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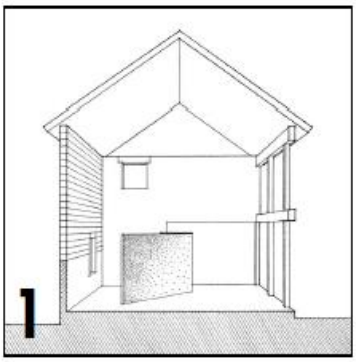
SCHOOL OF BUILDING AND ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

UNIT – I – Interior Space – SDE 4051



Interior Space

Space–definition; • elements of interior spaces, • Interior space–spatial qualities: form, scale, outlook; • structuring space with interior design elements; • spatial form; • spatial dimension – square, rectangle, curve linear spaces; • height of space; • spatial transitions – openings within wall planes, doorways, windows, stairways; horizontal and vertical circulation

SPACE

•**Space is a prime ingredient** in the designer's palette and the quintessential element in interior design.

•Through the volume of space we not only move; we see forms, hear sounds, feel gentle breezes and the warmth of the sun, and smell the fragrances of flowers in bloom.

•Space inherits the sensual and aesthetic characteristics of the elements in its field.

•Space is not a material substance like stone and wood.

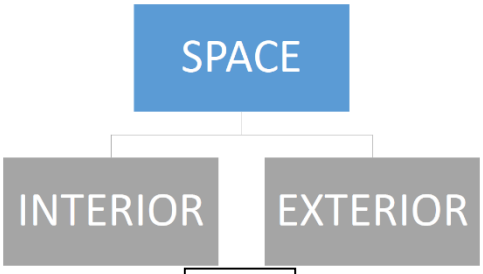
•It is inherently formless and diffuse.

•Universal space has no defining borders.

•Once an element is placed in its field, however, a visual relationship is established. As other elements are introduced into the field, multiple relationships are established between the space and the elements, as well as among the elements themselves.

•Space is formed by our perception of these relationships.

SPACE is the boundless, three-dimensional extent in which objects and events occur and have relative position and direction



Tab.1

EXTERIOR SPACE

A building's form, scale, and spatial organization are the designer's response to a number of conditions—functional planning requirements, technical aspects of structure and construction, economic realities, and expressive qualities of image and style.

In addition, the architecture of a building should address the physical context of its site and the exterior space.

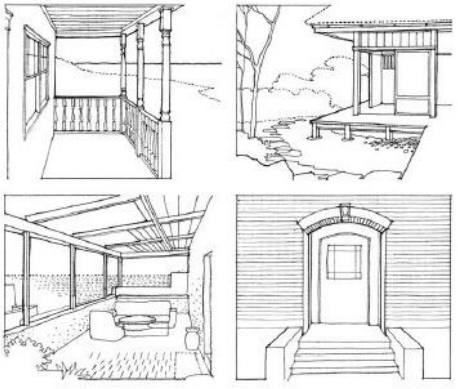


Fig.1

INTERIOR SPACE

They enclose space, articulate its boundaries, and separate it from adjoining interior spaces and the outside.
Floors, walls, and ceilings do more than mark off a simple quantity of space. Their form, configuration, and pattern of window and door openings also imbue the defined space with certain spatial or architectural qualities.

Spatial Qualities-
Form
Scale
Light
Outlook

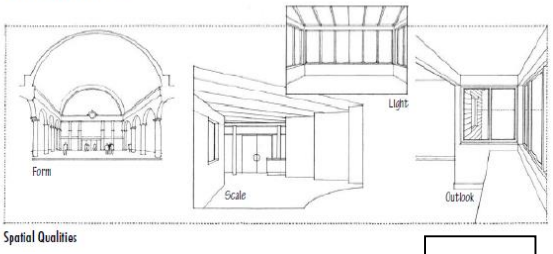
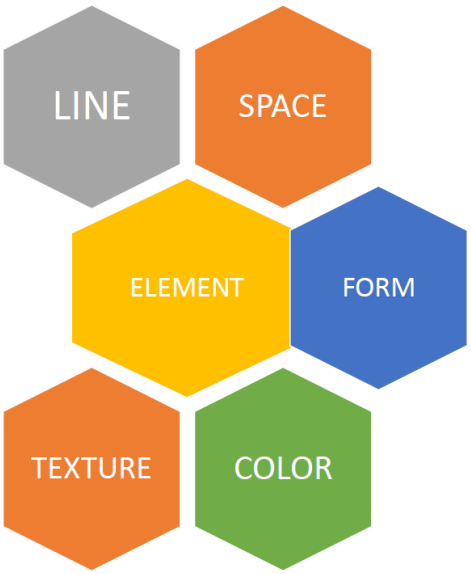


Fig.2



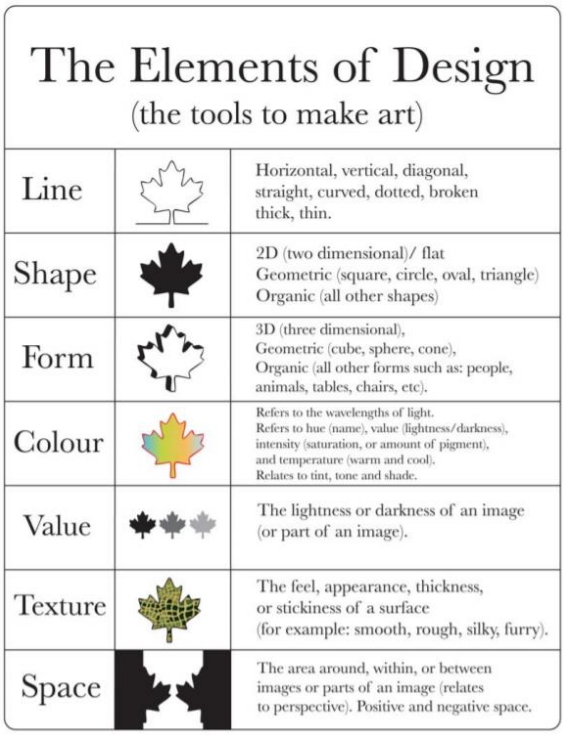
WHY ARE THESE ELEMENTS IMPORTANT ?

The elements of design are the fundamental building blocks of any composition.

• These pieces work together to form a unified composition, and when utilized successfully, create a strong, dynamic visual layout.

• The designer uses these elements as tools that control how a message is delivered to an audience.

• These principles can be applied to fine art, photography and graphic design.



LINE:

One of most important element of design, line defines a subject'sform or shape on a flat, two-dimensional surface.

Lines can be thick or thin, smooth or jagged, rigid and mechanical or organic and hand drawn. When discussing line as it applies to interior design, we mean the lines created by the furnishings and architecture of a room.

Line sets form and shape.

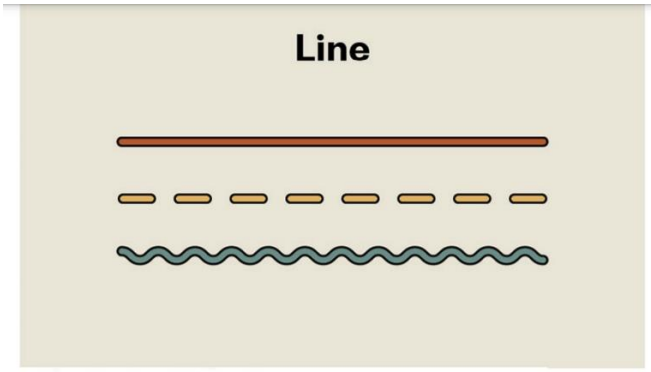
Line is responsible for harmony, contrast and unity in interior design.

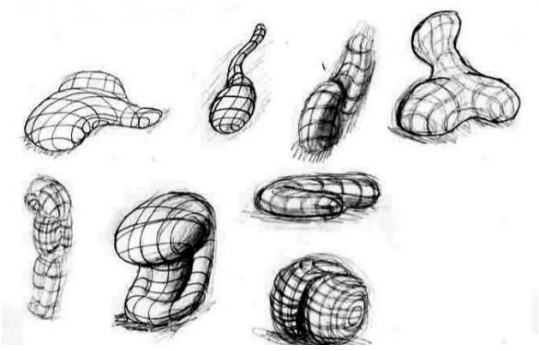
Line can be used to show movement and guides the eye throughout a room.

Line can be used to show mood. Lines can be used to convey a sense of strength, serenity, gracefulness, or action.

Combining lines and placing them in a design in certain ways can create specific effects and feelings.

The use of line can also have an effect on how space is perceived. Different types of lines have different effects on design.





mark, or stroke that is longer then it is wide. It is the path of a point moving in space. Objects and things are perceived by the line that describes them.

Characteristics of line include:

Width-thick, thin, tapering, uneven

Length-long, short, continuous, broken

Direction-horizontal, vertical, diagonal, curving, perpendicular, oblique, parallel, radial, zig-zag

Focus-sharp, blurry, fuzzy, choppy

Feeling-sharp, jagged, graceful, smooth ... can you think of others?

Fig.3

LINE

- **Vertical lines**

Vertical lines lead the eye up,

- adding height
- formality
- growth
- spirituality
- grandeur
- strength to a design.

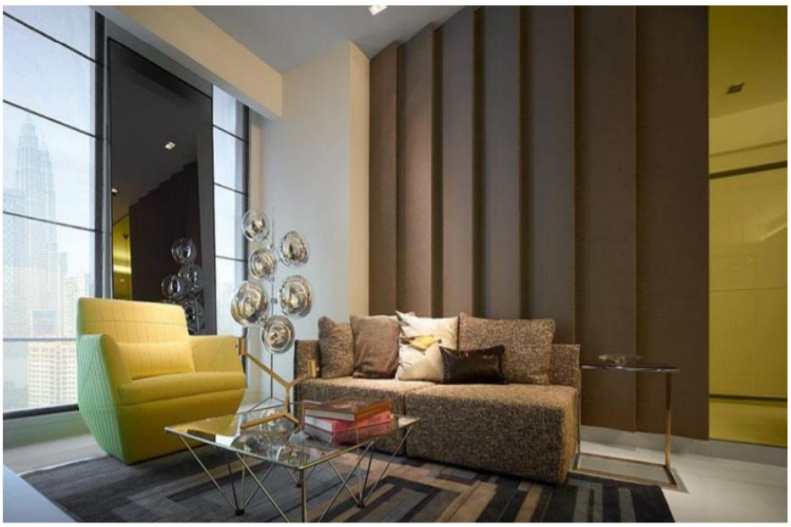


Fig.3

HORIZONTAL LINES

• Horizontal lines lead the eye to the left or right, suggesting informality

• calm

• peace

• gentleness

• gravity

• restfulness

Diagonal lines

• Diagonal lines suggest

• action,

• activity,

• movement

• excitement

• Creates a sense of speed

Curved lines

• Too many curved lines create

• a busy look

• Represent freedom

• Natural

• Flow

• Appearance of softness

• A soothing feeling.

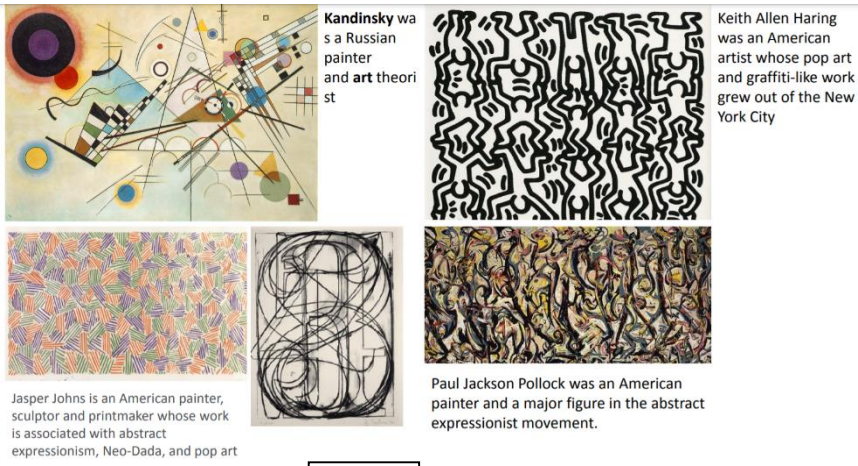


Fig.4

SPACE

• Space, in two-dimensional design, is essentially flat.

• It has height and width, but no depth.

• There are certain visual cues, however, that can create the illusion of space in the mind of the viewer.

• By using those cues, artists and designers can create images that are interpreted as threedimensional.

• Space is the area provided for a particular purpose.

• It may have two dimensions (length and width) such as a floor, or it may have three dimensions (length, width, and height), such as a room or dwelling.

• It refers to the area that a shape or form occupies.

• When space changes gradually, it is more pleasing than when it changes abruptly.

• When space changes suddenly, the eye shifts from one view to the other without making a smooth transition.

• Space can be defined as positive or negative.

• Positive space is the filled space, the object(s) or element(s) in the design.

• Negative space is the empty space, or the open space between design elements or objects, such as a background.

• Designers can create the illusion of physical space and spatial relationships through.

• Linear Perspective

• Size & Vertical Location

• Overlapping

• Detail (Aerial or Atmospheric Perspective)

Linear perspective is based on the visual phenomenon that as parallel lines (such as railroad tracks) recede into space, they appear to converge at a distant point. Linear perspective not only evokes a feeling of great depth, but it also creates a strong focal point at the place where the lines converge.

Size is one of the easiest ways to create the illusion of space. A larger image will appear closer than a smaller one because we observed (very early in life) that objects appear to become smaller as they get farther away.

Overlappingis another easy way to suggest depth in an image. When objects overlap each other, the viewer perceives the one that is covering parts of other to be in front and the one that is covered to be in the back.

Atmospheric perspective uses value, contrast and color to give the illusion of space.

• Atmospheric perspective is based on the fact that the farther something is away from us, the more the atmospheric haze may obscure our view of it.

• By lightening the value, lowering the value contrast, softening the edges, decreasing detail and muting the color, you can mimic the effect of atmospheric haze and create the illusion of increasing distance.

• Increasing the bluish cast of an image also creates a sense of depth because cool colors recede and warm colors come forward.

SHAPE

• A shape is defined as

• a two or more dimensional area.

• All objects are composed of shapes and all other 'Elements of Design' are shapes in some way.

• Shape is a flat image with two dimensions: Length and Width.

• Any self-contained area with defined form or outline.

• It refers to the nature of an enclosure, actual or implied, formed by a line/curve on a flat surface.

• Examples of "shape" in this context include "a geometric shape" (egsquare), "organic shape" (flower-shaped object).

• Shapes can be created by enclosingline, or by color and value changes which define edges.

SHAPE
A two-dimensional enclosed area

- Shape is an enclosed space defined by other elements of art. Shape is 2-Dimensional
- Shape can be:
- Geometric: Angular, man-made concept
- Organic: curvilinear - found in nature

Types of Shape

- **Geometric shapes** might be used to indicate solidity or rigidity.
- **Organic shapes** may be used to create a more relaxed, natural and fluid feeling.
- **Objective shapes** have a powerful associative effect, referring to objects in the real world.
- **Nonobjective shapes** can suggest a sense of artificiality or novelty when they are used abstractly in a non-representational work of art.

Geometric shapes have smooth, even edges and are measurable. The include the square, the circle, the triangle and the rectangle.

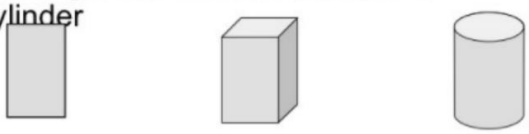
Turning **Shapes** into **Forms**

A triangle becomes a cone or a pyramid

A square becomes a cube

Turning **Shapes** into **Forms**

A rectangle can become a box or a cylinder

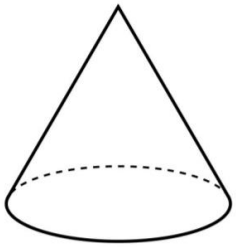


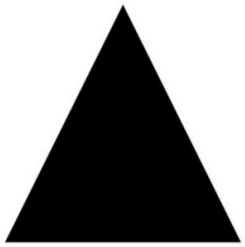
In order to turn a circle into a sphere, you must shade it. You can't add another side to it!

Fig.4

FORM

Forms are 3-Dimensional Volumes Versus shape, which is 2-dimensional, or flat





Form is the outlined edges of a three-dimensional object.

- ❑It has length, width, and depth (or height) as well as volume and mass.
- ❑Form can be measured, from top to bottom (height), side to side (width), and from back to front (depth).
- ❑Form is also defined by light and dark.
- ❑It can be defined by the presence of shadows on surfaces or faces of an object.
- ❑There are two types of form, geometric (man-made) and natural (organic form).
- ❑Form may be created by the combining of two or more shapes.
- ❑It may be enhanced by tone, texture and color.
- ❑It can be illustrated or constructed.
- ❑It has volume and mass.

Organic-natural, living form.

❑**Inorganic or geometric**-man-made, non-living forms.

❑**Open-forms**-forms that can be looked into.

❑**Closed-forms**-self-contained.

❑**Geometric Shape**-circle, square, rectangle, triangle, pentagon, octagon, other polygons.

❑**Geometric Form**-sphere, cube, pyramid, cone, cylinder.

❑**Free-Form**-any non-geometric shape: irregular, amorphic

Fig.5

TEXTURE

Texture refers to the surface quality or "feel" of an object, such as roughness, smoothness, or softness. Actual texture can be felt while simulated textures are implied by the way the artist renders the surface area. The way in which shapes are arranged can create texture

It is the surface quality or appearance of an object.
❑Texture can be used to enhance a room's features or provide added dimension.
❑The element of texture is defined as "the feel, appearance, or consistency of a surface."
❑Texture is a surface's tactile quality.
❑Tactile refers to the perception of touch.

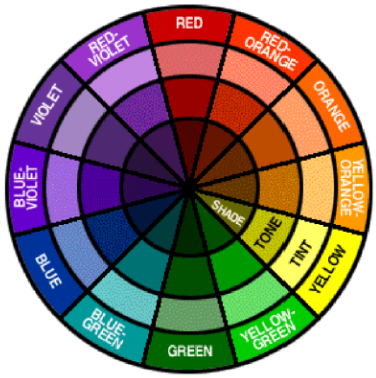
types

❑**Visualtexture**is a quality of the surface that you can 'see', but not necessarily 'felt'.
❑**Actualtexture**is a quality of the surface that you can both 'see' and 'feel'.

Color derives from the **spectrum** of light interacting in the eye with the spectral sensitivities of the light receptors. Color categories and physical specifications of **color are also associated with objects, materials, light sources**, etc., based on their physical properties such **as light absorption, reflection, or emission spectra.**

A colour wheel is a circle divided into at least six sections and containing:

- three primary colours
- three secondary colours,
- and tertiary colours



Primary Colours
Red
Blue
Yellow

They cannot be made by mixing any other Colours.

Secondary Colours
Purple
Orange
Green
Made by mixing the primaries.

COLORS

❑Color is the key element of interior design.
❑It is used to create aesthetically pleasing combinations and also works on a psychological level.
❑Each color has three characteristics: hue, value, and intensity.
❑It can give emphasis to create a hierarchy and the piece of art
❑Color Saturation gives a color brightness or dullness.
❑Color may connote emotion(excitement, rage, peace) and stimulate brain activity (action, relaxation, concentration).
❑Light is additive–working towards white.
❑Paint or pigment is subtractive–working towards black.
❑Mixing red blue and yellow can create any pigment color.
❑Tints are made when white is added to a pure hue to make light values.
❑A Shade is when black is added to a pure hue to make dark values.

Primary colors are hues from which all other colors can be made: red, yellow, blue.
Secondary colors are made from mixing equal parts of the Primary colors: orange, green, violet.
Tertiary colors are those colors between Primary and Secondary colors: yellow-orange, red-orange, etc.
Complementary colors are colors that are opposite each other on the color wheel: red-green, orange-blue, yellow-violet.
Analogous colors re colors that are adjacent (side by side) to each other on the color wheel.
Monochromatic colors are variations in value of one color by adding either white to make tints or black to make shades.

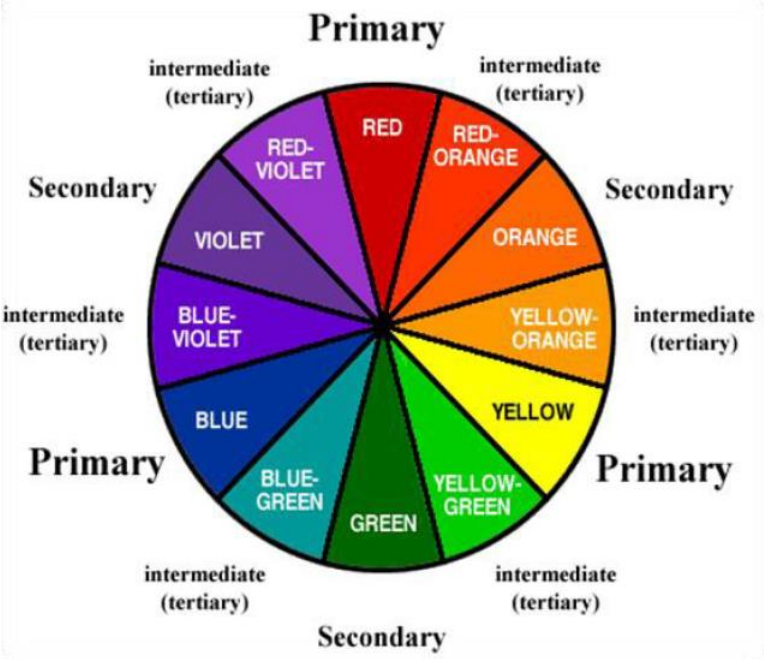


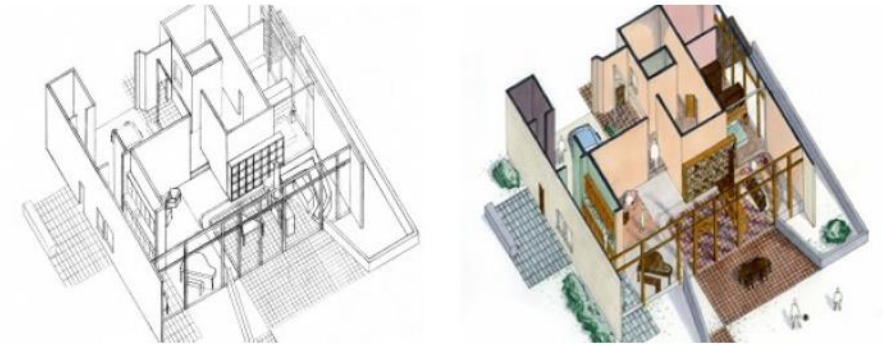
Fig.6

Colors have degrees of **transparency**
•A color is **Transparent**if the viewer can see clearly through it.
•A color is **translucent**if it admits light but the image is diffused and can not be seen clearly.
•A color is **opaque**if it can't be seen through.

Intensity
•refers to the **brightness or dullness of a color.**
•Intensity is the brightness or dullness of a hue.
•Adding some of its compliment can lower the intensity of a hue. The compliment of a hue is the color ` a standard color wheel.
•Examples of high intensity colors include hot pink and fire-engine red. Low intensity colors include rust and smoky blue.

Value is the lightness or darkness of a **hue.**
The **value** of a hue can be made lighter by adding white. This produces a tint.
Pink is a **tint** of red, made by adding white to red.
A hue can be made darker by adding black. This produces a **shade.**

INTERIOR SPACE



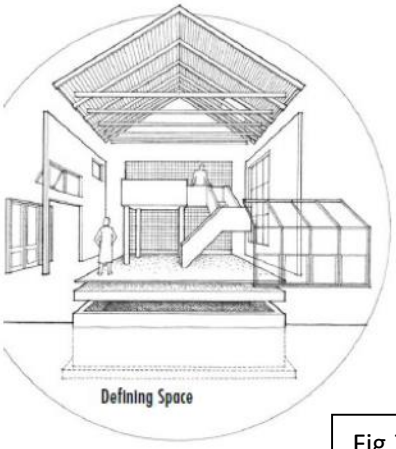
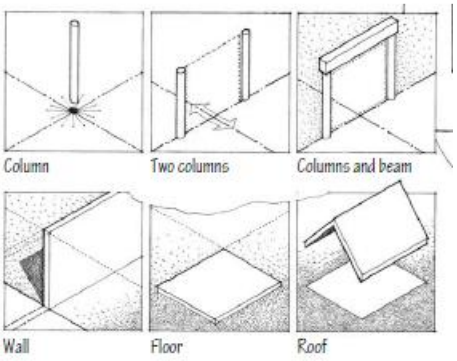


Fig.7

The geometric elements—point, line, plane, and volume—can be arranged to articulate and define space. In architecture, **these fundamental elements become linear columns and beams, planar walls,**
floors, and roofs.

