MULTIMEDIA TECHNOLOGIES

(UNIT-I)

What is Multimedia?

Multimedia is any combination of

- text,
- graphic art / images,
- sound,
- animation,
- video,

delivered by computer or electronic means

What is Multimedia?

- Text
- Graphics
- Sound
- Animation
- Video

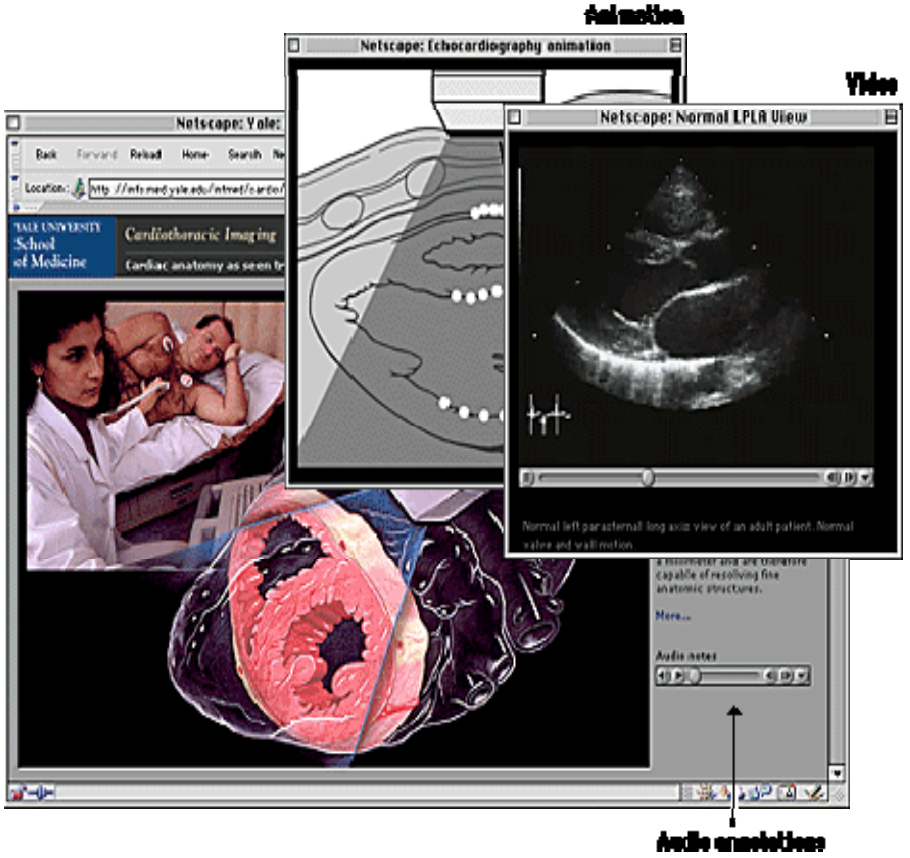
What is Multimedia?

Multimedia definitions :

- **Multimedia** is the field concerned with the computer controlled integration of text, graphics, drawings, still and moving images (Video), animation, audio, and any other media where every type of information can be represented, stored, transmitted and processed digitally.

Example of Multimedia

A presentation using power point Corporate presentations may combine all forms of media content.



Why Multimedia?

- Added value of visualization
  - Clarify thinking
  - Reinforce understanding
  - Integrate new knowledge
  - Identify misconceptions
- Added value of Audio
  - Ear training
- Added value of video
  - Quick, rich and authentic communication of demonstration, simulation, events and stories
  - Absorb and engage viewer making difficult concepts memorable

Why Multimedia?

Multimedia enhances learning, memory and retention

- audio stimulation - 20% retention rate
- audio/visual - up to 30% retention rate
- interactive multimedia - up to 60% retention rate

Types of Multimedia

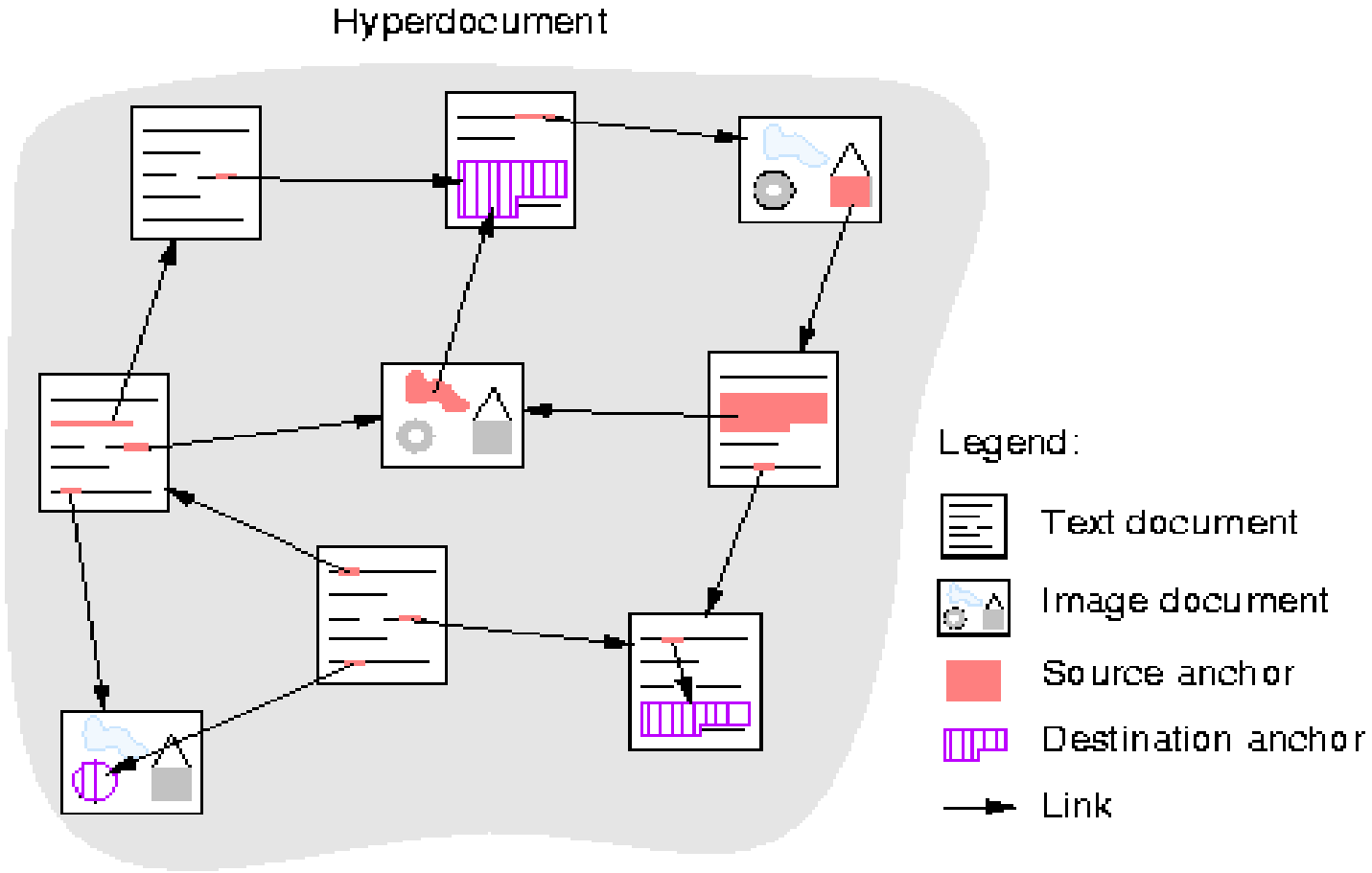
Non-linear and interactive multimedia

- users are given navigational control and can wander through the content. Ex-Hypertext, games, e-book
- Interactive Multimedia which provides a structure of linked elements through which the user can navigate.
- Allows the user to control
  - what and
  - when the elements are delivered
- Non-linear content is also known as **hypermedia** content. ex www, power point links

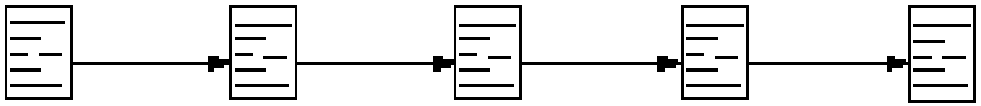
Linear multimedia

- **Linear or non Interactive-** users watch from beginning to end.

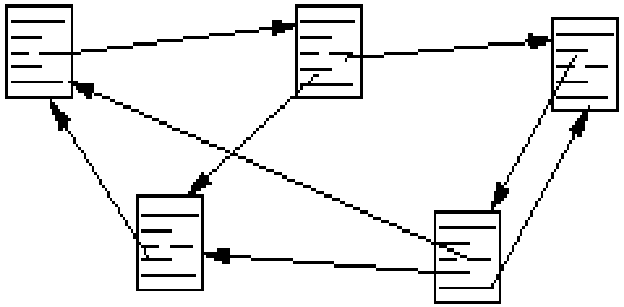
  Ex- movie


Hyperdocument
Legend:
Text document
Image document
Source anchor
Destination anchor
Link

Linear text

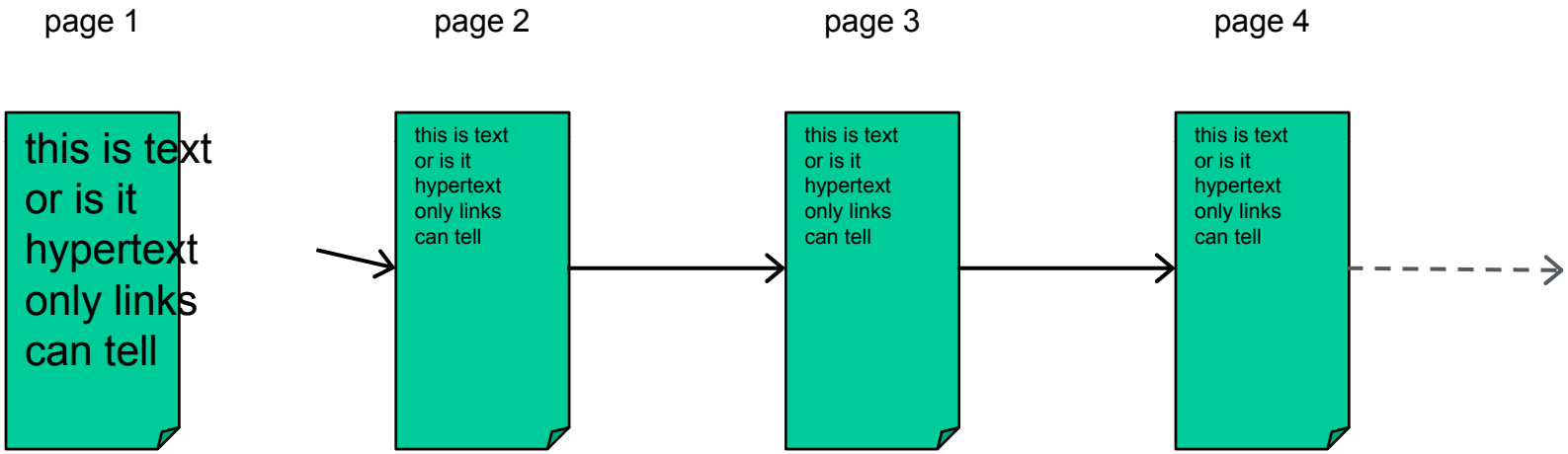


Hypertext



Text

- imposes strict linear progression on the reader
- the author's ideas of what is best

