# Chapter Seven

## Graphics, Hypermedia, and Multimedia

# After reading this chapter, you should be able to:

- Compare and contrast several types of computer graphics software programs used by artists and nonartists to produce high-quality graphics
- Explain how computers are changing the way professionals and amateurs work with video, animation, audio, and music

# After reading this chapter, you should be able to:

- Describe several ways that computers are used to create multimedia materials in the arts, entertainment, education, and business
- Explain the difference between hypermedia and multimedia, describing applications of each

# After reading this chapter, you should be able to:

- Describe several present and future applications for multimedia technology

# Chapter Outline

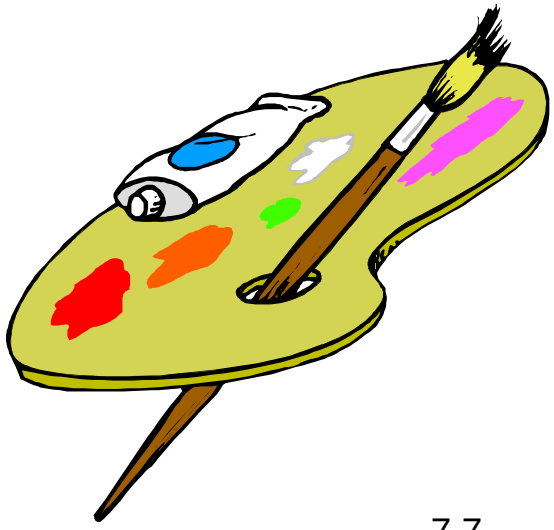
- Focus on Computer Graphics
- Dynamic Media: Beyond the Printed Page
- Interactive Multimedia: Eye, Ear, Hand, and Mind

# Focus on Computer Graphics

- Examples include:
  - Painting Software
  - Digital Image Processing
  - Drawing Software
  - 3-D Modeling Software
  - CAD/CAM
  - Presentation Software

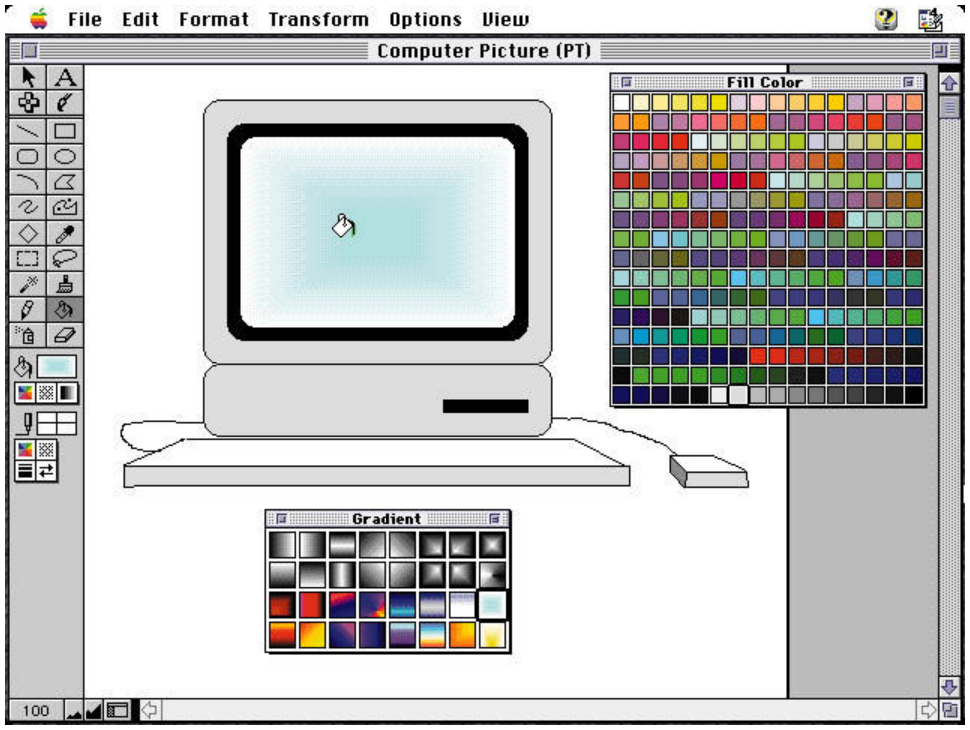
# Painting: Bit-Mapped Graphics

- Paint pixels on the screen with a pointing device
  - Select painting tools from a tools palette
  - Create bit-mapped graphics
  - Realism of the images is determined by the amount of memory allocation per pixel
  - Resolution is determined by the density of pixels



