

SEMESTER : VI
SUBJECT : MULTIMEDIA AND ANIMATION
UNIT : I
FACULTY :G. Suganya

1. INTRODUCTION TO MULTIMEDIA:

Multimedia therefore means ‘multiple intermediaries’ or ‘multiple means’. Multimedia therefore means ‘multiple intermediaries’ between the sources and sink of information or ‘multiple means’ by which information is stored, transmitted, presented or perceived.

The multiple media by which we can perceive information are:

Text (Example : Books, letters, newspapers)

Images and Graphics(Photographs, charts, maps , logos , sketches)

Sound (Radio, gramophone records, audio cassettes)

Video and animation (TV , video cassettes , motion pictures)

2. MULTIMEDIA PRESENTATION AND PRODUCTION

A multimedia presentation is basically a digital ‘show’ whose content is expressed through various media types like text, image, sound, video etc.

There can be various objectives of the presentation .Example (i) to deliver some information about company’s performance (corporate presentation)

1. To enhance the knowledge of students (computer based training)

2. To present the facilities offered by a travel company to the tourist (tourist kiosk) and soon.

The presentation is usually played back on a personal computer either from the hard disk or a CD- ROM. Sometimes when the audience consists of a large number of people, the presentation may be projected on a big screen using a projection system. Before a presentation can be viewed, however it has to be created. This process is known as multimedia production.

The production work is carried out by a team of professionals equipped with the required skill and knowledge. These professionals are called developers or authors and the development work is called authoring.

3. CHARACTERISTICS OF MULTIMEDIA PRESENTATION

CHARACTERISTICS

- Multiple media
- Non- linearity
- Scope of interactivity
- Integrity
- Digital representation

MULTIPLE MEDIA

Text has been the main mode of communication for many years during the pre-multimedia era, and still continues to be one, but it is now more and more supplemented by other media, which often prove more effective.

Pictures were sub-divided into two types.

The real – world pictures captured by a camera, called **images**.

The hand- drawn pictures like sketches, diagrams and portraits called **graphics**.

Text, images and graphics are together referred to as static elements, because they do not change over time. With further improvement in technology, time – varying elements like sounds and movies were used.

Sound requires audio speakers to be played back and can comprise music, human speech or other sound effects like breaking glass, gunshots, falling water etc.

Movies are essentially combination of images and sounds. Instead of a single picture, movies are composed of a series of pictures which are showed one after another at a certain speed, while the sound is played together in the background.

Movies are again divided into two classes.

1. Those which depicts real – world incidents are called **motion pictures** (recorded on film) or **motion video** (recorded on magnetic media)

2. Those which depict artificial or imaginary scenarios are called **animation**.

NON – LINEARITY

Non – linearity is the capability of ‘jumping’ or navigating from one point within a presentation to another point without appreciable delay. TV shows and motion pictures are considered linear presentations because the user or viewer has to watch the

information being displayed, in a pre- defined sequence of frames as determined by the producer or creator of the show. The viewer cannot change the sequence of frames or the timing between them if desired.

In multimedia presentation, the user can instantly navigate to different parts of the presentations and display the frames in anyway he/she chooses, without appreciable delays, due to which it is called a non – linear presentation. The author needs to ensure that the presentation behaves in a consistent manner, irrespective of the sequence or order in which it is viewed. In reality, however the user is restricted to a certain extent because he/she cannot arbitrarily navigate the presentation but only along those paths already defined by author or developer of the show.

INTERACTIVITY

To make non – linearity a possibility, a user needs to interact with a presentation. A linear presentation is usually watched passively without changing the order or sequence in which it is displayed. For a non – linear presentation a user will have to specify how he/she would like to watch the presentation. Example directly navigates to an area of interest instead of watching it from the beginning. Such interaction is made possible through a set of interactivity elements embedded within the presentation like buttons, menu items or hyperlinks. So the presentation should be capable of accepting these user inputs and change its course accordingly.

DIGITAL REPRESENTATION

Audio and video cassette players use media recorded on magnetic tapes in analog format. Magnetic tapes are called sequential access storage devices (ie) data is recorded sequentially along the length of the tape. When a specific portion of the data is required to be played back, the portion before that needs to be skipped. This creates a delay in accessing arbitrary portions of the data which is unsuitable for multimedia requirements.

Multimedia requires instant access to different portions of the presentation. This is the best done inside a digital computer which stores data on random access devices like hard disk, floppy disk and compact disk. The rotation of the disc and the radial movement of the read/write enable instant access to different portions of data recorded on the disk surface. Hence, multimedia presentations are produced and played back on

the digital platform. Each of the media types like text, image, audio, video needs to be expressed in the digital form before they can be utilized within a presentation.

INTEGRITY

One would tend to believe that any number of media files arbitrarily played on a computer would comprise a multimedia presentation.

Example we can edit a text document in a word processor, play a video clip in the media player and listen to an audio – CD using the CD player. All these applications collectively however would not constitute a multimedia presentation.

5. UTILITIES OF MULTISENSORY PERCEPTION

Multimedia system can widen the range of presentation in two ways.

