GALGOTIAS UNIVERSITY

Program: B.Tech CSE -GG

Course Code: CSGG4021

Course Name: Introduction to Graphics and Animation

Course Outcomes :

CO	Title
CO1	To understand the basics of computer graphics, different graphics systems ,applications of computer graphics and color theory.
CO2	To understand the various algorithms for scan conversion and two dimensional geometric transformations.
CO3	To apply the computer graphics concepts in the development of computer games, information visualization, and business applications and learn the use of OpenGL .
CO4	To implement and understand the basic concept of various open source graphics tools like GIMP and blender etc.
CO5	To evaluate and compare the various image compression techniques and implement basic 3D modeling techniques.

Course Prerequisites/Objective

The objective of this course is to:

- To learn the basic concepts of graphics design. This includes color theory and application of graphics design.

- Be able to discuss the application of computer graphics concepts in the development of computer games, information visualization, and business applications.

- To develop a facility with the relevant mathematics of computer graphics, e.g., 2D/3D rotations using both vector algebra, and transformations and projections using homogeneous coordinates.

- To learn the principles and commonly used paradigms and techniques of computer graphics, e.g., the graphics pipeline, and Bresenham's algorithm for speedy line and circle generation

UNIT-1

Introduction

Graphic Design Overview, Graphic Design as a discipline, evolution of Graphic Design – Emergence of the design industry, Twentieth century design; Applications of Graphic Design, Skills & Design Illustration, Importance of color in graphics, Things to consider while choosing color in layouts – Color theory: Primary color, secondary color, tertiary color, Knowledge of colors – Harmonious colors, Complimentary colors, Color Models: RGB, CMYK, HSV

Recap

- Evolution of Graphic Design

- Emergence of design industry

- Ninetieth Century Design

- Twentieth Century Design

- Applications of Graphic Designer

- Skills and Design Illustrations

Skills & Design Illustrations

Skills

- A graphic design project may involve the stylization and presentation of existing text and either preexisting imagery or images developed by the graphic designer. Elements can be incorporated in both traditional and digital form, which involves the use of visual arts, typography, and page layout techniques. Graphic designers organize pages and optionally add graphic elements. Graphic designers can commission photographers or illustrators to create original pieces. Designers use digital tools, often referred to as interactive design, or multimedia design. Designers need communication skills to convince an audience and sell their designs.

- The "process school" is concerned with communication; it highlights the channels and media through which messages are transmitted and by which senders and receivers encode and decode these messages. The semiotic school treats a message as a construction of signs which through interaction with receivers, produces meaning; communication as an agent.

  source: Wikipedia

Skills & Design Illustrations

Design

Interface design

- Since the advent of personal computers, many graphic designers have become involved in interface design, in an environment commonly referred to as a Graphical User Interface (GUI). This has included web design and software design when end user-interactivity is a design consideration of the layout or interface. Combining visual communication skills with an understanding of user interaction and online branding, graphic designers often work with software developers and web developers to create the look and feel of a web site or software application. An important aspect of interface design is icon design.

User experience design

- User experience design (UX) is the study, analysis, and development of creating products that provide meaningful and relevant experiences to users. This involves the creation of the entire process of acquiring and integrating the product, including aspects of branding, design, usability, and function.

Experiential graphic design

- Experiential graphic design is the application of communication skills to the built environment. This area of graphic design requires practitioners to understand physical installations that have to be manufactured and withstand the same environmental conditions as buildings. As such, it is a cross-disciplinary collaborative process involving designers, fabricators, city planners, architects, manufacturers and construction teams.

- Experiential graphic designers try to solve problems that people encounter while interacting with buildings and space (also called environmental graphic design). Examples of practice areas for environmental graphic designers are wayfinding, placemaking, branded environments, exhibitions and museum displays, public installations and digital environments.

source: Wikipedia

Skills needed by Graphic Illustrator

[Graphics illustration industry](), like most creative industries, is constantly changing because of changing consumer tastes and emerging software technology. Graphic illustrators need to stay at the forefront of new trends and constantly upgrade their skills to meet the challenges of the evolving market. Besides the ability to constant reinvent, graphic illustrators should also have the following basic skill set.

Typography

- Typography is the art and technique of arranging type and it is central to the work that a graphic illustrator does. Typography is not just about making the words legible, a graphic illustrator must understand the fundamental concepts of typography and apply it such that the choice of typeface synchronises with the design and colour scheme. Mastering the typography techniques can make a good illustrator into a great illustrator. Using the typography tutorials to help with the basics and using this knowledge to fine tune creative intuition is the best way forward for [graphic illustrators.]()

Generation of Ideas

- Like any other profession, graphic illustrators need to have an innovative approach towards their work in order to achieve professional success. Ability to think up creative ideas and a clear plan to translate those ideas into reality is an essential skill for career growth. Graphic illustrators need to develop their creative skills with reading and by collaborating with other creative thinkers.

