1969.

4.1. Distinction in Relation to Functionalism

Although Mies van der Rohe was a strong advocate of functionalism, he also added an aesthetic dimension to his works that sets him apart from some of his contemporaries. His minimalist approach, summarized by the adage "Less is more," reflects a pursuit of elegance and simplicity that transcends mere functionality. He successfully combined beauty with utility, creating spaces that are both practical and visually impressive.

4.2. Illustrative Works

- **Crown Hall (IIT, Chicago):** This building, designed for the Illinois Institute of Technology, is a perfect example of the application of functionalist principles. Mies created an open and flexible space, allowing for various configurations of use while showcasing the steel and glass structure, thereby revealing the construction materials.

Figure 55: Crown Hall (IIT, Chicago), Ludwig Mies van der Rohe, 1956.

- **Barcelona Pavilion (1929):** Although this building is often considered an example of modernism, it also illustrates functionalism through its fluid layout and use of noble materials. The pavilion is designed to host events, thus meeting functional needs while being aesthetically pleasing.

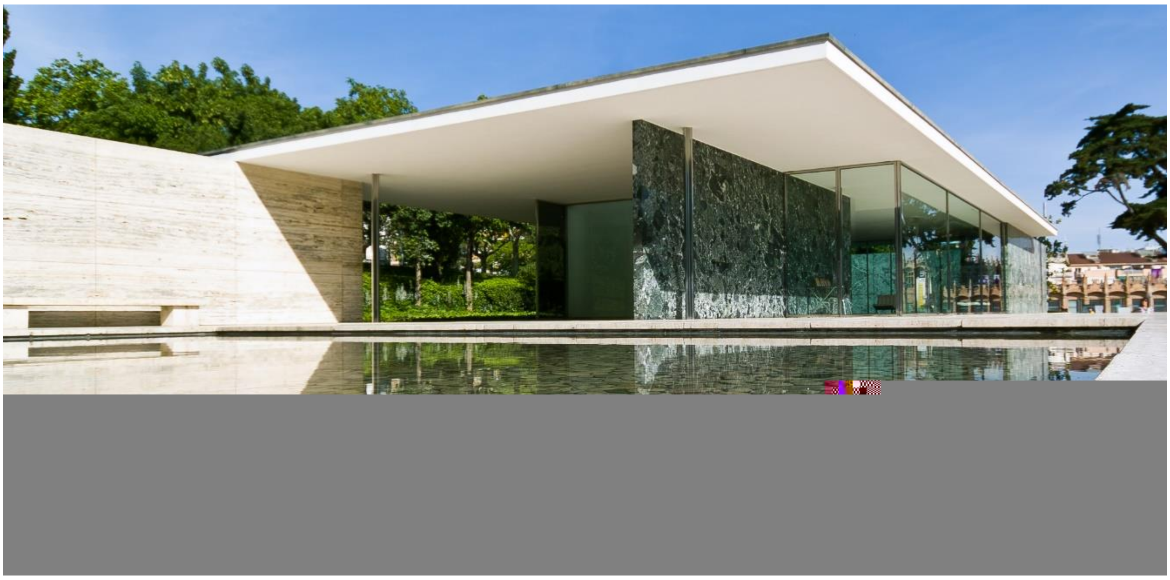


Figure 56: Barcelona Pavilion, Ludwig Mies van der Rohe, 1929.

- **Farnsworth House (1951):** This house is an iconic example of integrating architecture into the natural landscape. Its open design and large windows allow for direct interaction with the environment while meeting the occupants' needs.

Figure 57: Farnsworth House, Ludwig Mies van der Rohe, 1951

5. Legacy and Evolution

5.1. Modernism

Functionalism laid the groundwork for the modern architecture movement, which developed in the early 20th century. Modernism adopted functionalism's principles by emphasizing simplicity, functionality, and the use of new materials and construction techniques.

Figure 58: Modernism architecture, la villa Savoie, Le Corbusier

5.2. Brutalism

This movement emerged in the 1950s and 1960s and was influenced by functionalism in its expressive use of raw concrete. Brutalism highlights the rawness of buildings and their structure, while expressing the truth of construction materials.

Figure 59: Brutalism, University Constantine, Oscar nyemeyer

5.3. Minimalism

Minimalism in architecture, which appeared from the 1960s, was also influenced by functionalism. This movement emphasizes the simplicity of forms, clarity of spaces, and reduction to the essentials, reflecting the fundamental principles of functionalism.

Figure 60: Minimalism, residential project by balzar and alcocer, Spain

5.4. Ecological Architecture

More recently, ecological and sustainable architecture has drawn inspiration from functionalism in its quest to design buildings and urban environments that are both functional and environmentally friendly. This approach emphasizes energy efficiency, the use of sustainable materials, and the creation of healthy spaces for occupants, all while relying on the principles of functionalism.

Figure 61: Ecological architecture, green living facade of the building.

6. Relationship between Function proportion and Scale

The importance of proportion and scale in architectural design (human scale).