1. First they enrich the set of media which stimulate a given sense. Rich text, graphics and video are examples of visual media which enrich the basic plain text computer format.
2. Second they introduce media which stimulate new senses like audio in the form of human speech and music.

The benefits of multi sensory systems are manifold. They are

1. The interaction with the computer system may appear more natural and friendly.
2. The useful redundancy of information may be possible. Example user attention may be better caught when both visual and audio modes are mixed.
3. Complementary information presented together may improve memorization of knowledge. Also the fact the user interacts with the presentation leads to greater retentivity of information.
4. Emotional information is easier to convey. Example a video image of a correspondent added to his voice message may better express his views and sound more convincing.
5. Multisensory systems may be of invaluable benefits to users with special needs.

6. HARDWARE AND SOFTWARE REQUIREMENTS

Hardware and software requirements of a multimedia PC can be categorized into two classes.

1.MULTIMEDIA PLAYBACK

Multimedia playback usually required smaller amount of resources, those which are sufficient for viewing an existing multimedia presentation.

2.MULTIMEDIA PRODUCTION

Multimedia production generally requires greater and more powerful resources and should fulfill all requirements for designing and developing a multimedia presentation. In both cases however storage and processing requirements are much grater than non multimedia PCs, because media components like images, audio and video occupy large file sizes and require powerful processors for manipulation and presentation, as compared to plain text files.

USES OF MULTIMEDIA

1.HOME ENTERTAINMENT

Application of multimedia technology related to home entertainment includes computer based games for kid's interactive encyclopedias, story- telling, cartoons etc.

2.EDUCATIONAL PURPOSES

This includes learning packages and simulation of lab experiments (especially those which cannot be easily performed). Different aspects of the course curriculum which cannot be explained or grasped easily through simple text and images (as offered by the books) could be presented through video clips, animation, 3D modeling, audio annotations etc., for making them more comprehensible.

3.INDUSTRIAL TRAINING

This involves Computer Based Training (CBT) packages for employees, both technical and marketing successful organizations are required to maintain a high level of staff training and development.

4.INFORMATION KIOSKS

These are devices where information is accessed through a touch screen and viewed on a monitor. Example Train timings at railway station, shopping kiosks provide

consumers with access to an electronic shopping center offering a wide range of information, products and services.

5.CORPORATE PRESENTATIONS

Corporate presentations for emphasizing the salient features and activities of a company, its products, its business partners like suppliers and retailers, can be built by incorporating multimedia elements along with textual descriptions.

6. BUSINESS

Items difficult to stock like glass utensils, industrial equipments etc. Can be displayed to perspective buyers by company sales people through multimedia presentation Example Real estate agents can display interior and exterior of buildings along with necessary information like dimensions and price, architects and engineers can transform blueprints into buildings and products.

7.TOURISM AND TRAVEL INDUSTRY

Travel companies can market packaged tours by showing prospective customers glimpses of the place they would like to visit, details on lodging, fooding, special attractions etc., Hotel owners can utilize the technology to display details of facilities offered at various hotels at different locations.

8.ELECTRONIC SHOPPING

Like the travel industry, customized presentation for consumer and industrial products could be created and displayed to prospective customers.

9.COMMUNICATION AND NETWORKS

These applications allow real- time interactions between people who need to work together but cannot be in the same place at the same time. In order to cater to these needs, many public and private networks support services like voice mails and tele-conferencing.

10.MEDICINE

Multimedia technologies can be used to prepare high-quality magnetic resonance 3D images of human bodies and practice complicated surgical procedures. Archieves of X-ray images, CT scans, ultra-sonography images etc.,

11.ENGINEERING APPLICATIONS

Multimedia is used extensively in designing mechanical, electrical, electronic and architectural parts through the use of Computer Aided Manufacturing (CAM) applications.

12.CONTENT BASED STORAGE AND RETRIEVAL (CCBSR) SYSTEMS

As large repositories of media elements like images, audio and video are growing up all over the world, efficient methods of searching non- textual media are being developed. Example matching of a finger point from police records to identify a criminal.

STEPS FOR CREATING A MULTIMEDIA PRESENTATION

1.CHOOSING A TOPIC

The first task is to choose a topic on which to create the presentation. A topic may belong to any of the categories of uses of multimedia. Although in principle one can select any topic, topics which can be explained or demonstrated using various media types are more conducive to multimedia presentations. Media like sound, graphics etc to explain the subject matter. Use of text is not prohibited, but should be kept at a minimum. Example not more than a few lines per page or frame of the presentation.

2.WRITING A STORY

Once the subject matter has been chosen, the next step is to write a story. A story as the name suggest would the overall content of the presentation. The focus should be on what the wants to communicate to his/her audience.

3.WRITING THE SCRIPT

Once the overall subject matter has been finalized, the next step is to create a script. While a story focuses on ‘what’ is communicated, a script emphasizes ‘how’ the subject matter unfolds. Like a cinema script which not only depicts what the actors should say but also how they should talk, move, behave, a multimedia script also depict how the content should be displayed to the user.

4.PREPARING A STORY BOARD

Once the script has been prepared the author needs to prepare the story board. The story board depicts what should be the layout of each screen within the presentation. It depicts information about the background color or image, appearance

of the navigational buttons or menu items, the location and size of the graphics and text, the duration of the voice over.