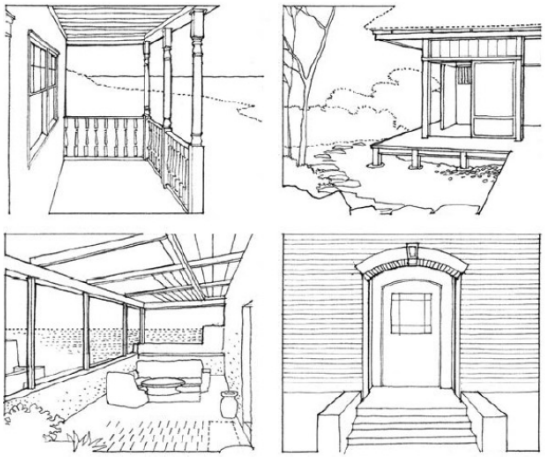
• A **column marks a point in space** and makes it visible in three dimensions.
• **Two columns define** a spatial membrane through which **we can pass**.
• When supporting a beam, the columns **delineate the edges** of a **transparent plane**.
• A wall, **an opaque plane**, marks off a portion of amorphous space and separates here from there.
• A floor defines a field of space **with territorial boundaries.**
• A roof provides shelter **for the volume** of space beneath it.



OUTSIDE TO INSIDE

A building's exterior walls constitute the interface between our interior and exterior environments. In defining both interior and exterior space, they determine the character of each. They may be thick and heavy, expressing a clear distinction between a controlled interior environment and the exterior space from which it is isolated. They may be thin, or even transparent, and attempt to merge inside and outside.

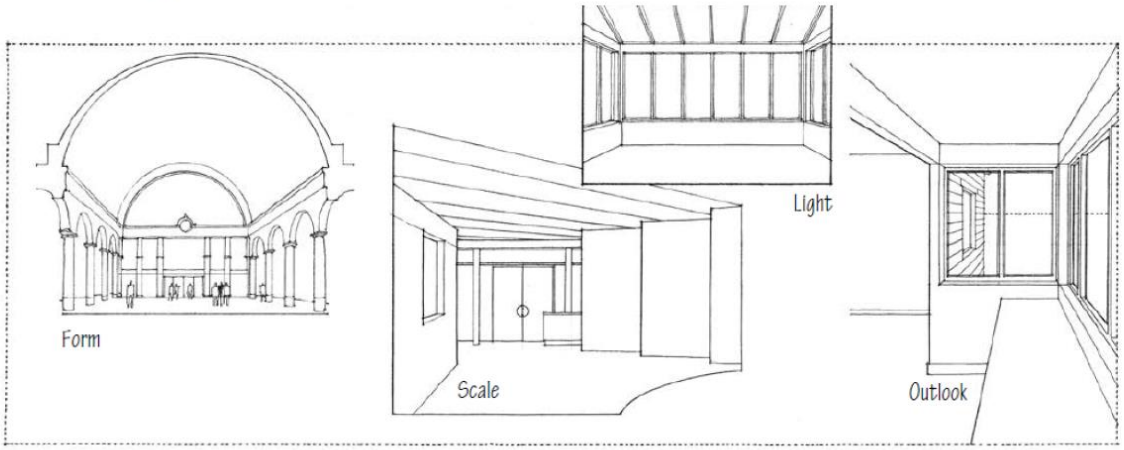
Windows and doorways, the openings that penetrate a building's exterior walls, are the spatial transitions between exterior and interior space. Their scale, character, and composition often tell us something about the nature of the interior spaces that lie between them.



Special transitional spaces, belonging to both the outside world and the inside, can be used to mediate between the two environments. **Familiar examples include a porch, a veranda, or an arcaded gallery.**

- Upon entering a building, we sense **shelter and enclosure.**
- This perception is due to the **bounding floor, wall, and ceiling planes of interior space.**
- These are the architectural elements that define the **physical limits of rooms**.
- They enclose space, a**rticulate its boundaries, and separate** it from adjoining interior spaces and the outside.

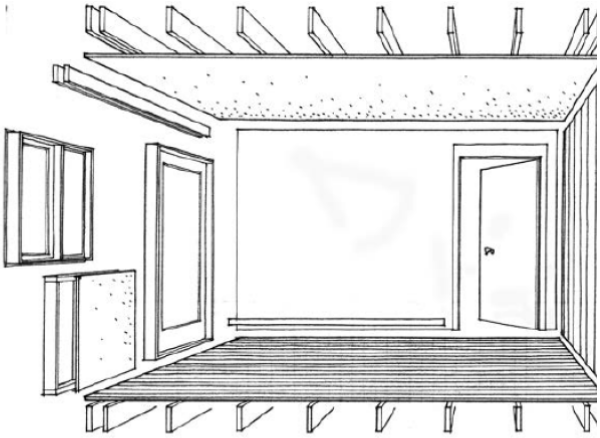
Spatial Qualities



Floors, walls, and ceilings do more than mark off a simple quantity of space. Their form, configuration, and pattern of window and door openings also imbue the defined space with certain spatial or architectural qualities. We use terms such as grand hall, loft space, sun room, and alcove not simply to describe how large or small a space is, but also to characterize its scale and proportion, its quality of light, the nature of its enclosing surfaces, and the way it relates to adjacent spaces.

Fig.8

- Interior design necessarily goes beyond the **architectural definition of space.**
- In planning the layout, **furnishing, and enrichment of a space,** the interior designer should be acutely aware of its **architectural character** as well as its potential for modification and enhancement.
- The design of interior spaces requires, therefore, an understanding of how they are formed by the building **systems of *structure* and enclosure**.
- With this understanding, the interior designer can effectively elect to work with, continue, or even offer a **counterpoint to the essential qualities of an architectural space.**



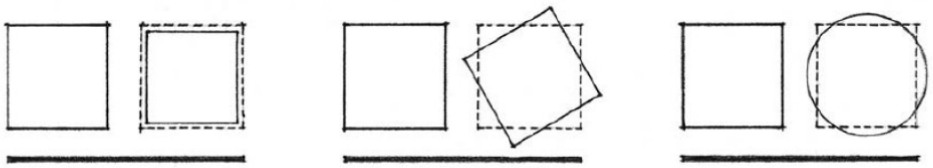
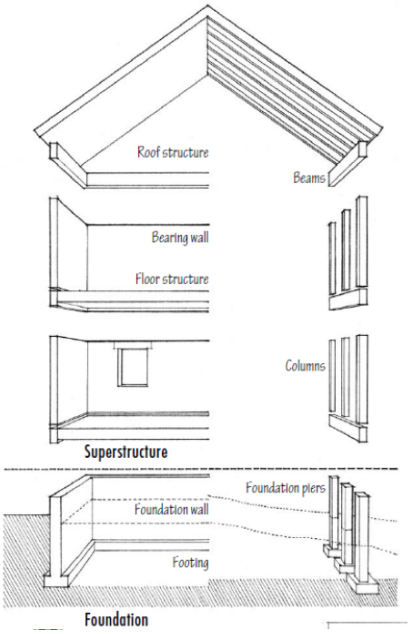


Fig.8

STRUCTURING SPACE



Structural Systems

• **The *superstructure*** is the vertical extension of the foundation system and consists of the columns, beams, and load-bearing walls that support the floor and roof structures.

• **The *foundation*** system is the substructure that forms the base of a building, anchors it firmly to the ground, and supports the building elements and spaces above. These systems must work together to support the following types of loads:

Dead Loads: How a building is constructed determines its dead load, which is a static vertical load comprising the weight of its structural and nonstructural components, including any equipment permanently attached to the structure.

Live Loads: How a building is used determines its live load, which is a movable or moving load comprising the weight of its occupants and any mobile equipment and furnishings. In cold climates, collected snow and water impose an additional live load on a building.

Dynamic Loads: Where a building is located determines its potential loading from the dynamic forces of wind and earthquake.

The two basic linear structural elements are the column and the beam.
•A *column* is a vertical support that transmits compressive forces downward along its shaft.
•The thicker a column is in relation to its height, the greater its load-bearing capacity and its ability to resist buckling resulting from off-center loading or *lateral forces*.

•A beam is a horizontal member that transmits forces perpendicular to itself along its length to its supports.
•A beam is subject to bending and deflection, which result in an internal combination of compressive and tensile stresses.
•These stresses are proportionally greater along the upper and lower region of a beam's cross section.
•Increasing depth and placing material where stresses are greatest optimize a beam's performance.

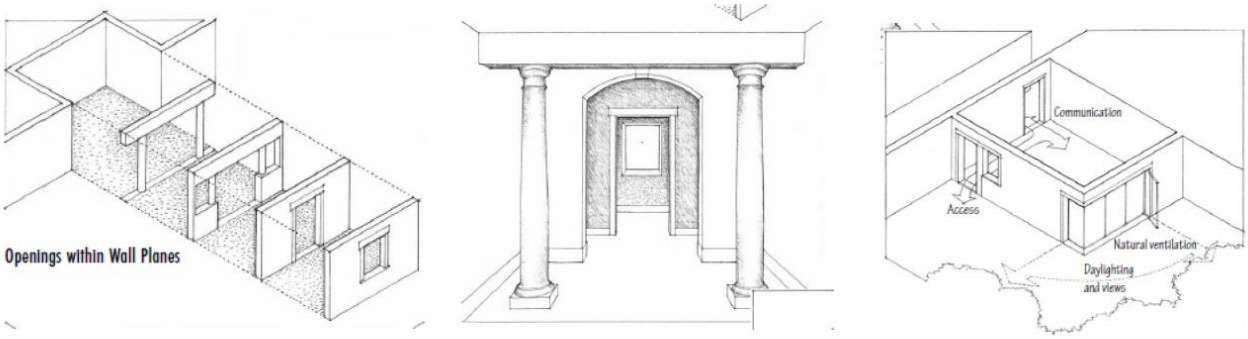
Although a building's structural system sets up the basic form and pattern of its interior spaces, these spaces are ultimately structured by the elements of interior design.

•The term "structure" is not used here in the sense of physical support. It refers to the selection and arrangement of interior elements such that their visual relationships define and organize the interior space of a room.

•Non-load-bearing partitions and suspended ceilings are often used to define or modify space within the structural framework or shell of a building.

•The color, texture, and pattern of wall, floor, and ceiling surfaces affect our perception of their relative positions in space and our awareness of the room's dimensions, scale, and proportion.

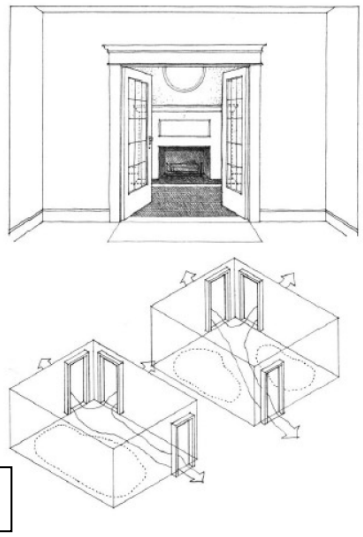
SPATIAL TRANSITIONS

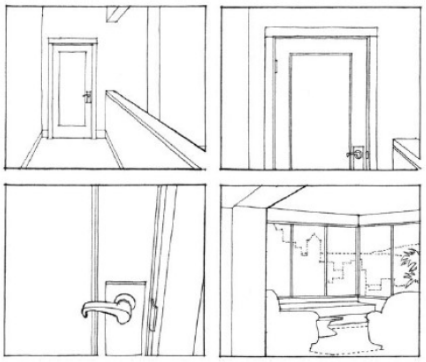


Openings created within the wall plane for windows and doorways re establish contact with the surrounding spaces from which the room was originally cut.

DOORWAYS

- Doorways provide physical access from one space to another.
- When closed, they shut a room off from adjacent spaces.
- When open, they establish visual, spatial, and acoustical links between spaces.
- Large open doorways erode the integrity of a room's enclosure and strengthen its connection with adjacent spaces or the outdoors.





The number and location of doorways along a room's perimeter affect our pattern of movement within the space, and the ways we may arrange its furnishings and organize our activities.

Fig.9

•Windows let light and air into the interior spaces of buildings and provide views of the outdoors, or from one space to another.

•Their size and placement, relative to the wall plane in which they occur, also affect the degree of separation between an interior space and the exterior environment.

•Views to the outside and *natural ventilation* are important elements in sustainable design.

STAIRWAYS

Stairways are also important forms of spatial transitions between rooms. An exterior set of steps leading to a building's entrance can serve to separate private domain from public passage and enhance the act of entry into a transitional space such as a porch or terrace. Entrances without steps support visit ability and aging-in-place.

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SCHOOL OF BUILDING AND ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

UNIT – 2 – DESIGN VOCABULARY & PRINCIPLES – SDE 4051

PRINCIPLES OF PERCEPTION

Gestalt Principles

The word “gestalt” in German, means ‘shape’, ‘form’, ‘essence’ or ‘whole’. This is a theory of visual perception developed by three German psychologists : Max Wertheimer, Wolfgang Kohler and Kurt Koffka at Frankfurt university. There are eight laws under this theory which explain our various cognitive psychology.

Why are these principles important?

This theory plays a very important role in every creative field and helps the designers to develop their cognitive psychology and see things beyond what they actually are. It helps us to interpret this complex world in a more simple and coherent whole.

- It helps you to understand which of the various design elements are most effective in a given instance. e.g., when to do or not to do background shading, when to use gradients, and how to group similar items and distinguish different ones.
- Our visual perceptions are highly influenced by these laws, and hence allows you to focus more on specific points, therefore, get us to take specific actions, and create our designs accordingly.
- And last but not the least, user’s problems or needs are addressed in a more easy and intuitive way which helps to design products that are more consumer friendly and aesthetic at the same time.

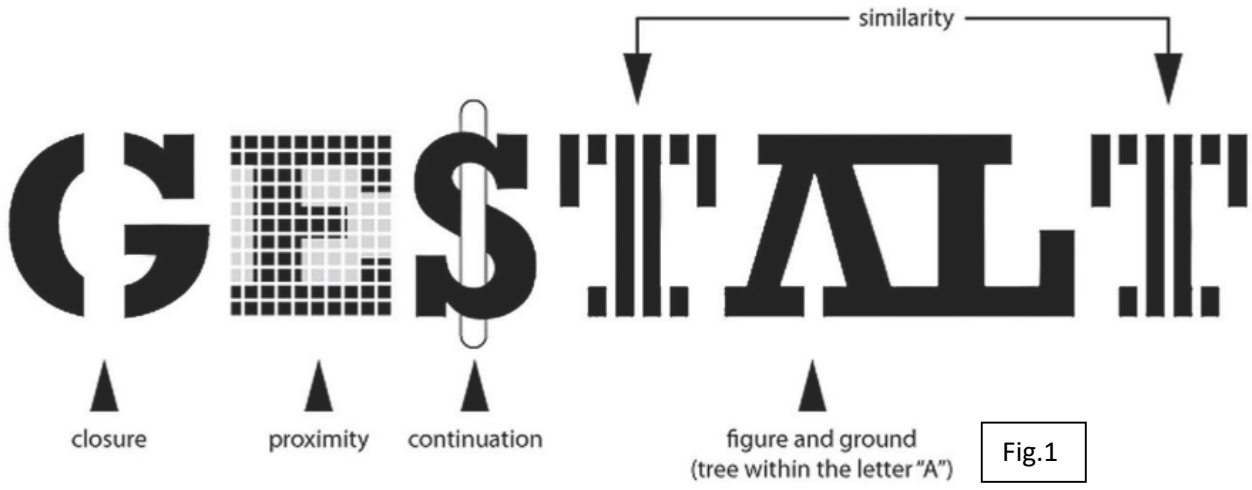

Fig.1

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1. Principle of figure & ground

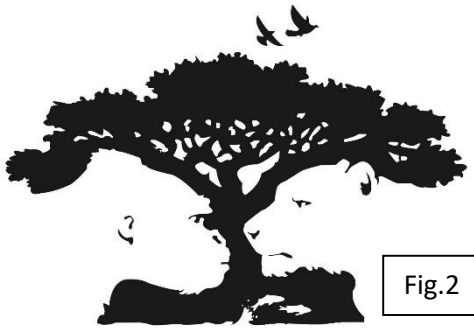


Fig.2

The human brain tends to isolate the visual field into figure (foreground) and ground (background).The foreground is considered to be the positive space and the background as negative space.It tells you subconsciously where to focus more.The artwork on the left, was designed by Shigeo Fukuda, a Japanese designer in 1975. This is one of the famous artworks depicting the principle in the most impeccable manner.And the artwork on the right, is a poster from the Melbourne food & wine festival , 2007.In both the artworks, if you notice, the foreground and background are completely separated but when visually looked at, together, makes a very cohesive art-form. Using this principle, you can make interesting designs, without having to do more.

2. Principle of similarity

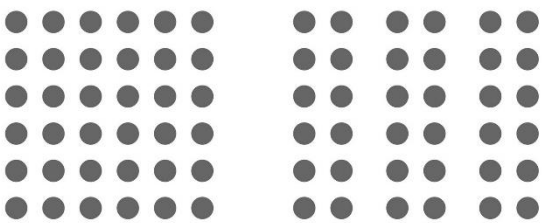
Fig.3

Design elements tend to be grouped together by the virtue of their similarity. Our brain tends to make up a relationship between similar elements within a design space, using elements like shapes, colours and sizes. Objects that stand out are called 'anomalies'.

On the left, is a very famous painting called 'The starry night' by the Dutch painter Vincent Van Gogh and is a very prominent example of 'law of similarity'. In Spite of using similar kinds of brush strokes throughout, we can clearly make out each object on the canvas. This is because of the similarity of colours & direction of the brush strokes used to depict a particular object.

Similarly, on the right, is a pseudoIsochromatic plate is another great example of 'Principle of Similarity'.

3. Principle of proximity



Elements eg. various shapes which are placed in close proximity to one another tend to create a more complex image than they would appear if

placed farther from each other. It has a very strong impact on the human brain and sometimes tends to override the colour or shapes.

If you take a close look at the below picture (left), you will find that it is just a combination of dots and nothing else. But your mind perceives it as a complete image of an eye because of the closeness or proximity of various dots.

Following the exact same principle, in the photograph on the right, the man appears to be kicking the sun like a football.

Today's technology is based on this visual perception law where the pixels are put together to create different images on your digital screen.

4. Principle of continuity

Our mind has a biased visual perception to notice objects in continuous shapes or forms rather than disconnected ones. It just allows our mind to have a continuous flow with help of paths, lines and curves of various things.

Below on the left side is a picture depicting the logo of the Hotel association of Canada and on the right is the logo of the famous Chanel CNN. These logos have a sense of movement because our mind tends to move through one object to another one beyond its end point.

5. Principle of closure

Our mind, while looking at a complex set of visual elements, interprets it as a single recognisable pattern rather than separated objects. It tends to fill in the missing parts and form a complete image.

Below, on the left, is a logo of the World Wildlife Fund and on the right, is the logo of Formula 1 racing cars. In these pictures, our mind automatically seems to complete the image of the panda and one respectively, even if many of the lines aren't actually there.

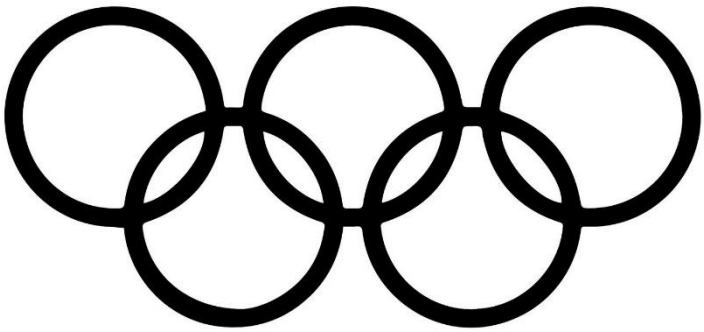
6. Principle of focal point

It states that any design element, if unique among the lot or stands out visually among others, will automatically attract the attention of our brain first.

On the left is a fantastic example of 'principle of focal point' being used in architecture. It is by the virtue of arrangement of the stairs that the focus is directed automatically towards the top.

Similarly, on the right side, is an image of the logo of the United Nations depicting the law in the most convenient way.

7. Principle of symmetry



It says that our brain tends to see complex or ambiguous objects in as simple a manner as possible, breaking down each complexity into simplicity. For example, if you see this monochrome logo of olympics, you will realise it as five circles rather than just various curved lines amalgamated together.

One of the seven wonders, the Taj Mahal, is an exemplary specimen of symmetrical architecture built in 1632 by the great Mughal emperor Shah Jahan. (on the left)

The last supper was a masterpiece created by Leonardo-Da-Vinci in 1498. It is the most familiar example of an artist's creative use of symmetrical balance.

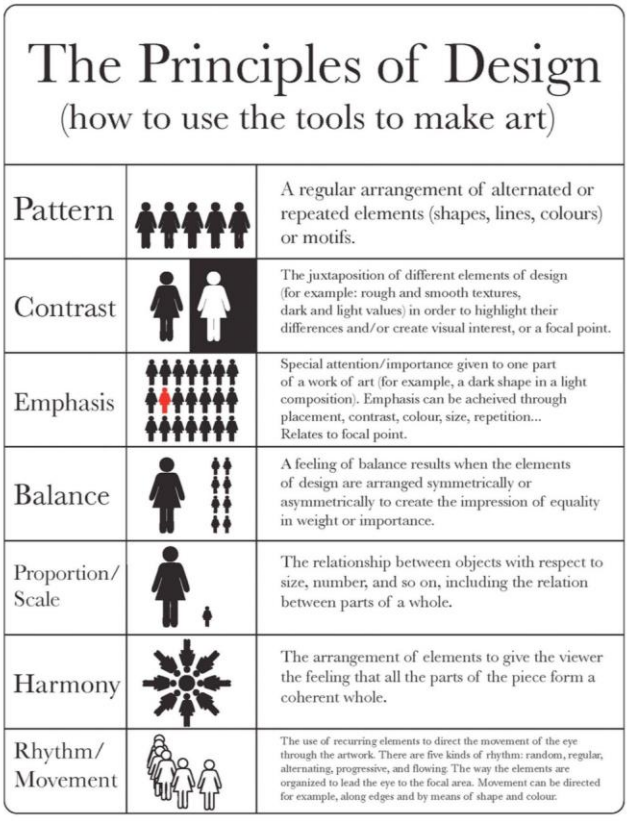
What is meant by "Principles of Interior Design"?

•The Principles of interior Design are the ways that designers use the Elements of interior design to create good Compositions (decoration/arragements).

•Design principles are ways of arranging or organizing design elements.

•These principles evaluate each element in a design (magnificent vs. mediocre right vs. wrong).

•The way the elements are arranged to create a feeling of stability in a work.



Principles:

BALANCE
CONTRAST
EMPHASIS
VARIETY
UNITY/HARMONY
PROPORTION
RHYTHM
MOVEMENT
PATTERN
REPETITION

BALANCE :

Balance in interior design refers to the proper distribution of objects in a room to create visual balance.

- Balance refers to the distribution of visual weight within a composition.
- Lack of balance disturbs the harmony of a composition.
- A work that is unbalanced visually creates tension.
- Balanceis created when there is an equilibrium of elements that need each other and together they create Unity.

