

UNIT 7: MULTIMEDIA

7.1 INTRODUCTION TO MULTIMEDIA

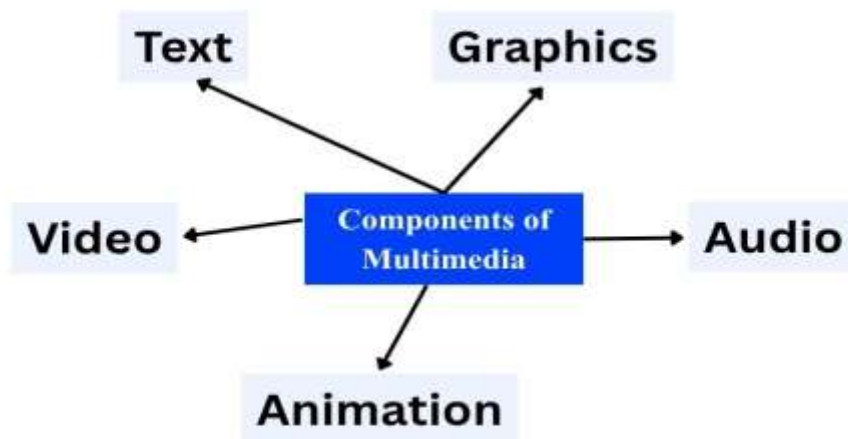
Multimedia is the combination of two or more different types of media, such as text, graphics, audio, video, and animation, used together to inform or entertain an audience.

The word itself comes from "multi" (many) and "media" (means of communication), and the whole point of combining them is that different types of content reach an audience in different ways. A textbook page can only show static words and pictures, but a multimedia presentation on the same topic can add narration, a short video demonstration, and an animated diagram, which usually makes the content easier to follow and remember.

Multimedia is described as **interactive** when a user can control what they see or hear, such as clicking through slides or choosing which video to watch next, as opposed to **linear** multimedia, such as a movie, which plays from start to end without the viewer changing anything.

7.2 COMPONENTS OF MULTIMEDIA

Multimedia is built from five basic components. A single multimedia product rarely uses just one of these; it usually blends several together.



7.2.1 Text

Text is written or printed words used to convey information, instructions, or explanations within a multimedia product.

Text is the simplest and easiest component to create and edit, and it's usually the backbone that everything else in a multimedia presentation is built around, such as titles, captions, menus, and on-screen instructions.

Common file formats: .txt (plain text), .doc/.docx (formatted documents), .pdf (portable, fixed-layout documents), .rtf (rich text format).

7.2.2 Graphics

Graphics are visual, non-moving images, including photographs, drawings, icons, charts, and diagrams, used to represent information visually.

Graphics fall into two broad categories, based on how the image is actually stored:

Type	How It's Stored	Behavior When resized	Common Formats
Raster (Bitmap) Graphics	A grid of individual-colored dots (pixels)	Loses sharpness and looks blocky when enlarged	JPG, PNG, BMP, GIF
Vector Graphics	Mathematical paths and shapes, not fixed pixels	Stays sharp and clean at any size	SVG, AI, EPS

A photograph is almost always raster, since a camera captures a fixed grid of pixels. A logo is usually vector, since it needs to scale from a tiny favicon up to a huge banner without losing quality.

7.2.3 Audio

Audio is the sound component of multimedia, including music, narration, speech, and sound effects.

Audio adds a dimension that text and graphics can't, since tone of voice, music, and sound effects all carry emotional and informational cues on their own. A narrated tutorial, for example, can explain a diagram while the viewer's eyes stay free to actually look at it, instead of having to read a caption at the same time.

Common file formats: MP3 (compressed, widely used), WAV (uncompressed, high quality, large file size), AAC (compressed, common in streaming and mobile devices).

7.2.4 Video

Video is a sequence of moving visual images, typically combined with synchronized audio, used to show motion, demonstrations, or recorded events.

A video is really just a fast sequence of still images (frames) played one after another quickly enough that the eye perceives continuous motion, almost always paired with an audio track.

It's especially useful for showing a process step by step, such as a lab experiment or a software tutorial, where the order and timing of actions matters.

Common file formats: MP4 (widely supported, good compression), AVI (older Windows format, larger files), MOV (common on Apple devices).

7.2.5 Animation

Animation is the simulation of movement created by displaying a rapid sequence of still images or frames, each slightly different from the last, giving the illusion of motion.

