جامعة اللاذقية
كلية الهندسة المعلوماتية
قسم البرمجيات ونظم المعلومات

Multimedia Systems

Introduction

Lecture 1

Multimedia

The word multimedia is composed of two parts: the prefix multi and media.

Multi = many

Media = Medium of communication

A medium with multiple content forms.

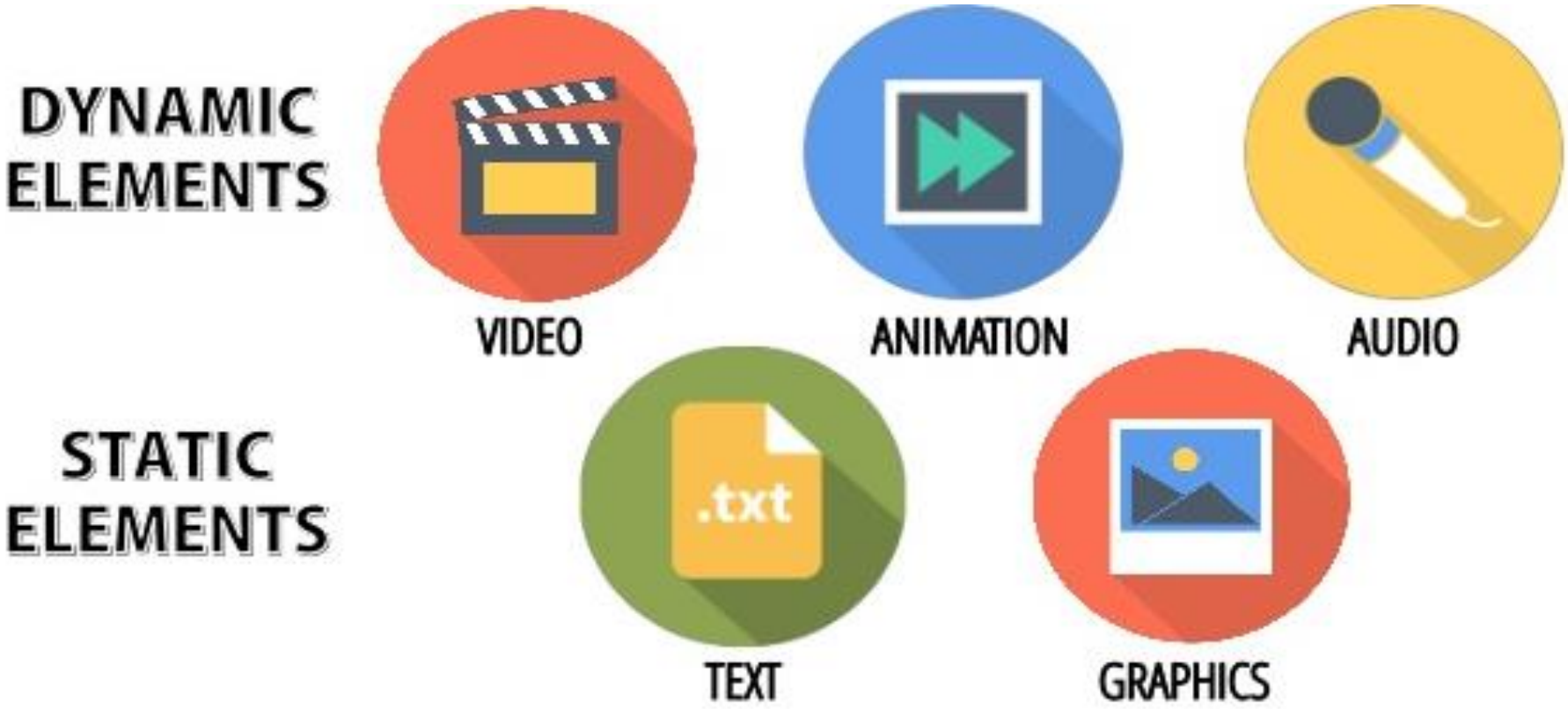
Multimedia uses media in an interactive manner to provide information in multiple ways.

Importance of Multimedia

“Tell me and I will forget; teach me and I may remember; involve me and I will understand” (Chinese proverb).

In fact, research shows that people remember only 30% of what they see, 20% of what they hear. When they see and hear it, they remember 50%, if we include some interaction; they will remember 80% of it .

