

# INTRODUCTION TO MULTIMEDIA COMPUTING

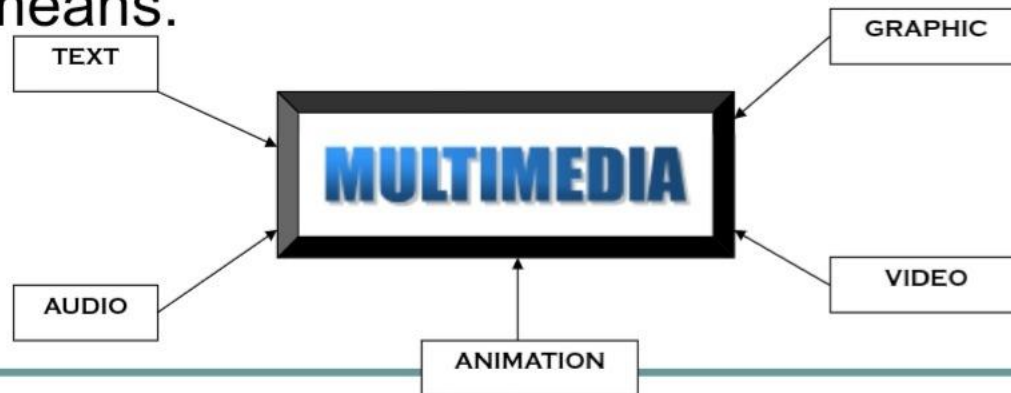
**DR.RAYA BASIL**

# What is Multimedia?

- Derived from the word “Multi” and “Media”
  - Multi
    - Many, Multiple,
  - Media
    - Tools that is used to represent or do a certain things, delivery medium, a form of mass communication – newspaper, magazine / tv.
    - Distribution tool & information presentation – text, graphic, voice, images, music and etc.

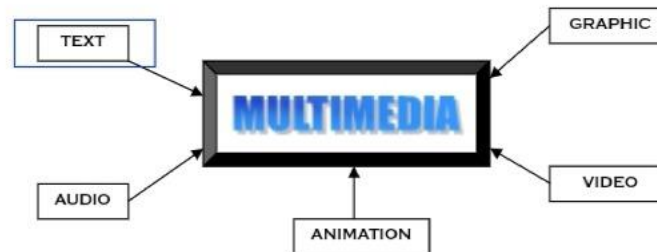
# Definition of Multimedia

- Multimedia is a combination of text, graphic, sound, animation, and video that is delivered interactively to the user by electronic or digitally manipulated means.



# Elements of Multimedia

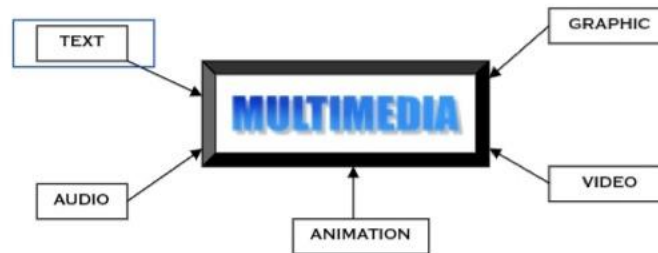
## TEXT



- A broad term for something that contains words to express something.
- Text is the most basic element of multimedia.
- A good choice of words could help convey the intended message to the users (keywords).
- Used in contents, menus, navigational buttons

# Elements of Multimedia

## TEXT

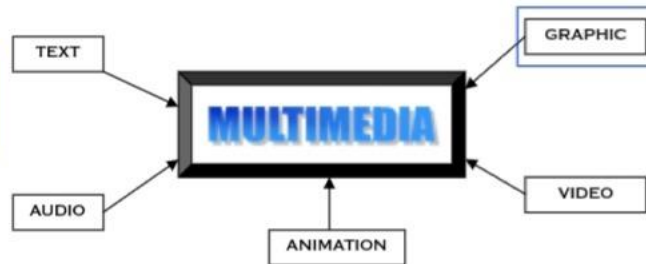


- Example

<b>ROAD SAFETY</b>	<b>Basic</b>	<b>Intermediate</b>	<b>Advanced</b>
First, before crossing the road, make sure you look to your left, to your right and then left again.			
Then, walk carefully to cross the road.			