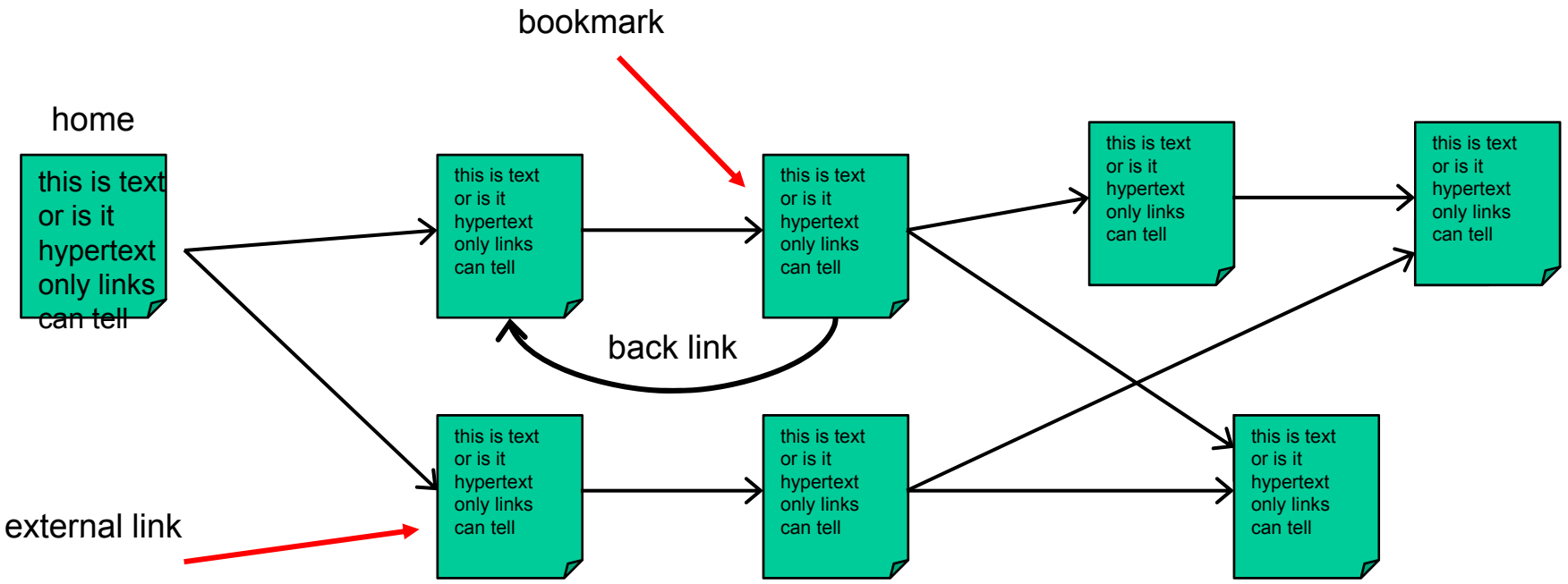


- often good :-)

… but not always!

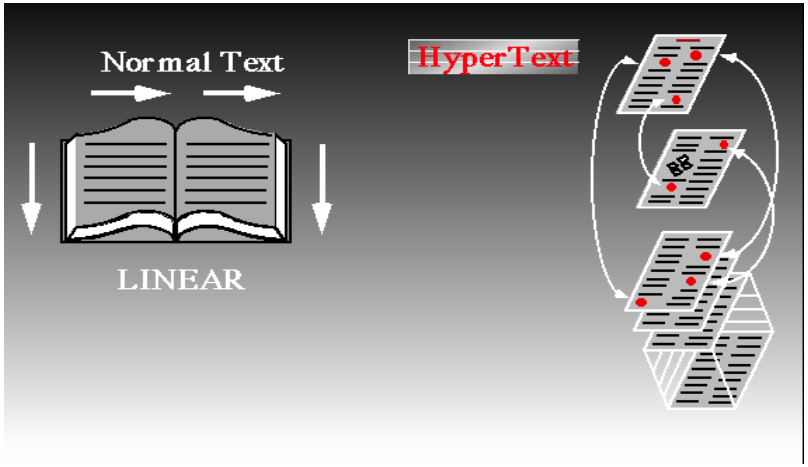
Hypertext - not just linear

- Non-linear structure
  - blocks of text (pages)
  - links between pages create a mesh or network
  - users follow their own path through information

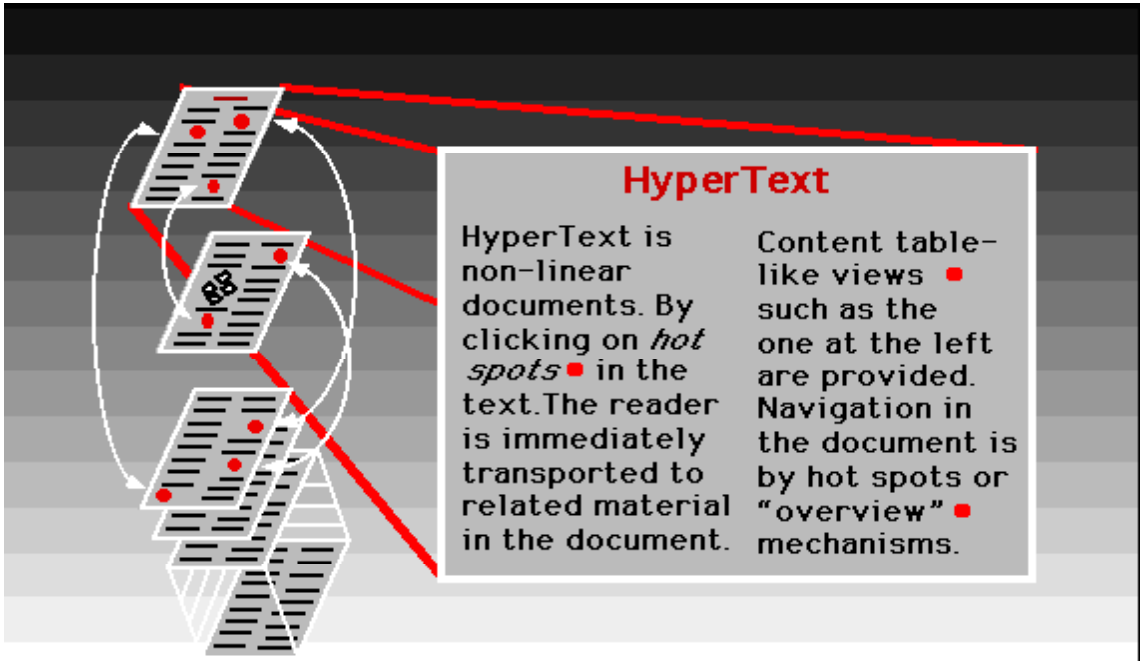


Hypertext

- *Hypertext* is a text which contains links to other texts. The term was invented by Ted Nelson around 1965.



-Hypertext is therefore usually **non-linear** (as indicated below).

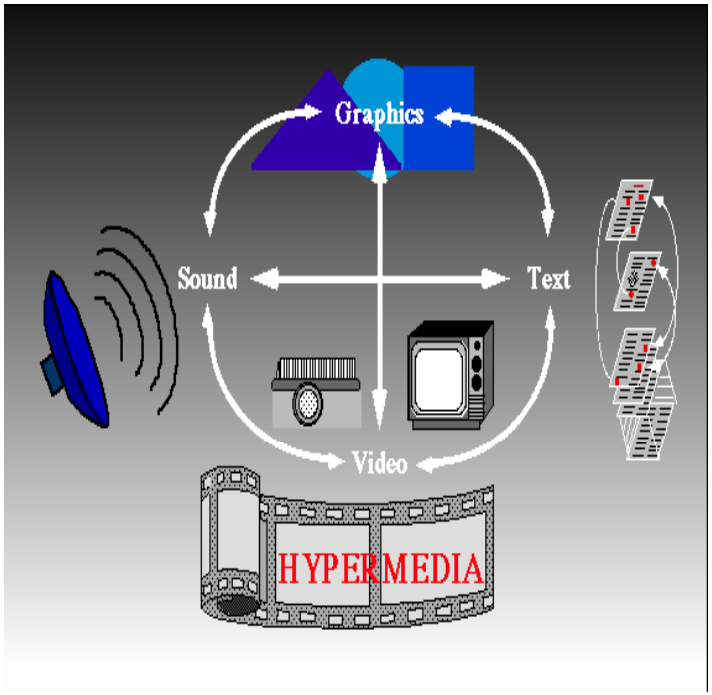


Hypermedia – not just text

- hypertext systems + additional media
  - picture, photographs, video and sound,diagram
- links/hotspots may be in media
  - areas of pictures
  - times and locations in video

Hypermedia

- *Hypermedia* is not constrained to be text-based. It can include other media, e.g., graphics, images, and especially the continuous media – sound and video.
- The World Wide Web (WWW) is the best example of a hypermedia application.
- Powerpoint



Anchors and links principle

- Hypertext documents contain references using *anchor* and *links* to other parts .
- *An Anchor is a fragment of information within a given document part, to which a link may be attached. As Hypertext deals only with text, an* ***anchor may be any word, set of words, sentence, or paragraph.***
- *A link is a* ***reference, or pointer****, to another piece of information. It must contain all the information necessary to access the linked document part.*

The anchor string is specially highlighted: it can be underlined or colored- the most frequent conventions in WWW implementation- italicized or framed.

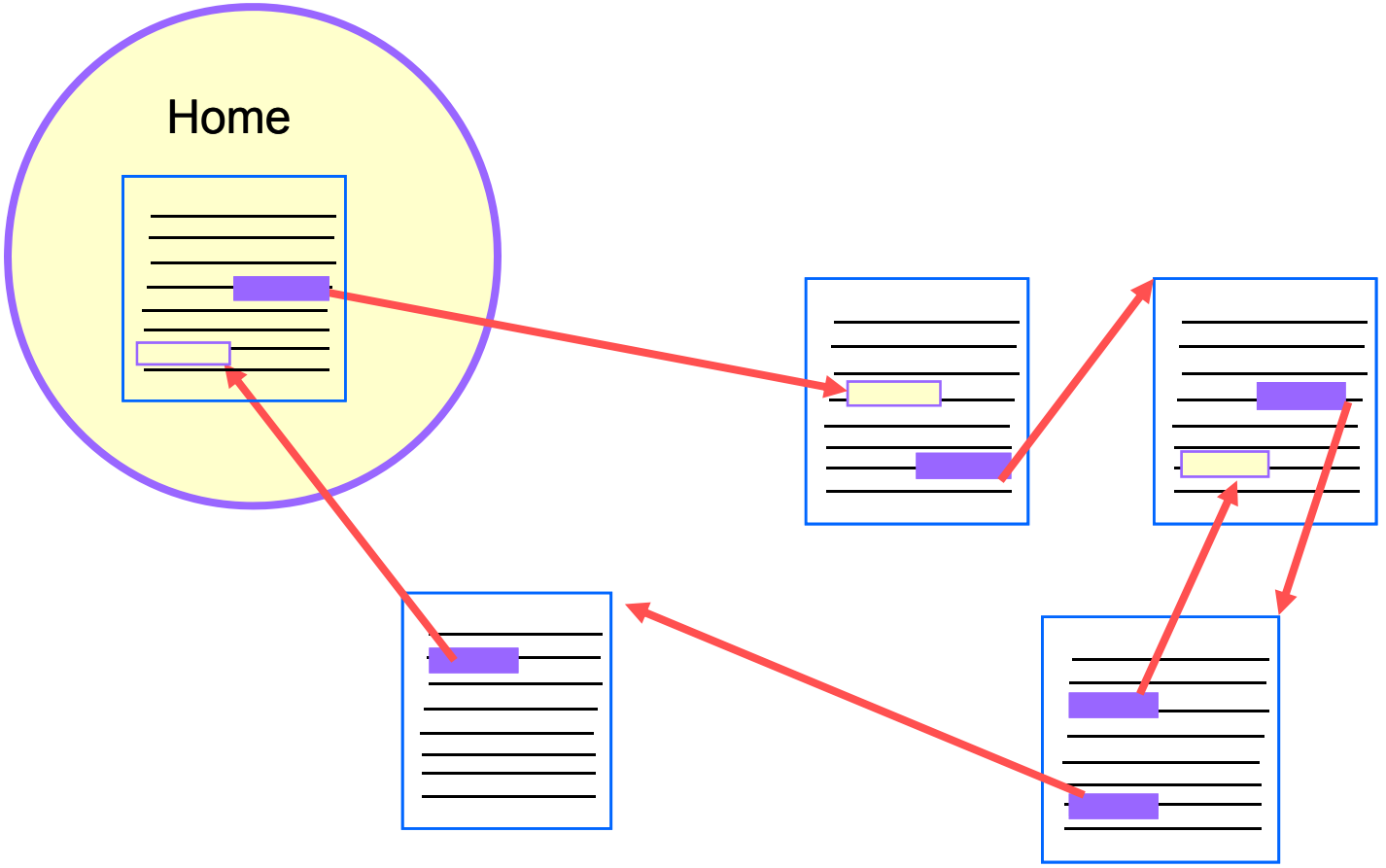
- *Return Path:*

  Mechanisms are provided to return to a previously displayed document in the chain. Users may simply jump back, *either* by reverse chaining - that is, passing through all the documents till they reach the one they want- *or* directly if they vaguely remember the reference of that document.

