



# CIRCULATION OF ARCHITECTURAL SPACES

The movement through spaces





# Circulation Of Architectural

- In architecture, circulation means the pathways through a floor plan. These pathways are how we experience architecture; the design of these pathways has an enormous effect on the success or failure of a plan. Circulation spaces ought to be as interesting as any other part of a building. There are always unique opportunities to make circulation interesting.



# Circulation Of Architectural

- Obvious pathways include hallways (horizontal circulation) and stairs (vertical circulation). But every space we are able to occupy is part of the circulation system of a building. Halls can be expanded to become spacious areas like vestibules, foyers, galleries, arcades, and colonnades. Vertical circulation can include elevators and escalators. Less obvious pathways are the spaces between and around furniture: the spaces in rooms where people are likely to walk. All of these variations on circulation are important aspects of architecture because it is through movement that we enjoy architecture as a three-dimensional experience. Without movement, architecture is merely a stage set: entertaining to look at, perhaps, but with no direct relationship to the user.

# Circulation Of Architectural



- Good circulation is essential to successful architecture. Like the flow of blood in a body, circulation works best when the route is clear and unobstructed. After all, how can you appreciate beautiful spaces if you don't know where to go or you're constantly bumping into obstacles? When we confront people with an obstacle course, their eyes are on the obstacles, not the architecture.





*Circulation: movement through  
space*

— *Francis DK Ching in Architecture: Form, Space &  
Order*

# WHAT IS CIRCULATION?

- The word circulation meant the movement of blood around the human body when it comes to science
- In architecture, the concept of circulation isn't so different - it refers to the way people, the blood of our buildings, move through space.
- In particular, circulation routes are the pathways people take through and around buildings or urban places. Circulation is often thought of as the 'space between the spaces', having a connective function, but it can be much more than that. It is the concept that captures the experience of moving our bodies around a building, three-dimensionally and through time.

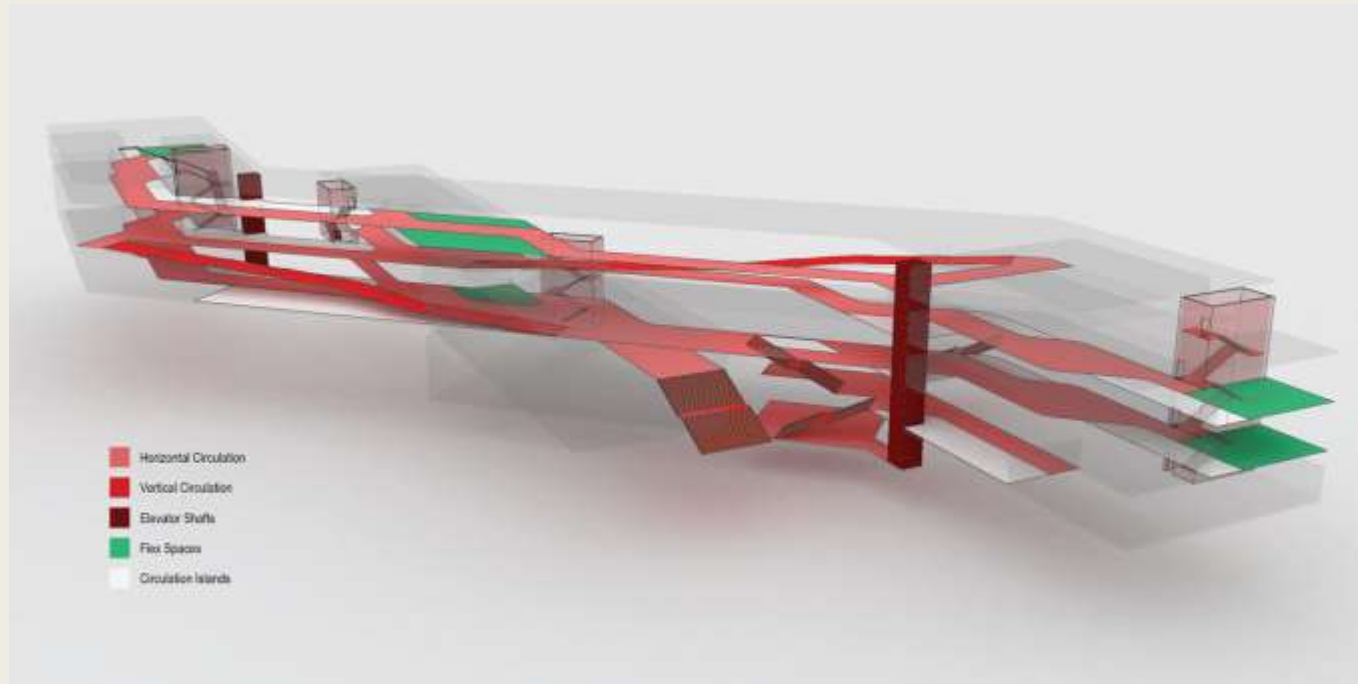


# Circulation Of Architectural



- It is the perceptive thread that links or assembles a set of interior and/or exterior spaces.
- The tours are always linear, have a point of item, from which it removes us across a series of spatial sequences up to coming to the destination or finally. The contour of tour changes in agreement to the way of used in transport, the pedestrian adapts to any tour, the vehicles are limited for it radio of draft. In the tour always there are crossings or intersection, and the routes have broad different according to hierarchy and flows.

# Circulation Of Architectural

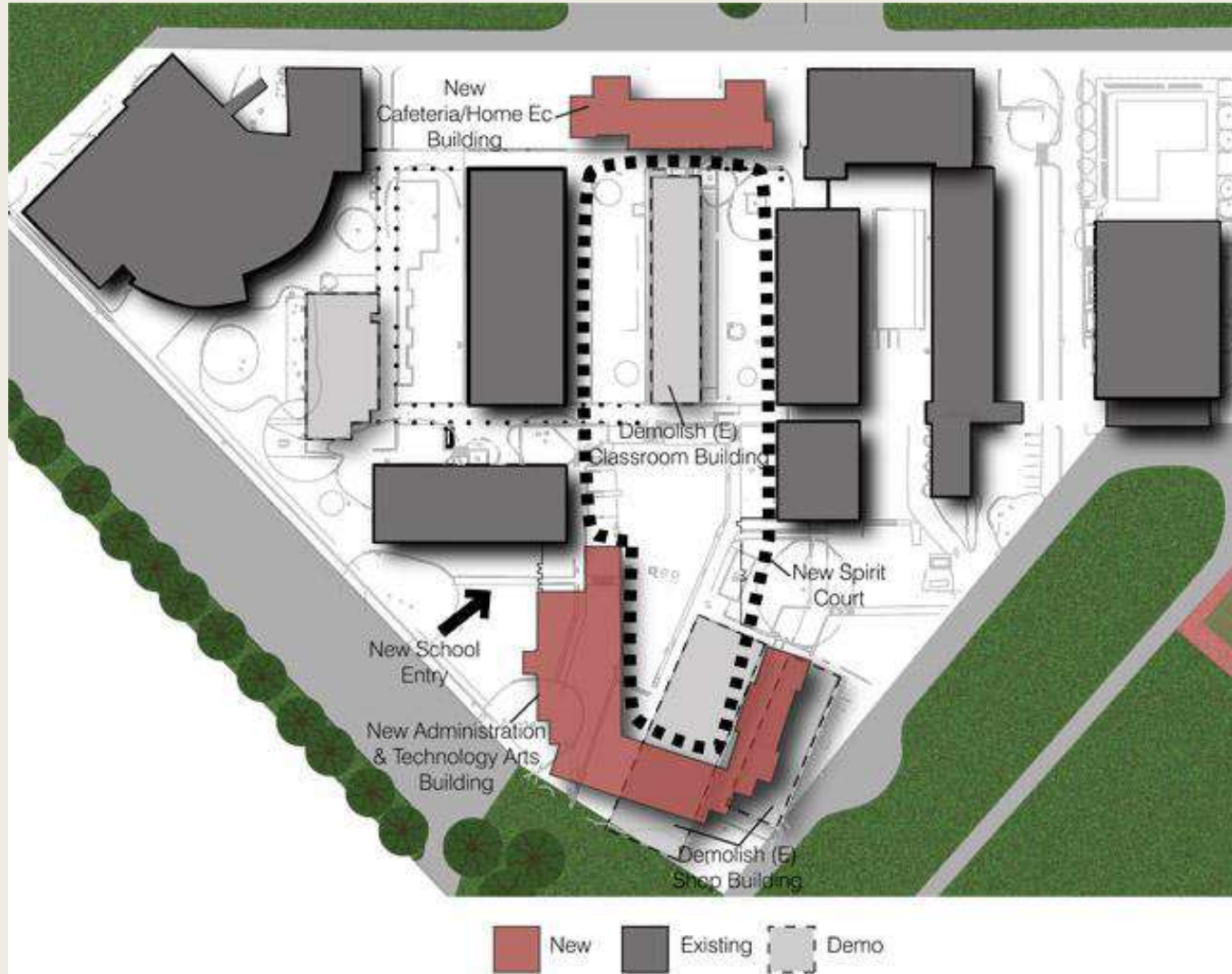


- Circulation in architecture refers to how the space or buildings is designed to facilitate the human flow in the building. Circulation in buildings commonly move both vertically and horizontally with the use of staircases and lifts. Circulation in building plays a major role in how the circulation is designed.