Proportion and scale are two fundamental concepts in architecture, though often confused. Here's an overview of their differences and their importance in architectural study:

6.1. Proportion

Proportion concerns the relationships between the dimensions of a building and its parts. It is a concept aimed at creating harmony and coherence in the dimensions of a structure. Architects have often sought to apply mathematical proportions such as ratios of 1/2, 1/3, or 2/3 to achieve this perfection. Vitruvius, a Roman architectural theorist, defined proportion as "the relationship that the entire work has with its parts, and the one they have separately, compared to the whole, according to the measure of a certain part."[8] He compared this to the proportions of the human body.

6.2. Scale

Scale refers to the relationships between the dimensions of a building and those of the human body. It is the concept of the apparent size of a structure in relation to humans. Architecture is said to be "to scale" when its dimensions are adapted to human use. The notion of scale appeared more recently than proportion in architecture. It involves adapting proportions according to the context and use of the building, as opposed to a rigid application of mathematical rules.

6.3. Le Corbusier's Modulor

Le Corbusier developed the concept of the Modulor in the 20th century, a measurement system based on the human scale. This system aimed to harmonize building proportions around an anthropometric standard. The Modulor exemplifies the quest for unity between proportion and scale in modern architecture. In summary, proportion and scale are two complementary notions in architecture. Proportion ensures internal coherence of dimensions, while scale adapts these proportions to human use. Their study is essential for designing harmonious and functional spaces.

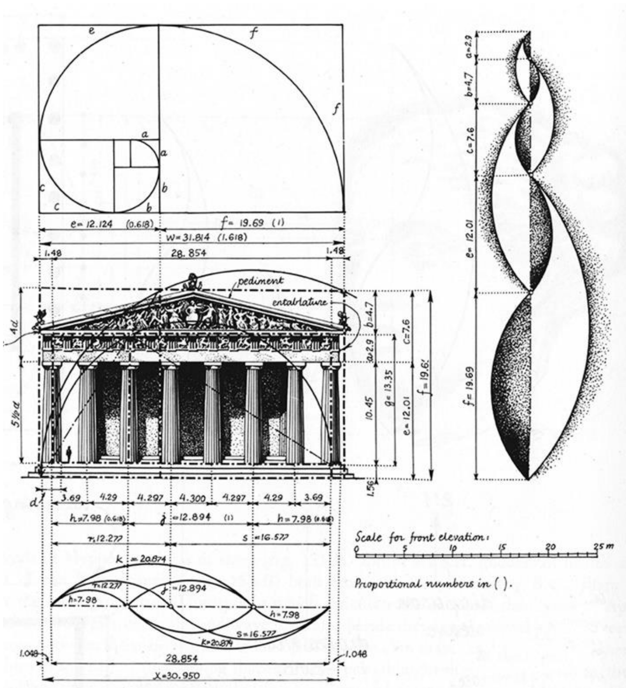


Figure 62: Application of proportions and scales in architecture

[8] Guillerme, J. (n.d.). Architecture, proportion et échelle. Universalis. https://www.universalis.fr/encyclopedie/proportion/2-architecture-proportion-et-echelle/

6.4. Human Scale

Human scale refers to the design of spaces that take into account human dimensions and perceptions. This includes considerations on how individuals interact with their environment, considering their size, movement speed, and social needs. A city or building designed on a human scale is meant to be accessible and pleasant for its users.

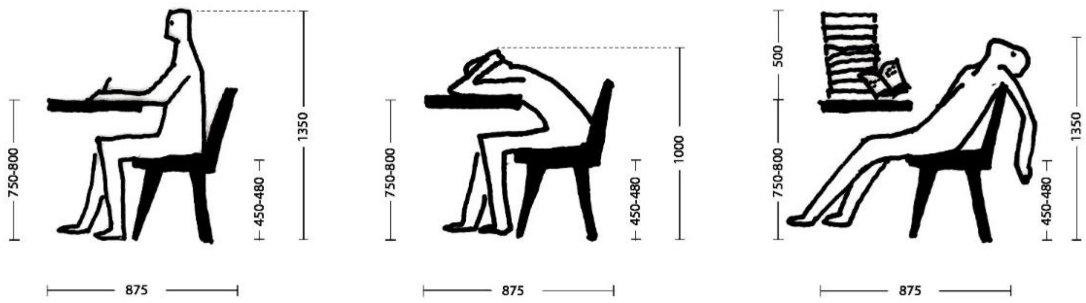


Figure 63: Human scale in desing

6.5. Characteristics of Human Scale

- **Accessibility:** Spaces should be easily accessible on foot or by bike, promoting slow movement and sociability.
- **Social Interaction:** Spaces should encourage interactions between individuals, creating a dynamic community.
- **User-friendliness:** Urban elements should be designed for the comfort and well-being of users.

6.6. Interconnection Between Functionalism and Human Scale

Functionalism applies the principle of human scale with the idea that architecture should serve the needs of its users. By integrating human scale into a functional framework, architects can create spaces that are not only efficient but also pleasant to live in.

6.7. Aesthetics as a Complement to Function

- **Function and Aesthetics:** How functionality and aesthetics have intertwined in these creations.

