



Multimedia Programming

Multimedia
Software

Level 3

Lecture 3

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Graphics in Multimedia Programming



Lecture Objectives:

- The student will understand the concept of graphics and its types.
- Distinguish between raster and vector graphics.
- Understand the role of graphics in multimedia applications.
- Practice a simple activity that links theory with practice.



What is graphics?

Anything drawn or designed visually to represent information or an idea.

Its connection to multimedia:

- Without graphics, applications would be text-only..



Definition of GRAPHICS:

The word “graphic” refers to any visual representation of data and includes a variety of forms including drawings, photographs, line art, graphs, diagrams, numbers, symbols, geometric designs, maps, and engineering drawings. Graphics may be images only or may also include text and they can be used for decorative or functional purposes, including educating, illustrating, or entertaining.



Definition of GRAPHICS:

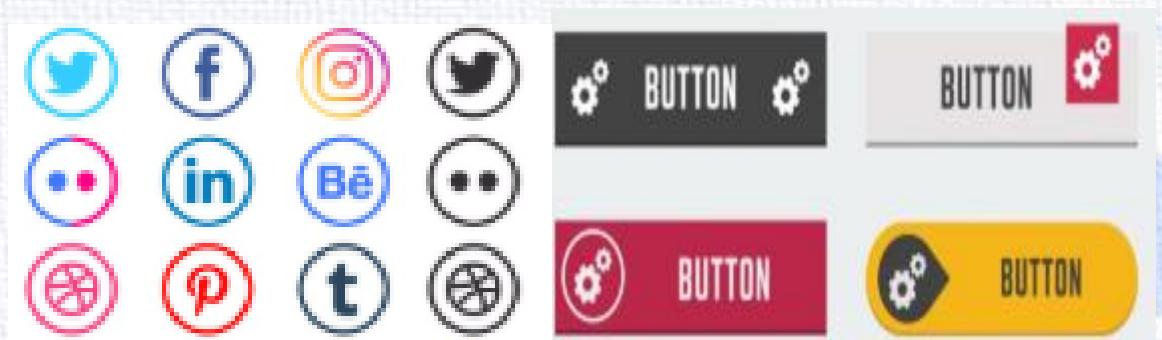
Examples:

- Graphic Design =
 - Graphic =
 - Computer Graphics =
-
- Logo
 - Mobile User Interface (UI)
 - Games Graphics



The Purpose of Graphic Design

1. Convey information visually rather than just text.
2. Grab attention and enhance the user experience.
3. Express an idea or visual identity.
4. Support interactivity in multimedia programs (such as buttons, icons, and animations).





The Purpose of Graphic Design

5. The main purpose of graphic design is to communicate and solve problems through visual content.
6. It involves using text, images, colors, and symbols to convey messages and ideas making it useful, effective and attractive form.
7. Graphic design is used across various industries for purposes such as branding, advertising, web design, editorial design, product packaging, and more.
8. The goal is to attract, engage, and inform audiences, often with the intent of prompting them to take a specific action or to create a strong brand recognition.



Key Objectives of Graphic Design:

1. Brand Recognition: Establishing a unique and memorable brand identity (such as a name, logo, shape, or voice).
2. User Engagement: Creating designs that attract and hold attention.
3. Information Clarity: Presenting information in a clear and compelling way.
4. Call to Action (CTA): Encouraging desired responses, such as clicking a button or making a purchase.



Key Objectives of Graphic Design:

5. Communication: **Clearly convey the idea**
6. Attractiveness: **Beautiful design that engages the user**
7. Usability: **Easy to use and understand**
8. Creativity: **Create new visual solutions**

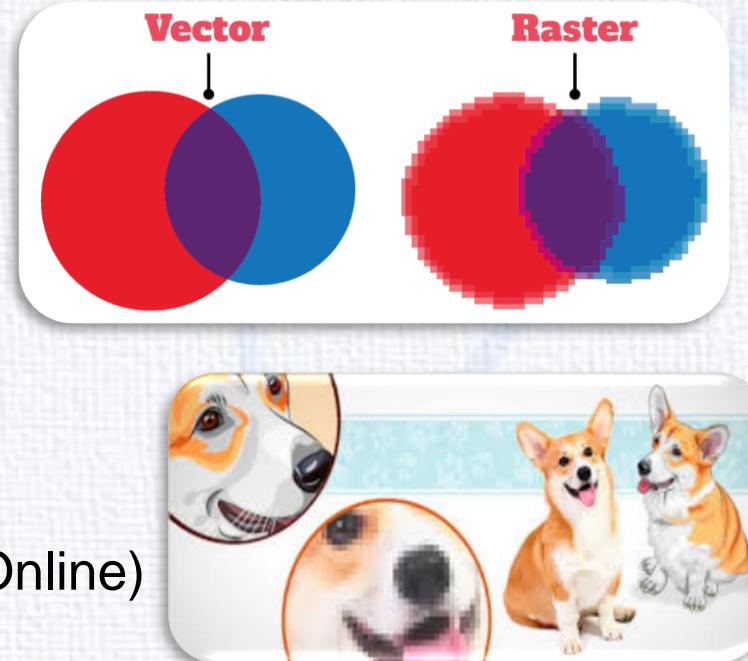


2. Types of Graphics:

1- Raster Graphics (bitmaps) :

- Composed of pixels (like photographs).
- Loss of quality when enlarged.