Social Network

- Building up a good set of interpersonal skills and a solid social network is the key to a sustainable career as a graphic illustrator. Building positive relationships is important both personally and professionally for a graphic illustrator. Many illustrators are self-employed and therefore, work alone. A good social network not only provides support and feedback on your work, it also helps in making fresh contacts and drumming up business. It is necessary for [graphic illustrators]() to attend seminars and networking events and to carry contact information when they go to meet people.

Business Skills

- The last essential skill set for a design illustrator is business savvy. An illustrator must have adequate knowledge of management, finance and marketing in order to build up a successful career or business. In addition, an ability to understand customer challenges and ensure customer satisfaction is important because a loyal and stable customer base is the foundation of all successful businesses.

What does a graphic designer do?

When he gets a graphic design job, be it a poster design, book design, web design, advertising, he has to start with asking himself the following **fundamental questions:**

- What is the objective of the communication?

- What needs to be said first and then next and then after that? (levels of hierarchy)

- How do you want the eye to flow through the page?

- What is the tone of voice?

- Who are you speaking to?

Objectives of Communication

What is the information that needs to be passed on? When the audience reads your book/webpage/ad what's he supposed to get out of it?

An advertisement and a newspaper have different objectives of communication.

What needs to be said first and the next and then after that?

Once you have figured out what the objective of your communication is you'll want to think about what needs to be said first and foremost and what it should be followed by.
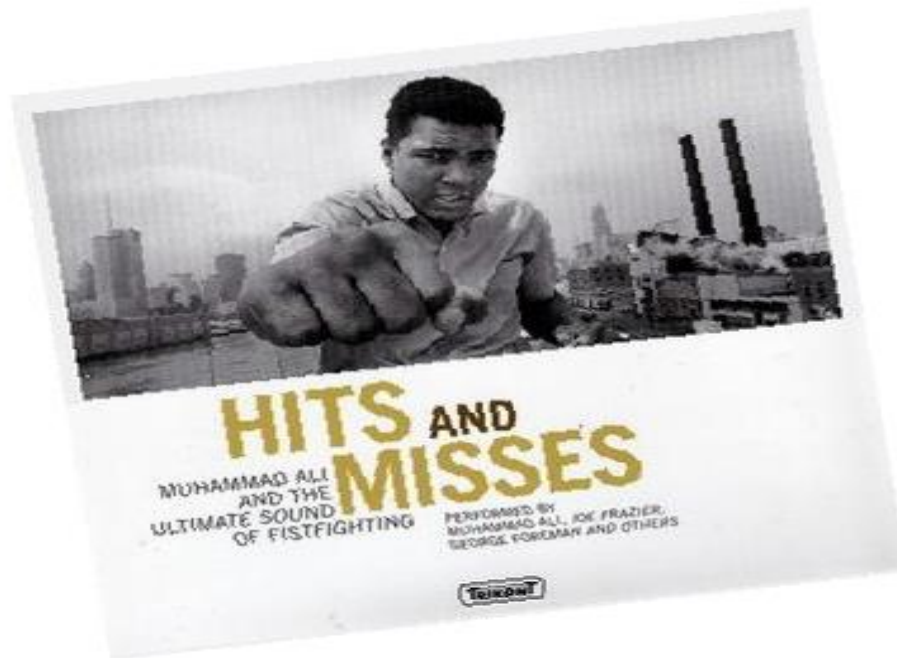
How do you want the user's eye to move around the page?

The hierarchy mentioned above, along with elements like color, contrast, size etc, will automatically make your viewers eyes go through the page in a certain way. This can be manipulated as per your intention.

Who are you speaking to?

You have to be very sure about this as different people need to be spoken to differently, just the way it is in real life.

What is the tone of voice?