Components Of Multimedia



Multimedia

General Definition

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 in a meaningful way to convey some information , where every type of information can be ***represented*** , ***stored*** , ***transmitted*** and ***processed*** **digitally**

meaningful way*!!*

you may pick up different words at random from a dictionary one after the other and try to compose a sentence, but we can't call it a sentence unless it conveys a meaning.

Presentation values & dimensions

presentation values determine the way, the media is represented.

Examples:

- Text is a sequence of characters
- Voice is a pressure wave
- Images consists of light waves
- Videos are varying light waves (sequences of images)

Presentation Dimensions:

- *Spatial dimensions*

  1-dimensional: sound

  2-dimensional: images

  3-dimensional: videos

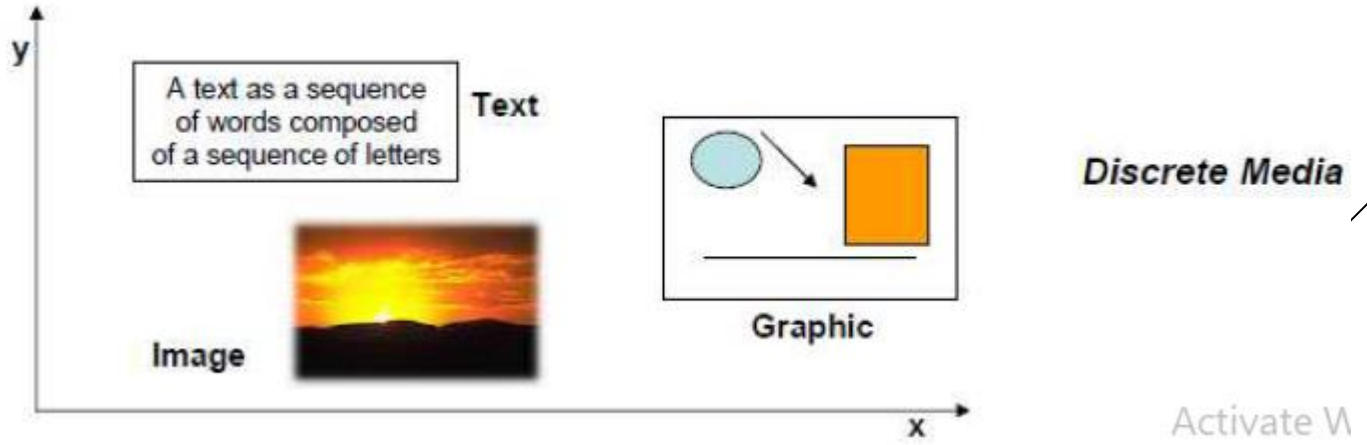
- *Time dimension*

  presentation values change over time: sound, video

Classification Of Media Types :

Discrete = Time-independent media

- Composed of time-independent items
- Meaning is not dependent on speed and order of presentation (time is **not** part of the semantics)



Classification Of Media Types :

Continuous = Time-dependent Media

- Composed of time-dependent items
- Time-dependency between data items is part of the information
- The internal representation might still be discrete (e.g., set of images in a video)

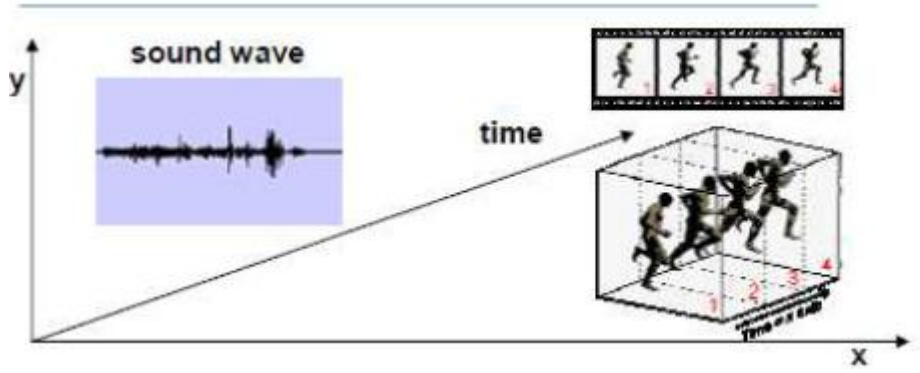
Audio, Video:

– Presentation requires a continuous playout at regular intervals

– The limitation of the human senses just gives the impression of continuity

Interactive gaming, animations:

– Presentation has certain requirements on playout timing



Continuous Media

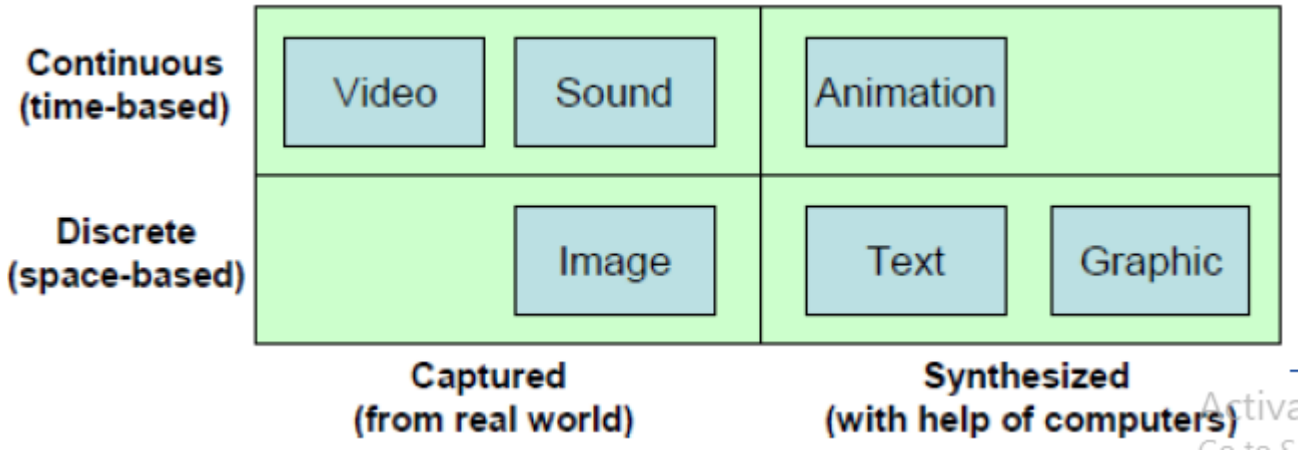
Classification Of Media Types :

Captured media

- Media representations captured from real world objects
- Examples: still pictures, moving pictures, sound

Synthesized Media

- Media representations synthesized by computers
- Examples: text, graphics, computer animation



Components of a Multimedia System

Components (Hardware and Software) required for a multimedia system:

Capture devices

- Video Camera, Video Recorder, Audio. Microphone, Keyboards, mice.

Storage Devices

- Hard disks, CD-ROMs, DVD-ROM, etc

Display Devices

- CD-quality speakers, HDTV, Hi-Res monitors, Color printers etc

Communication Networks

- Local Networks, Intranets, Internet, Multimedia or other special high speed networks.

Computer Systems

- Multimedia Desktop machines, Workstations,

Examples of Multimedia System

- Education & Training:

Multimedia systems are very convenient and cost-effective methods of helping people to learn (Computer-based training)

- Entertainment area:

Multimedia systems designed for entertainment (computer games)

- Virtual reality

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

- Hospitals

Real time monitoring of conditions of patients in critical illness or accident

- Communication

The feature of Online video calling has become a new face for communication using video calling platforms, e.g: zoom, Google Meet.

Challenges for Multimedia Systems :

1. Render different data at same time , There is a *temporal* relationship between many forms of media (e.g. Video and Audio). There are 2 forms of problems here:

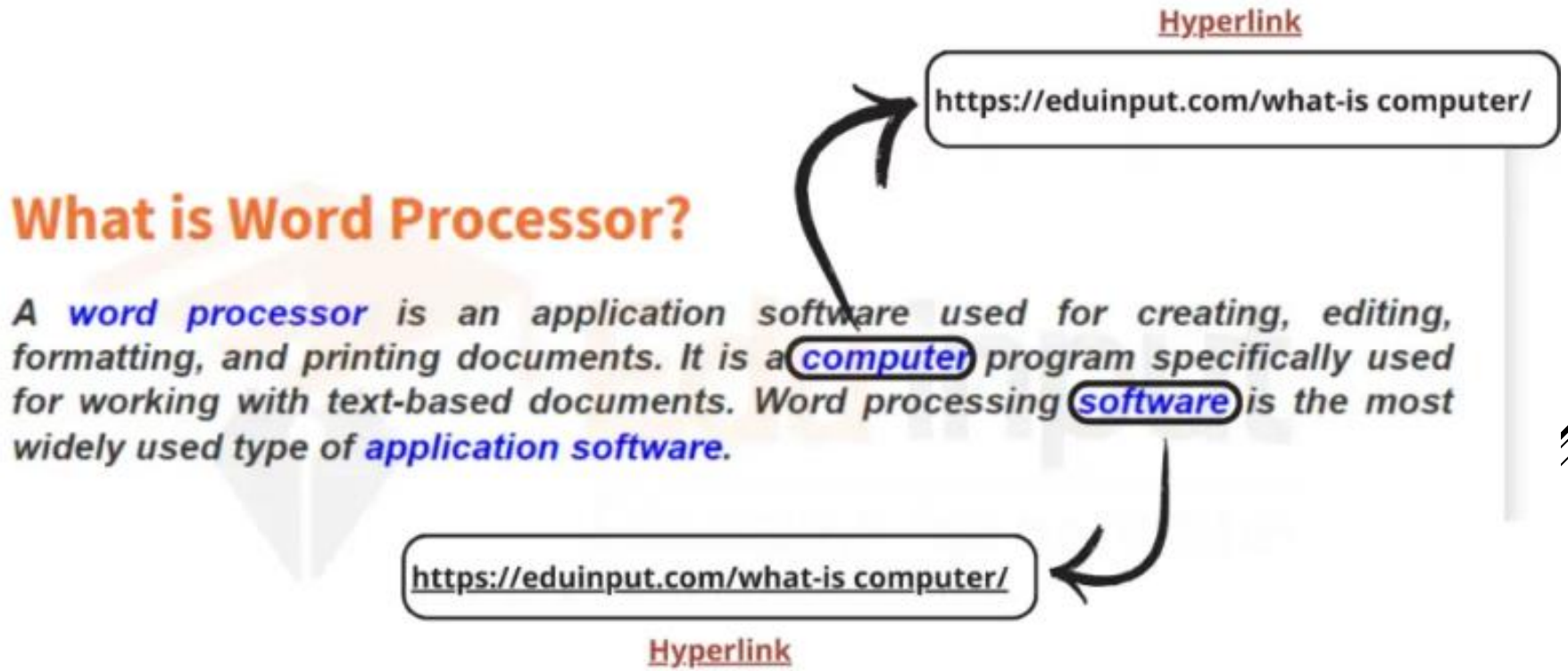
   - ✓ **Sequencing within the media :**
     playing frames in correct order/time frame in video

   - ✓ **Synchronization** :
     E.g. Video and Audio — Lip synchronization is clearly important for humans to watch playback of video and audio and even animation and audio.

2. The data is *large* several Mb easily for audio and video -- therefore storage, transfer (bandwidth) and processing overheads are high. Data compression techniques very common

Multimedia: Past and Present

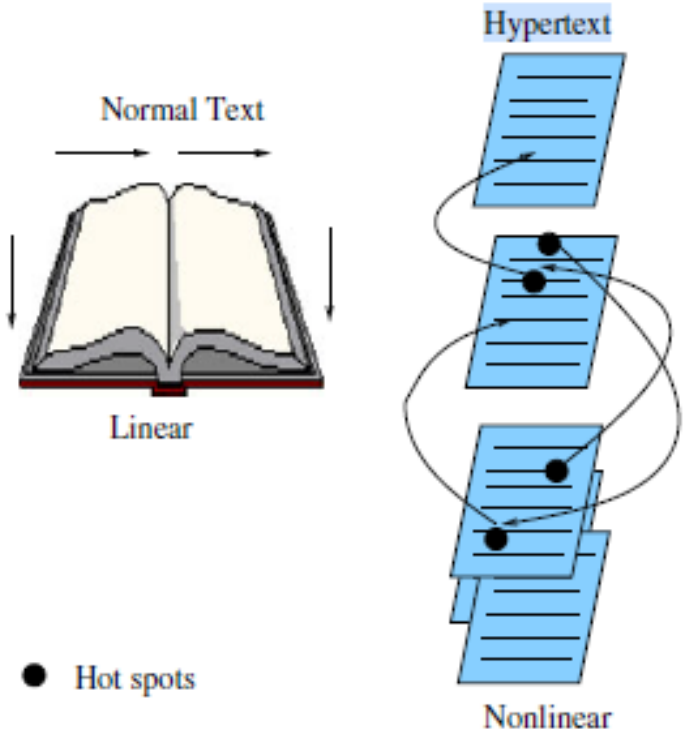
- **Hypertext** is a ***text*** which contains links to other ***texts***.



- Link *or* hyperlink ??

