Mahavir Polytechnic, Nashik
Department of Information Technology

Year: SY **Subject: AMT (313003)**

Unit - I Introduction to Multimedia

Syllabus:

1.1 Definition of Multimedia, application of Multimedia: business, education.

1.2 Multimedia System Framework, Display System (LCD, LED, OLED,QLED,Foldable).

1.3 Component of Multimedia: text, graphics, audio, video and animation 2D and 3D

1.4 Color models like RGB, CMYK, HSV, YIQ, saturation and brightness.

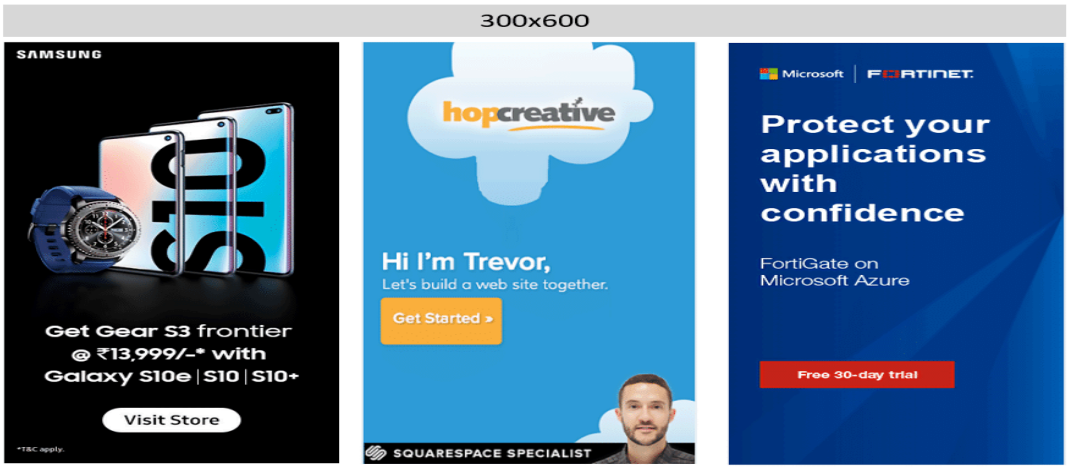
1.1 Definition of Multimedia.

Multimedia: Multimedia offers many career paths that can lead to occupations in such fields as graphic design, web design, animation, audio and video production, and project management. To become competent in any multimedia field, however, you need to learn the fundamental multimedia concepts first.

Multimedia is the integration of various media, including text, graphics, audio, video, and animation, in a digital format

1.2 Application of Multimedia:

1) Business: Advertising and Marketing



2) Education: 🎬 Helps children with learning disabilities through customized audio-visual content.

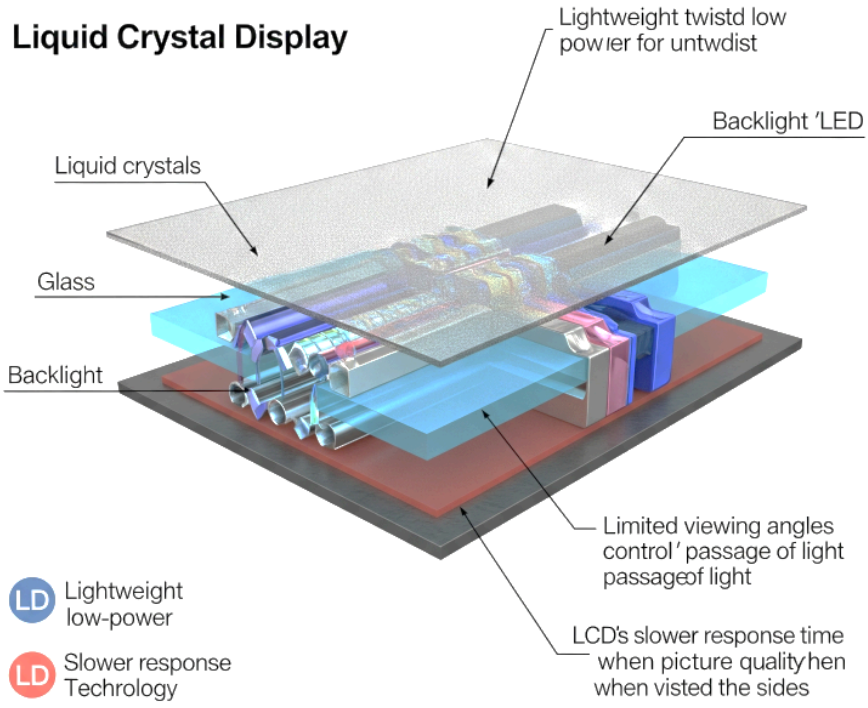
1.2 Multimedia System Framework:

A **Multimedia System** is a system capable of processing multimedia data and applications. It integrates various types of media such as text, graphics, audio, video, and animation.