The interaction between functionality and aesthetics in architecture is a central topic that has evolved over time. Although functionalism emphasizes utility, it does not overlook aesthetics. In fact, many contemporary architects argue that beauty and functionality can coexist and enhance each other. For example, architect Shigeru Ban integrates aesthetic elements into his designs while addressing the practical needs of users, demonstrating that aesthetics can enhance the functional experience.

Le Corbusier, as previously mentioned, is a prime example of this fusion between functionality and aesthetics.

6.8. Evolution of Architectural Standards

Over time, architectural standards have evolved to incorporate aesthetic considerations while meeting functional requirements. Contemporary architects navigate between these two aspects, seeking to create buildings that are not only practical but also inspiring. This approach is particularly evident in projects that emphasize sustainability and the integration of natural spaces, where aesthetics become a means to enhance the user experience.

Chapiter 03: Structure in architecture

Course 01: Introduction to the Concept of Structure

<u>Course structuration</u>

Introduction

In architecture, the structure or framework is the system that enables the transfer of various forces applied to the building down to the ground where they balance out. It is often likened to the skeleton of a human body that supports buildings and other constructions. It ensures the construction's rigidity, hence its solidity and stability.

The structure follows the laws of nature to ensure that constructions withstand the forces exerted on them, not only to prevent their collapse but also to ensure their proper functioning by limiting deformations and vibrations imposed on them.

1. Structure in Architecture

Structure plays a crucial role in architecture for several reasons:

1. **Stability and Safety:** The structure ensures the stability and safety of a building by resisting natural forces such as gravity, wind, earthquakes, etc. It must be designed to prevent any risk of collapse.
2. **Durability:** A well-designed structure contributes to the longevity of a building. It must withstand the test of time and environmental conditions.
3. **Functionality:** The structure influences the layout and organization of spaces within a building. It can allow for large open spaces, multiple floors, etc.
4. **Aesthetics:** The structure can also play an aesthetic role. In some cases, the structure of a building can be highlighted to create an impressive visual effect.
5. **Energy Efficiency:** Thoughtful structural design can contribute to the energy efficiency of a building, for example, by optimizing the use of natural light.

summary, the structure is an essential element that links form, function, and safety in architecture. It is at the core of architectural design and plays a crucial role in the success of a project.

2. Types of structures

In architecture, there are several types of structures, each with its own importance and utility. Here are some of the most commonly used types of structures in architecture:

2.1. Linear Structure

This type of structure includes elements such as columns, beams, frames, and arches. They are often used to create

"Centre Pompidou" in Paris, is a famous example of a building with a visible column and beam structure.

Figure 64: Linear Structure, example: Library Georges Pompidou

2.2. Surface Structure

This type of structure includes elements such as load-bearing walls, vaults, domes, and slabs. They are often used to create structural envelopes in buildings.

the "Pantheon" in Rome, is a famous vaulted structure.

Figure 65: Surface Structure, example Panthéon in Rome

2.3. Rigid Structure

This type of structure is characterized by its resistance to deformation. It is often used in constructions that require high stability, such as tall buildings.

The "Burj Khalifa" in Dubai is an example of a rigid structure, as it is designed to withstand the forces of wind and gravity at extreme heights.

Figure 66: Rigid structure, example: Bordj khalifa

2.4. Flexible Structure

This type of structure is characterized by its ability to deform without breaking. It is often used in constructions that require some flexibility, such as suspension bridges.

The "Academy Bridge" in Venice is an example of a flexible structure, as it can deform slightly under load without breaking.

Each type of structure is important in architecture. The choice of structure depends on many factors, such as the type of building, environmental conditions, design requirements, and budget constraints.

Figure 67: Flexible Structure, example: Academy bridge

2.5. Pole and Beam Structures

Pole and beam structures are a type of structure commonly used in architecture. They consist of vertical elements (poles) that support horizontal elements (beams). This structural system is often left exposed inside buildings, showcasing the aesthetics and warmth of the materials used.

- **Technical data sheet:**

- **Design Flexibility**: Pole and beam structures provide great flexibility in architectural design. They allow for large open spaces without load-bearing walls, making interior layout easier.
- **Materials:** Poles and beams can be made from various materials such as concrete, steel, or wood. The choice of material depends on factors like design requirements, budget constraints, and environmental considerations.
- **Durability:** Pole and beam structures are typically durable and strong. They are designed to withstand various forces such as gravity and wind.
- **Aesthetics:** Pole and beam structures can be aesthetically pleasing. They can be designed to be visible inside the building, showcasing the construction material and adding an architectural design element.
- **Easy Retrofitting:** Pole and beam structures make retrofitting easier. Since interior partitions and facades are not load-bearing, it's simpler to reconfigure the space.

Figure 68: Examples of Pole and Beam Structures (different materials)

2.6. The structural wall

also known as a "voile" in architecture, is a commonly used type of structure. In masonry, a concrete structural wall is referred to as a "voile de béton," which is a vertical reinforced concrete wall cast in place. A thin structural wall refers to a shell of reinforced concrete.

