Human Computer Interaction

UNIT-1

Lecture 5:

Interactive System Design-

GUI Design & Aesthetics

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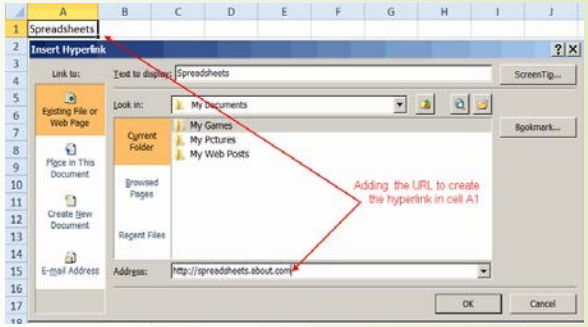
GUI: Graphic User Interface

The interface through which a user operates a program or an application or an device



Consists of individual or group of ICONS, buttons, scroll bars, menus, widgets, boxes, status lamps, labels, instructions, visuals etc - arranged on the screen in a pattern that is visually pleasing as well as ergonomically useable.

Very important and critical component in facilitating user interaction with the software & hardware inside the device / product.

GUI determines the Usability Index of the product as a whole. Gives the product an identity, personality & character.

Requirements of a GUI

Should be

FUNCTIONAL:

Useable - Easy to operate ; locate what is required & where it is required on the screen; and do what is expected of it – without need for learning or training

AESTHETIC:

Pleasing to the eye ; Highest Visual Quality; Identifiable; Distinct ; Recognizable, Recallable

COMMUNICABLE:

Express what it represents; how it is to be operated; Unambiguous; Meaningful; Culturally & Contextually compatible

In GUI Design Aesthetics is about

Sensory + Empirical + Taste + Judgment

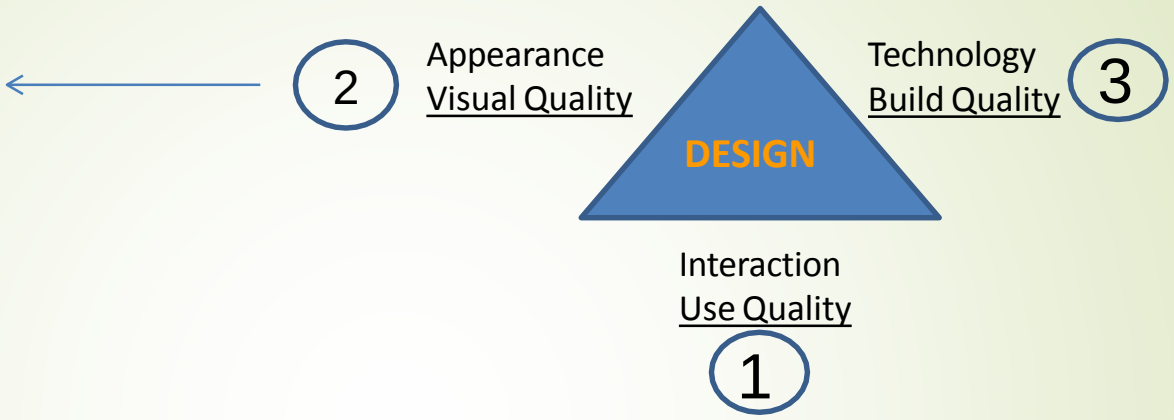
The Philosophical argument of aesthetics shown below is incorporated into Interfaces through Graphic designing

Simplicity + Infinity + Eternity + Serenity = Beauty

Aesthetics is both Art as well as Mathematics.
It is both rational as well as emotional at the same time.

Aestheticsis a medium for User Experience

Appearance
Visual Quality



Aesthetics (Look & Feel) + Communication + Use ability

= Total UI Experience

Role of Aesthetics – often misunderstood & underestimated

- Aesthetics is not mere beautification.
- It has as much to do with FUNCTION as with beauty

- Aesthetics is not the surface characteristics of a GUI It is not decoration. It is not cosmetic

- A ‘good looking’ GUI needs also to function
  to communicate
  to express
  to instruct
  to perform

While the judgment of Aesthetics is subjective the construction / configuration is not.

There are elements & principles of good aesthetic configuration

ELEMENTS

Line, Shape, Space, Color, Form, Texture, Light

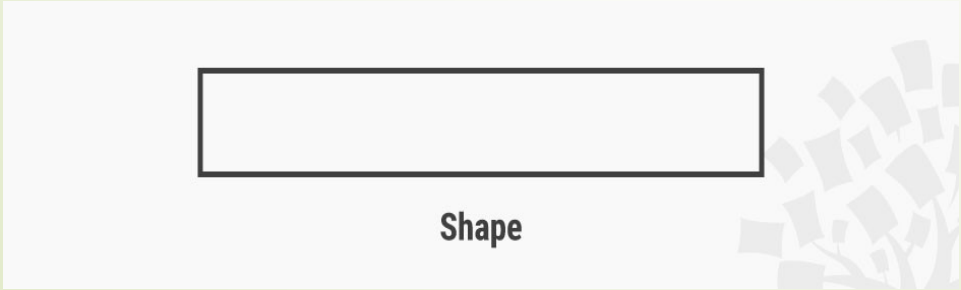
PRINCIPLES

Balance, Emphasis, Rhythm, Unity, Contrast, Movement

Elements of Good Aesthetic Design

Line: Lines are strokes connecting two points, and the most basic element of visual design. We can use them to create shapes, and when we repeat them, we can form patterns that create textures.