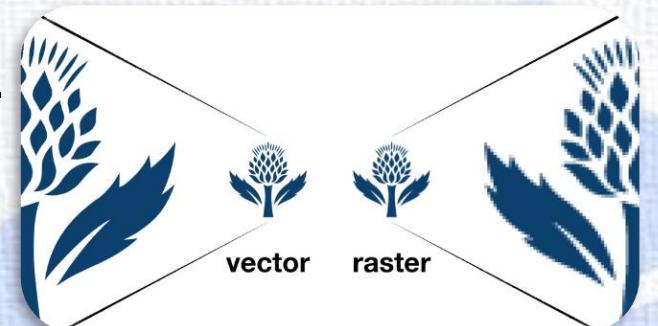
Examples: PNG, JPEG. (Camera Photos - Photos Online)



2- Vector Graphics:

- It consists of mathematical lines and paths.
- Does not lose quality when enlarged.

Examples: SVG, AI. (logos, drawing)- Adobe Illustrator.





2. Types of Graphics:

Element	Raster	Vector
Formation	Pixels	Lines& Equations
Quality at Enlargement	Decrease	Unaffected
Size	Large	Small
Software Used	Photoshop	Illustrator



2. Types of Graphics:

. Pixel

- A pixel is the smallest unit of a digital image.
- Each pixel represents a color value (e.g., RGB or RGBA).
- When millions of pixels are combined, they form the complete image.



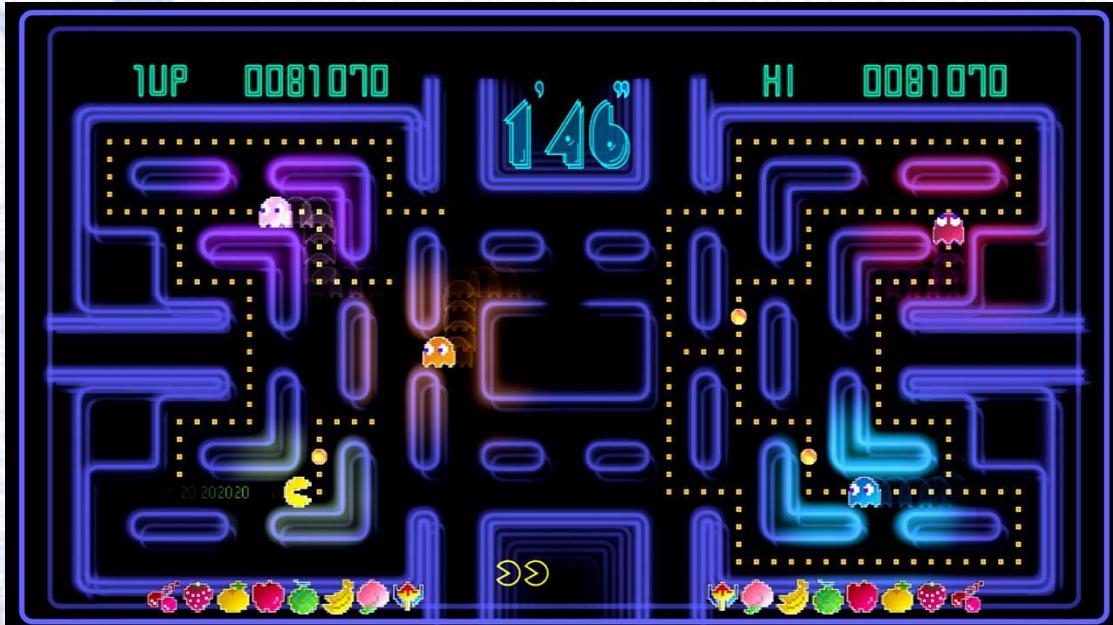
Example:

A screen with 1920×1080 resolution has 1920 pixels horizontally and 1080 pixels vertically



