

# Lecture

## MULTImedia TECHnology



# PART I



# Lecture 11 Multimedia technology

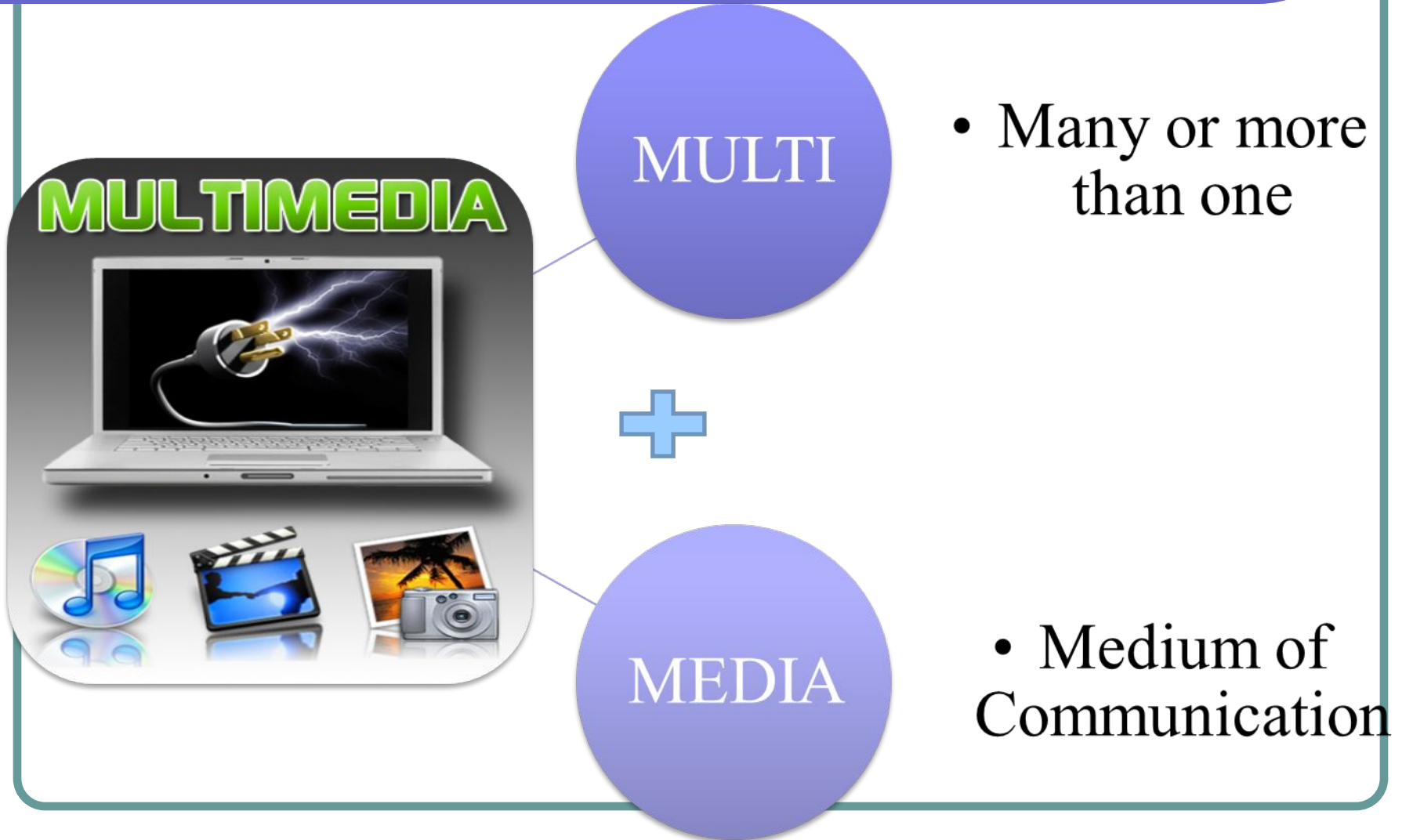


## What is Multimedia?

Derived from the word “Multi” and “Media”

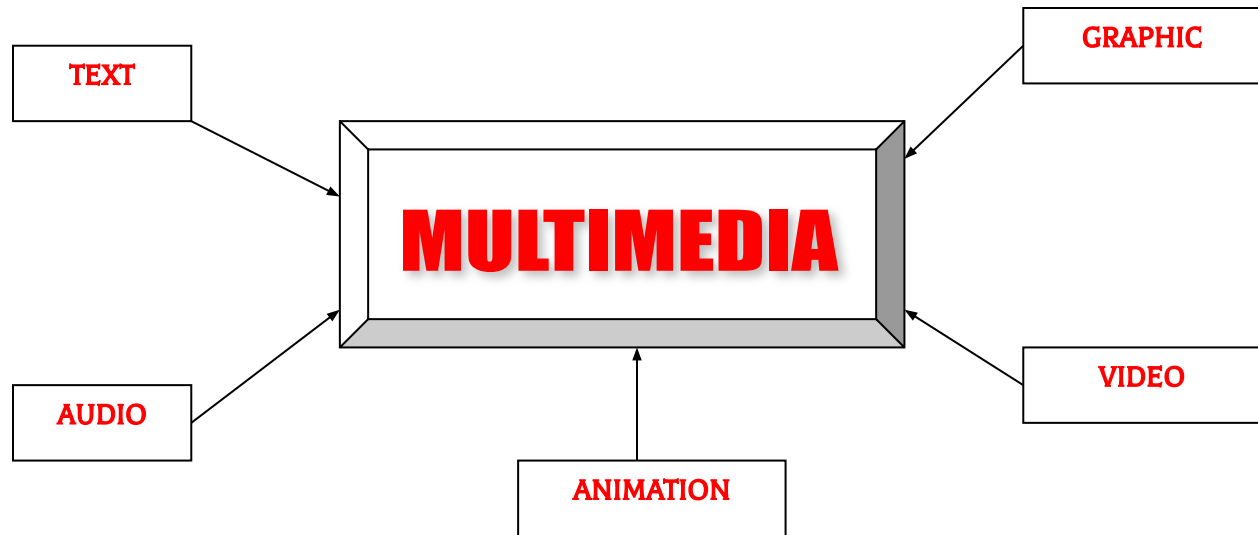
- Multi
  - Many, Multiple,
- Media
  - Tools that is used to represent or do a certain things, delivery medium, a form of mass communication – newspaper, magazine / tv.
  - Distribution tool & information presentation – text, graphic, voice, images, music and etc.