- *Home page:*

  The basic principle is that every exploration begins with a well-defined document which contains the first links to the structure. This is the starting point. This document is generally called the *Home page*.

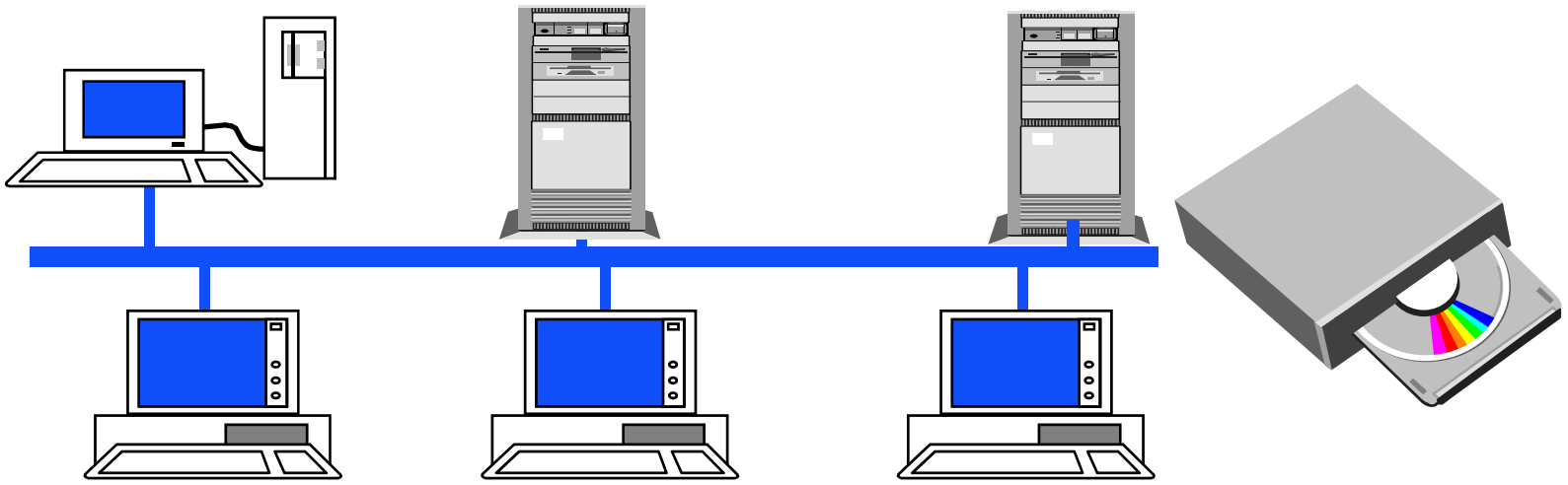
- The home page is the starting point of explorations in Hypertext structures.



Where are the Hypertext Documents?

- *Geographical independence:*

  The Hypertext and Hypermedia concept places no restriction on the physical location of where the various documents or document parts are stored.



- *Physical storing locations of Hypertext documents:*
  - Stored on ***different corporate computers***. These computers are connected on site to a LAN.
  - Stored on ***different servers*** **at different geographical locations**. The servers are interconnected via Wide-Area Networks.

- *To summarize:*

  A fundamental characteristic of the Hypertext and Hypermedia concept is geography independence. Fragments of information may be anywhere in the world or stored on the local user disk.

Characteristics of a Multimedia System

A Multimedia system has four basic characteristics:

- Multimedia systems must be ***computer controlled***.
- Multimedia systems are ***integrated***.
- The information they handle must be represented ***digitally***.
- The interface to the final presentation of media is usually ***interactive***

Components of a Multimedia System

Capture devices

- Video Camera, Video Recorder, Audio Microphone, Keyboards, mice, graphics tablets, 3D input devices, sensors, VR devices.

Storage Devices

- Hard disks, CD-ROMs, Jaz/Zip drives, DVD, Flash drives ***etc***

Communication Networks

- Ethernet, Token Ring, FDDI, ATM, Intranets, Internets.

Computer Systems

- Multimedia Desktop machines, Workstations, MPEG/VIDEO Hardware

Display Devices

- CD-quality speakers, HDTV, Hi-Res monitors, Colour printers ***etc.***

Applications

- World Wide Web
- Hypermedia
- Video conferencing
- Video-on-demand
- Interactive TV
- Home shopping
- Games
- Virtual reality
- Digital video editing and production systems
- Multimedia Database systems
- Ringtone cutter
- railways
- Airlines
- Banking sector

Applications cont..

Entertainment and Fine Arts

- Multimedia is heavily used in the entertainment industry, especially to develop special effects in movies and animations.
- Computer games provide a high level of interactivity.

- Multimedia games are a popular pastime and are software programs available either as CD-ROMs or online.

Applications cont..

video games also use multimedia features. Multimedia applications that allow users to actively participate instead of just sitting by as inactive recipients of information are called *Interactive Multimedia*.

Education

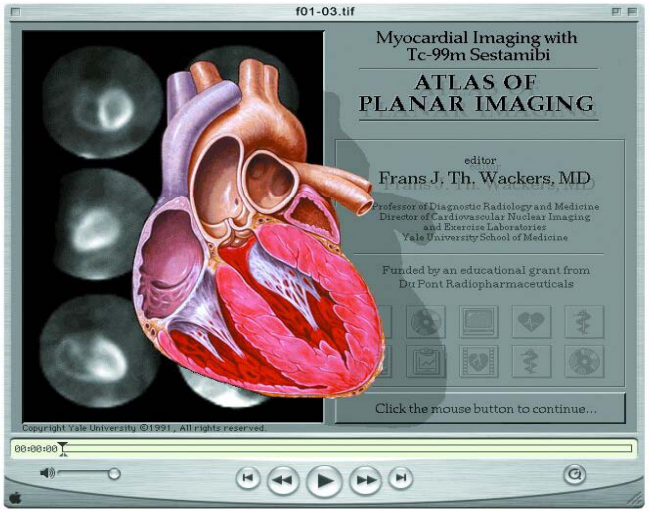
Multimedia systems are very effective at helping people to learn

- In Education, multimedia is used to produce computer-based training courses (popularly called CBTs) and reference books like encyclopedia
- Presentations
- Video clips

Applications cont..

Medicine

- In Medicine, doctors can get trained by looking at a virtual surgery or they can simulate how the human body is affected by diseases spread by viruses and bacteria and then develop techniques to prevent it.



Applications cont..

Virtual Reality

Virtual reality is the use of computer modeling and simulation to enable a person to interact with an artificial environment.

- At the meeting of technology and creative invention in multimedia is virtual reality, or VR. Goggles, helmets, special gloves, and human interfaces attempt to place you “inside” a lifelike experience.

- In flight simulators, different scenarios are modeled and the reactions of the plane are made as realistic as possible in order to train pilots.

Applications cont..

- **Car** companies have used VR technology to build virtual prototypes of new vehicles, testing them thoroughly before producing a single physical part.
- Designers can make alterations without having to scrap the entire model, as they often would with physical ones. The development process becomes more efficient and less expensive as a result.

- Virtual environments are used in training programs for the **military,** the **space program** and even **medical students**.

Applications cont..

Multimedia in Public Places

- In hotels, railway stations, shopping malls, museums

- multimedia will become available at stand-alone terminals or kiosks to provide information and help.

Features for a Multimedia System

Very High Processing Power

- needed to deal with large data processing and real time delivery of media. RAM,HDD,CPU etc.

Network Support

- Client-server systems common as distributed systems common.

Software Tools

- user friendly tools needed to handle media, design and develop applications, deliver media.

Storage and Memory

- large storage units (of the order of 50 -100 Gb or more) and large memory (1-2 Gb or more). Large Caches also required for efficient management.

Features for a Multimedia System

Efficient and High I/O

- input and output to the file subsystem needs to be efficient and fast. Needs to allow for real-time recording as well as playback of data. ***e.g.*** Direct to Disk recording systems

Multimedia Capable File System

- needed to deliver real-time media - ***e.g.*** Video/Audio Streaming. Special Hardware/Software needed ***e.g.*** RAID technology.

Data Representations/File Formats that support multimedia

- Data representations/file formats should be easy to handle yet allow for compression/decompression in real-time.

Introduction to Making Multimedia Projects

Developing Multimedia

1. To make multimedia, **you need hardware, software, good ideas.**
2. To make GOOD multimedia you also need talent and skill, organization, time, money and the help of others.
3. Teamwork is essential

- **Knowledge of hardware and software, as well as creativity** and organizational skills are essential for creating a high-quality multimedia project.

Stages of a Project

- A Multimedia application is developed in **stages as all other software** are being developed.
- In multimedia application development a few stages have to complete before other stages being, and **some stages may be skipped or combined with other stages.**
- Following are the **four basic stages** of multimedia project development :

1. **Planning and costing,**
2. **Design and production,**
3. **Testing and**
4. **Delivery.**

Stages of a Project

1. Planning and costing- should include: with an idea

- Identify objectives
- Develop a prototype
  - plan text, graphics, music, video
  - develop graphic layout (“look and feel”)
  - develop a structure and navigation system
- Estimate time and cost
  - estimate time needed to complete
  - prepare budget (if necessary)

Making Multimedia cont..

- A flow chart or timeline showing the **basic flow of the project**
- A list of **hardware and software resources** that will be **required**
- A list of skills that will be required

Making Multimedia cont..

2. Designing and Producing : The next stage is to execute each of the planned tasks and create a finished product.

3. Testing : Testing a project ensure the **product to be free from bugs.**

- Another aspect of testing is to ensure that the multimedia application meets the objectives of the project.
- It is also necessary to test whether the multimedia project **works properly** on the intended deliver platforms and they meet the needs of the clients.

Making Multimedia cont..

4. **Delivering :** The final stage of the multimedia application development is to **pack** the project and **deliver** the completed project to the end user.

- This stage has several steps such as maintenance, shipping and marketing the product.

- **package and deliver to end user**
  - **create CD-ROM, labels, etc.**
  - **prepare user manual**

Making Good Multimedia

multimedia systems should be interactive -users click and watch For **fully interactive systems**, Designers need clear picture of what happens as user interacts

- More GUI
- More interactive
- More user friendly
- Easy navigation
- Max client satisfaction

Making Multimedia (What you need)

What you need to make a good multimedia product is

1. Hardware
2. Software
3. Creativity / Good ideas
4. Time & money
5. Organization
6. Teamwork

Multimedia Skills and Training

Multimedia Skill set and Multimedia Project Team

- Project Manager
- Multimedia Designer
- Interface Designer
- Writer
- Video Specialist
- Audio Specialist
- Multimedia Programmer
- Producer of Multimedia for Web

Project Manager

Responsibilities

- **Overall project**
- Day to day operations and budget
- Put together good core team
- Maintain the “big picture” – the vision

Background/skills

- Understand hardware & software
- Communication skills
- Good “people” skills- a good listener

Multimedia Designer

Responsibilities:

- **Overall content and structure**
- Prepares design for project: content, media, interaction
- Sometime overlaps with Interface Designer
- Coordinates team
  - ✓A) Graphic Designers
  - ✓B) Instructional Designers
  - ✓C) Information Designers

Multimedia Designer

Background/skills

- Ability to analyze content structurally and match it with **effective presentation**
- **Expert with different media types**
- Ability to look at information from different points of view
- Interpersonal skills
- Understand resources- both technological and human
- Solid organizational skills, attention to detail

Multimedia Designer

A) Graphic designer – deals with visuals

- ✓Animators (Flash)
- ✓Image processing specialists (Photoshop)

B)Instructional Designers – deal with subject matter

- •Clear and proper presentation
- •Knowledge of content

C)Information Designers – deal with **contents and navigation Structure content**

- •Determine user feedback

Interface Designer

Responsibilities:

- Provides access to media and guide the people who use it
- Makes clear interface “transparent” to users (**effective use of windows, icons, backgrounds, controls, etc**.)