There's three different kinds of balance:
- symmetrical (formal),
- asymmetrical (informal)

The elements of art – line, shape, texture etc – work together to create balance within a composition.
The four most important types of balance are:

- Formal,
- Approximate symmetry
- Symmetrical balance
- Informal,
- Asymmetrical balance
- Radial balance

Symmetrical (formal) Balance

- He easiest way to achieve balance is by using the symmetrical or formal form, objects are repeated or mirrored along a central axis.
- It's when the space is evenly split into two sides that mirror each other.
- Symmetry is created by dividing a space and the elements within it equally.
- Symmetry can create order, formality, calmness and stillness.

Asymmetrical/informal balance

Asymmetrical design is typically created with an odd number of disparate elements.

- Lines, colours, forms and textures are balanced in a space without duplication.
- The two sides of a work of art are not exactly the same, but are still visually balanced.
- Asymmetry can look informal, natural and energetic.
- A design effect in which elements on either side of an imaginary central line are unmatched but appear to be in balance.
- Asymmetrical balance makes for a more relaxed and lively interior space.
- This balance scheme uses a central line but relies more on the eye's sense of balance to complete the design.
- Rather than having identical objects on either side of the central axis, asymmetrically balanced spaces have different objects of equal visual weight on either side of the line.

Fig.1

Radial Balance

- When there is a central focal point with other elements radiating from it or around it, this is radial balance.
- Radial balance is almost circular –distributed arrangement of items around a central point either extending outward or inward.
- You see radial balance less often in traditional homes;round roomsare difficult to link to other spaces.Butthe result can be stunning. The central elements of a radially balanced room —like the dining table and light fixture in this dining space —become the immediate focal points.
- The chairs, sculpture and print all radiate out from this central point.

Fig.2

Visual Balance

There are instances when this is thedesired effect, but for the majorityof spaces one goal is visual balance.

- This is achieved by distributing thevisual weight of objects within a space to achieve a feeling of equilibrium.
- The size, color, texture, shape of anelement can change its visual weight.
- For example, larger, darker, brighter,highly textured, complexly shapedobjects typically feel heavier andrequire balance through theplacement equally “heavy” items ormultiple less heavy items.

Fig.3

Very dark or saturated areas of colordemand attention within a composition.

- An area of high contrast, even at a small size, will automatically draw theviewer’s eye.
- Forms placed near the edge of a page can also draw morevisual attention than forms placed directly in the centerof a page.

Contrasts

Contrast create visual excitement and interest to a work of art.
If all the other elements –value, for example, are the same –the result is monotonous and plain.
Contrast emphasizes differences between the art elements

Contrast of **Color** –Warm vs. Cool colors
Contrast of **Value** –Dark vs. Light
Contrast of **Texture** –Smooth vs. Rough
Contrast of **Size** –Large vs. Small
Contrast of **Shape** –Organic vs. Geometric

Contrast through line.

In this Margaret Preston Print, the fine lines of the tree branches contrast with the heavy shadows on the road.

Contrasting materials.

In this work of contemporary art by Fiona Hall, the use of recycled PVC, beads, wire and glass helps establish meaning.

Focus/Emphasis

Accent, stress, or importance placed on a part of a piece of artwork.

Focus can be created by contrasting elements so that they attract attention.

Emphasis is something we all know about. It simply means that every room or space has a focal point, whether it is architectural or an object.

A fireplace is the most common architectural focal point.

Fig.4

Oversized artwork or a large piece of furniture can also be a focal point in a room.

Interior design elements like color, texture and form are used to add emphasis to a focal point.

If you refaced your fireplace with bronze glass tiles, you have used colorand texture to create emphasis.

EMPHASIS

The focal point of an image, or when one area or thing stands out the most, is dominant or the center of interest

Rhythm and Movement

A regular repetition of elements to produce the look and feel of movement.
Rhythm refers to a way of utilizing the art elements to produce the look and feel of rhythmic movement with a visual tempo or beat
Sometimes to create rhythm, an artist will repeat not just elements but also the same exact objects over and over.

Movement and Rhythm is achieved in four ways

•Visual rhythm
•Kinetic art
•Compositional movement
•Progressive rhythm

Rhythm can be accomplished through the following means:

1.Repetition
2.Alternation
3.Progression

Repetition

For example: chevron patterns on both your sofa and wall tapestry,aseries of similar vases lining a mantle or a stack of books on a shelf.

Similarly-themed home ware and arts will also contribute to the theme of your interior design.

Repetition is the simplest way to attain rhythm and can be achieved by repeating any of the elements of design (line, colour, texture and pattern, light, and scale and proportion) or other design concepts in an organized and regular way.

Alternation

Alternation is used to create rhythm by alternating two or more elements in a regular pattern.

The pattern may be ABCABC or ABBABB, but always repeating in the same order

a modular sofa with alternating colours of white and green, placing a small roundtable between two armchairs, or even differently-shaped wall recesses can achieve this effect, as seen below.

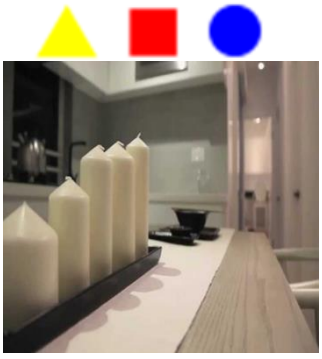
Progression

Interior design elements placed according to size from smaller to bigger ones, or perhaps according to the gradient of their colours.

Some of the ways to achieve unity include:

1. Alignment
2.Similarity
3.Proximity
4.Repetition
5.Continuation
6. Overlapping

1.Alignment



Alignment consists of arranging elements so that their edges are lined up.

The common alignment allows the eye to group those elements together.

A grid is often used to create unity through alignment, not just in a single design but also between related designs (the pages of a magazine or book, for example).

2.Similarity

Repeating colors, shapes, values, textures, or lines creates a visual relationship between elements, called correspondence.

3.Proximity

Proximity is based on grouping by closeness; the closer elements are to each other, the more likely we will see them as a group.

Proximity is one of the easiest ways to achieve unity.

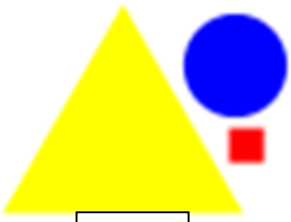


Fig.5

4.Repetition

Repetition is based on grouping by similarity; elements that are similar visually are perceived to be related.

Any element can be repeated -line, shape, color, value or texture -as well other things such as direction, angle or size.

Repetition helps unify a design by creating similar elements and is one of the most effective ways to unify a design.

5.Continuation

Continuation means that something (a line, an edge, a curve, a direction) continues from one element to another.

The viewer's eye will follow the continuing line or edge smoothly from one element to other and the mind will group the elements because of this connection.

Implied lines are one example of continuation.

6. Overlapping

Overlapping design elements can contribute to unity by creating a relationship between separate elements.

Fig.6

Movement and Rhythm is achieved in four ways

•Visual rhythm

•Kinetic art

•Compositional movement

•Progressive rhythm

Similar to rhythm in music and dance, visual Rhythm is closely related to movement. It may be produced by repeating one of several units of a design, such as a triangle shape or the colour green.

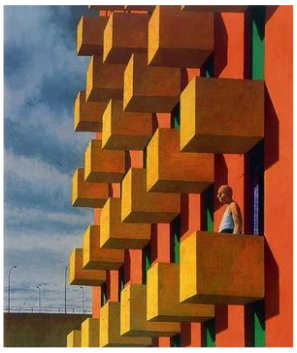
Repeating an object or art element creates Pattern and Rhythm.

Kinetic Art Certain works of art, such as motorized sculptures, actually move or change over time. Art that includes actively moving parts is called kinetic art.

Fig.7

Progressive Rhythm

In art, visual rhythm, which is similar to pattern, may be produced by repeating one or more motifs in a recognizable or predictable order.



MOVEMENT

Movement is the principle of art used to create the look and feeling of action and to guide a viewer's eye throughout the work of art.
When you look at a work of art your eye moves from part to part.
Artists use the principle of movement to lead the viewer's eyes throughout the work.

Fig.8

Compositional Movement

Compositional movement is neither action nor a record of action. It is experienced by comparing the positions of stationary objects or spaces within a design. In two dimensional art, the act of purposely leading the viewer to look at a focal point is called compositional movement.

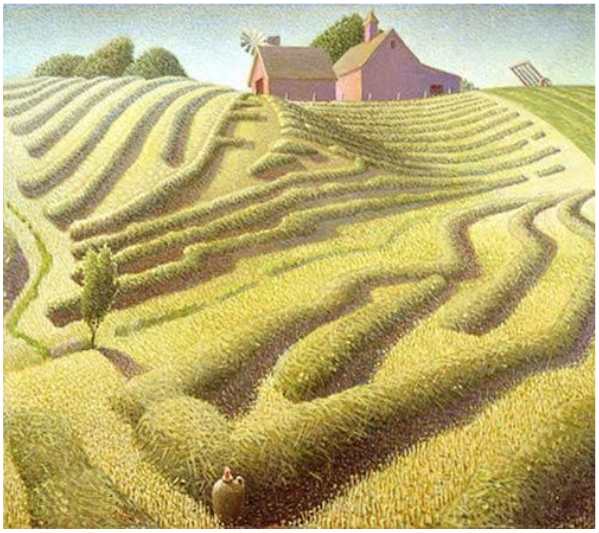


Fig.9

Ways to Create Movement

•Overlap objects

•Aligning to edges to produce a feeling of continuous movement

•Strong sense of form

•Create a path between objects

•Emphasizing/Exaggerating elements

•Placing center line (horizon line) high in the picture

•Blurry outlines

•Multiple images

Pattern
Repetition of an element of art (i.e., shapes, lines, or colors) to achieve decoration or ornamentation.
Pattern uses the art elements in planned or random repetitions to enhance surfaces of paintings or sculptures.
Patterns often occur in nature, and artists use similar repeated motifs (a distinctive and recurring form, shape, figure in a design, as in a painting or on wallpaper) to create these occurrences.

Repeated elements can vary in size, color, or axis placement. Repeated elements can create a pattern. The use of repetition may be applied to all Visual Elements. Motion can be created by repetition.

Fig.10

Unity

This principle refers to the visual quality of wholeness or oneness that is achieved through effective use of the elements of art and principles of design Harmony refers to blending elements to create a

work of calm, restful appearance. An artist may use similar textures, colors values, to make a piece feel even and together.

Unity is achieved when the elements of an artwork work together as a whole. There are many ways of achieving unity in a painting. These include repetition and creating dominance. In the work below unity is achieved through repetition of shapes.

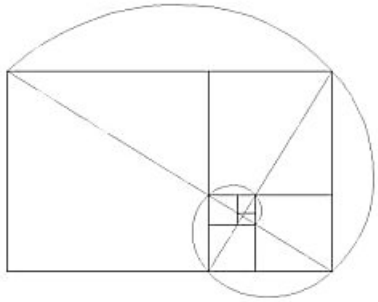
Variety
Variety is achieved when the art elements are combined in various ways to increase visual interest. For instance, an assortment of shapes that are of a variety of sizes attracts more attention than an assortment of shapes all the same size. By giving a work variety, the artist heightens the visual appeal of the work.

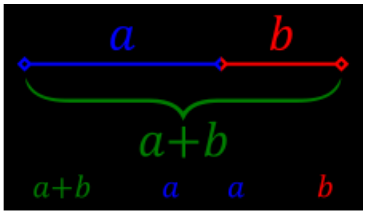
Proportion
The comparative relationship of one part to another and to the whole work with respect to size, quantity, or degree; SCALE.

When the proportions of architectural composition are applied to a particular building, the two-termed relationship of the parts to the whole must be harmonized with a third term—the observer. He not only sees the proportions of a door and their relationship to those of a wall (as he would in a drawing of the building), but he measures them against his own dimensions. This three termed relationship is called scale.
A well-scaled building such as a Greek temple will serve for illustration. If it were to be magnified to the size of St. Peter's in Rome, with its proportions remaining unchanged in their own relationships, the temple would be out of scale, and the result would appear monstrous.
If the columns were to be doubled in width while the temple remained the same size, they would be out of scale and out of proportion with the whole. The proportions of the temple are satisfactory as they are because they are based on certain aesthetic principles established by the Greeks, principles that are partly rooted in human psychological makeup and partly accepted by custom (*e.g.*,as are musical consonances). It is difficult to understand, however, why the scale of these temples is so successful within a certain range of size, for neither the ancient Greeks nor anyone else established laws to relate scale to size. They found their solution by experiment and subjective judgment.

It may be that the success of scale depends upon man's ability to comprehend proportions in relation to some unit or module that is roughly human sized and close enough to a person in a building to permit him to measure it against himself.
The Greeks, in employing the base of the column as a module for all the proportions of a temple, found a unit of a size that can be grasped easily and one that is close to eye level as a person approaches the temple. This module is a key to relationships among elements too far away to measure. This can be done in much larger buildings, too, where the elements close to the observer are too massive to be measured easily.
Roman and Renaissance architecture retained the ancient Greek orders as decoration partly for this reason, using them to break up huge masses into more comprehensible parts. In entirely different styles of architecture, such as the Gothic, where the expressive function requires immeasurable proportions, there is still a measurable module given in the base of the pier. But piers and columns are not always a source of the module. In masonry construction, the single block can serve the same purpose. In frame construction, the bay (distance between floors or columns) or doors and windows may make a better key.
The most successful modern skyscrapers retain a comprehensible scale, in spite of their size, by the repetition of some such module, and this is one reason why the skeleton is so often expressed on the exterior even when it is hidden behind walls.

Human scale in architecture is deliberately violated:
for monumental effect. Buildings, statues, and memorials are constructed in a scale larger than life as a social/cultural signal that the subject matter is also larger than life. The extreme example is the Rodina (Motherland) statue in Volgograd (Stalingrad).
for aesthetic effect. Many architects, particularly in the Modernist movement, design buildings that prioritize structural purity and clarity of form over concessions to human scale. This became the dominant American architectural style for decades. Some notable examples among many are Henry Cobb's John Hancock Tower in Boston, much of I. M. Pei's work including the Dallas City Hall, and Mies van der Rohe's Neue Nationalgalerie in Berlin.





to serve automotive scale. Commercial buildings that are designed to be legible from roadways assume a radically different shape. The human eye can distinguish about 3 objects or features per second. A pedestrian steadily walking along a 100-foot (30-meter) length of department store can perceive about 68 features; a driver passing the same frontage at 30mph (13 m/s or 44ft/s) can perceive about six or seven features. Auto-scale buildings tend to be smooth and shallow, readable at a glance, simplified, presented outward, and with signage with bigger letters and fewer words. This urban form is traceable back to the innovations of developer A. W. Ross along Wilshire Boulevard in Los Angeles in 1920.

The golden sectionis a line segment divided according to the golden ratio: The total length a + bis to the length of the longer segment aas the length of ais to the length of the shorter segment b.

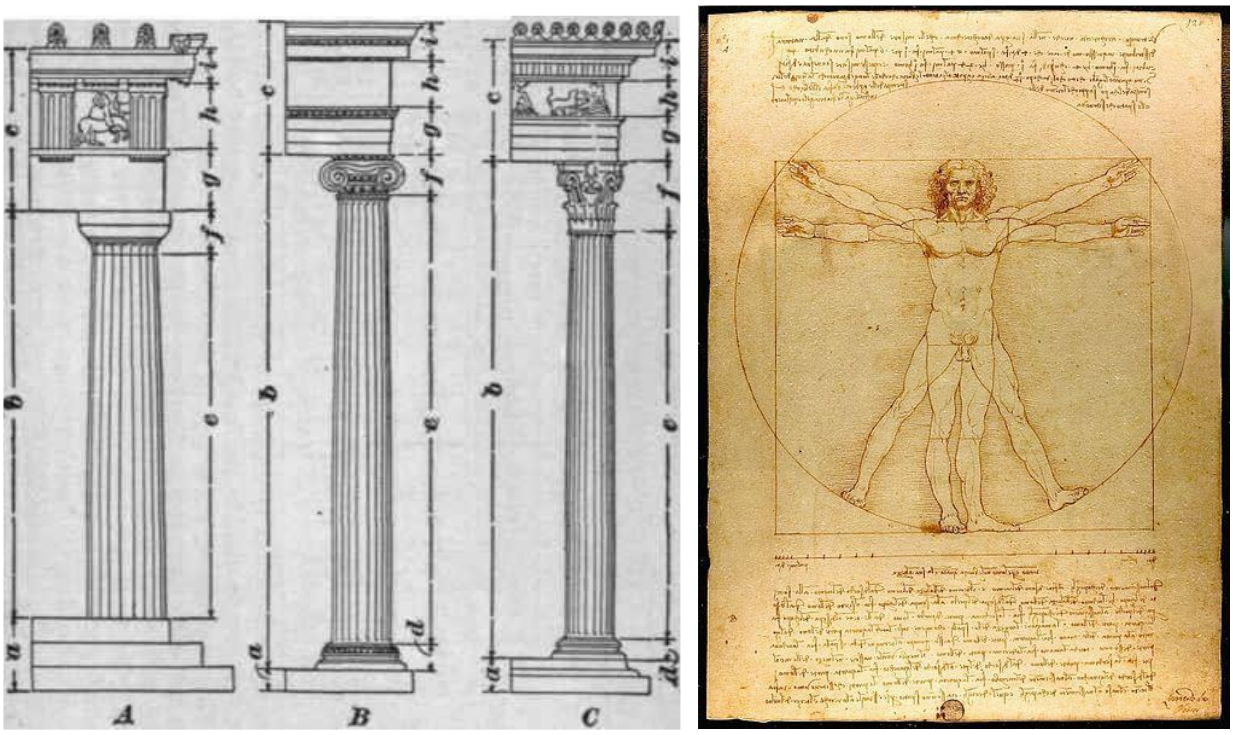
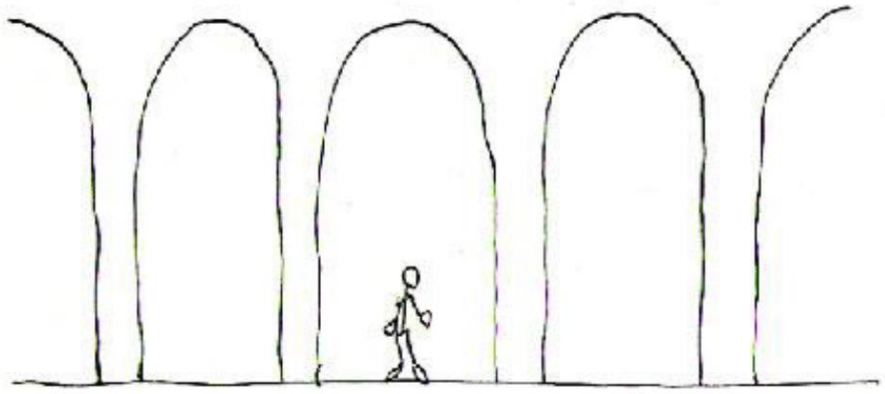
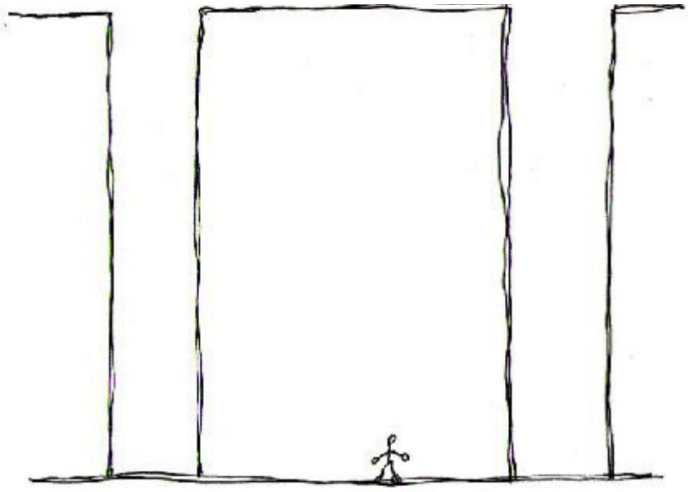


Fig.11



Human scale



Divine scale??

Fig.12

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SCHOOL OF BUILDING AND ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

UNIT – 3 – ANTHROPOMETRICS– SDE 4051

- Definition
- body link system
- static and dynamic anthropometry
- theory of standard dimension based on human figures for activities
- functions
- circulation
- furniture design
- spatial requirements
- relationship between human activities and anthropometrics
- introduction to ergonomics
- Design of Furniture for Living, Dining, Kitchen, Office etc.

What is ANTHROPOMETRICS ?

- The study of the **human body** and its movement, often involving research into measurements relating to people.
- It also involves collecting statistics or measurements relevant to the human body, called **Anthropometric Data.**
- The data is usually displayed as a table of **results, diagram or graph**.
- Anthropometric data is used by designers and architects.
- Anthropometry refers to the measurement of **the size and proportions of the human body**
- It derives from the Greek words '**anthropos**' (meaning human), and '**metron**' (meaning measure).
- **Ergonomics** involves the study of people and their relationship with the environment around them.

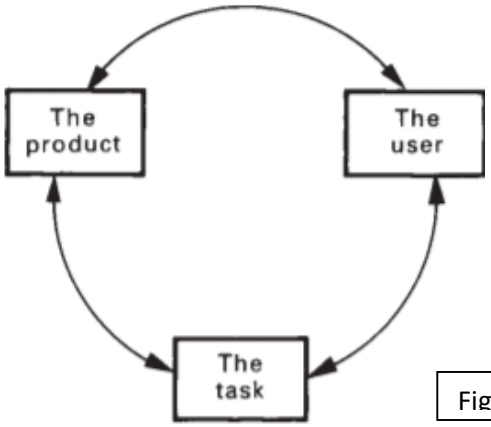


Fig.1

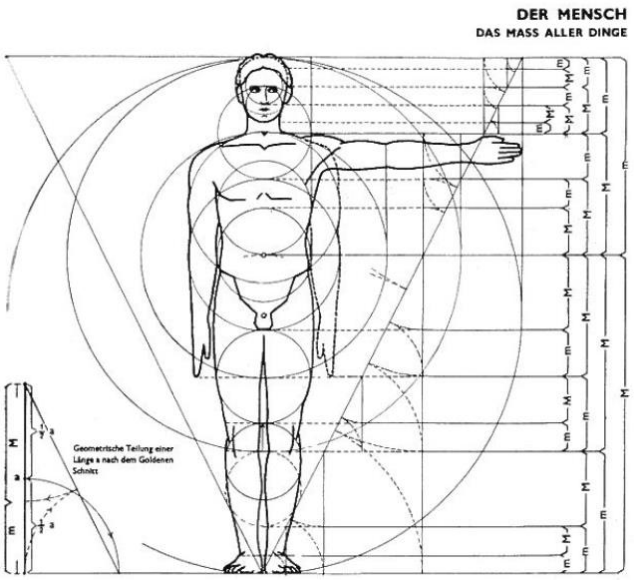


Fig.2

- It often involves research into the way people interact with **products and the environment.**
- **Anthropometry** influences a wide range of industries, processes, services, and products and has considerable importance in optimizing the design of buildings.
- **Human dimensions** and capabilities are the key factors in determining a building's proportions and overall design.
- Anthropometrics in building design aims to ensure that every user is as comfortable as possible.
- Anthropometry provides a range of standard requirements and approved solutions for designers to help ensure suitable designs.

During the course of time, a significant amount of anthropometric data has been amassed. Unfortunately for the designer, however, the thrust of much of the efforts in this area was for taxonomic purposes, physiological studies, etc., and not primarily for the ergonomic implications of body size. It was not until the 1940s that the need for anthropometric data, generated in a variety of industrial fields, but primarily in the aircraft industry, began to develop and increase. The Second World War naturally provided much of the impetus, and even today it is in the military-industrial sector that much of the anthropometric research is generated. Although the discipline has fallen within the purview of the anthropometrist, anatomist, or ergonomist, it is time for the architect and interior designer to become more aware of the data available and its applicability to the design of interior spaces.