# WHAT IS MULTIMEDIA ?



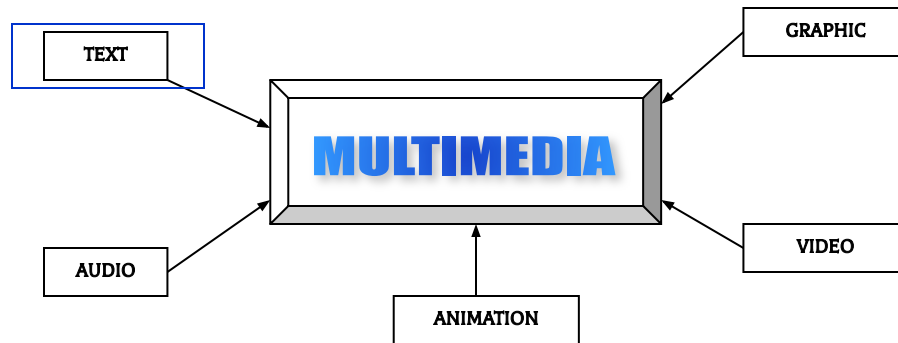
# Definition of Multimedia

- **Multimedia** is a combination of **text**, **graphic**, **sound**, **animation**, and **video** that is delivered interactively to the user by electronic or digitally manipulated means.



# Elements of Multimedia

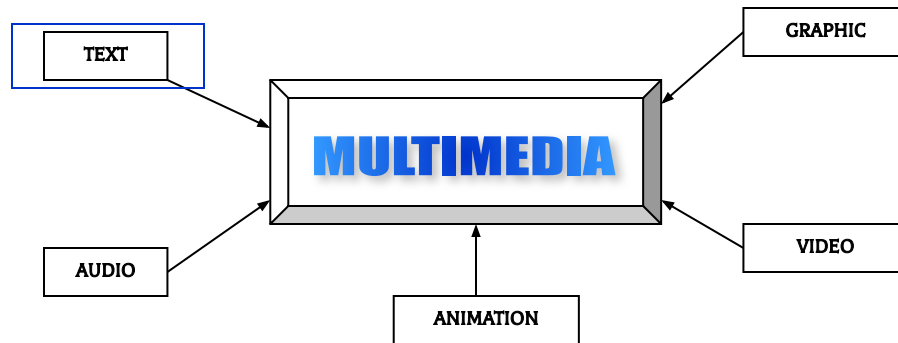
**TEXT**



- A broad term for something that contains words to express something.
- Text is the most basic element of multimedia.
- A good choice of words could help convey the intended message to the users (keywords).
- Used in contents, menus, navigational buttons

# Elements of Multimedia

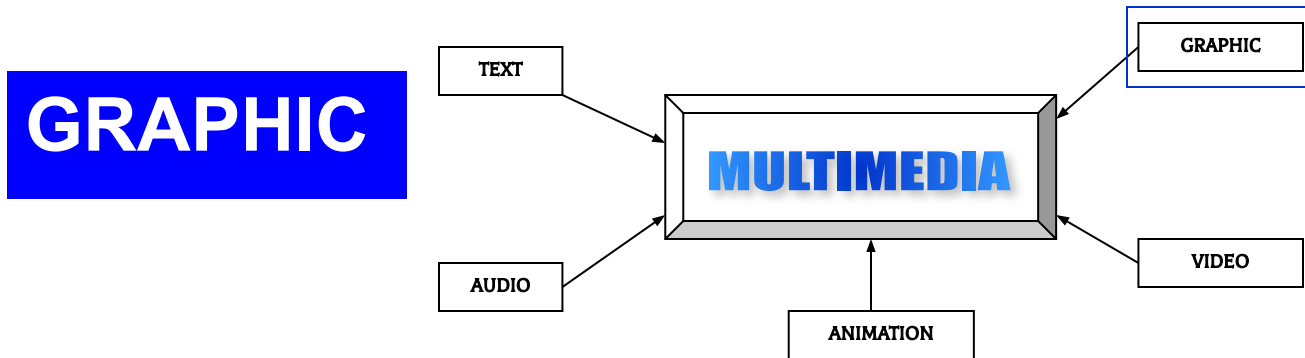
**TEXT**



- Example

<b>ROAD SAFETY</b>	<b>Basic</b>	<b>Intermediate</b>	<b>Advanced</b>
First, before crossing the road, make sure you look to your left, to your right and then left again..			
Then, walk carefully to cross the road.			