Only once you have got the above figured out can you think about the more external elements of your piece of work.
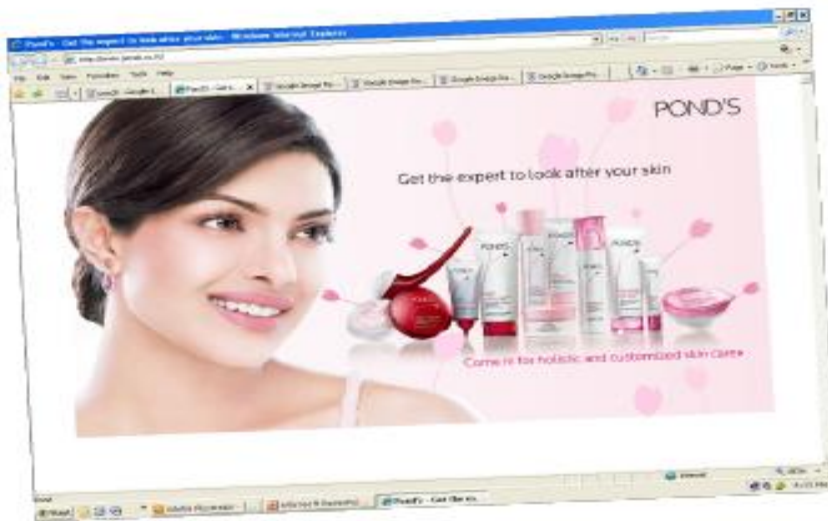
Solutions to these questions

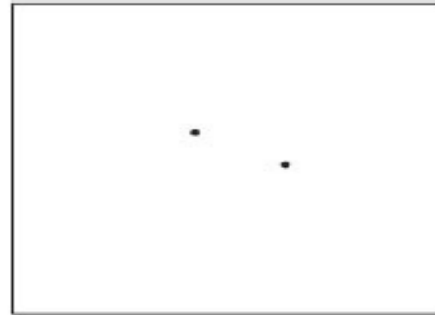Broadly speaking, the following **tools** are available to him to solve the aforementioned issues:

- Point
- Line
- Form
- Pattern
- Texture

- Space
- Size
- Typography
- Color
- Image

Point

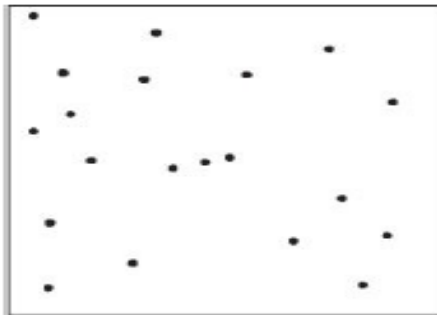Point is the fundamental part of graphic design
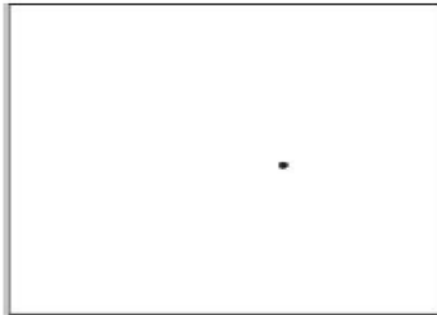
I see lonliness, I see a blemish, a mole or some kind of mark thats spoiling the sanctity of the whiteness

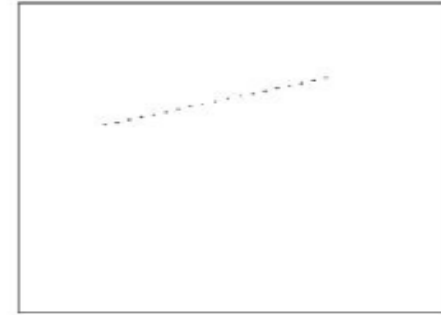I see some connection between the two, I am reminded of a salt dispenser.

I see a pepper dispenser, and a triangle

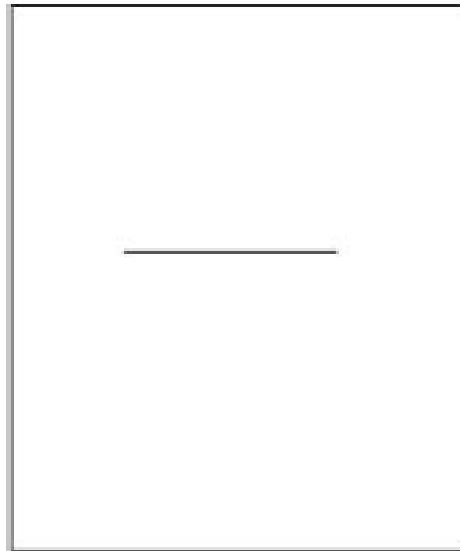I see random dots. I'm reminded of when I had measels.

I see the constellation Orion.

