Multimedia
• what is multimedia.
• It also supplies an overview of multimedia software tools, such as video editors and digital audio programs
multimedia

- applications that use multiple modalities, including text, images, drawings (graphics), animation, video, sound including speech, and interactivity.
Multimedia and Computer Science

• Graphics, HCI (human-computer interaction), visualization, computer vision, data compression, graph theory, networking, database systems --- all have important contributions to make in multimedia at the present time.
• Multimedia involves multiple modalities of text, audio, images, drawings, animation, and video.

• Examples of how these modalities are put to use:
  1. Video teleconferencing.
  2. Distributed lectures for higher education.
  3. Tele-medicine.
5. Searching in (very) large video and image databases for target visual objects.


7. Including audio cues for where video-conference participants are located.

8. Building searchable features into new video, and enabling very high- to very low-bit-rate use of new, scalable multimedia products.

10. Building "inverse-Hollywood" applications that can recreate the process by which a video was made.

11. Using voice-recognition to build an interactive environment, say a kitchen-wall web browser.
History of Multimedia:

1. **Newspaper**: perhaps the *first mass communication medium*, uses text, graphics, and images.

2. **Motion pictures**: conceived of in 1830's in order to observe motion too rapid for perception by the human eye.

3. **Wireless radio transmission**: Guglielmo Marconi, at Pontecchio, Italy, in 1895.

4. **Television**: the new medium for the 20th century, established video as a commonly available medium and has since changed the world of mass communications.
History of Multimedia:

5. The connection between computers and ideas about multimedia covers what is actually only a short period:

• 1945 - Vannevar Bush wrote a landmark article describing what amounts to a hypermedia system called Memex.

• 1960 - Ted Nelson coined the term hypertext.

• 2000 - WWW size was estimated at over 1 billion pages.
Hypermedia and Multimedia

- A **hypertext** system: meant to be read nonlinearly, by following links that point to other parts of the document, or to other documents

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

- **Multimedia** means that computer information can be represented through audio, graphics, images, video, and animation in addition to traditional media.
Overview of Multimedia Software Tools

• software tools available for carrying out tasks in multimedia are:
  1. Music Sequencing and Notation
  2. Digital Audio
  3. Graphics and Image Editing
  4. Video Editing
  5. Animation
  6. Multimedia Authoring
1. Music Sequencing and Notation

- **Cakewalk:** now called Pro Audio.
  - The term sequencer comes from older devices that stored sequences of notes ("events", in MIDI [Musical Instrument Digital Interface]).
  - It is also possible to insert WAV files and Windows MCI commands (for animation and video) into music tracks (MCI is a ubiquitous component of the Windows API.)

- **Cubase:** another sequencing/editing program, with capabilities similar to those of Cakewalk. It includes some digital audio editing tools.

- **Macromedia Soundedit:** mature program for creating audio for multimedia projects and the web that integrates well with other Macromedia products such as Flash and Director.
2. Digital Audio

- Adobe Audition (formerly Cool Edit) is a powerful, popular digital audio toolkit that emulate a professional audio studio, including multitrack productions and sound file editing, along with digital signal processing effects.

- Sound Forge Like Audition, Sound Forge is a sophisticated PC-based program for editing WAV files.

- Pro Tools: a high-end integrated audio production and editing environment. It offers MIDI creation and manipulation; powerful audio mixing, recording, and editing software.
3. Graphics and Image Editing

- **Adobe Illustrator**: a powerful publishing tool from Adobe. Uses vector graphics; graphics can be exported to Web.
- **Adobe Photoshop**: the standard in a graphics, image processing and manipulation tool.
  - Allows layers of images, graphics, and text that can be separately manipulated for maximum flexibility.
  - Filter factory permits creation of sophisticated lighting-effects filters
- **Macromedia Fireworks**: software for making graphics specifically for the web.
- **Macromedia Freehand**: a text and web graphics editing tool that supports many bitmap formats such as GIF, PNG, and JPEG.
4. Video Editing

- **Adobe Premiere**: an intuitive, simple video editing tool for nonlinear editing, i.e., putting video clips into any order:
  - Video and audio are arranged in "tracks".
  - Provides a large number of video and audio tracks, superimpositions and virtual clips.
  - A large library of built-in transitions, filters and motions for clips => effective multimedia productions with little effort.

- **Adobe After Effects**: a powerful video editing tool that enables users to add and change existing movies. Can add many effects: lighting, shadows, motion blurring; layers.
4. Video Editing

• **Final Cut Pro**: a video editing tool by Apple; Macintosh only.

• **CyberLink PowerDirector**: PowerDirector produced by CyberLink Corp.
  – is by far the most popular nonlinear video editing software.
  – It provides a rich selection of audio and video features and special effects
  – easy to use.
  – It supports all modern video formats (AVCHD 2.0, 4K Ultra HD, and 3D video)
  – It supports 64-bit video processing
  – it is not as “programmable” as Premiere.
5. Animation

• **Multimedia APIs:**
  - **Java3D:** API used by Java to construct and render 3D graphics, similar to the way in which the Java Media Framework is used for handling media files.
    1. Provides a basic set of object primitives (cube, splines, etc.) for building scenes.
    2. It is an abstraction layer built on top of OpenGL or DirectX (the user can select which).

- **DirectX** : Windows API that supports video, images, audio and 3-D animation
- **OpenGL**: the highly portable, most popular 3-D API.
5. Animation

• Animation Software (Rendering Tools):

- 3D Studio Max: rendering tool that includes a number of very high-end professional tools for character animation, game development, and visual effects production.

- Softimage XSI: a powerful modeling, animation, and rendering package used for animation and special effects in films and games.

- Maya: competing product to Softimage; as well, it is a complete modeling package.

- RenderMan: rendering package created by Pixar.
5. Animation

- GIF Animation Packages:
  - simpler approach to animation, allows very quick development of effective small animations for the web.
  - GIFs can contain several images, and looping through them creates a simple animation.
  - Linux also provides some simple animation tools, such as animate.
6. Multimedia Authoring

- Tools that provide the capability for creating a complete multimedia presentation, including interactive user control, are called **authoring** programs.

- **Macromedia Flash**: allows users to create interactive movies by using the score metaphor, i.e., a timeline arranged in parallel event sequences.

- **Macromedia Director**: uses a movie metaphor to create interactive presentations. It is very powerful and includes a built in scripting language, **Lingo**, that allows creation of complex interactive movies.
6. Multimedia Authoring

- **Authorware**: a mature, well-supported authoring product based on the Iconic/Flow-control metaphor.

- **Quest**: similar to Authorware in many ways, uses a type of flowcharting metaphor. However, the flowchart nodes can encapsulate information in a more abstract way (called frames) than simply subroutine levels.