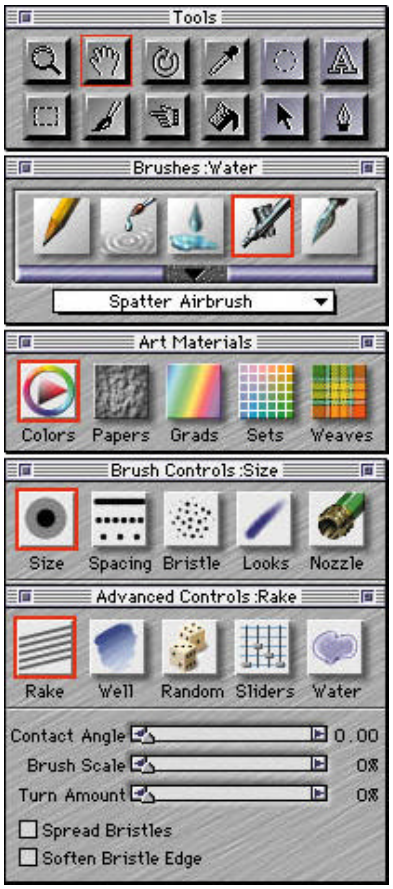
# Painting: Bit-Mapped Graphics

- The outlined areas can be filled with a color or with a pattern



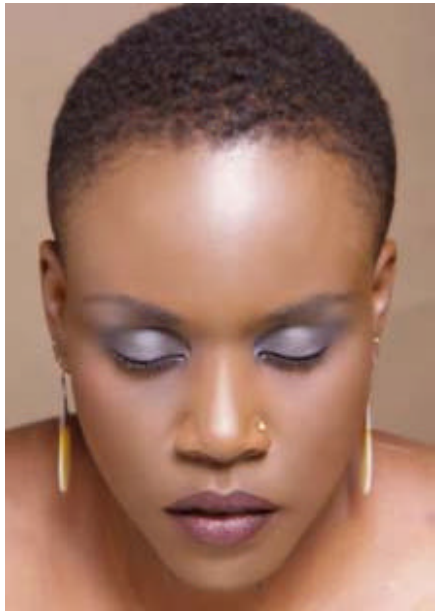
# Digital Image Processing: Photographic Editing by Computer

- You can edit high-resolution bit-mapped images
  - Select editing tools from a palette
  - Alter digitized photographs and graphics from paint programs



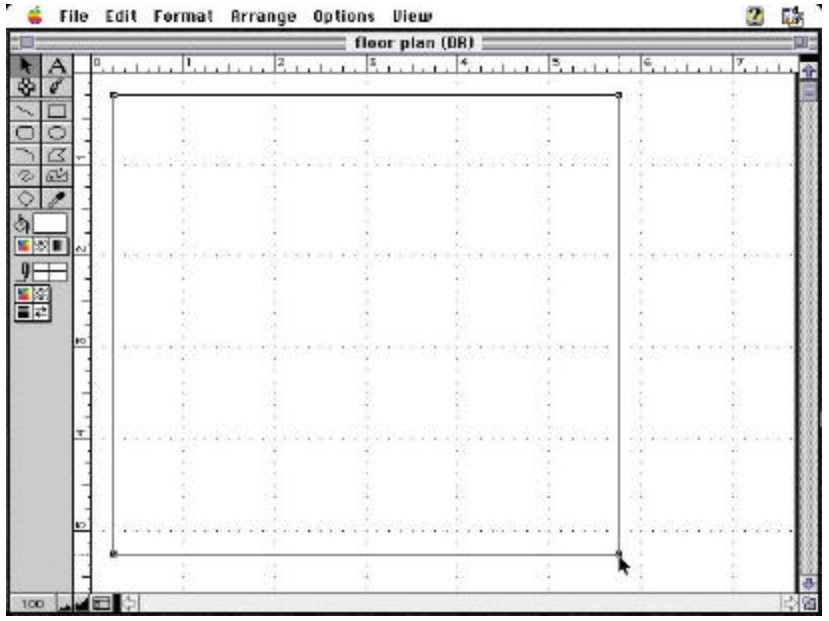
# Digital Image Processing: Photographic Editing by Computer

- Caution: evidence of alterations or deceptions may be missing



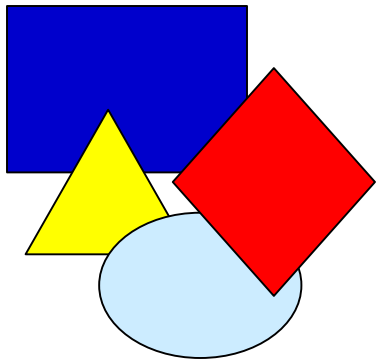
# Drawing: Object-Oriented Graphics

- Draw the shapes of objects with a pointing device
  - The palette of drawing software differs from that of painting software