Figure 69: Contemporary architecture using walls structure

- **Technical data sheet:**

- **Essential role in stability and resistance of structures:** Flexibility of design: Structural walls in buildings are vertical elements that play an essential role in the stability and resistance of structures. They connect vertical loads, participate in bracing, and provide thermal and acoustic insulation.
- Wall structures offer great **flexibility in terms of architectural design.** They allow for the creation of load-bearing walls that can support significant loads.
- **Materials:** Walls can be made from various materials, such as reinforced concrete. The choice of material depends on various factors, such as design requirements, budget constraints, and environmental considerations.
- **Aesthetics:** Wall structures can be aesthetically appealing. They can be designed to be visible inside the building, highlighting the construction material and adding an architectural design element.

2.7. Shell structure

Shell structures are three-dimensional structures with thin walls, typically featuring a curved average surface. They are often used in architecture for their structural efficiency and attractive aesthetics.

Figure 70: examples of designs adopting shell structure

- **Technical data sheet:**

- **Structural efficiency:** Shells are highly efficient structures as they allow for large spans with very small volumes of structural material. This is due to the fact that they are more structurally efficient shapes than post-and-beam structures.
- **Materials:** Most architectural shell structures are currently designed using reinforced and prestressed concrete. Concrete, with its malleability and strength, can be molded into a wide variety of shapes.
- **Aesthetics:** Shells can be aesthetically appealing and give a building a unique and distinctive appearance. They can take on various curved and complex forms, offering great design possibilities.
- **Disadvantages:** Despite their numerous advantages, shells also have some disadvantages. For instance, they may not be able to support heavy concentrated loads without the addition of ribs or other types of stiffeners. Additionally, their complex shape can make construction more costly and challenging.

3. Building Materials

In architecture, several materials are commonly used in structures such as concrete, steel, wood, etc…

These materials are essential in construction due to their varied properties. The choice of material depends on various factors, such as design requirements, budget constraints, and environmental considerations. Each material has its advantages and disadvantages, and selecting the appropriate material can have a significant impact on the appearance, functionality, and durability of a building.

3.1. Concrete

Concrete is a very common building material in modern architecture. It is known for its durability and compressive strength. Concrete can be cast into different shapes and sizes, making it extremely flexible in terms of design. Additionally, concrete is a cost-effective and widely available material, which contributes to its popularity**.**

Figure 71: Building Materials : Concret

3.2. Steel

Steel is a strong and durable material used for building structures, beams, columns, and frames. It provides tensile strength and flexibility, making it ideal for long-span structures. Steel is also valued for its ability to be precisely shaped, allowing for complex architectural designs.

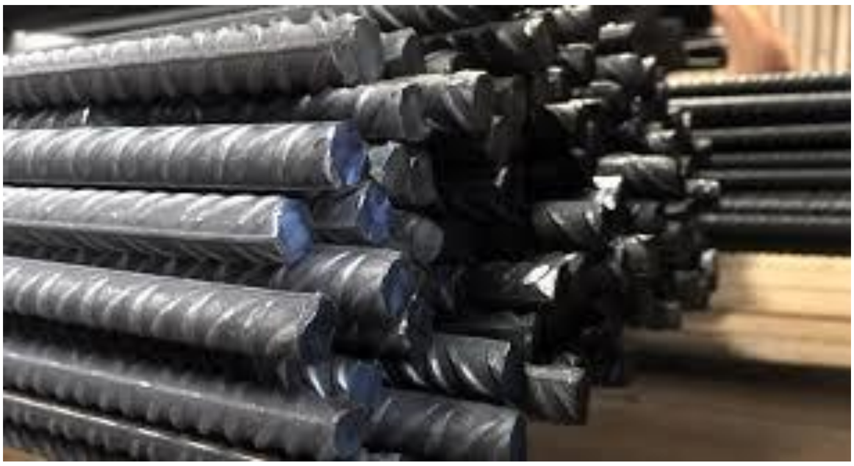


Figure 72: Building Materials : Steel

3.3. Wood

Wood is a natural and renewable material used for framing, walls, floors, and cladding. It provides aesthetic appeal and insulation properties. Wood is also valued for its warmth and natural texture, which can help create a comfortable and inviting indoor environment.

Figure 73: Building Materials : wood

4. Structural Analysis

4.1. Definition of Structural Analysis

Structural analysis is the process of calculating and determining the effects of loads and internal forces on a structure, building, or object.

Structural analysis typically examines individual structural elements and the forces they experience. A structural engineer will examine the results of structural analysis for beams, slabs, cables, and walls. All these elements are subject to forces such as wind loads, dead loads (such as self-weight), and live loads (such as people or vehicles). It is therefore important for the engineer to assess how each of these elements behaves under these loads.

Structural analysis is an indispensable tool for architects and structural engineers. It allows them to design safe, efficient, and cost-effective buildings.