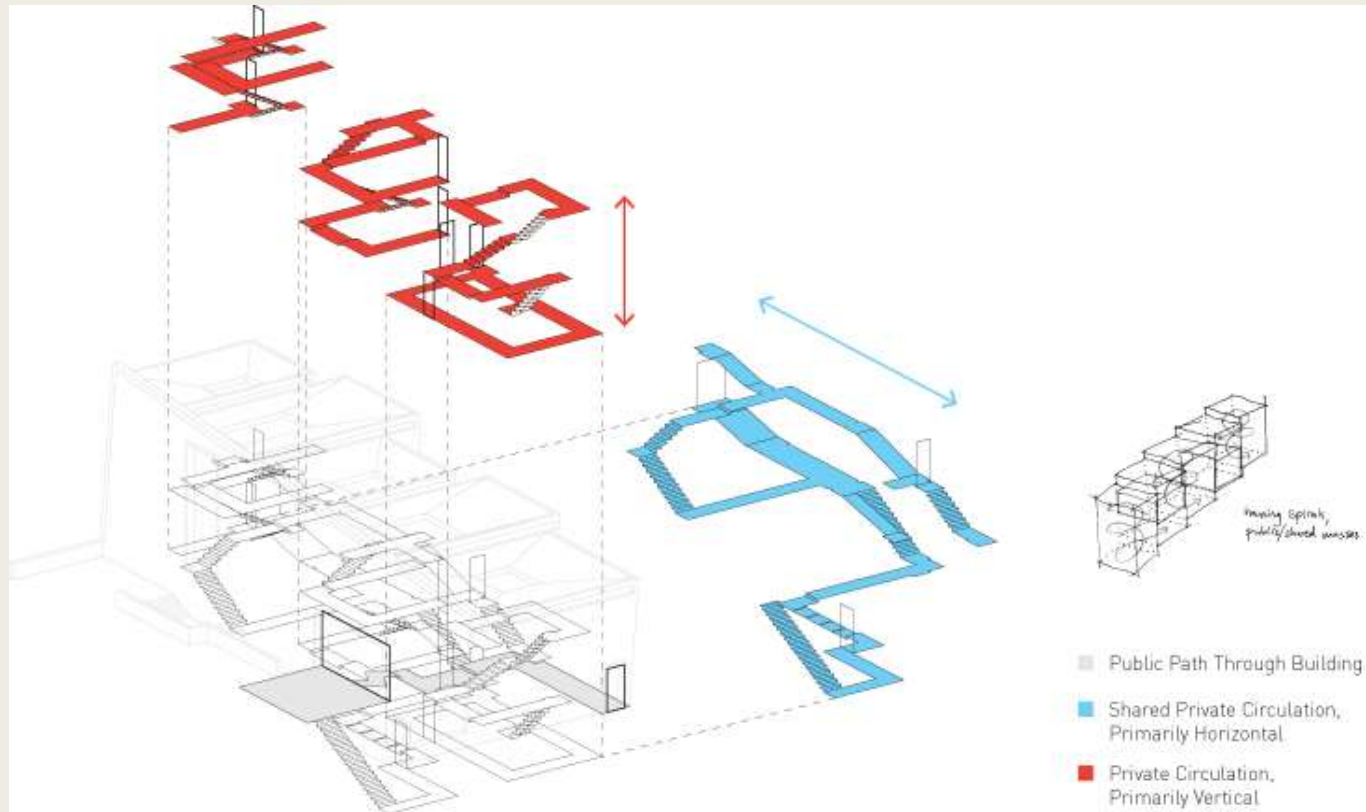


# Architecture is not a static experience

- In the field of architecture, circulation refers to
- The way to enter, go through and go around a building.
- They help people to understand the architecture as they move through a building and its spaces.



# Circulation Of Architectural



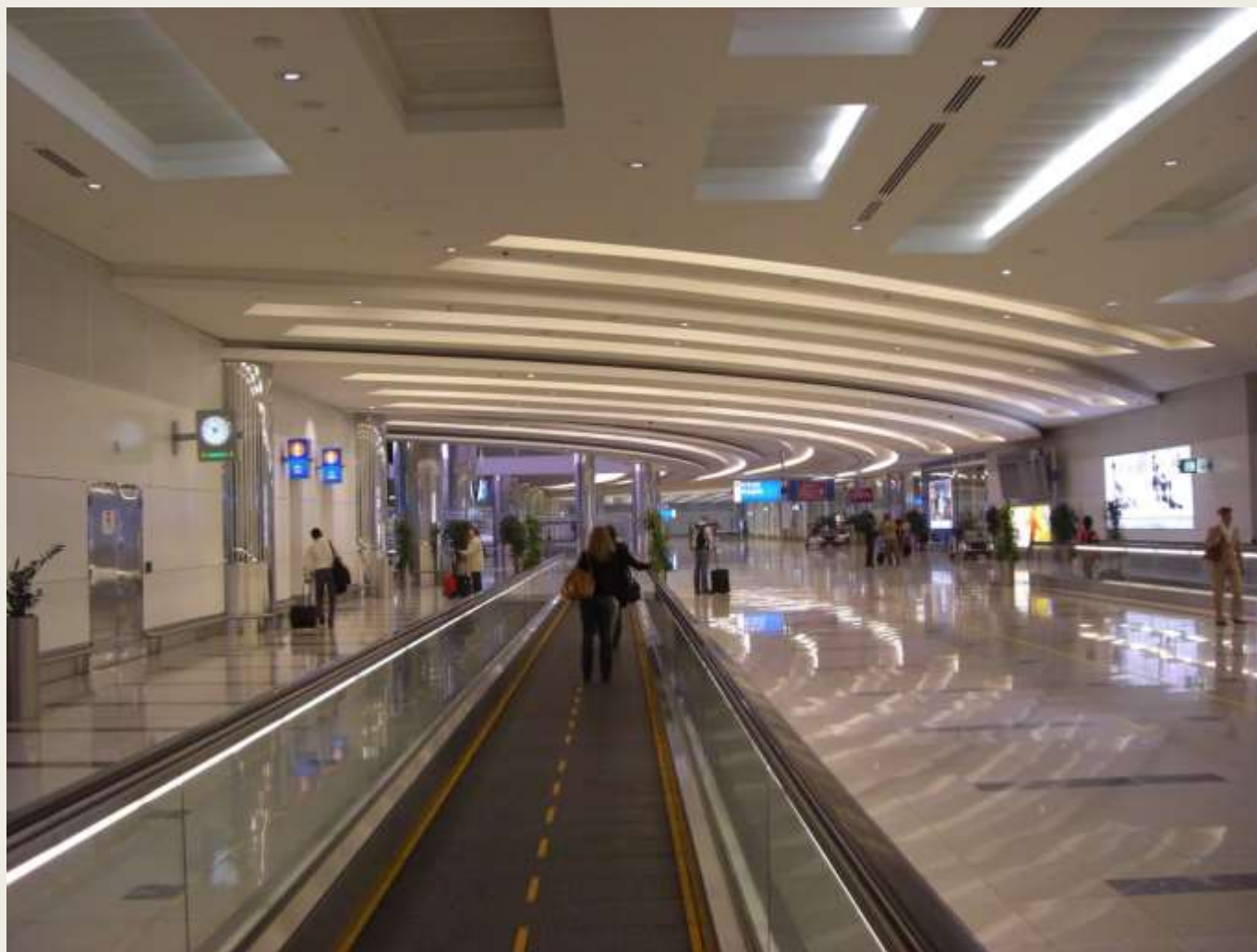
- The function of architectural circulation, as predominated by human movements and programmatic functions, dictates the organization of spaces which includes the idea of
- Linearity
- Vertical

# Components Of Circulation

- Although every space a person could access or occupy forms part of the circulation system of a building, when we talk about circulation, we typically don't try to account for where *every* person might go. Instead, we often approximate the main routes of the majority of users.
- To simplify further, architects typically divide their thinking according to different types of circulation, which overlay with one another and the overall planning. The type and extent of these divisions will be project dependant, but might include:
  - **direction of movement:** horizontal or vertical;
  - **type of use:** public or private, front of house or back of house;
  - **frequency of use:** common or emergency; and
  - **time of use:** morning, day, evening, continuous.
- Each of these types of circulation will require different architectural consideration. The movement might be fast or slow, mechanical or manual, undertaken in the dark or fully lit, crowded or individual. The pathways might be leisurely and winding, or narrow and direct.
- Of these types of circulation, **direction** and **use** are often critical to a building layout.







# DIRECTION

- **Horizontal circulation** might include hallways, atria, paths, entries and exits. It is also affected by the furniture layout, or other objects in the space such as columns, trees, or topographic changes. This is why architects usually furnish as part of a concept design, because it is critically linked to the flow, function and feeling of the space.



CIRCULATION  
:  
HORIZONTAL

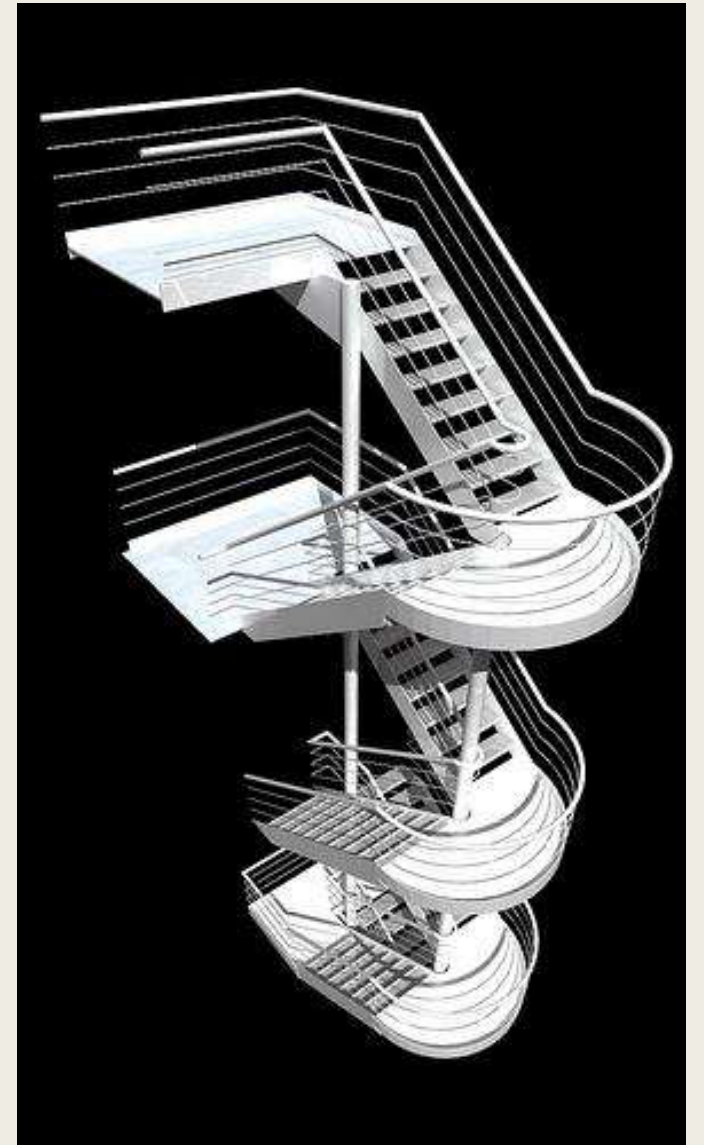
# DIRECTION

- **Vertical circulation** is how people move up and down within the building, so includes things like stairs, lifts, ramps, ladders and escalators which allow us to move from one level to another.