2. Types of Graphics:

. Pac-Man





2. Types of Graphics:

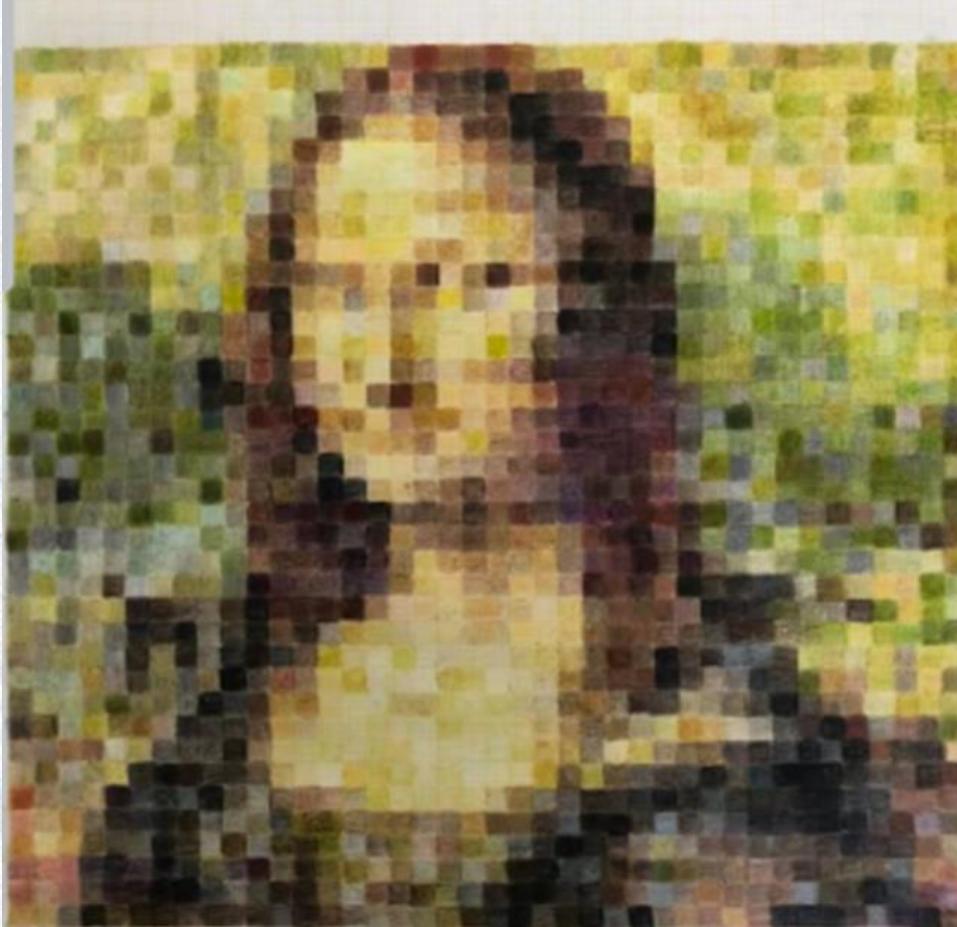
Super Mario





2. Types of Graphics:

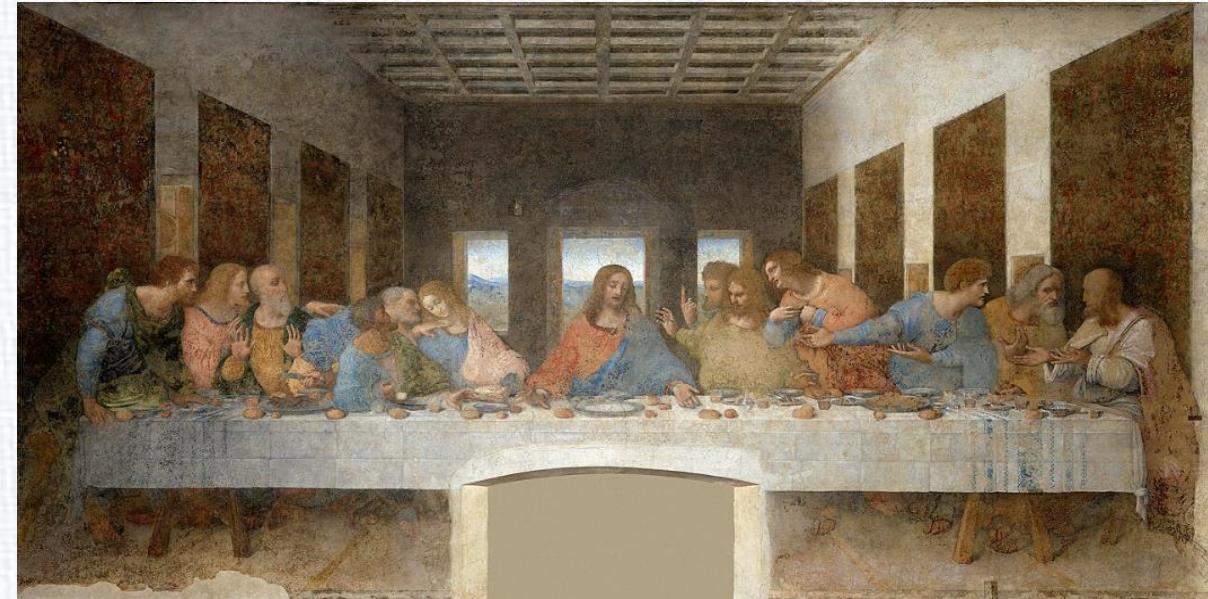
Pixel Art





2. Types of Graphics:

Leonardo's Last Supper



Some contemporary artists have used the concept of pixels as a symbol of disintegration or reconstruction.



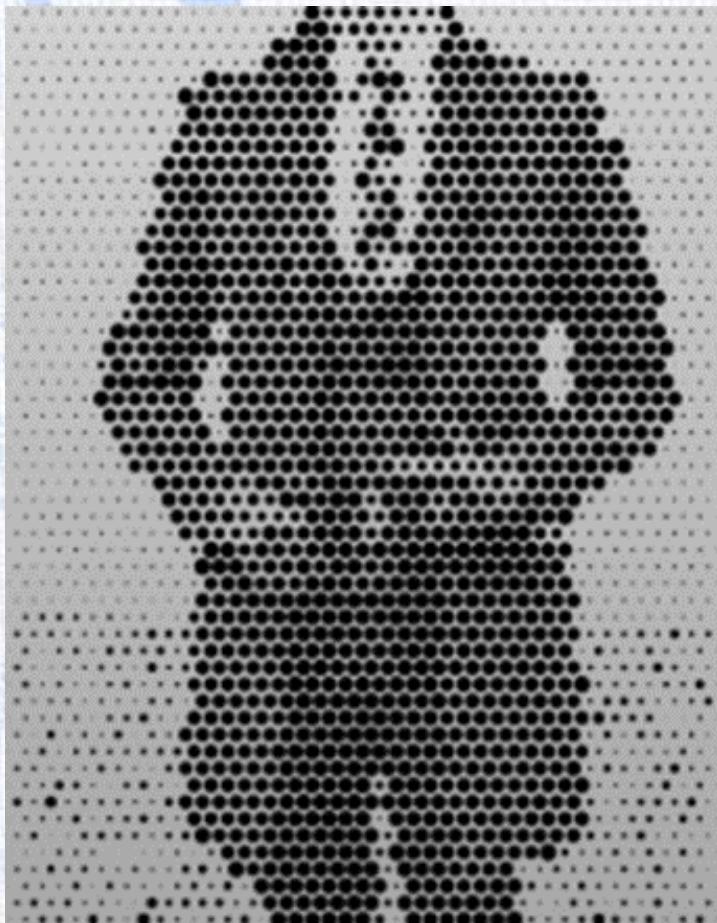
2. Types of Graphics:

Vincent van Gogh's Sunflowers





2. Types of Graphics:





2. Types of Graphics:

. Bitmap

- A bitmap is an image file or representation made up of many pixels arranged in a grid.
 - Each pixel's color is stored as a numeric value.
 - The .bmp format is a common example of bitmap images.
-
- Difference:
 - Pixel = one point.
 - Bitmap = collection of many pixels forming the image.



2. Types of Graphics:

A raster image (also known as a bitmap) is made up of a grid of pixels, where each pixel holds a specific color value. When viewed at normal size, these pixels blend together to form the image.

◆ Key characteristics of raster images:

- Composed of pixels (tiny dots of color).
- Common raster formats: .bmp, .png, .jpg, .gif
- Resolution-dependent — when you zoom in or scale up, the image becomes blurry.



Raster Graphics (bitmaps) :



Figure 1 This image is made up of 1200 x 800 pixels and looks to the eye like a scene might look in reality.

Figure 2 This image is made up of only 120 x 80 pixels, which is called 'pixelation.'

Both resolution and image size need to be used together.



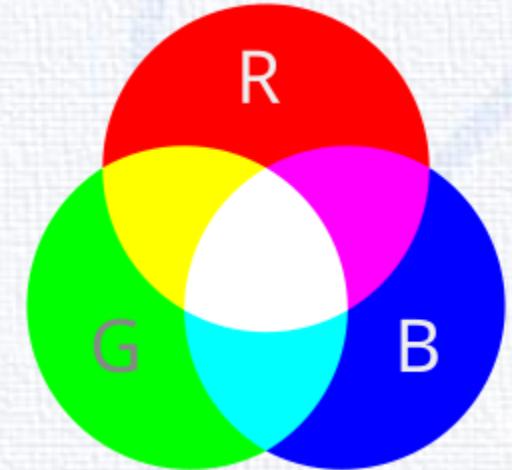
2. Types of Graphics:

RGB

- ◆ Abbreviation for Red – Green – Blue
- ◆ It is the basic color system upon which digital images are built
- ◆ Each color in an image consists of three numerical values representing the proportion of red, green, and blue.
- ◆ Each value ranges from 0 to 255.

Example:

RGB (255, 0, 0) ← It means pure red (maximum red, no green or blue).





2. Types of Graphics:

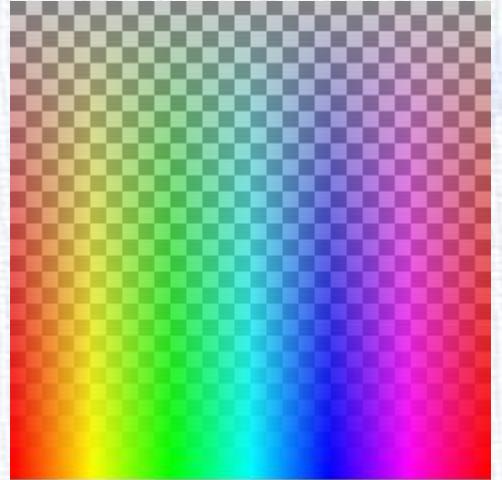
RGBA

2. RGBA

- ◆ Same principle as RGB, but with an additional channel called Alpha.
- ◆ The letter A = Alpha Channel, which is responsible for transparency.
- ◆ The Alpha value usually ranges from 0 to 1 (or sometimes from 0 to 255).

Example:

RGBA (255, 0, 0, 0.5) ← It means a semi-transparent red color (0.5 = 50% transparency).





2. Types of Graphics:

Summary:

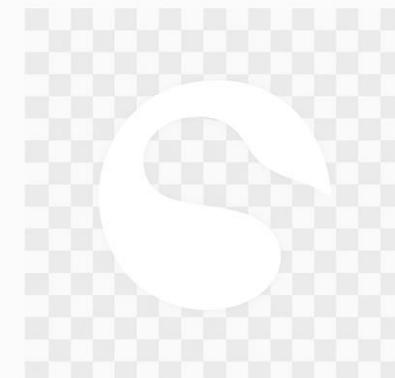
RGB = Color Only.

RGBA = Color + Transparency.