5. PREPARING A FLOW LINE

A flow line depicts the navigational pathways within the presentation. Each page is represented as a rectangular block and a directed line from one block to another means that the second page is accessible from the first via some navigational element. Example by clicking a button.

6. IMPLEMENTATION

Implementation has number of steps.

The **first step** is the **collection of media items**.

First types are the **editing software** which is used to edit the digitized items. Examples clipping a part of a digital image change the size and color of a graphic, selecting a 10 second music clip from a larger sound file.

Second type of software are the **authoring software** which are used to integrate all the edited media into a single presentation by specifying where on the screen each item needs to be displayed and the start time and end time for each.

1. TESTING AND FEED BACK

After the implementation phase is completed, an important step of testing and feedback should be done for improving the quality of the presentation. This step involves distributing whole or part of the presentation to sections of the target audience or experts and getting feedback from them about the possible areas which need improvement.

2. FINAL DELIVERY

The final phase in the production schedule is the delivery of the application to the intended client. Usually the run time version of the application files are copied onto a CD-ROM and physically handed over to the customer.

7. ANALOG REPRESENTATION

An **analog quantity** is a physical value that varies continuously over space and/or time. It can be described by mathematical functions of the type $S = f(t)$, $S = f(x, y, z)$ or $S = f(x, y, z, t)$.

Physical phenomena that stimulate human senses like light and sound can be thought of continuous waves of energy stream existing over a region in space or a period of time. Unless the stream is physically interrupted.

These phenomena can be measured by instruments which transform the captured physical variable into another space/time dependent quantity called a **signal**.

If the signal is also continuous we say that it is analogous to the measured variable. The instruments are called **sensors** and the signals usually are electrical in nature, because of the ease with which can manipulate and measure electrical signals. Example microphone converts the environmental sound energy into electrical signals and a solar cell converts the radiant energy from the sun into electrical signals.

Analog signals have two essential properties.

First, the signal delivered by the capturing instrument may take any possible value within the limits of the instrument. Thus, the value can be expressed by any real number in the available range. Analog signal are thus, said to be **amplitude continuous**.

Second, the value of the analog signal can be determined for any possible value of time or space variable. Analog signals are therefore also said to be **time continuous or space continuous**.

8. WAVES

We usually represent analog quantities as 'waves' as an analogy to the waves on seashore or the wavy ripples in a pond, which seem to us as continuous and flowing. Light, heat, sound, magnetism and electricity also share these properties of continuity and flow due which they are modeled as waves. Waves can be conceived of energy propagating from one place to another.

The particles of the medium (example molecules, electrons) absorb a part of the energy from source and oscillate or vibrate about their mean position, thereby transferring a part of the energy to the next layer of particles and propagating the wave outwards in all directions from the source. Because a wave as in general associated with oscillatory or vibrational forces, we usually think of a mean position about which a particle is oscillating giving rise to the concept of positive and negative displacements.

A wave therefore essentially represents a graph or plot of the motion of a particle or a set of particles in the path of a wave over space or time. When there are no motional

particles associated examples light, we can think of the energy stream as comprising of vibrating energy bundles or photons.

FUNDAMENTAL PROPERTIES OF WAVES

Three fundamental properties can be identified in waves that determine the characteristics of the physical quantity that the wave represents. These are amplitude, frequency and wave form.

1. PEAK AMPLITUDE

The peak amplitude of a wave is the maximum displacement of the oscillating particle from its mean position. Higher amplitude would signify a larger distance between the opposite crests of the wave.

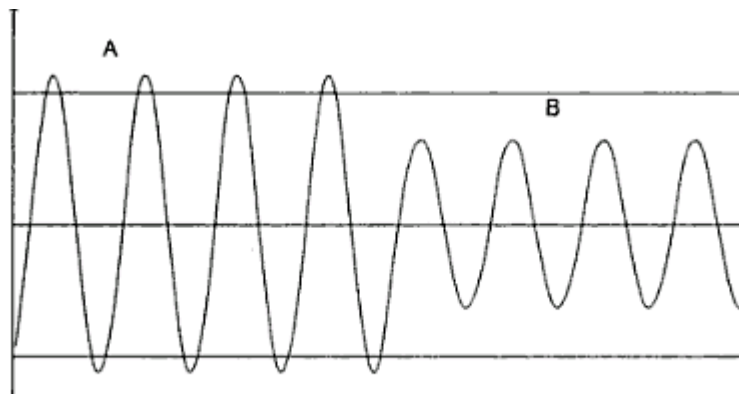


Figure 2.3 Two waves of different amplitudes

In the above figure the smaller wave B is said to have smaller amplitude than the larger wave A. Wave is a pictorial representation for a physical quantity, therefore changing a fundamental property of a wave would usually bring about a change in some physical property of the quantity.

The amplitude actually represents the **intensity** of the physical quantity. Example the brightness of light, the loudness of sound, the voltage/current level of electricity etc. Increasing the amplitude would therefore increase the intensity of the quantity and vice-versa. This is logical because higher amplitude would signify a larger energy content of the oscillating particle as it moves further from the mean position, which manifests as greater intensity of the physical quantity.