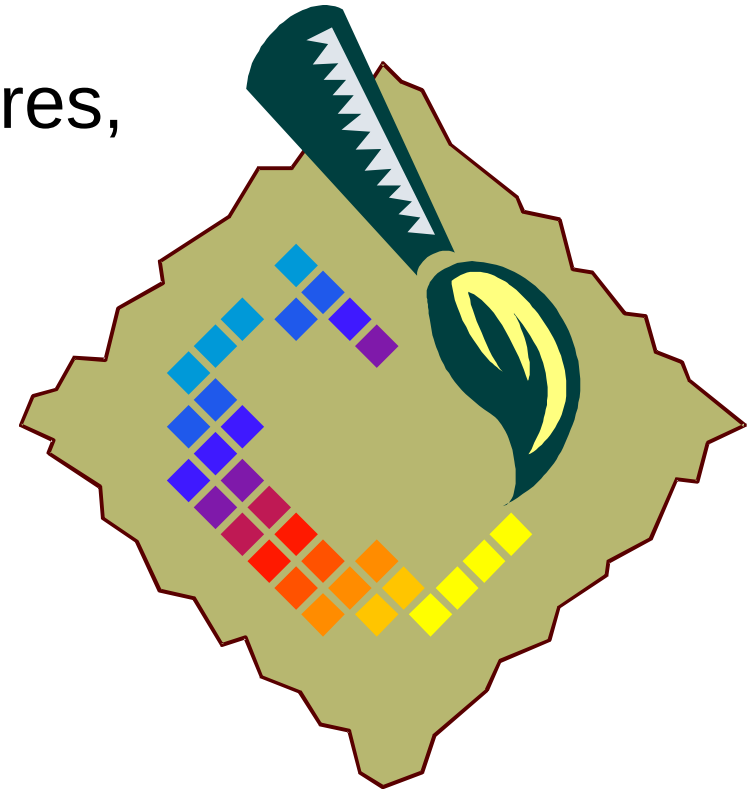
# Drawing: Object-Oriented Graphics

- Shapes:
  - Are stored as formulas (text) describing how to draw that shape the allows infinite resolution and requires less memory
  - The shape formulas allow for infinite resolution of the image
  - The shape formulas also mean fewer memory demands



# Painting Pixels vs. Drawing Object Shapes

- Painting pixels:
  - More control over textures, shading and fine detail
  - Used to create screen displays (for video games, multimedia presentations, and Web pages)

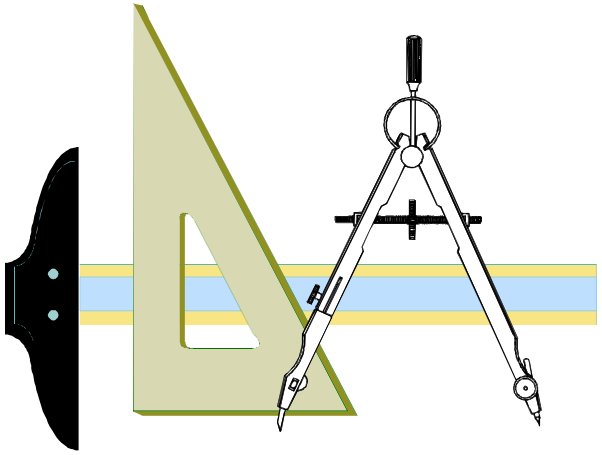


# Painting Pixels vs. Drawing Object Shapes

- Painting pixels:
  - Used for simulating natural paint media
  - Used to embellish photographic images