Background/skills

- Familiar with different multimedia interfaces
- Knows authoring system, user testing
- Basic drawing skills

Video Specialist

Responsibilities:

- Coordinate videographers, sound technicians, lighting designers, set designers, script supervisors, production assistants, actors

Background/skills:

- Skilled with QuickTime or MS Video for editing
- Macromedia Premiere for special effects

Audio Specialist

Responsibilities:

- Locating and selecting suitable music and talent
- Scheduling recording sessions
- Digitizing, editing recorded materials

Background/skills:

- Skilled in studio recording

Multimedia Programmer

Responsibilities:

- Integrates multimedia elements as complete project using programming language or authoring system (Authorware)
- Coding displays to controlling devices

Background/skills:

- Multimedia languages (C++, Java, Lingo)
- HTML, VRML, XML
- Ability to quickly learn new languages.

Writers

Responsibilities:

- Create character, action, point of view, interactivity
- Write proposals, script actor's narration, write text screen(content writers)

Background/skills:

- Background in marketing
- Ability to work within tight deadlines

Multimedia Producer for the Web

Responsibilities:

- Coordinates set of pages for the web
- Web content uploading

Background/skills:

- Knowledge of HTML, CGI scripts, Photoshop, etc.

Multimedia Hardware Peripherals

Multimedia Hardware Peripherals

Input devices

Output devices

Storage devices

Communication devices

_Modems

--Network Interfaces

Input Devices

- Keyboards
- Mice and Trackballs
- Touch screens
- Magnetic Card Encoders and Readers
- Graphic Tablets
- Scanners
- Optical Code Recognition (OCR)Devices
- Infrared remotes
- Voice Recognition Systems
- Digital Cameras
- Lightpens

Output Devices

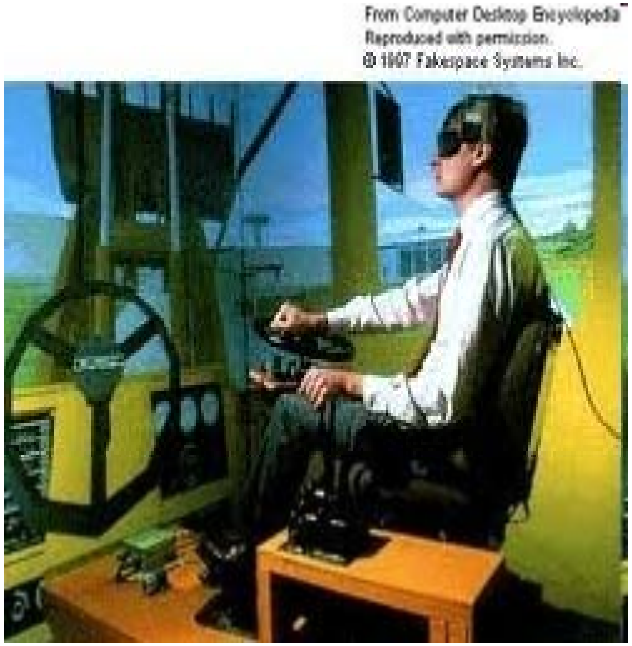
- Audio Devices
- Amplifiers and Speakers
- Monitors
- Video Devices
- Projectors
  - ✓CRT – cathode ray tube
  - ✓LCD – liquid crystal display
- Printers
  - Injet
  - laser

Output Devices

VR helmet and VR immersive display
Video Devices

Output Devices

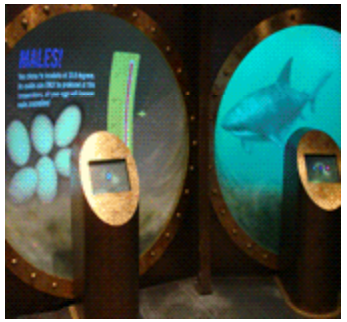
VR helmet



Output Devices

Immersive Environments and Display Systems

- We create dynamic, audio visual displays which immerse users into a virtual world.
- Using single lens or multi-projector technology, we are able to create immersive digital signage, interactive museum exhibits, flight simulators, 3D immersive user and gaming experiences.



Memory and Storage devices

- Sufficient memory must be allocated for storing and archiving files.
- Memory requirements of a multimedia project depend on the project's content and scope.
- RAM,ROM
- Floppy and Hard Disks
- Zip, Jaz and Syquest
  - Zip – 100MB
  - Jaz – 1 GB
- Optical Storage CD, CD-R,WORM etc.
- RAID(redundant array of inexpensive drives)
- DVD (Digital Versatile Disk) upto 1GB
  - DVD-video,DVD-ROM etc.

Memory and Storage devices cont..

- **Magneto-optical drives** -MO discs were WORM (write once, read many) drives, but later read/write MO drives became available.
- The disc consists of a ferromagnetic material sealed under a plastic coating.
- the older type of magnetic diskette can store 1.44 megabytes (MB) of data, an MO diskette can store many times that amount, ranging from 100 MB up to several gigabytes (GB).

Multimedia Software

Familiar Tools

Multimedia Authoring Tools

Elemental Tools

Familiar Tools

Word Processors

- _ Microsoft Word
- _ WordPerfect

Spreadsheets

- _ Excel

Databases

Presentation Tools

- _ PowerPoint

Elemental Tools

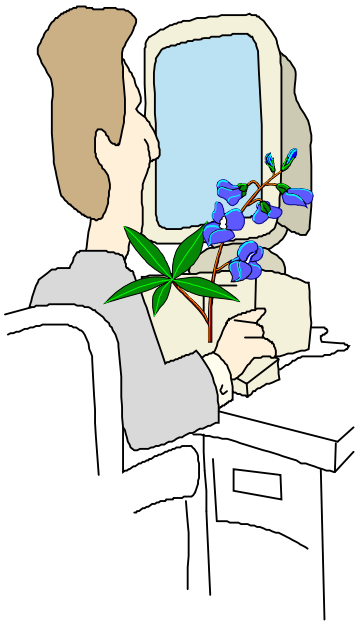
Elemental tools help us work with the important basic elements of your project: its graphics, images, sound, text and moving pictures.

Elemental tools includes:

- Painting And Drawing Tools(Ex-DeskDraw, DeskPaint, Designer, paint)
- Cad And 3-D Drawing Tools(Ex- AutoCAD)
- Image Editing Tools(-photonova,photowings,funnyface)
- OCR Software
- Sound Editing Programs
- Tools For Creating Animations And Digital Movies
- Helpful Accessories
- Convertors

Painting And Drawing Tools

- *Painting and drawing* tools are the most important items in your toolkit because the impact of the graphics in your project will likely have the greatest influence on the end user.



- *Painting software* is dedicated to producing excellent bitmapped images .
- *Drawing software* is dedicated to producing line art that is easily printed to paper.
- Drawing packages include powerful and expensive computer-aided design (*CAD*) software.
- Ex: DeskDraw, DeskPaint, Designer

Good Drawing Programs Contain Tools for:

- Creating different shapes (rectangles, circles, ellipses, polygons, etc.)
- Drawing different lines (varying thickness, different dashes, different arrowheads, etc.)
- Cutting and pasting regular and irregular shapes
- Support different fonts, sizes, styles, shapes, and orientations, such as sloped or along a curve, varying the font and color.

Good Drawing Programs Contain Tools for:

- Erasing, restoring, and saving all or portions of images
- Performing geometric transformations of images (rotations, stretches, shrinking, etc.)
- Creating layers of objects within an image, so that those in the foreground mask either wholly or partially those at lower layers
- Controlling the colors and gray scales of all or portions of an image

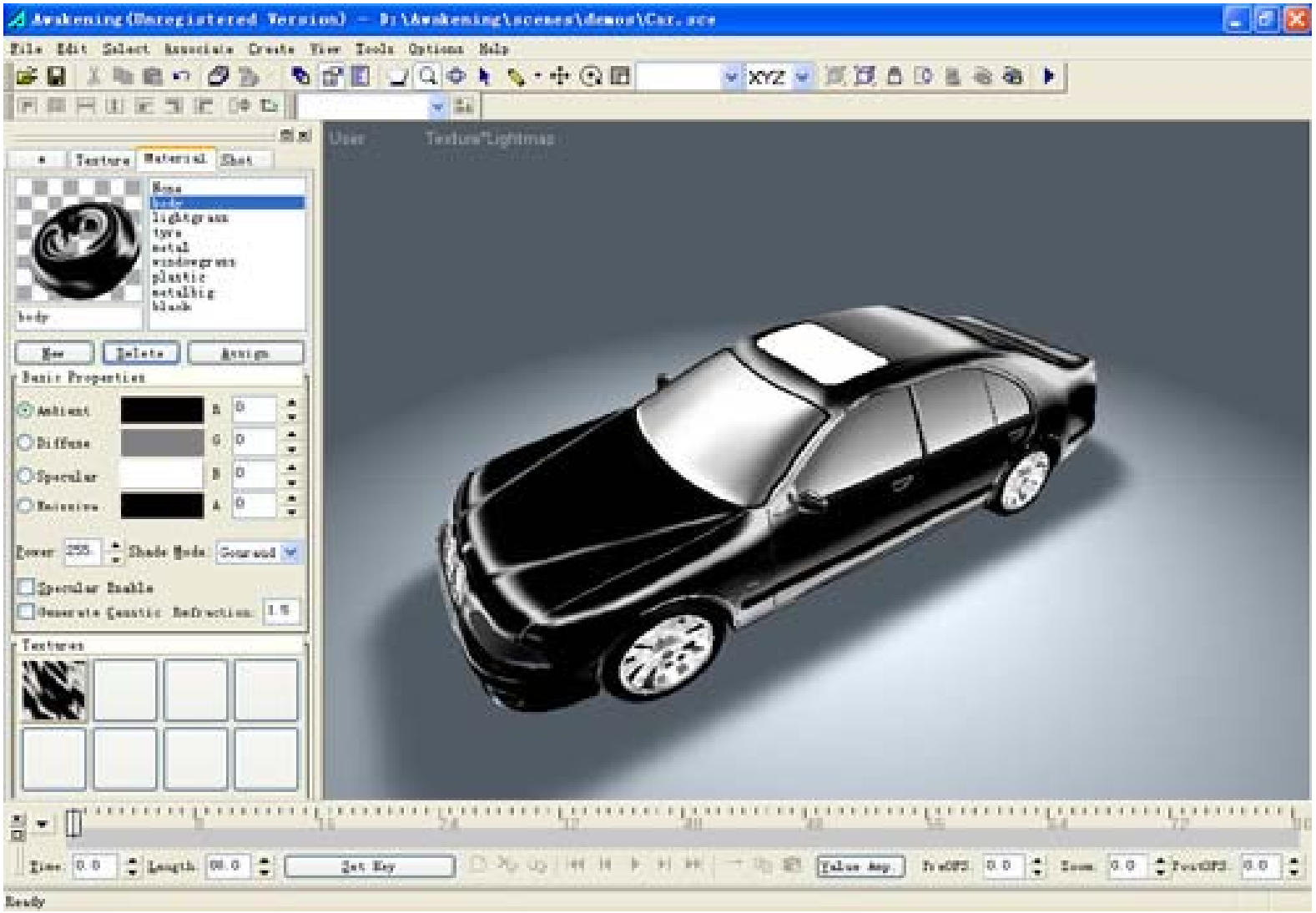
Good Drawing Programs Contain Tools for:

- Modify and control brightness, contrast, and color balance
- Facilitate retouching, sharpening, blurring, smoothing, and so on.
- Simulate painting with different implements such as brushes, sponges, pencils, and so on
- Accept input from keyboard, mouse, and tablet

CAD And 3-D Drawing Tools

- *CAD (computer-aided design*) is a software used by architects, engineers, drafters, artists and others to create precision drawings or technical design.
- It can be used to create two-dimensional (2-D) drawings or three dimensional modules.
- The CAD images can spin about in space, with lighting conditions exactly simulated and shadows properly drawn.
- With CAD software you can stand in front of your work and view it from any angle, making judgments about its design.