# Elements of Multimedia

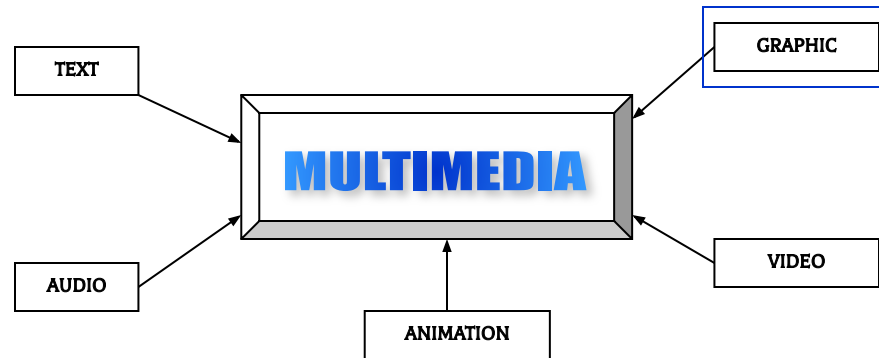


- Two-dimensional figure or illustration
- Could be produced manually (by drawing, painting, carving, etc.) or by computer graphics technology.
- Used in multimedia to show more clearly what a particular information is all about (diagrams, picture).



# Elements of Multimedia

## GRAPHIC



- Example

**ROAD SAFETY**    Basic    Intermediate    Advanced

First, before crossing the road, make sure you look to your left, to your right and then left again.

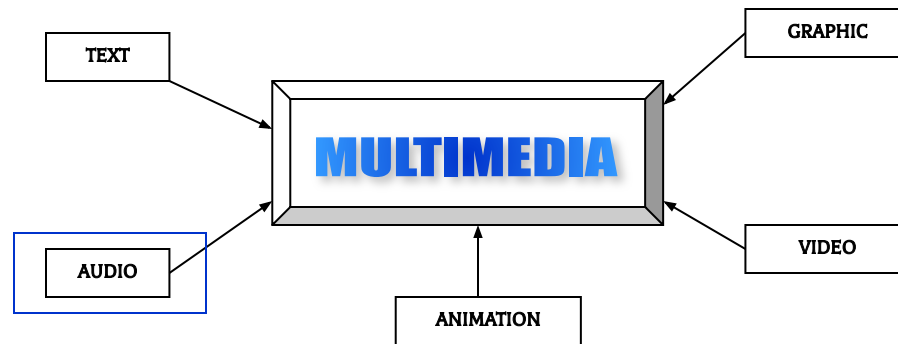


Then, walk carefully to cross the road.



# Elements of Multimedia

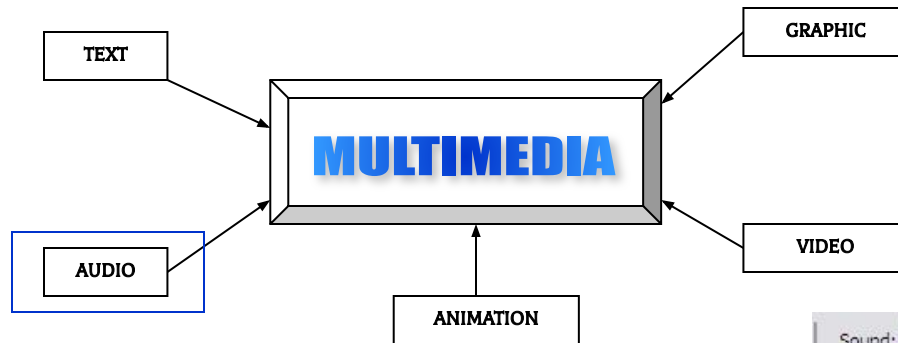
## AUDIO



- Produced by vibration, as perceived by the sense of hearing.
- In multimedia, audio could come in the form of speech, sound effects and also music score.

# Elements of Multimedia

AUDIO



- Example

## ROAD SAFETY Basic Intermediate Advanced

First, before crossing the road, make sure you look to your left, to your right and then left again.

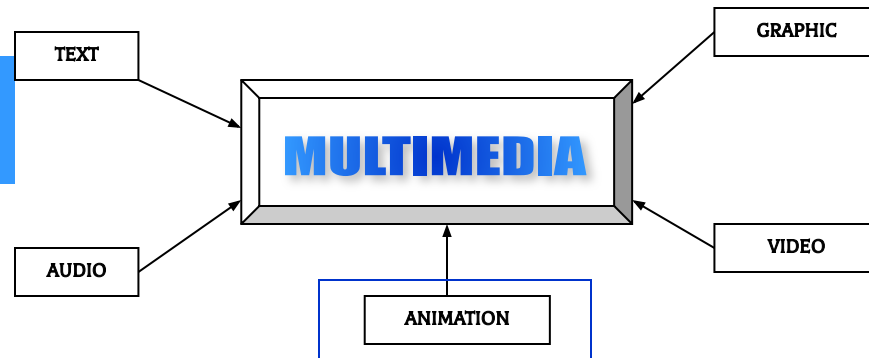


Sound: NG11905  
Effect: Custom Edit...  
Sync: Start Repeat 1  
44 kHz Stereo 16 Bit 67.2 s 806.9 kB

The screenshot shows a multimedia software interface. At the top, there is a timeline with a ruler from 1 to 55. Below the timeline, there is a list of assets: 'sound', 'pic3b', 'pic3a', 'pic2b', and 'pic1a'. The 'sound' asset is selected, and its waveform is visible in the timeline. The interface also shows various icons for editing and playback.