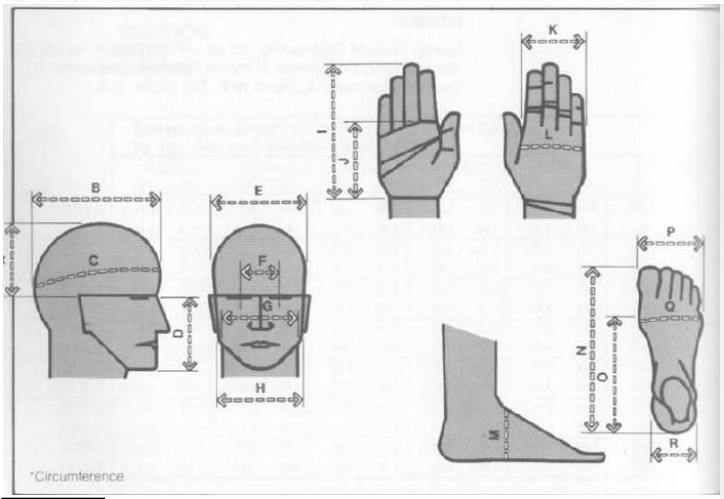


Fig.3

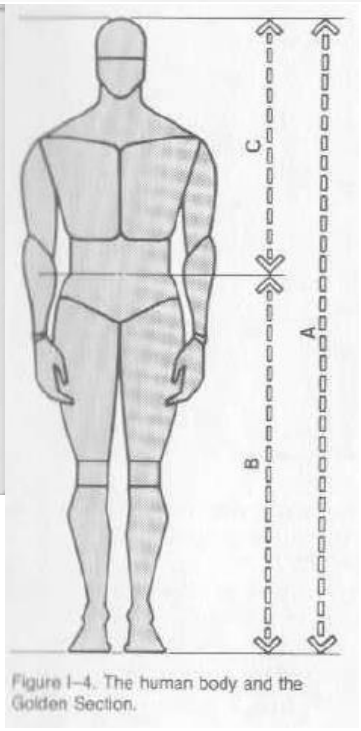


Figure I–4. The human body and the Golden Section.

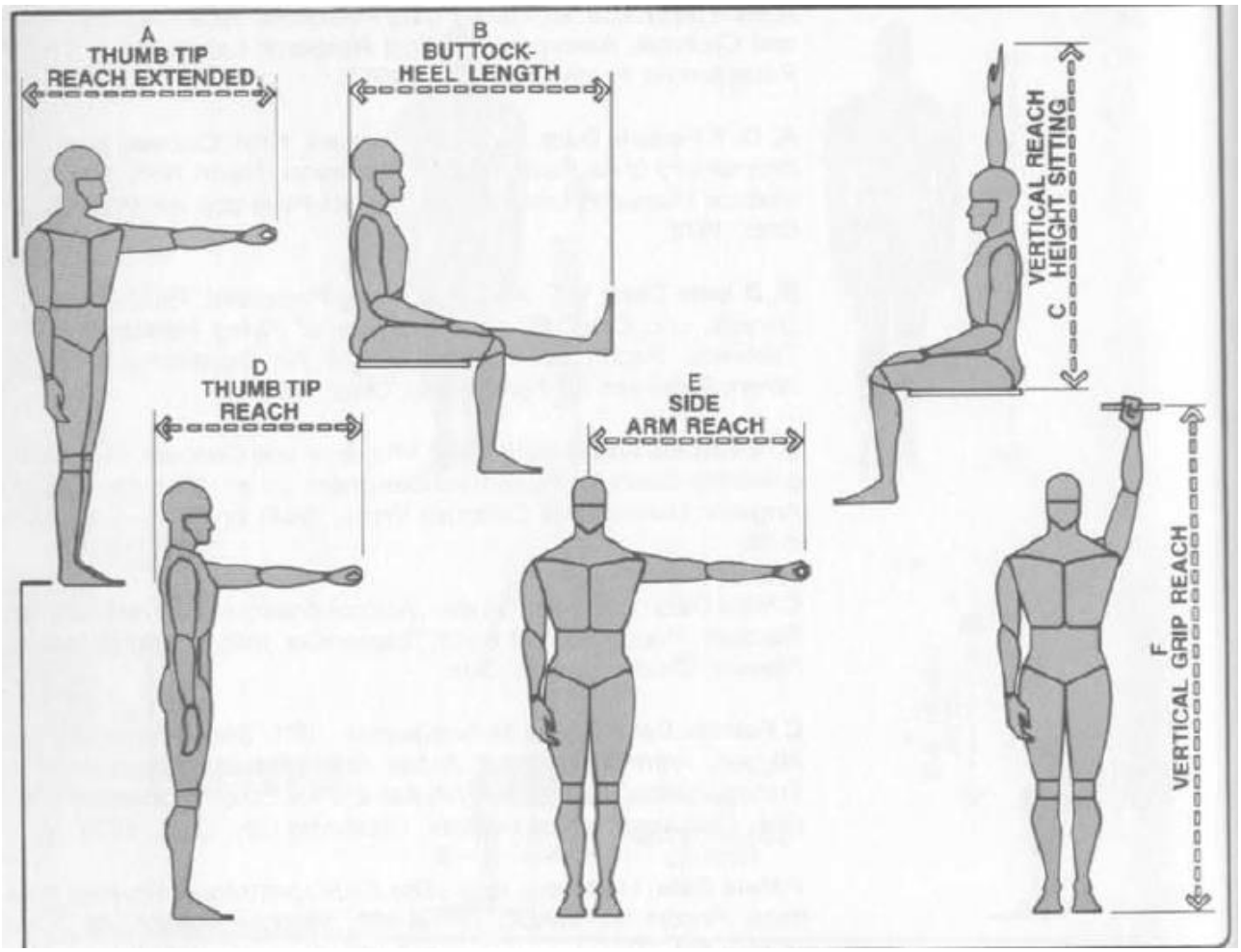
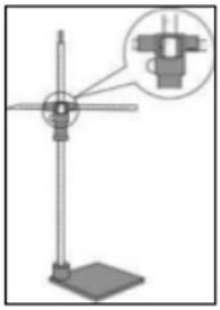

A
THUMB TIP
REACH EXTENDED
B
BUTTOCK-
HEEL LENGTH
C
VERTICAL REACH
HEIGHT SITTING
D
THUMB TIP
REACH
E
SIDE
ARM REACH
F
VERTICAL GRIP REACH

Fig.4

Anthropometric Measuring Tools



Anthropometer

Tape

Medical scale

Sliding Calipers: large and small

Spreading Caliper

Specifically, anthropomorphic measurements involve :

- **Size** (e.g., height, weight, area, and volume)
- **Structure** (e.g., height, width, length of various body parts)
- **Composition** (e.g., the percentage of body fat, water content, and body mass) of humans.

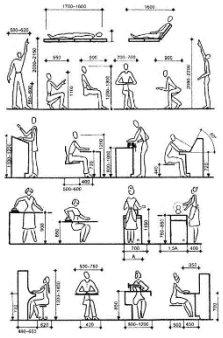


Fig.5

Anthropometric data Variability

Sources of variability:

- Measurement(e.g., population samples selected)
- Intra-individual (e.g., longitudinal study on statue from young to old)
- Inter-individual (e.g., cross-sectional study, people of different ages, sizes… included in the sample set)
- Secular: (e.g., statue, weight increases, contemporizes bigger than ancestors)

The antropometric data that we already get will be applicated widely,which are :

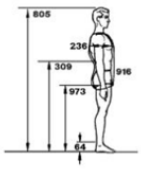
- Work station design (*work station*, car interior,etc)
- Work equipments design (tools, mesins, dll).
- Consumptive products design (clothes, chair, desk, etc).
- Physical work environment design.

- There are two basic types of anthropometry:

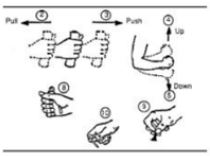
Static anthropometry is the measurement of body sizes at rest and when using devices such as chairs, tables, beds, mobility devices, and so on.

Functional anthropometry is the measurement of abilities related to the completion of tasks, such as reaching, maneuvering and motion, and other aspects of space and equipment use.

- Static Measures
  - Passive measures of the dimensions of the human body.
  - These measures are used to determine size and spacing requirements of work space.
  - Example Measures
    - arm length (e.g., your lab …)
    - height
    - weight
    - wing span
    - seat to elbow height.



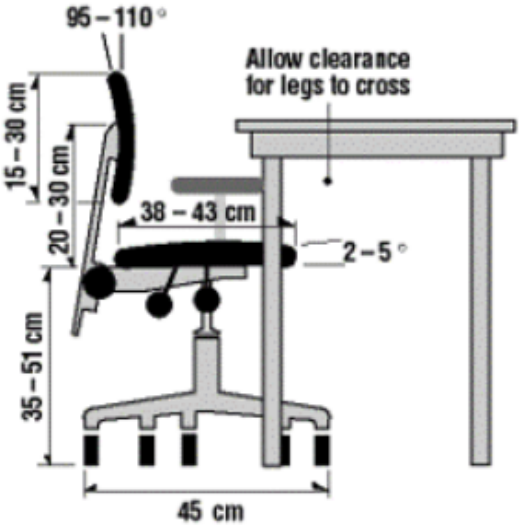
- Dynamic Measures
  - Measures of the dynamic properties of the human body, such as strength and endurance.
  - These measures are used to match the dynamic characteristics of controls to user.
  - Measures
    - range of motion for various joints
    - force of leg pushes
    - strength of fingers



- **Examples of Anthropometric data include:**
- How far people can reach
- How much space a person needs
- How much force a person can exert
- The height and/or width of a person
- Length of arms/legs

- Size of a person's feet
- Size of a person's hand

The ergonomics of an office chair is especially important, especially considering that a lot of people that use an office chair, can often sit in the same position for hours on end. Designers of these types of chairs would then especially want to ensure that the user would remain comfortable for long periods of time.



- The use of anthropometrics in building design aims to ensure that every person is as comfortable as possible.
- In practical terms, this means that the dimensions must be appropriate, ceilings high enough, doorways and hallways wide enough, and so on.
- In recent times, it has come to have particular significance for workplace design, and the relationship between desk, chair, keyboard and computer display.

- The building regulations provide a range of standard requirements and approved solutions for designers to help develop suitable designs. However, it is important to consider the specific purpose and requirements of end users. Attempts to apply standardized dimensions may not reflect the true need of the space requirements.
- Older people, children, people with mobility issues, wheelchair users and so on may have specific requirements. In particular, good accessibility and easy manoeuvrability around the building must be considered when designing stairs, lifts, ramps and other features. See Accessibility in the built environment for more information.

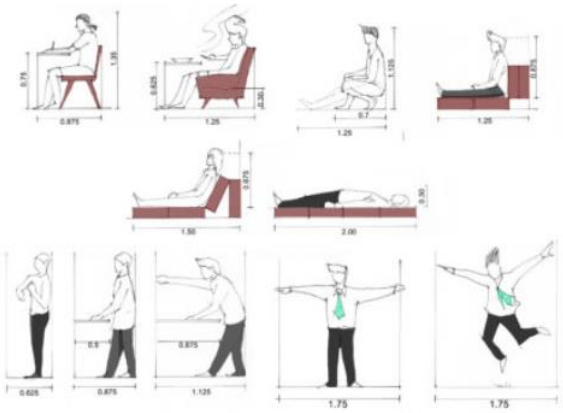


Fig.5

- Anthropometry may also impact on space requirements for furniture and fittings. For example, a bathroom must have enough space to comfortably fit a bath and sink; a bedroom must have enough space to comfortably fit an average-sized bed; an office building must have enough space to fit desks, air-conditioning units, communal areas, meeting rooms, and so on. Anthropometric data is regularly updated to reflect changes in the population.

Anthropometric data

Sources

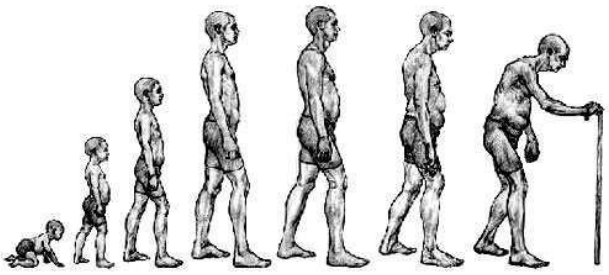


Fig.6

- Few organizations outside the military have the resources to mount a full-scale anthropometric survey.
- As a consequence, we have extensive and detailed anthropometric data for many of the world's armed services, but relatively few data for the civilian populations from whom they were recruited and of whom they may or may not be representative samples.
- AGE
- • The change in body dimensions from birth to maturity is well known and, indeed, the increases occur consistently although sometimes irregularly
- CULTURE
- OCCUPATION

Accuracy

- What accuracy is actually required in anthropometric data?
- This is a very difficult question which must be studied at several different levels.
- The human body has very few sharp edges—its contours are rounded and it is generally squashy and unstable.
- The consequent difficulty in identifying landmarks and controlling posture makes it virtually impossible to achieve an accuracy of better than 5 mm in most anthropometric measures—and for some dimensions the errors may be much worse (sitting elbow height is a notorious example).
- These errors, however, pale into insignificance in comparison with those that might occur in the application of even the most accurate.

Two basic areas in anthropometry

- **Static anthropometry**
- Static anthropometry is a body size measurement carried out when the condition of one's body is at rest or in a static state. In addition, measurements can be made when the body is using devices such as chairs, tables, beds, mobility devices, and so on.
- **Functional anthropometry**
- In contrast to static anthropometry, functional anthropometry is a measurement of human motion related to the completion of tasks, moves, and matters related to the use of space and equipment. For example, for factory employees, measurements are made when they are operating equipment in the room.

- The use of anthropometry in building design aims to ensure that everyone has as much comfort as possible while doing work. For example, dimensions must be appropriate, the roof ceiling is quite high, the doors and aisles are wide enough, and so on. Lately, anthropometry has also been used for the purposes of workplace design, such as the example of the relationship between tables, chairs, keyboards, and computer screen displays.
- Conventional measurements usually use ***measuring instruments*** such as anthropometers, measuring tape and calipers. These measurements can sometimes cause data errors. So, it is better to do measurements with more modern tools such as ***anthropometric chairs.***
- In this case, dynamic measurement is also known. Research based on dynamic measurement must contribute to a number of factors, namely comfort, efficiency, comfort, and human safety. One can imagine how good design is for industrial workers, school rooms, vehicles and machinery, and also for military problems. There must be contributions to the design of furniture and architecture of workspaces such as kitchens and bathrooms.
- **theory of standard dimension based on human figures for activities**

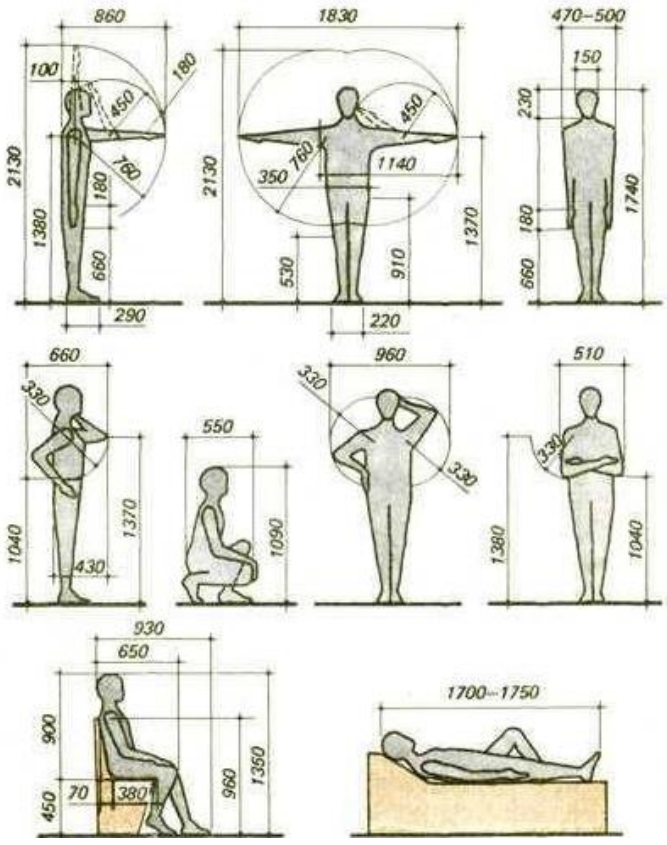
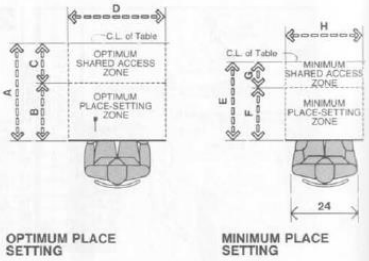


Fig.7

2.2 DINING SPACES

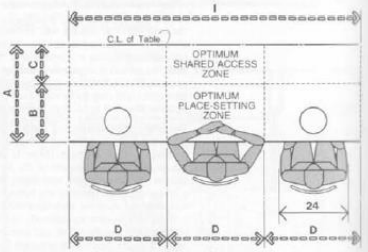
To determine table size it is helpful to view the table as consisting of two zones. The place setting zone represents the personal activity space directly in front of the individual diner. Ideally, it should be of adequate size to accommodate the necessary dinnerware, silverware, glassware, etc., both in its original structured form and in its eventual state of disarray during the course of its use. The width of this zone should also accommodate the human dimension and body positions assumed during the eating process. Etiquette aside, it should be generous enough to allow for the inevitable projection of the elbows. Anthropometrically, the maximum body breadth measurement of the larger person should be considered. Accordingly, the optimal width suggested for this zone, allowing for elbow projection, is about 30 in, or 76.2 cm, and the minimal width about 24 in, or 61 cm. To allow for the elements of the setting itself, the optimal and minimal depths suggested for this zone are 18 and 16 in, or 45.7 and 40.6 cm, respectively. The optimal place setting zone can be viewed as a rectangle, 30 by 18 in, or 76.2 by 45.7 cm, and the minimal zone, 24 by 16 in, or 61 by 40.6 cm. The shared access zone represents the table space opposite the place setting zones necessary to accommodate serving dishes and platter, related silverware, glasses, decorative centerpieces, candelabras, etc. The size of this zone varies greatly and is a function of lifestyle, type of meal, level of formality and sophistication, serving help available, nature of serving operation, occasion, and number of people. The optimal depth suggested if relatively formal and frequent dinner parties are involved is 18 in, or 45.7 cm. The minimal depth is about 10 in, or 25.4 cm. If half of the depth of this zone is allocated to the individual place setting zone, it is possible to arrive at an optimal and minimal incremental unit of area per diner that can be applied in determining table size to serve any given number of diners. The optimal unit so calculated becomes 30 by 27 in, or 76.2 by 68.6 cm, and the minimal unit 24 by 21 in, or 61 by 53.3 cm, respectively. The drawings on these two pages examine table sizes in terms of their optimal and minimal incremental units. The drawing at the top of the facing page illustrates the basic optimal and minimal units.

The bottom drawing illustrates each of the units arranged three in a row. The drawings at the top of this page illustrate the units arranged around the end of the table, while the bottom drawing illustrates a table for six based on a minimal increment. It should be noted that room size also dictates the size of the table. It is also possible to function with tables of less or certainly greater width. Dining tables of 36 in, or 91.4 cm, for example, are quite common. Much depends, however, on the level of comfort and convenience desired, which, within limits, becomes a matter of personal decision.

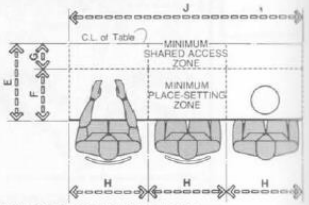


OPTIMUM PLACE SETTING

MINIMUM PLACE SETTING

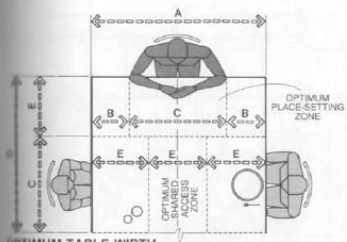


OPTIMUM PLACE SETTING FOR THREE

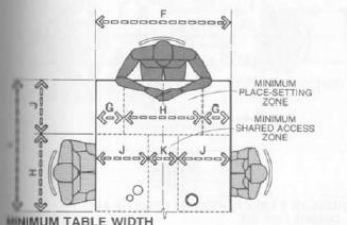


MINIMUM PLACE SETTING FOR THREE

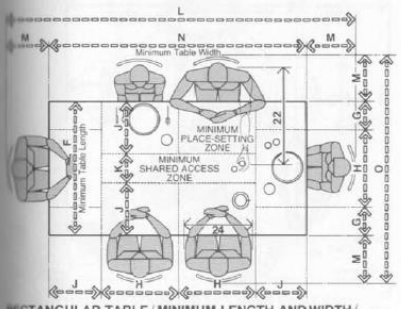
	in	cm
A	27	68.6
B	18	45.7
C	9	22.9
D	30	76.2
E	21	53.3
F	16	40.6
G	5	12.7
H	24	61.0
I	90	228.6
J	72	182.9



OPTIMUM TABLE WIDTH



MINIMUM TABLE WIDTH



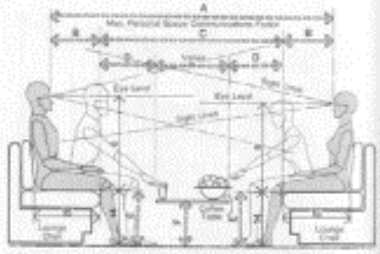
RECTANGULAR TABLE / MINIMUM LENGTH AND WIDTH / DINING FOR SIX

	in	cm
A	54	137.2
B	12	30.5
C	30	76.2
D	48	121.9
E	18	45.7
F	42	106.7
G	9	22.9
H	24	61.0
I	40	101.6
J	16	40.6
K	10	25.4
L	116–128	294.6–325.1
M	18–24	45.7–61.0
N	80	203.2
O	78–90	198.1–228.6

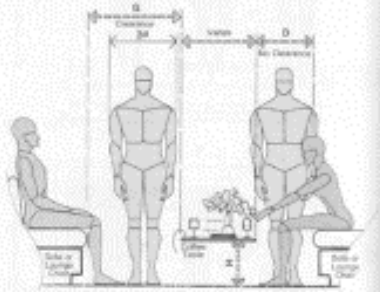
2.1 LIVING SPACES

The drawings at the top and center deal with the major clearances involved in lounge or conversational seating. The top drawing is based on a conversational grouping in which the clearance between the front of the seat and the edge of the table is established between 16 and 18 in, or 40.6 and 45.7 cm. This clearance may require some degree of body contact or sidestepping for circulation and access. Anthropometrically, however, it does accommodate human reach, permitting the seated person access to the coffee table without rising. The drawing also suggests a dimensional range for verbal conversation. The center drawing illustrates a similar furniture arrangement that would permit circulation with full head-on access. The clearance indicated, however, to permit such access would make it impossible for most people to reach the coffee table from a seated position. This would be extremely undesirable in terms of food, beverages, and cigarettes. Given the choice between full head-on access and the accommodation of reach, the authors opt for each and recommend the smaller clearance.

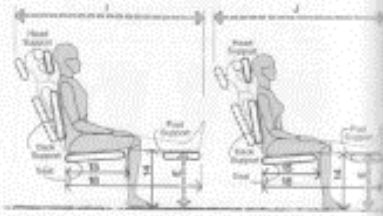
The bottom drawing suggests an overall allowance for easy chair or reclining chair seating, including footrest. The buttock-leg length of the larger person is the most significant anthropometric measurement in establishing this clearance. It should also be noted that the height of the footrest is also a function of seat height. The footrest should be a few inches below the height of the seat.