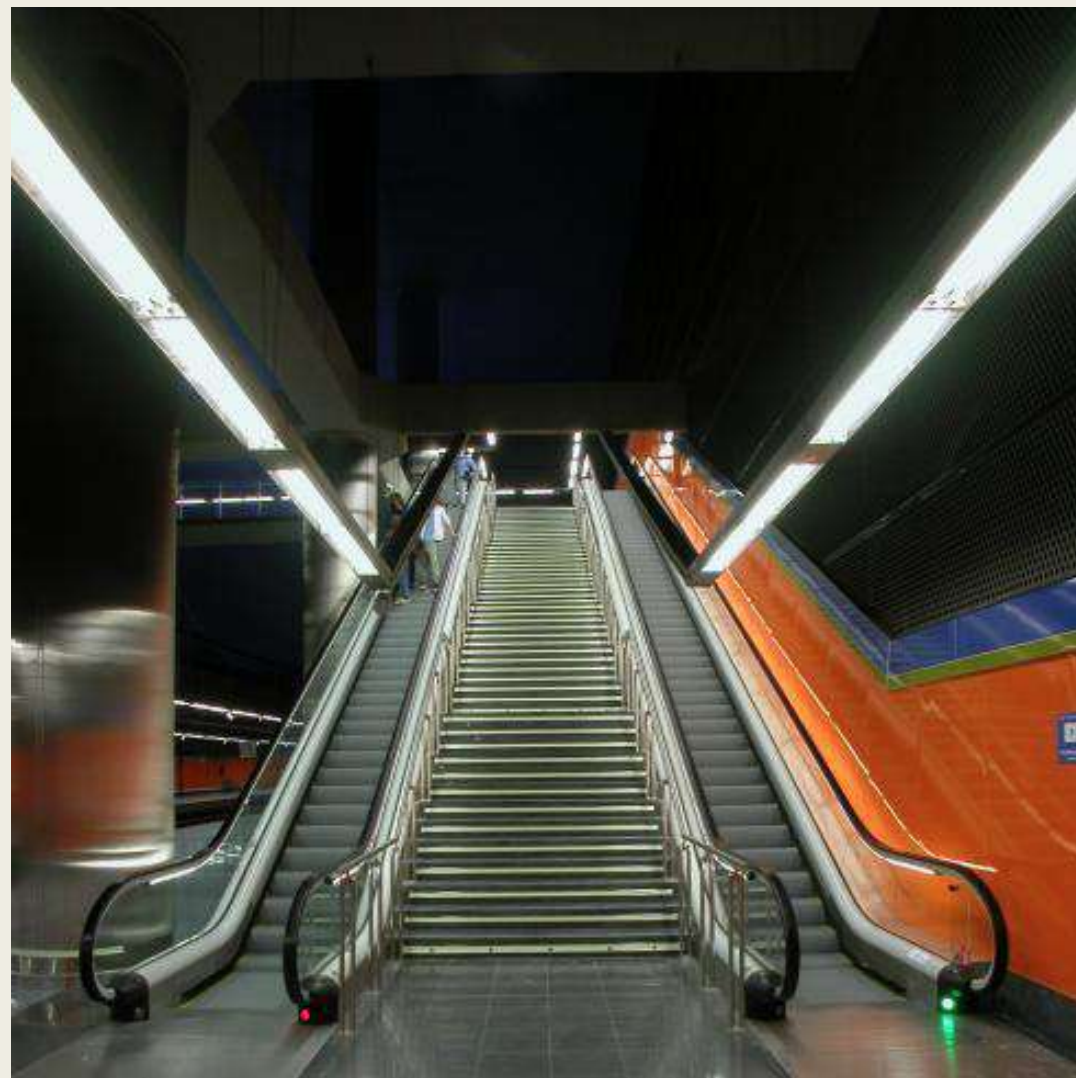




# CIRCULATION: VERTICAL



# CIRCULATION: VERTICAL







# USE

- **Public circulation** is the areas of the building which are most widely and easily accessible. In this guise, circulation is often overlapped with other functions, such as a lobby, atrium, or gallery, and is enhanced to a high level of architectural quality. Issues of visibility, how crowds move, and clear escape paths are key.
- **Private circulation** accounts for the more intimate movements within the building, or the more ugly ones which require a degree of privacy. In a house this might be the back door, in a large building the back of house, staff offices or storage zones.





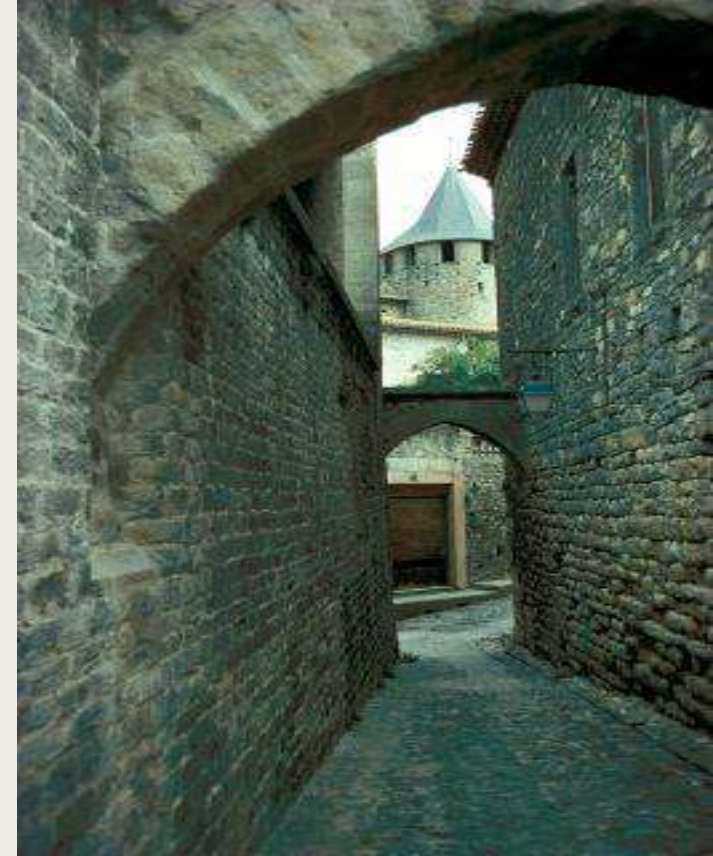






# A circulation Space may be:

- **ENCLOSED** : forming a public walk-through space or private corridor that relates to the spaces it links, through entrances in a wall plane

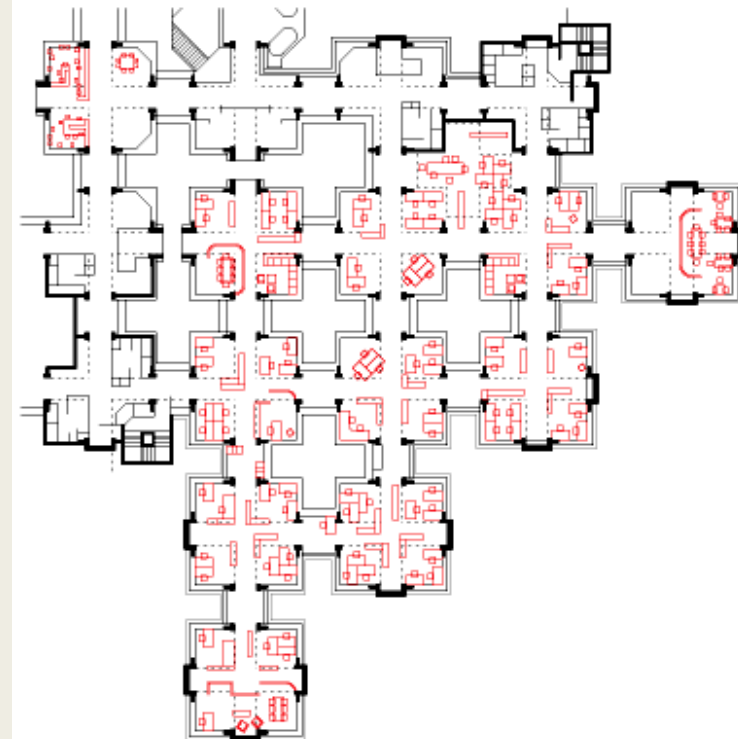
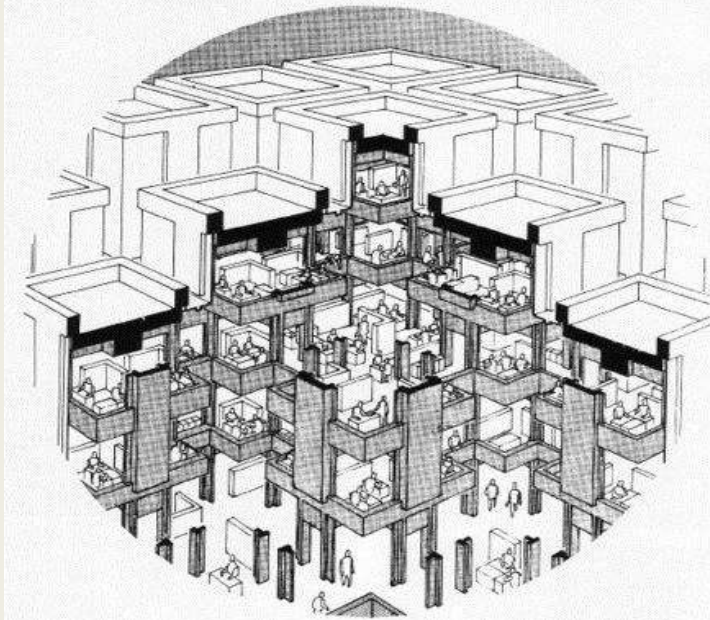


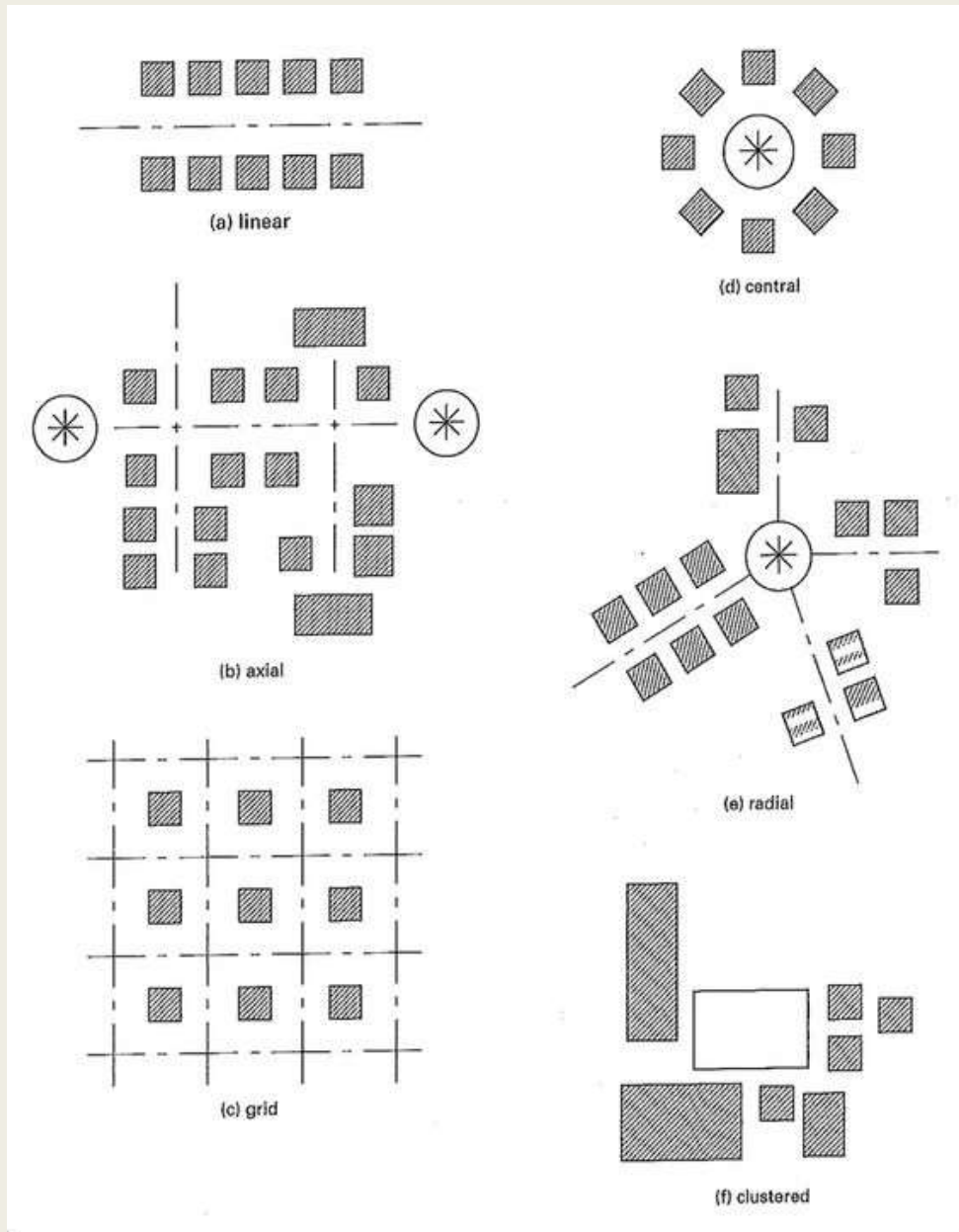




- **OPEN ON ONE SIDE:**  
Forming a balcony or gallery that provides visual and spatial continuity with the space it links