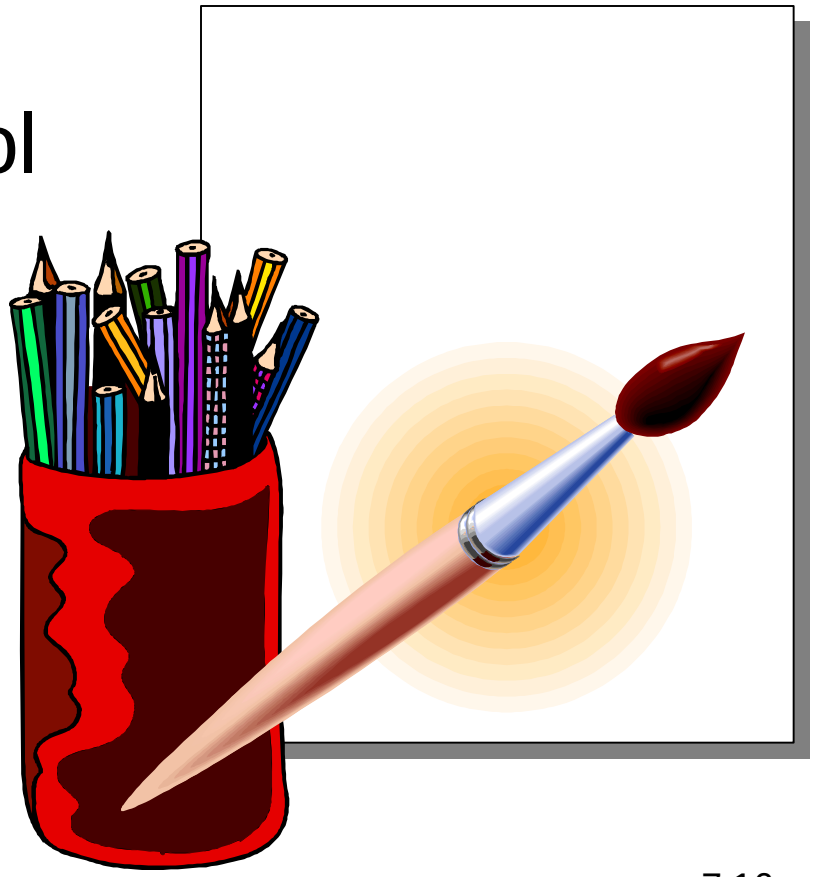
# Painting Pixels vs. Drawing Object Shapes

- Drawing object shapes:
  - Better choice for creating printed graphs, charts, and illustrations with clean lines and smooth shapes



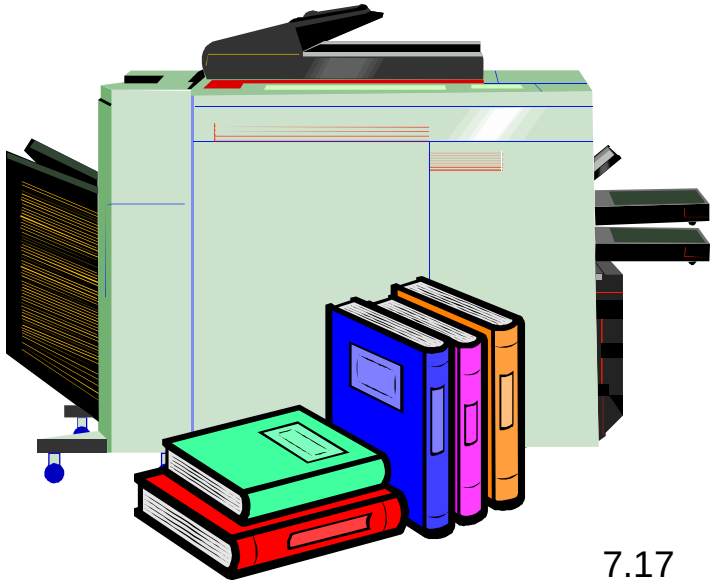
# Rules of Thumb: Graphics

- Overcome anxiety
- Choose the right tool
  - Painting pixels
  - Drawing objects



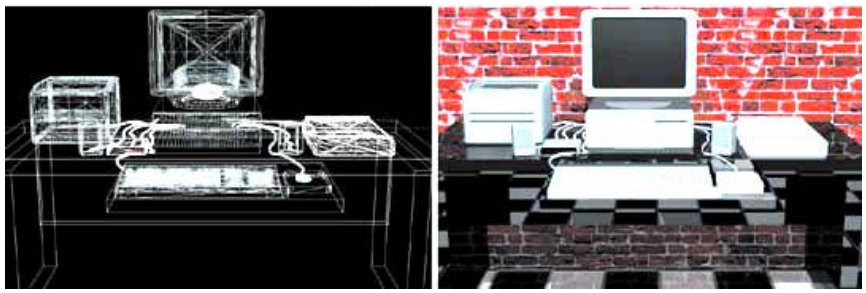
# Rules of Thumb: Graphics

- Use ready-made graphics (clip art)
- Honor copyright laws (buy protected work or use copyright-free clip art)
- Protect your own work (use this symbol: ©)



# 3-D Modeling Software

- Add depth to two-dimensional objects:
  - Tools palette is similar to that in drawing software
  - Objects can be rotated, stretched, and combined with other objects
  - Used by illustrators and designers who create 3-D images

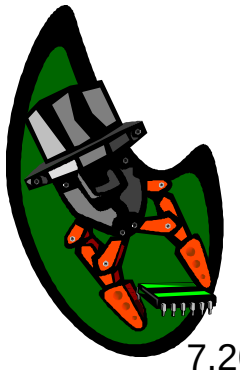


# CAD/CAM: From Pictures to Products

- Engineers,architects, and designers use CAD/CAM software to design or manufacture products