# Elements of Multimedia

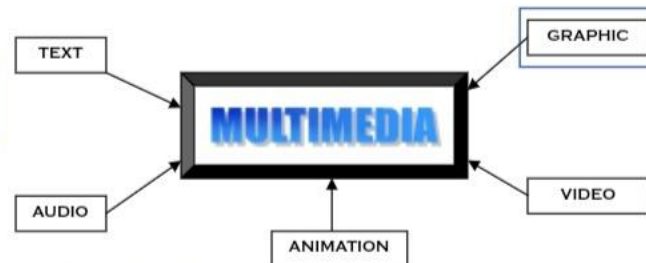
## GRAPHIC



- Two-dimensional figure or illustration
- Could be produced manually (by drawing, painting, carving, etc.) or by computer graphics technology.
- Used in multimedia to show more clearly what a particular information is all about (diagrams, picture).

# Elements of Multimedia

## GRAPHIC



- Example

**ROAD SAFETY**    Basic    Intermediate    Advanced

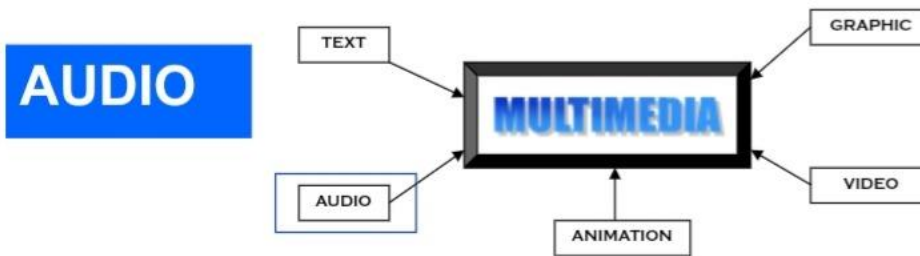
First, before crossing the road, make sure you look to your left, to your right and then left again.



Then, walk carefully to cross the road.



# Elements of Multimedia

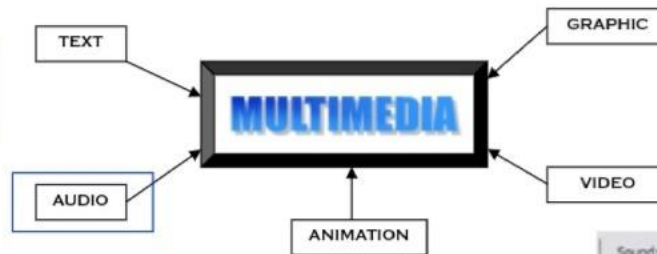


- Produced by vibration, as perceived by the sense of hearing.
- In multimedia, audio could come in the form of speech, sound effects and also music score.



# Elements of Multimedia

AUDIO

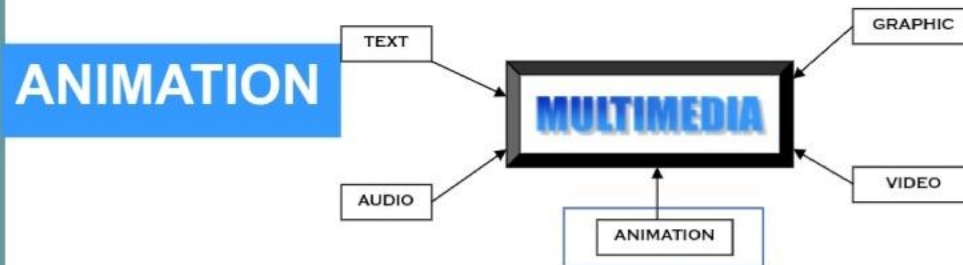


- Example

The screenshot displays a multimedia software interface for a 'ROAD SAFETY' animation. The interface is divided into several sections:

- Top Panel:** Contains tabs for 'Basic', 'Intermediate', and 'Advanced'. The 'Basic' tab is selected.
- Text Area:** Displays the instruction: "First, before crossing the road, make sure you look to your left, to your right and then left again."
- Preview Window:** Shows a 3D character standing on a road with trees in the background. The character is shown in three different poses, likely representing the sequence of looking left, right, and then left again.
- Timeline:** Located at the bottom, it shows a sequence of frames with a red playhead indicating the current position in the animation.
- Sound Control Panel:** Located on the right side, it includes a dropdown menu for 'Sound' (set to 'NG 11905'), an 'Effect' dropdown (set to 'Custom'), and a 'Sync' dropdown (set to 'Start'). It also shows 'Repeat' set to '1' and technical specifications: '44 kHz Stereo 16 Bit 67.2 x 806.9 kB'.

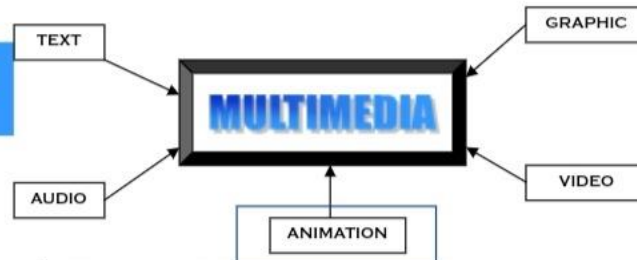
# Elements of Multimedia



- The illusion of motion created by the consecutive display of images of static elements.
- In multimedia, animation is used to further enhance / enriched the experience of the user to further understand the information conveyed to them.

# Elements of Multimedia

## ANIMATION



- Example

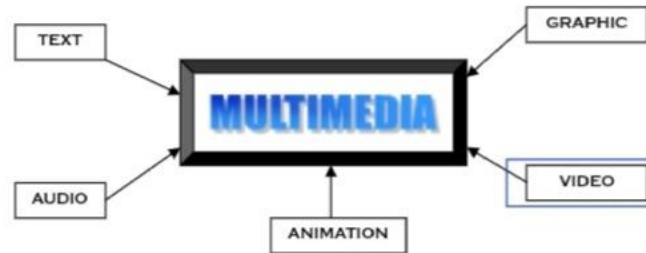
**ROAD SAFETY** Basic Intermediate Advanced

First, before crossing the road, make sure you look to your left, to your right and then left again.

A cartoon illustration of a yellow smiley face character with a blue shirt, looking towards three stylized green trees with brown trunks. The background is a light blue gradient.

# Elements of Multimedia

## VIDEO



- Is the technology of capturing, recording, processing, transmitting, and reconstructing moving pictures.
- Video is more towards photo realistic image sequence / live recording as in comparison to animation.
- Video also takes a lot of storage space. So plan carefully before you are going to use it.

## Interactive Multimedia

- When the user is given the option of controlling the elements.

## Hyper Media

- A combination of hypertext, graphics, audio, video, (linked elements) and interactivity culminating in a complete, non-linear computer-based experience.

# Example

- Interactive Multimedia



# Example

- Hyper Media



- Main Page
1. Video link
  2. Image link
  3. Audio Link



# Linear VS Non-Linear

## LINEAR

- A Multimedia Project is identified as Linear when:
  - It is not interactive
  - User have no control over the content that is being showed to them.
- Example:
  - A movie
  - A non-interactive lecture / demo show



# Linear VS Non-Linear

## NON-LINEAR

- A Multimedia Project is identified as Non-Linear when:
  - It is interactive
  - Users have control over the content that is being showed to them.
  - Users are given navigational control
- Example:
  - Games
  - Courseware
  - Interactive CD

# Authoring Tools

- Use to merge multimedia elements (text, audio, graphic, animation, video) into a project.
- Designed to manage individual multimedia elements and provide user interaction (if required).