# Elements of Multimedia

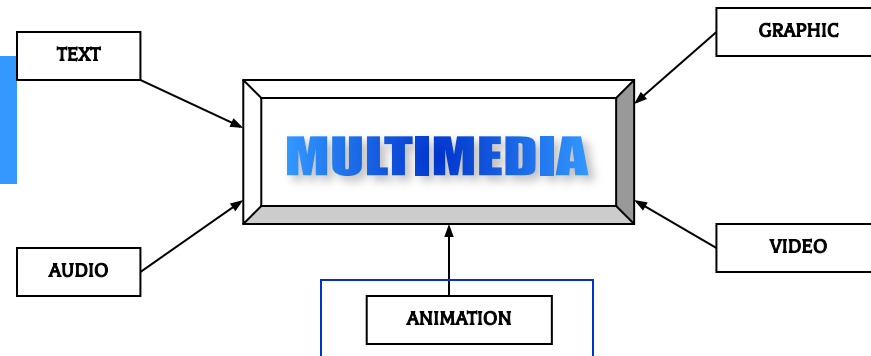
## ANIMATION



- The illusion of motion created by the consecutive display of images of static elements.
- In multimedia, animation is used to further enhance / enriched the experience of the user to further understand the information conveyed to them.

# Elements of Multimedia

## ANIMATION



- Example

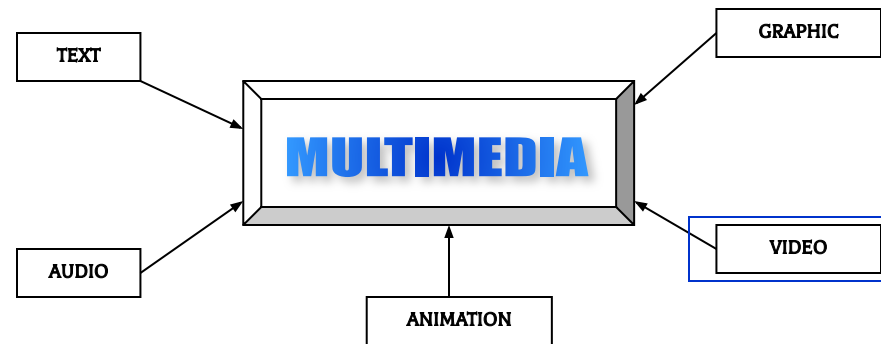
**ROAD SAFETY** Basic Intermediate Advanced

First, before crossing the road, make sure you look to your left, to your right and then left again.

The illustration shows a yellow character with a neutral expression looking towards a road. The road is flanked by three stylized green trees with brown trunks. The background is a light blue sky.

# Elements of Multimedia

## VIDEO



- Is the technology of capturing, recording, processing, transmitting, and reconstructing moving pictures.
- Video is more towards photo realistic image sequence / live recording as in comparison to animation.
- Video also takes a lot of storage space. So plan carefully before you are going to use it.

# Interactive Multimedia

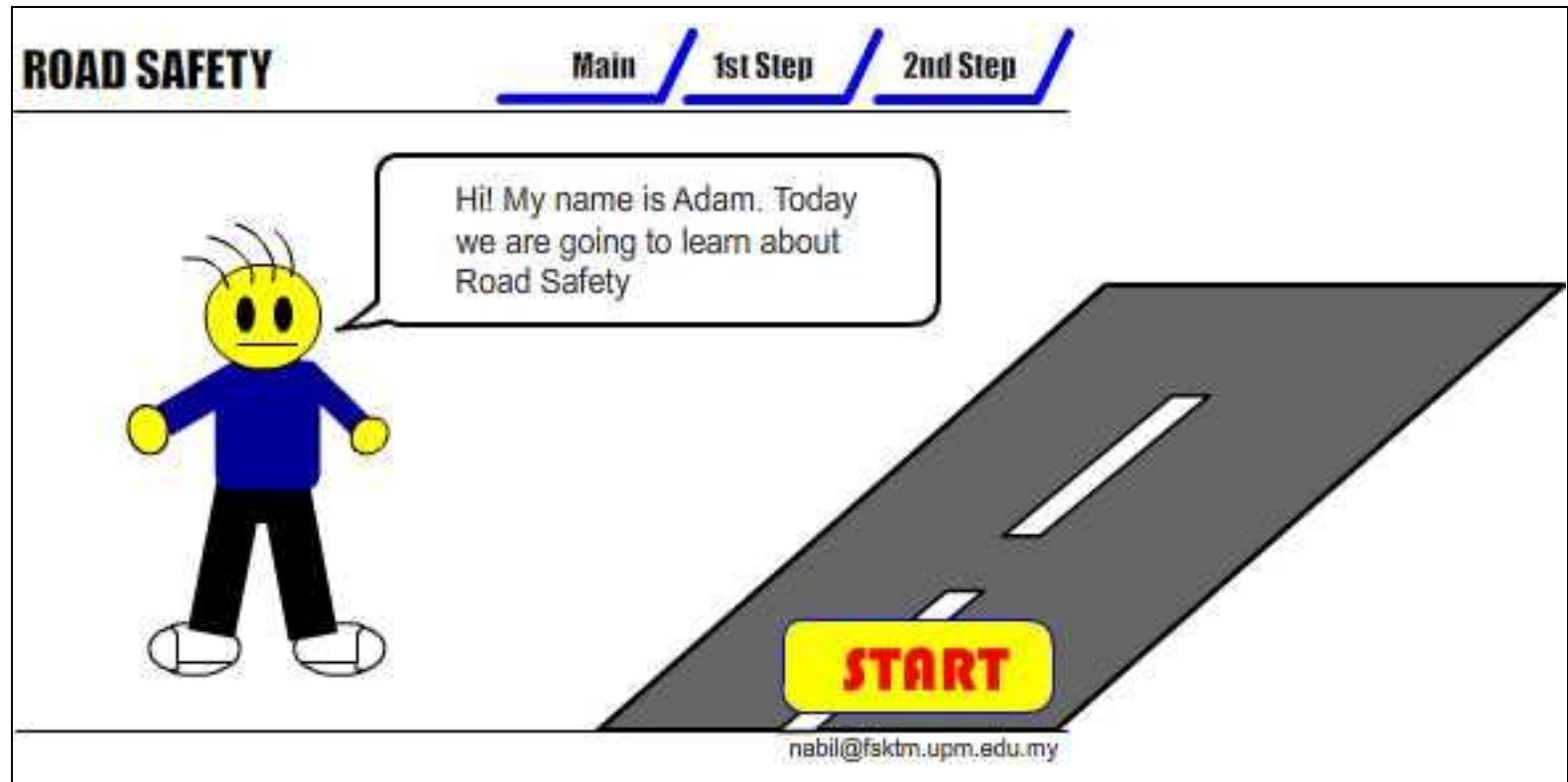
- When the user is given the option of controlling the elements.