Key Components of a Multimedia System:

Display System Technologies:

- LCD - Liquid Crystal Display
- LED - Light Emitting Diode
- OLED - **Organic Light-Emitting Diode**.
- QLED - Quantum dot light emittng diode
- FOLDABLE devices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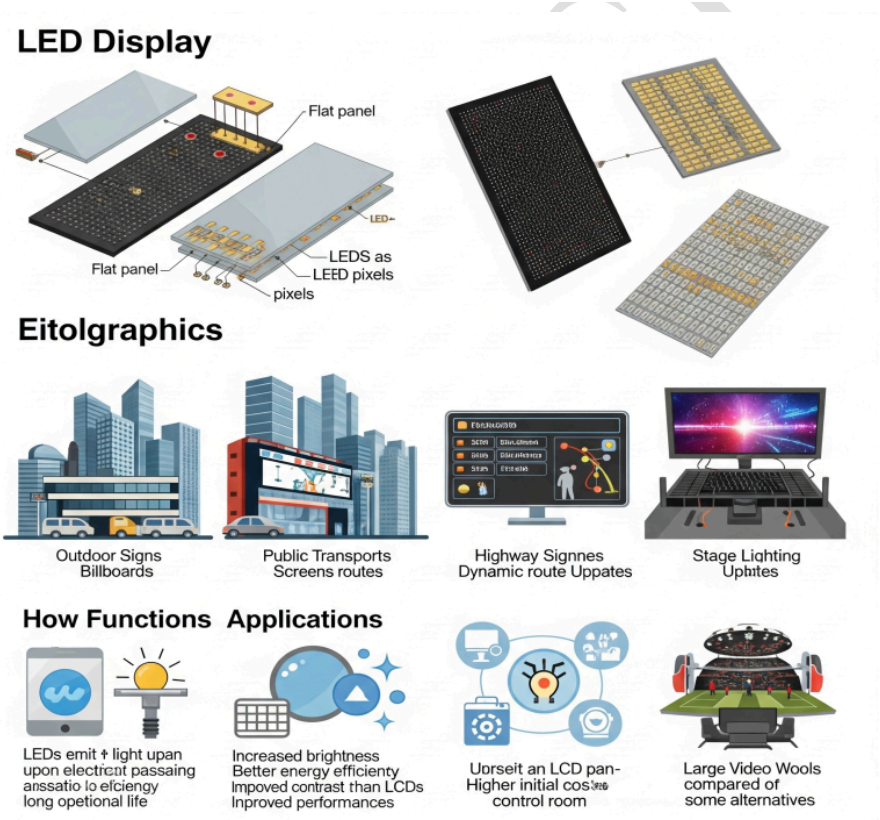
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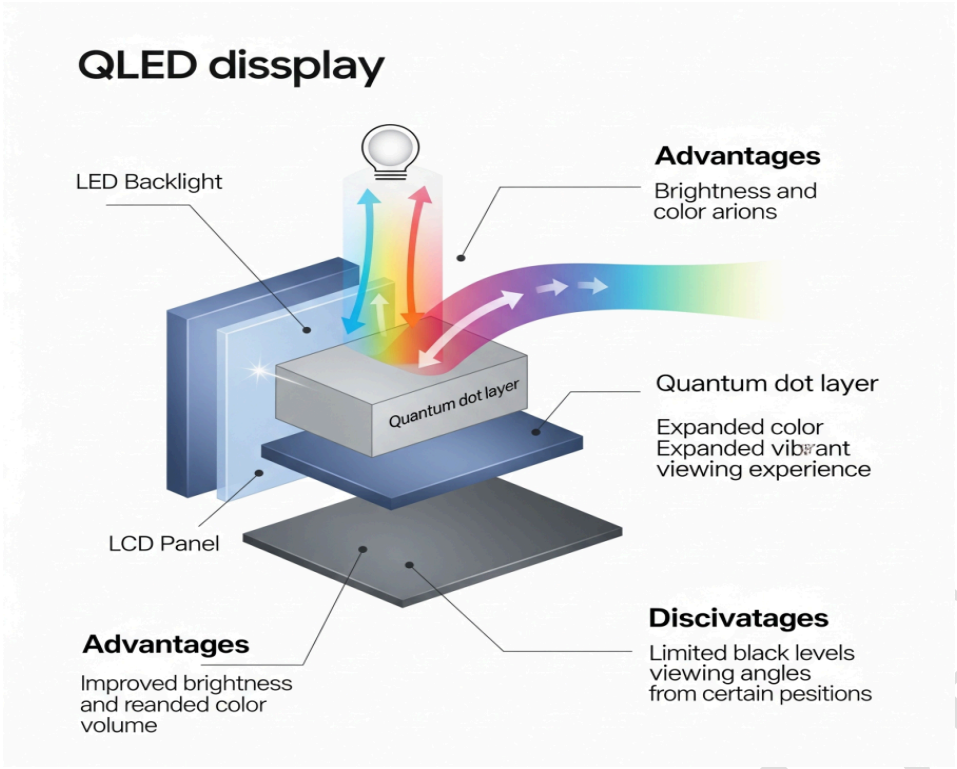
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Advantages
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Quantum dot layer
Quantum dot layer
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Expanded vibant viewing experience
LCD Panel
Advantages
Improved brightness and reanded color volume
Discivatages
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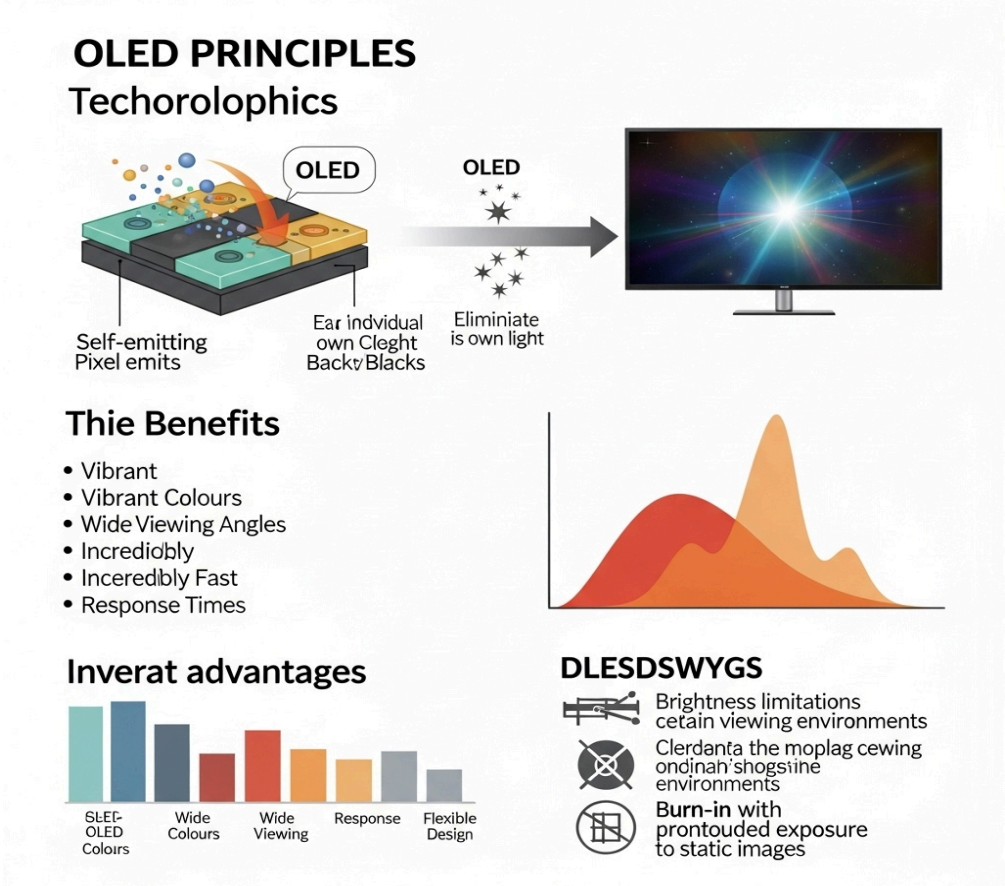
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1. **LCD** A flat-panel display technology that uses liquid crystals, which are organic compounds that exhibit properties between those of conventional liquids and solid crystals.
2. **LED** stands for Organic Light-Emitting Diode. It's a type of display technology where each pixel emits its own light, eliminating the need for a separate backlight like in LCD displays.
3. **QLED** (Quantum Dot Light Emitting Diode) is a display technology primarily developed and marketed by Samsung, though other manufacturers also use it. It's an evolution of traditional LED-backlit LCD panels, enhanced by the incorporation of quantum dots.
4. **OLED** stands for **Organic Light-Emitting Diode**. It's a display technology that has revolutionized how we experience screens, offering stunning visuals and innovative design possibilities.