RGB



RGBA





2. Types of Graphics:

HTML RGB & RGBA Colors

RGB	RGBA
<code>rgb(red, green, blue)</code>	<code>rgba(red, green, blue, alpha)</code>

(JPG ... Ping ... PSD ... PDF)



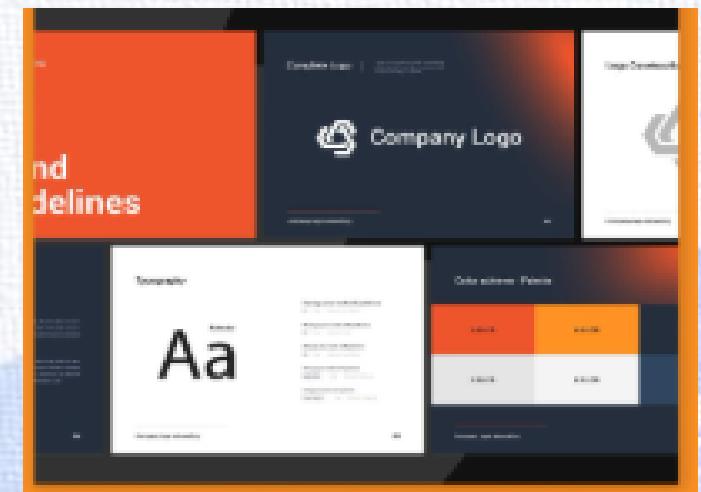
Types of Graphic Design

Graphic design is a broad field with various specializations, each serving different purposes:

1. Visual Identity Graphic Design

Visual identity design focuses on creating the visual elements that define a brand.

Designers in this field develop logos, typography, color schemes, and brand guidelines to ensure consistency across all brand materials.





Types of Graphic Design

2. Marketing & Advertising Graphic Design

This type of design is used to create promotional content that drives consumer engagement. Examples include print ads, social media graphics, and product packaging. The goal is to communicate marketing messages in a visually compelling way that motivates action.





Types of Graphic Design

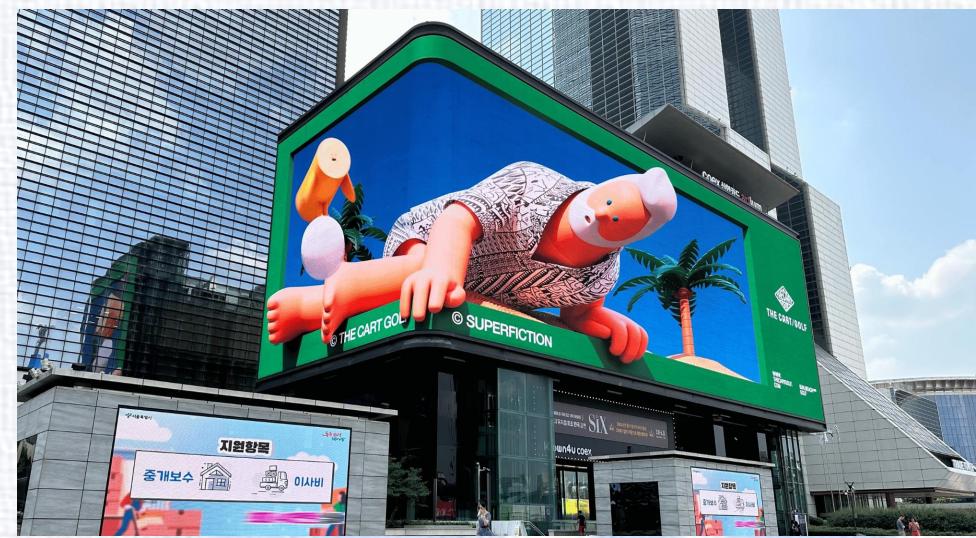
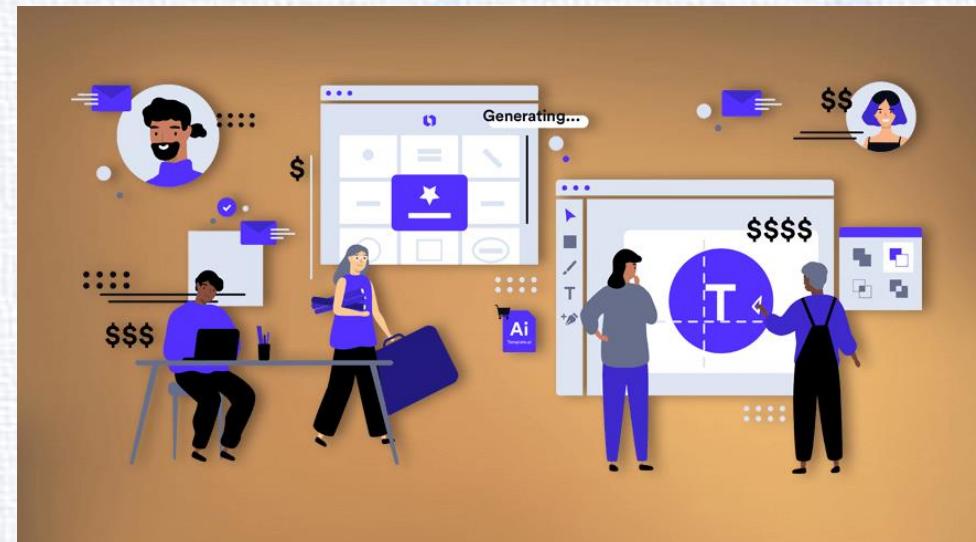
2. Marketing & Advertising Graphic Design





