

# Multimedia Software Systems CS4551

## Introduction to Multimedia

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## What is Multimedia?

- What is **multimedia**?
  - multi + media
  - Multi (multus) : numerous
  - Media : means that conveys something such as information
- From wikipedia.org: **Multimedia** is the use of several different media to convey information (text, audio, graphics, animation, video, and interactivity).
- In our class,
  - **Multimedia** : the use of several different *digitized computer media* (text, audio, graphics, animation, video, etc) to convey information.

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## Inherent Properties of Multimedia

- Mixture of different media types
- Digital always
- Voluminous (Multimedia data is huge)
- Interactive (data contact human)
- Synchronization
- Real - time

=> Understanding these properties is important to design good multimedia applications.

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## Three Processes that are essential to Multimedia Systems

- Multimedia content creation or multimedia authoring
  - The process involves digitizing media ( audio, images, video) using capture devices and assembling/ processing them using smart software and hardware
- Storage and compression
  - The process mostly involves state- of- the- art compression algorithms and standards for audio, video, images, and graphics.
- Distribution
  - Distribution involves how multimedia content is distributed via various media, such as wired cables, optical networks, satellite, wireless networks, or any combination thereof, to specific platforms ranging from television, computers, personal digital assistants (PDAs), and so on.

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# Media Types

## (Modalities of Multimedia)

- Current Media Types
  - Text
  - Images
  - Video (Movies, Documentaries, ...)
  - 2D/3D Graphics (Computer Object)
  - Moving graphics (games, animation)
  - Audio (Speech, Music, MIDI music)
- Future Media Types?

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## Text

- **text** is a simple media that contains words to express something

This is a line of text to explain that text does convey information with a [hyperlink](#) example!

- Hypermedia vs. Multimedia
  - Hypertext : a user interface paradigm for displaying documents which contain automated cross-references to other documents called hyperlinks.
  - Hypermedia: Hyperlinks also referring other than text
    - Hypermedia is an application of multimedia.

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# Images

- Captured picture or computer generated (synthesized) picture
- Image
  - In the form of a spatial two dimensional array
  - Width and height
  - Consists of individual elements called pixel
  - Pixel depth (or bit depth) : 1,2,4,8,16,24 bits
- No particular structure other than pixel

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# Video

- How do you describe video ?
- Moving images
  - Collection of frames
  - Frame rates : number of frame displayed per second (fps)
  - Aspect ratio : ratio of width to height
  - Scanning format: interlaced or progressive
  - No particular structure other than pixel/frame number

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## 2D Graphics/3D Graphics



- Computer generated object
- Vector Graphics, 2D Sprites, etc
- Contains structure and they are revisable meaning editable

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## Animation

- Can be represented by a set of objects and time-dependent directives (programs to be executed at playtime)
- Compactness and revisable
- Requires processing power for the playback
- Can be rendered to a video format (movie)

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# Audio

- How do you describe audio ?
  - Waveform, structure, ...
- Properties
  - Sampling rate in hertz : # of samples per second
  - Sample size: number of bits per sample
  - Dimensionality: number of channels (mono or stereo)
  - Frequency range or frequency band (narrow band voice vs. wide band music)
- Audio Media is of various kinds
  - Speech
  - Non-speech sound
  - MIDI (Structured Audio)

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