4.2. Importance of Structural Analysis

Structural analysis is an essential process in architecture and civil engineering. It plays a crucial role for several reasons:

1. **Safety:** Structural analysis ensures that the structure of a building is capable of resisting the loads and forces to which it will be subjected. This includes dead loads (such as the weight of the building itself), live loads (such as the weight of people and furniture), and environmental loads (such as wind and earthquakes).
2. **Performance:** Structural analysis helps optimize the performance of a structure. For example, it can help minimize the weight of the structure while maximizing its capacity to resist loads.
3. **Economy:** By optimizing the structural design, structural analysis can contribute to reducing construction and operating costs of a building.
4. **Compliance with standards:** Structural analysis is necessary to demonstrate that the design of a building complies with applicable standards and regulations.
5. **Prediction of behavior:** Structural analysis allows predicting how a structure will behave under different loads and conditions, which can help identify and solve potential problems before they occur.

4.3. Methods of Structural Analysis

There are several methods used to perform structural analysis, depending on the level of accuracy required. Here are some of the most commonly used methods:

1. **Static Linear Analysis:** This is the simplest form of structural analysis. It assumes that materials are elastic (i.e., they return to their original shape once the load is removed) and that deformations are relatively small.
2. **Nonlinear Analysis:** This method is used when structures exhibit nonlinear behaviors, such as buckling, large deformations, or nonlinear materials.
3. **Dynamic Analysis:** This method is used to analyze the responses of structures to dynamic loads, such as earthquakes, explosions, or impacts.
4. **Finite Element Analysis (FEA):** This method divides the structure into a large number of small elements, allowing for the analysis of complex structures with high precision.
5. **Discrete Element Analysis:** This method is used to analyze structures composed of distinct pieces, such as frame and truss structures.

Chapter 04: Introduction to Project Shaping

Course 01: Basic Programming Concepts

Course 02: Adapting architecture to human needs

Course 01: Basic Programming Concepts

Course structure

Introduction

1. Architectural programming
2. Architectural programming steps
3. the main idea behind programming
4. Programmers and designers

Introduction

«The idea of a project is as old as human activity ». Giard et Midler (1996).

The etymology of the term "project" consists of the prefix "pro," meaning "which comes before in time, which occurs before," and the root "jacere," meaning "to throw." Thus, the term gradually took on the meaning that is currently attributed to it, referring to two different dimensions depending on whether it relates more to an abstract idea (arising from a process of reflection concerning uncertainty about its implementation) or to a concrete implementation (resulting from a process of modification, design, or planning).

1. Architectural programming

The construction of a building doesn't happen on its own. A building must be planned to appear beautiful and function well. It's the result of a joint effort and cooperation between a good client and a good architect.

Programming the requirements of a building is the first task of the architect, often the most important one.

There are some fundamental principles that apply to architectural programming, from the most complex hospital to the simplest home.

So, the architectural programming of a project involves an organized method of inquiry; it is a five-step process that interacts with four considerations

2. Architectural programming unfolds in five steps:

1. Establishment of objectives.
2. Collection and analysis of facts.
3. Discovery and testing of concepts.
4. Determination of needs.

Presentation of the problem.

The approach is both simple and complete, simple enough for the process to be repeated and applied to different types of buildings, yet complete enough to cover a wide range of factors influencing the design of new buildings

The five-step process can be applied in almost any discipline - banking, engineering, or education, but when specifically applied in architecture, it has its own content, which is the architectural product at different scales: a room, a building, or a city.

The principle of this process is that a product will have a much better chance of success when, during the design phase, the four major considerations are taken into account simultaneously.

These considerations (or design determinants) indicate the types of information required to fully define an architectural problem: **Function, Form, Economy, Time**

3. the main idea behind programming

- It is the search for sufficient information to clarify, understand, and articulate an architectural problem.
- If programming is the search for the problem, then design is the solution to the problem.
- These are two distinct processes, requiring different attitudes and even different abilities.
- Problem-solving is a valid approach to design when the design solution indeed addresses the client's design problem.
- The client's design problem can only be begun after thorough research of relevant information.

4. Programmers and designers:

«If I had an hour to save the planet, I would spend 59 minutes defining the problem and one minute solving it. » Einstein

Who does what? Do designers program?

➔ They can, but it requires highly skilled and specialized architects who know how to ask the right questions at the right time, who can distinguish between wants and needs, and who have the skills to set things in place.

Programmers need to be objective (to a certain degree), possess analytical minds, with abstract ideas, and be capable of evaluating information and identifying important factors while disregarding those that are not.

Designers may not always be able to do this. Designers are typically subjective, intuitive, and accustomed to physical concepts.

The qualifications of programmers and those of designers are different.

Programmers and designers are different specialists because their respective problems are very complex and require two different mental capacities, one for analysis and another for synthesis.

It is possible for there to be a person who manages both analysis and synthesis equally well. If so, they must possess two minds that they use alternately. However, for practical reasons, these two different qualifications are preferably held by different individuals, programmers and designers.

The overall design process includes two stages: analysis and synthesis. In analysis, the parts of a design problem are separated and identified. In synthesis, the parts are brought together to form a coherent design solution. The difference between programming and design is the difference between analysis and synthesis.