**OPEN ON BOTH SIDES:** Forming a colonnaded passageway that becomes a physical extension of the space it passes through

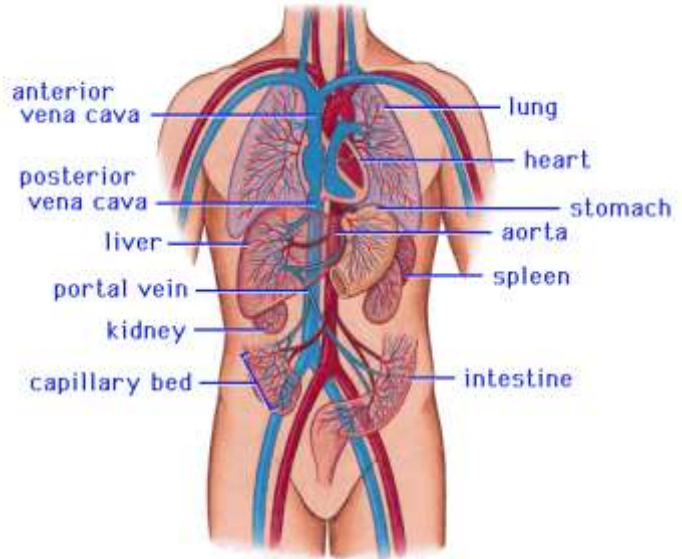




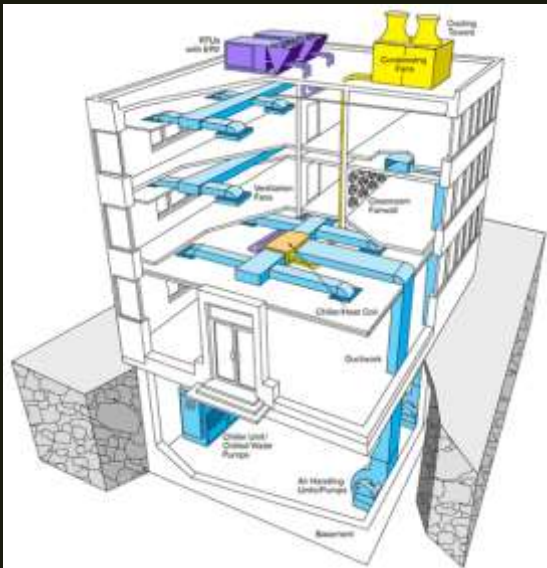
# Organizational Patterns Of Architecture



# Building of a Building

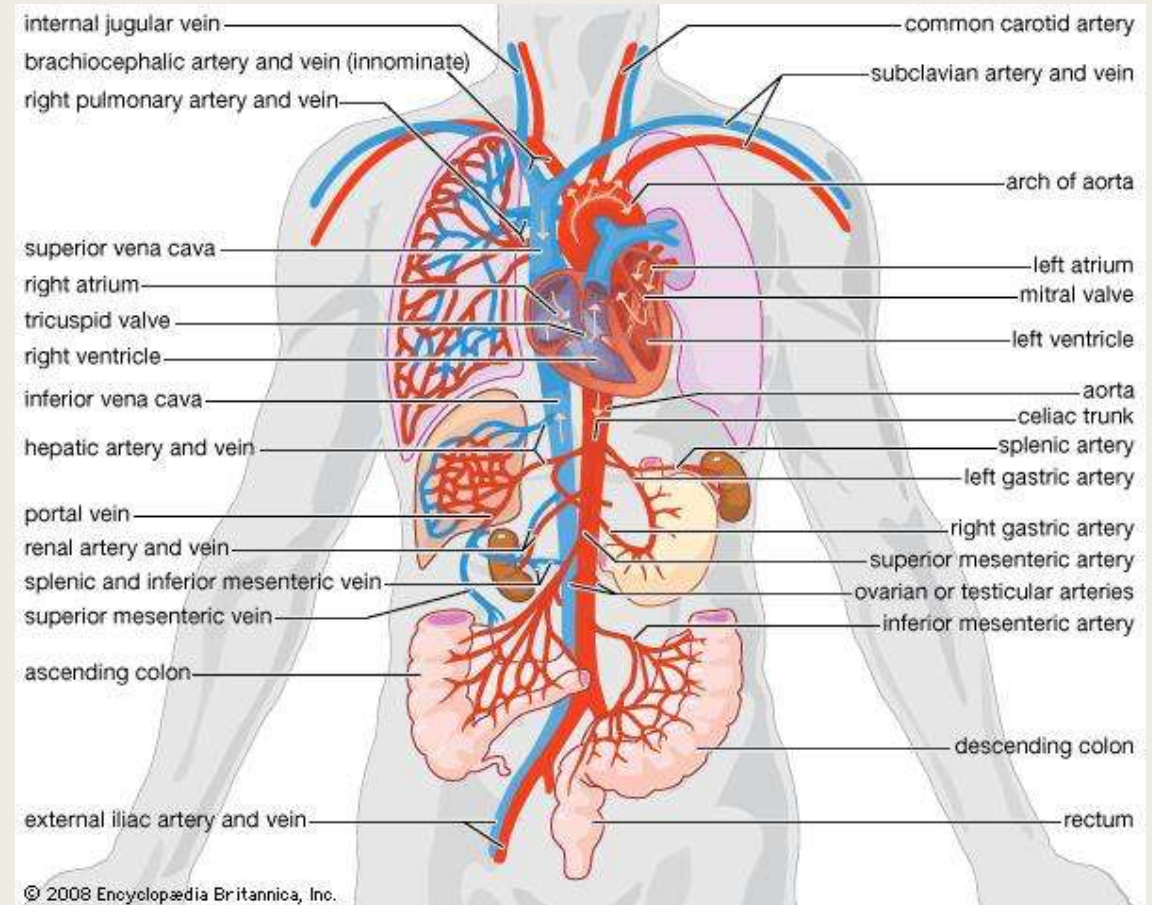


- Just like our body organs and spinal cord
- Architecture buildings also have their own “organs” and “spinal cord” in order for it to be complete

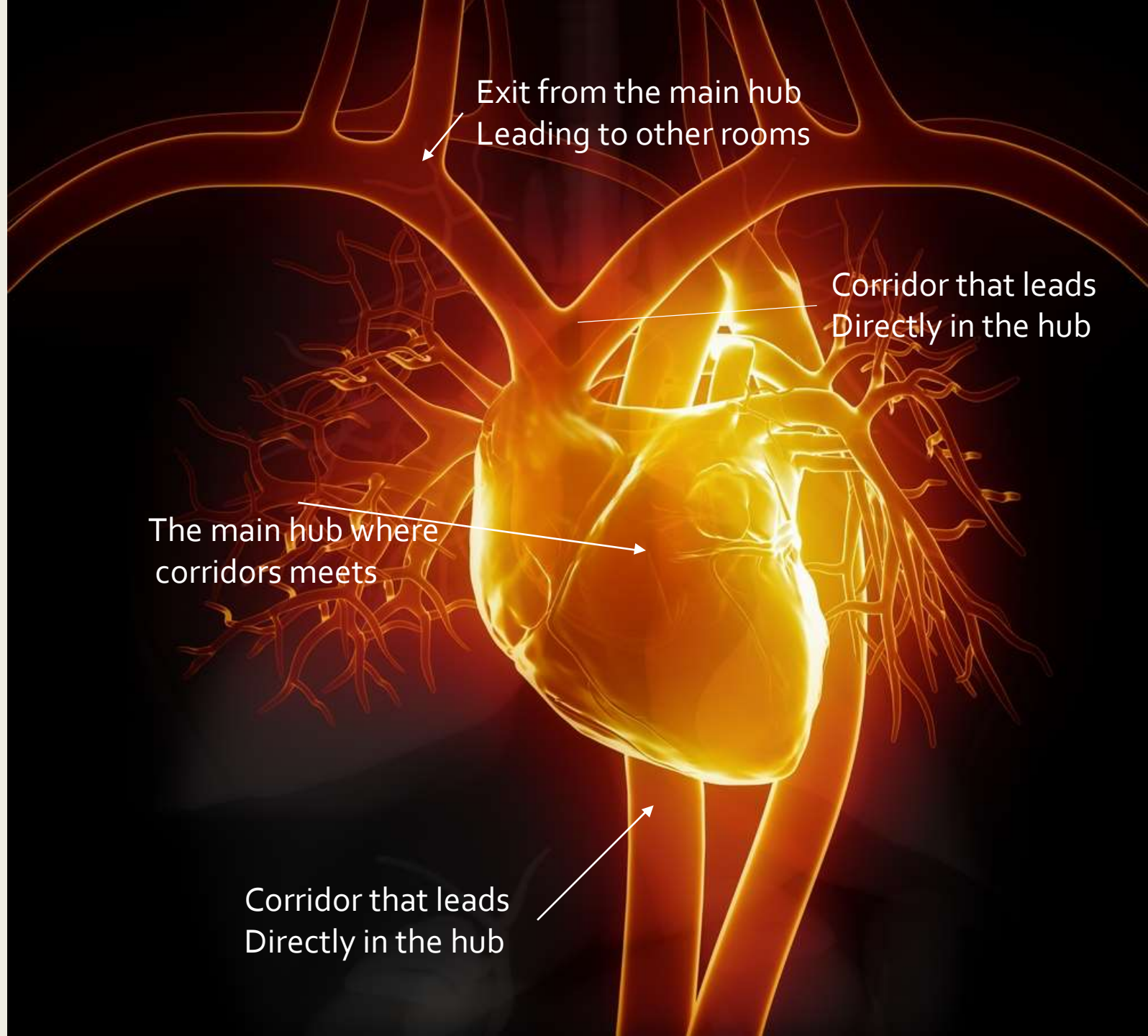


# THE CIRCULATORY SYSTEM

- The circulatory system to act as a transport service for them. Two fluids move through the circulatory system: **blood** and **lymph**. The blood, heart, and blood vessels form the **Cardiovascular System**. The lymph, lymph nodes and lymph vessels form the **Lymphatic System**. The Cardiovascular System and the Lymphatic System collectively make up the **Circulatory System**.
- The circulatory system transport nutrients, oxygen, carbon dioxide, hormones, blood cells. And help stabilize the body temperature and pH level.