## Hyper Media

- A combination of hypertext, graphics, audio, video, (linked elements) and interactivity culminating in a complete, non-linear computer-based experience.

# Example

- Interactive Multimedia





# Example

## Hyper Media

Video link

Image link

Audio Link



# Linear VS Non-Linear

## LINEAR

- A Multimedia Project is identified as Linear when:
  - It is not interactive
  - User have no control over the content that is being showed to them.
- Example: **A movie; A non-interactive lecture / demo show**

## NON-LINEAR

- A Multimedia Project is identified as Non-Linear when:
  - It is interactive
  - Users have control over the content that is being showed to them.
  - Users are given navigational control
- Example: **Games; Courseware; Interactive CD**

# Authoring Tools

- Use to merge multimedia elements (text, audio, graphic, animation, video) into a project.
- Designed to manage individual multimedia elements and provide user interaction (if required).



# Authoring Tools

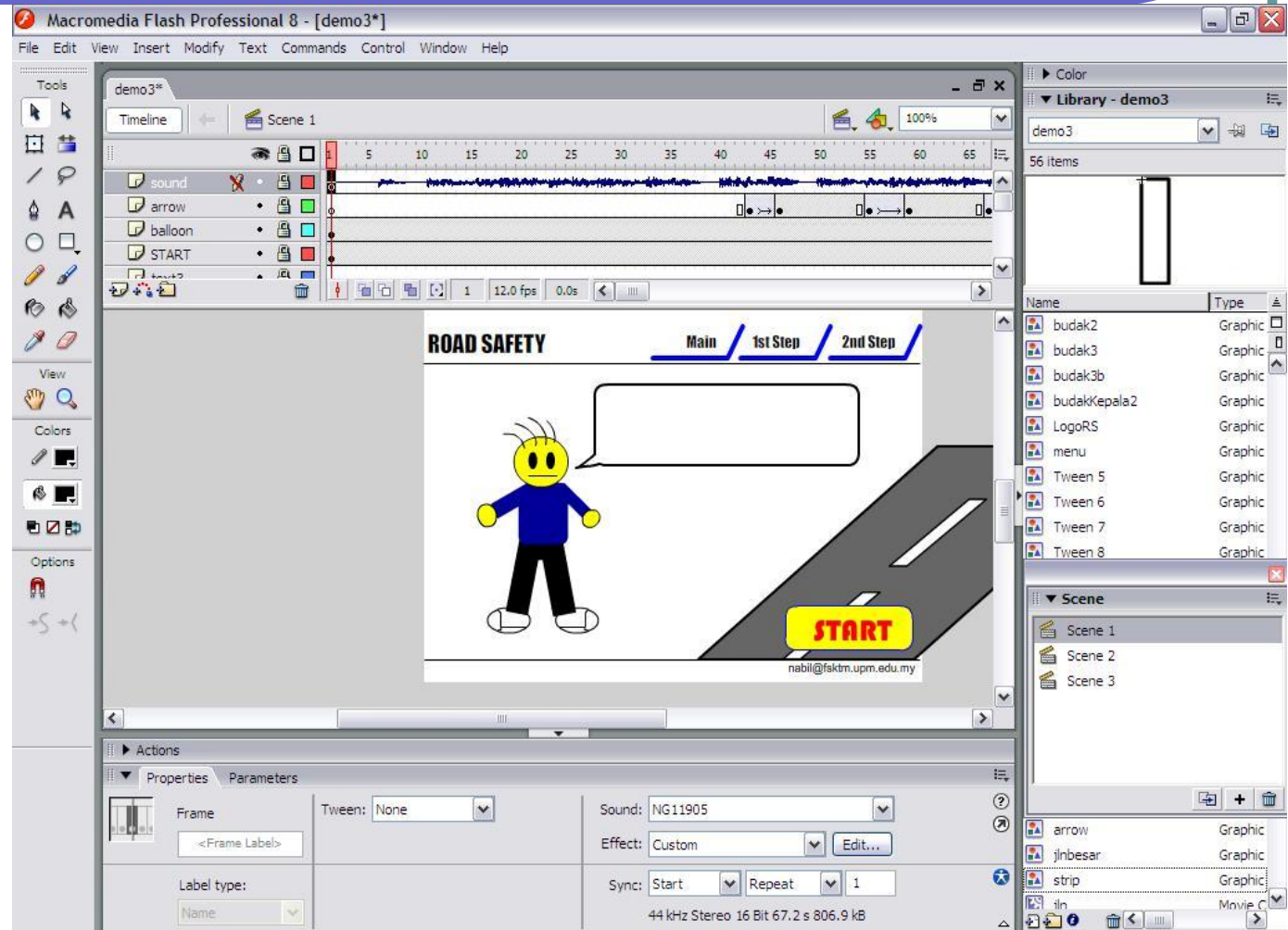
Example:

**Macromedia  
Authorware**

**Macromedia  
Director**

**Macromedia  
Flash**

**Microsoft  
Power Point**



# Importance of Multimedia

- There are a number of fields where multimedia could be of use. Examples are:-

- Business
- Education
- Entertainment
- Home
- Public Places



# Importance of Multimedia

- **Business**

- Use and Applications
  - Sales / Marketing Presentation
  - Trade show production
  - Staff Training Application
  - Company Kiosk



- **Education**

- Use and Applications
  - Courseware / Simulations
  - E-Learning / Distance Learning
  - Information Searching



# Importance of Multimedia

- **Entertainment**

- Use and Applications
  - Games (Leisure / Educational)
  - Movies
  - Video on Demand
    - Online



- **Home**

- Use and Applications
  - Television
  - Satellite TV
  - SMS services (chats, voting, reality TV)



Тридцать первый канал



- **Public Places**

- Use and Applications
  - Information Kiosk
  - Smart Cards, Security

# Multimedia Products

1. Briefing Products
2. Reference Products
3. Database Products
4. Education and Training Products
5. Kiosk
6. Entertainment and Games



# Multimedia Products

## 1 Briefing Products

- Small, straightforward, linear products used to present information quickly and concisely.
- **Characteristic of briefing product:** a) Short Development Cycle; b) Limited Number of Presentations; c) Usage of text to present information with limited use of graphic, audio and video; d) Have few navigational controls. (mouse click and button press to move from one page to another); e) Content and the format are suitable for the audience and fulfill the purpose of the presentation.
- **Good briefing presentation depends on:**
  - ✓ **The understanding of the presented subject.**
  - ✓ **Seamless integration of content.**
  - ✓ **Consistent layout**
    - **Example:**
      - ✓ **Corporate Presentation**
      - ✓ **Sales Presentation**
      - ✓ **Educational Lectures**



# Multimedia Products

## 2 Reference Products

- Often used for answering specific questions or for general browsing of information. (stored on CD/ DVD ROM)
- **Characteristic of reference product:**
  - ✓ Used by wide range of user (small – adult)
  - ✓ Have navigational menu, book marking, searching, printing utility
- **2 Basic classes of reference product:**
  - ✓ **Generalized Content** (dictionary/encyclopedia) Broad treatment of content at a limited depth
  - ✓ **Detailed Content** Focus on specific area and provide extensive information.
- **Good usability and success depends on:** 1) The developers understanding the body of information and how the end user will want to access it. 2) Help function should always be available to explain how to access and use the information

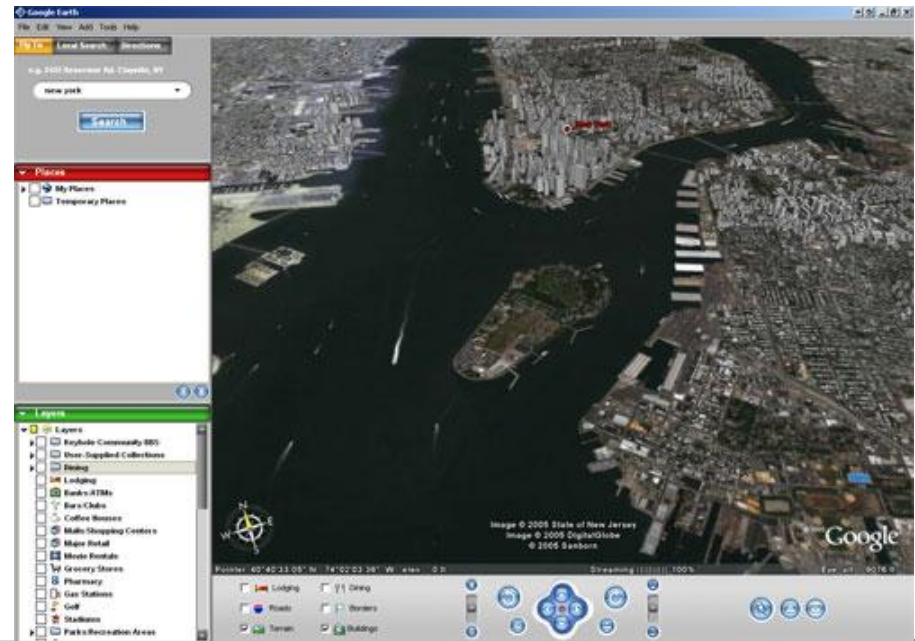


- **Examples are electronic forms of:**
  - ✓ Encyclopedia
  - ✓ Dictionaries
  - ✓ Cookbooks, Historical, Informative
  - ✓ Scientific surveys.

