

Chapter 2

Introduction

Fundamentals

The Term “Multimedia”

■ Composed of 2 parts:

- **Multi** (multus) : “numerous, multiple”
- **Media** (medium): “middle, center” – agent for something. Used for dissemination (distribute) and representation of information.
- In general, multimedia could be defined as the usage of multiple agent (**text, audio, video, images**) for disseminating and presenting information to audience (target user)

The Term “Media”

- Can be categorized based on a few criteria:
 - Perception media
 - Representation media
 - Presentation media
 - Storage media
 - Transmission media

Perception Media

- *How do humans perceive information*
 - We perceive information from what we see and what we hear
 - Visual media:
 - Text, graphics, images, video
 - Auditory media:
 - Music, sound and voice

Representation Media

- *How in information encoded in the computer*
 - Referring to how the information is represented internally to the computer.
 - The encoding used is of essential importance.
 - Several options:
 - Text is encoded in ASCII
 - An audio data stream in PCM (Pulse Coded Modulation)
 - Image in JPEG format
 - Video in MPEG format

Presentation Media

- *Which medium is used to output information from the computer or input in the computer*
 - Refers to physical means used by systems to reproduce information for humans, e.g: audio and visual devices
 - Input:
 - Keyboards, cameras, microphone, Head Mounted Device (for VR input)
 - Output:
 - Paper, monitors, loudspeakers

Storage Media

■ *Where is information stored*

- Refer to various physical means for storing computer data, such as
 - magnetic tapes,
 - magnetic disks, or
 - digital optical disks (CD-ROM, CD, DVD)

Transmission Media

- *Which medium is used to transmit data*
 - Refers to the physical means – cable of various type (coaxial cable, twisted pair, fiber optics), radio tower, satellite – that allow the transmission of telecommunication signals.
 - The difference between transmission media and storage media is the capability of transferring data continuously over networked computers.

Definition: Multimedia Systems

- The American Heritage[®] Dictionary of the English Language: Fourth Edition. 2000.
 - The combined use of media, such as movies, music, lighting, CD-ROMs, and the Internet, as for education or entertainment
- Multimedia is the presentation of a (usually interactive) computer application, incorporating media elements such as text graphics, video, animation, and sound, on a computer.

Key Properties of a Multimedia Systems

- Discrete and Continuous Media
 - At least one discrete and continuous media
- Independent Media
 - Separate each media independently
- Computer-Controlled Systems
- Integration

Interactive Multimedia Systems

■ Interaction

- Thought - Something that you do to yourself ~ internal process (mental state)
- Action - Something you do to an object in the world. E.g.: pressing key, clicking mouse button
- Interaction - Involves the participant in going outside the individual. Two way process. E.g.: give a query to search engine which can return an outcome of my search.

■ Properties

- Various media integration
- High level degree of interactivity between user and computer
- Digital environment

Application Areas of IMS

- Education
 - Computer Aided Learning (CAL)
 - E-Learning (World Wide Web)
- Training
- Point of Sales Information (Kiosk)
 - Direct visitors around the large complexes
- News Delivery, Broadcasting and Advertising
- Commerce and Business Applications
- Virtual Reality (Games)

The History of Multimedia

- 1972 – A Game of Pong (first commercial multimedia product)
- 1973 – ATARI (laser disc, used in game cartridges)
- 1973 – IBM Discovision (first multimedia interactive kiosk products)
- 1978 – Apple II (with floppy drive)
- 1981 – Microsoft and IBM (IBM PC)
- Christmas 1981 – Nintendo hit the market (30 million machines)
- 1982 – Apple II had voice synthesis capability

The History of Multimedia

- 1980s – mouse was invented by Xerox Corp.
- 1984 – Macintosh using mouse
- 1984 – Virtual Reality was invented by NASA, input devices using HMD (Head-Mounted Display) and Dataglove
- 1985 – Macromind (Macromedia) produced VideoWorks, later changed to Director (the most widely used cross-platform multimedia authoring tool)
- 1986 – first electronic encyclopedia, first international conference on multimedia, first CD-ROM
- 1987 – Mac II (first color GUI)
- 1988 – CD-R (CD-Record)
- 1989 – Creative Labs (Sound Blaster sound card)