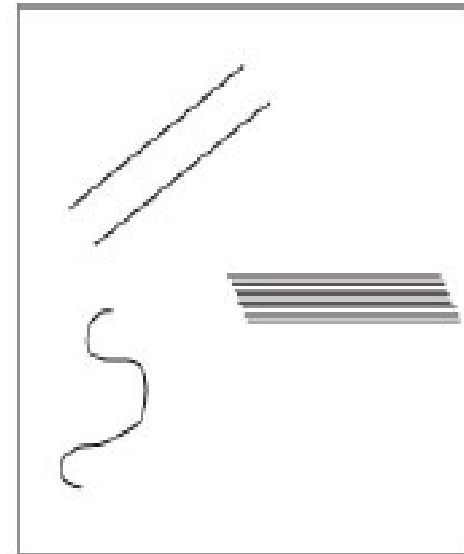I see a diagonal line

Line

Line is any mark connecting two points

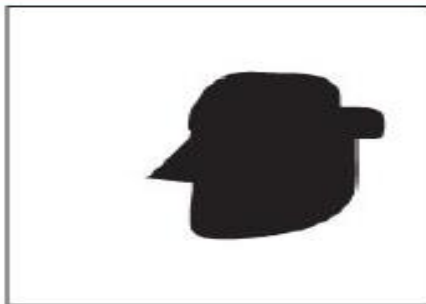Calm, subtraction, state of rest.

Two parts of the page, one bigger, one smaller.
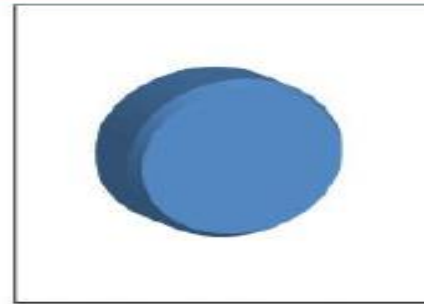
Lazy line, speed and active line

Shape

Anything that has a height and width is shape

It is a human tendency to make meaning out of a shape. In this case i recognise the profile of a man in the shape.
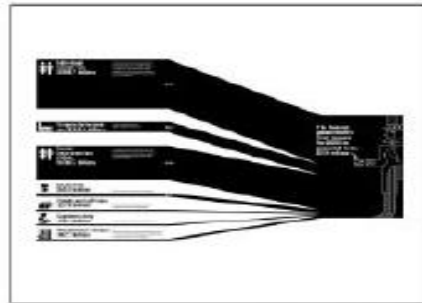
A geometrical shape and an irregular shape.

A three dimensional shape gives us an illusion of depth in the page and gives a shape a tactile quality.

It is important to note that the negative space is as important as the positive space.
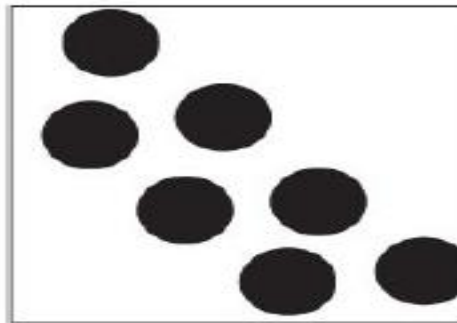
Here shapes have been used to organize information.

Shapes are used in icon design for their immediate cognition.

Pattern

Our tendency to make meaning an order will find a pattern in things

Patterns are a way of making sure the user can comprehend the page system logically. For example the user understands that there will be a continuation of the pattern above even beyond the page.
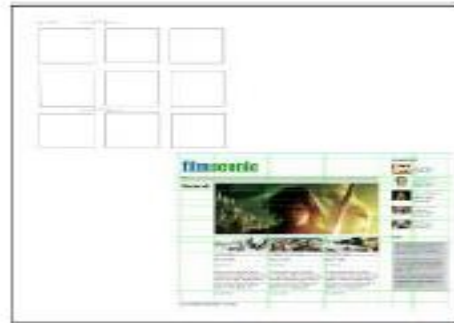
When a grid is used to lay out a page the underlying network of lines organises the information for the viewer and helps him take in the information in logically

Branching and tesselations are two major types of patterns, both of which are used in organizing information.

Here pattern has been used to organize information logically.

Here the way pagination has been treated forms a pattern.

Here a repititive pattern using colour and shape is used in textile design.

Texture

Texture is the look or feel of a surface. You can add richness and dimension to your layouts with texture. Visual texture creates an illusion of texture on a printed publication or web page.

- Texture can create mood and personality
- Provoke emotion

Texture is the illusion of a tactile quality. It is used to give a surface an expression.

In real life the raised surface of the buttons of a remote control are depressed to perform an action.

With new web RIA technologies this is emulated to give a flat surface a tactile quality.

Size

Size is how large or small something is.

Size is very important in making a layout functional, attractive, and organized.

It shows what is most important, attracts attention, and helps to fit the layout together.

Size is important to create emphasis and heirarchy.