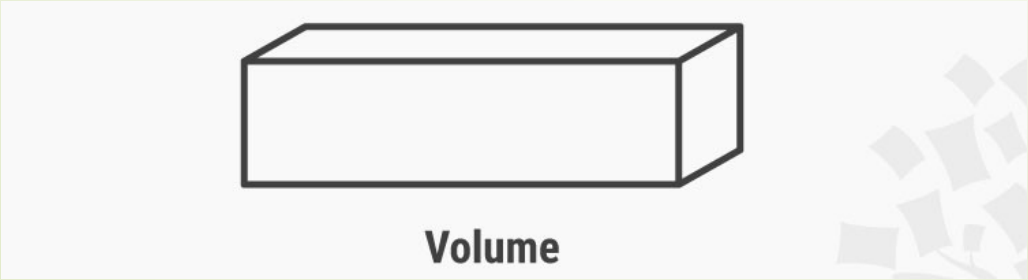
Shape: Shapes are self-contained areas, usually formed by lines (although they may also be formed by using a different color, value or texture). A shape has two dimensions: length and width.



Elements of Good Aesthetic Design

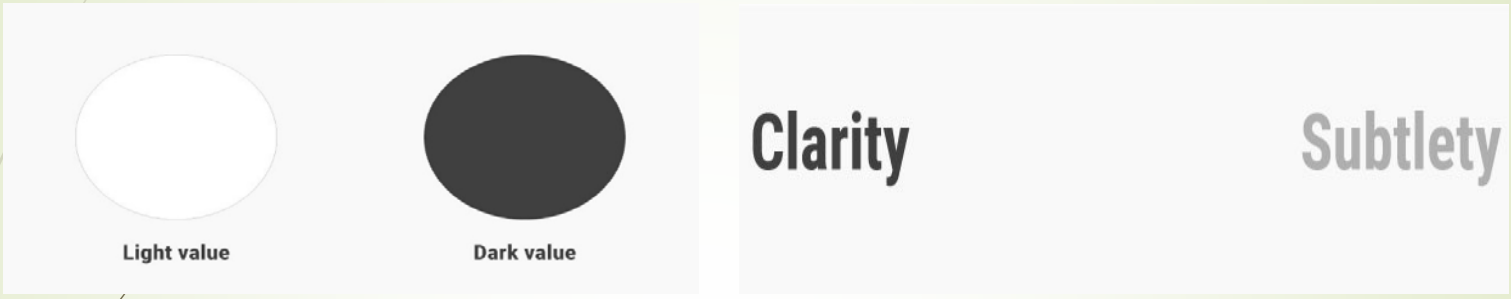
Negative/White space: Negative space (also known as white space) is the empty area around a (positive) shape. The relation between the shape and the space is called *figure/ground*, where the shape is the figure and the area around the shape is the ground.

Volume: Volume applies to visuals that are three-dimensional and have length, width and depth.

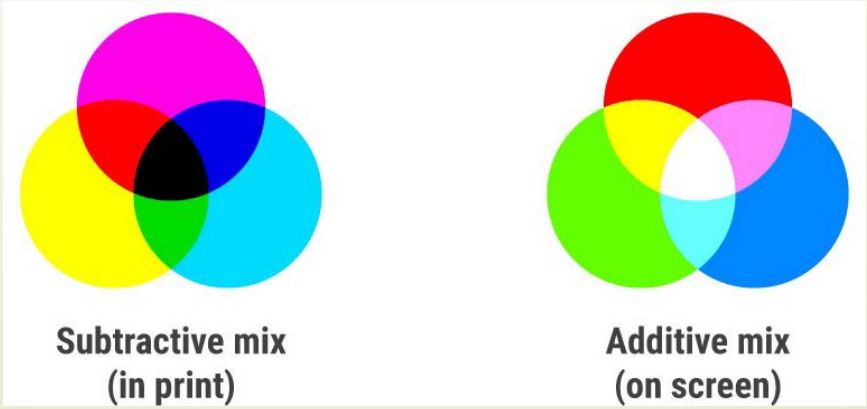


Elements of Good Aesthetic Design

- **Value:** Value, quite simply, describes light and dark. A design with a high contrast of values (i.e., one which makes use of light and dark values) creates a sense of *clarity*, while a design with similar values creates a sense of *subtlety*.



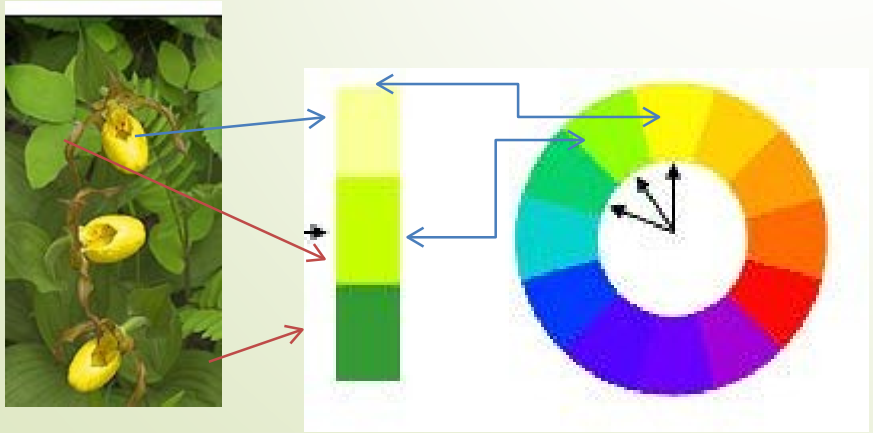
- **Color:** Color is an element of light. Color theory is a branch of design focused on the mixing and usage of different colors in design and art. In color theory, an important distinction exists between colors that mix subtractively and colors that mix additively.



COLOUR

- Colour is a vast subject of both Physics and Fine Arts.
- Graphic Designers use metrics to specify colours.

- **Graphic Designers use metrics to specify colors.**
- **Hue:** refers to the names of the primary colors. (Red, green and blue).
- **Value:** lightness and darkness of the hue
- **Shade:** amount of white or black added.
- **Intensity:** the purity or saturation of the color
- **Monochromatic:** use of one color where only the value of the color changes
- **Analogous colors:** colors that are adjacent to each other on the color wheel, e.g. yellow and green are analogous.