Ex: AutoCAD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Ambient
Diffuse
Specular
Emissive
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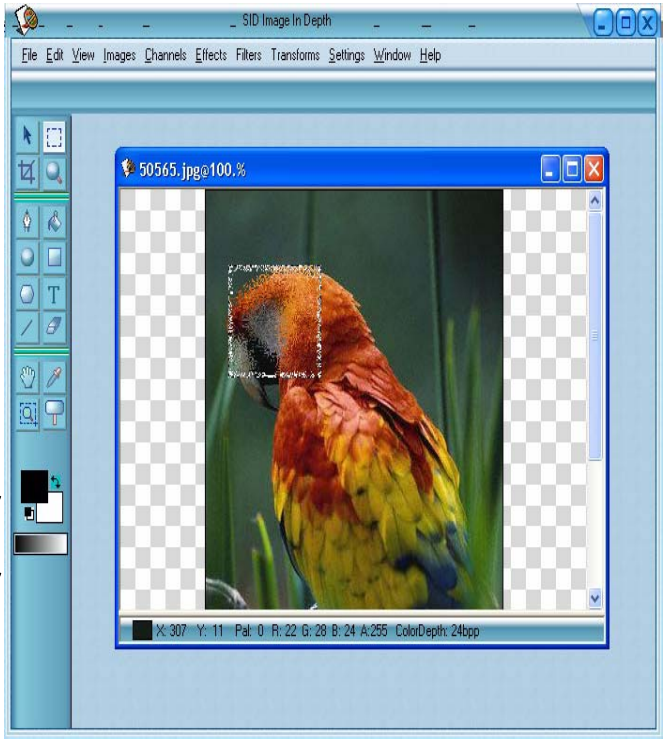
Image Editing Tools

- *Image editing applications* are specialized and powerful tools for enhancing and retouching existing bitmapped images.
- can be used to create images from scratch as well as images digitized from scanners, digital cameras or artwork files created by painting or drawing packages.

Ex: Photoshop, Picasa, Paint.net , Adobe Lightroom



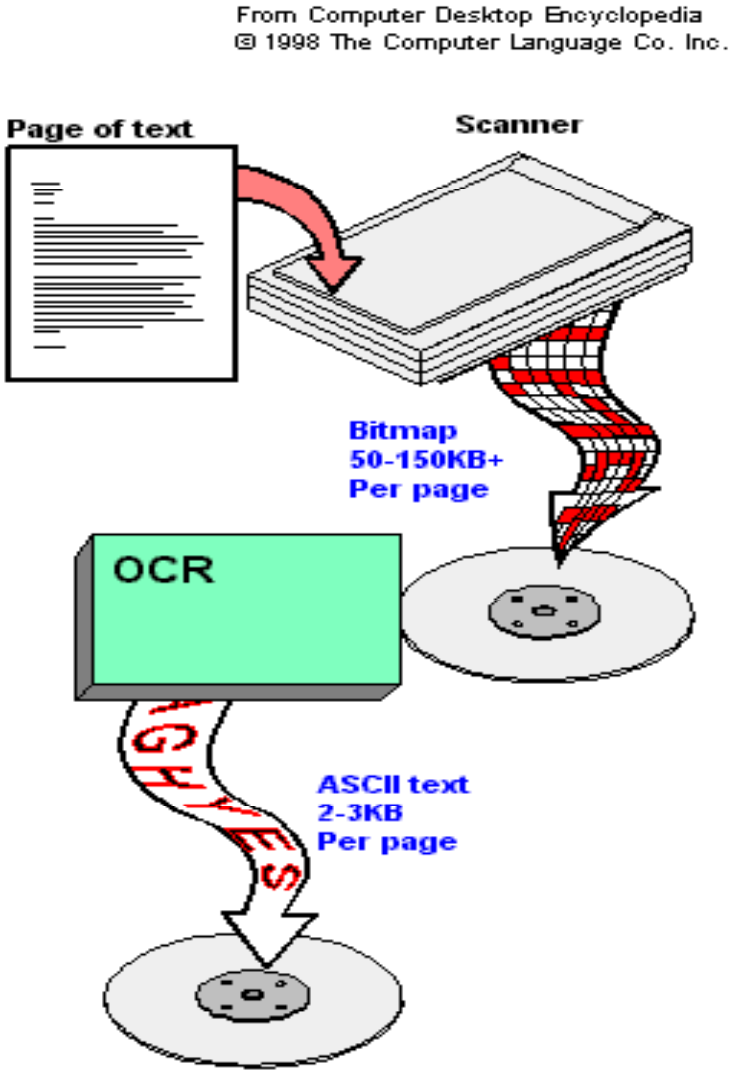
OCR Software

- *Optical character recognition (OCR)* is a system of converting scanned printed/handwritten image files into its machine readable text format.

- Often you will have printed matter and other text to incorporate into your project, but no electronic text file.

- With *Optical Character Recognition* (*OCR*) software, a flat-bed scanner and your computer you can save many hours of typing printed words and get the job done faster and more accurately.

Ex: Perceive



OCR Software

- Hardware — scans the text, image
- Software — systematically checks the entire image for patterns of light and dark that it recognizes as alphabetic, numeric, or special characters.
- OCR software requires pattern recognition, a complicated logic problem.

E e E E e e E E e E

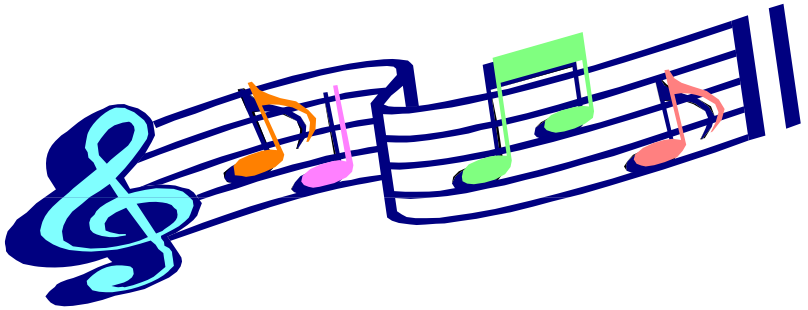
e e E E E e e E e e

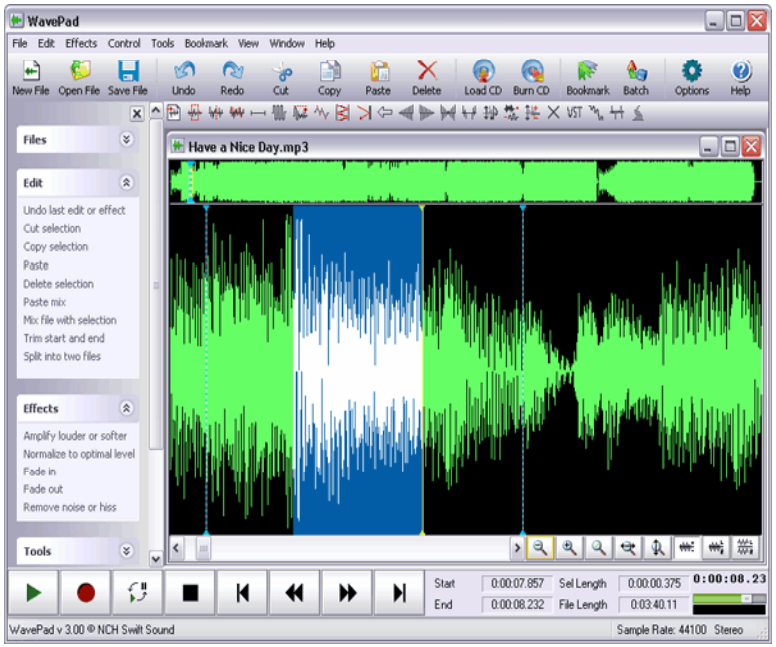
-- It is relatively easy for a human to recognize each of these characters as the letter "e."

-For the pattern recognition logic in OCR software, this is very difficult.

Sound Editing Programs

- You can cut, copy, paste and edit segments of the sound with great precision and making your own sound effects.





Sound Editing Programs

- A **digital audio editor** is defined as a computer application **for manipulating digital audio**.

- As a multimedia creator, we normally use audio editor for recording audio, **edit the duration and timeline, mix multiple sound tracks**, apply simple effects for audio enhancement and create **conversion between different audio file formats**.

- Sound editing functions include cut, copy, paste, delete, insert, silence, auto-trim and more

Sound Editing Programs

•Audio effects include amplify, normalize, equalizer, envelope, reverb, echo, reverse and many more

•Supports almost all audio and music file formats including mp3, wav, vox, gsm, wma, au, aif, flac, real audio, ogg, aac, m4a, mid, amr, and many more

Examples-

•Audacity is free, open source software for recording and editing sounds.

•Power Sound Editor

•Music Editor

•SoundEdit Pro

Tools For 3D Modeling ,Creating Animations And Digital Movies

- 3D animation is playing a larger role in today's film, games, and television projects.
- 3D Animation Software - ***Autodesk MAYA***, Autodesk MotionBuilder

- **Blender** is a free and open-source 3D computer graphics software product used for creating animated films, visual effects, interactive 3D applications or video games.
- Blender's features include 3D modeling, UV unwrapping, texturing, rigging and skinning, fluid and smoke simulation, particle simulation, animating, match moving, camera tracking, rendering, video editing and compositing.

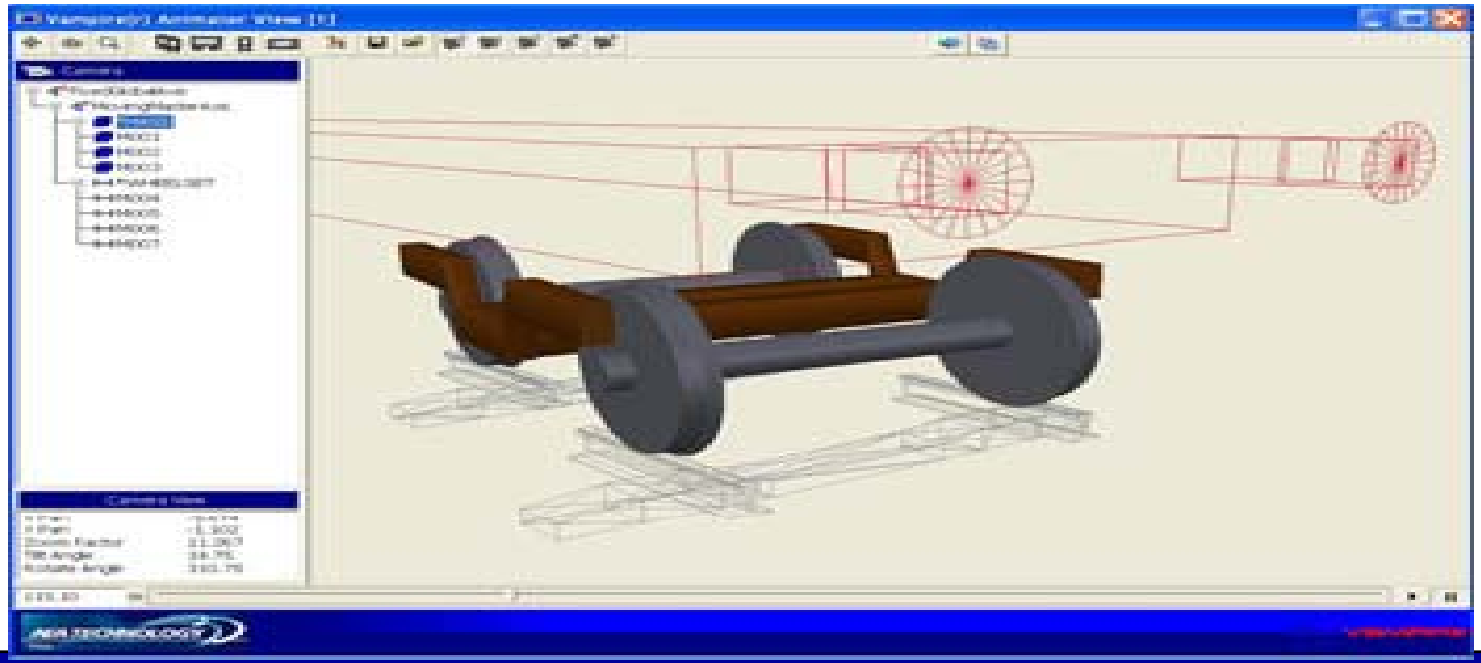
Movie-making tools

- *Movie-making tools* let you edit and assemble video clips captured from camera, animations, scanned images, other digitized movie segments.
- The completed clip, often with added transition and visual effects can be played back.