Types of Graphic Design

2. Marketing & Advertising Graphic Design

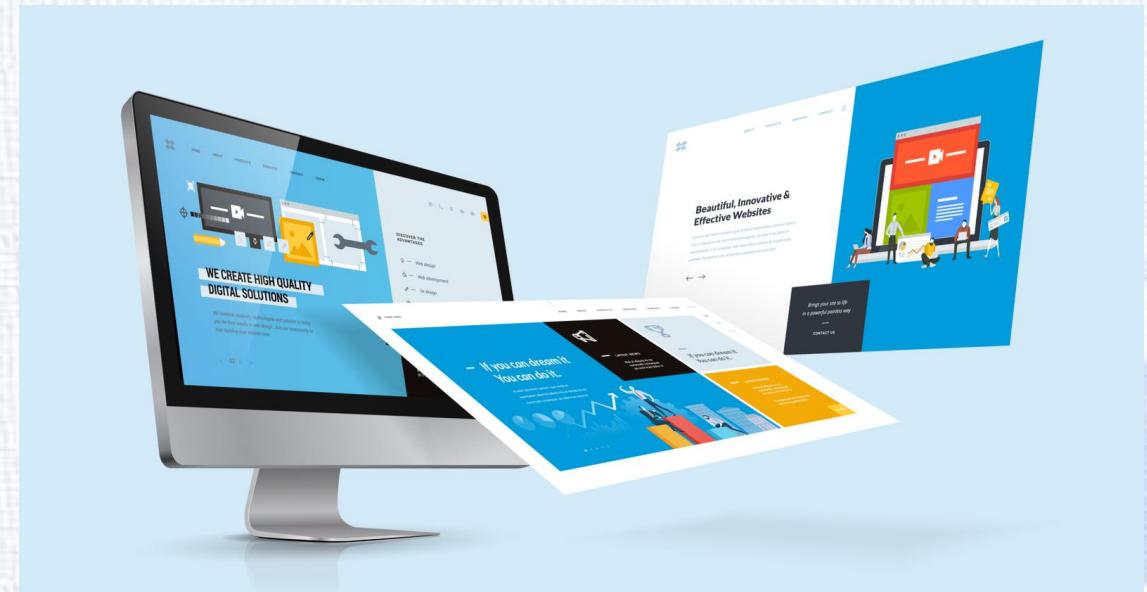




Types of Graphic Design

3. Web Design

Web design involves creating engaging and aesthetically pleasing online experiences for users. Designers focus on the layout, color scheme, typography, and usability of websites. The aim is to make websites functional, easy to navigate, and visually appealing, enhancing the overall user experience.





Types of Graphic Design

4. Publication Graphic Design

Publication designers work with printed materials like books, magazines, and newspapers. They design layouts that are both visually appealing and easy to read, ensuring the content is well-organized and engaging.



PUBLICATION GRAPHIC DESIGN

SECTION 1: LETTERS

We are part of a vibrant and growing climate justice movement – and good governance is critical

South Africa finds itself at a critical juncture: it must navigate the global energy transition away from harmful energy sources, especially coal, in the context of unprecedented constraints, extreme inequality and, increasingly, high unemployment, especially amongst young people. As a public interest law organisation working within the sphere of environmental and climate justice in South Africa, CER has to confront important questions: how can we support the transition to a cleaner energy future, how can CER influence policy upstream of regulatory and corporate decision-making to progress environmental and climate justice? In other words, how do we ensure that our advocacy is effective, that regulatory or administrative action that requires court action to set aside? And how can we take a more intersectional approach – both in terms of human rights and social justice issues – to ensure that we play our part in building the cohesive, inclusive, effective climate and environmental justice movement required to address the climate emergency?

As Chairperson of the CER Board, it has been a privilege to see CER tackle these questions head on. The organisation is single-minded in its resolve to work to expand the scope of its work beyond the environmental and climate justice movement to also recognise the importance of a diverse, empowered environmental and climate justice movement, and the need to influence the institutions of power that make decisions outside of and beyond the environmental and climate justice movement. Good governance is a precondition for the success of any organisation that challenges these complex issues. CER's Board of Directors consist of a diverse and skilled group of professionals who take their mandate seriously, and are responsible for setting the strategic direction of the organisation and ensure its execution, to ensure the financial resilience of the organisation, and adequate risk management – and to do this at the highest level of accountability. This is a privilege to be associated with such a vibrant, brave and thoughtful group of activist lawyers working for environmental and climate justice.

Nomphi Ndawo Vilakazi

LETTER CONTINUED

We need an informed, resourced and diverse environmental and climate justice movement led by and serving those most affected by the transition of our society and planet.

NOMPHI NDAWO VILAKAZI

– that want a society based on justice and equality in which all people and the environment can thrive, now and in the future, recognising the way in which our environment and society are interconnected, that became acute during the COVID-19 pandemic. Shortly before the time of writing, catastrophic floods in KwaZulu-Natal resulted in the displacement of thousands of people and caused billions of rands in damage to housing and other infrastructure.

To achieve this goal, we need an informed, resourced and diverse environmental and climate justice movement led by and serving those most affected by the transition of our society and planet. We need laws and policies that protect the environment and climate that promote and secure Constitutional rights, and are transparent, accountable and enforced in a transparent, lawful and accessible way. We need institutions with power to hear the concerns of the environmental and climate justice movement, that rely on sound science, and to take action to address environmental and social injustice, the climate crisis and economic inequality.

As the climate crisis escalates, South Africa's water and food security is predicted to deteriorate further, with impacts that disproportionately affect the most vulnerable people (as well as our future generation) and South Africa's rural communities.