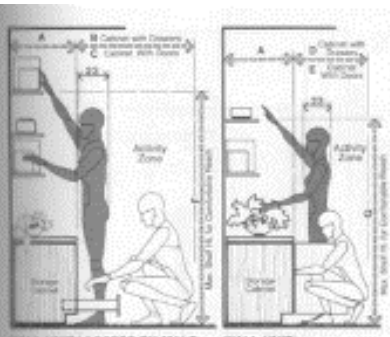
LOUNGE SEATING / CLEARANCES



LOUNGE SEATING: CLEARANCE RELATIONSHIPS

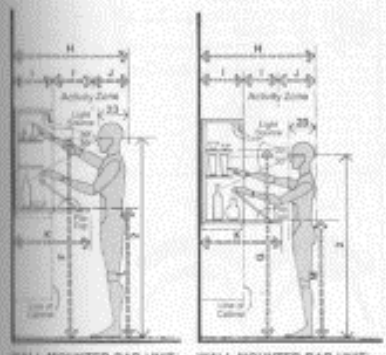


	in	cm
A	84–112	213.4–284.5
B	13–18	33.0–40.6
C	58–80	147.3–203.2
D	16–18	40.6–45.7
E	14–17	35.6–43.2
F	12–18	30.5–45.7
G	30–36	76.2–91.4
H	12–18	30.5–40.6
I	60–68	152.4–172.7
J	54–62	137.2–157.5



WALL UNIT / ACCESS BY MALE

WALL UNIT: ACCESS BY FEMALE



WALL-MOUNTED BAR UNIT: ACCESS BY MALE

WALL-MOUNTED BAR UNIT: ACCESS BY FEMALE

2.1 LIVING SPACES

The drawings on this page illustrate the relationship of human dimension and accessibility to low and high storage or furniture usually associated with living spaces. The configuration of the furniture is not intended as a realistic illustration of any specific element of furniture, but rather as a general representation of furniture types normally found in a living space. In situations where the user is not a known entity, either in terms of sex or body size, the body size data of the smaller person should govern. In the event the user is known, dimensions more appropriate to that body size should be used where practical. It should be noted that for each sex two dimensions are shown on the drawing. In each case the lower figure is based on 5th percentile body size data and the larger on 95th percentile data.

	in	cm
A	18–28	45.7–61.0
B	48–58	121.9–147.3
C	16–40	66.4–101.6
D	44–52	111.8–132.08
E	30–36	76.2–91.4
F	72	182.9
G	68	172.7
H	42–66	106.7–127.0
I	12–18	30.5–40.6
J	18	45.7
K	24–52	61.0–81.3
L	38–42	96.1–106.7
M	36–38	91.4–99.1

2.1 LIVING SPACES

The drawings at the top and center deal with the major clearances involved in lounge or conversational seating. The top drawing is based on a conversational grouping in which the clearance between the front of the seat and the edge of the table is limited between 16 and 18 in, or 40.6 and 45.7 cm. This clearance may require some degree of body contact or sidestepping for circulation and access. Anthropometrically, however, it does accommodate human reach, permitting the seated person access to the coffee table without rising. The drawing also suggests a dimensional range for verbal conversation. The center drawing illustrates a similar furniture arrangement that would permit circulation with full head-on access. The clearance indicated, however, to permit such access would make it impossible for most people to reach the coffee table from a seated position. This could be extremely undesirable in terms of food, beverages, and cigarettes. Given the choice between full head-on access and the accommodation of reach, the authors opt for reach and recommend the smaller clearance.

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	in	cm
A	84–112	213.4–284.5
B	13–18	33.0–40.6
C	58–80	147.3–203.2
D	16–18	40.6–45.7
E	14–17	35.6–43.2
F	12–18	30.5–45.7
G	30–36	76.2–91.4
H	12–16	30.5–40.6
I	60–68	152.4–172.7
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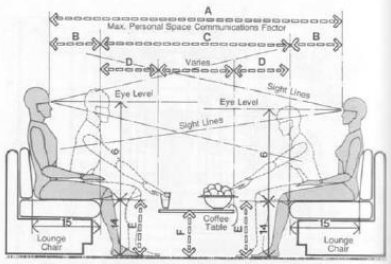
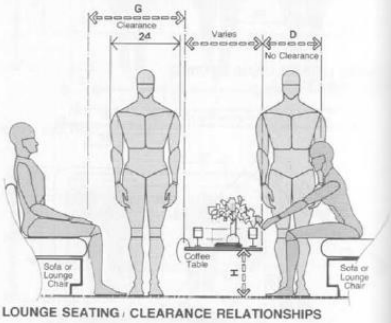
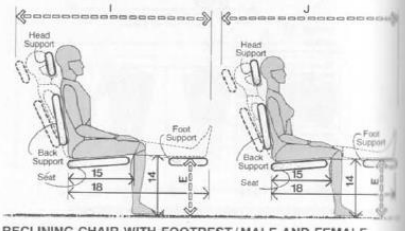


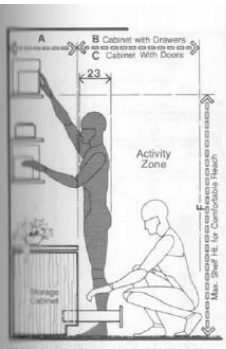
LOUNGE SEATING / CLEARANCES



LOUNGE SEATING / CLEARANCE RELATIONSHIPS



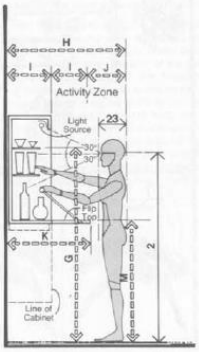
RECLINING CHAIR WITH FOOTREST / MALE AND FEMALE



WALL UNIT / ACCESS BY MALE

WALL UNIT/
ACCESS BY FEMALE

WALL-MOUNTED BAR UNIT/
ACCESS BY MALE



WALL-MOUNTED BAR UNIT/
ACCESS BY FEMALE

2.1 LIVING SPACES

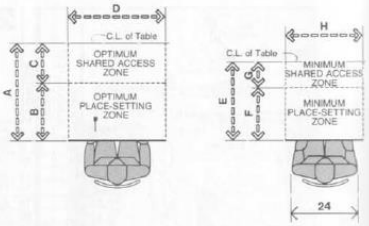
The drawings on this page illustrate the relationship of human dimension and accessibility to low and high storage or furniture usually associated with living spaces. The configuration of the furniture is not intended as a realistic illustration of any specific element of furniture, but rather as a general representation of furniture types normally found in a living space. In situations where the user is not a known entity, either in terms of sex or body size, the body size data of the smaller person should govern. In the event the user is known, dimensions more appropriate to that body size should be used where practical. It should be noted that for each sex two dimensions are shown on the drawing. In each case the lower figure is based on 5th percentile body size data and the larger on 95th percentile data.

	in	cm
A	18–24	45.7–61.0
B	48–58	121.9–147.3
C	36–40	91.4–101.6
D	46–52	116.8–132.08
E	30–36	76.2–91.4
F	72	182.9
G	69	175.3
H	42–50	106.7–127.0
I	12–16	30.5–40.6
J	18	45.7
K	24–32	61.0–81.3
L	39–42	99.1–106.7
M	36–39	91.4–99.1

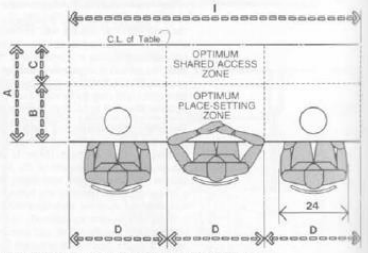
2.2 DINING SPACES

To determine table size it is helpful to view the table as consisting of two zones. The place setting zone represents the personal activity space directly in front of the individual diner. Ideally, it should be of adequate size to accommodate the necessary dinnerware, silverware, glassware, etc., both in its original structured form and in its eventual state of disarray during the course of its use. The width of this zone should also accommodate the human dimension and body positions assumed during the eating process. Etiquette aside, it should be generous enough to allow for the inevitable projection of the elbows. Anthropometrically, the maximum body breadth measurement of the larger person should be considered. Accordingly, the optimal width suggested for this zone, allowing for elbow projection, is about 30 in, or 76.2 cm, and the minimal width about 24 in, or 61 cm. To allow for the elements of the setting itself, the optimal and minimal depths suggested for this zone are 18 and 16 in, or 45.7 and 40.6 cm, respectively. The optimal place setting zone can be viewed as a rectangle, 30 by 18 in, or 76.2 by 45.7 cm, and the minimal zone, 24 by 16 in, or 61 by 40.6 cm. The shared access zone represents the table space opposite the place setting zones necessary to accommodate serving dishes and platter, related silverware, glasses, decorative centerpieces, candelabras, etc. The size of this zone varies greatly and is a function of lifestyle, type of meal, level of formality and sophistication, serving help available, nature of serving operation, occasion, and number of people. The optimal depth suggested if relatively formal and frequent dinner parties are involved is 18 in, or 45.7 cm. The minimal depth is about 10 in, or 25.4 cm. If half of the depth of this zone is allocated to the individual place setting zone, it is possible to arrive at an optimal and minimal incremental unit of area per diner that can be applied in determining table size to serve any given number of diners. The optimal unit so calculated becomes 30 by 27 in, or 76.2 by 68.6 cm, and the minimal unit 24 by 21 in, or 61 by 53.3 cm, respectively. The drawings on these two pages examine table sizes in terms of their optimal and minimal incremental units. The drawing at the top of the facing page illustrates the basic optimal and minimal units.

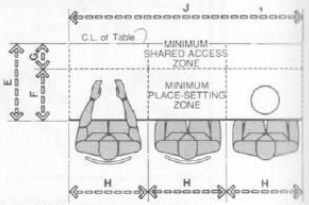
The bottom drawing illustrates each of the units arranged three in a row. The drawings at the top of this page illustrate the units arranged around the end of the table, while the bottom drawing illustrates a table for six based on a minimal increment. It should be noted that room size also dictates the size of the table. It is also possible to function with tables of less or certainly greater width. Dining tables of 36 in, or 91.4 cm, for example, are quite common. Much depends, however, on the level of comfort and convenience desired, which, within limits, becomes a matter of personal decision.



OPTIMUM PLACE SETTING **MINIMUM PLACE SETTING**

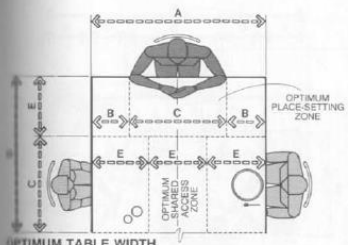


OPTIMUM PLACE SETTING FOR THREE

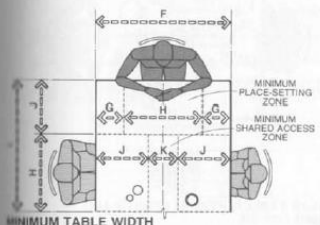


MINIMUM PLACE SETTING FOR THREE

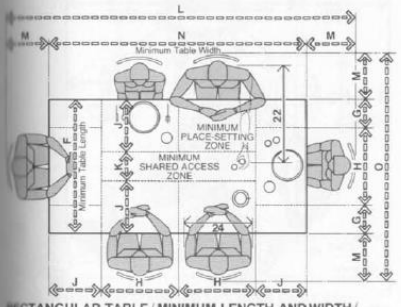
	in	cm
A	27	68.6
B	18	45.7
C	9	22.9
D	30	76.2
E	21	53.3
F	16	40.6
G	5	12.7
H	24	61.0
I	90	228.6
J	72	182.9



OPTIMUM TABLE WIDTH



MINIMUM TABLE WIDTH

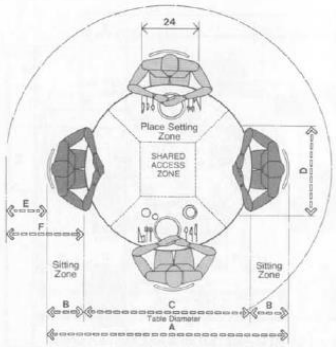


RECTANGULAR TABLE / MINIMUM LENGTH AND WIDTH / DINING FOR SIX

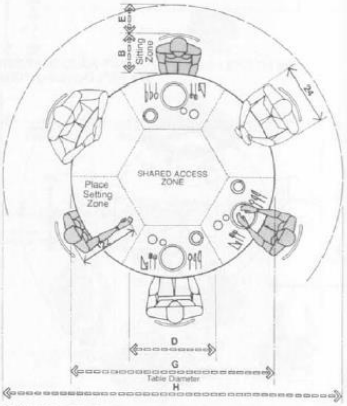
	in	cm
A	54	137.2
B	12	30.5
C	30	76.2
D	48	121.9
E	18	45.7
F	42	106.7
G	9	22.9
H	24	61.0
I	40	101.6
J	16	40.6
K	10	25.4
L	116–128	294.6–325.1
M	18–24	45.7–61.0
N	80	203.2
O	78–90	198.1–228.6

2.2 DINING SPACES

The optimal place-setting zone at the beginning of this section was established at 18 by 30 in, or 45.7 by 76.2 cm. The 60-in, or 152.4-cm, diameter table shown at the top of the page can easily, if not luxuriously, accommodate four such optimal zones. If perimeter were the only consideration, the table could easily accommodate six and possibly seven people. In the process, however, the area of the individual place-setting zone would fall below optimum size and into the minimal category. The advantage of the round table is its relative flexibility to accommodate additional people. The disadvantage is the floor area consumed. By comparison, a 60- by 66-in, or 152.4- by 167.6-cm, rectangular table, which could effectively occupy about the same floor area, can seat six people and provide each with an optimal place-setting zone of 18 by 30 in. The choice of a 60-in diameter table to seat four people would not be a wise decision. The 72-in, or 182.9-cm, diameter table to seat six people, with optimal place-setting zones, would, on balance, constitute a more sensible choice than a 60-in diameter table to serve four.

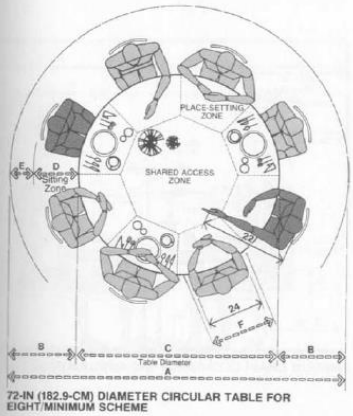


60-IN (152.4-CM) DIAMETER CIRCULAR TABLE FOR FOUR/OPTIMUM SEATING

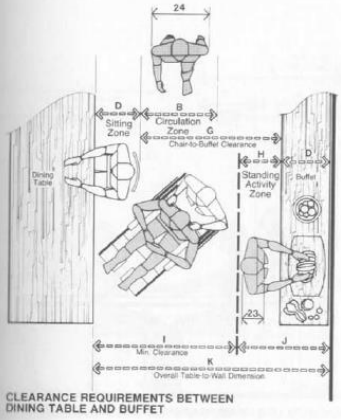


72-IN (182.9-CM) DIAMETER CIRCULAR TABLE FOR SIX/OPTIMUM SCHEME

	in	cm
A	96–108	243.8–274.3
B	18–24	45.7–61.0
C	60	152.4
D	30	76.2
E	12	30.5
F	30–36	76.2–91.4
G	72	182.9
H	132–144	335.3–365.8



72-IN (182.9-CM) DIAMETER CIRCULAR TABLE FOR EIGHT/MINIMUM SCHEME

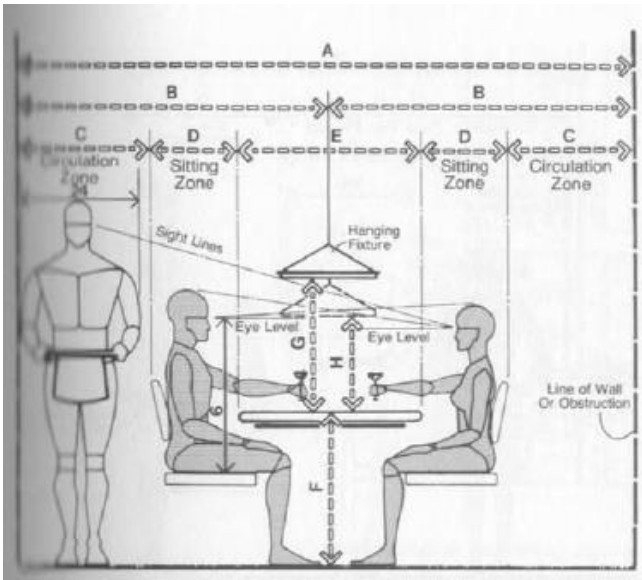


CLEARANCE REQUIREMENTS BETWEEN DINING TABLE AND BUFFET

The top drawing shows a 72-in, or 182.9-cm, diameter table that seats eight people based on a minimal place-setting zone. Although the effective depth of the zone is less than provided in the optimal arrangement shown on the preceding page, the central shared access zone is greater.

The bottom drawing illustrates the clearance suggested for wheelchair access to the dining table and the space required by a person standing, arranging, or otherwise preparing food to be served.

	in	cm
A	132–144	335.3–365.8
B	30–36	76.2–91.4
C	72	182.9
D	18–24	45.7–61.0
E	12	30.5
F	24	61.0
G	50–54	127.0–137.2
H	50–60	127.0–152.4
I	54	137.2
J	86–102	218.4–259.1
K	90–96	228.6–243.8

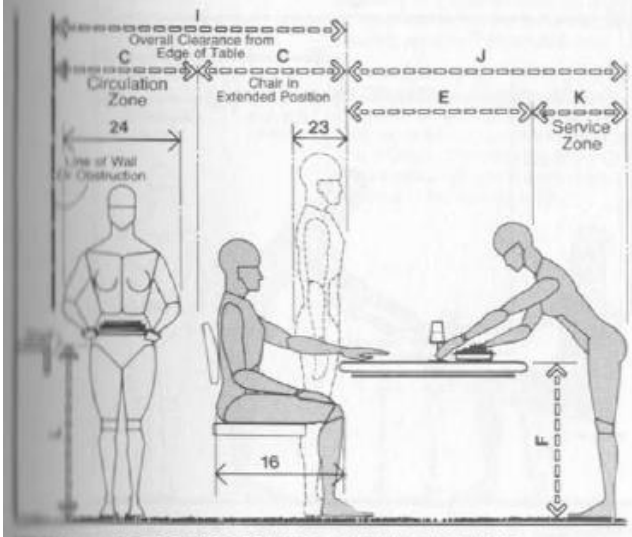


MINIMUM DINING AREA WIDTH

2.2 DINING SPACES

The proper height of a chandelier or other type of pendant lighting fixture above a dining table should be based on human dimension to ensure that it does not obstruct vision. The top drawing shows the relationship of fixture height above the table surface to a small and a large person. Eye height sitting is the body measurement to consider anthropometrically. The ideal solution is an adjustable arrangement so that the height of the fixture can be regulated to respond to personal preferences. The information on the drawing is useful in establishing initial height parameters as a basis for preliminary design assumptions. The drawing also indicates a minimal clearance between the table and the wall 48 in, or 121.9 cm, with the chair minimally extended from the table to permit one-lane service circulation behind the seated person.

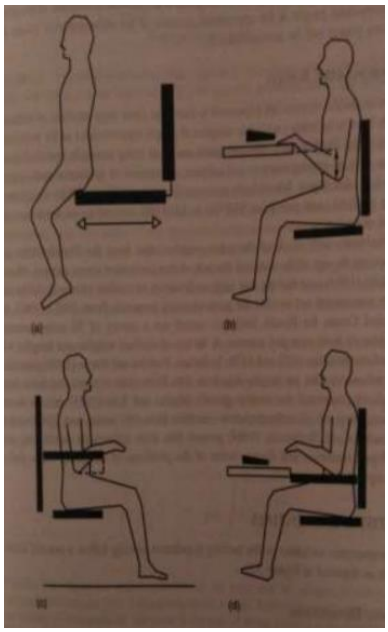
The bottom drawing provides additional clearance information and suggests a minimum distance of 60 in, or 152.4 cm, between table and wall to accommodate one-lane head-on circulation with the chair extended a maximum distance from the table.



MINIMUM CLEARANCE BEHIND EXTENDED CHAIR

	in	cm
A	132–162	335.3–411.5
B	66–81	167.6–205.7
C	30–36	76.2–91.4
D	18–24	45.7–61.0
E	36–42	91.4–106.7
F	29–30	73.7–76.2
G	27	68.6
H	19	48.3
I	60–72	152.4–182.9
J	54–60	137.2–152.4
K	18	45.7
L	29–36	73.7–91.4

Design to fit everyone



• Approach of ergonomics is to consider product dimensions in human terms in view of constraints placed on the design by body size variability. Eg. Seats

• Information about body size in not directly applicable to a design problem.

• Designer has to analyze in what ways anthropometric mismatches are possible and then decide on which data might be appropriate to the problem.

• Designer has to develop clear ideas about what constitutes an appropriate match user and product dimensions.

• A suitable percentile has to be chosen.

• If design accommodates people at appropriate extreme of the anthropometric range, less extreme people will get accommodated.

APPLICATION OF ANTHROPOMETRY IN DESIGN

Some of the applications of anthropometric data are

1. Determine the body dimensions.

2. Determine what principle is to be applied.

3. Defining equipment and facilities.

4. Space requirements.

1.BODY DIMENSIONS

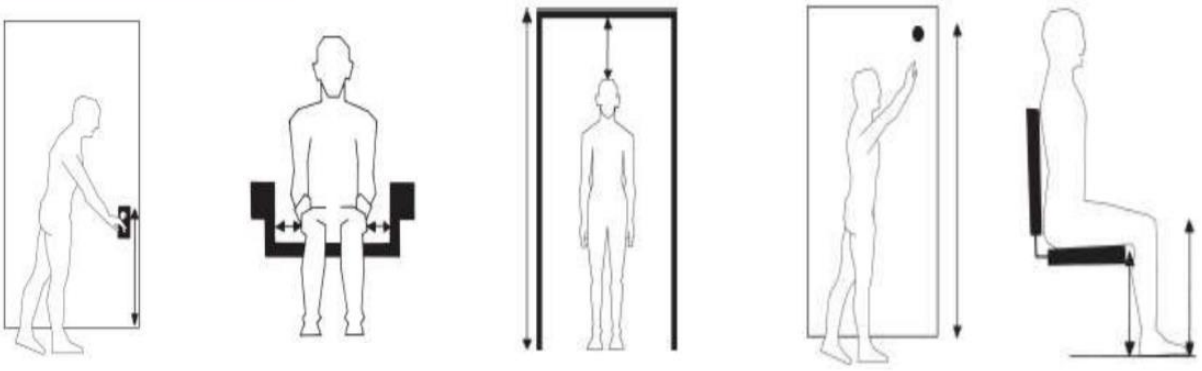


Fig.8

2.PRINCIPLES TO BE APPLIED

There are three principles for applying anthropometric data to specific design problems:

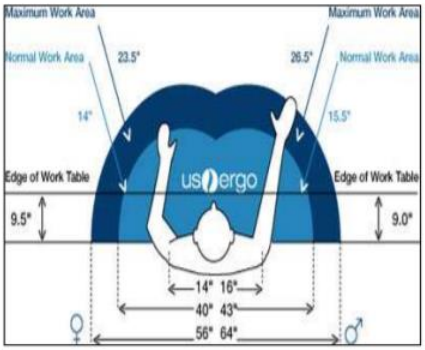
1. Design For Extreme Individuals
2. Design For Adjustable Range
3. Design For The Average

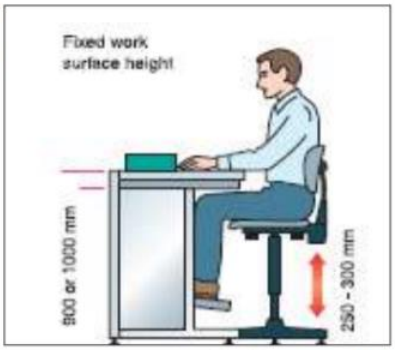
3.EQUIPMENT AND FACILITIES

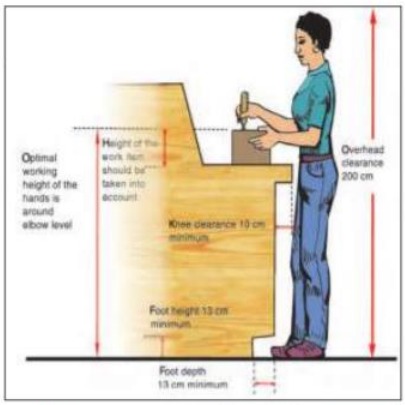
- Criteria of judgment of design features of physical equipment and facilities:
    - Comfort
    - work performance
    - safety, physical effects
- Equipment's are of three kinds:
    - Spaces into which men fit
    - Tools or controls which men use
    - Protective clothing and devices

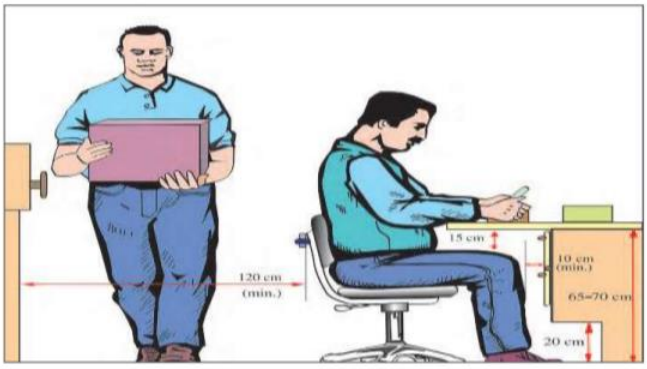
4.SPACES

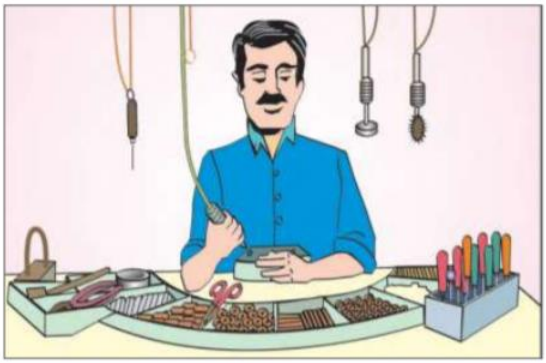
- One of the applications of anthropometric data is the design of work spaces, including the work-space envelopes.