# Authoring Tools

## Example:

- Macromedia Authorware
- Macromedia Director
- Macromedia Flash
- Microsoft Power Point





# Multimedia Products

1. Briefing Products
2. Reference Products
3. Database Products
4. Education and Training Products
5. Kiosk
6. Entertainment and Games

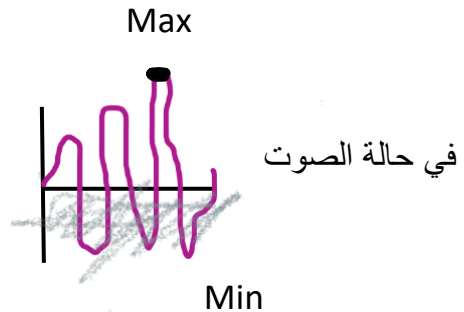
THANK YOU

LZW : is lossless data compression used widely in Text format for unix file compression also its in image format.

الفكرة الأساسية تكون بالاعتماد على الاسكي الخاص بكل حرف المدى الخاص بالاسكي هو [0-255] في حالة كون لدينا مدى اكبر من أعلاه عندها نطبق normlizing عليها باستخدام القانون [ استخراج كود اكبر من 8-bit,9bit..... ]

$$\text{Linear normalizing} = \frac{X - \text{Min}}{\text{Max} - \text{Min}} * \text{Max}$$

الخطوة الثابتة سوف يكون لدينا طور نحولها الى int ثم نطبق عليها Lzw للحصول على كبس للبيانات



يتم اهمال الجزء السالب وناخذ الجزء الموجب ويتم تحويلها الى مدى [ 0 - 255 ]

## Example [edit]

The following example illustrates the LZW algorithm in action ,showing the status of the out put and the dictionary at every stage, both in encoding and decoding the data . This example has been constructed to give reasonable compression on a very short message. In real text data , repetition is generally less pronounced ,so longer input streams are typically necessary before the compression builds up efficiency .

The plaintext to be encoded (from an alphabet using only the capital letters) is:

TOBEORNOTTOBEORTOBEORNOT#

The # is a marker used to show that the end of the message has been reached. There are thus 26 symbols in the plaintext alphabet (the 26 capital letters A through Z) and the # character represents a stop code . we arbitrarily assign these the values 1 through 26 for the letters and 0 for '#'. (Most flavors of LZW would put the stop code after the data alphabet ,but nothing in the basic algorithm requires that . The encoder and decoder only have to agree what value it has )

A computer renders these as string of bits .Five – bit codes are needed to give sufficient combinations to encompass this set of 27 values . The dictionary is initialized with these 27 values .As the dictionary grows ,the codes must grow in width to accommodate the additional entries. A 5 – bit code gives  $2^5 = 32$  possible combinations of bits , so when the 33 rd dictionary word is created , the algorithm must switch at that point from 5-bit strings to 6-bit strings

(For all code values ,including those previously out put with only five bits ). Note that since the all -zero code 00000

Is used , and is labeled "0". The 33 rd dictionary entry is labeled **32**.

(Previously generated output is not affected by emitted, so the width for subsequent output shifts to 6 bits to accommodate That .)



The initial dictionary , then ,consists of the following entries

Symbol	Binary	Decimal
#	00000	0
A	00001	1
B	00010	2
C	00011	3
D	00100	4
E	00101	5
F	00110	6
G	00111	7
H	01000	8
I	01001	9
J	01010	10
K	01011	11
L	01100	12
M	01101	13
N	01110	14
O	01111	15
P	10000	16
Q	10001	17
R	10010	18
S	10011	19
T	10100	20
U	10101	21
V	10110	22
W	10111	23
X	11000	24
Y	11001	25
Z	11010	26

Current	Next	Output		Extended	comments
Sequence	Char	Code	Bits	Dictionary	
Null	T				
T	O	20	10100	27: TO	27 = first available code after 0 through 25
O	B	15	01111	28: OB	
B	E	20	00010	29: BE	
E	O	5	00101	30: EO	
O	R	15	01111	31: OR	
R	N	18	10010	32: RN	32 requires 6 bit ,so for next output use 6bit
N	O	14	001110	33: NO	
O	T	15	001111	34: OT	
T	T	20	010100	35: TT	
TO	B	27	011011	36: TOB	
BE	O	29	011101	37: BEO	
OR	T	31	011111	38: ORT	
TOB	E	36	100100	39: TOBE	
EO	R	30	011110	40: EOR	
RN	O	32	100000	41: RNO	
OT	#	34	100010		# stops the algorithm , send the cur seq
		0			and the stop code

un encoded length = 25 symbols \* 5 bits /symbol = 125 bits

Encoded length = (6 codes \* 5 bits /code ) + (11 codes \* 6 bits/code) = 96 bits

Using LZW has saved 29 bits out of 125, reducing the message by almost 22%. If the message were longer , then the dictionary words would begin to represent longer and longer sections of text , sending repeated words very compactly .

