UNIT II

MULTIMEDIA FILE FORMATS AND STANDARDS

File formats – Text, Image file formats, Graphic and animation file formats:

1. Text File Formats

Text file formats are used to store text-based content, such as plain text, formatted text, or documents. These formats are often lightweight and can store content in human-readable form or with minimal encoding. Common text file formats include:

- Plain Text (.txt): A simple format that contains only text with no special formatting (e.g., bold, italics, or font style). It is highly portable and compatible across platforms, but lacks rich formatting.
- Rich Text Format (.rtf): A more advanced text format than plain text, it supports basic text formatting (e.g., bold, italics, font size, color). RTF files can be opened in most word processors without losing formatting.
- Microsoft Word (.doc, .docx): Proprietary formats used by Microsoft Word, which support advanced formatting, tables, images, hyperlinks, and other complex elements in documents.
- OpenDocument (.odt): An open-source format used for text documents. It is similar to Word's DOCX format but is based on open standards and is compatible with various word processors like OpenOffice and LibreOffice.
- HyperText Markup Language (.html, .htm): The standard file format used to create web pages. HTML files consist of structured text, embedded images, links, and other media elements, which are rendered by web browsers.
- Markdown (.md): A lightweight text format that uses plain text with simple formatting syntax (such as ** for bold and * for italic). It is commonly used for documentation, websites, and blogs.
- Portable Document Format (.pdf): Although it's often used for documents that include both text and images, PDF files preserve formatting across devices and platforms. They can contain complex layouts, hyperlinks, and multimedia elements.

2. Image File Formats

Image file formats are used to store and display digital images. Each format has its strengths and weaknesses, depending on the image type, compression requirements, and use case.

- JPEG (.jpg, .jpeg): A commonly used format for digital photographs and web images. JPEG uses lossy compression, which reduces file size but also loses some image quality. It is well-suited for photographs but not ideal for images with sharp lines or text.
- PNG (.png): A lossless image format that supports transparency, making it ideal for images that need to be layered over other graphics or backgrounds. PNG is widely used for web images, logos, and icons.
- GIF (.gif): A format that supports animation and simple graphics. GIF uses lossless compression and can contain a maximum of 256 colors. It is commonly used for web animations and simple icons.
- TIFF (.tif, .tiff): A flexible format that supports both lossy and lossless compression. TIFF is often used in professional photography, medical imaging, and publishing due to its high-

quality, uncompressed versions. It supports multiple layers and color depths.

- BMP (.bmp): A bitmap image format used primarily on Windows systems. It's uncompressed, which results in large file sizes, but provides high image quality. BMP files are rarely used for web content due to their large size.
- WebP (.webp): A relatively newer image format developed by Google that supports both lossy and lossless compression, along with transparency (like PNG). WebP achieves smaller file sizes with high image quality, making it ideal for web images.
- HEIF (.heif): The High Efficiency Image Format is used for photos and images on modern devices, particularly iPhones and newer versions of Android. HEIF offers better compression and quality compared to JPEG.
- SVG (.svg): A vector graphic format that uses XML to describe images. Unlike raster formats (JPEG, PNG), SVG images can be scaled infinitely without loss of quality, making them ideal for logos, icons, and illustrations.

3. Graphic and Animation File Formats

Graphic and animation file formats are designed to store vector-based images or animations, often used in design, web development, and multimedia presentations.

Vector Graphic Formats (based on mathematical formulas, can scale without loss of quality):

- SVG (.svg): As mentioned earlier, SVG is a vector-based image format used primarily for web and interface design. It supports interactive elements, animation, and styling with CSS and JavaScript.
- EPS (.eps): Encapsulated PostScript is a vector format used for high-quality graphics and illustrations, often in print publishing. EPS files can store both vector and bitmap images, but they are typically used for vector artwork.
- AI (.ai): Adobe Illustrator's native file format, used for vector graphics. AI files contain high-quality illustrations and designs that can be scaled without losing resolution.
- PDF (.pdf): While primarily a document format, PDF can also store vector images, especially for illustrations, diagrams, and page layouts. It is often used for print-ready graphics.

Animation Formats (used to store motion graphics and animations):

- GIF (.gif): In addition to being an image format, GIF also supports simple animation by combining multiple images into a single file. It is widely used for web-based animations and memes, although its 256-color limitation reduces its quality for complex visuals.
- Flash (.swf): Once a popular format for creating interactive animations and web-based multimedia, SWF files were used with Adobe Flash Player. However, Flash has been deprecated, and modern alternatives like HTML5 are used instead.
- WebM (.webm): A format used primarily for video streaming and animation on the web. WebM supports both still images and video, and it is optimized for web use, offering efficient compression while maintaining quality.
- APNG (.apng): An extension of the PNG format that supports animation. Unlike GIF, APNG supports 24-bit images with full alpha transparency, providing higher-quality animated images for the web.
- MNG (.mng): A format used for animated PNGs (APNG) and sometimes called the "Animated PNG" format. While it supports full-color and transparent animation, it has never gained the popularity of GIF or APNG.
- AVI (.avi): A multimedia container format that can store both video and audio, often used for standard video clips and animations. However, AVI files are typically larger due to less compression compared to more modern formats like MP4.

- MOV (.mov): A video format developed by Apple, commonly used for storing animations and video clips. MOV files can support a wide range of video and audio codecs and are often used in professional video editing.
- MP4 (.mp4): A highly popular multimedia container format that can store video, audio, and animations. MP4 is widely used for video streaming, including animation content, and is compatible across various platforms.
- FLV (.flv): A format that was once widely used for streaming video content on the web, particularly for Flash-based video. Although Flash has been deprecated, FLV files are still found in some legacy systems.