Programming is analysis, design is synthesis

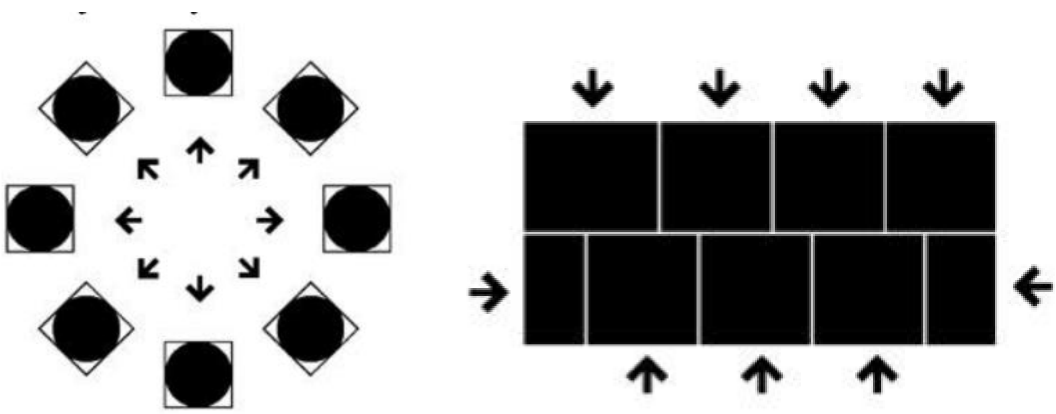


Figure 74: The difference between Programming and design

Course 02: Adapting architecture to human needs

Course structure

1. The Architecture of Happiness by Alain de Botton

In his book *The Architecture of Happiness*, Alain de Botton explores how architecture meets human needs by linking the built environment to our emotional and psychological well-being. Below are some key points on this relationship:

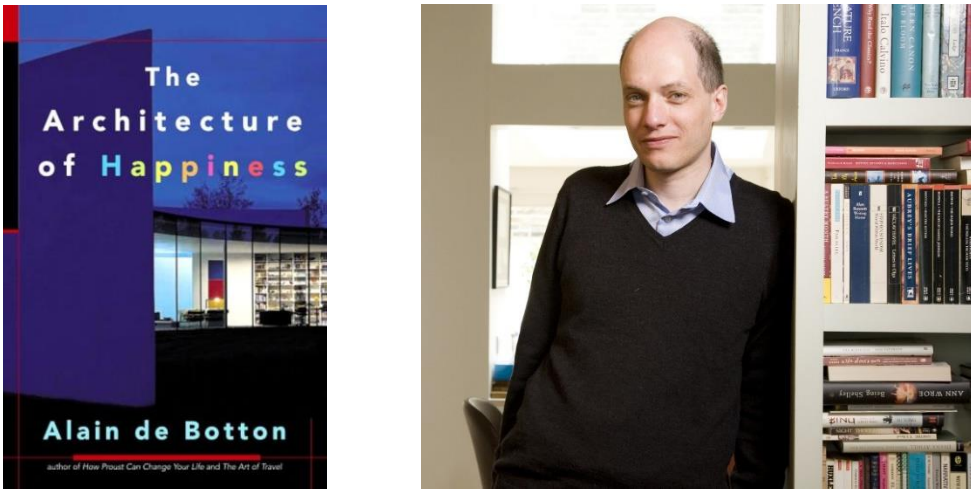


Figure 75: Alain de Botton author of The Architecture of Happiness, 1969

1.1. The Impact of the Environment on Well-Being

De Botton argues that the quality of our surroundings—buildings, streets, even furniture—has a direct impact on our happiness and state of mind. He suggests that well-designed spaces can foster feelings of joy and comfort, while neglected or unpleasant environments can lead to negative emotions. For example, he discusses how open, light-filled spaces can create a sense of vitality, whereas dark, confined spaces can produce an oppressive atmosphere.

1.2. Beauty as a Human Need

De Botton also explores the idea that beauty is a fundamental human need. He argues that buildings should be aesthetically pleasing to enrich our daily experience. Beauty in architecture is not just about taste; it plays a crucial role in our happiness. By creating harmonious environments, architecture can contribute to our overall well-being and sense of belonging.

1.3. Reflection of Identity and Values

Architecture is also a reflection of our personal and collective identity. De Botton emphasizes that homes and public buildings should embody the values and aspirations of the communities they serve. For instance, a home may reflect the tastes and values of its occupants, while a public building can symbolize a society's ideals. This connection between architecture and personal identity strengthens the sense of belonging and community.

1.4. Architecture as a Tool for Communication

De Botton views architecture as a means of communication that can express ideas and emotions. Buildings tell stories and convey messages about a society's culture, history, and aspirations. This ability to communicate through architecture allows individuals to connect with their environment in a deeper, more meaningful way.

2. Aesthetic and Happiness

2.1. Visual Harmony

Well-designed architecture creates visual harmony that can positively affect our mood and satisfaction. Visual harmony in architecture refers to how the elements of a building or urban space interact to create an aesthetically pleasing experience. Good architecture can significantly impact our mood, satisfaction, and overall well-being.