## LZW FOR COMPRESSION ( HIGH REDUNDANCY)

**a b c f g h a b c g h e a b c g**

Input String	Next Symbol	Output Code	Dictionary	
			String	Code
a	b	97	ab	256
b	c	98	bc	257
c	f	99	cf	258
f	g	102	fg	259
g	h	103	gh	260
h	a	104	ha	261
a	b			
ab	c	256	abc	262
c	g	99	cg	263
g	h			
gh	e	260	ghe	264
e	a	101	ea	265
a	b			
ab	c			
abc	g	262	abcg	266
g		103		

Input code	Last	Output	String	
			String	code
97	-	a		
98	a	b	ab	256
99	b	c	bc	257
102	c	f	cf	258
103	f	g	fg	259
104	g	h	gh	260
256	h	ab	ha	261
99	ab	c	abc	262
260	c	gh	cg	263
101	gh	e	ghe	264
262	e	abc	ea	265
103	abc	g	abcg	266

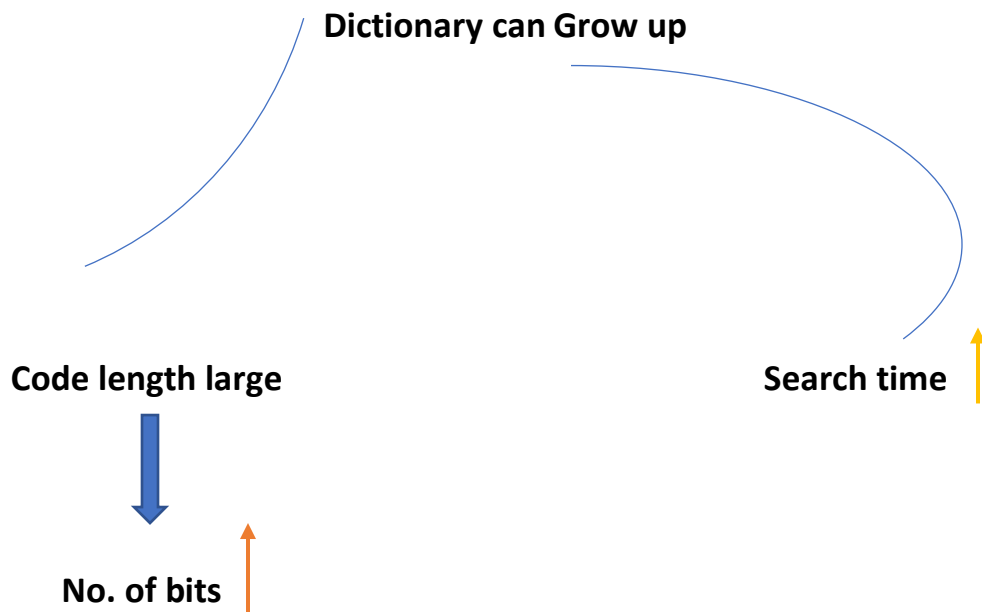
### Example

aaaaaabbbbb

Input String	Next	Output	Dictionary String	Dictionary code
a	a	97	aa	256
a	a			
aa	a	256	aaa	257
a	a			
aa	a			
aaa	b	257	aaab	258
b	b	98	bb	259
b	b			
bb	b	259	bbb	260
b	b			
bb		259		

Code	Old	Current	String	Code
97	-	a		
256	a	aa	aa	256
257	aa	aaa	aaa	257
98	aaa	b	aaab	258
259	b	bb	bb	259
259	bb	bb	bbb	260

### Disadvantages



Solution → limit # of Entries



# File Formats

*Presented By:*  
*Anita Kumari*

# File Format

- A **file format** is a standard way that information is encoded for storage in a computer file.
- A file format specifies how bits are used to encode information in a digital storage medium.
- File formats may be either proprietary or free and may be either unpublished or open.
- For example : image file format , audio file format , video file format and Text Formats etc.