It is clear to us that the climate crisis and the ecological breakdown that is already evident, is one that cannot be solved without being addressed simply by improving our environmental regulatory system: a much broader, integrated, intersectional approach is required to address the systemic discrimination that props up the exploitation of people and planet that has brought us into a climate emergency.

CER is part of a vibrant and growing movement of organisations, networks and individuals – beyond the traditional environmental sector

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South Africa's over-reliance on coal for power generation is devastating the lives, health and livelihoods of communities in our coal areas.

NOMPHI NDAWO VILAKAZI

1 CENTRE FOR ENVIRONMENTAL RIGHTS | IMPACT REPORT 2023

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Types of Graphic Design

5. Packaging Graphic Design

Packaging design is crucial for attracting customers and reinforcing brand identity. It's not just about aesthetics—packaging needs to be functional and convey key product information.





Types of Graphic Design

6. Motion Graphic Design

Motion graphics bring visual elements to life through animation and audio, which can be used in advertisements, animated logos, and explainer videos. This dynamic form of design can make complex ideas more accessible and engaging through movement.

Motion Graphic Design





Types of Graphic Design

7. Environmental Graphic Design

Also known as experiential design, this type combines elements from interior, architectural, and graphic design to enhance the way people interact with public spaces. This can include wayfinding systems, mural designs, branding, and informational displays that connect people to places.





Types of Graphic Design

8. Illustration for Graphic Design

Illustrators create original artwork that complements or acts as the primary visual representation in various applications. Illustration can provide a more artistic and unique style to projects like children's books, editorial articles, and boutique packaging.

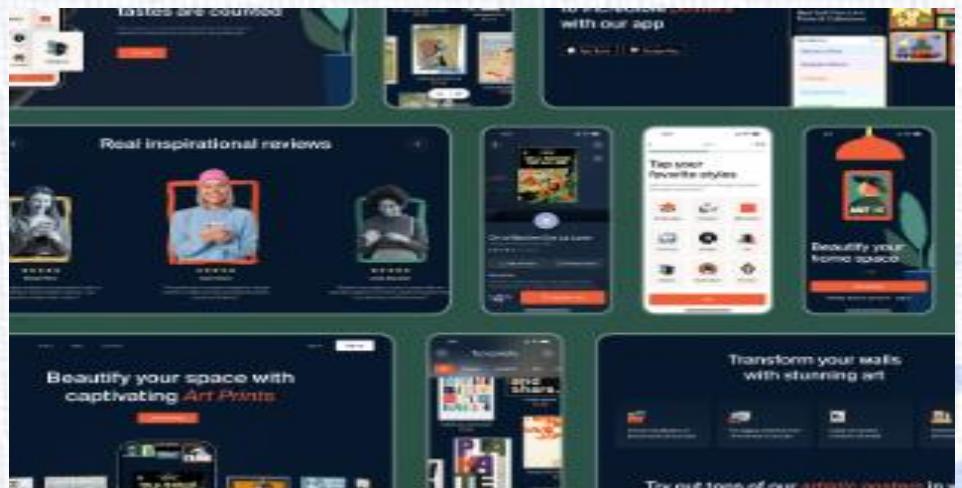




Types of Graphic Design

9. User Interface Graphic Design

UI design focuses on the aesthetics of user interfaces for software, websites, and apps. The goal is to create interfaces that are intuitive and easy to use, with careful consideration given to the placement of buttons, icons, typography, color schemes, and responsive design.

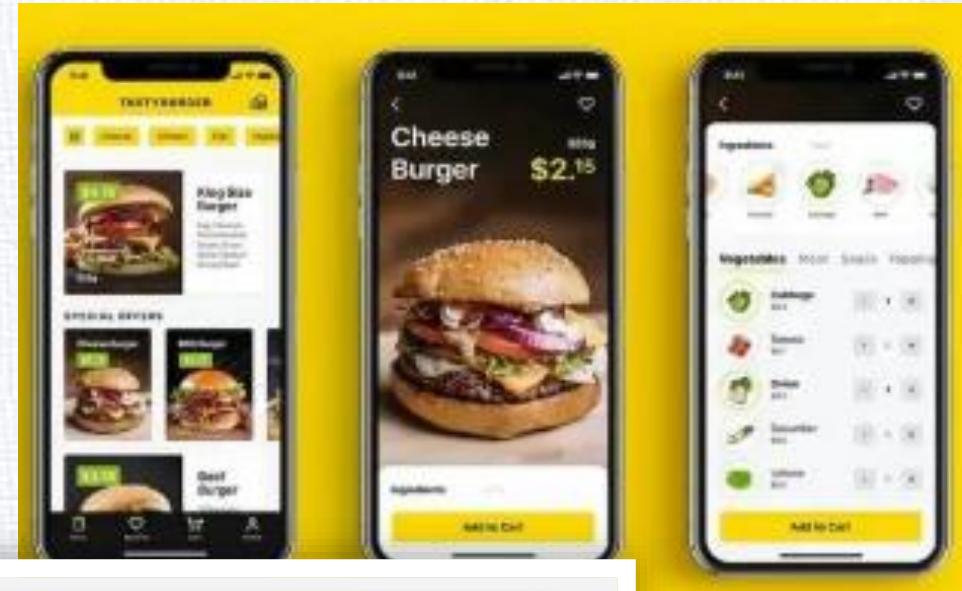
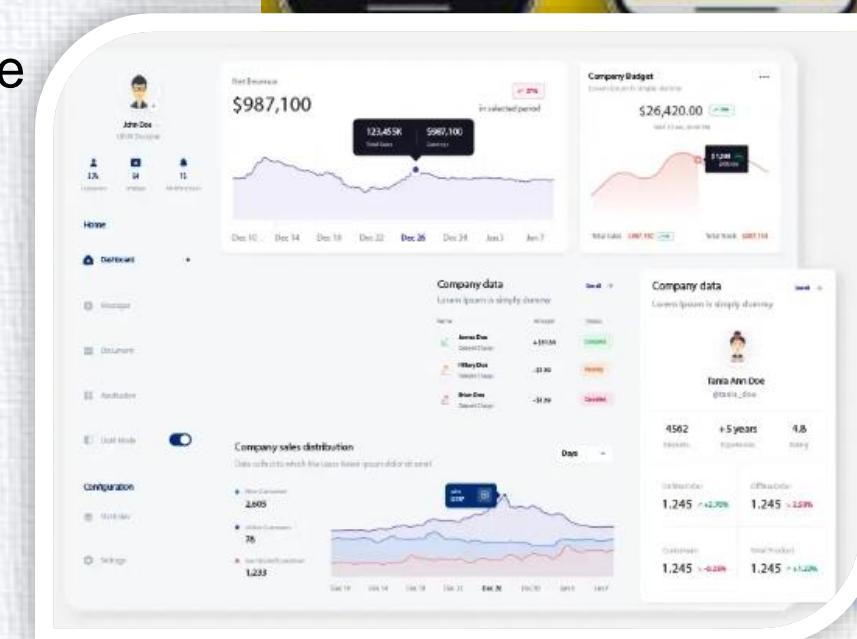