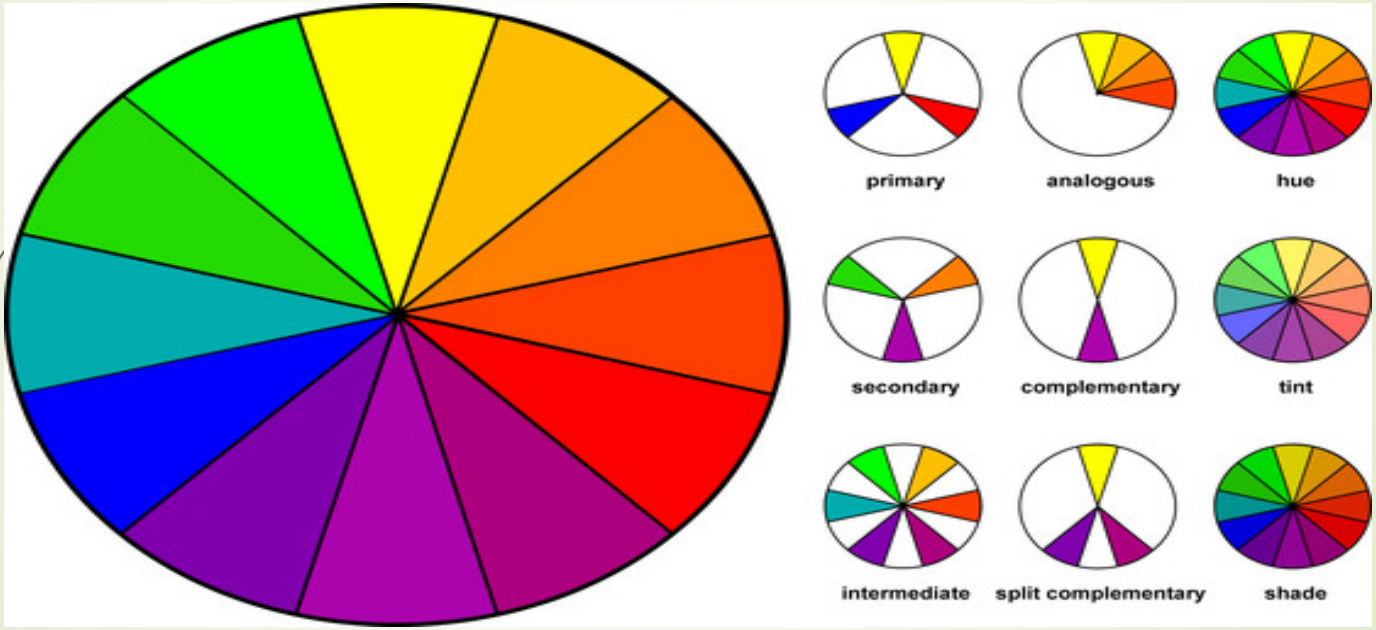


Limitations of Technology

The Visible spectrum consists of billions of colours, a computer monitor can display millions, a high quality printer is only capable of producing thousands, and older computer systems may be limited to 216 cross-platform colours.

The Psychology of Colors

- WARM colors include: yellows, red and orange we associate these with blood, sun and fire.
- COOL colors include: violet, blue and green because of our association with sky, water.



Texture: is the surface quality of an object.

- As a designer, we can work with two types of texture:

1. Tactile texture

- 2. Implied texture

- **Point:** A Point is basically the beginning of “something” in “nothing”. It forces the mind to think upon its position and gives something to build upon in both imagination and space. Some abstract points in a group can provoke humanagination to link it with familiar shapes or forms

- **Form:** In visual design, form is described as the way an artist arranges elements in the entirety of a composition. It may also be described as any three dimensional object. 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.

Principles of design inVisuals

Design is composed of manipulating the physical characteristics of size, shape, texture, proportion, scale, mass and color.

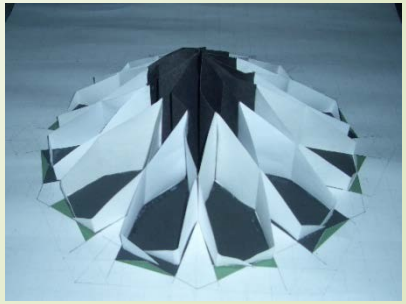
Order & composition is the arrangement and organization of elements in relation to each other.

Form follows function is a design approach wherein the form (overall layout / composition/geometric shape) of a GUI is determined by what function it does.

Ex: An arrow has a Form having a sharp angular face at one end expressing the function of pointing to a direction.

Composition

An orderly arrangement of elements using the principles of design



Principles of Design

Grammar of the visual language.
Rules for composing with the elements

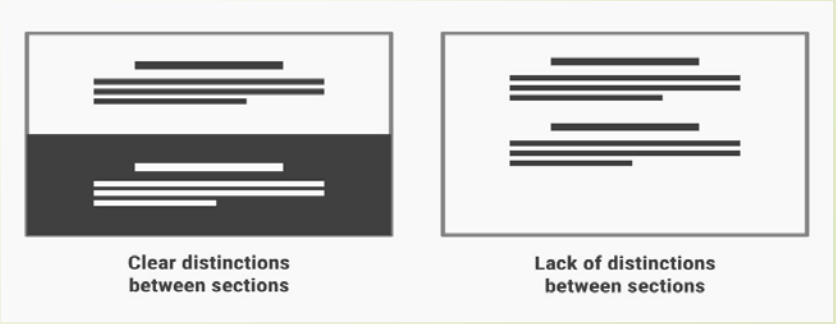
- The Principles of Design can be thought of as what we do with the elements of design to express and communicate a predetermined message of Usability, Reliability, & Functionality in a harmonious fashion.