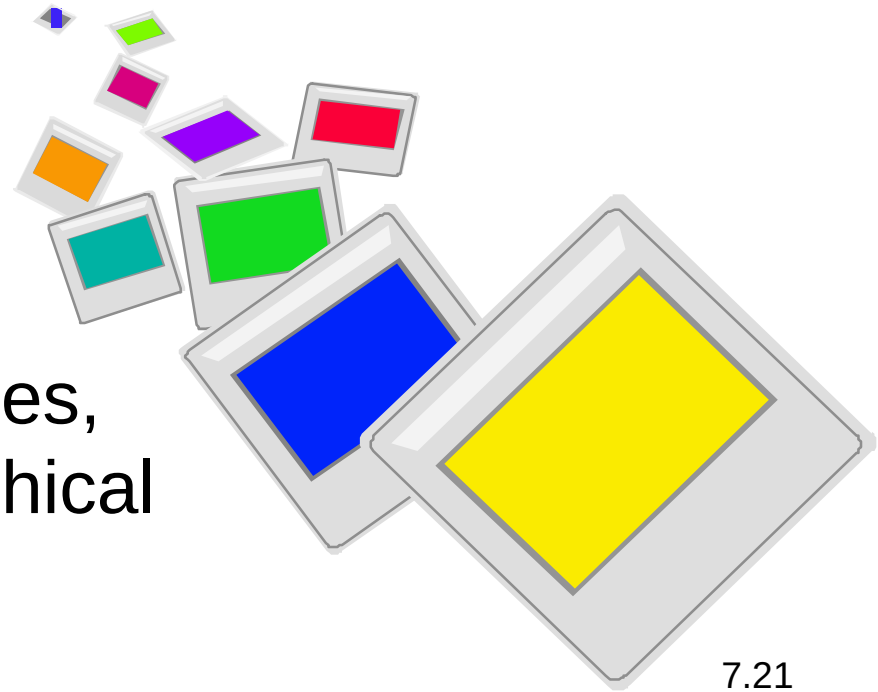
# CAD/CAM: From Pictures to Products

- CAD (computer-aided design) is a modern drafting tool for designers
  - Designs can be tested under various conditions before being built
- CAM (computer-aided manufacturing) is a program that controls the manufacturing of parts
  - CAM uses data from a CAD program to build the part that was designed



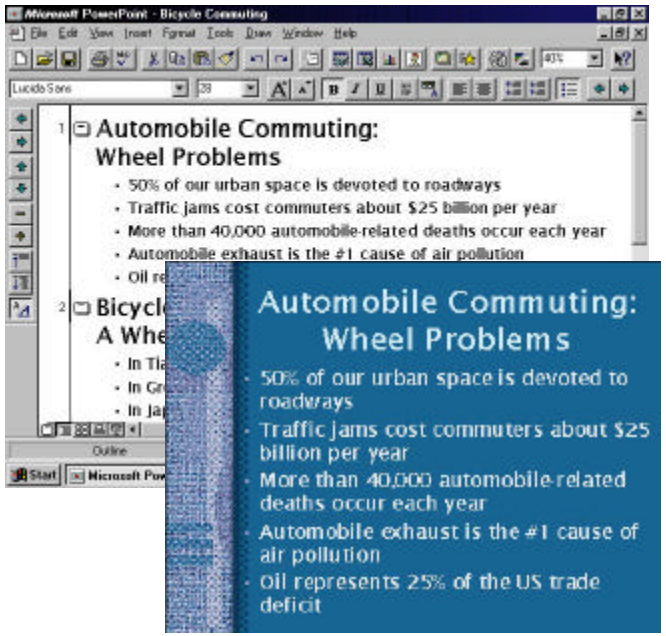
# Presentation Graphics: Bringing Lectures to Life

- Create visual aids and enhance presentations to groups with this kind of software
  - Visual aids include producing screen-sized slides, 35mm slides, transparencies, handouts, and graphical displays