Ex: Animator Pro and SuperVideo Windows

•*Animations and digital movies* are sequences of bitmapped graphic scenes (frames), rapidly played back.

•But animations can also be made within an authoring system by rapidly changing the location of objects to generate an appearance of motion.



Helpful Accessories

No multimedia toolkit is complete without a few indispensable utilities to perform some odd, but repeated tasks. These are the *accessories.*

Helpful Accessories

For example a *screen-grabber* is essential, because bitmap images are so common in multimedia, it is important to have a tool for grabbing all or part of the screen display so you can import it into your authoring system or copy it into an image editing application.

Multimedia Authoring Tools

Authoring versus Programming

- Two types of tools that can be used to create multimedia applications:
  - Authoring tools
  - Programming tools
- Authoring tools are what we call **high level** tools
  - A lot of the technical details of how things are done is hidden from the developer.
  - The developer can concentrate on the functionality instead of how to make the hardware work
  - Can be used by non-programmers for assembling multimedia elements into a single cohesive project.
- Authoring software provides an integrated environment for binding together the content and functions of your project.

Authoring versus Programming

- Programming tools are **low level** tools
  - They provide access to the low level hardware features for those who want to get the most out of the computer
  - Are used by programmers or software engineers

- Each has their own set of pros and cons:
  - Authoring tools are generally quicker to learn and can be used by non-programmers but may have limited flexibility
  - Programming tools are more difficult to use and require good programming knowledge but can be much more flexible

The Components of an Authoring Tool

- Most authoring systems provide facilities for:
  - Loading and saving media assets (graphics, sounds, videos, text, etc.)
  - Creating or editing audio and graphic images
  - Page or slide building (layering multimedia data to create a single page)
  - Animation / transition effects
  - Specifying the sequence of the application
  - Adding interactive controls for navigation and actions at run-time

Features of Authoring Tools or S/W

- Editing and organizing features.
- Programming features.
- Interactivity features.
- Performance tuning and playback features.
- Delivery, cross-platform, and Internet playability features.
- Script language programs
- Hypertext

Editing and Organizing Features

- Authoring systems include editing tools to **create, edit, and convert multimedia elements** such as animation and video clips.
- The organization, design, and production process for multimedia involves flowcharting.

Programming Features

- Visual programming with icons or objects is the simplest and easiest authoring process.
- Visual authoring tools such as **Authorware** and **IconAuthor** are suitable for slide shows and presentations.
- Authoring tools offer ‘very high level language’ (VHLL) or interpreted scripting environment.

Interactivity Features

- Interactivity gives the end user **control over the content** and flow of information in a project.
- Simple branching is the ability to **go to another section** of the multimedia production.
- Conditional branching is an activity based on the results of IF-THEN decisions or events,GoTo etc.
- Structured language supports complex programming logic, subroutines, event tracking, and **message passing among objects and elements.**

Performance Tuning and Playback Features

- Achieving synchronization is difficult, considering that **performance of the different computers** used for multimedia development and delivery varies.
- Authoring system should facilitate **accurate timing of events.**
- It should enable developers to **build a part of a project and then test it immediately.**

Cross-Platform Authoring Notes

- **Macintosh and Windows** computers use **different schemes to manage text and colors.**
- While using text fields, ensure that the **text displays correctly on both platforms.**

Types Of Authoring Tools

Card- or Page-based Tools

Icon-based Tools

Time-based Tools

Card- or Page-based Tools

- In these authoring systems, elements are organized as pages of a book or stack of cards.
- The authoring system lets you link these pages or cards into organized sequence and they also allow you to play sound elements and launch animations and digital videos.
- Best used when the bulk of your content consists of elements that can be viewed individually
- jump, on command, to any page
- play sound elements and launch animations and digital video.

Card- or Page-based Tools

- Page-based authoring systems are object-oriented: the objects are the buttons, graphics and etc.

- Each object may contain a programming script activated when an *event* related to that object occurs.

EX: Visual Basic

Icon-based Authoring Tools

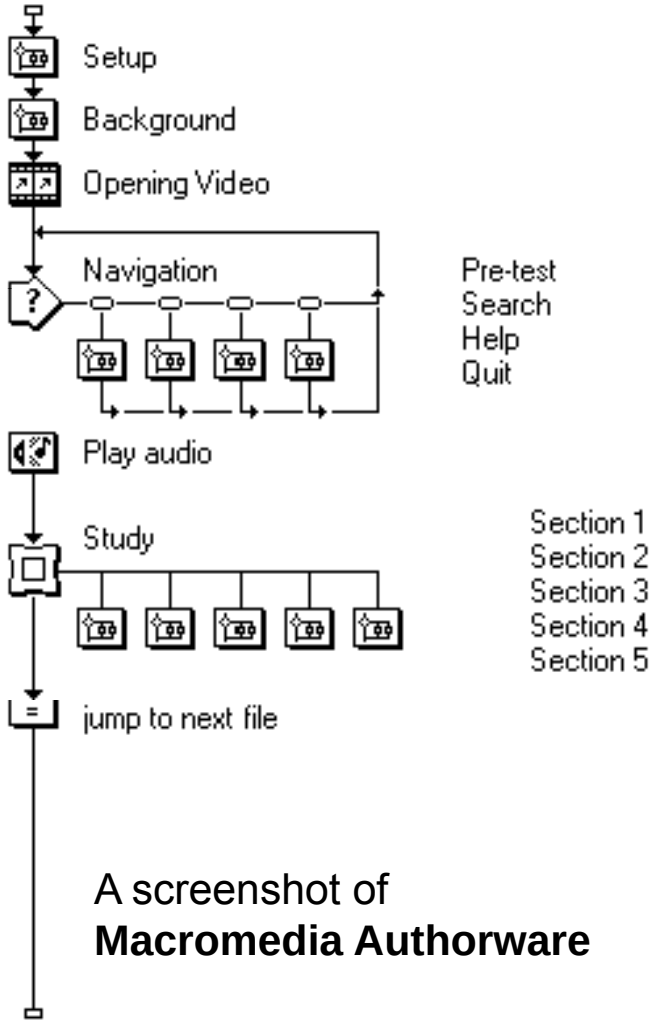
- *Icon-based, event-driven or object oriented* tools provide a visual programming approach to organizing and presenting multimedia.

- First you build the flowchart of events, tasks and decisions by using appropriate icons from a library.

- These icons can include menu choices, graphic images and sounds.

Icon-Based Authoring

- Each part is represented an **icon** (symbolic picture)
- Each icon does a specific task, e.g. plays a sound
- Icons are then linked together to form complete applications
- Can easily visualise the structure and navigation of the final application

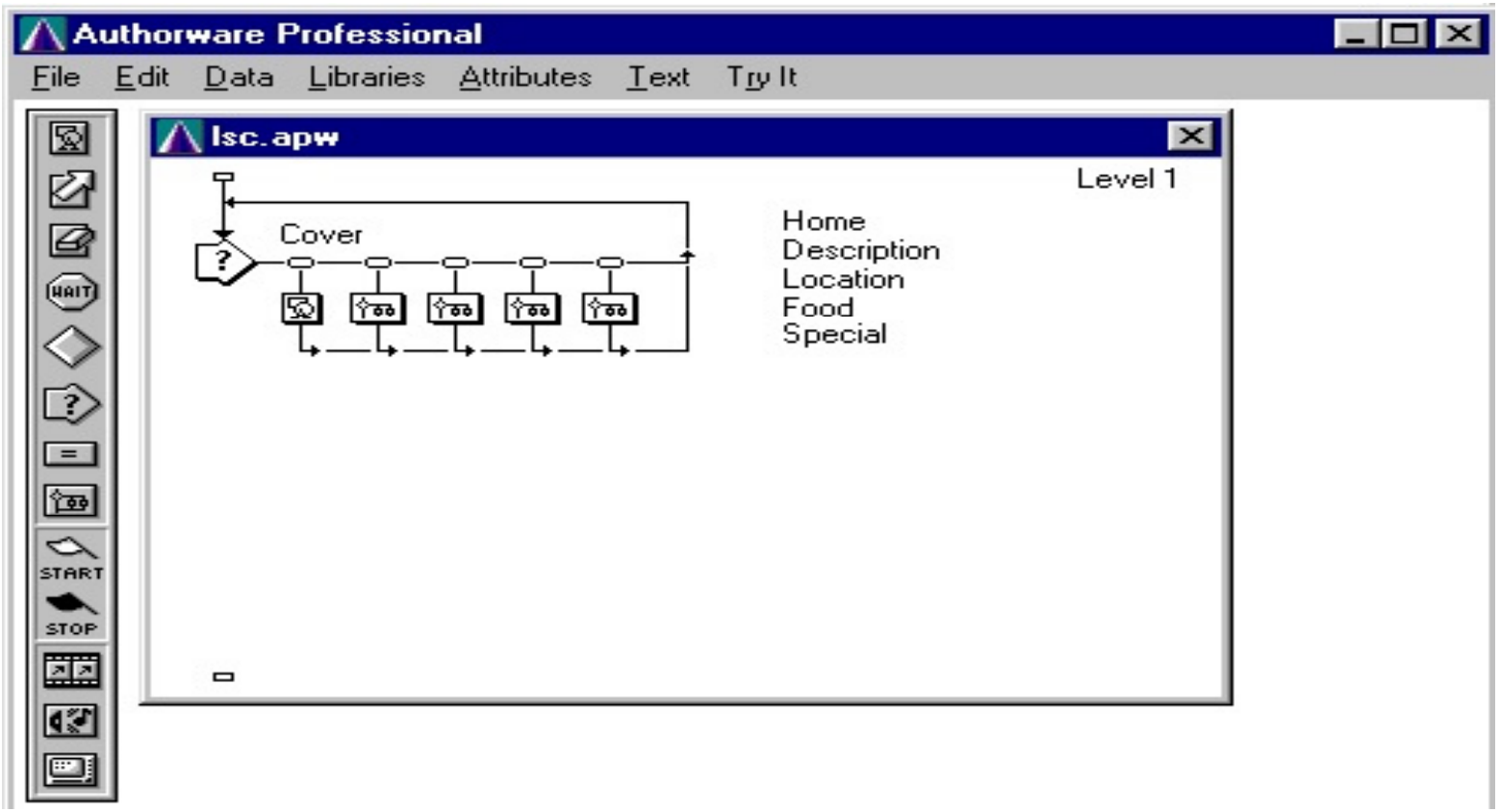


A screenshot of
Macromedia Authorware

Icon-based Authoring Tools

When the flowchart is built, you can add your content: text, graphics, animations, sounds and video movies.

EX: Authoware Professional



Icon-based Authoring Tools

- Icon-based authoring programs are object oriented development programs where individual multimedia elements are represented by icons rather than script commands.

Time-based Authoring Tools

- Time-based authoring tools are the most common of multimedia authoring tools.
- In these authoring systems, elements are organized along a time line.
- They are the best to use when you have message with the beginning and an end.
- Sequentially organized graphic *frames* are played back at the speed that you can set.
- Other elements (such as audio events) are triggered at the given time or location in the sequence of events.

EX: Animation Works Interactive ,FLASH,MAYA,Blender etc.

Macromedia Director

- Director is a package with many features
  - Sound and audio editing
  - **Bitmap and vector graphics** editing

- Director has its own programming language called **Lingo** which can be used to add new functionality
- *Director is one of the most widely used PC tools*

- cross-platform compatibility
- Strong yet intuitive animation features
- And as extensive architecture to add functionality.