- **Balance**
- **Unity**
- **Proportion**
- **Harmony**
- **Direction**
- **Rhythm**
- **Symmetry**
- **Pattern**
- **Emphasis**
- **Contrast**
- **Movement**

Principles of Design

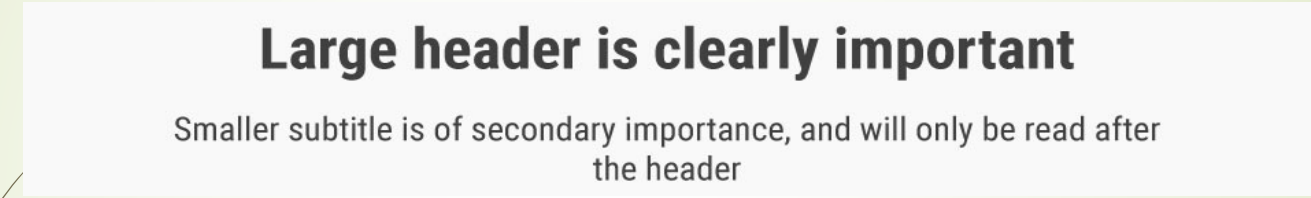
- **Unity:** Unity has to do with creating a sense of harmony between all elements in a page. A page with elements that are visually or conceptually arranged together will likely create a sense of unity.

- **Gestalt:** Gestalt refers to our tendency to perceive the *sum* of all parts as opposed to the individual elements. The human eye and brain perceive a unified shape in a different way to the way they perceive the individual parts of such shapes.

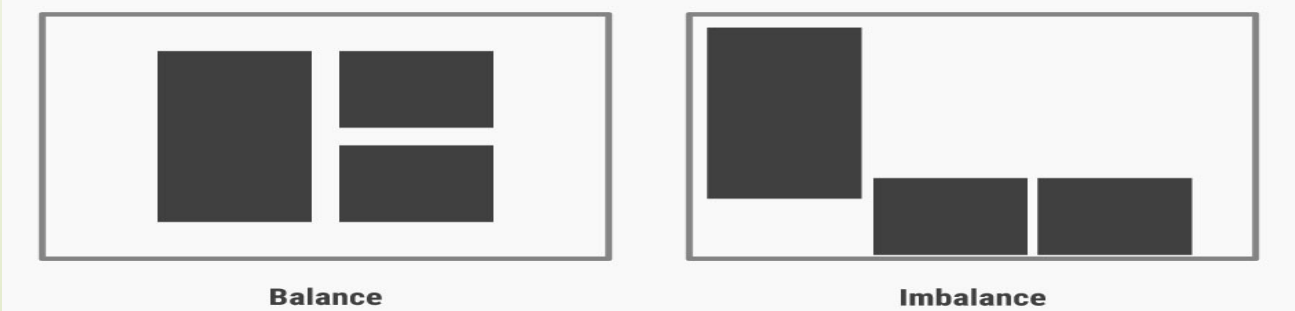


Principles of Design

- **Hierarchy:** Hierarchy shows the *difference in importance* of the elements in a design. Color and size are the most common ways we can create hierarchy

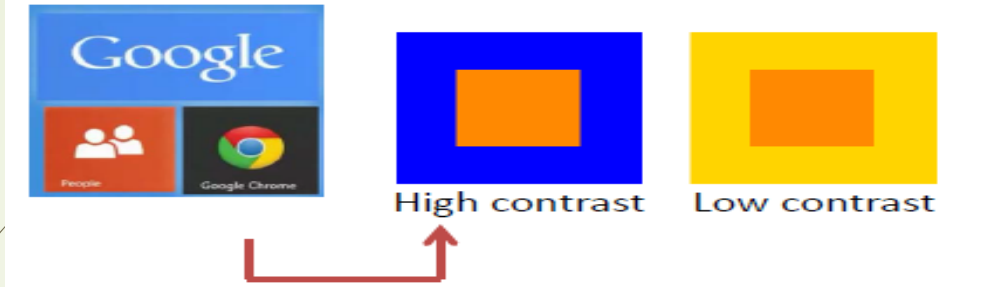


- **Balance:** Balance is the principle governing how we distribute the elements of a design *evenly*. Balanced designs tend to appear calm, stable and natural, while imbalanced designs make us feel uneasy.

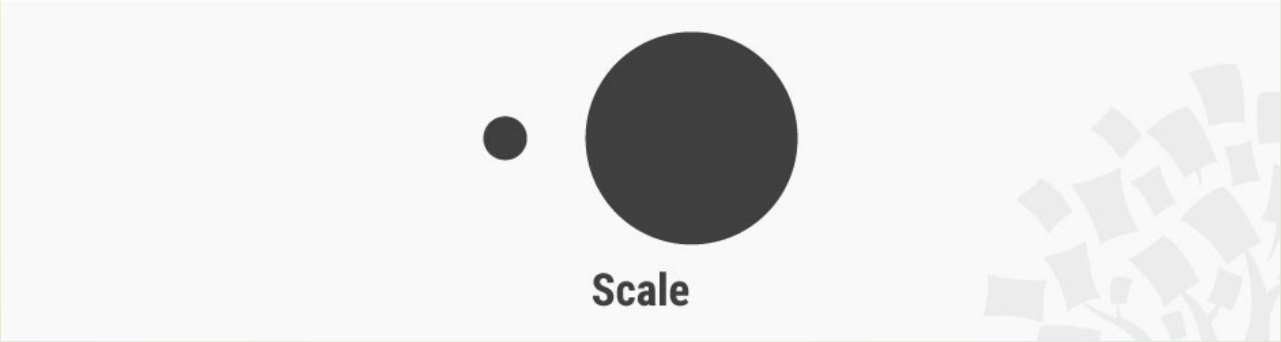


Principles of Design

- **Contrast:** We use contrast to make an element *stand out* by manipulating differences in colour, value, size and other factors.

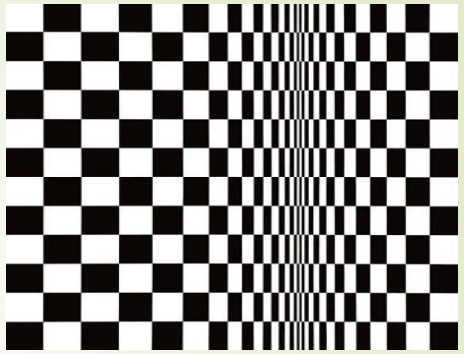


- **Scale:** Scale describes the *relative sizes* of the elements in a design. By using scale to make an element larger than others appearing with it, you can *emphasis* that element.