Animation is closely related to video, but the images are typically drawn or generated (by hand or by a computer) rather than filmed from real life, which makes it well suited to showing things that would be difficult or impossible to film directly, such as the inside of a human cell or a chemical reaction at the molecular level.

- **2D Animation:** flat, hand-drawn or digitally illustrated animation, such as a traditional cartoon
- **3D Animation:** computer-generated animation with depth and volume, giving objects a more realistic, three-dimensional appearance
- **GIF Animation:** a simple looping animation made from a short sequence of frames, commonly used for small, repeating clips on the web

7.3 APPLICATIONS OF MULTIMEDIA

Multimedia is used across almost every field today, since combining several types of media generally communicates an idea faster and more memorably than any single one on its own.

Field	How Multimedia Is Used
Education	E-learning platforms, animated lessons, narrated slideshows, and virtual labs
Entertainment	Movies, video games, music videos, and streaming content
Business and Advertising	Product demo videos, animated logos, interactive presentations, and digital ads
Medicine	Surgical simulations, diagnostic imaging, and patient education videos
Engineering and Architecture	3D models and simulations used to visualize a design before it's built
Journalism and News Media	Combining written reports with photos, video footage, and infographics

Real-World Application Scenarios

A short, worked scenario usually makes it clearer how these components actually combine in practice than a list of fields does on its own.

1. An E-Learning Platform Explaining Photosynthesis

Written explanations and key term definitions (**text**) sit alongside a labelled diagram of a leaf's cell structure (**graphics**). A teacher's narrated voice-over (**audio**) walks through the diagram while a short-animated sequence (**animation**) shows sunlight, water, and carbon dioxide actually moving into a leaf and being converted into glucose and oxygen. A recorded lab demonstration (**video**) then shows the real experiment being performed.

2. A Hospital's Surgical Training Simulator

A trainee reads step-by-step instructions (**text**) next to detailed anatomical illustrations (**graphics**). A 3D animated model (**animation**) lets them rehearse a procedure without any risk to a real patient, while recorded footage of an actual surgery (**video**) with a surgeon's narration (**audio**) shows how the same procedure looks in a real operating room.

3. A Product Launch Advertisement

A product's name and tagline (**text**) appear over high-resolution photos of the product (**graphics**). A background music track (**audio**) sets the mood, a short demo clip (**video**) shows the product in actual use, and an animated logo reveal (**animation**) opens and closes the advertisement.

Quick Revision: Key Points

- Multimedia = combination of two or more media types: text, graphics, audio, video, animation
- Interactive multimedia lets the user control what they see/hear; linear multimedia (e.g. a movie) just plays through
- Graphics are either raster (pixel-based, e.g. JPG/PNG) or vector (path-based, e.g. SVG), differing mainly in how they scale
- Audio formats: MP3, WAV, AAC; Video formats: MP4, AVI, MOV
- Animation differs from video mainly in how the images are produced: drawn/generated vs. filmed
- Applications span education, entertainment, business, medicine, engineering, and journalism

Sample Board Exam Questions

Based on the official NEB Computer Science Specification Grid 2077, Unit 7 (Multimedia) carries 4 marks out of the theory paper, drawn mainly from the Remembering and Understanding levels. Given the size of this unit, it's typically tested entirely through Multiple Choice Questions.

Group A: Multiple Choice Questions $1 \times 4 = 4$

1. Which of the following is NOT a component of multimedia?
 - a) Text
 - b) Compiler
 - c) Audio
 - d) Animation
2. Which type of graphic is made up of a fixed grid of pixels?
 - a) Vector graphic
 - b) Raster graphic
 - c) Animation
 - d) SVG graphic
3. Which of the following is a common audio file format?
 - a) MP4
 - b) AVI
 - c) MP3
 - d) SVG
4. Multimedia used in a surgical training simulator is an example of its application in which field?
 - a) Entertainment
 - b) Medicine
 - c) Journalism
 - d) Advertising

Important Questions

1. What is multimedia? Explain with a suitable example.
2. List and briefly explain the components of multimedia.
3. Differentiate between raster (bitmap) and vector graphics with examples.
4. Differentiate between animation and video.
5. Differentiate between interactive and linear multimedia.
6. Explain any four applications of multimedia with examples.

7. List any three common file formats used for audio and video each.
8. How is multimedia used in the field of education? Explain with an example.
9. Why is text still considered an important component of multimedia despite being the simplest one?