Examples of Authoring tools

- **Icon Author**, an authoring tool requires the use of an icon-based flowchart for building an application.
- **Everest Authoring System**
- **Macromedia's Author ware** is a dependable industrial-strength environment that allows multiple people to contribute to an application. Artists can load a library with media, programmers can provide templates for complex interactions, and interface designers can put everything together.
- one non-programming designer can even do the entire job alone.

Examples of Authoring tools

- **ImageQ** is a multimedia authoring software package.
- create slide show presentations well.

Examples of Authoring tools

- **Quicklime** is software, developed by Apple that supports time-based media on the Macintosh.
- It has also been ported for windows environment.
- An example of time based media is video—a sequence of images that are displayed on screen to create the illusion of motion.

Stages Of Authoring

There are five distinct stages of multimedia authoring:

1. Analysis
2. Design
3. Development
4. Evaluation
5. Distribution

Software that Enables Multimedia

- **Development software**
  - Graphics, sound, and text applications; Web development; multimedia authoring tools
- **System software**
  - Operating systems, utilities
- **Communications software / Protocols**
- **Delivery software**
  - Stand-alone programs, and players

Software that Enables Multimedia

System software

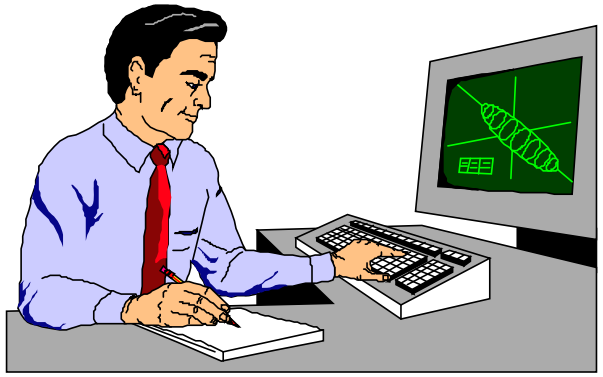
- Consists of the programs that control the operations of the computer and its devices
- Serves as the **interface between the user, the application software, and the computer's hardware**

Operating Systems

- From the moment you turn on your computer, you are not in *direct* command of the hardware
- A set of programs containing instructions that coordinate all the activities among computer hardware resources required for a computer to work
- Sometimes called the software platform or platform

Operating Systems Utilities

- **Utility software** is a kind of system software designed to help analyze, configure, optimize and maintain the computer.
- A single piece of utility software is usually called a **utility** or **tool**.



Software that enables Multimedia

Utility software categories

- **Disk defragmenters** can detect computer files whose contents are broken across several locations on the hard disk, and move the fragments to one location to increase efficiency.

- **Disk cleaners** can find files that are unnecessary to computer operation, or take up considerable amounts of space. Disk cleaner helps the user to decide what to delete when their hard disk is full.

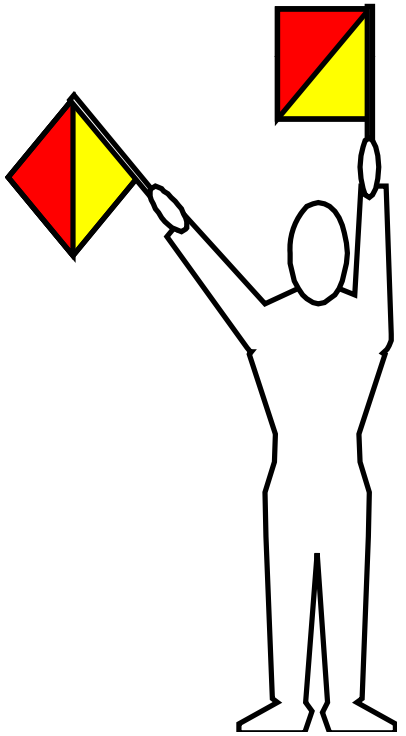
- **Disk partitions** can divide an individual drive into multiple logical drives, each with its own file system which can be mounted by the operating system and treated as an individual drive.

Software that Enables Multimedia

- **Disk compression** utilities can transparently compress/uncompress the contents of a disk, increasing the capacity of the disk.
- **Anti-virus** utilities scan for computer viruses.
- **Cryptographic** utilities encrypt and decrypt streams and files.
- **Network utilities** analyze the computer's network connectivity, configure network settings, check data transfer or log events.
- **Backup utilities** can make a copy of all information stored on a disk, and restore either the entire disk (e.g. in an event of disk failure) or selected files (e.g. in an event of accidental deletion).

Communications Protocols

- Needed to facilitate traffic and avoid collisions
- Common Network standards
  - Ethernet
  - Token Ring
  - ATM



Ethernet

- **Ethernet** is a physical and data link layer technology for local area networks (LANs). Ethernet was invented by engineer Robert Metcalfe.
- The Ethernet specification served as the basis for the IEEE 802.3 standard, which specifies the physical and lower software layers.
- Ethernet uses the CSMA/CD access method to handle simultaneous demands.
- It is one of the most widely implemented LAN standards.
- A newer version of Ethernet, called *100Base-T* (or *Fast Ethernet),* supports data transfer rates of 100 Mbps.
- And the newest version, *Gigabit Ethernet* supports data rates of 1 gigabit (1,000 megabits) per second.
- Higher level network protocols like Internet Protocol (IP) use Ethernet as their transmission medium. Data travels over Ethernet inside protocol units called *frames*.

Token Ring

- **Token ring** local area network (LAN) technology is a protocol which resides at the data link layer (DLL) of the OSI model.
- It uses a special three-byte frame called a token that travels around the ring.
- Token-possession grants the possessor permission to transmit on the medium. Token ring frames travel completely around the loop.
- Initially used only in IBM computers, it was eventually standardized with protocol **IEEE 802.5**.

Token Ring cont..

- A type of computer network in which all the computers are arranged (schematically) in a circle.
- A *token*, which is a special bit pattern, travels around the circle. To send a message, a computer catches the token, attaches a message to it, and then lets it continue to travel around the network.

Token Ring cont..

- The data transmission process goes as follows:
- Empty information frames are continuously circulated on the ring.
- When a computer has a message to send, it inserts a token in an empty frame (this may consist of simply changing a 0 to a 1 in the token bit part of the frame) and inserts a message and a destination identifier in the frame.
- The frame is then examined by each successive workstation. The workstation that identifies itself to be the destination for the message copies it from the frame and changes the token back to 0.
- When the frame gets back to the originator, it sees that the token has been changed to 0 and that the message has been copied and received. It removes the message from the frame.
- The frame continues to circulate as an "empty" frame, ready to be taken by a workstation when it has a message to send.

Asynchronous Transfer Mode

- **ATM** is a high-speed networking standard designed to support both voice and data communications.
- ATM is normally utilized by Internet service providers on their private long-distance networks.
- ATM operates at the data link layer (Layer 2 in the OSI Model) over either fiber or twisted-pair cable.
- ATM differs from more common data link technologies like Ethernet in several ways
  - ATM utilizes no routing. *ATM switches* are used
  - Instead of using variable-length packets as Ethernet does, ATM utilizes fixed-sized cells. *ATM cells* are 53 bytes in length, that includes 48 bytes of data and five (5) bytes of header information.
  - The high cost of ATM relative to Ethernet is one factor that has limited its adoption to backbone and other high-performance, specialized networks.

Communications Protocols

- Message passing protocols
  - HTTP — Hypertext transfer protocol
  - SMTP — Simple mail transfer protocol
  - AppleTalk — Apple's network architecture
  - TCP/IP — Transmission control protocol / Internet protocol
  - IPX/SPX — Internetwork packet exchange / sequential packet exchange
  - SNA — IBM's system network architecture

Servers

-high processing computers

-Facilitate sharing of H/W and S/W resources permit fewer copies of software to be purchased to serve several users.

-sharing data files

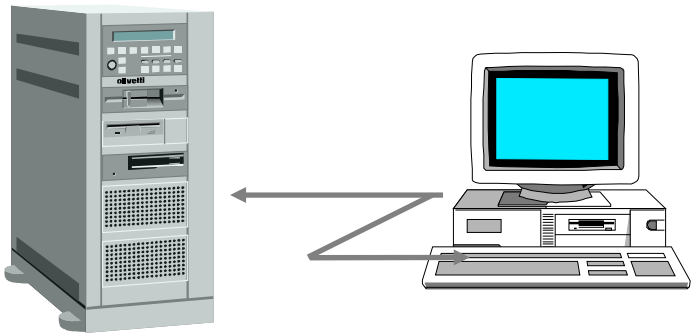
However, a crash will affect many users, not just one.

Uses of Servers

- Repository for applications programs
- **Network server** for control of network traffic
- **Database server** for access to a large database
- **File server** for accessing many data files
- **Mail server** for e-mail connectivity and storage
- **Web server** for storage of WWW materials and Web connectivity
- **Print server** for multiple user access to printers

Client / Server Organization

- One computer acts as server to provide resources to many client computers each client has a portion of the application program to be executed
- but the bulk of the processing is performed by the server.
- The server may store huge amount of data.



The Multimedia Highway

- Telecommunication networks are global and **information elements** will link up **online as distributed resources** on a data highway.
- **Copper wire, glass fiber, and radio/cellular technologies** also serve a means for **delivering multimedia files across a network.**
- Examples: Full-text content from **books and magazines**;
- **Street maps** of any city;
- **movies** are displayed at home;
- **real-time news** reported from anywhere on earth;
- lectures from participating universities.

CD-ROM and Multimedia Highway

- CDROM has become the most **cost-effective distribution medium for multimedia projects.**

- It can contain unique mixes of images, sounds, text, video and animations controlled by an authoring systems to provide unlimited user interaction.

- CD-ROM Presentations can carry virtually unlimited information, they are considered a modern inter-active phenomenon of **distribute/share/broadcast corporate and product information .**

CD-ROM & Multimedia Presentations

- Using CD-ROMs or multimedia presentations to share our objective is a proven electronic marketing approach.
- We have constructed hundreds of presentations…Financial Reports, Product Demonstrations, Year-End Recaps, Database, the list of applications is endless.
- Post them on your website, send them out via CD-ROM mailers, e-mail them to your clients
- a wide range of affordable choices are available.

CD-ROM and Multimedia Highway

The primary media for delivering multimedia projects are:

- Compact disc read-only (CD-ROM).: Red Laser
  - ✓640MB
- Digital Versatile Disc (DVD): Blue Laser
  - ✓: 4.7GB
  - ✓: 8.5GB
  - ✓: 9.4GB
  - ✓: 17GB

- Multilayered DVD technology increases the capacity of current optical technology to 18 GB.
- DVD authoring and integration software is used to create interactive front-end menus for films and games.
- DVD burners are used for reading discs and converting the disc to audio, video, and data formats.

DVD-ROM

-DVD-Video is an optimal way to reach users at home with full motion video content.

-A new type of read-only compact disc that can hold a minimum of 4.7GB (gigabytes), enough for a full-length movie.

-DVD authoring and integration software allows the creation of interactive front-end menus for films and games.

Advantages ?

- Portable & Inexpensive medium for distribution material.
- Highly interactive medium.
- Technical and professional approach.
- Comparable price.


Guidenet.net
A Better Life Through Programming
Windows vs. Mac

Which Platform Mac or PC?

--Macintosh and Windows are the two most common platforms used in multimedia.

- **Select platform based on**
  - Personal preference
  - Budget constraints
  - Project delivery requirements
  - Availability to target audience

Macintosh versus Windows platform.

Windows platform

- With almost 90% of the operating system market share Windows.
- It's in commercial buildings, industrial facilities, as well as home computers.
- Windows, having been introduced in 1985, is a very mature and complete piece of software.
- Compatibility: Almost every application, driver or game will work on Windows.
- Technical support: Having so many users, you can always find someone (either online or offline) who can help you with Windows.

- **Viruses:** You may need to buy an antivirus program, although free ones exist.

- **Slow:** Windows, especially Vista and 7, requires a lot of computer resources (memory, processor, disk space), and thus, runs slower.

The Windows platform:

  - Is a collection of different vendor-components that are tied together by the requirements of the Windows operating system.