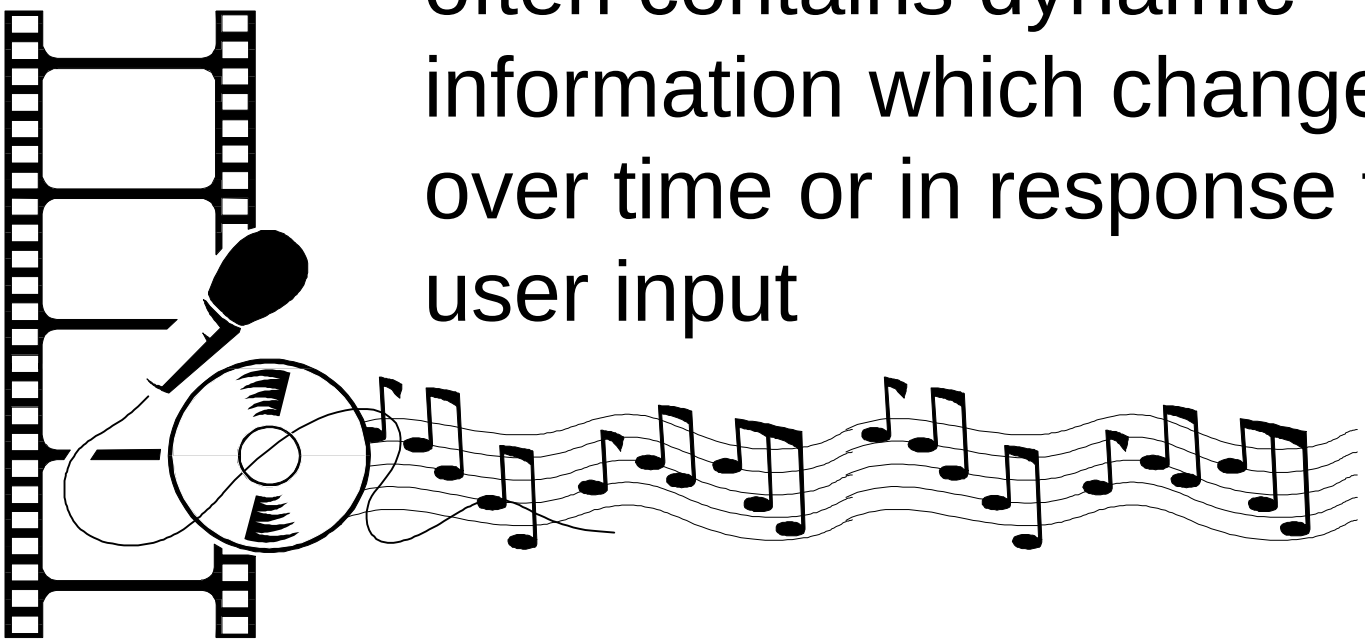
# Presentation Graphics: Bringing Lectures to Life

- Users can enter textual material as a structured outline
- Enhancements include font and style changes, clip art, audio, and video clips
- Special effects and transitions can be added to computer “slide shows”



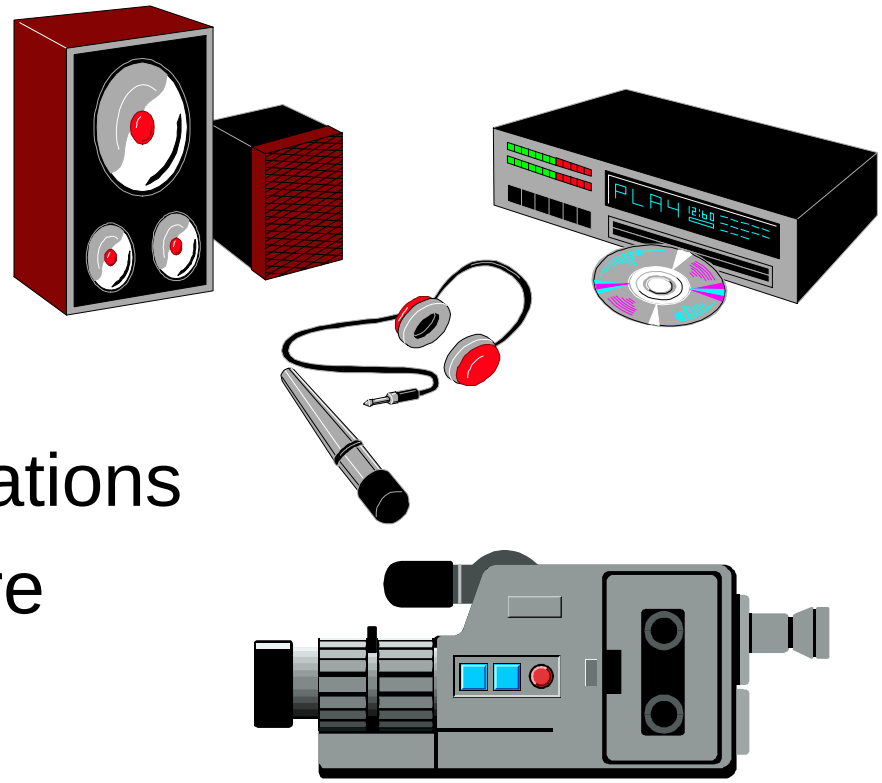
# Dynamic Media: Beyond the Printed Page

- Unlike the printed page, modern media often contains dynamic information which changes over time or in response to user input



# Dynamic Media: Beyond the Printed Page

- The raw materials for this dynamic media include:
  - Animation
  - Desktop video
  - Audio
  - Interactive applications
  - Authoring software