Principles of Design

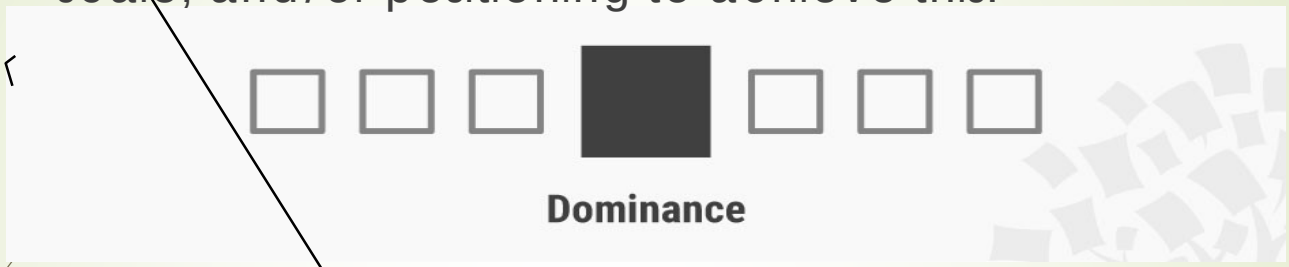
Movement is the path the viewers eye takes through the artwork, often to focal areas. Animation is often used.

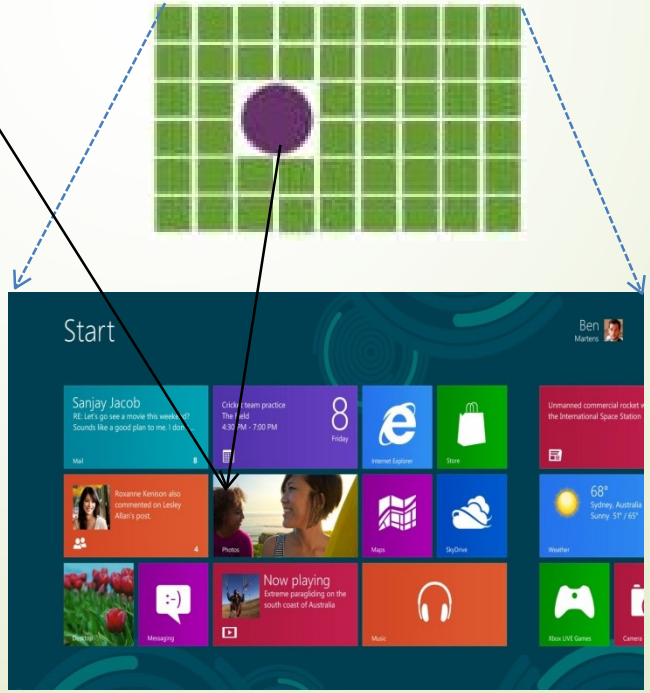


Rhythm is created when one or more elements of design are used repeatedly to create a feeling of organized movement / direction.

Principles of Design

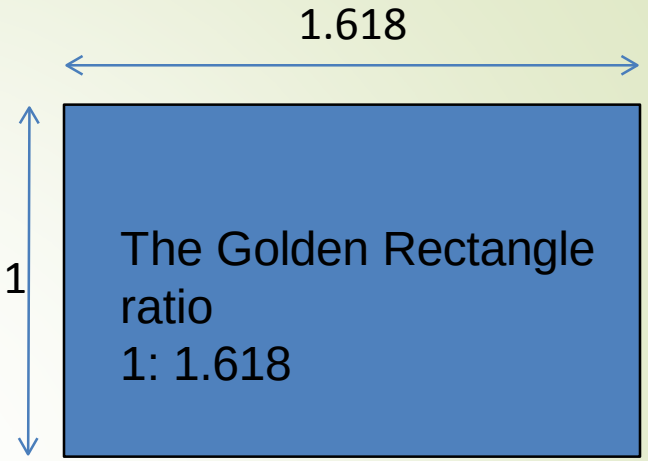
- **Emphasis/Dominance:** Dominance creates *focus* on a *single* element. We can use colour, shape, contrast, scale, and/or positioning to achieve this.



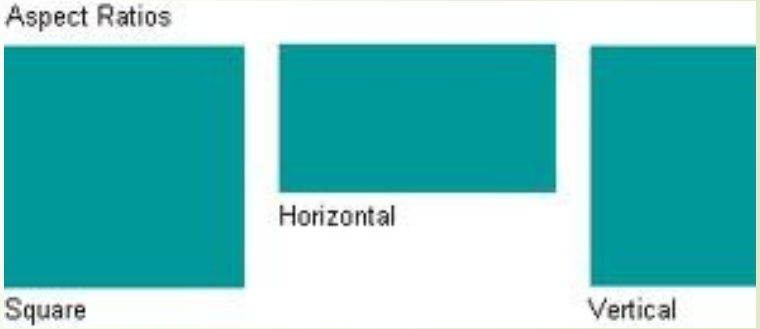


Principles of Design

- **Proportion:** Size relationships found within an object or design. Also a comparison in terms of ratio of size, shape, etc with neighboring elements. Example see proportions of various buttons within Windows 8 screen



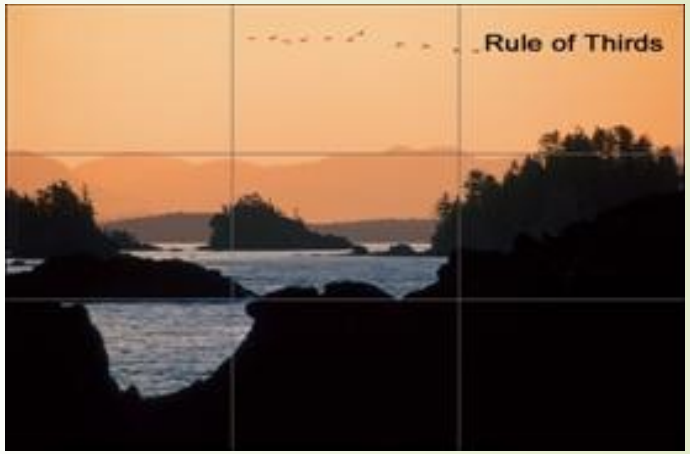
Proportion refers to the size relationship of visual elements to each other and to the whole picture. One of the reasons proportion is often considered important in composition is that viewers respond to it emotionally.