- First, 95% of the people surfing the Web use Windows on PCs.
  - Initially focused on business computing and was not suitable for multimedia.
  - However, it is now easier to find multimedia hardware and software for Windows as compared to the Macintosh.

Apple's Macintosh OS

- Apple's Macintosh OS is even older than Windows. It is the first ever successful graphical-based operating system, being released one year before it's Microsoft counterpart.

- **Viruses:** Apple Macs get almost no viruses. This is mostly due to Window's superior market share.

- **Reliability:** Macs only run on Apple computers, and are thus less prone to hardware and software crashing.

- **Expensive:** Mac costs even more than Windows.

- **Only available on Apple computers:** If you already have a computer, you cannot install MAC on it unless it's an Apple. Otherwise, you must buy a new computer.

- **Compatibility:** Only a few programs will run on Mac, and almost no games.

Mac versus Windows

The Macintosh platform:

- Was launched by Apple in 1984.
- Has a good built-in audio and high-quality graphics capability.
- Includes hardware and software for digitizing and editing video and producing DVD discs.
- Makes multimedia project development easier and smoother.

Mac versus Windows

- **Macintosh**, commonly known as **Mac**, is a brand name which covers several lines of personal computers designed, developed, and marketed by Apple .
- The original Macintosh was released on January 24, 1984.
- It used a graphical user interface (GUI) , instead of the command line interface.
- Mac systems are mainly targeted at the home, education, and creative professional markets.
- All current Mac models come pre-installed with a version of the latest Mac OS.

Mac Hardware

- The current Mac product family uses Intel processors.
- Macs include two standard data transfer ports: **USB,** standardized in 1998 with the iMac; and **FireWire,** a technology developed by Apple to support higher-performance devices;
- **FireWire** is mainly reserved for **high-performance devices** such as hard drives or video cameras.

Mac

- The Macintosh operating system enjoys a **near-absence of the types of malware and spyware that affect Microsoft Windows users.**

MAC vs. PC

•Macintosh

•Since 1984 has been multimedia

•Good built-in audio

•Easy to learn GUI

•Have Ethernet built- in

•Usually run AppleTalk

•Mac computers are generally more expensive than Windows computers.

PC

- Since late 1985's provides multimedia capabilities
- Intended for business

System beeps and tiny, tinny speaker

- DOS screen- command driven
- Need ethernet cards
- Usually run TCP/IP Protocol suite for networking and communication
- Windows computers are generally less expensive than Macs.

•Macs are typically the target of fewer virus and attacks. They also require less time and effort to keep secure.

- Viruses and other "malware" attacks are more heavily targeted at Windows. Keeping a Windows computer secure takes more time and effort, when compared to a Mac.

Macintosh Production Platform

- Production of the Macintosh is based upon a vertical integration model in that **Apple facilitates all aspects of its hardware and creates its own operating system.**
- This is in contrast to PCs, where different brands of hardware run operating systems such as Microsoft Windows.

Mac Current product line

The **Mac mini** is the least expensive Mac currently in production. It ships without a keyboard, or mouse.

Mac Current product line

- **iMac**

The iMac is Apple's current flagship consumer desktop computer, powered by the mobile version of the Intel CPU. It is an all-in-one unit with screen sizes available at 20" and 24".

Mac Current product line

- **MacBook**

The MacBook is Apple's consumer portable. It uses an Intel Core 2 Duo processor running at slightly slower speeds (2.0 GHz or 2.16 GHz) than the CPUs in the MacBook Pro line.

Mac Current product line

- **MacBook Pro**

The MacBook Pro is a high-end portable workstation computer which runs on an Intel Core 2 Duo processor at 2.2 GHz, or 2.4 GHz, with 15.4 or 17-inch screens.

Networking Mac and Windows

- To establish communication between a Macintosh and Windows PC, install Ethernet system and client-server software.
- Ethernet is a method of wiring up computers.
- Client/server software is required for communication and transfer of files.
- Macintosh computers have built-in Ethernet networking, while Windows PCs require an additional Ethernet card.
- Macintosh and Windows are the two most common hardware platforms used in multimedia.

Networking

LANs- local area networks

- Located within short distances (such as a campus, or building)
- Allow sharing of resources such as printers
- Ethernet for cross-platform development

WANs- wide area networks

- Used for long distances
- More expensive to install and maintain
- ISPs make it available and affordable

Communication Devices

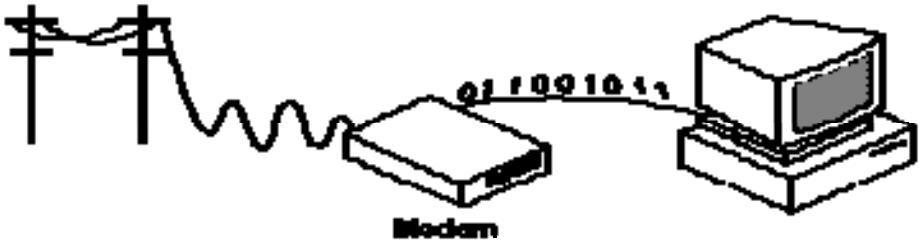
- Modems
- ISDN – Integrated Services Digital Network
- DSL-Digital Subscriber Line
- Cable Modems

•Modems

•***mo****dulator-****dem****odulator.* A modem is a device or program that enables a computer to transmit data over, for example, telephone or cable lines.

•Computer information is stored digitally, whereas information transmitted over telephone lines is transmitted in the form of analog waves. A modem converts between these two forms.

•A modem modulates outgoing digital signals from a computer or other digital device to analog signals for a conventional copper twisted pair telephone line and demodulates the incoming analog signal and converts it to a digital signal for the digital device.

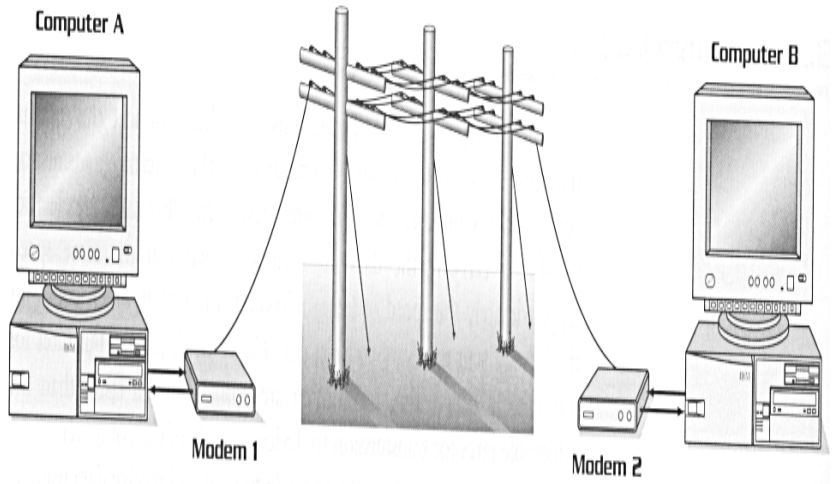


Modems

- Modems modulate and de-modulate analog signals.
- They provide connectivity through standard phone lines.

- A modem is a communications device that can be either internal or external to your computer.
- It allows one computer to connect another computer and transfer data over telephone lines.
- Modem speed -The standard modem speed should be at least 56 Kbps.

Use of modems and telephone lines for connectivity



•***ISDN-i****ntegrated* ***s****ervices* ***d****igital* ***n****etwork*, an international communications standard for sending voice, video, and data over digital telephone lines or normal telephone wires.

• ISDN supports data transfer rates of 64 Kbps (64,000 bits per second).

•It is used for higher transmission speeds by telephone.

•ISDN lines are used for networking, Internet access, and audio-video conferencing, distance learning etc.

•They are more expensive than the conventional analog lines.

•

•**Types of ISDN**

• -B ISDN

• -N ISDN

• -Hybrid ISDN

Cable Modems

- They provide Internet access at speeds 100 to 1,000 times faster than a telephone modem,over the same cable network that supplies the television signal.
- However, due to noise in the system, sending rates may be much slower than receiving rates.

Cable Modems

•A modem designed to operate over cable TV lines. Because the coaxial cable used by cable TV provides much greater bandwidth than telephone lines, a cable modem can be used to achieve extremely fast access to the World Wide Web.
•This, combined with the fact that millions of homes are already wired for cable TV, has made the cable modem something of a holy grail for Internet and cable TV companies.

•Your cable modem has the following features to help you access and use the Internet:
•• Two-way design allows the cable modem to send and receive data over the cable television network.

- Cable bandwidth allows data rates of up to 38 megabits per second (Mbps)*, which is faster than analog modems, integrated services digital network (ISDN), or asymmetric digital subscriber line (ADSL).
- Using your cable line means that the cable modem is always on, always connected, and doesn't tie up your phone line.
- Plug-and-play operation through universal serial bus (USB) ensures easy setup and installation.

Long Questions

1. Explain different software and hardware used in developing multimedia products? Explain with example.
2. What is multimedia? Explain its applications in various fields.
3. How will you select hardware and software for multimedia applications? Discuss.
4. What is meant by Authoring of Software and Explain about authoring tools?
5. What are the various stages in a multimedia project? What are the basic requirements to make good multimedia?

Long Questions

6. What is the purpose of Multimedia Highway? What is Interactive Multimedia?
7. Discuss various applications and uses of multimedia.
8. Which platform is more suitable for multimedia application development and why? How are the connections established during multimedia presentations?
9. What are different Hardware and Software requirement for multimedia?

Long Questions

10. Discuss the features of a Multimedia Authoring tool. Name any two popular multimedia authoring tools and mention their special features.
11. Explain the working of a CD-ROM. Differentiate between CDROM and DVD technology.
12. Describe the process of creation of a multimedia application, user interface and essential requirement in detail.

Short Questions

1.What is the role of HTML and HTTP in delivering and launching multimedia on the web?

3.Explain the different stages of making multimedia.

4. Explain different multimedia software tools.

5.Explain multimedia on Internet

6.Explain the concept of HTML in Multimedia.

Short Questions

7. Write short notes on Multimedia Production Platforms.
8. What is authoring? Explain about different authoring tools.
9. Explain the production life cycle of multimedia project.
10. What is meant by multimedia? How is it different from graphics?

Short Questions Contd…

11.Explain the following: -

(a)Hyper Media

(b) Multimedia Hardware

(c)Media Games

(d) Interactive TV

(e)Web Server

(f)HTML

(g)Web Browser

Short Questions

(h) Media games

(i) Multimedia tools

(j) Use of multimedia

(k) Multimedia highway

Multiple Choice Question

1.A Browser is used to view-

a)Program code b)Storyboards

c)Fonts d)web-based pages and documents

2.VR stands for-

a)Visual response b)virtual reality

c)video raster d)variable rate

3.DVD stands for-

a)digital versatile disc b)digital video disc

c)Double view disc d)density variable disc

Multiple Choice Question

4.PDA stands for-

a)Personal digital assistant b)primary digital asset

c)Portable digital armor d)none of these

5.The most precious asset you can bring to the multimedia workshop is your-

a)Creativity b)programming skill

c)Musical ability d)file and video clip

6.which of the following is not a stage of multimedia production?

a)Planning and costing b)testing

c)Marketing d)deivering

Multiple Choice Question

7.Which of these is not a common platform for producing and delivering multimedia projects?

a)Macintosh OSX b)window 98

c) Macintosh classic d)IBM VMS

8.For multimedia production, mastering your medium means knowing-

a)Instructional design b)video production

c)Hardware and software d)screenwriting

9.The diverse range of abilities needed to produce a new media project is called the----------

10.The person responsible for overall development and implementation of a project ,as well as for day-to-day operation,is the----------

Thanks…..

References

Books:

Multimedia: Making It Work

By: Tay Vaughan

Information Technology: Principles and Applications

By: Ajoy Kumar Ray & Tinku Acharya

Multimedia System Design :K. Andleigh and K. Thakkar

Web sites:

http://www.cse.fau.edu/research/mmlab/journal.html

http://www.iis.fraunhofer.de/amm/techinf/mpeg4/index.html

http://www.uky.edu/~rst/mmbook.html

http://www.clearleadinc.com/site/multimedia_authoring.html