# Types of File Formatting

```
graph TD; A[Types of File Formatting] --> B[Image File Format]; A --> C[Audio File Format]; A --> D[Video File Format]; A --> E[Text Format];
```

Image File  
Format

Audio File  
Format

Video File  
Format

Text Format

# Image File Format

- Image Formats bring different ways to overcome the problem of delivering an image with reduced file size and minimum download time
- Image file formats are standardized means of organizing and storing digital images
- Image files are composed of digital data in one of these formats that can be rasterized for use on a computer display or printer
- An image file format may store data in uncompressed, compressed, or vector formats. Once rasterized, an image becomes a grid of pixels, each of which has a number of bits to designate its color equal to the color depth of the device displaying it.

# TYPES OF IMAGE FORMATS



GIF

JPEG

PNG

# GIF

- Stands for Graphic Interchange Format.
- Uses lossless compression technique
- Supports 8 bit colors
- Supported by all browsers
- Suitable for text , artwork , icons and cartoons
- Large File Size
- Extension is .gif

# JPEG

- Stands for Joint Photographic Experts Group
- Uses lossy compression technique
- Supports 24-bit colors
- Supported by all browser
- Suitable for photographs
- Smaller File Size as compared to GIF
- Extension is .jpg or .jpeg

# PNG

- Stands for Portable Network Graphics
- Uses lossless compression technique which supports 24-bits colors but not supported by all browsers
- Suitable for text , icons etc.
- Smaller File Size as compared to GIF and JPEG
- Extension is .png


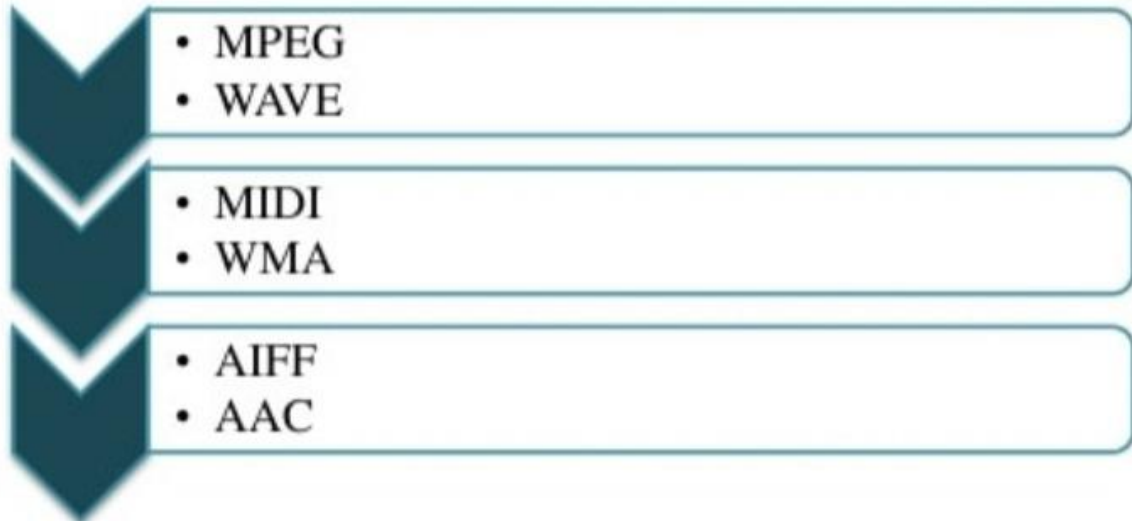




# Audio File Format

- An audio file format is a file format for storing digital audio data on a computer system.
- This data can be stored uncompressed, or compressed to reduce the file size.
- It can be a raw bit stream, but it is usually a container format or an audio data format with defined storage layer.