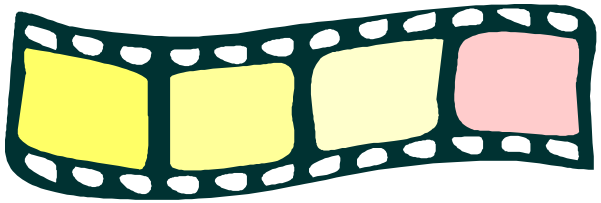


# Animation: Graphics in Time

- Create the illusion of animation from still images

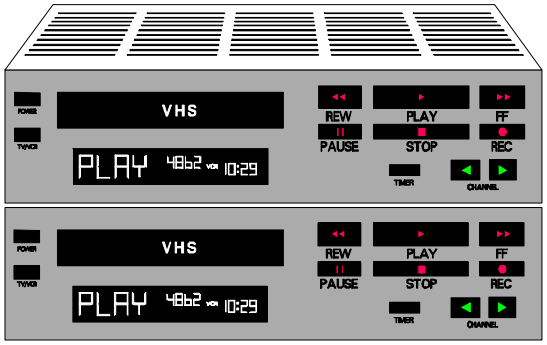
# Animation: Graphics in Time

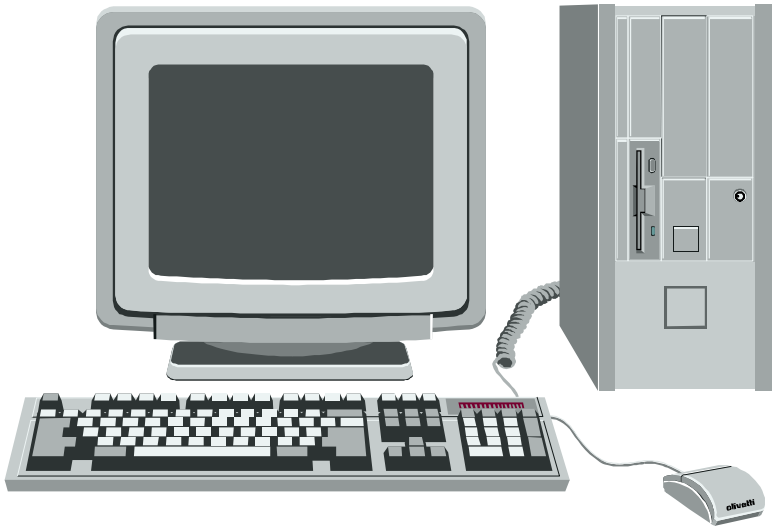
- Tedious tasks have been automated with computers and animation software
- Each frame is a computer-drawn picture
- Some software allows for 3-D animation
- *Toy Story* was the first full-length animated movie created on a computer



# Desktop Video: Computers and TV

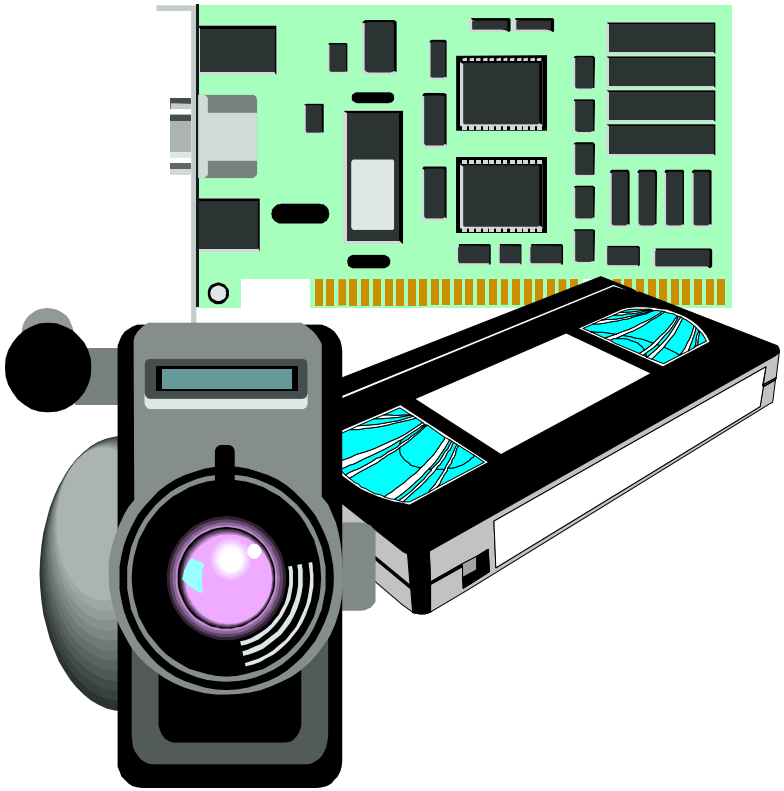
- Video can be edited or created by:
  - Using special VCRs and hardware to control the editing without ever digitizing the video