THE HEART  
OF HUMAN  
BODY IN  
RELATION  
TO  
ARCHITECT  
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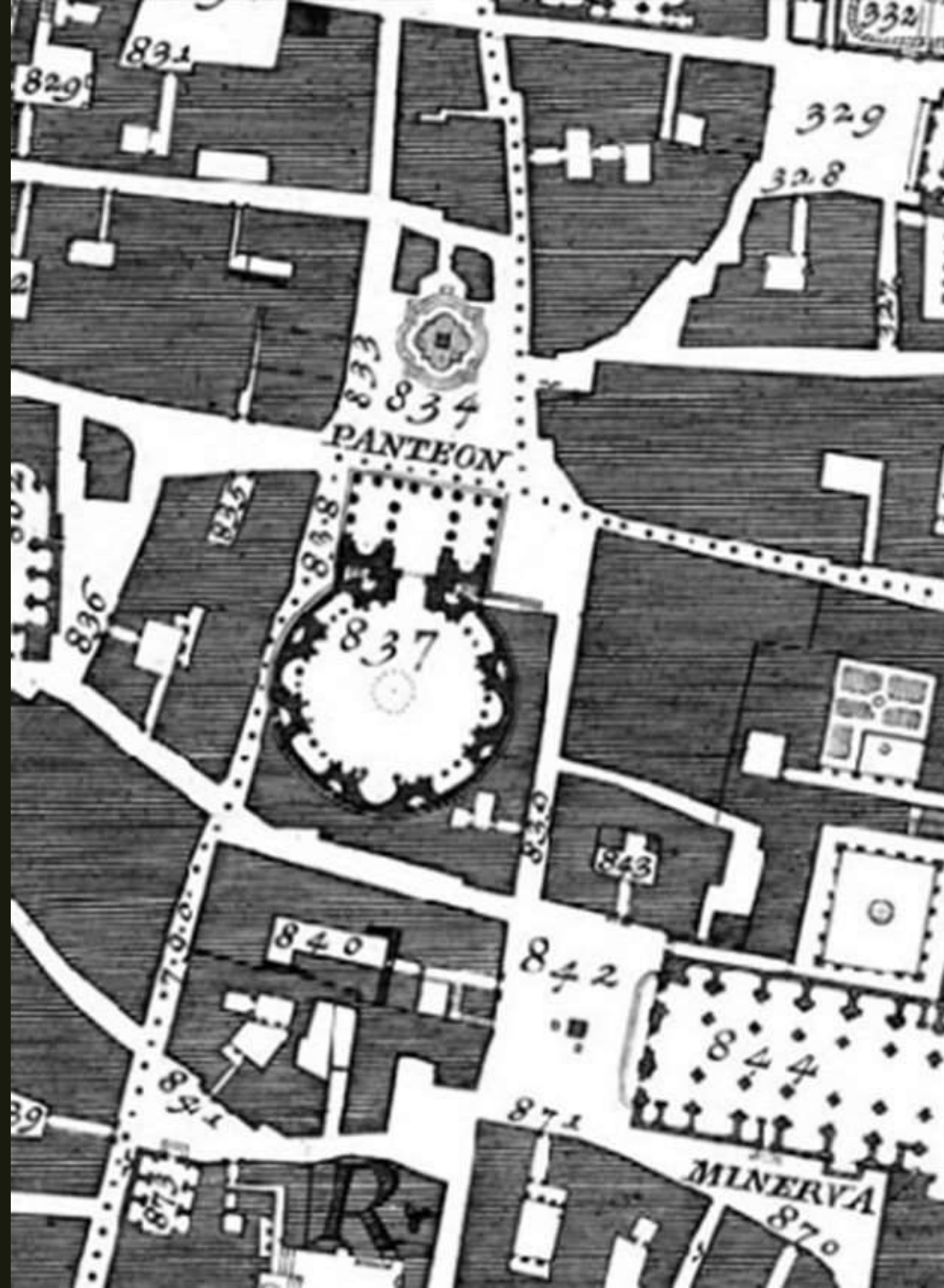


# Urban distribution, Orderly distribution



- Just like the human body, architecture also demands a “circulatory system”
- Different city have different grids. In order to distribute and circulate human traffic and human condition.

CROP OF THE  
MAP OF ROME  
GIAMBATTISTA  
NOLLI, 1748



# Hippodamus of Miletus

- Hippodamus of Miletus, was an ancient Greek architect, urban planner, physician, mathematician, meteorologist and philosopher and is considered to be the “father” of urban planning, the namesake of Hippodamian plan of city layouts (grid plan). He was born in Miletus and lived during the 5th century BC, on the spring of the Ancient Greece classical epoch. His father was Euryphon. According to Aristotle, Hippodamus was the first author who wrote upon the theory of government, without any knowledge of practical affairs.[1] His plans of Greek cities were characterised by order and regularity in contrast to the intricacy and confusion common to cities of that period, even Athens. He is seen as the originator of the idea that a town plan might formally embody and clarify a rational social order.





# The Grid Iron city

- It is composed of straight streets crossing at right angles to create many regular city blocks.
- This form is typical of cities built after the industrial revolution – because only then did cities place such importance on economic activity.
- A city grid iron plan facilitates the movement of people and product throughout the city.

## Advantages

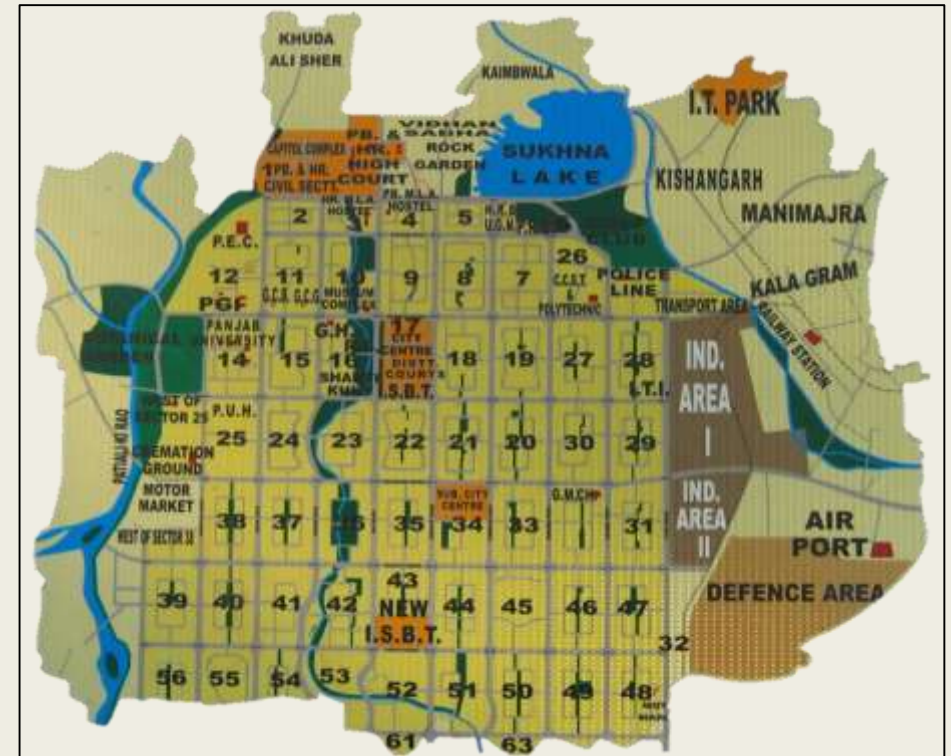
- High accessibility,
- minimum disruption of flow,
- expansion flexibility,
- excellent psychological orientation, adaptability to level or moderately rolling terrain.

## Disadvantages

- Requires flow hierarchies,
- limited in its adaptability to the terrain,
- potentially monotonous

# Grid Cities: Grid Iron Pattern

- CHANDIGARH
- The primary module of city's design is a Sector, a neighbourhood unit of size 800 m X1200 m.
- It is a self-sufficient unit having shops, school, health centres and places of recreations .
- The population of a sector varies between 3000-20000 depending upon sizes of plots and topography of the area.
- The shopping street of each sector is linked to the adjoining sectors thus forming one long, continuous ribbon .
- The central green of each Sector also stretches to the green of the next sector



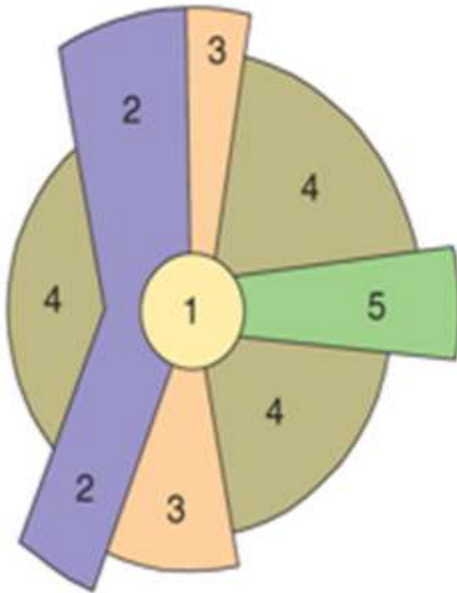
# Grid Cities: Grid Iron Pattern



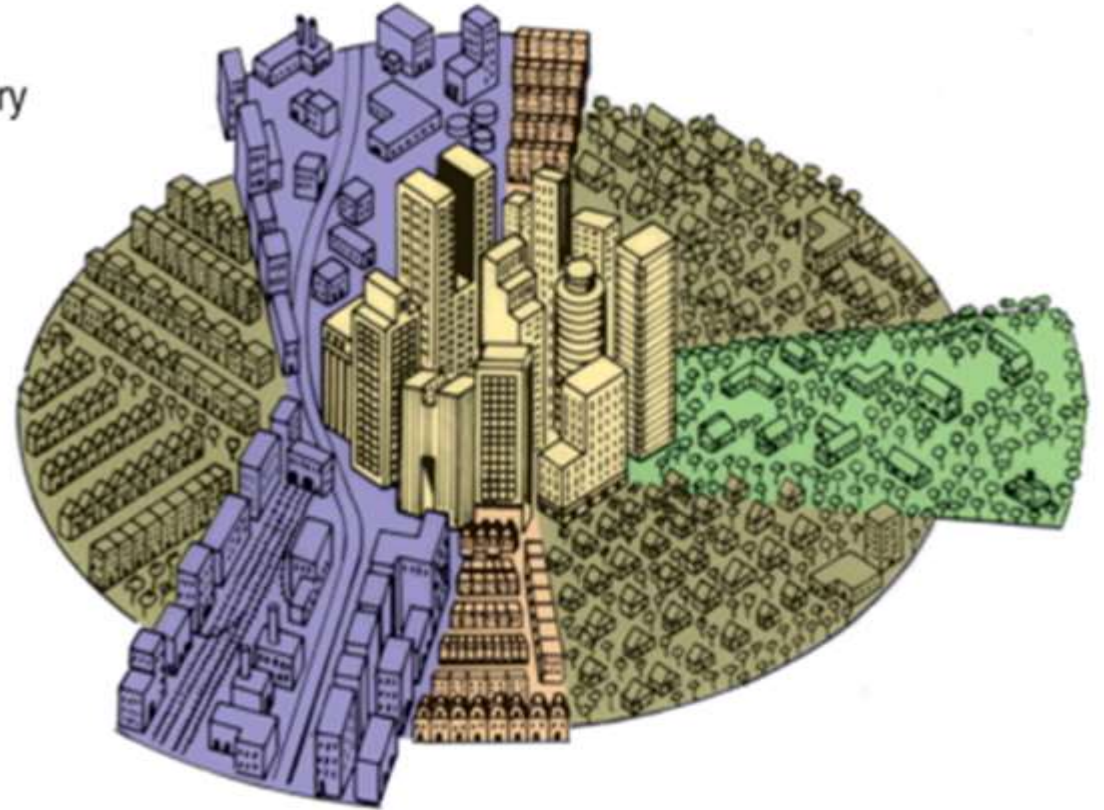
- San Francisco was designed to accommodate outrageous number of people that came to the city during the Gold Rush.
- It was laid out in a grid pattern imposed on a city of hills built on the end of a peninsula.
- Both grids and irregular forms can be seen in San Francisco.
- Downtown San Francisco is extremely dense. The planning commission split downtown into four separate zones with different purposes.
  - Office District
  - Retail District
  - General Commercial District
  - Support District



# Sector Model



1. Central business district
2. Transportation and industry
3. Low-class residential
4. Middle-class residential
5. High-class residential



# The Radiocentric city

- Geographical possibilities of spreading in all directions.
- Radio centric - Radiate outward from a common centre.
- Inner Outer ring roads linked by radiating roads.
- Core has business area.
- Industrial area interspersed within the residential.
- Periphery has green belts.
- Example : Washington DC, Pre-industrial Baghdad in Iraq.