- ADVANTAGES OF ANTHROPOMETRIC DATA
- Increase accuracy
- Reduce Fatigue
- Better comfort
- Reduce chance of injuries
- Time management
- Increased productivity

Possible problems in standing work

- If the standing posture is the choice for a task and if there is insufficient rest to the legs, or if they have to maintain an awkward posture for long duration, then it can lead to fatigue, pain and discomfort.

Fig.8

- Prolonged daily standing in the awkward posture of the upper body is known to be associated with low back pain.
- Standing in one particular position or in any unnatural posture for long duration could lead to discomfort, tiredness and fatigue.
- To maintain a standing posture for a long duration, the muscles and ligaments would experience static loading; soft tissues in the joints would experience compression, and venous pooling in the leg areas are more likely to occur.
- If there is not enough recovery time for the muscles and the soft tissues in the joint, then fatigue would develop and cause pain.

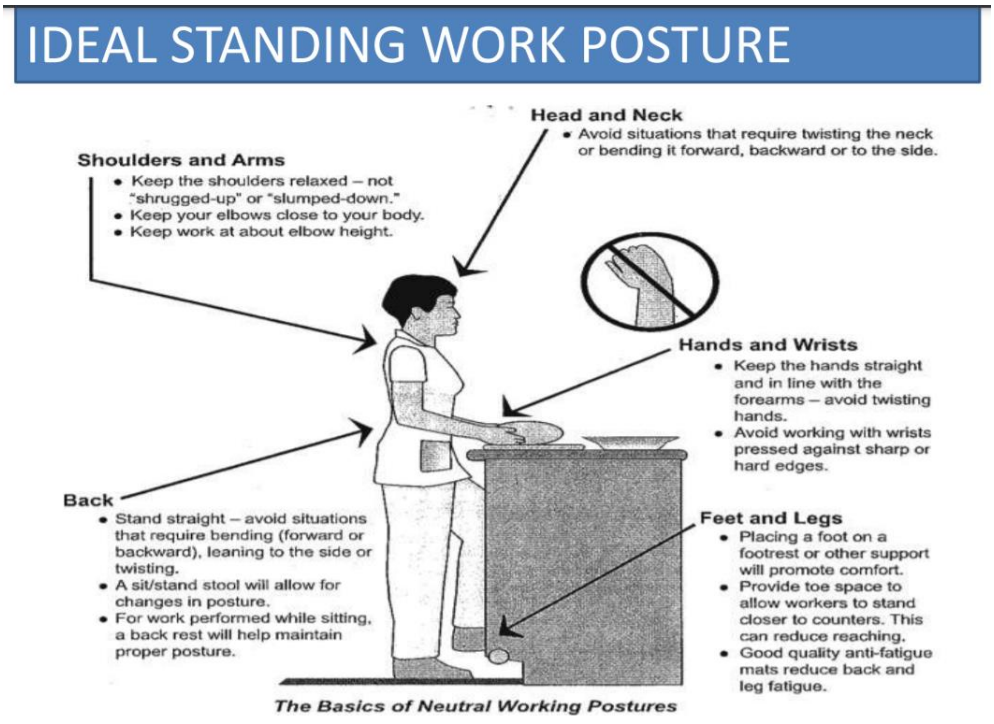
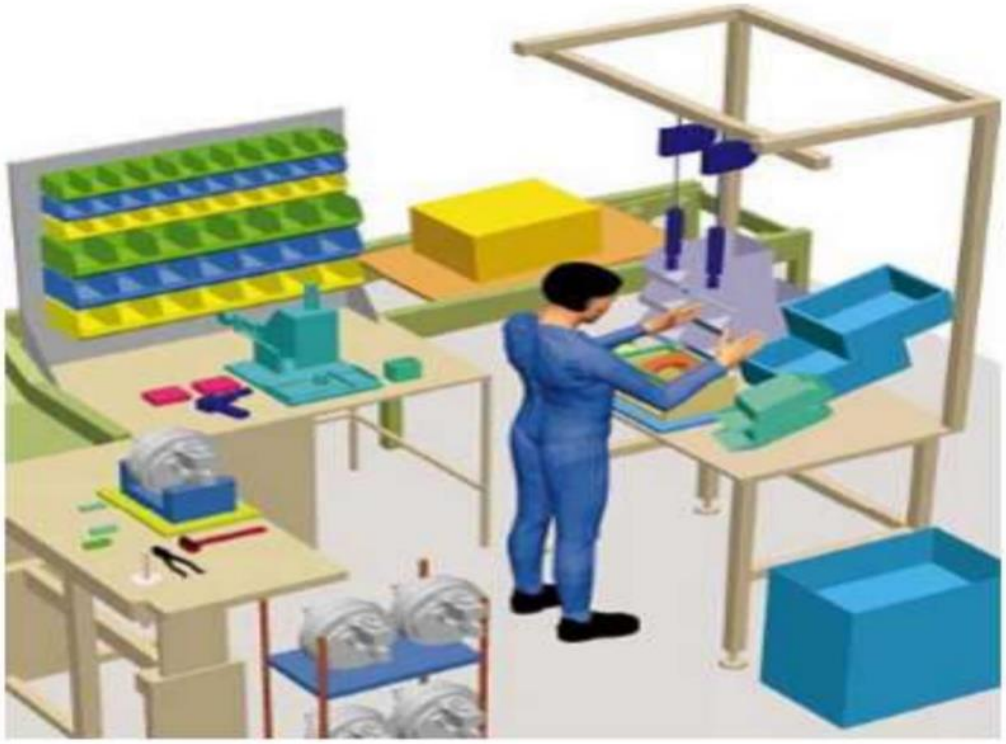


Fig.9

Ideal workspace design



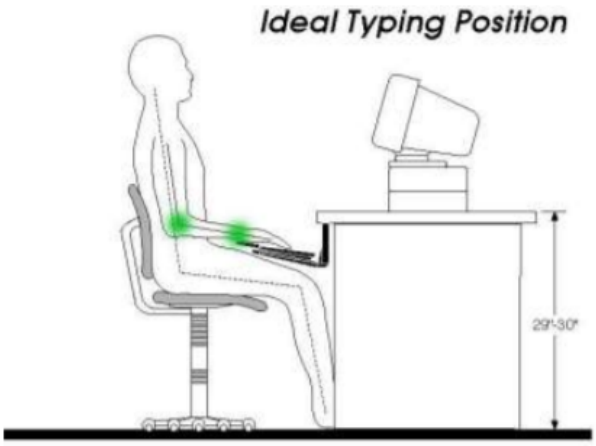
Computer workstation ergonomics

- Chair
- Monitor
- Keyboard
- Mouse
- Document holders
- Lumbar pads/pillows
- Arm rests

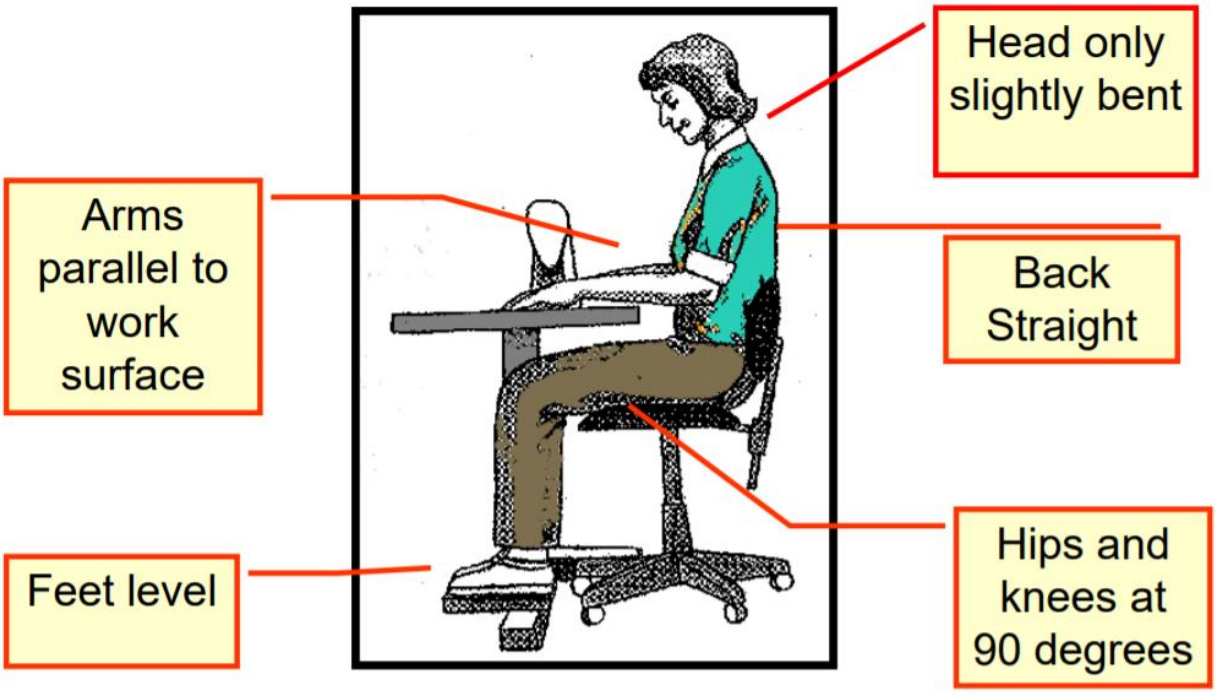
- Glare
- Eye strain
- Footrests
- Wrists pads
- Keyboard trays
- Laptops

Posture check

Increased stress, decreased circulation…



This is the Best Way to Sit



With spinal curvature
Not adjusted

With spinal curvature
Adjusted

No spinal curvature
Not adjusted

No spinal curvature
Adjusted

Enclosure and access

The classical human search for environmental support has imbued us with very discreet feelings about space and enclosure.

We are uncomfortable in open space without a back-up element.

A back-up element provides us with great psychological comfort. We now have a personal reference point. We can face the world and invite involvement or we can turn away and limit involvement.

2 Good

Four sided enclosure is bad for the wide awake and activity-oriented man. He is isolated, insulated and remote. His ability to be part of an organizational family is diminished.

5 Bad

Three sides with a slightly widened opening appears to be the best enclosure of all as a generality. There is good definition of territory or domae . . . privacy is well expressed and the ability to survey or participate is well maintained.

4 Best

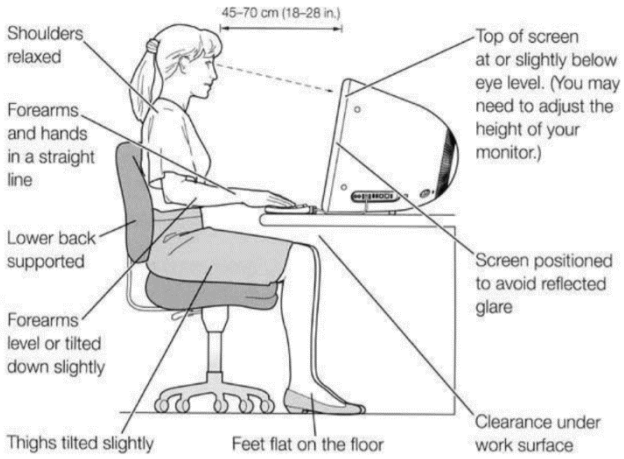
If the back-up can give us some enclosure, we are even better off . . . now we have a way to express relative exposure and gain a greater degree of privacy.

3 Better

ERGONOMICS – DEFINITION

- SCIENTIFIC STUDY OF HUMAN WORK
- "DESIGNING THE JOB TO FIT THE WORKER , NOT FORCING THE WORKER TO FIT THE JOB“

- SCIENCE THAT DEALS WITH DESIGNING AND ARRANGING THINGS SO THAT PEOPLE CAN USE THEM EASILY AND SAFELY

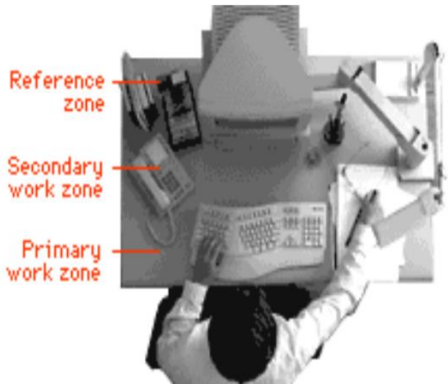


ERGNONIMICS APPROCHES

- Body Mechanics
- Proper Lifting Techniques
- Exercise
- Stretching
- Improved postures

Arranging Your Workspace

Arrange tools around your desk so you minimize the distance you have to reach for them. Divide your work space into ***three zones:***



- **Primary work zone** - the distance from elbow to hand. Things you touch on a daily basis.
- **Secondary work zone** - within arm's reach. Use this zone to position those items that you use frequently, but don't need all the time.
- **Reference zone** - outside arm's reach. Use this zone for your least-often used

To be ergonomic , a design must

- Fit the user
- Be easy to use
- Improve comfort
- Improve performance
- Improve health and safety

ERGONOMICALLY DESIGNED CHAIR

Fig.10

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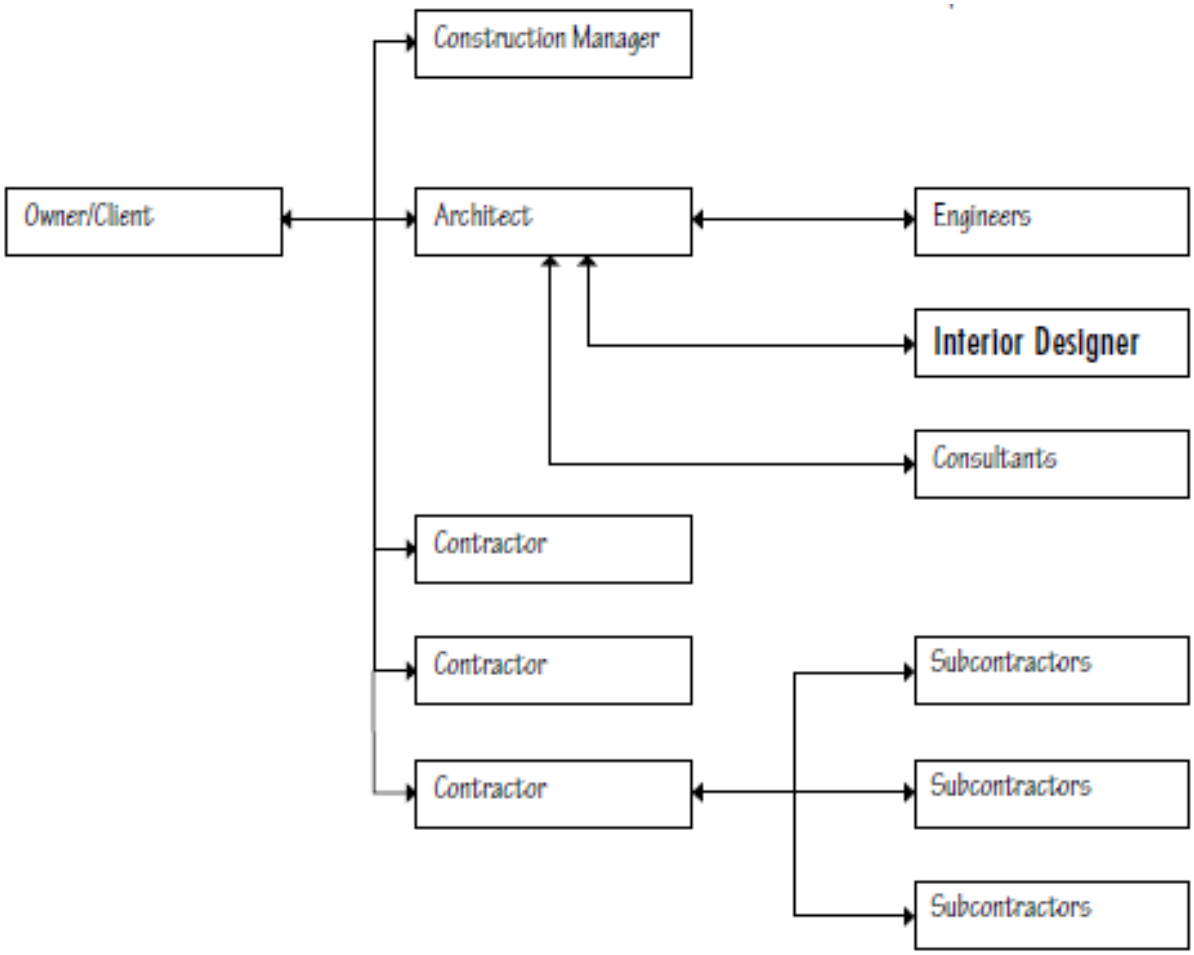
SCHOOL OF BUILDING AND ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

UNIT – 4 – DESIGN PROCESS – SDE 4051



Tab.1

- The information the interior designer collects about the client, the space, and the intended activities has implications for the work of the other members of the design team.
- The interior designer may be working as a sole practitioner; collaborating with other designers, architects, and design specialists in a larger design firm;or serving as a consultant to an architectural firm.

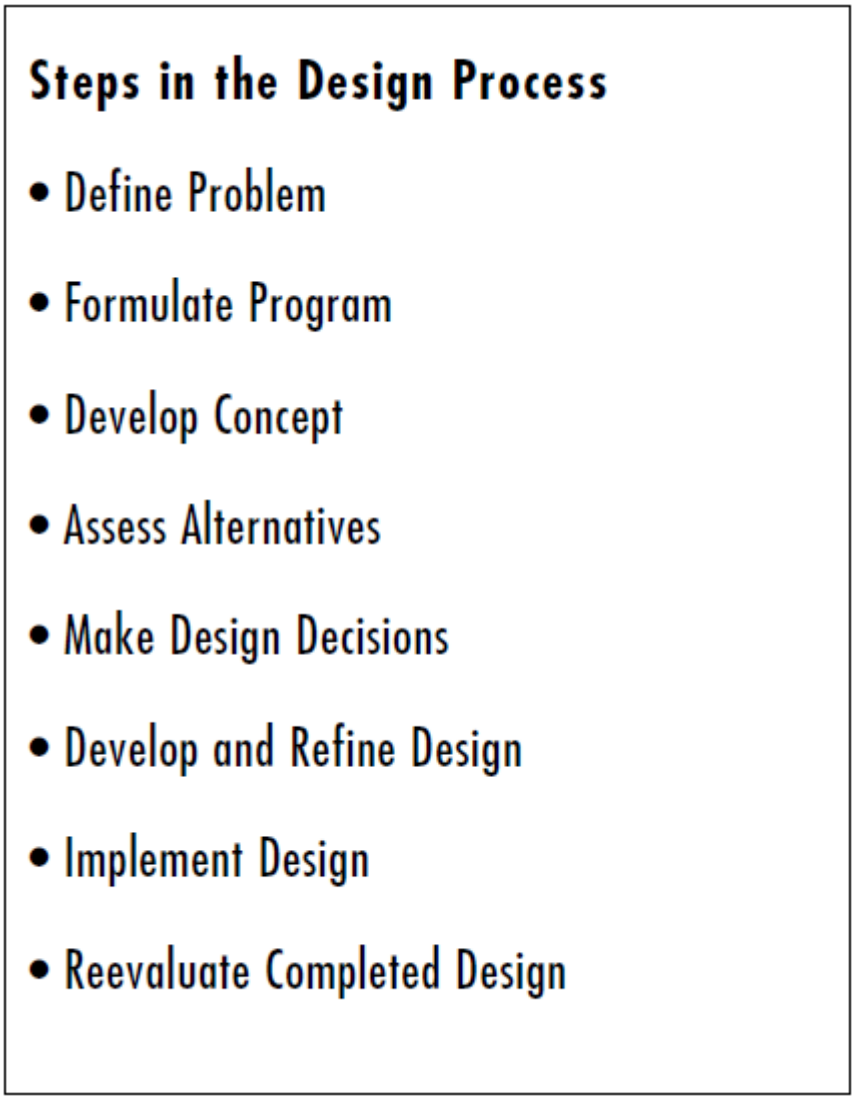
We determine which elements to use and how to arrange them into patterns through the process of design.

- It is a sequence of careful analysis, synthesis, and evaluation of available information, insights, and possible solutions is repeated until a successful fit between what exists and what is desired is achieved.
- three basic stages of design process:
- analysis,
- synthesis,
- and evaluation

five basic project phases:

(1)PROGRAMMING,
(2) SCHEMATIC DESIGN,

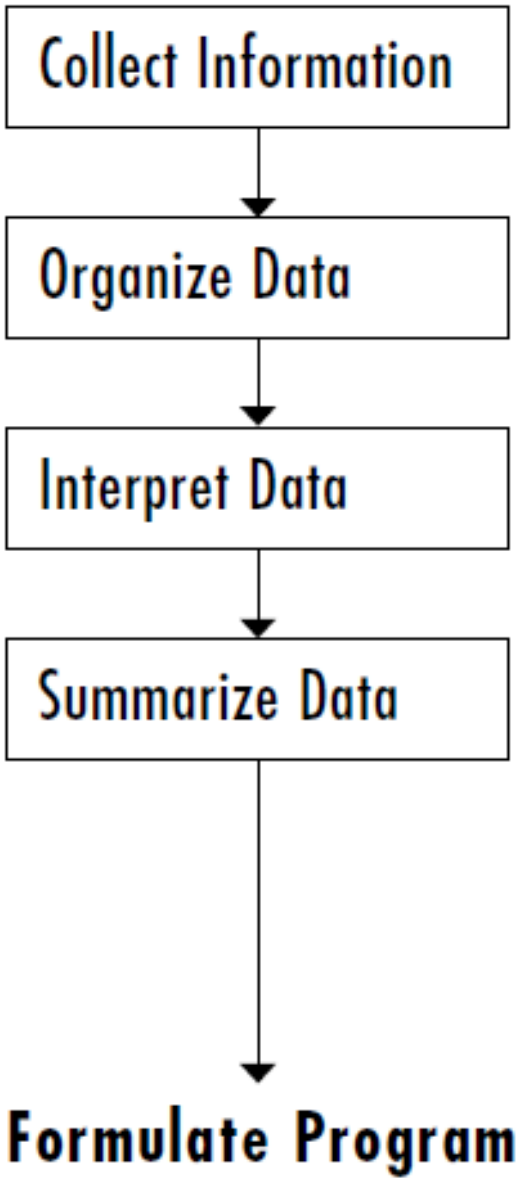
(3) DESIGN DEVELOPMENT,
(4) CONSTRUCTION DOCUMENTATION,
(5) CONTRACT ADMINISTRATION.