2. FREQUENCY

The frequency refers to how fast a particle in the path of a wave is oscillating and is defined as the number of oscillations completed by the particle in unit time. In

below figure wave B has a higher frequency than wave A although both have the same amplitude. Frequency represents the pitch of sound or color of light

A higher pitch results in shrill sound. Example a whistle. While a lower pitch results in a dull and flat sound. Example sound of a padded hammer. Violet colored light has a higher frequency than red. Frequency is measured in a unit called **Hertz** represented as **Hz**. A wave is said to have a frequency of 100 Hz when it completes oscillations in one second.

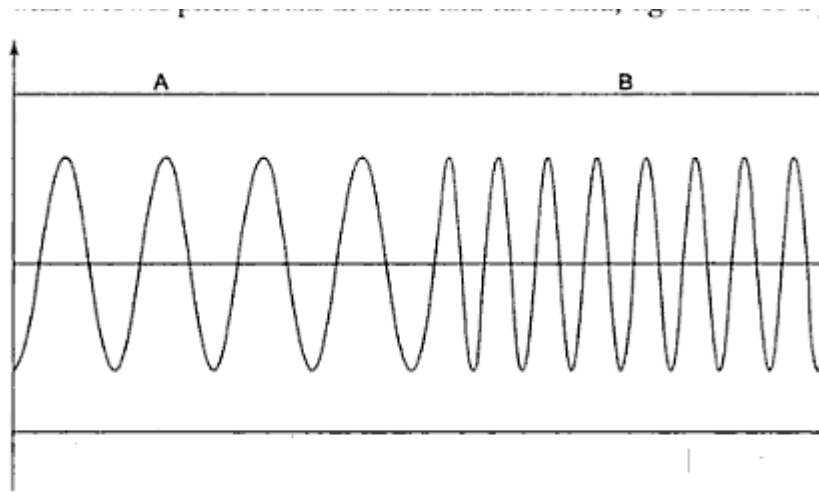


Figure 2.4

Two waves of different frequencies

3.WAVEFORM

The wave form essentially represents the shape of the wave and signifies the change of the amplitude and frequency overtime. Waves can have any shape like triangular, square, half-sinusoidal etc. A wave can also have an irregular shape without any apparent periodicity. The waveform determines the quality of the physical quantity. Example timbre of sound or texture of light.

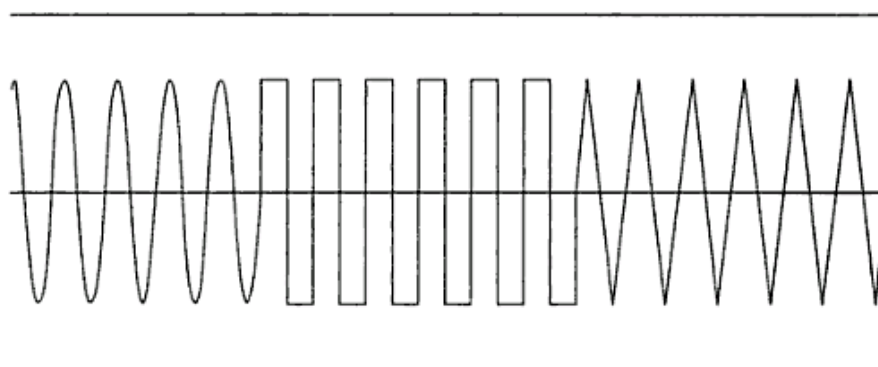


Figure 2.5

Waves having same amplitude and frequency but different waveforms

9. DIGITAL REPRESENTATION

Digital quantities are not continuous over space or time, and as such they cannot be represented by smooth waves. They are discrete in nature which means that they exist or have values only at certain points in space or instants in time, but not at other points or instants.

We therefore do not represent digital quantities as equations but rather as sets of values or numbers along with the time instants when the values are occurring. Example $\{X_1:t_1, X_2:t_2 \dots X_n: t_n\}$ the state of the digital quantity between these points is unknown and therefore cannot be represented graphically.

Example the state of an electric switch can be represented by two numbers. 1 when it is ON position and 0 when it is in OFF position. In such a case the number 1.5 does not carry any meaning because it does not represent a valid state of the switch. Even if the switch is half-closed then either a contact exist between the opposite poles of the switch in which case it behaves as ON(1) or there is not contact in which it behaves as OFF(0).

10. NEED FOR DIGITAL REPRESENTATION

A digital computer can only recognize digital values. The reason for this is due to the internal architecture of the computer. The processor and memory of the computer are actually Integrated Circuits (ICs) which are made of a large number of elementary components called **transistors**. Each transistors essentially behaves as a bi-polar switch if can either be ON or OFF.

These states of the switches are used to store data. If we can represent data as a combination of 1s and 0s, say A is represented as 1100001, and then we can have a series of seven switches as ON, ON, OFF, OFF, OFF, OFF, ON and say they store the character 'A'. This is actually done: each alphanumeric character is represented by a combination of 1s and 0s known as its **ASCII code**.(American Standard Code for Information Interchange) using which they are represented internally within a computer. Hence digital quantities are represented within a computer as discrete binary numbers. Each of these digits is known as a **bit**, short for **binary digit**, while a collection of 8 bits is called a **byte**.