# Types of Audio File Format

- 
- 
- MPEG
  - WAVE

- MIDI
- WMA

- AIFF
- AAC



# MPEG

- Stands for Moving Picture Experts Group
- MPEG files employ loss data compression
- MPEG files use the .mp3 filename extension
- Digital music , pod casts and audio books are often saved as MPEG3 files
- Older MPEG files are usually designated with an extension of .mp2
- Older MPEG files are usually designated with an extension of .mp2
- One minute of music takes up approximately 1MB of storage space

# WAVE

- Stands for Resource Interchange File Format  
Waveform
- Wave files employ an uncompressed audio format
- WAVE uses .wav filename extensions
- This file format is a proprietary format that was sponsored jointly by Microsoft and IBM
- The .wav format can support both monaural (single-channel) and stereo (multichannel) audio
- One minute of stereo music takes up approximately 10MB of storage space

# MIDI

- Stands for Musical Instrument Digital Interface
- MIDI files are very small, but are not compressed
- They use .mid or .midi filename extensions
- A MIDI file is not a recording of music being played; it is a description of how to create the sound based on predefined sounds, like a 6-string guitar or pipe organ
- A MIDI recording never contains the human voice
- A 10KB (10,000 storage locations) MIDI file could easily hold more than a minute of music

# WMA

- Stands for Windows Media Audio
- WMA file formats use a loss compression developed by Microsoft and is widely recognized by a variety of players and jukeboxes, like Winamp and Music Match
- Windows Media Audio files use a .wma filename extension
- It is non-proprietary MP3 format for saving and storing music files

# AIFF

- Stands for Audio Integrated File Format
- AIFF uses the .aiff file extension
- AIFF is the native audio file format developed by Apple for the Macintosh computer platform
- It is an uncompressed audio format
- This means that it is much larger in file size than MP3 but can support the highest possible audio recording quality as well as lower quality settings
- AIFF can support music from the highest quality 48K recording through to lower quality recordings



# AAC

- Stands for Advanced Audio Coding
- AAC is a standardized loss compression
- It uses the .aac file extension
- Intended to be the successor to MP3 format, AAC generally has better audio quality and is the default format for many digital audio players like the iPod, iPhone, iPad, Nintendo DS and others

# Video File Format

- Video File Format is consist of two ways:
  1. Analog
  2. Digital
- Examples of these formats is:
  - MPEG
  - MOV
  - AVI
  - WMV
  - Real Video
  - SWF

# Types of Video File Format

- 
- MPEG
  - MOV

- AVI
- WMV

- REAL VIDEO
- SWF





# MPEG

- Stands for Motion Picture Experts Group
- MPEG files are also a common format for digital videos and movies
- It use the filename extensions of .mpg or .mpeg
- The latest MPEG version, MPEG4, uses the .mp4 filename extension

# MOV

- Stands for QuickTime Movie
- The QuickTime video and movie file format was originally developed for the Apple Macintosh
- But MOV is now recognized by all personal computers
- QuickTime movies use the .mov filename extension
- .qt filename extension used as an alternative

# AVI

- Stands for Audio/Video Interleave
- The AVI video and movie file format was originally developed by Microsoft for Windows-based personal computers
- It uses the .avi filename extension
- It is the nominal standard for personal computers using Windows

# WMV

- Stands for Windows Media Video
- WMV file formats are propriety to Microsoft licensed products
- WMV are not widely recognized by non-Windows players
- Windows Media Video files use a .wmv filename extension
- Files stored in this format are intended to be played, not edited

# RealVideo

- RealVideo is a proprietary file format
- It uses .rm, .ram, .ra as file extensions
- Used mainly for real-time streaming of audio and video it requires RealPlayer (Windows and Mac) software

# SWF

- Stands for Originally ShockWave Flash, now means Small Web Format
- SWF files use the .swf file extension
- It is a format for multimedia, vector graphics and ActionScript in the Adobe Flash environment
- SWF files can contain animations or applets of varying degrees of interactivity and function
- Currently, SWF functions are the dominant format for displaying "animated" vector graphics on the Web



# Text Format

- Files in the text file format are files in which the bytes represent the text characters of a particular character set using a specific system to relate the binary numbers in the file to the text characters of the set.
- Such systems are called 'encodings' and become an issue when the file includes characters that are not in the standard ASCII set, such as characters in languages other than English
- The Text file format includes a number of different formatting strategies for text files in which data fields are structured in a regular pattern.