Tab.2

1. Define Problem

Identify client needs.
• Who, what, when, where, how, why?
Set preliminary goals.
• Functional requirements
• Aesthetic image and style
• Psychological stimulus and meaning



Tab.3

2. Analysis also involves gathering relevant information that would help us to understand the nature of the problem and develop appropriate responses.

What exists?
• Collect and analyze relevant information.
• Document physical/cultural context.
• Describe existing elements.
What is desired?
• Identify user needs and preferences.
• Clarify goals.
• Develop matrices, charts, and adjacency diagrams.
What is possible?
• What can be altered…what cannot?
• What can be controlled…what cannot?
• What is allowed…what is prohibited?
• Define limits: time, economic, legal, and technical.

From the analysis of the problem and its parts, we can begin to formulate possible solutions. There are several approaches one can take to generate ideas and synthesize possible design solutions, including:

• Isolate one or more key issues of value or importance, and develop solutions around them.
• Study analogous situations that could serve as models for developing possible solutions.
• Develop ideal solutions for parts of the problem, which could be integrated into whole solutions and tempered by the reality of what exists.

3. Develop Concept

Brainstorm ideas.

• Diagram major functional and spatial relationships.
• Assign values to key issues or elements.
• Search for ways to combine several good ideas into a single better one.
• Manipulate the parts to see how a change might affect the whole.
• Look at the situation from different points of view.

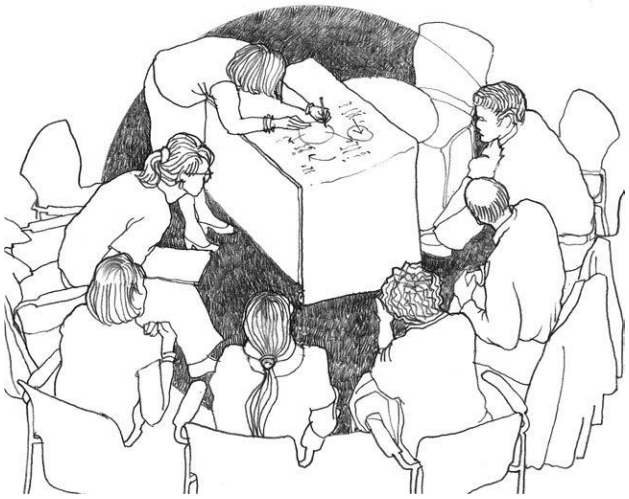


Fig.1

Draft a concept statement.

• Verbalize the principal design ideas in a concise manner.

Develop schematic designs.

• Establish major functional and spatial relationships.
• Show relative sizes and shapes of important features.
• Develop several alternatives for comparative study.

Design requires a critical view of alternatives and careful weighing of the strengths and weaknesses of each proposal until the best possible fit between problem and solution is achieved.

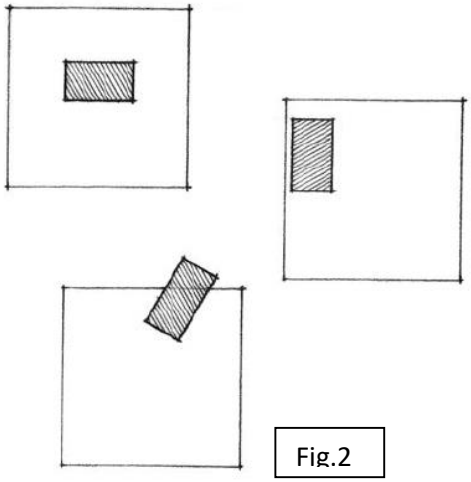


Fig.2

4. Assess Alternatives

[ ] Compare each alternative with design goals.
[ ] Weigh the benefits and strengths of each alternative against the costs and liabilities.
[ ] Rank alternatives in terms of suitability and effectiveness.

5. Make Design Decisions

Combine the best design elements into the final design.

• Draw preliminary plans.
• Construct scale drawings.
• Show important interior architectural details (e.g., walls, windows, built-in elements).

• Show furniture if appropriate.
• Computer design software may combine these steps.

Make preliminary material selections.

• Develop alternative color and finish schemes.
• Collect material samples.

Make preliminary furniture and lighting selections.

Prepare a presentation to the client for feedback and preliminary approval.

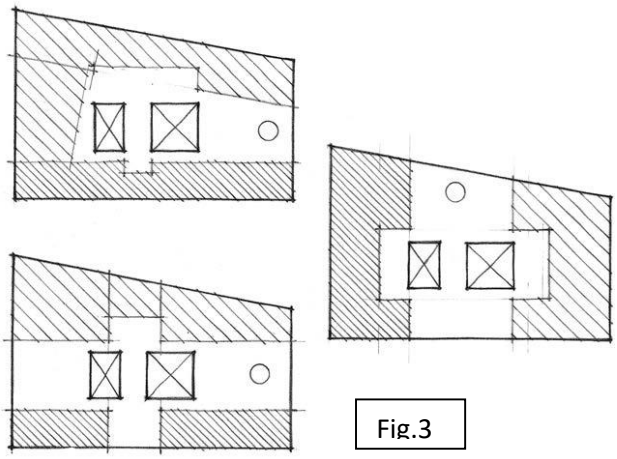


Fig.3

- Once a final decision has been made, the design proposal is developed, refined, and prepared for implementation.
- This includes the production of construction drawings and specifications and other services related to purchasing, construction, and supervision.
- No design process is complete until a design solution that has been implemented is evaluated for its effectiveness in solving a given problem. This critical appraisal of a completed design can build up our knowledge base, sharpen our intuition, and provide valuable lessons that may be applied in future work.

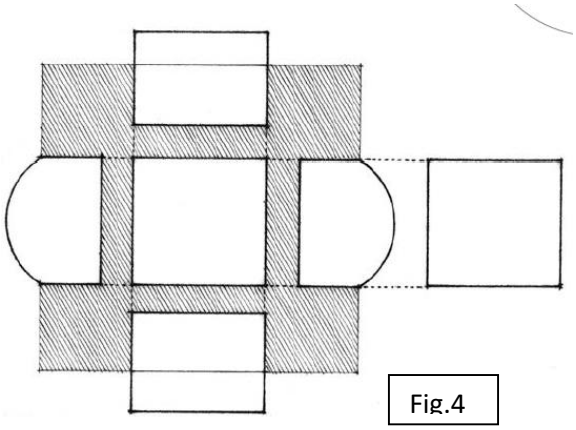


Fig.4

6. Develop and Refine Design

[ ] Develop plans, elevations, sections, and
details.
[ ] Develop specifications for interior finish
materials, furnishings, and lighting.

Implement Design

[ ] Prepare construction drawings.
[ ] Finalize specifications for interior finish
materials, furnishings, and lighting.

Reevaluate Completed Design

[ ] Perform design reviews.
[ ] Coordinate with architect, engineers, and consultants.
[ ] Solicit client feedback.
[ ] Perform post-occupancy evaluation.

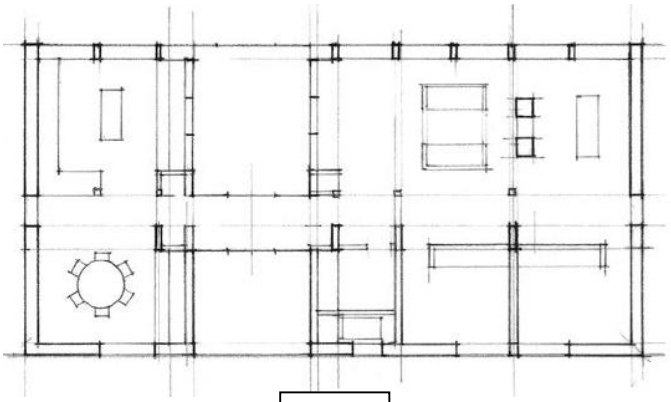


Fig.5

GOOD AND BAD DESIGN

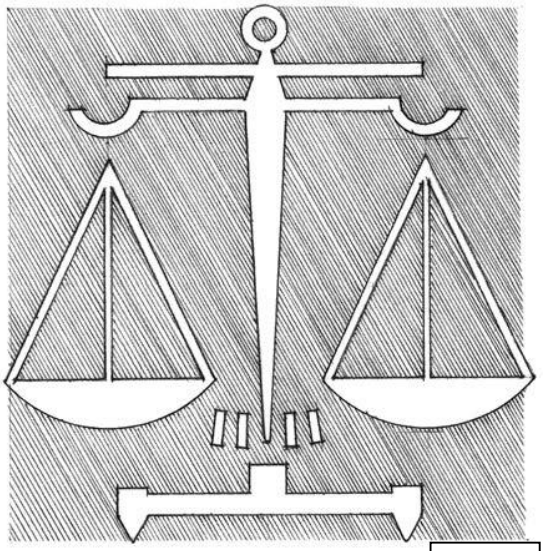


Fig.6

- A design may be good in the judgment of the designer,
- the client, or the people who experience and use the
- design for any of several reasons:
- Because it functions well—it works.
- Because it is affordable—it is economical, efficient, and durable.
- Because it looks good—it is aesthetically pleasing.
- Because it recreates a feeling remembered from
- another time and place—it carries meaning.
- A good design, therefore, should be understandable to its audience.
- Knowing why something was done helps to make a design comprehensible.
- If a design does not express an idea, communicate a meaning, or elicit a response, either it will be ignored or it will appear to be a bad design.

DESIGN CRITERIA

Function and Purpose
First, the design must satisfy its intended function and fulfill its purpose.
Utility, Economy, and Sustainability
Second, a design should exhibit utility, honesty, economy, and sustainability in its selection and use of materials.
Form and Style
Third, the design should be aesthetically pleasing to the eye and our other senses.
Image and Meaning
Fourth, the design should project an image and promote associations that carry meaning for the people who use and experience it.

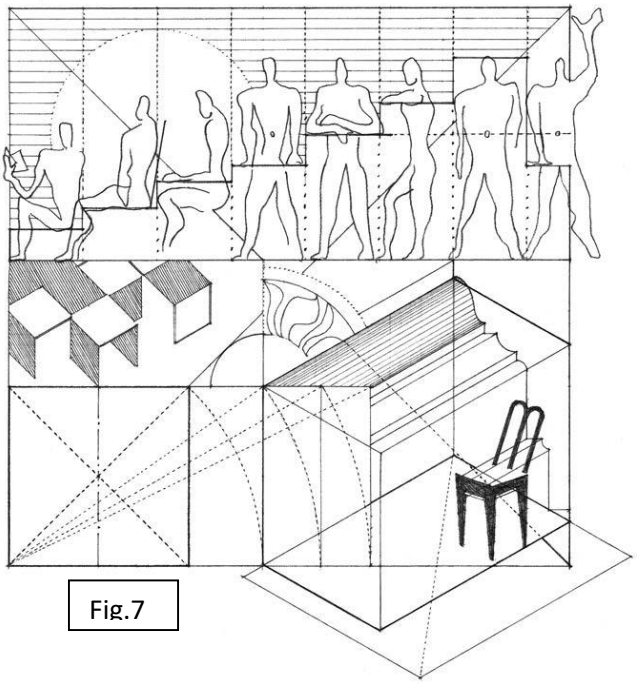


Fig.7

In defining and analyzing a design problem, one also develops goals and criteria by which the effectiveness of a solution can be measured. Regardless of the nature of the interior design problem being addressed, there are several criteria with which we should be concerned.

SUSTAINABLE DESIGN

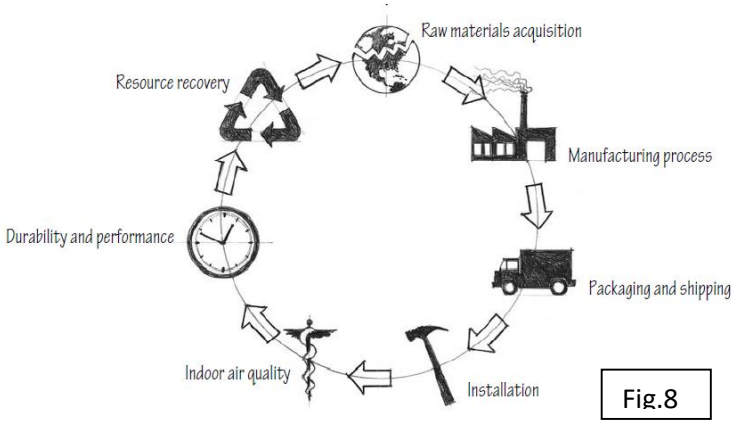


Fig.8

Buildings use large amounts of materials and energy for their construction and operation. Sustainable design seeks to produce buildings that use energy and natural resources efficiently throughout their lives. Sustainable architecture strives to find architectural solutions that protect both the natural environment and the myriad forms of life on earth. Simply put, sustainable design strategies for building interiors include the following:

• Reduce, reuse, and recycle materials.
• Evaluate environmental and health impacts, from acquisition of raw materials through end-of-use recovery.
• Design for energy efficiency.

Interior designers can support sustainable design in the following ways:

• Reduce energy use by specifying efficient lighting and equipment.
• Design to facilitate daylight, views, and fresh air.
• Design for disassembl y, so that materials can be taken apart and recycled.
• Limit the use of potable (drinkable) water in toilets and sinks.
• Select interior finishes and materials made from rapidly renewable, salvaged, refurbished, or recycled
materials from local sources.
• Choose low volatile organic compound (VOC)-emitting products and installation materials.
• Specify products from manufacturers who minimize energy, water, and raw material consumption.
• Avoid waste in manufacturing, packaging, and installation.

HUMAN FACTORS

The interior spaces of buildings are designed as place for human movement, activity, and repose.

Intimate Zone

• Allows physical contact; invasion by a stranger can result in discomfort.

Personal Space

• Allows friends to come close and possibly penetrate inner limit briefly; conversation at low voice levels is possible.

Social Zone

• Appropriate for informal, social, and business transactions; conversation occurs at normal to raised voice levels.

Public Zone

• Acceptable for formal behavior and hierarchical relationships; louder voice levels with clearer
enunciation are required for communication.

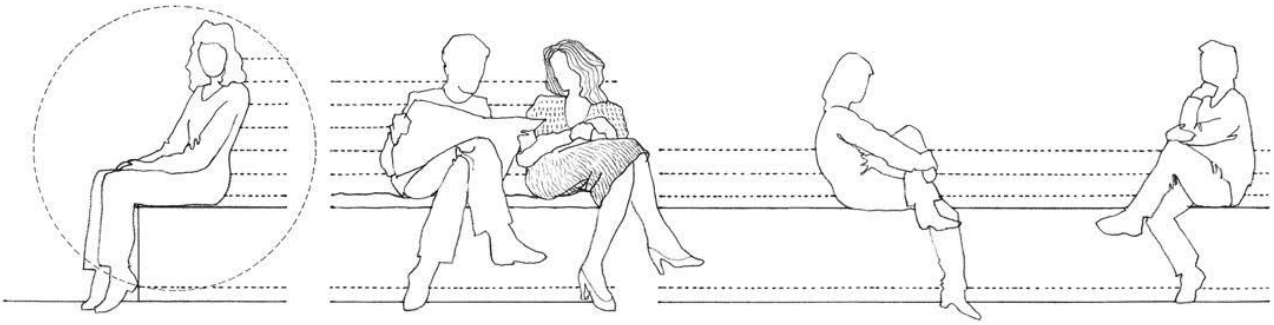


Fig.9

PROGRAMMING

USER REQUIREMENTS

[ ] **Identify users.**

• Individuals

• User groups

• User characteristics

• Age groups

[ ] **Identify needs.**

• Specific individual needs and abilities

• Group needs and abilities

[ ] **Establish territorial** requirements.

• Personal space

• Privacy

• Interaction

• Access

• Security

[ ] **Determine** preferences.

• Favored objects

• Favorite colors

• Special places

• Special interests

[ ] **Research environmental concerns.**

• Energy efficiency

• Daylight, views, and fresh air

• Reduce, reuse, recycle

• Water conservation

• Sustainable materials and manufacturing

processes

• Low VOC-emitting products

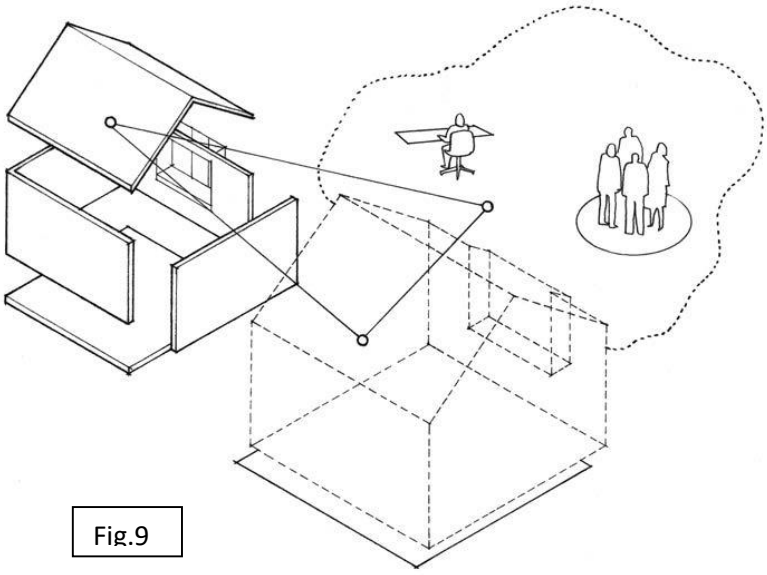


Fig.9

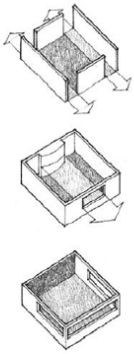
• Decreased waste

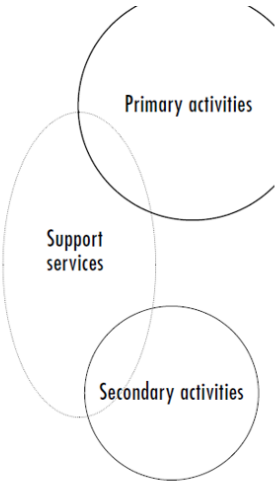
- A prime criterion for judging the success of an interior design is whether or not it is functional. Function is the most fundamental level of design.
- We design to improve the functioning of interior spaces and make the tasks and activities performed within them more convenient, comfortable, and pleasurable.
- The proper functioning of a design is, of course, directly related to the purposes of those who inhabit and use it, as well as to their physical dimensions and abilities.

PROGRAMMING

ACTIVITY REQUIREMENTS

[ ] **Identify primary and secondary activities.**
• Name and function of primary activity
• Names and functions of secondary or related activities
[ ] **Analyze nature of the activities.**
• Active or passive
• Noisy or quiet
• Public, small group, or private
• Compatibility of activities if space is to be used for more than one activity
• Frequency of use
• Times of day or night use
[ ] **Determine requirements.**
• Privacy and enclosure
• Access
• Accessibility
• Flexibility
• Light
• Acoustic quality
• Security
• Maintenance and durability





FURNISHING REQUIREMENTS

[ ] **Determine furnishings and equipment for each activity.**
Number, type, and style of:
• Seating
• Tables
• Work surfaces
• Storage and display units
• Accessories

[ ] **Identify other special equipment** required.
• Lighting
• Electrical
• Mechanical
• Plumbing
• Data and communications
• Security
• Fire safety
[ ] **Establish quality requirements of furnishings.**
• Comfort
• Safety
• Variety
• Flexibility
• Style
• Durability and maintenance
• Sustainability
[ ] **Develop possible arrangements.**
• Functional groupings
• Tailored arrangements
• Flexible arrangements

Space Planning

- The form of a building's structure and enclosure affects the character of the spaces within. Space planning involves the efficient and productive use of these spaces, fitting living patterns to the architectural patterns of the space.
- The term "space planning" is often used to refer to the specific task of planning and designing large-scale spaces for commercial and retail businesses.
- In this narrow sense, space planners program client needs, study user activities, and analyze spatial requirements.
- The results of such planning are then used in the architectural design of new construction or for negotiating the leasing of existing commercial spaces.
- **SPACE ANALYSIS**
- [ ] **Document existing or proposed space.**
- Measure and draw base plans, sections, and interior elevations.
- Photograph existing space.
- [ ] **Analyze space.**

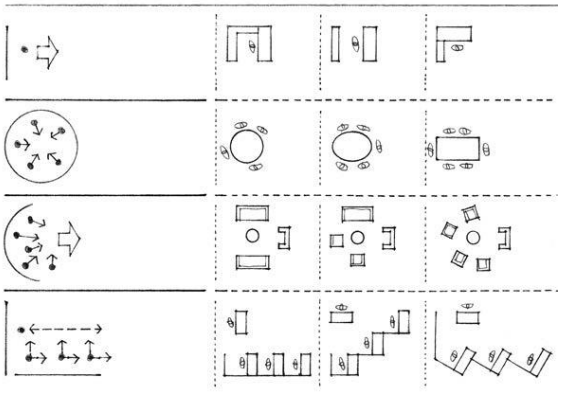
  Orientation and site conditions of space
- Form, scale, and proportion of space
- Doorway locations, points of access, and the circulation paths they suggest
- Windows and the light, views, and ventilation they afford
- Wall, floor, and ceiling materials
- Significant architectural details
- Location of plumbing, electrical, and mechanical fixtures and outlets
- Possible architectural modifications
- Elements for possible reuse, including finishes and furnishings

DIMENSIONAL REQUIREMENTS

Fig.10

[ ] Determine required dimensions for space and furniture groupings.

- Each functional grouping of furniture
- Access to and movement within and between activity areas
- Number of people served
- Appropriate social distances and interaction



DESIRED QUALITIES

Determine appropriate spatial qualities compatible with client's or users' needs or wishes.

• Feeling, mood, or atmosphere

• Image and style

• Degree of spatial enclosure

• Comfort and security

• Quality of light

• Focus and orientation of space

• Color and tone

• Textures

• Acoustical environment

• Thermal environment

• Flexibility and projected length of use

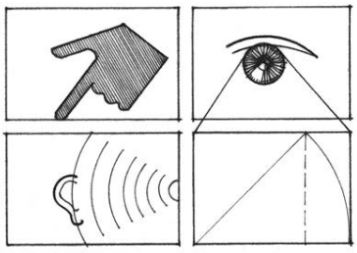
DESIRED RELATIONSHIPS

[ ] **Determine desired relationships between:**

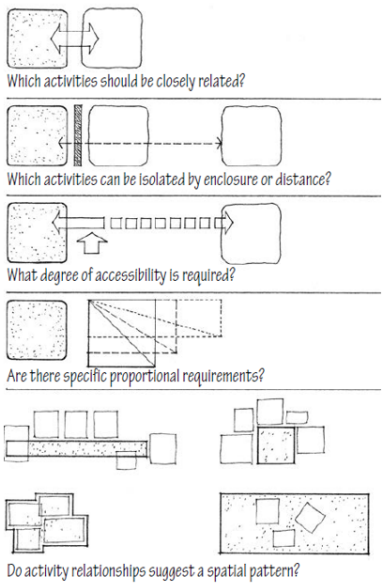
• Related activity areas
• Activity areas and space for movement
• Room and adjacent spaces
• Room and the outside

[ ] **Determine desired zoning of activities.**

• Organization of activities into groups or sets according to compatibility and use



ACTIVITY RELATIONSHIPS



- Whether collaborating on the design of a new building or planning the remodeling of an existing structure, the interior designer strives for a proper fit between the demands of activities and the architectural nature of the spaces that house them.
- Certain activities may need to be closely related or adjacent to each other, while others may be more distant or isolated for privacy.
- Some activities may require easy access, while others may need controlled entries and exits.
- Daylighting and natural ventilation may be priorities for some areas, while others may not need to be located near exterior windows.
- Some activities may have specific spatial requirements, while others may be more
- flexible or be able to share a common space.

Fig.11

FITTING TO THE SPACE

As interior areas are organized—on the basis of considerations developed during programming, along with considerations of the building site and adjacent structures—the architect will begin to develop the shape and form of a new building.