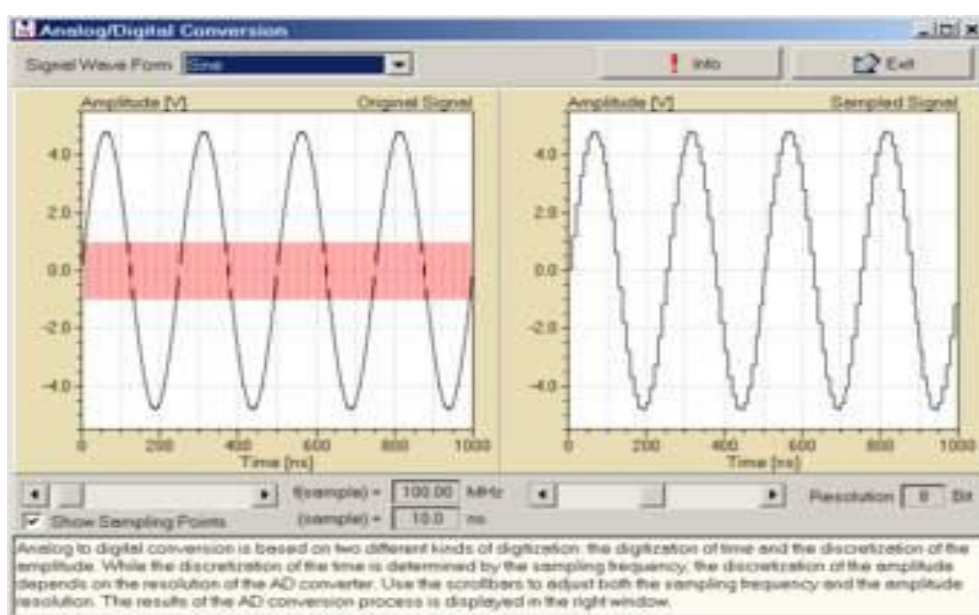
11. Analog-to-digital converter

An **analog-to-digital converter** (abbreviated **ADC**, **A/D** or **A to D**) is a device that converts a continuous physical quantity (usually voltage) to a digital number that represents the quantity's amplitude.

The conversion involves quantization of the input, so it necessarily introduces a small amount of error. Instead of doing a single conversion, an ADC often performs the conversions ("samples" the input) periodically. The result is a sequence of digital values that have converted a continuous-time and continuous-amplitude analog signal to a discrete-time and discrete-amplitude digital signal.

An ADC is defined by its bandwidth (the range of frequencies it can measure) and its signal to noise ratio (how accurately it can measure a signal relative to the noise it introduces). The actual bandwidth of an ADC is characterized primarily by its [sampling rate](#), and to a lesser extent by how it handles errors such as aliasing.

An ADC may also provide an isolated measurement such as an electronic device that converts an input analog voltage or current to a digital number proportional to the magnitude of the voltage or current. However, some non-electronic or only partially electronic devices, such as rotary encoders, can also be considered ADCs. The digital output may use different coding schemes. Typically the digital output will be a two's complement binary number that is proportional to the input, but there are other possibilities. An encoder, for example, might output a Gray code.



The inverse operation is performed by a digital-to-analog converter(DAC).

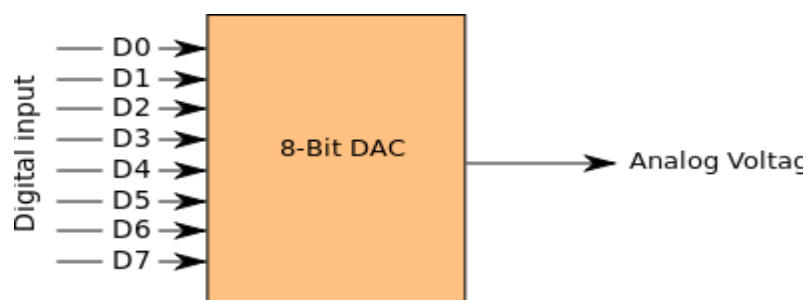
12. Digital-to-analog conversion

In electronics, a **digital-to-analog converter (DAC, D/A, D2A or D-to-A)** is a function that converts digital data (usually binary) into an analog signal (current, voltage, or electric charge). An analog-to-digital converter (ADC) performs the reverse function. Unlike analog signals, digital data can be transmitted, manipulated, and stored without degradation, albeit with more complex equipment. But a DAC is needed to convert the digital signal to analog to drive an earphone or loudspeaker amplifier in order to produce sound (analog air pressure waves).

The digital stream is then divided into packets where it may be mixed with other digital data, not necessarily audio. The digital packets are then sent to the destination, but each packet may take a completely different route and may not even arrive at the destination in the correct time order. The digital voice data is then extracted from the packets and assembled into a digital data stream. A DAC converts this into an analog electrical signal, which drives an audio amplifier, which a signal, so a DAC should be specified that that has insignificant errors in terms of the application.