# Multimedia Products

## 3 Database Products

- Similar to reference product in a sense that large amount of information are made available to the end user.
- **Focus on storing and accessing the actual data** (multimedia data such as text, graphic, audio, animation and video)
- **Characteristics of Database Products are:**
  - ✓ Manages multimedia data (large data)
  - ✓ Descriptive finding methods
    - Content based search
  - ✓ Simultaneous access
    - Online database
  - ✓ Relational consistency in data management.
- **Examples are:**
  - ✓ Google Search
  - ✓ Google Earth



# Multimedia Products

## 4 Education and Training Products

- Similar to textbook or training manuals but have added media such as [audio](#), [animation](#) and [video](#).
- Make up a significant share of the multimedia market ranging from pre-kindergarten to postgraduate offerings from technical to corporate training products.
- **2 categories of reference product:**
  - ✓ Instructor Support Products
  - ✓ Standalone or Self-Paced Products
  - ✓ Combination Products
- Shares the same characteristics as Reference Product

Polymer Characterization (1)

### Polymer Characterization

Gennadiy Mesh

Click on the text in **BOLD** for hyper-text links.

Enter the correct name of this polymer into the box below and win!!!\*\*

Submit

\*Select a topic from the polymer chain. \*\*Here's a hint: The green atoms are found in most toothpastes.

Sound Print Resources Tour About Chapter 3 Simplifying Algebraic Expressions Quit

### Chapter 3

## Simplifying Algebraic Expressions

3.1

cctelgado

Mentor

Objectives Prerequisites Instructions

In this lesson, you will review some basic properties of real numbers, and you will learn to simplify algebraic expressions by grouping like terms and by using the distributive property.

Glossary Introduction Tutorial Examples Summary Practice & Problems Extra Practice Self-Check

THOMPSON UPDATE NEEDED

Charles P. McKeague, Interactive Elementary Algebra

### 5.4 Addition and Subtraction of Polynomials

In this section we will extend what we learned in Section 5.3 to expressions called polynomials. We begin the section with the definition of a polynomial.

**DEFINITION** A polynomial is a finite sum of monomials (terms).

**Examples** The following are polynomials:

$$3x^2 + 2x + 1 \quad 15x^2y + 21y^2 - y^3 \quad 3a - 2b + 4c - 5d$$

Polynomial can be further classified by the number of terms they contain. A polynomial with two terms is called a binomial. If it has three terms, it is a trinomial. As stated before, a monomial has only one term.

**DEFINITION** The degree of a polynomial in one variable is the highest power to which the variable is raised.

**Examples:**

$3x^2 + 2x + 1$	A trinomial of degree 5
$2x + 1$	A binomial of degree 1
$3x^2 + 2x + 1$	A trinomial of degree 2
$2x^3$	A monomial of degree 5
$-9$	A monomial of degree 0

There are no new rules for adding or subtracting polynomials. We rely only on our previous knowledge. Here are some examples:

**EXAMPLE 1** Add  $(2x^2 + 5x + 3) + (4x^2 + 7x - 3)$ .

**Solution** We use the commutative and associative properties to group similar terms together and then apply the distributive property to add.

$$(2x^2 + 5x + 3) + (4x^2 + 7x - 3)$$
$$= (2x^2 + 4x^2) + (5x + 7x) + (3 - 3)$$

Characterization and associative properties

# Multimedia Products

## 5 Kiosk Products

- A product which is usually stationed at public places and allow the user to find information interactively and also other types of transaction.
- **Characteristics of Kiosk Products:-**
  - ✓ Limited target users and usage.
  - ✓ User friendly and easily used by user.
  - ✓ Fast response.
- **Categories of Kiosk**
  - ✓ *Point Of Information*  
Provide certain information (example map, timetable etc)
  - ✓ *Point Of Sales System*  
Allow users to purchase or make orders
- **Example of Kiosk Products:-**
  - ✓ Instant Photo Booth
  - ✓ Banking Kiosk (money deposit, cheque)
  - ✓ University Information Kiosk



# Multimedia Products

## 6 Entertainment & Games

- Most popular
- Shipped in the form of Interactive CD / DVD ROM.
- Characteristics of E & G Products:-
  - ✓ Immersive.
  - ✓ Requires constant feedback and interaction with the user.
  - ✓ Challenging and sometimes intriguing for user
  - ✓ Enabled online play for more than one user experience.



# Questions

- 1- The submission of text, audio, video and graphic information in digital format.
- 2- The underlying technology to compress the information.
- 3- 3-D representation of the virtual world and the animation.
- 4- Tools for developing multimedia applications.
- 5- The use of multimedia technology to plan, describe business processes and their visualization.

