Department of Collegiate and Technical Education

UNIT 1

SESSION 2

MULTIMEDIA AND ANIMATION – 20CS21P

UNIT 1

INTRODUCTION TO MULTIMEDIA SYSTEMS

1.3 Multimedia Image and Graphics

1.3.1 Resolution, Size and Compression

I. Importance of Resolution, Size and compression of Images in Multimedia

An image consists of a rectangular array of dots .The physical **size** of the image, in inches or centimeters, depends on the **resolution.** In order to make the file small, JPEG uses lossy **compression**.

i) Importance of images in multimedia

Still images are the important element of a multimedia projector a web site. To make multimedia presentation look elegant and complete. It is necessary to spend ample amount of time to design the graphics and the layouts.

ii) Importance of image resolution in multimedia

Higher resolution means higher detail, and can be measured in dots per inch (DPI). When it comes to printing, resolution is super important, as high-quality image looks beautiful and professional, whereas a low-resolution image looks fuzzy, indistinct and completely unprofessional.

iii) Image compression

Image compression is an application of data compression that encodes the original image with few bits. The objective of image compression is to reduce the redundancy of the image and to store or transmit data in an efficient form

iv) Importance of image compression in multimedia

Image compression is minimizing the size in bytes of a graphics file without degrading the quality of the image to an unacceptable level. The reduction in file size allows more images to be stored in a given amount of disk or memory space. There are several different ways in which image files can be compressed.

1.3.2 File Formats of various multimedia files

The following is an outline of current file formats used for the production and delivery of multimedia data.

1. *Text Formats*
   i)   **RTF**

Rich Text Format is the primary file format introduced in 1987 by Microsoft with the specification of their published products and for cross-platform documents interchange.

   ii)   **Plain text**

Plain text files can be opened, read and edited with most text editors. Commonly used are Notepad (Windows), Gedit or nano (Unix, Linux), TextEdit (Mac OS) and so on. Other computer programs are also capable of reading and importing plain text. Plain text is the original and popular way of conveying an e-mail.

2. *Image Formats*

   i)   **TIFF (Tagged Image File Format)**

This format is common in desktop publishing world (high quality output), and is supported by almost all software packages. Recent versions of TIFF allows image compression, and the format is comfortable for moving large files between computers.

   ii)   **BMP (Bitmap)**

Initially this format is in use with Windows 3.1. It is quite large and uncompressed and hence BMP is used for high-resolution or large images.

   iii)   **DIB (Device Independent Bitmap)**

This format which is similar to BMP, allows files to be displayed on a variety of devices.

iv) GIF (Graphics Interchange Format)

GIF is a compressed image format. Most of the computer color images and backgrounds are GIF files. This file format is best suitable for graphics that uses only limited colors, and it is the most popular format used for online color photos. 13-bit Color look up table is used by the GIF format to identify its color values. This format is supported widely.

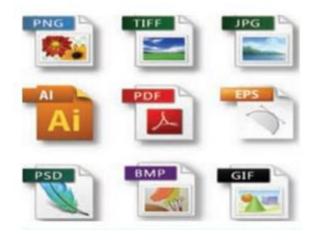#### v) JPEG (Joint Photographic Experts Group)

JPEG was designed to attain maximum image compression. It uses loss compression technique, where a compression method is referred that loses some of the data required for the image reconstruction. It works good with photographs, naturalistic artwork, and similar material but functions less on lettering, live drawings or simple cartoons.

vi) TGA (Tagra)

It is the first popular format for high-resolution images. TGA is supported by Most of the video-capture boards.

vii) PNG (Portable Network Graphics)

An extensible file format for the less loss, portable and well compressed storage of raster images. PNG acts as replacement for GIF and also replaces multiple common uses of TIFF. PNG works good with online viewing applications like worldwide web. So it is fully streamable with best display option.

3. *Digital Audio File Formats*

i)   WAV (Waveform Audio File Format)

It is the most popular audio file format in windows for storing uncompressed sound files. In order to attain the reduced file size it can also be converted to other file formats like MP3.

ii)   MP3 (MPEG Layer-3 Format)

MPEG Layer-3 format is the most popular format for storing and downloading music. The MP3 files are roughly compressed to one-tenth the size of an equivalent WAV file.

iii) OGG

A free, open source container format that is designed for obtaining better streaming and evolving at high end quality digital multimedia. It can be compared to MP3 files in terms of quality.

iv)   AIFF (Audio Interchange File Format)

A standard audio file format used by Apple which is like WAV file for Mac.

v)   WMA (Windows Media Audio)

It is a popular windows media audio format owned by Microsoft and designed with Digital Right Management (DRM) abilities for copyright protection.

4. RA (Real Audio Format)

Real Audio format is designed for streaming audio over the Internet. The digital audio resources are usually stored as computer file in computer's hard drive or CD/DVD. Besides the variety of audio file formats available, the most common formats are wave files (.WAV) and MPEG Layer-3 files (.MP3), WMA and RA.