DACs are commonly used in music players to convert digital data streams into analog audio signals. They are also used in televisions and mobile phones to convert digital video data into analog video signals which connect to the screen drivers to display monochrome or color images. These two applications use DACs at opposite ends of the speed/resolution trade-off.

The audio DAC is a low speed high resolution type while the video DAC is a high speed low to medium resolution type. Discrete DACs would typically be extremely high speed low resolution power hungry types, as used in military radar systems. Very high speed test equipment, especially sampling oscilloscopes, may also use discrete DACS.



13. TEXT

Ever since the inception of human civilization ideas have been largely articulated using the written mode. The flexibility and ease of use of the textual medium makes it ideal for learning. Word processing programs emerged as one the earliest application programs. In multimedia presentations, text can be combined with other media in a powerful way to present information and express moods.

14. TYPES OF TEXT

Essentially there are three types of text that can be used to produce pages of a document.

- Unformatted text
- Formatted text
- Hypertext

UNFORMATTED TEXT

Also known as plain text, this comprise of fixed sized characters from a limited character set. The character set is called **ASCII table** which is short for American Standard Code for Information Interchange and is one of the most widely used character sets.

It basically consists of a table where each character is represented by a unique 7-bit binary code. This means there are 2^7 or 128 code words which can be used to identify the characters. The characters include a to z, A to Z, 0 to 9, and other punctuation characters like parenthesis, ampersand, single and double quotes, mathematical operators etc. All the characters are of the same height.

In addition to normal alphabetic, numeric and punctuation characters collectively called **printable** characters, the ASCII characters set also includes a number of **control** characters.

These include BS(Backspace), LF(Line feed), CR(Carriage return), NUL(Null), SOH(Start of heading), STX(Start of text), ETX(End of text), EOT(End of transmission), ENQ(Enquiry), ACK(Acknowledge), BEL(Bell), TAB(horizontal tab), VT(Vertical tab), FF(Form feed), SO(Shift out), SI(shift in), DLE(Data link escape), DC1(device control 1), DC2(Device control 2), NAK(Negative acknowledge), SYN(Synchronous idle), ETB(End of trans block), CAN(Cancel), EM(End of medium),

SUB(Substitute), ESC(Escape), FS(File separator), GS(Group separator), RS(Record separator), US(unit separator)

Later as requirements increased an extended version of ASCII table was introduced known as the **extended ASCII** character set, while the original table came to be known as **standard ASCII** set. The extended set used an 8- bit representation and therefore had a provision of 256 characters. The first 128 characters were the same as the original character set, now known as the standard ASCII table while the remaining codes were used to represent small simple graphical symbols.

Dec	Hx	Char	Dec	Hx	Oct	Chr	Dec	Hx	Oct	Chr	Dec	Hx	Oct	Chr
0	0	NUL (null)	32	20	040	Space	64	40	100	@	96	60	140	.
1	1	SOH (start of heading)	33	21	041	!	65	41	101	A	97	61	141	a
2	2	STX (start of text)	34	22	042	"	66	42	102	B	98	62	142	b
3	3	ETX (end of text)	35	23	043	#	67	43	103	C	99	63	143	c
4	4	EOT (end of transmission)	36	24	044	\$	68	44	104	D	100	64	144	d
5	5	ENQ (enquiry)	37	25	045	%	69	45	105	E	101	65	145	e
6	6	ACK (acknowledge)	38	26	046	&	70	46	106	F	102	66	146	f
7	7	BEL (bell)	39	27	047	'	71	47	107	G	103	67	147	g
8	8	BS (backspace)	40	28	050	(72	48	110	H	104	68	150	h
9	9	TAB (horizontal tab)	41	29	051)	73	49	111	I	105	69	151	i
10	A	LF (NL line feed, new line)	42	2A	052	*	74	4A	112	J	106	6A	152	j
11	B	VT (vertical tab)	43	2B	053	+	75	4B	113	K	107	6B	153	k
12	C	FF (NP form feed, new page)	44	2C	054	,	76	4C	114	L	108	6C	154	l
13	D	CR (carriage return)	45	2D	055	-	77	4D	115	M	109	6D	155	m
14	E	SO (shift out)	46	2E	056	.	78	4E	116	N	110	6E	156	n
15	F	SI (shift in)	47	2F	057	/	79	4F	117	O	111	6F	157	o
16	10	DLE (data link escape)	48	30	060	0	80	50	120	P	112	70	160	p
17	11	DC1 (device control 1)	49	31	061	1	81	51	121	Q	113	71	161	q
18	12	DC2 (device control 2)	50	32	062	2	82	52	122	R	114	72	162	r
19	13	DC3 (device control 3)	51	33	063	3	83	53	123	S	115	73	163	s
20	14	DC4 (device control 4)	52	34	064	4	84	54	124	T	116	74	164	t
21	15	NAK (negative acknowledge)	53	35	065	5	85	55	125	U	117	75	165	u
22	16	SYN (synchronous idle)	54	36	066	6	86	56	126	V	118	76	166	v
23	17	ETB (end of trans. Block)	55	37	067	7	87	57	127	W	119	77	167	w
24	18	CAN (cancel)	56	38	070	8	88	58	130	X	120	78	170	x
25	19	EM (end of medium)	57	39	071	9	89	59	131	Y	121	79	171	y
26	1A	SUB (substitute)	58	3A	072	:	90	5A	132	Z	122	7A	172	z

FORMATTED TEXT

Formatted texts are those where apart from the actual alphanumeric characters, other control characters are used to change the appearance of the characters example: bold, underline, italics, varying shapes, sizes and colors. Most text processing software uses such formatting options to change text appearance. It is also extensively used in the publishing sector for the preparation of books, papers, magazines, journals and soon.