## Advantages-

- A direct line of travel for centrally directed flows,
- economics of a single- centralised terminal or origin point.

## Disadvantages-

- Central congestion ,
- local flow problems ,
- difficult building sites

# Radial Cities: The Radiocentric city

- Moscow, the world biggest Megapolis (Russian Moskva) is the capital of Russia.
- The city grew in a pattern of rings and radials that marked Moscow's growth from ancient time to modern layout.
- The center of all rings is ***Moscow Kremlin*** and famous ***Red Square***.





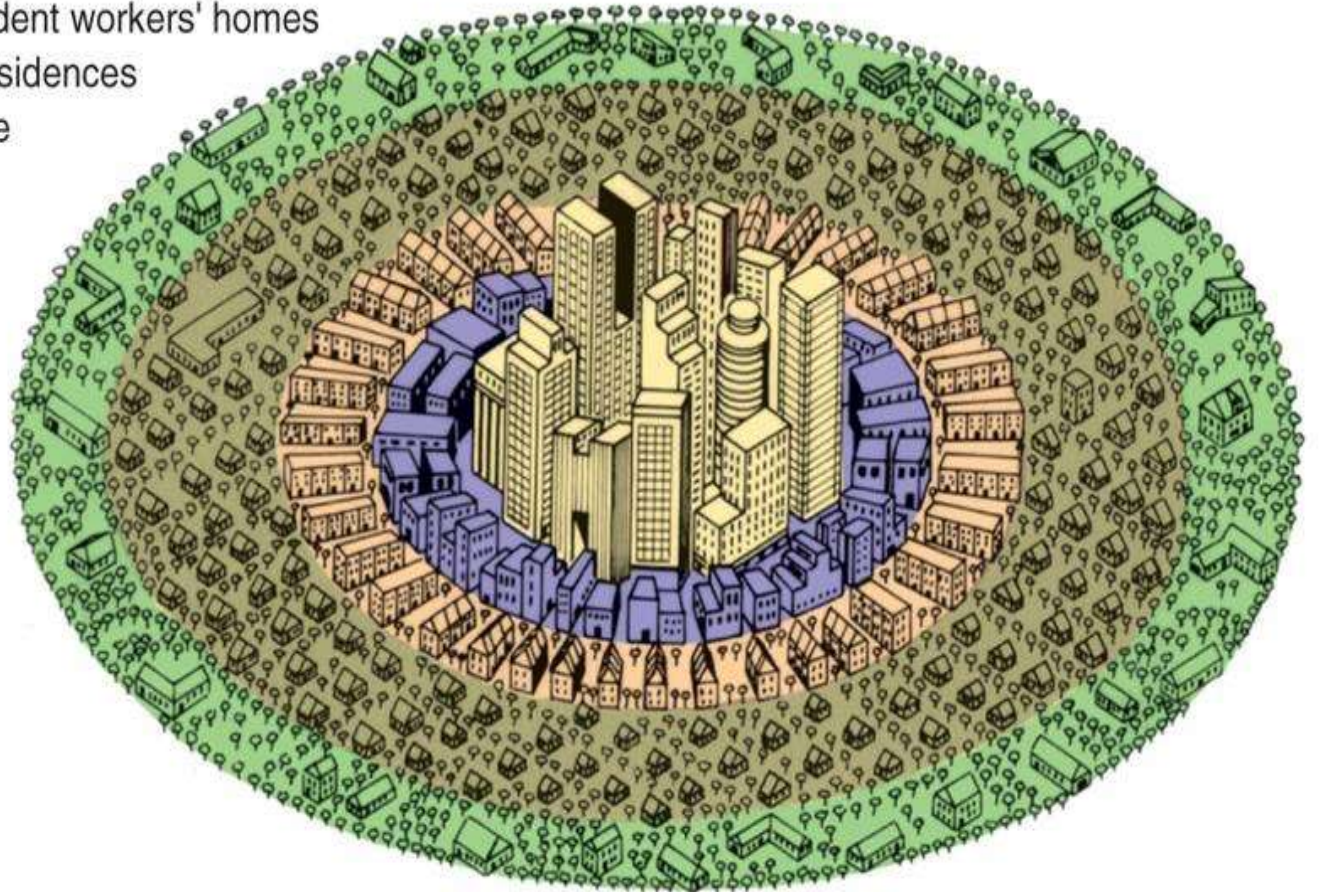
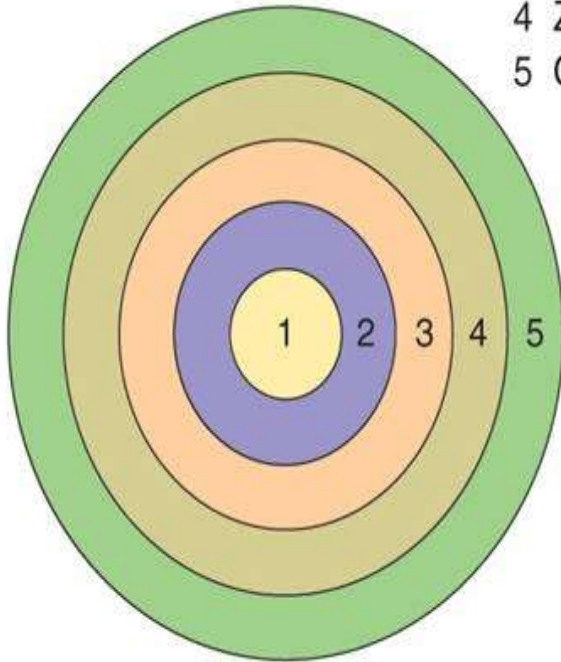
# The Radial city: Moscow



- Successive epochs of development are traced by the
  - The Boulevard Ring and
  - The Garden Ring,
  - The Moscow Little Ring Railway,
  - And the Moscow Ring Road.

# Concentric zone model

- 1 Central business district
- 2 Zone of transition
- 3 Zone of independent workers' homes
- 4 Zone of better residences
- 5 Commuter's zone



# The Linear city

- Initially proposed by Soria Y Mata.
- Expand the city along the spine of transport
- The Linear City concept is a Conscious Form Of Urban Development with Housing And Industry Growing Along The Highway Between existing cities and contained by the continuous open space of the rural countryside.

## Advantages

- High accessibility
- adaptability to linear growth
- useful along the limited edge.

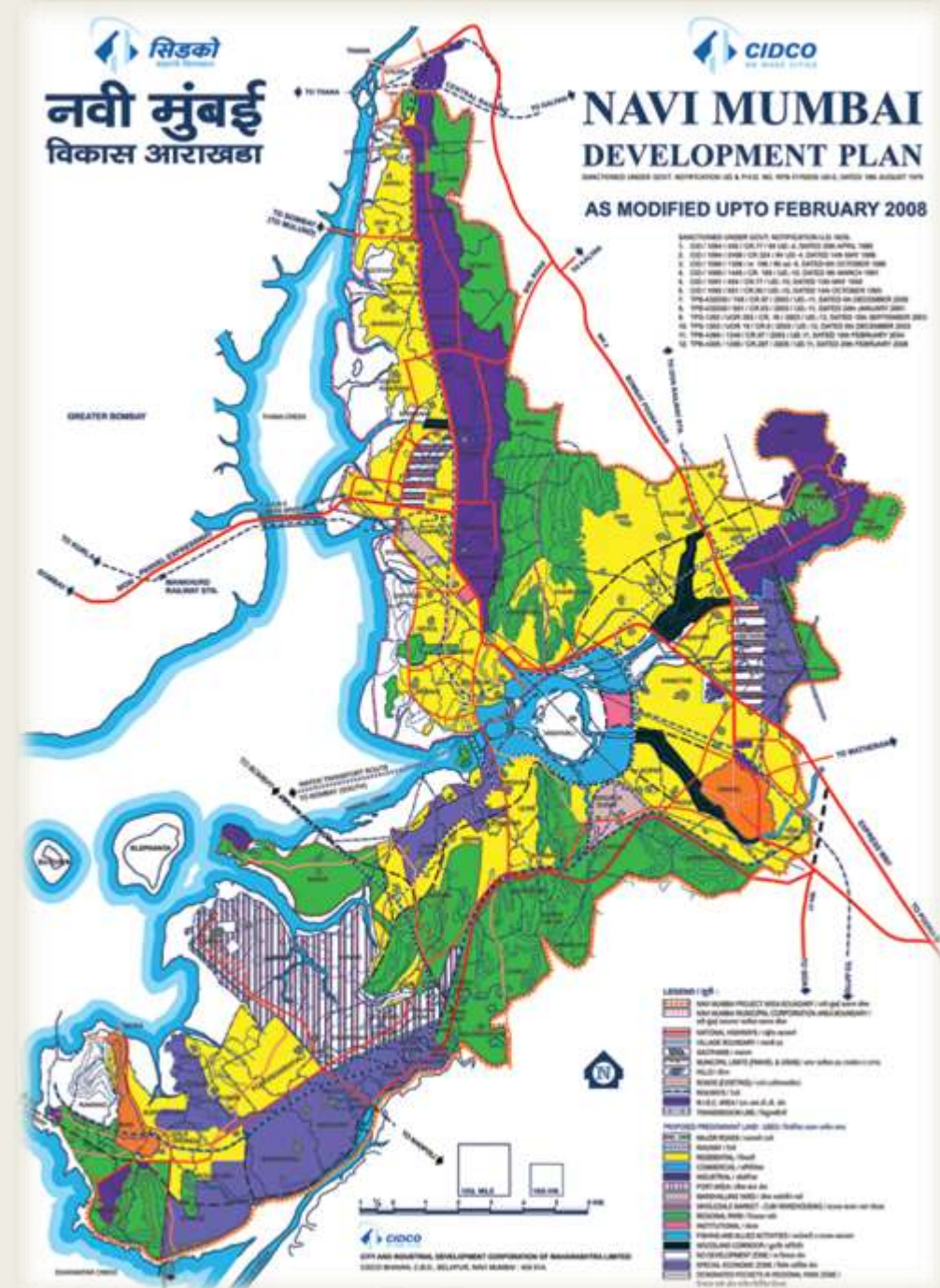
## Disadvantages

- Very sensitive to blockage  
requires control of growth
- lacks focus,
- The choice of connection or of  
direction of movement are much  
less.