Figure 4.10 Digital Audio File Formats

5. *Digital Video File Formats*

i)   AVI (Audio/Video Interleave)

AVI is the video file format for Windows. Here sound and picture elements are stored in alternate interleaved chunks in the file.

ii)   MPEG (Moving Picture Experts Group)

MPEG is a standard for generating digital video and audio compression under the International Standards Organization (ISO) by the group of people. The group has developed MPEG-1, the standard on which Video CD and MP3 are based, MPEG-2, the standard that supports products as Digital Television set top boxes and DVD, MPEG-4, the standard for multimedia and mobile web. MPEG-7, the standard for search of audio and visual content. Research on MPEG-21 "Multimedia Framework" has started in 2000. Simply MPEG is the standards for digital video and audio compression.

Figure 4.11 Digital Video File Formats

Multimedia Formats

- Import — import a video file as well as metadata.

- Export — export video and audio data to video files.

- "MP4" — MPEG-4 Part 14 video format (.mp4)

- "AVI" — Microsoft AVI format (.avi)

- "FLV" — Adobe Flash video files (.flv)

- "QuickTime" — Apple QuickTime multimedia container (.mov)

1.4 Multimedia Hardware

1.4.1 Interfaces

A **hardware interface** specifies the plugs, sockets, cables and electrical signals that pass through each line between the CPU and a peripheral device or communications network.

Hardware interfaces are the plugs, sockets, cables and electrical signals travelling through them. Examples are **USB**, **FireWire**, Ethernet, ATA/IDE, SCSI and **PCI**.

Advantages of Multimedia Interface

- More alternative methods.
- The flexibility of combining different schemes.
- More efficient for specific tasks.
- Greater precision of information.
- Help handicapped people to use computers.

1.4.2 I/O Devices

a) INPUT DEVICES:

A great variety or input devices -from the familiar keyboard and handy mouse to touch screen and voice recognition setups can be used for development and delivery or a multimedia project.

1) KEYBOARD:

A keyboard is the most common method of interaction with a Computer. Keyboards provide various tactile responses and have variously layout depending upon your Computer system and keyboard -model. Keyboard is typically rated at least 50 million cycles.

The most common keyboard for PCs is the 1011 style, although many styles are available with one or more special keys LED's.

2) MICE:

A mouse is the standard tool for interacting with a graphical user interface (QUI). All Macintosh computers require a mouse; on PCs, mouse: are not required but recommended. The buttons on the mouse provide additional user input, such as pointing and double clicking to open a document.

3) TRACK BALL:

Track ball are similar to mice except that the cursor is moved by using one or more fingers to roll across the top of the ball. The track ball does not need the flat space required by a mouse. Track ball have at least two buttons;one for the user to click, and the other to provide the press and hold condition necessary for selecting & dragging operation.

4) TOUCHSCREEN:

Touch screens are monitors that usually have a textured coating across the glass face. This coating is sensitive to pressure and register the location of the user's finger when it touches the screen. The touch mate system, which has no coating, actually measures the pitch roll, and yaw rotation of the monitor when pressed by finger, and determine how much force exerted and the location where the force was applied.

5) MAGNETIC CARD ENCODERS AND READERS:

Magnetic card setups are useful when you need an interface for a data- base application or multimedia project that tracks users. You need both card encoder and a card reader for this type of interface. The encoder connects to the computer at the serial port and transfer information to magnetic strip of tape on the back of the card.

6) FLAT-BED SCANNERS:

A scanner may be the most useful piece of equipment you will use in the course of producing a multimedia project. There are flat bed scanner and handheld scanners. Most commonly available are gray -scale and color flat- bed scanners that provide a resolution of 300 or 600 dots per inch.

Professional graphics houses may use even higher resolution unit.

7) OPTICAL CHARACTER RECOGNITION (OCR) DEVICES:

OCR sofware, such as omni page from cacre or perceive from ocron, to convert printed matter to ASCII text files in our computer. We can also convert paper document into a word processing document on our computer without retyping or rekeying.

An OCR terminal can be of use to multimedia developer because it recognizes not only printed characters but also handwriting.

8) INFRARED REMOTES:

An infrared remote unit Iets a user interact with our project while we are freely moving about. Remotes work like mice and trackballs, except they use infrared light to direct the cursor and require no cables to communicate. Remote mice work well for a Iecture or other presentation in an auditorium or similar environment, when the speaker needs to move around the room.

9) VOICE RECOGNITION SYSTEM:

Voice recognition system facilitates hands free interaction with your project. These system usually provide a unidirectional cardiod, noise canceling microphone that automatically filters out background noise. Most voice recognition system currently available can trigger common events such as Save, Quit, Open, Print etc.The Macintosh A V and Power Macintosh computer include voice recognition capability and add on sound board such as the Sound blaster or Diamond Sonic Sound and other provide this features for PCs.

10) DIGITAL CAMERA:

Digital Camera use the same technology i.e. CCD as video camera uses. They capture the still images of a given no. of pixels and the images are stored in camera's memory to be uploaded later to a computer. The higher the mega pixel rating, the higher the resolution of camera.Images are uploaded from the camera's memory using a serial, parallel cable.

b) OUTPUT DEVICES:

Presentation or the audio and the visual components or our multimedia project requires hardware that may or may not be included with the computer itself- speakers, amplifiers, monitor, motion video devices and capable storage devices. There is no greater test of benefit of good output hardware than to feed the audio output of your computer into an external amplifier.