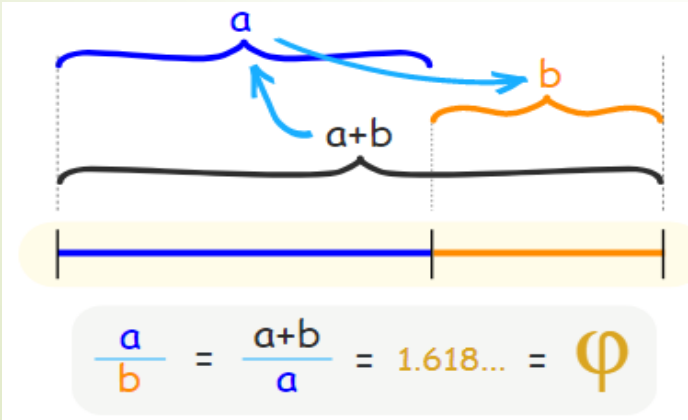


Rule of Third & Golden Ratio

- The **rule of thirds** is a “rule of thumb" or guideline which applies to the process of composing visual images such as designs, films, paintings and photographs.

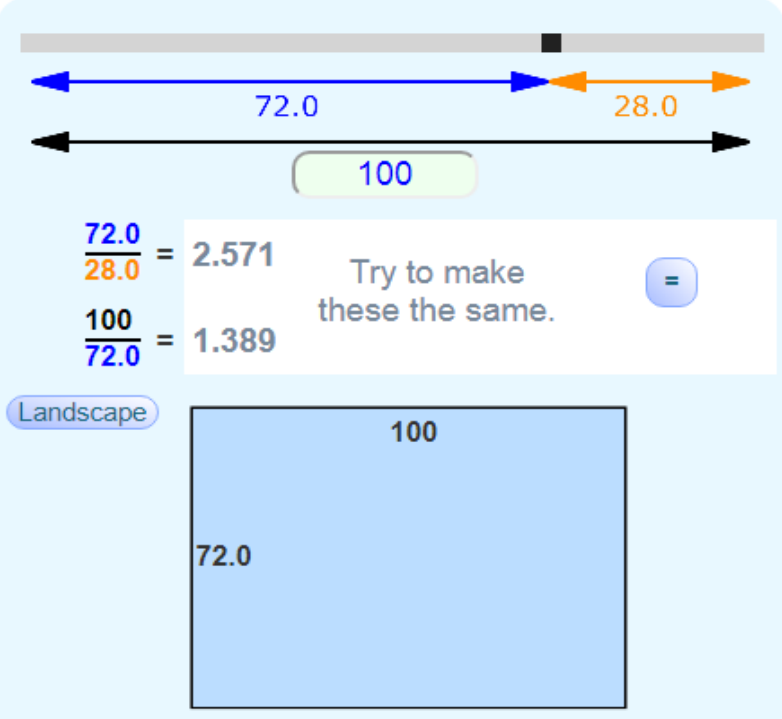
The guideline proposes that an image should be imagined as divided into nine equal parts by two equally spaced horizontal lines and two equally spaced vertical lines, and that important compositional elements should be placed along these lines or their intersections.

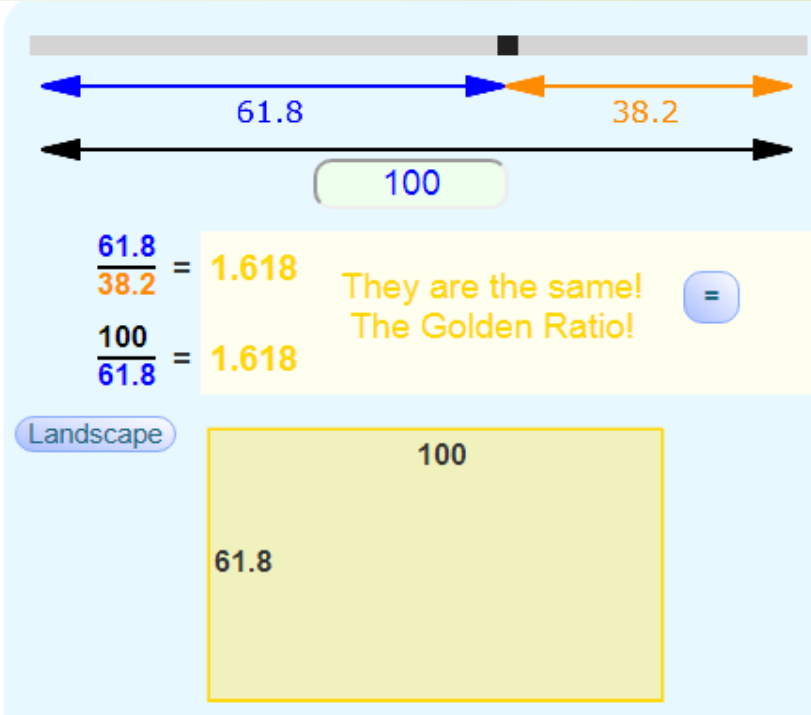




We find the golden ratio when we divide a line into two parts so that: the long part divided by the short part ***is also equal to*** the whole length divided by the long part

Golden Ratio Example





Some artists and architects believe the Golden Ratio makes the most pleasing and beautiful shape.