## Text Format (Con't)


- Most of these formats represent rows of data on different lines of the file using different strategies to separated data values within each row. 'Fixed-width' formats place each data entry in a separate column and therefore limit the size of the data entries.
- 'Separated' formats use a special character or character sequence to separate entries. For instance, the comma separated value, the tab separated value formats and the space separated value formats use commas, tabs, and spaces respectively to separate the data fields.



# Types of Text File Format

- 
- DOC/DOCX
  - RTF

- 
- TXT
  - HTML

- 
- PDF
  - ZIP



## DOC/DOCX

- Microsoft's Word (word processing) software saves documents using the .doc filename extension
- These files contain special formatting codes that identify how the text will look ( bold, italic, color, typeface, etc.) as well as how the page lays out (margins, indentation, pagination, etc.)
- This file format was superseded in Word 2007 with the .docx filename extension
- DOCX files incorporate XML (EXtensible Markup Language) coding rules that help integrate a document with Internet applications
- As a result, earlier versions of Word cannot read DOCX documents, but Microsoft does provide software that converts DOC documents into a DOCX format
- Word 2007 can read DOC documents and is able to save new documents in a DOC format when using the Save As option

# RTF

- Stands for Rich Text Format
- RTF documents are designed to transfer documents between word processing software
- These files use .rtf filename extensions
- While the text formatting options are as "rich" as those used by Word, RTF files have limited page layout options
- For example, you cannot create columns, add page numbers, headers, or footers
- The WordPad word processor included with Windows defaults to creating RTF documents

# TXT

- TXT documents only contain text
- Any computer can read a TXT file, but don't expect it to look pretty
- The Notepad text editor included with Windows defaults to creating TXT documents
- The individual characters in the document (letters, punctuation, newlines etc.) are each encoded into bytes using the ASCII encoding (or another character encoding such as UTF8 or iso8859-1, particularly if the document is not in English), and stored in a simple sequence
- This format only stores the text itself, with no information about formatting, fonts, page size, or anything like that
- It is portable across all computer systems and can be read and modified by a huge range of software applications
- The details of the format are freely available and standardized
- If the storage media are damaged, any undamaged sections can be recovered without problems

# HTML

- Stands for HyperText Markup Language
- It use either .htm or .html filename extensions
- HTML files contain codes that browsers, like Internet Explorer or Safari, translate into Web pages
- The text, plus simple formatting, is stored in a simple encoding that is based on the plain text file format above, with plain text markup interspersed with the text
- This format is freely available and controlled by a public-interest standards body
- The document can be viewed in any web browser
- It can be edited in a text editor by someone who knows HTML, or in any number of “rich text” editors, word processors, HTML editors and so on



# PDF

- Stands for Portable Document Format
- PDF files use a .pdf filename extension
- These files are created using a software package from Adobe called Acrobat
- This software must be purchased and converts files created by other softwares, like Microsoft's Word, into a read-only PDF file
- In this format case, the text plus formatting, page size and similar information are stored in a moderately complex encoding
- While the details of this encoding are freely available, the format is owned by Adobe and can be changed by them at any time, for any reason
- The document can be viewed and printed on all major platforms, using free software provided by Adobe (or others)
- PDF documents cannot be readily edited

# ZIP

- ZIP files are compressed data files
- Files of ZIP format use the .zip filename extension
- A popular shareware program called WinZip originally used this format
- At one time you needed to use WinZip to compress (zip) and uncompress (unzip) ZIP files, but many personal computers now recognize this file format and will unzip the files
- ZIP files can contain several compressed files under one filename, called an archive, when using the WinZip software
- As a result you could unzip a file (archive) named testbank.zip and find it contains 12 unique files for a 12-chapter textbook



**Thank You!**