1.3 Component of Multimedia: text, graphics, audio, video and animation 2D and 3D.

Multimedia is the combination of different content forms, such as **text**, **graphics**, **audio**, **video**, and **animation**, to present information or entertain an audience. Each component plays a crucial role in creating a rich and interactive experience:

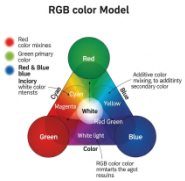
- **Text:** This is the most fundamental component, used for titles, headings, content, and navigation. It provides direct information and context.
- **Graphics:** These include still images like photos, illustrations, charts, and drawings. Graphics enhance visual appeal, convey information quickly, and can evoke emotions.
- **Audio:** This encompasses sounds, music, voiceovers, and sound effects. Audio adds another dimension to multimedia, providing atmosphere, conveying emotion, or delivering spoken information.
- **Video:** Video consists of moving pictures, often accompanied by audio. It's highly effective for demonstrating processes, telling stories, or capturing real-world events.
- **Animation:** This involves sequences of images that create the illusion of movement.
    - **2D Animation:** Creates movement within a two-dimensional space, often seen in cartoons or motion graphics.
    - **3D Animation:** Creates movement in a three-dimensional space, allowing for more realistic or complex visual effects often used in movies, games, and simulations.

1.4 Color models like RGB, CMYK, HSV, YIQ, saturation and brightness.

Color models are systematic ways of organizing and representing colors, usually as a set of numerical values. Different models are used for different purposes, depending on how colors are created (additive vs. subtractive) and how humans perceive them.

1.4.1 RGB:

2 **Representation:** Typically represented as a triplet of values, often ranging from 0-255 for each component (e.g., RGB(255, 0, 0) for pure red, RGB(255, 255, 255) for white, RGB(0, 0, 0) for black).



1.4.2 CMYK (Cyan, Magenta, Yellow, Key/Black)

- **Type:** Subtractive color model.
- **How it Works:** Starts with white (the paper) and subtracts light by absorbing certain wavelengths using ink. The more ink you add, the darker the color. Combining Cyan, Magenta, and Yellow theoretically produces black, but in practice, it often results in a muddy brown. Therefore, black (Key) ink is added for true blacks, detail, and cost efficiency.
- **Primary Colors:** Cyan, Magenta, Yellow, Black (Key).
- **Representation:** Each color component is usually represented as a percentage from 0% to 100%.
- **Applications:** Primarily used in printing processes:
    - Commercial printing
    - Home inkjet/laser printers
    - Any material that will be physically printed

1.4.3 HSV (Hue, Saturation, Value)

- **Type:** Perceptual color model (closer to how humans perceive color).
- **How it Works:** Represents colors in a way that is more intuitive for artists and designers than RGB or CMYK. It describes color based on three fundamental attributes:
    - **Hue (H):** The pure color itself, like red, green, blue, yellow, etc. It's represented as an angle on a color wheel (0-360 degrees), where 0 degrees is red, 120 degrees is green, 240 degrees is blue, and so on.
    - **Saturation (S):** The purity or intensity of the color. It describes how much gray is in the color. A fully saturated color (100%) is vivid and pure, while a completely desaturated color (0%) is a shade of gray.
    - **Value (V) / Brightness (B):** The perceived brightness or lightness of the color. A value of 0% is black, and 100% is the brightest possible version of that hue at its given saturation.
- **Representation:** Hue (degrees), Saturation (percentage or 0-1), Value (percentage or 0-1).
- **Applications:**
    - Color pickers in graphic design software
    - Image editing for color adjustments
    - Computer graphics and animation where intuitive color selection is needed

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1.4.4 YIQ (Luminance, In-phase, Quadrature)

- **Type:** Broadcast color model, designed for analog television systems.
- **How it Works:** Separates the luminance (brightness) information from the chrominance (color) information.
    - **Y (Luminance):** Represents the black-and-white (grayscale) information of the image. This component can be used by black-and-white TVs.
    - **I (In-phase) and Q (Quadrature):** These components carry the color information (chrominance). 'I' primarily represents orange-cyan differences, and 'Q' represents green-magenta differences. The human eye is more sensitive to changes in the orange-cyan range, so the 'I' signal is given more bandwidth than 'Q' for efficient transmission.
- **Applications:** Primarily used in the analog **NTSC** (National Television System Committee) television broadcasting standard (used in North America, Japan, etc.). It allowed color TV signals to be compatible with older black-and-white TVs.