2.1.1. Elements of Visual Harmony

Proportions and Scale: The proportions and scale of buildings are crucial to visual harmony. Balanced dimensions and harmonious relationships between different parts of a building can create a sense of comfort and equilibrium. For example, buildings that adhere to Vitruvian principles (firmitas, utilitas, venustas) are generally perceived as more pleasing.

Colors and Materials: Thoughtful use of colors and materials also contributes to visual harmony. Cohesive color palettes and materials that blend with the natural environment can enhance a building's aesthetics. For instance, neutral or natural tones can create a calming atmosphere, while vibrant colors can energize a space.

Lines and Forms: The lines and shapes of a building influence our perception. Clean lines and simple geometric forms can convey a sense of modernity and clarity, while curves and organic shapes can evoke a connection with nature. The architecture of Frank Lloyd Wright, for example, often incorporates organic forms that blend harmoniously with the landscape.

Figure 76: Example of the use of the elements of Visual Harmony

3. Impact on Mood and Satisfaction

Psychological Well-Being: Harmonious architecture can positively affect our psychological well-being. Studies have shown that aesthetically pleasing environments reduce stress, improve mood, and promote creativity. Well-designed spaces, such as urban parks or welcoming public buildings, encourage social interaction and strengthen the sense of community.

Sense of Belonging: Visual harmony also contributes to a sense of belonging. Buildings that integrate harmoniously into their cultural and historical context reinforce local identity and residents' connection to their community. This can translate into collective pride and a commitment to preserving the built environment.

Sensory Experience: Harmonious architecture also engages our senses. Thoughtful design of textures, light, and shadows can enrich our experience of a space. For example, well-placed windows that allow natural light to enter can transform a space into a warm and welcoming place, fostering a positive atmosphere.

3.1. The Impact of Spaces on Our Emotions

Architectural spaces play a crucial role in how we feel and interact with our environment. Architecture can evoke a range of emotions, from serenity to joy, even melancholy.

3.2. The Importance of Emotional Design

Emotional design aims to create spaces that resonate with users on an emotional level. By incorporating elements such as interesting shapes, soothing colors, and natural materials, architects can design environments that positively influence our mood. For example, open spaces with large windows and natural light can promote a sense of happiness and productivity, while dark, confined environments can induce negative emotions like sadness or anxiety.

Figure 77: Emotional Design,

Atmosphere and Emotion: The atmosphere of a space plays a fundamental role in how we perceive it. Peter Zumthor, a Swiss architect, emphasizes that the atmosphere of a place can evoke deep memories and emotions. For example, entering a religious building can evoke feelings of solemnity and peace, while a relaxation space like a spa can evoke serenity and well-being. Architects can manipulate elements such as light, textures, and proportions to create specific atmospheres that influence our emotions.

Calm Spaces and Areas of Rest: Creating calm areas within buildings or urban spaces is essential to providing respite to stressed individuals. These areas may include gardens, lounges, or meditation spaces, designed to promote relaxation. Incorporating soothing elements such as soft colors, natural materials, and dim lighting can help reduce stress and anxiety, providing an emotional refuge in an often-hectic environment.

Cognitive and Emotional Reactions: Research shows that our brains react to the physical attributes of architecture, influencing our cognition and emotions. For example, studies have found that varied architectural environments with interesting details and diverse shapes can stimulate our curiosity and desire to explore, promoting a sense of well-being. On the other hand, monotonous or overly imposing spaces can induce feelings of oppression or fatigue.

Architecture as a Tool for Well-Being: Architecture can also be designed to promote happiness and well-being. Spaces that encourage social interaction, such as public squares or community centers, strengthen the sense of connection and belonging, which is essential to our emotional health. Contemporary architects work with neuroscientists to create environments that promote creativity, attention, and friendliness, contributing to personal and collective fulfillment.

4. The Significance of Details

4.1. Details and Characteristics

Attention to architectural details is crucial to creating meaningful and functional spaces. These details are not just decorative elements but play a critical role in defining a building's identity and the user experience.

Figure 78: Citation of Ludwig Mies Van der Rohe "God is in the details".

4.2. Definition and Importance of Architectural Details

Details in architecture can define:

Ornaments: Sculptures, friezes, and decorative motifs add an aesthetic dimension and can tell a story or symbolize cultural values.

Materials: The choice of materials, such as brick, stone, or wood, influences not only the appearance of a building but also its durability and integration into the environment.

Finishes: Finishing details, such as joints and textures, can enhance the tactile and visual perception of a space.

4.3. Significance of Architectural Details

Expression of Cultural Identity: Architectural details can reflect the cultural and historical identity of a region. For example, using traditional motifs or local materials can anchor a building in its geographical and cultural context, thus strengthening the sense of belonging among inhabitants. This is particularly visible in architectural styles such as vernacular, which incorporates local elements.