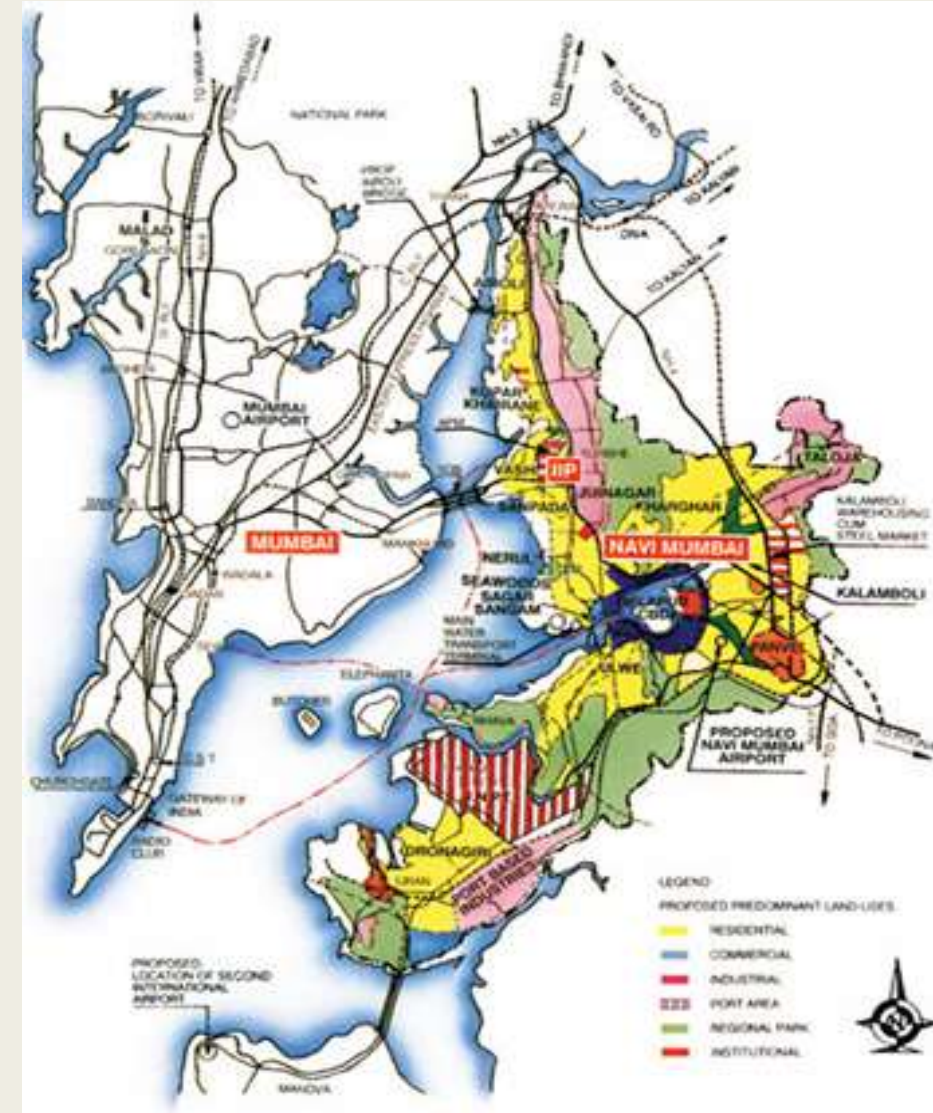
# NAVI MUMBAI

Alternative to Mumbai



# The Linear City: Navi Mumbai

- The growth of Mumbai city is constrained by sea at south, east and west. As a result total land area available for development of Mumbai is limited.
- The cost of real estate and housing in Navi Mumbai is much less than costs in Mumbai and sub-urban areas.
- Many government and corporate offices have been shifted from Mumbai to Navi Mumbai .
- the Taloja and Thane Belapur Industrial Belt of Navi Mumbai offer job opportunities of every conceivable kind – from engineers to mechanics to clerks to peons. As a result a large population of service class and middle class population shifted to Navi Mumbai.







City planning evolved from different culture and different ways of looking at the city. For example ,Mexico is about compression, being clustered together. While Algeria is about long and flowing avenues



# Radial - Centrifugal & Centripetal

- A **centripetal force** (from Latin *centrum*, "center" and *petere*, "to seek"[1]) is a force that makes a body follow a curved path. Its direction is always orthogonal to the motion of the body and towards the fixed point of the instantaneous center of curvature of the path. Isaac Newton described it as "a force by which bodies are drawn or impelled, or in any way tend, towards a point as to a centre".[2] In Newtonian mechanics, gravity provides the centripetal force responsible for astronomical orbits
- In Newtonian mechanics, the **centrifugal force** is an inertial force (also called a 'fictitious' or 'pseudo' force) directed away from the axis of rotation that appears to act on all objects when viewed in a rotating reference frame. The concept of the centrifugal force can be applied in rotating devices such as centrifuges, centrifugal pumps, centrifugal governors, centrifugal clutches, etc., as well as in centrifugal railways, planetary orbits, banked curves, etc. when they are analyzed in a rotating coordinate system

# Radial - Centrifugal

- The distinction between the two spatial types is best expressed by considering the role of the column as a spatial generator.
- A single column in space can define a space around it, the size of which depends upon the height of the column but the definition of which depends upon the interaction of the column and the observer
- Therefore, a column defines a space around it in a radial fashion; this is centrifugal space

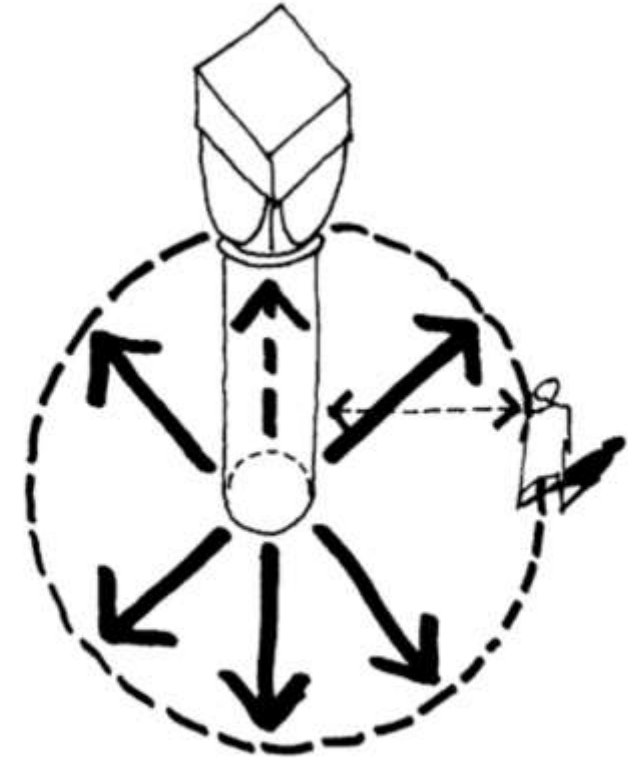


Figure 6.1 Centrifugal space: single column.

# Radial - Centripetal

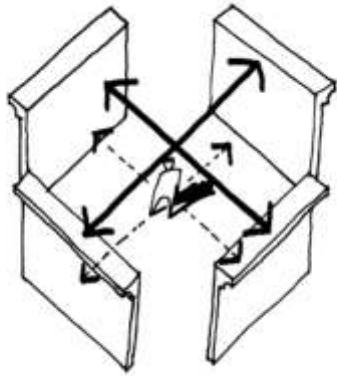


Figure 6.3 Centripetal space: four walls.

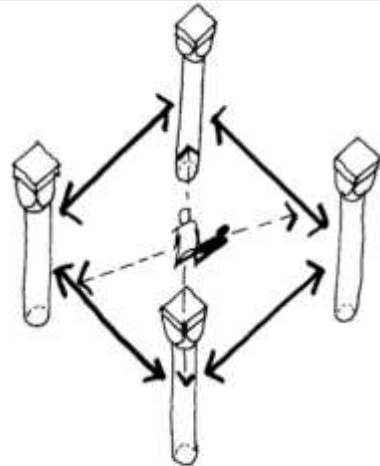


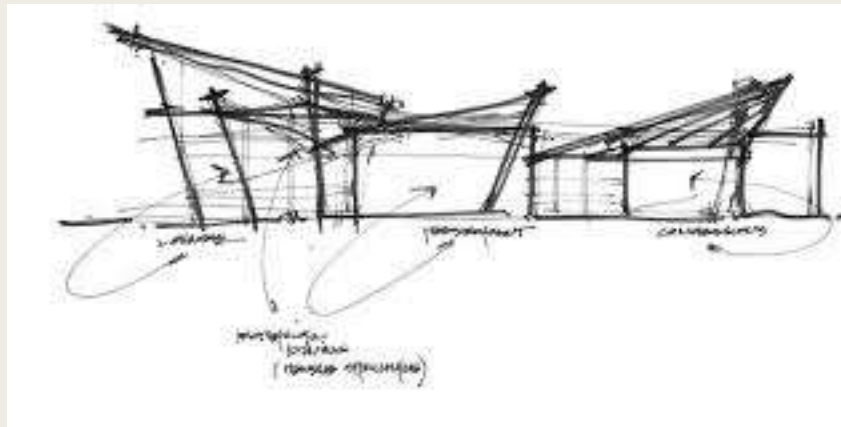
Figure 6.2 Centripetal space: four columns.