1) AUDIO DEVICES:

All Machintosh are equipped with an internal speaker and a dedicated sound chip and they are capable of audio output without additional hardware and /or software.To take advantage of built in stereo sound, external speakers are required.

Digitizing sound on your Machintosh requires an external microphone and sound editing/recording software such as Sound edit 16 from Macromedia, Sound Forge.

2) <u>AMPLIFIERS ANS SPEAKERS:</u>

Often the speakers we use during a project development will not be adequate for development of multimedia project.Speakers with built in amplifier are important when our project will be presented to a large audience.

3) <u>MONITORS:</u>

The monitors we need for development of multimedia projects depend on the type of application we are creating.A wide variety of monitors are available for both Machintosh and PCs.High-end, large screen graphics monitors and LCD panels are available for both, and they are expensive.

Serious multimedia developers will often attach more than one monitor to their computers, using add-on graphics boards.This is because many authoring system allow us to work with several open windows at a time so we can dedicate one monitor to viewing the work we are creating or

designing and can perform various editing tasks in windows on other monitor that do not block the view of work.

4) <u>VIDEO DEVICES:</u>

Message medium has the visual impact of video with a video digitizing board installed in computer, can display a television picture on monitor. Some boards include frame-grabber features for capturing the images and turning it into a color bitmap, which can be saved as a PICT or TIFF file and then used as a part of a graphics or a background project.

5) <u>PROJECTORS:</u>

When we need to show material to more viewers that can huddle around a computer monitor, we will need to project it onto a large screen or even a white painted wall. Cathoda-ray tube projectors, liquid crystal display (LCD) panel attached to an overhead projector, stand alone LCD projectors, and light-valve projectors are available to splash work onto big screen surfaces.

6) <u>PRINTERS</u>:

With the advent of reasonably priced color printers, hard copy output has entered the mutimedia scene. From storyboards to presentation to production of collateral marketing material, color printers have become an important part of the multimedia development environment.Color helps clarify concept, improve understanding and retention or information, and organize complex data. Xerox offers both solid ink and laser options.

1.4.3 Multimedia storage

External Storage and Optical Device

1. Compact Disk-Read Only Memory (CD-ROM)

CD-ROMs, which use laser beam technology instead of magnetic technology for hard disks, have capabilities to store up to 600MB data.

2. Digital Versatile Disc (DVD) and High Density DVD (HD-DVD)

The Digital Versatile Disc (DVD) has a far better capacity than the CD for storing data.

3. Blu-ray Disc (BD)

The Blu-ray Disc (BD) is a high-density optical disc to store digital media,

Multimedia storage is usually made to fit the type of media being stored, sometimes reducing the overall area needed to hold a large number of items. With more and more digitized media, it is becoming increasingly popular to store media in the form of disk drives and media players.

An mp3 player.

USB or Universal Serial Bus is required it is a serial bus standard to interface with a series of computer devices

Multimedia can be stored on a USB drive.

1.4.4   Communication devices

Many multimedia application are developed in workgroups comprising instructional designers, writers, graphics artists, programmers, and musician located in the same office space or building. The workgroup member's computers typically arc connected on a local area network (LAN) the client's computers, however, may he thousand miles distant, requiring other methods of good communication.

In the work place us quality equipment and software for your communication setup. The cost in both the time and money of stable and fast networking will be returned to you.

MODEMS:

Modems can be connected to your computer externally at the serial port or internally as a separate board. Internal modems often include fax capability.Be sure that the modem is Hayes compatible. Hayes AT standard commmand set allows us to work with most software communication packages.

Modem speed, measured in band, is the most important consideration. Because the multimedia files that contain the graphics, audio resources, video samples and progressive version of the project are usually large and in many cases we need to move as much data in short period of time. Compression saves significant transmission time and money, especially over long distance.

ISDN:

For higher transmission speed, we will need to use Integrated Service Digital Network (ISDN), switched -56, TI, T3, DSL, ATM etc. ISDN lines are popular because of their fast 128 kbps data transfer rate- four to five times faster than the more common 28.8 kbps analog modem. ISDN lines are important for Internet accessing, Networking and audio and video conferencing. They are more expensive than the convention analog lines, so analyze your costs and benefits carefully before upgrading to ISDN. Newer and faster Digital Subscriber Line (DSL) technology using copper lines and promoted by the telephone companies may overtake ISDN.

CABLE MODEM:

Cable modems usually send and receive data symmetrically -they receive more (faster) than they send. In the downstream direction from provider to user, the data is modulated and placed on a common 6 Mhz television carrier, somewhere between 42 MHz & 750 MHz. The upper stream channel, or reverse path, from user to provider is more difficult to engineer because cable is more noisy environment with interference from HAM radio, CB radio, home appliances, loose connections etc.