# Desktop Video: Computers and TV

- Convert video into digital form with video digitizers, which requires enormous memory and storage
- Digitize the video at the camera level and modify it with digital video-editing software



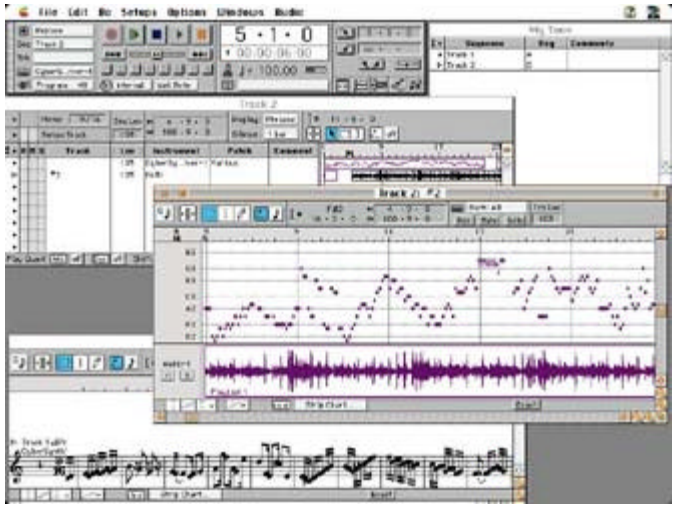
# Morphing Software

- Once video is digitized it can be transformed using software tools
- With a morph, one image metamorphoses into another
- Click the image to see a demo morph from *Morph Studio*

*Morph Studio v1.0 1994*

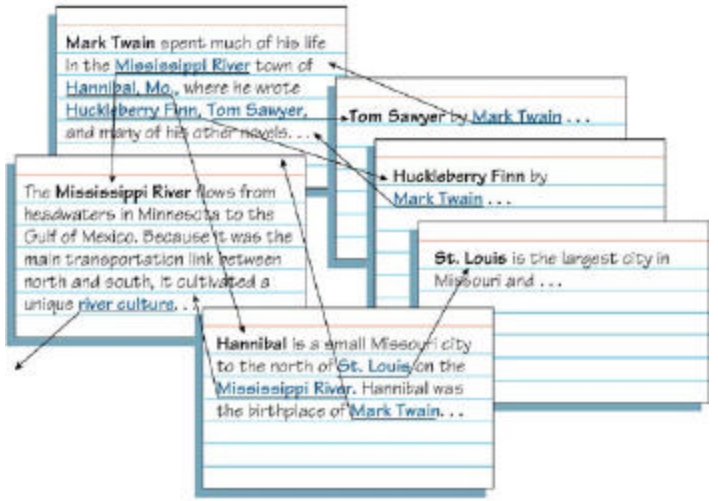
# The Synthetic Musician: Computers and Audio

- Add sound to any multimedia project
  - Use digitized audio (music or any sound) from a CD or audio file
  - Use synthesized audio (music or sound) using a MIDI (Musical Instrument Digital Interface) instrument



# Hypertext and Hypermedia

- Interactive text that is linked nonsequentially and includes navigational tools




  - Hypermedia (hypertext combined with graphics, audio, or video)
  - Examples include HyperCard and HTML (hypertext markup language for use on the Web)

# Interactive Multimedia: Eye, Ear, Hand, and Mind

- Combine text, graphics, animation, video, music, or sound effects in such a way that the user takes an active part in the experience

# Interactive Multimedia: Eye, Ear, Hand, and Mind

- Requirements: high-quality color monitors, fast processors, large memory, CD-ROM drives, speakers, and sound cards
- The user controls the flow of information and is not a passive viewer

# Multimedia Authoring: Making Mixed Media

- Create and edit multimedia projects.
  - Begin with source documents (text, graphics, video clips, music, and sound files)
  - Multimedia authoring software allows you to combine the individual sources
  - Some authoring software allows the final project to be interactive (requiring the user to take an active role)

# Rules of Thumb: Making Interactive Multimedia Work

- Be consistent
- Product should be intuitive
- Strive for simplicity
- Keep it lively
- Make sure the message gets through
- Provide navigational aids
- Test the product on novices

# Interactive Media: Visions of the Future

- Interactive multimedia:
  - Positive effects: interactive multimedia will increase communication, give people control over the flow of information, and allow more participation in democratic decision making

# Interactive Media: Visions of the Future

- Interactive multimedia:
  - Negative effects: interactive multimedia will further remove us from books, people, and the natural world