Types of Graphic Design

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Types of Graphic Design

10. Typography Graphic Design

Typography is an art form that involves choosing typefaces, adjusting font size, and spacing letters to improve readability and visual appeal. Good typography can dramatically enhance the effectiveness of a design by ensuring the text is both readable and attractive.

Roboto
Aa

Lorem ipsum dolor sit amet, consectetur adipiscing elit,

H1 34pt Roboto ExtraBold

Lorem ipsum dolor sit amet, consectetur adipiscing elit,

H2 22pt Roboto Bold

Lorem ipsum dolor sit amet, consectetur adipiscing elit,

H3 18pt Roboto SemiBold

Lorem ipsum dolor sit amet, consectetur adipiscing elit,

Body Text 14pt Roboto Medium

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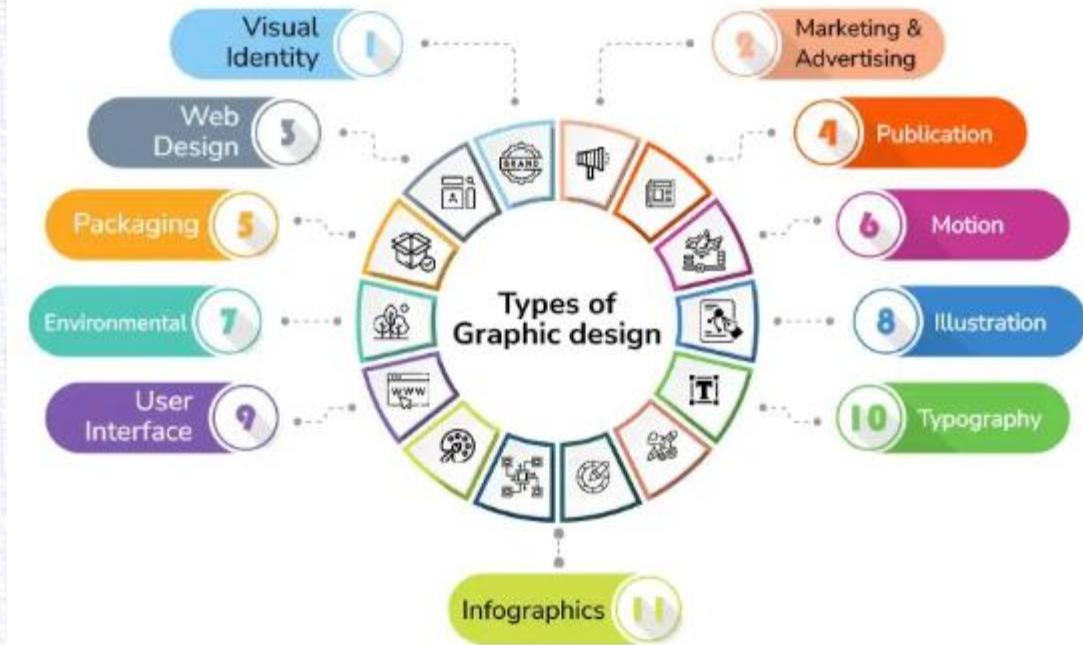
Description 14pt Roboto Regular



Types of Graphic Design

11. Infographics

Infographics are visual representations of information, data, or knowledge intended to present content quickly and clearly. Graphic designers in this field distill complex data into digestible, engaging graphics that communicate information at a glance.



Graphic Design



Business Cards
Stationary
Letter heads

Envelopes,
Brochures, Folders

Booklets, Catalogs,
Magazines, Posters

Hoardings Back-
drops, Indoor

Outdoor Signages,
Corporate Brand

Communication and
collatrals
Retail

Web Designs, Mobile
Advertising, print and
online Adverti

Advertising and
marketing communi-
cation designs

Print Media

Web Media

Online Media

**Fine Art
sales Catalogs**

Thank you