- Whether a space is situated within an existing structure or is contemplated in a newly designed building, it usually provides clues for the interior designer as to how it can best be utilized.
- The entries into a space may define a pattern of movement that divides the area into certain zones.
- Some zones may be more easily accessed than others.
- Some may be large enough to accommodate group activities, while others are not.
- Some may have access to exterior windows or skylights for daylighting or ventilation; others may be internally focused.
- Some may include a natural center of interest, such as a view window or a fireplace.

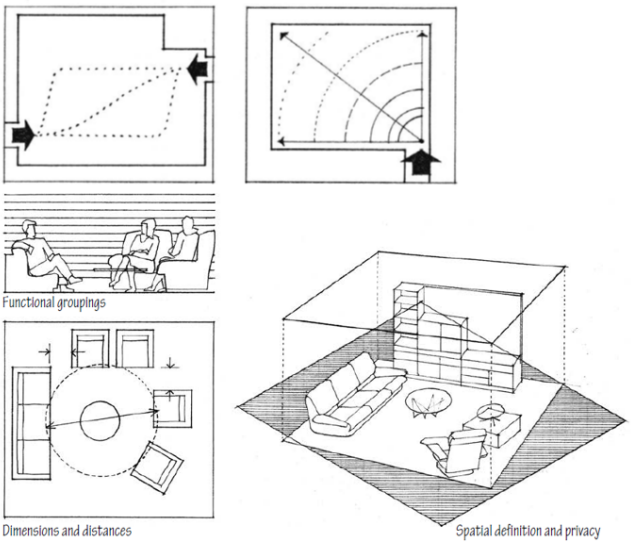


Fig.12

PLAN ARRANGEMENTS

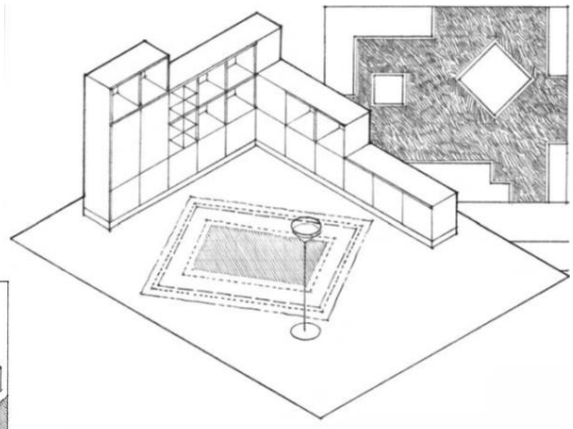
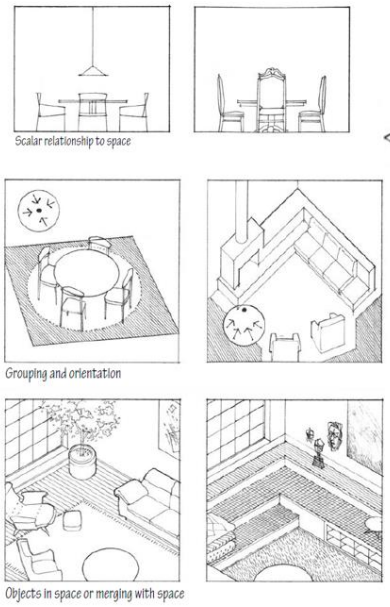


Fig.13

Aesthetics

- Appropriate scale to space function
- Visual grouping: unity with variety
- Figure-ground reading
- Three-dimensional composition: rhythm, harmony, balance
- Appropriate orientation toward light, view, or an internal focus
- Shape, color, texture, and pattern



Case Study

PROJECT PHASE	TYPICAL TASKS AND ACTIVITIES	TYPICAL MEANS OF VISUAL PRESENTATION
Programming also known as pre-design	**In depth analysis and documentation of needs, requirements goals and objectives.** Can include: identification of space and adjacency requirements analysis; asset assessment; specialized needs assessments; codes and accessibility research and identification of conceptual and thematic issues. As well as; analysis of architectural or site parameters; and analysis of scheduling and budget.	Most often written information compiled in a programming report. Often includes problem identification, diagrams, charts, matrixes, and may include some orthographic drawings and early fit studies. May include preliminary scheduling graphics.
Schematic Design also known as the preliminary design phase	**Preliminary conceptual, spatial, conceptual, and technical design of project.** Includes preliminary space planning often using; relationship diagrams; matrices; bubble diagrams; blocking diagrams; stacking plans; and fit plans. As well as initial furnishings, fixtures and equipment design/layout. Development of projects conceptual and thematic issues. Color, material and finish studies. Preliminary code review. Preliminary budgetary information.	Graphic presentation of preliminary design; can include relationship diagrams; blocking and fit plans; preliminary space plan(s); preliminary furnishing and equipment layouts; preliminary elevations and sections; preliminary 3-D drawings; preliminary color and materials studies; and study models. Presentation may also include graphic presentation of conceptual and thematic issues using sketches, diagrams, and mixed media.
Design Development	**Refinement of finalized design.** Includes space plan and design of interior construction elements and details. Often involves incorporation of lighting, electrical, plumbing, and mechanical systems design; as well as data and telecommunication systems integration. Often includes millwork design and detailing. Also includes color, materials, and finish selection. Design and specification of furnishings, fixtures,and equipment, as well as refinement of budgetary and scheduling information.	Finalized, refined design presentation incorporating all necessary components of design. Graphic presentation of finalized design can include conceptual diagrams; space plan(s); and plan(s) for furnishings, fixtures and equipment, as well as elevations; sections; ceiling plans; 3-D drawings; colors, materials, and finish samples; scale models and mockups. Multimedia presentations can incorporate all of the above elements plus sound and animation.
Construction Documents	**Preparation of drafted, working drawings and/or contract documents.** Includes preparation of drawings, schedules, details, and specifications, as well as coordination and integration of consultants documents. Can include preparation of specialized equipment and/or furnishings documents for bidding by purchasing agents. May include purchasing documents.	Preparation of contract documents. Often includes submission to general contractor(s) and purchasing agents for bid and to appropriate agencies for plan check.
Construction Administration	**Guide and review construction and installation.** Can include periodic site visits and creation of progress reports. Coordination and review of shop drawings and sample submittals. May include clarification and interpretation of drawings, as well as possible review of billing and payment. Preparation of punch list. May include move coordination and supervision of furnishings, fixtures and equipment installation.	Communication with contractors, agencies and clients is primarily written and verbal. May include scheduling, budgetary, and administrative graphics.

Adapted from: AIA Owner-Architect Agreement for 'Interior Design Services' and the ASID Interior Design Services Agreement'

2-1

ECO TOYS Programming Information

Company History:
Eco Toys is a young, dynamic company. Larry Leader, the company president started the company in 1985. The company designs and produces toys for preschoolers, using recycled plastic products. Eco Toys has enjoyed tremendous success and growth in the last five years. Owing to recent growth, the company must move to larger, better organized design and marketing offices.

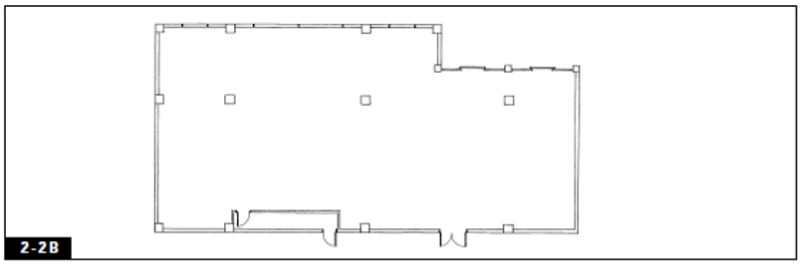
Company Structure and Organization:
The president is at the center of all company operations and constantly interacts with all members of his staff. Mr. Leader depends a great deal on his assistant Steve Stable. Although Mr. Leader is in touch with all levels of operation, he has set up the company in a horizontal organizational structure. This means that all members of the Eco Toys staff have equal status and power and are seen as important contributors to the organization. The design of the space should reflect the organizational structure of the company.

General Requirements:
Because of the non hierarchical organizational structure, all workstations must be exactly the same size. As a means of encouraging team meetings and sharing within departments small (8' x 8') individual workstations have been requested. As a result of complicated egress conditions, the existing door locations must be retained.

Department Information and Requirements:

Entry/Reception: Very public, must visually represent company's mission. Requires reception desk with work surface and transaction counter, task seating. Guest seating for 6. Must allow space for movement of children into toy test center. Must be near conference room, toy test center and close to marketing dept.
Conference Room: Very public and attractive, seating for 10 at tables with additional seating available. Requires multimedia center. View if possible. Immediately adjacent to toy test center (with visual connection), close to reception, and near marketing dept.
Toy Testing Center: Open and flexible space for use by 4 - 6 preschool age children. Must be visually connected to conference room and adjacent to entry and conference room.
Design Dept.: 2 designers and 2 assistants. All individual work spaces must accommodate CADD station, plus layout space, 2 file drawers, and handy reference storage. Adjacent to model shop; a messy, noisy, enclosed space -120 sq. ft. min. Adjacent to engineering dept. Nearby team meeting space with casual seating for 4, room for plotter, display area, and filing.
Marketing Dept.: 2 marketing managers and 1 assistant. All individual work spaces must accommodate a P.C., 2 file drawers, and handy reference storage. Must have adjacent team space with table and seating for 5. Must be near conference room, toy test and reception area.
Engineering Dept.: 2 engineers. All individual work spaces must accommodate CADD station, and lay-out space, two file drawers, and handy reference storage. Must be adjacent to design dept. and near design team space.
Accounting Dept.: 2 accountants. Individual work spaces must accommodate a P.C. and printer, 2 file drawers, and handy reference storage. Requires some privacy and no major interaction with other departments, with the exception of the President.
President: Pres. plus assistant (2 total); must accommodate P.C. and printer, 2 file drawers, and handy reference storage. President to have small conference table (to seat 4). Near all depts. and break room.
Break Room: Generous counter space, base and wall cabinets, sink, refrig., microwave, and commercial coffee makers. Seating for 8 minimum.
Copy/Mail: Room for copy machine and adjacent 5 lineal ft. of collating space, room for 16 mailboxes, paper, and supply storage. Convenient to corridor.
Storage: Generous heavy-duty shelving. Must be enclosed and private, requires shelving and ventilation for Local Area Computer Network.

2-2A



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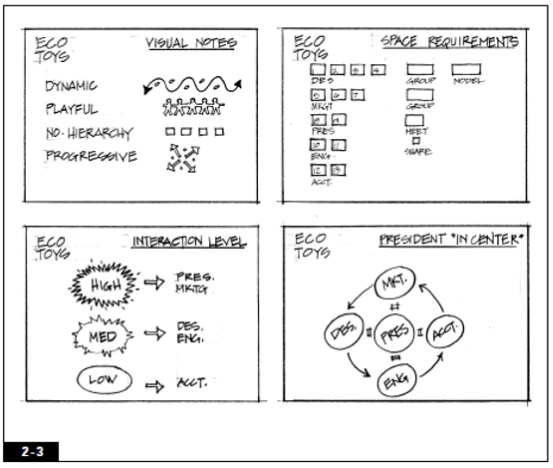

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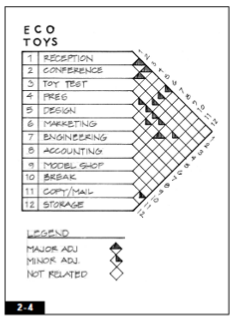
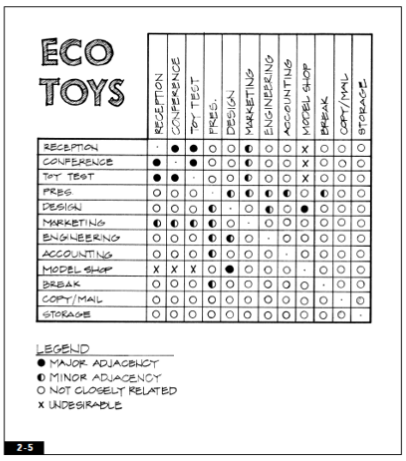


2-4

FIGURE 2-4
Simple adjacency matrix for the sample project.



2-5

FIGURE 2-5
Another type of adjacency matrix for the sample project.

Fig.14

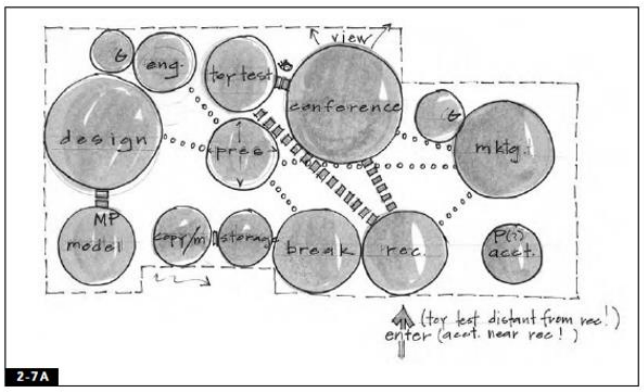
ECO TOYS

		Adjacencies	# of Dept. Members	Seating Req's	Public Access	Privacy	Plumbing	Data/Phone	Special Req's	Comments
1	Reception	①③6	1	6 min	●			●	Y	Visually rep mission; used by adults & children; "dynamic & playful"
2	Conference	①③6		10+	●			●	Y	"Dynamic & playful"; multimedia center; multiple lap-top /computers
3	Toy Test	①②		4-6	●			○	Y	Used by preschoolers; open, flexible, playful
4	President	5678 10	2	4				●	Y	PC, printer, 2 file drawers, ref storage for each 8' x 8' work space
5	Design	③⑦	4	4 min				●	Y	CADD, lay-out, 2 file drawers, ref storage for each 8' x 8' work space
6	Marketing	①②3	3	5 min				●	Y	PC, printer, 2 file drawers, ref storage for each 8' x 8' work space
7	Engineering	⑤	2					●	Y	CADD, lay-out, 2 file drawers, ref storage for each 8' x 8' work space
8	Accounting	4	2			●		●	Y	PC, printer, 2 file drawers, ref storage for each 8' x 8' work space
9	Model Shop	⑤				○	●	○	Y	Messy & noisy; enclosed
10	Break Room	4		8 min			●	○	Y	Relaxing & inviting; gen counters; refrig, microwave, sink, coffee makers req
11	Copy/Mail							○	Y	5 lineal feet collating space; 16 mailboxes; storage
12	Storage					●			Y	Generous heavy-duty shelving; ventilation

Legend

①	Major Adjacency	○	Secondary Requirement
1	Minor Adjacency	Y	Yes, See Commento
●	Mandatory Requirement	X	Undesirable

2-6



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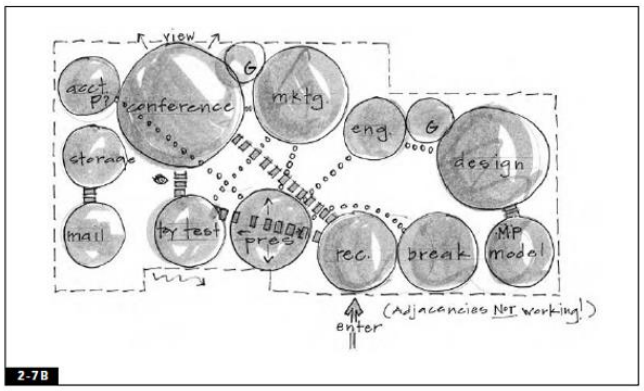

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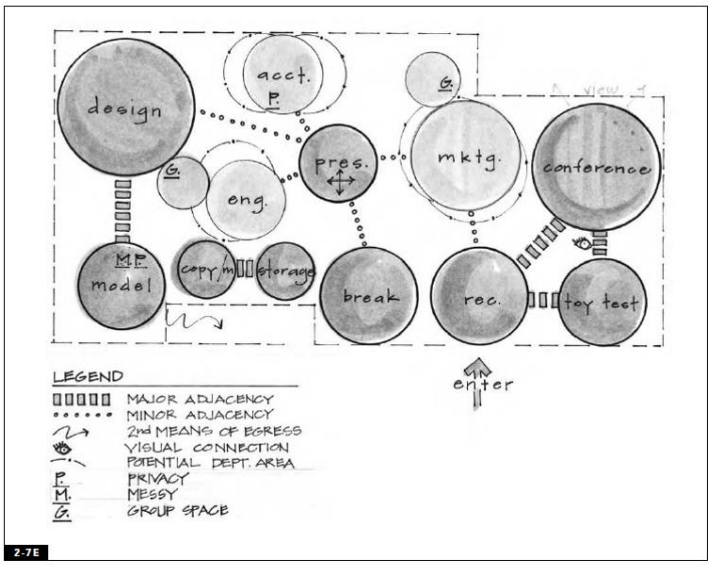

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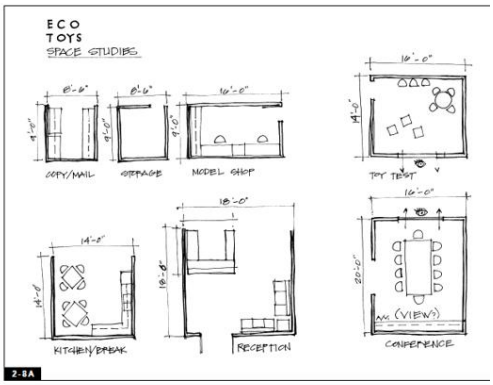

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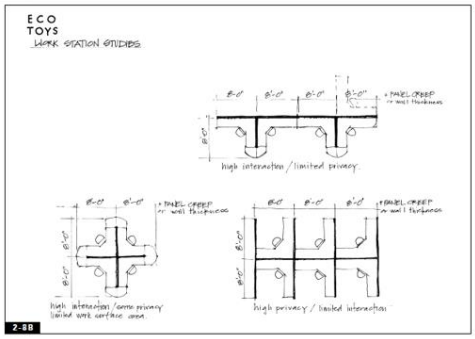
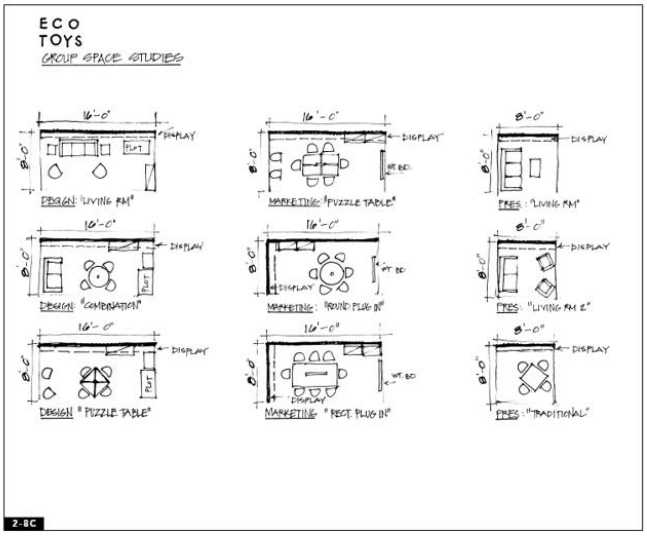
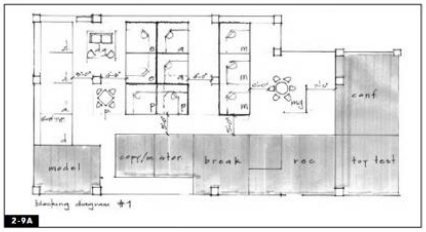
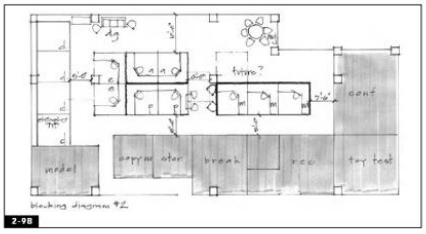


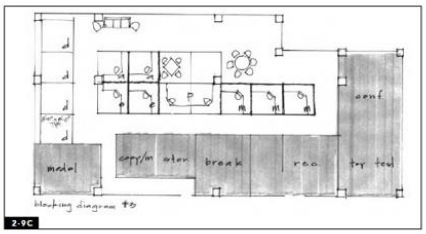
2-8B

Fig.15









FIGURES 2-9A, 2-9B, 2-9C
Blocking diagrams for the sample project. Note that these blocking diagrams focus on the layout of individual work spaces.

Fig.16

FIGURES 2-12A, 2-12B
Schematic presentation for the sample project, graphite on drafting film.

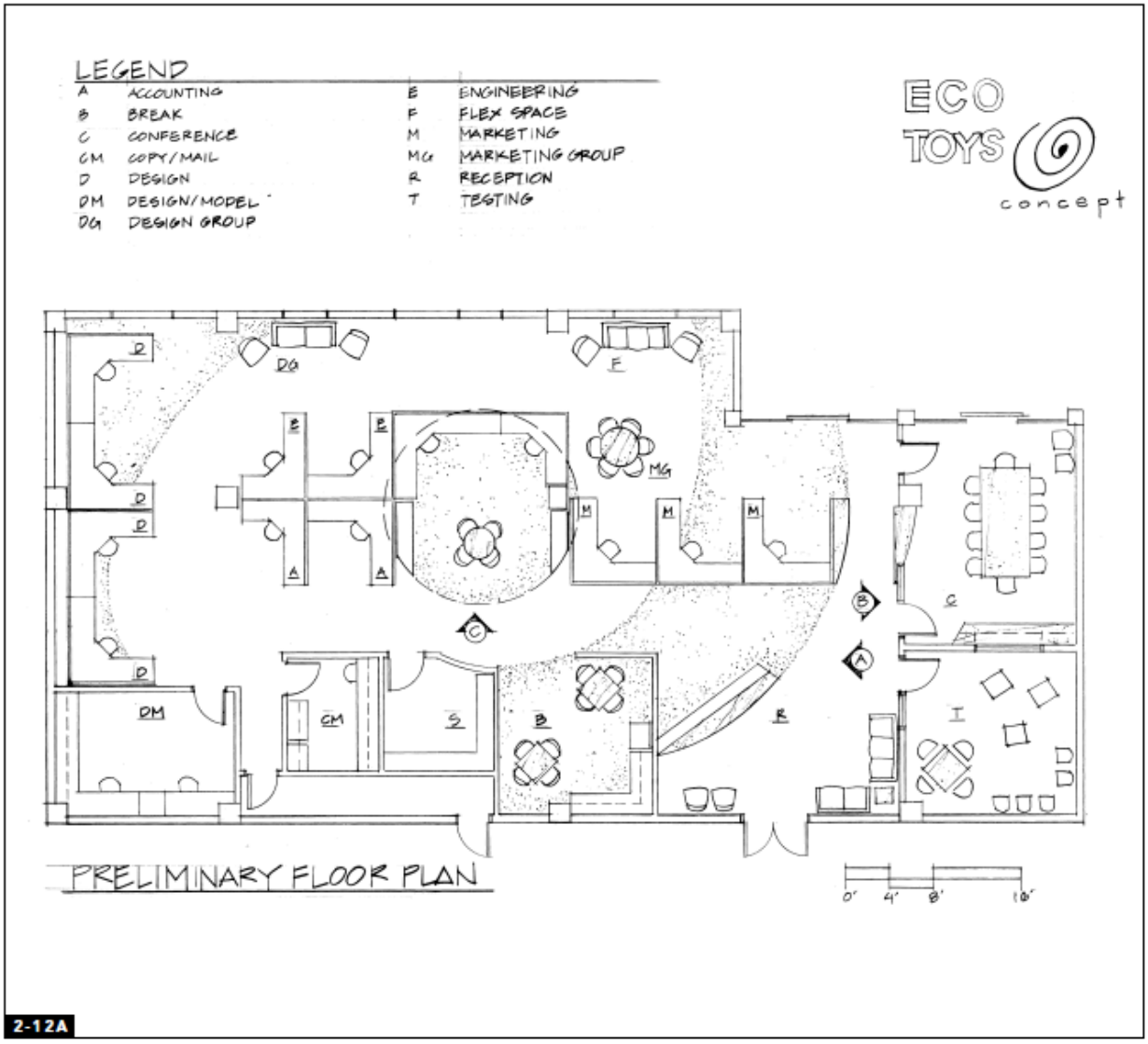


Fig.17