The History of Multimedia

- 1990s – Adobe released Photoshop.
- 1990s – Windows 3.0 multimedia enabled by Microsoft
- 1992 – first children 's interactive book title “Just Grandma and Me”
- 1993 – double speed CD-ROM drives as a multimedia standard
- 1993 – Web Browser Mosaic
- 1994 – Web Browser Netscape
- 1995 – Multimedia PC, 32 bit, Windows 95. Later followed by Windows 98, Windows 2000

Input Devices

- Keyboard, mouse (*track balls, joysticks, etc*)
- *graphics tablets* - drawing
- Scanner – capture image from printed material
- Digital camera - capture and transform image into digital form
- Touch screen for kiosk application
- Analogue audio input from microphone and audio player
- Networking support for file distribution
- modem

Output Devices

- High resolution screen, 256 colors (at least) – output video
- Speakers, amplifier or tape devices - Output audio
- Network with capacity at 10 millions bit/second
- Analog modem at 28 800 bit/second speed. ISDN digital modem at speed 128 000 bit/second.
- Printer

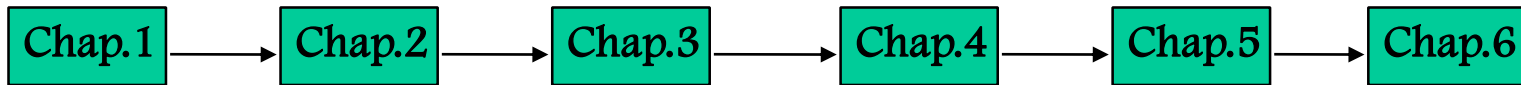
Storage Requirements

- At least 32MB RAM to produce good quality of graphics, audio, video, etc
- VRAM (Video Random Access Memory) to support high color definition
- Hard disk at high volume capacity with good drive system speed to support graphics, video, audio, and animation processing.
- Secondary storage CD-ROM, Magnetic Tape, etc

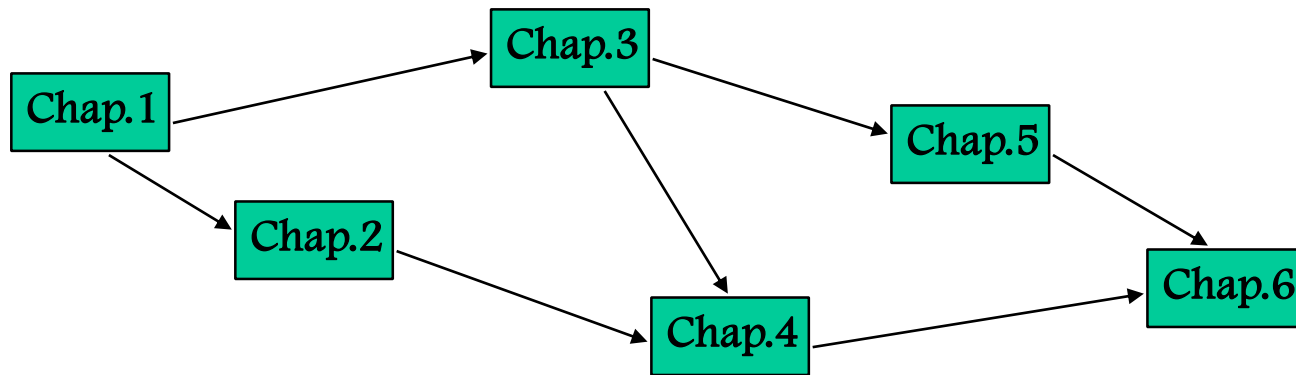
Hypermedia

- Hypermedia is a way of organizing multimedia information by linking media elements.
- Hypermedia has grown out of a fusion between hypertext and multimedia.
- Hypertext was developed to provide a different structure for basic text in computer systems :
 - text is essentially sequential in nature
 - hypertext was developed to permit more random access between components of text documents, or between documents, to allow a greater degree of flexibility and cross-referencing than a purely linear or sequential model would allow.