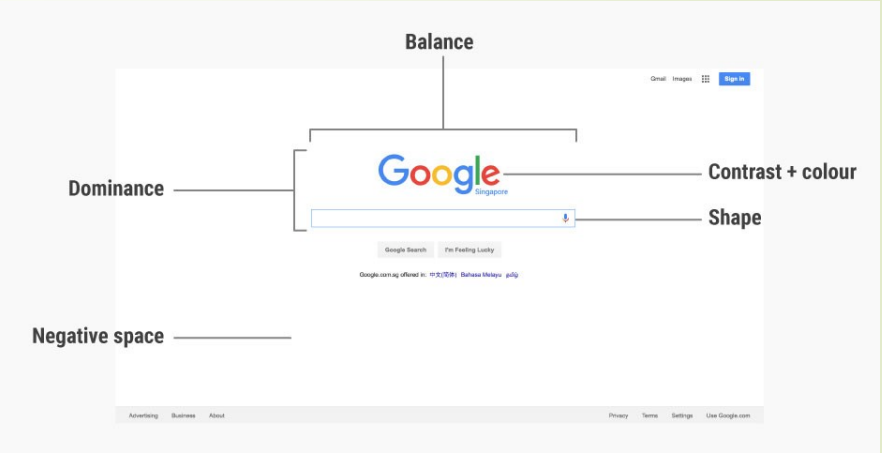
Examples to highlight design elements and principles
Google's homepage

- Google's homepage is one of the most visited webpages in the world. The raw simplicity of the page is partly why it is so well designed, but here are other factors that make this page work superbly:

Dominance: The large Google logo and search box gives it dominance, making it the core (and to most, sole) focus of the entire page.

Contrast (and colour): Google's logo uses bright (mostly primary) colours, and these mix well, forming a visually pleasing logo. The logo also has sufficient contrast against a white background, making it stand out on the page.

Shape: The search box uses a rectangular shape to delineate the search field, making it very usable.



Negative space: Google's homepage is predominantly made out of negative space, which makes the search box (the main function of the page) the centre of attention. The negative space also works well for the page, as it acts like a blank sheet of paper before users type in their search terms.

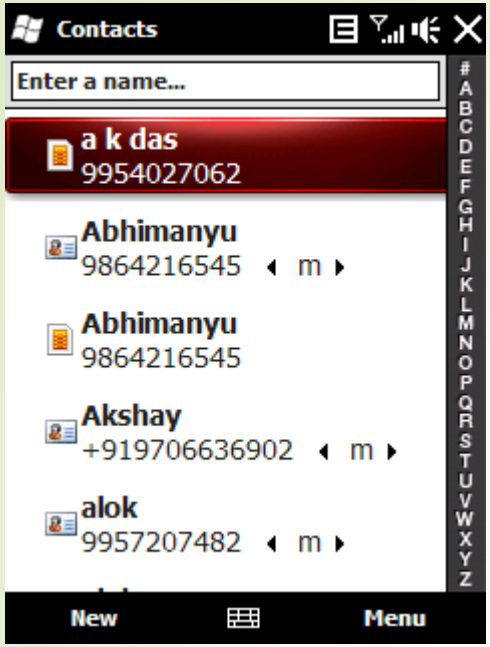
Balance: The page is almost vertically symmetrical, resulting in a sense of balance that is very pleasing and calm to look at.

Graphic Design Principles: Example: mobile screen

The Clustering Principle:

Organizing the screen into visually separate blocks of similar controls, preferably with a title for each block. Modern WIMP (Windows-Icons-Menus-Pointer) systems are a natural expression of the Clustering Principle

Information on a screen which is not catagorised into some order (right hand screen in the above figure) can be confusing. GRIDS are therefore used to not only to align & please aesthetically but also catagorise UI elements according to functions .



Type size and font, for example: the Reduced Cluster Principle would suggest that one or two type styles are sufficient.