Communication of Values: Details can also communicate the values and aspirations of an era. For instance, modernist architecture, with its clean lines and lack of ornamentation, reflects a quest for simplicity and functionality, while baroque and neoclassical styles, with their elaborate details, evoke power and grandeur.

Enhancement of User Experience: Architectural details directly influence the user experience. Elements such as natural light, unobstructed views, and varied textures can create a pleasant and welcoming atmosphere. For example, well-lit spaces with carefully designed details promote the well-being and satisfaction of occupants.

4.4. Attention to Details in Architectural Practice

Design Process: Integrating architectural details begins in the design phase. Architects must consider how each detail contributes to the overall project by balancing functionality, aesthetics, and durability. This requires deep reflection on materials, construction techniques, and user needs.

Interdisciplinary Collaboration: Effective architectural details design often requires collaboration among various professionals, including architects, engineers, interior designers, and craftsmen. This collaboration ensures that each detail is not only visually appealing but also technically feasible and functional.

5. Architecture and Society

Architecture plays a crucial role in daily life and society, influencing not only the aesthetics of built environments but also the well-being of individuals and communities. Here is an overview of architecture's impact on daily life and society, based on research findings.

5.1. Impact of Architecture on Daily Life

Quality of Life: Architecture contributes to individuals' quality of life by creating functional and pleasant spaces. Well-designed buildings, whether homes, schools, or hospitals, promote comfort, safety, and well-being. For example, hospitals designed to be healing places can improve patient health outcomes.

Aesthetics and Emotion: The aesthetics of buildings influence people's emotions and psychological well-being. Beautiful and harmonious architectural environments can evoke feelings of joy and inspiration, while poorly designed spaces can create discomfort or anxiety. Architecture thus has a direct impact on people's emotional state.

Social Interaction: Architecture also shapes social interactions. Public spaces, such as parks and squares, are designed to encourage meetings and exchanges between individuals. Good urban design promotes conviviality and strengthens the social fabric, creating more cohesive communities.

5.2. Impact of Architecture on Society: Reflection of Cultural Values

5.2.1. Architecture as a Reflection of Cultural and Social Values

Architecture often mirrors the cultural and social values of a society. Architectural styles, the materials used, and the organization of spaces reflect the beliefs, traditions, and aspirations of a community. For example, public buildings can symbolize democratic ideals and commitment to the common good.

5.2.2. Sustainability and Environment

Modern architecture increasingly takes into account sustainability and environmental impact. The design of energy-efficient and sustainable buildings addresses growing societal concerns about climate change and resource conservation. This demonstrates how architecture can play a role in promoting a sustainable future.

5.2.3. Urban Transformation

Architecture has the power to transform cities and neighborhoods. Urban redevelopment projects can revitalize degraded areas, attract new residents and businesses, and improve the quality of life for residents. Thus, architecture becomes a driver of economic and social development.

5.3. Reflection on Identity: How Buildings Reflect the Values and Aspirations of an Era

Buildings often reflect the cultural values of an era through their design, architectural style, and social function. Architecture embodies cultural identity and societal ideals at a given time.

5.3.1. Representation of Cultural Values

Architecture often serves as a mirror for the cultural values of a society. For instance, architectural styles can illustrate religious beliefs, political ideals, or economic aspirations. Examples include:

- **Gothic Cathedrals**: Reflect religious devotion and ecclesiastical power with their soaring spires and stained-glass windows.
- **Modern Skyscrapers**: Symbolize technological progress and economic ambition.

Figure 80: Ando 1989 Osaka Eglise Lumiere

Figure 79: Gothic Cathedrals

5.4. Evolution of Architectural Styles

Changes in architectural styles also reflect the evolution of societal aspirations. For example:

- **Transition from Neoclassicism to Modernism**: Represents a break from past traditions in pursuit of innovation. Modernist architects like Le Corbusier and Mies van der Rohe aimed to create functional spaces that meet contemporary needs, characterized by simple and clean forms.

Figure 82: The Jefferson Memorial In washington, DC. source: Siri Stafford/Getty images

Figure 81:Modernism, Oscar Nyemeyyer, Brasil

5.4.1. Impact of Social and Historical Contexts

Historical events and social movements also influence architecture. For example:

- **Post-World War II**: Many countries sought to rebuild and modernize their infrastructure, resulting in buildings that express a desire for renewal and peace.
- **Post-Colonial Architecture**: Seeks to assert local culture in the face of Western influence by incorporating traditional elements into modern structures.

5.4.2. Architecture as a Tool for Collective Identity

Public buildings such as museums, libraries, and community centers play a crucial role in building a society's collective identity. They are often designed to be spaces of gathering and sharing, reinforcing the sense of belonging to a community. For instance: **Centre Pompidou in Paris**: With its bold architecture and accessibility, it embodies the idea of open and democratic culture.

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37139&Signature=Qa%2b3hgqqfseofhxphczmw6ymfay%3d&Response-Content-Disposition=Attachment%3b+Filename%2a%3dutf-8%27%272017_016_Cantale_Enonce_8_Proportions.Pdf&Response-Content-Type=Application%2fpdf

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