In addition a variety of document formatting options are supported to enable an author to structure a documents into chapters, sections and paragraphs and with tables and graphics inserted at appropriate points. The control characters used to format the text is application dependent and may vary from one package to another example bold appearance.

HYPertext

Documents provide a method of transmitting information. Reading a document is an act of reconstructing knowledge. A book or an article on paper has a given structure and is represented in a sequential form. Although it is possible to read individual paragraphs, without reading previous paragraphs, authors mostly assume sequential reading. Novels as well as movies always assume a pure sequential reception.

Technical documentation (example: manuals) consists often of a collection of relatively independent information units. There also exists many cross- references in such documentation which leads to multiple searches at different places for the reader. A hypertext document can be used to handle such situations.

The term hyper is usually used to mean something excessive (beyond super) example: hyper active, hyper tension etc. Here the term is used to mean certain extra capabilities imparted to normal or standard text like normal text, a hypertext document can be used to reconstruct knowledge through sequential reading but additionally it can be used to link multiple documents in such a way that the user can navigate non-0 sequentially from one document to the other for cross-references. These links are called **hyperlinks**. Hyperlinks from one of the core structures in multimedia presentations, because multimedia emphasizes a non-linear mode of presentation.

The underlined text string on which the user clicks the mouse is called an **anchor** and the document which opens as a result of clicking is called **target document** on the web target documents are specified by a specific nomenclature called web sites address technically known as Uniform Resource Locator or URL. Example of hypertext:

The text string “Microsoft Home Page” forms the anchor which when mouse clicked opens the Microsoft website defined by the URL www.microsoft.com whenever the mouse pointer is placed over a hypertext, the cursor changes to hand icon.

Other than the Internet, hypertext can also be used in other applications like MS-Word, MS- PowerPoint, Adobe Acrobat and multimedia presentations. Here hypertexts are used to jump to one page of the document to another page, or even from one point to another within the same page. Using programming language like JavaScript or Lingo, hypertexts can be used to initiate playback of media files like a video clip. A hypertext consists **of two different parts: the anchor and the link**.

15. UNICODE STANDARD

The Unicode standard is a new universal character coding scheme for written characters and text. It defines a consistent way of encoding multilingual text which enables textual data to be exchanged universally. The Unicode standard goes far beyond ASCII'S limited more than 1 million characters. Multilingual support is provided for European, Middle Eastern and Asian languages. The Unicode consortium was incorporated in 1991 to promote the Unicode standard.

The Unicode Technical Committee (UTC) is the working group within the consortium responsible for the creation, maintenance, and quality of the Unicode standard. The Unicode standard draws a distinction between characters, which are the smallest component of written language and Glyphs, which represents the shapes, the characters can have when displayed. The Unicode standard deals only with character codes, representation of the glyphs are not part of the standard. These are to be dealt with by the font vendors and hardware vendors. A font and its rendering process define a mapping from the Unicode values to glyphs.

Example: the Hindi character 'Pa' is represented by the Unicode sequence 0000100100101010(U + 092A), how it will be rendered on the screen will be decided by the font vendor. The first byte represents the language area while the next byte represents the actual character. Some of the languages and their corresponding codes are: Latin (00) , Greek(03) , Arabic(06), Devanagiri/ Bengali (09) , Oriya / Tami9l (0b) etc.

16. FONT

FONT APPEARANCE

The appearance of each character in case of formatted text is determined by specifying what a font name. Font name refers to font files which contain the actual description of the character appears on the windows platform font files are stored in specific folder called fonts under the windows folder. These files are usually in **Vector format meaning that** character descriptions are stored mathematically. This is useful because characters may need to be scaled to various heights and mathematical descriptions can easily handle such variations without degrading the appearance of characters.

Windows call these fonts as **true types** fonts because their appearance stays the same on different devices like monitors, printers and plotters, and they have a file extension of TTF. An alternative form of font files is the **bitmap format** where each character is described as a collection of pixels.

FONT STYLE AND SIZE

Font characters have a number of sizes. Size is usually specified in a unit called point (pt) where 1 point equal $1/72$ of an inch. Sometimes the size may also be specified in pixels. Standard characters in textual documents usually range from 10 to 12 pts in size, while the upper limit may go well beyond 100. Specified font types can be displayed in a variety of styles. Some of the common styles used are: **bold**, *italics*, underline, super^{script} and sub_{script}. Some application packages allow changing the horizontal gap between the characters called **kerning** and the vertical gap between two lines of text called **leading**.

Some packages allow a number of special effects on text to make it more dramatic, interesting and fun. This includes changing the appearance in a variety of ways like bending, slanting, warping, rotating, adding shadows and 3D effects etc, other ways of manipulating text include animations like scrolling, fading, changing colors, adding sound effects etc.