Here size has been used to indicate which feature is more important than the other. The different sets of sizes also organize information on the page into categories.
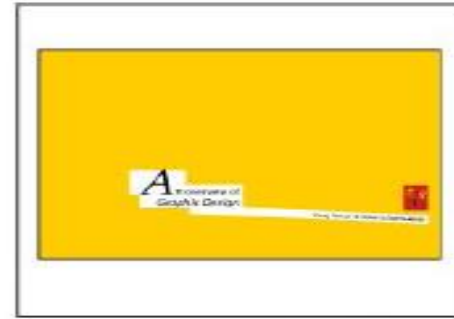
In the first slide of this presentation i had to use a lot of white and black to balance the mindtree logo. The red has a smaller size but a very heavy visual weight in this picture.

Type

Typography is one of the most important tools for a graphic designer.

Typography can take you back to a different time, set a mood, set a tone of voice, organize pages, create unity between objects etc.

Typography is used to make text legible and clear. Certain typeface are more readable than others. Choice of font, line spacing, line length are some functions to keep in mind when setting large amounts of text.

Stylized typography is used for creating distinctive logos. In this case the type has been inspired by roots of trees and work well with the image of the bird.

Type is used to evoke an era and an emotion.

Color

Color in layouts can convey moods, create images, attract attention, and identify objects.

When selecting colors for a publication or a web page, think about what you want the color to do and what is appropriate for your purpose.

Colour has the ability to immediately conjure up emotion

Colour is used to highlight important elements such as headlines and subheads.

Provoke emotion.

Colour is one of the most important elements in creating a corporate identity.

Colour can be used to represent ideology.

Knowledge of colour complimentaries and harmonies are used to create composition.

Importance of Colors in Graphics Design

- Color plays a major part in the correct reflection of your brand. This visually obvious yet subtle application has a significant impact on the way a brand is perceived by the public. No matter if you're designing a brand for yourself, a small company, or a corporation the effects of color will not discriminate based on how much cash you have to start. When looking at color options for your brand it's always best to take a look at other brands to get a clear idea on how color schemes play a part on the perception of brand perception. A company with strong brand recognition, altering the color scheme where it is expected to be maintained can have dangerous results.

- Today's marketplace is bombarded with products that are trying to get our attention at every head turn, decreasing the likely hood that your product will immediately stand out. According to the way our natural senses function Color is the most influential, followed by Shapes, Symbols, and finally Words. Here we will look at what colors mean on a basic level, as well as brands that are best known for their recognition by color, color combination practices, and how you can use these methods to develop your own brand.

- But make no mistake, brand recognition will make a good company succeed faster and make bad companies fail faster. People attach most of how they feel about your brand according to their personal experience with your products and services. By selecting a color and/or color combinations for your brand you will take the first step in growing a favorable acceptance in your chosen industry.

Meaning of Colors

Color meanings vary from culture to culture, and the impact that your brand has on your targeted audience. Here is a list of a few meanings on how colors are interpreted by brands:

Hue is the primary value of a color and how the color red, green, blue, purple, etc. is perceived through the eye. Saturation of a color is the overall intensity or brightness of the color, any color that appears dull is referred to as desaturated. Value is the lightness or darkness of overall colors schemes.

I.   **Blue:** Security, Trust Worthy, Stability, Loyalty, Wisdom, Confidence, Trust, Friendliness, Preservation, Courage, Science.

II.   **Green:** Wealth, Money, Calming, Trees, Ambition, Endurance, Healing, Calm, Generosity, Natural, Completion, and Protection.

III.   **Red:** Energy, Power, Vigor, Leadership, Courage, Passion, Activity, Joy.

IV. **Yellow:** Optimism, Childish, Freshness, Law, Education, Arrogance.

V. **Pink:** Romantic, Feminine, Love, Beauty.

VI. **Orange:** Cheerful, Passion, Pleasure, Enthusiasm, Fascination, Creativity, Fun.

VII. **Black:** Powerful, Mysterious, Elegance, Sophistication, Functionality.

Source: Wikipedia

Tips for Choosing Colors

I. Don't stick with presets: Almost every program you use will automatically give you preset colors. Get past the presets and explore color on your own. Don't let the program decide how you use color in your design.

II. Start with one color you like: Every time I design something, I start with one color and build the color scheme from there. If you try and start with more than one color, you'll have a harder time finding harmony between your colors.

III. Save your color schemes: If you find a color scheme you like, it'll probably be useful to you later. I wouldn't suggest using the same color scheme for every chart or graphic you create, but you can always use different schemes in different ways later on.

IV. Practice makes perfect: The more you play with color and practice design, the better you get. No one creates their masterpiece the first time around.

Source: Wikipedia

Thank You