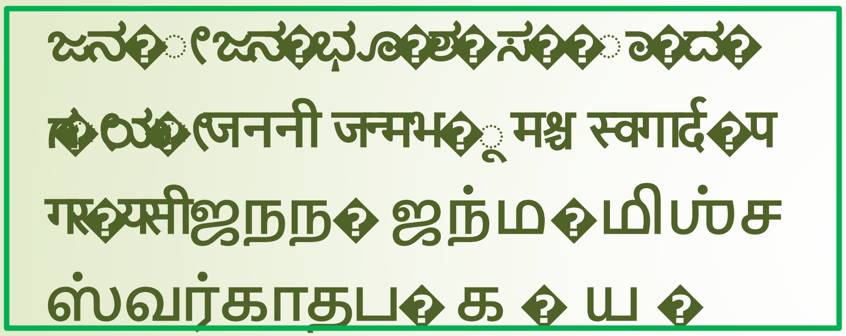
Poor Font readability

Avoid fancy fonts totally

Safe Fonts

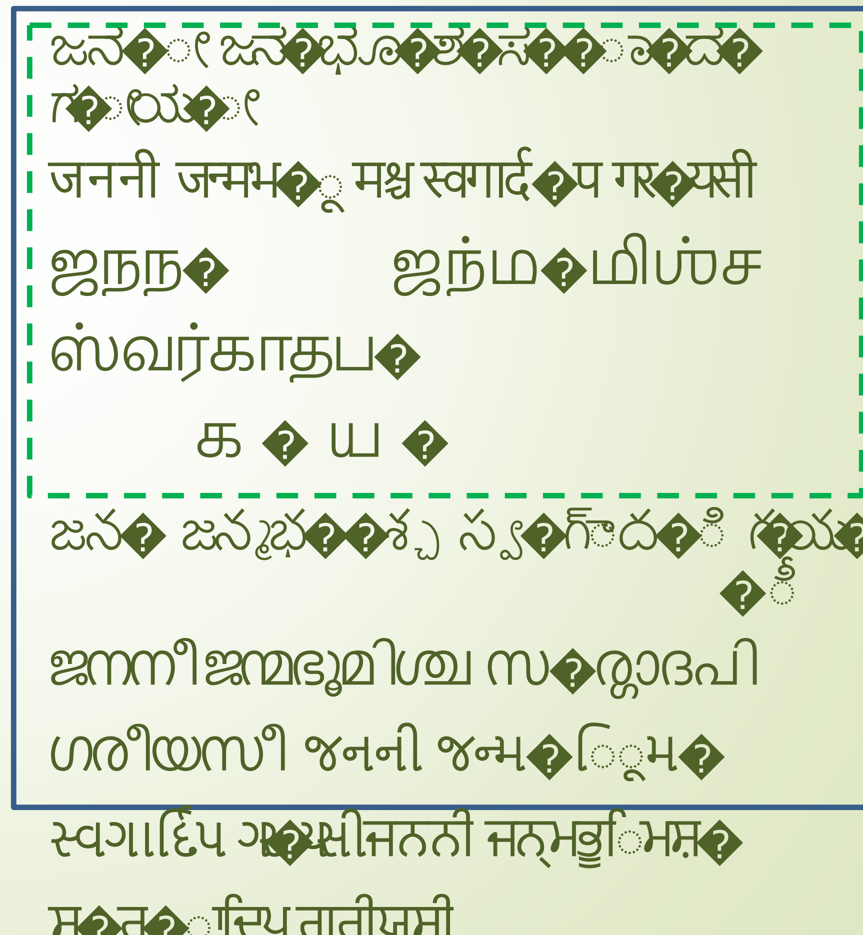
- Arial, Helvetica, sans-serif
- Courier New, Courier, mono
- Verdana, Arial, Helvetica, sans-serif
- Geneva, Arial, Helvetica, sans-serif

Regional Fonts still have unresolved problems when used in low resolution & small displays screens.



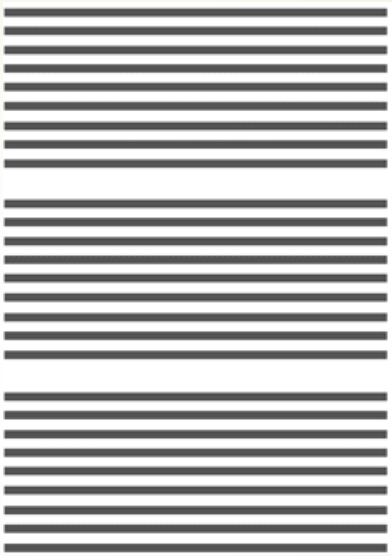
Weight of font matters

BOLD – some times , results in poor smudged readability on mobile screens - even on AMOLED



Graphic Design – Website Layout

HCI-Designers besides being Engineers are Artists in the sense that they have to become sensitive to the visual language and master the use of visual elements in accordance to Principles



Too much of order. Not Interesting

Rhythmic spacing. Different shapes create interesting lay out.

Case Study 1 : Windows GUI

Aesthetic and minimalist design:

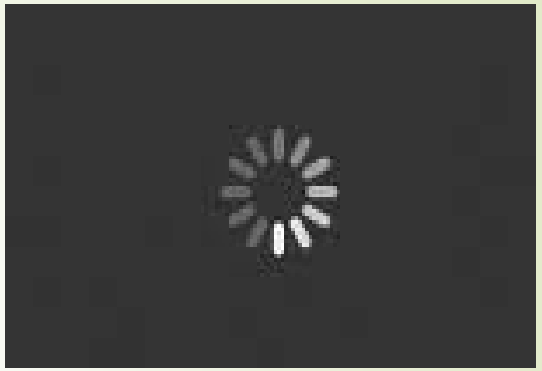
The system is not clustered with excessive use of icons and buttons. Tabs are used to separate different functionalities. A simple rectangle composition arrangement is used to model information.

Recognition rather than recall: The use of colour schemes and icons act to denote functionalities . Example ‘ Head Phone icon”. This design feature promotes recognition of rather than recall of system functionalities

Case Study 2 : Icon Design

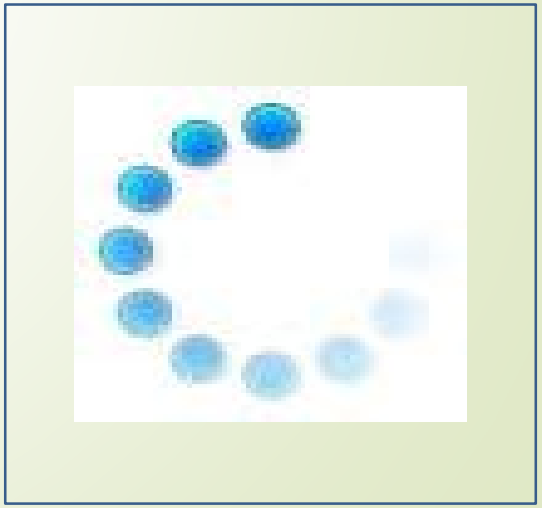
Two simple icons communicating an activity in progress.

Both the icons are graphically simple, do the function of informing the status & are not complicated to understand.



They use gradient in colorus (monochrome) to depict time progress through animation. The circular form express the abstract concept of time.

The state of ‘please wait’ is expressed in a pleasant peaceful unhurried manner.



Assignment 1

From any computer or mobile screen pick one GUI which you do not like & one more GUI which you like.

Analyze their constituting graphic / visual elements by applying principles of aesthetics and find out if you can attribute any aesthetic reasons for your ‘like’ & ‘dislike’. Keep functional & usability aspects out of the judgment for the time being.

Assignment 2

- Sketch as many alternatives as you can visualise for the two icons that depict activity progress happening in the background .

- Conduct a quick survey from amongst your friends as to which of the icon concepts, you have come up with, are 'liked' by them.

- You can ask them to rate each design for 10 points and empirically find out the one that is most likely to be accepted in terms of aesthetics & function representation.

- You can also ask them to point out one visual element from your design that if changed will improve your design.