17. INSERTION OF TEXT

Text can be inserted in a document using variety of methods. These are;

USING A KEY BOARD

The most common process of inserting text in to a digital document is by typing the text using an input device like the keyboard. Usually a text editing software, like Microsoft word, is used to control the appearance of text which allows the user to manipulate variables like the font, size, style, color etc. Some image processing and multimedia authoring software provide a separate text editing window where the user can type text and integrate it with the rest of the media like background images.

COPYING AND PASTING

Another way of inserting text in to a document is by copying text from a pre-existing digital document. The existing document is opened using the corresponding text processing program and portions of the text may be selected by using the key board

or mouse. Using the **copy** command the selected text is copied to the clipboard. This text can then be inserted in to another existing document or a new document or even in another place of the same document by choosing the **paste** command, where upon the text is copied from the clipboard in to the target document. This text can then be edited as per the user's requirements.

USING AN OCR SOFTWARE

A third way of inserting text in to digital documents is by scanning it from a paper documents. The text in a paper document including books, newspaper, magazines, letter heads etc can be converted in to the electronics form using a device called the scanner.



The electronic representation of the paper document can then be saved as a file on the hard disk of the computer. The scanned file will however be an image file in which the text will be present as part of an image and will not be editable in a text processors. To be able to edit the text, it needs to be converted from the image format in to the editable text format using software called Optical Character Recognition (OCR) software. The OCR software traditionally works by a method called pattern matching.

18. TEXT COMPRESSION

Large text documents covering a number of pages may take a lot of disk space. We can apply compression algorithms to reduce the size of then text file during storage. A reverse algorithms must be applied to decompress the file before it contents can be displayed on screen. However to be meaningful, the compression – decompression process must not change the textual content in anyway, not even a single character. There are two types of compression methods that are applied to text as explained.

HUFFMANCODING

This type of coding is intended for applications in which the text to be compressed has known characteristics in terms of the occurrences. Using the

information, instead of using fixed length code words, an optimum set of variable – lengths code words is derived such that the shortest codeword is used to represent the most frequently occurring characters. This approach is called **Huffman coding**.

LEMPEL –ZIV (LZ) CODING

In the second approach followed by the Lempel – ziv (LZ) method, instead of using a single character as a basis of the coding operation a string of characters is used. Example: a table containing all the possible words that occur in a text document is held by both the encoder and decoder. As each word occurs in the text, instead of representing the text as ASCII characters, the encoders stores only the index of where the word in the table. The decoder converts the index in to the appropriate words from the table. Thus the table is used as a dictionary, and the LZ algorithm is also known as dictionary based algorithm.

LEMPEL – ZIV WELSH (LZW) CODING

Most word processing packages have a dictionary associated with them which is used for both spell checking and compression of text. Typically they contain in the region of 25000 words and hence, 15 bits ($2^{15} = 32768$) are required to encoding the index. To encode the word compression with such as scheme would require only 15 bits instead of 777 bits with 7 bit ASCII code words. The above method may not however produce efficient result for documents with a small subject of words in the dictionary. Hence the variations of the above algorithm called Lempel-ziv welsh (LZW) method allows the dictionary to be built up dynamically by the encoder and decoder for the document under processing. The dictionary becomes a better match for a specific document than a standard dictionary.

19. FILE FORMATS

The following text formats are usually used for textual documents.

TXT (TEXT)

Unformatted text document created by an editor kike note pad on those platform. Unformatted text document can be used to transfer textual information between different platform like windows DOS and UNIX. The data is encoded using ASCII codes but sometimes Unicode encodings like UTF – 8 or UTF – 16 may be used.

DOC (DOCUMENT)

Developed by Microsoft as a native format for storing documents created by the ms word package. Contains a rich set of formatting capabilities .Since it require property software it is not considered a document exchange format.

RTF(RICH TEXT FORMAT)

Developed by Microsoft in 1987 for cross platform document exchanges . it is the default format for Mac OS X's default editor text edit. The word pad editor earlier created RTF files by the default although now it has switched to the DOC format RTF control codes are human readable , similar to HTML code.

Example this is (\b bold) text; \par a new paragraph begins.

PDF (PORTABLE DOCUMENT FORMAT)

Developed by adobe systems for cross platform exchange of documents. In addition to text the format also support images in graphics PDF is an open standard and any one make write programs that can read and write PDF s without any associated royalty charges.PDF readers can be downloaded for free from adobe site and there are several free open source readers available.

Example; X PDF ([http://www.foolabs.com/x PDF](http://www.foolabs.com/xPDF)),

PDF ([http:// www. Purl.org/net/Gpdf](http://www.Purl.org/net/Gpdf)),

View PDF (<http://mac.wms-network.de/gnustep/image apps /view PDF /view pdf.html>)

PS(POST SCRIPT)

Post script is a page description language used mainly for desktop publishing. A page description language 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. Post script was developed in 1985 and soon became the ideal choice for graphical output for printing applications.

A post script interpret a inside the printer converted the vectors back in to the raster dots to be printed. These allow arbitrary sealing, rotating and other transformations.