- However four columns positioned in some proximity with each other to form a “square: will interact and induce a space enclosure. A centripetal order is established to define a space which even at this most basic level approximates to “architecture without a roof” this is centripetal space.
- If four walls are used to define this space as compare to four columns, then the sense of enclosure is enhanced, but the corners are less well defined and space tends to “leak” from the voids thus created

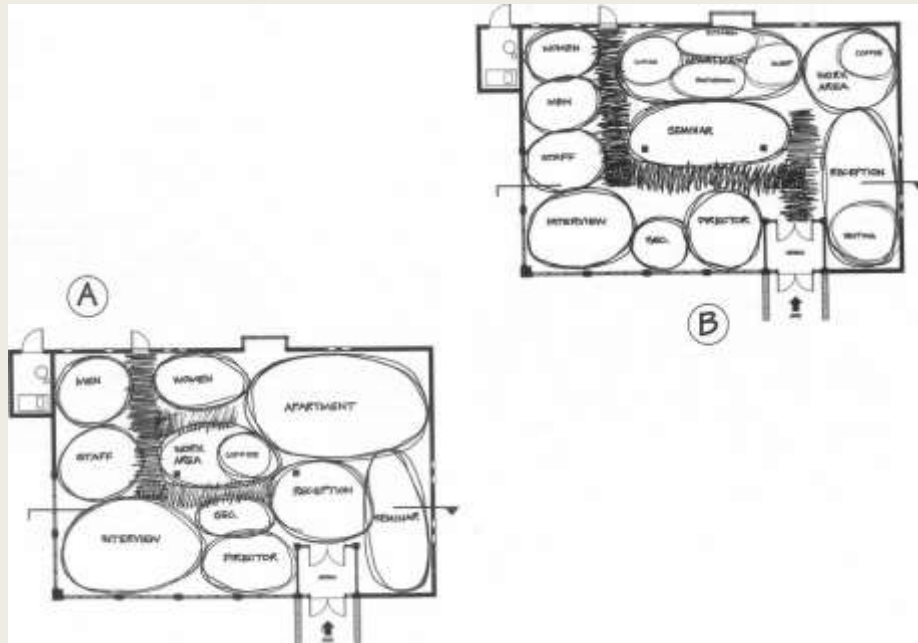


# Parti [pahr-tee, pahr-tee]

- A parti or parti pris comes from the French prendre parti meaning "to make a decision". Often referred to as the big idea, it is the chief organizing thought or decision behind an architect's design presented in the form of a basic diagram and / or a simple statement. The development of the parti frequently, but not always, precedes the development of plan, section, and elevation diagrams. [5] In a figurative way parti pris is used when a researcher starts with a preconceived opinion to prove that this opinion is true.

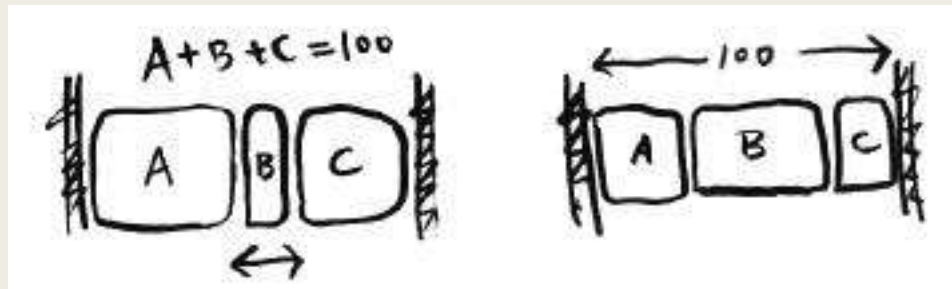


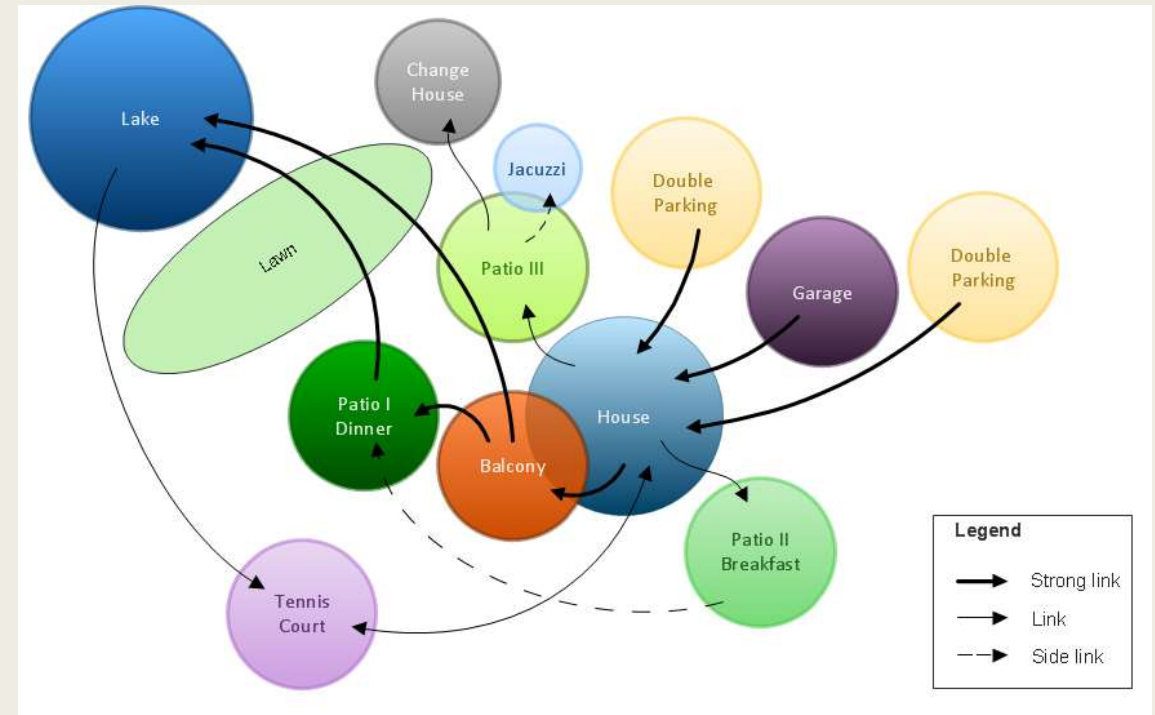
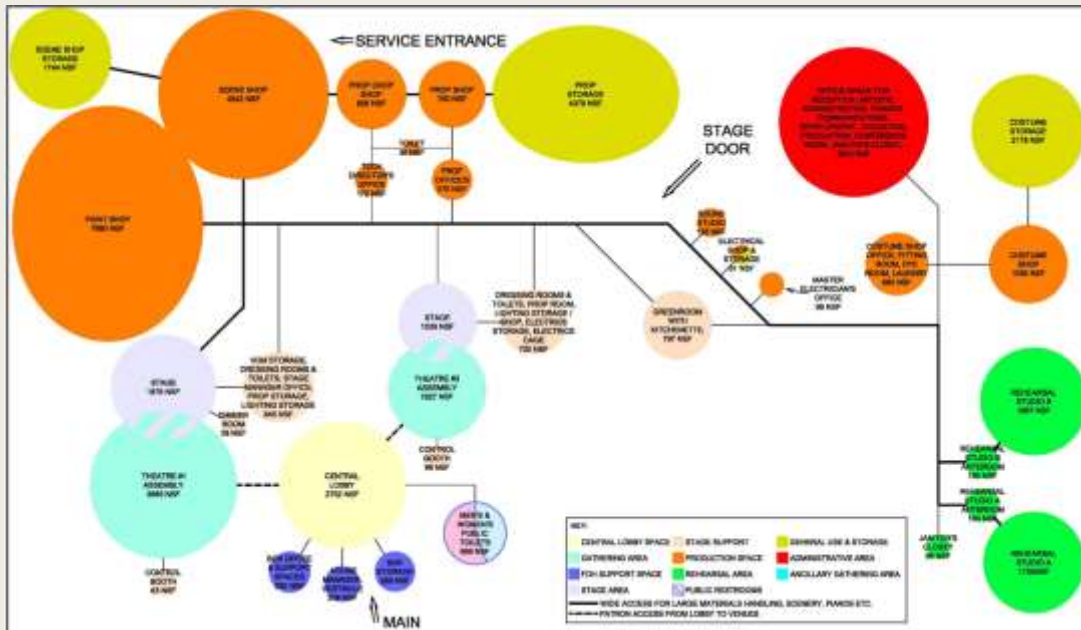
# BUBBLE DIAGRAMMING



Architects use these 'bubble' diagrams to explore relationships among the sizes, adjacencies, and approximate shapes of the spaces needed for various activities. The architect sometimes draws arrows or lines between functions that must communicate, or small tics to indicate an adjacency requirement between two functions, as distinct from pairs of functions that simply happen to be adjacent in the drawing.

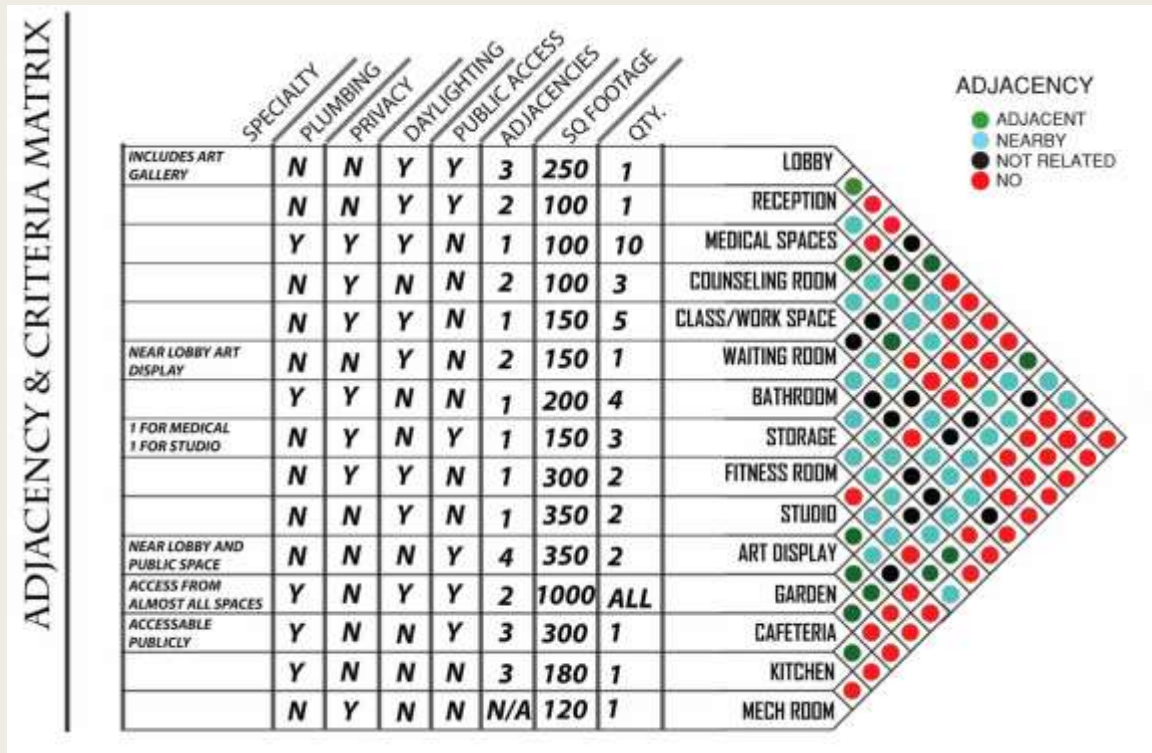
A bubble helps the architect consider possible changes to the design. Each bubble represents the space needed to carry out a function (living, dining, sleeping, etc.) For example, were the architect to enlarge one space, the diagram reveals how the adjacent spaces would need to be correspondingly adjusted to remain adjacent and stay within their own size constraints. On the other hand, the architect can see when squeezing the diagram would make the dimension of a space too small for its intended function. In short, a bubble diagram helps the architect understand the constraints of a floor plan and the consequences of proposed changes to the design. The diagram makes adjacencies, overlaps, and relative dimensions available by inspection







# Criteria Matrix In Architecture



Diagrams such as bubble diagram and matrix diagram are used to help both the designer and client illustrate, understand and arrange a space or building design more efficiently. Schematic or box diagrams are also used to illustrate when a building has multiple function and levels.

# Reference

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