



# Introduction to Computer Graphics: Elements and Applications

Explore the fascinating world of computer graphics, understanding its fundamental elements, historical evolution, and diverse applications in modern technology.



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# The Evolution of Computer Graphics

Tracing the Development of Visual Technology

01

## Early Experiments with Vector Graphics

The 1960s marked the beginning of computer graphics as pioneers experimented with vector graphics and simple animations.

02

## Introduction of Raster Graphics

In the 1980s, raster graphics became prominent, leading to the creation of foundational software like Adobe Photoshop.

03

## Advancements in 3D Graphics

The 1990s saw significant growth in 3D graphics, fueled by advancements in rendering techniques and improved hardware.

04

## Rise of Real-Time Graphics

From the 2000s onward, real-time graphics gained traction in gaming and virtual reality applications, pushing visual boundaries.

# Key Elements of Computer Graphics

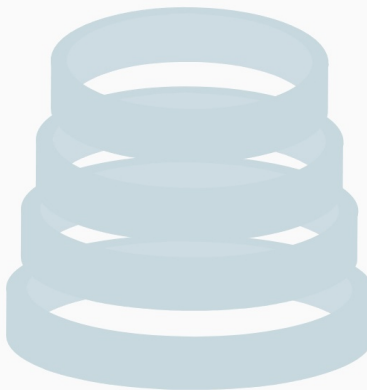
Understanding the Fundamental Components of Graphics

## Points in Computer Graphics

The simplest graphical element, representing a single position in 2D or 3D space.

## Visual Aid in Graphics

A diagram is included to illustrate how points, lines, and shapes interconnect and interact.



## Lines: Connecting Points

Lines connect two points, forming the basis for various shapes and diagrams.

## Shapes: Combination of Elements

Shapes are formed by connecting lines and points, including polygons and curves.

# Exploring 2D Graphics

An Overview of 2D Graphics



## Definition of 2D Graphics

Graphics that represent objects in two dimensions, crucial for various design applications.



## Dimensions Used in 2D Graphics

Utilizes width and height, lacking depth, making it ideal for flat representations.



## Applications of 2D Graphics

Commonly seen in logos, illustrations, and user interface designs, enhancing visual communication.

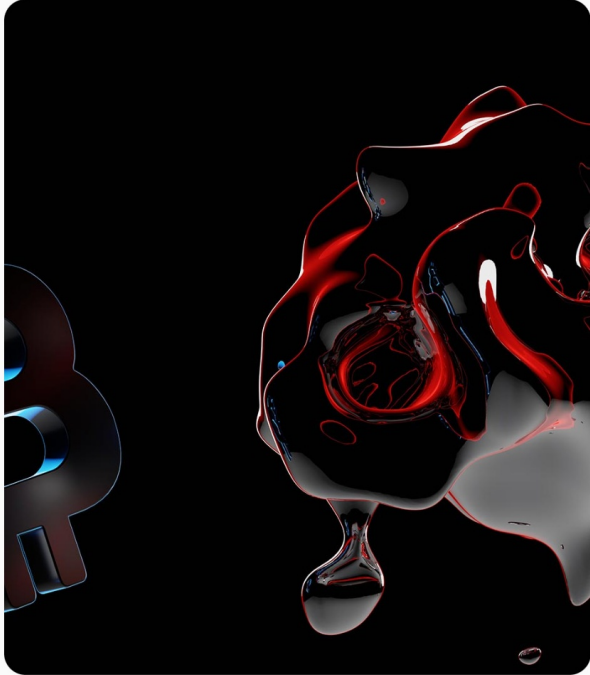


## Visual Representation

Visual aids play a vital role in showcasing 2D graphics across different platforms and mediums.

# Exploring the Depth of 3D Graphics

A Comprehensive Overview of 3D Graphics Applications



- **Definition of 3D Graphics**

3D graphics depict objects in three dimensions, providing depth and realism.

- **Key Differences from 2D**

3D graphics utilize x, y, and z axes, creating a more lifelike appearance compared to flat 2D images.

- **Applications of 3D Graphics**

3D graphics are widely used in gaming, architecture, and simulations to enhance user experience.

- **Visual Aids**

Incorporating visual comparisons between 2D and 3D objects helps illustrate their differences.

# Rendering Techniques in Computer Graphics

Understanding Key Techniques and Their Impact

## Definition of Rendering



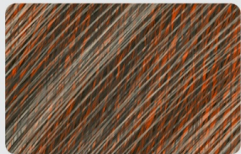
Rendering is the process of generating an image from a model using computer programs.

