Multimedia -

1. Characteristics of multimedia presentation -
   - Multiple Media
   - Non-linearity
   - Scope of interactivity
   - Interactivity
   - Digital Representation

2. Use of Multimedia -
   - Distance learning
   - Information distribution
   - Entertainment
   - Home shopping
   - Medical healthcare
   - Video conferencing
   - Multimedia Classroom

Components of Multimedia -
   - Text
   - Audio
   - Video
   - Graphics
   - Animation

3. Types of Multimedia -
   1. Text
   2. HyperText - links embedded in the text
   3. Hypermedia - HyperText with multimedia
   4. Image
   5. Video
   6. Sound

Text -

1. Text can be of various types -
   - PlainText - simple text with no special formatting or appearance
   - Formatted Text - Text that can be formatted, includes bold, italic, underline, etc.
   - HyperText - links embedded in the text
(2) **UNICODE standard**

It replaced ASCII table and it is capable of representing international characters from various languages throughout the world.

(3) **Text Compressors**

- **Huffman Coding**

An optimum set of variable-length code words is derived such that the shortest code word is used to represent the most frequently occurring character.

- **Hempel-Ziv (LZ) Coding**

Instead of using a single character as a basis of coding operation, a string of characters is used.

- **Hempel-Ziv-Welch (LZW) Coding**

Allows the dictionary to be built dynamically by the encoder and decoder for the document under processing.

(4) **Text File Formats**

- **TXT** - Unformatted (Plain) text document created by an editor like Notepad on various platforms.

- **DOC** - Document developed by Microsoft, rich set of formatting capabilities.

- **RTF (Rich Text Format)** - Developed by Microsoft in 1987 for non-platform document exchanges. Default format for Mac OS, similar to HTML.

- **PDF (Portable Document format)** - Developed by Adobe Systems for cross-platform document exchanges. Also supports images and graphics. PDF is often standard.

- **PS (Postscript)** - Page description language used mainly for desktop publishing. It is a high-level language that can describe the contents of a page such that it can be accurately displayed on output devices usually a printer.
Audio -

1. Components of audio system -
   - Microphone
   - Amplifier
   - Audio Recording System
   - Speakers

   Microphone → Dynamic, Condenser, Omni-directional, Bi-directional, Unidirectional, Polar pattern.
   Amplifier → Class A, Class B, Class AB, Class C, Negative feedback,
   Class D, Class E.
   Speakers → Dynamic, Woofers and Tweeters.
   Audio Recording System → Audio Mixer.

2. Digital Audio - Conversion process of sampling, quantization and code word generation.
   - Sampling frequency → 40 KHz around.
   - Streaming audio → Used for downloading files on the internet.

3. Musical Instrument Digital Interface (MIDI) -
   - It is a protocol or set of rules for connecting digital synthesizers to each other or to digital computers.

4. Sound card - It interfaces with the CPU via slots on the motherboard.
   - Basic components -
     - Memory Banks
     - DSP (Digital Signal Processor)
     - DAC/ADC (Digital to Analog or Analog to Digital Converter)
     - Wave Table/EN Synthetizer Chip (MIDI Synthesizer Chip)
     - CD Interface
     - 16 bit ISA Connector

   I/O ports → MIC, Line In, Line Out, Speakers.
Audio File Formats:
- WAV (Waveform audio) - defined by Microsoft
- AIFF (Audio Interchange File Format) - defined by Electronic Arts
- AU (Audio) - developed by Sun Microsystems
- MPS (NEC, hauc III) - highly compressed audio format
- VOC (Voris) - filled with sound blocker round card
- RNF (Rich Music Format) - Beatech Inc.
- WMA (Windows Media Audio) - Microsoft
- RA (Real Audio) - Real Networks
- AAC (Advanced Audio Coding) - lossy data compression scheme

Audio Processing Software:
- An audio editing software allows you to open, edit, manipulate, transform, and save digital audio sound files in various formats.

Video:
- Digital Video
- Digital video processing
- Video file formats: (AVI, MOV, MPEG, DivX, WMV, MP4)

Digital Audio Processing:

\[ \text{ADC} \rightarrow \text{Storage device} \rightarrow \text{DAC} \rightarrow \text{Speaker} \rightarrow \text{Sound wave} \]