Multimedia: Past and Present

- Traversal through pages of hypertext is therefore usually **non-linear**

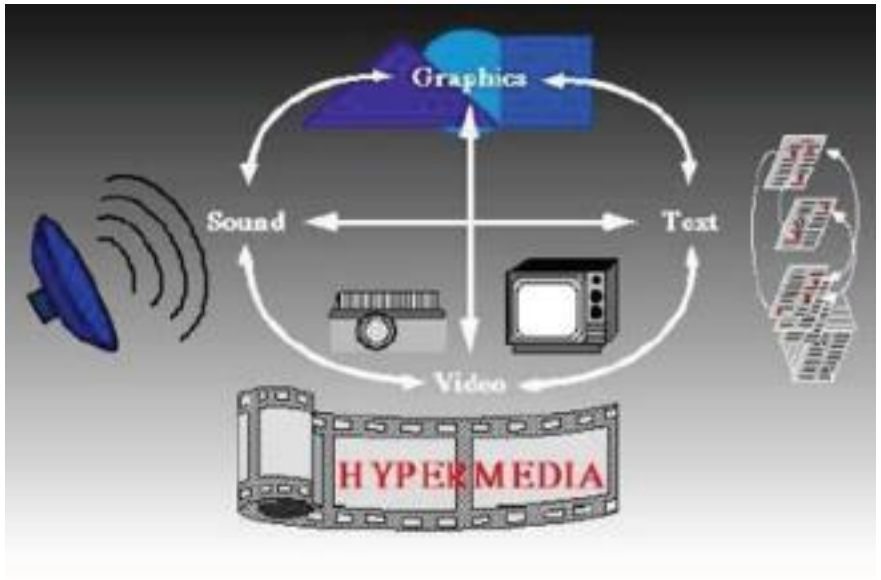


Multimedia: Past and Present

- **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.
- When you provide a structure of linked elements through which the user can navigate.

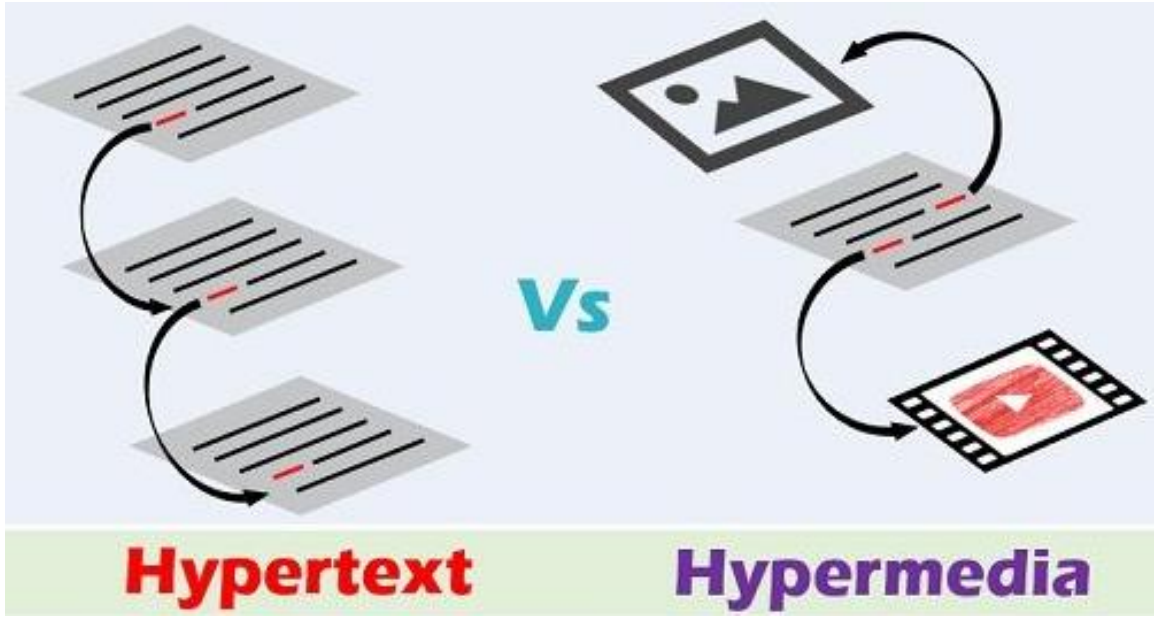
Examples:

- The World Wide Web (WWW) is the best example of a hypermedia application.
- Power point
- ??



Multimedia: Past and Present

- Hypertext is a part of the hypermedia as hypermedia includes text, image, audio, video,



End of introduction lecture