## Ray Tracing Technique



Ray tracing simulates light interactions with objects for realistic images.

## Rasterization Technique



Rasterization converts 3D images into a 2D format for display.

## Quality of Graphics



Rendering techniques significantly influence the quality and realism of produced graphics.



# Real-World Applications of Computer Graphics

Exploring How Computer Graphics Shape Various Sectors



## Gaming Industry

Realistic environments and characters enhance gameplay, providing immersive experiences for players.



## Medical Imaging

3D models are utilized to aid in diagnostics and surgeries, improving patient outcomes and precision.



## Animation and Film

Creation of lifelike characters and environments brings stories to life, captivating audiences worldwide.



## Architecture

Visualization of buildings and spaces before construction allows for better planning and design adjustments.



# The Future of Computer Graphics

Exploring the latest advancements in visual technologies



## 01 Virtual Reality (VR)

Immersive environments for gaming and training, enhancing user experiences.

## 02 Augmented Reality (AR)

Enhances real-world views with computer-generated data, revolutionizing interaction.

## 03 Machine Learning

Improves rendering processes and image generation, making graphics more efficient.

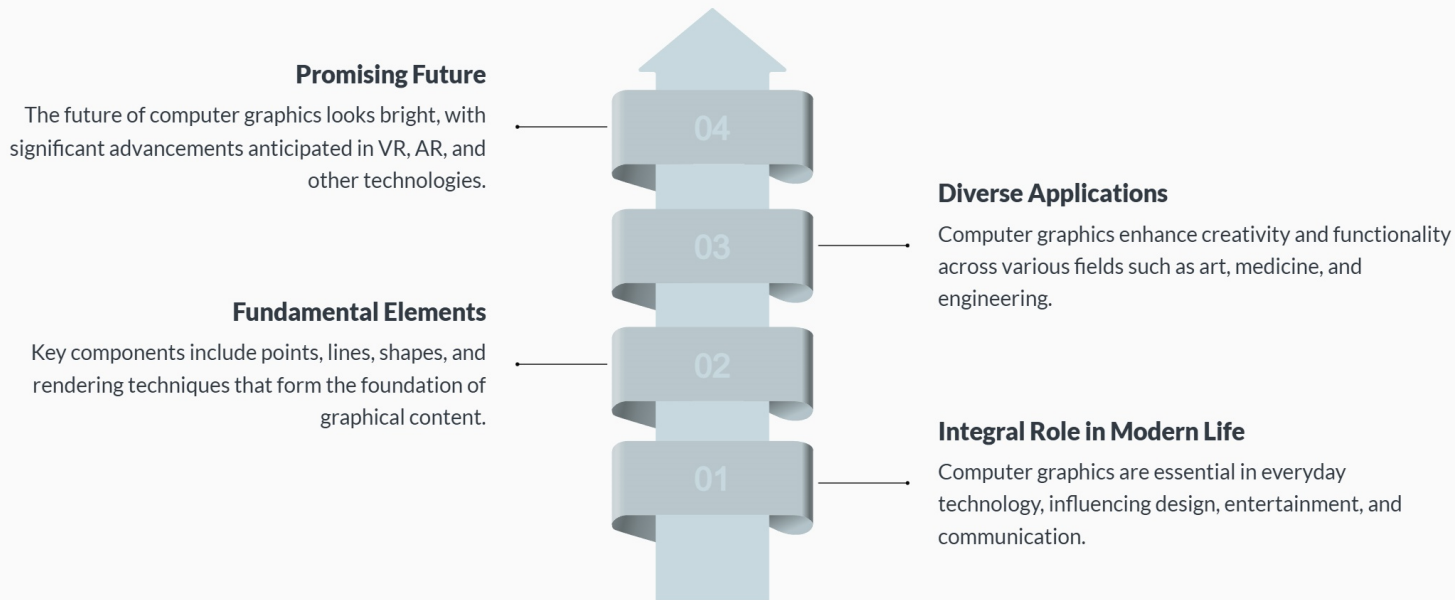
## 04 Real-time Graphics

Advancements in gaming and interactive media, providing seamless visual experiences.



# Key Takeaways on Computer Graphics

Summary of Main Insights





# Unleash the Power of Computer Graphics

Dive into the captivating realm of computer graphics, where innovation meets creativity, shaping our digital experiences and enhancing visual communication. Explore the endless possibilities today