Hypermedia



A sequential text

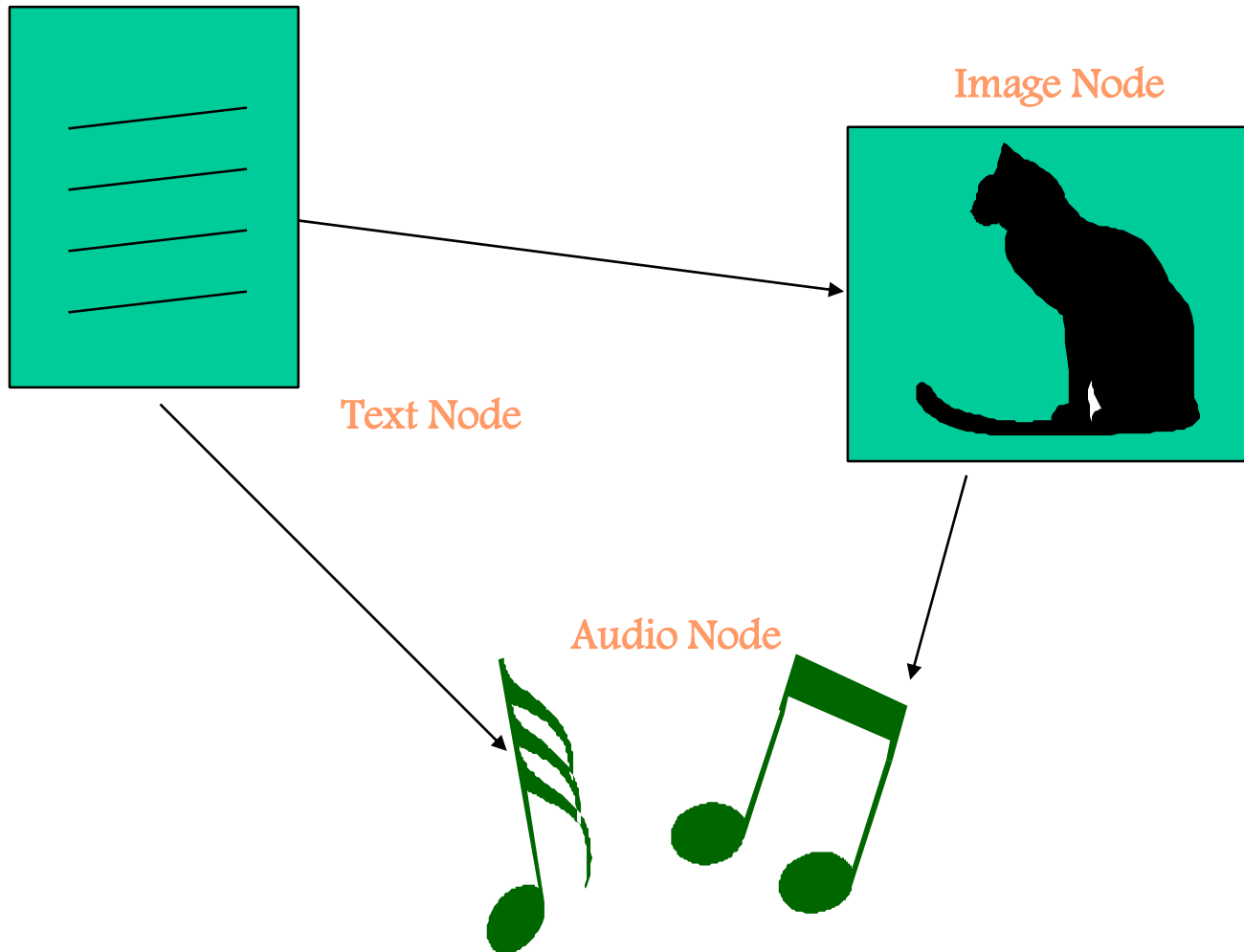


A linked, self-referencing text

Hypermedia

- The structure of a hypermedia organizations is called a ***hypermedia web***, which consists of a number of multimedia elements or ***nodes*** with ***links*** between them.
- Links represent semantic relationships, thus when a link exists between two nodes they must be related in some fashion :
 - a digital image linked to a textual description of it
 - a slide-show linked to an audio commentary
- Most widely used hypermedia tools are hypermedia browsers, which let users view nodes and traverse links between them, and markup languages, such as HTML, which allow users to create hypermedia webs as structured documents.

Hypermedia



A Simple Hypermedia Web

Why is multimedia so hot?

■ Technology Push

- More processing power per chip
- Progress in storage capacity
- Personal computer revolution
- Progress in networking
- Progress in user interfaces, and software
- Progress in compression techniques

■ Market Pull

- Large market - Revolutionizing film/video industry
- Application challenges and competition
- Market opportunities
- Customer demand and comfort