# PART II

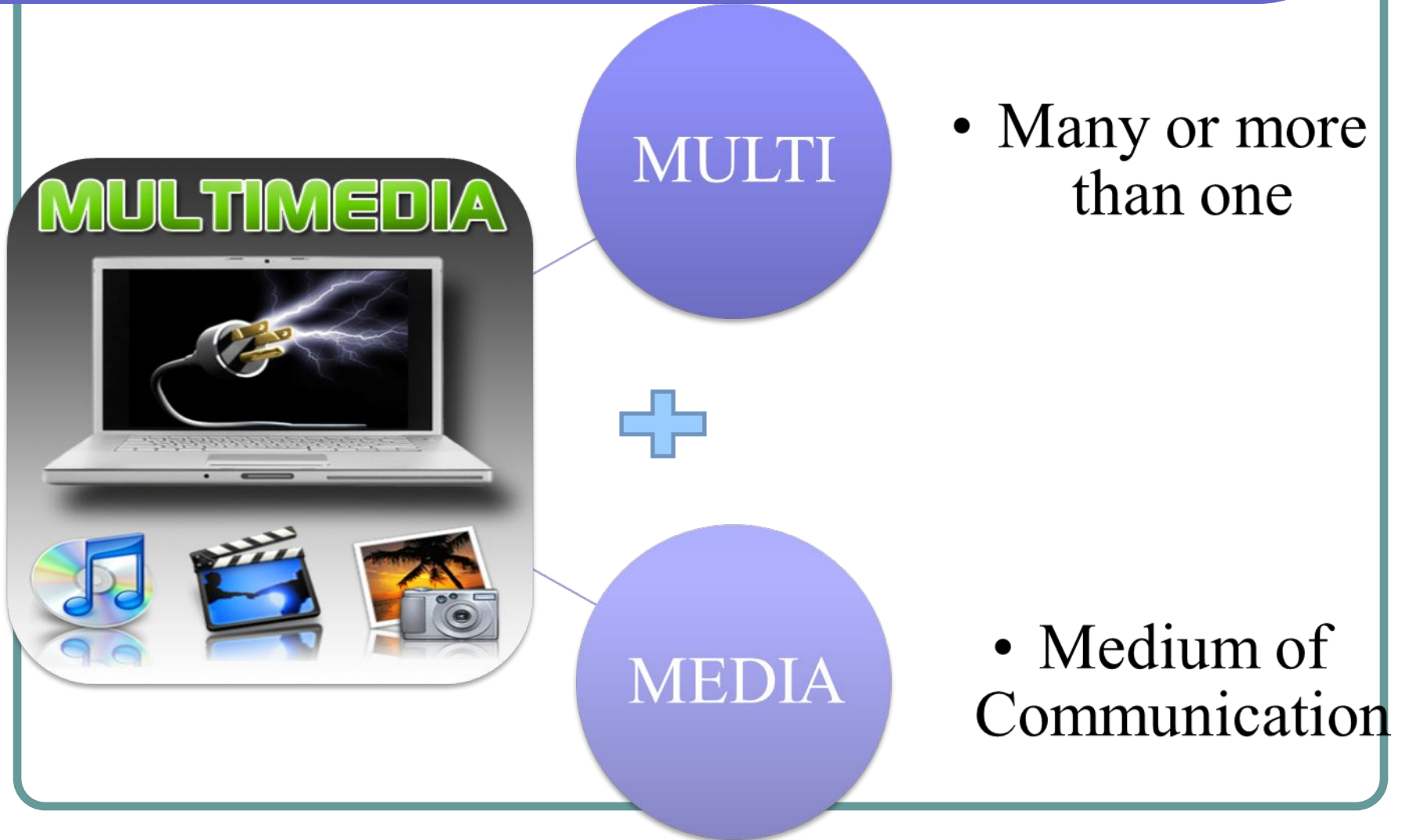




# Outline

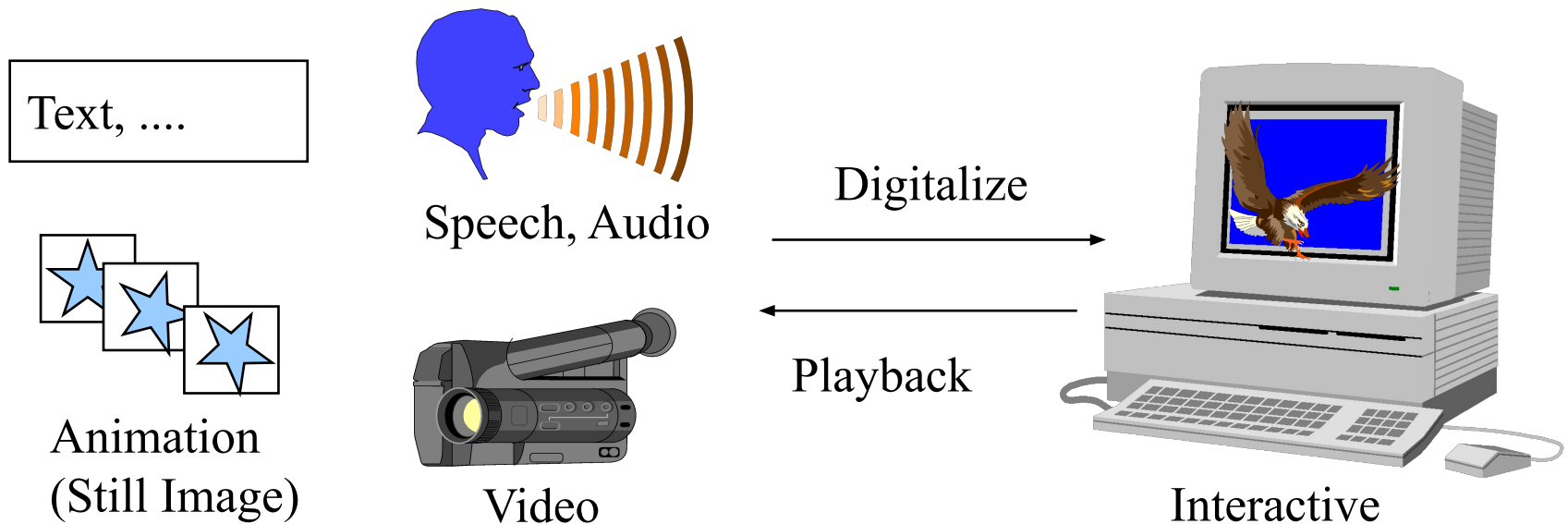
1. History of Multimedia Systems
2. Characteristics of a Multimedia System
3. Current definition of multimedia in ICT
4. Types of multimedia
5. Advantages and disadvantages
6. Multimedia products
7. Areas of use for multimedia

# WHAT IS MULTIMEDIA ?



# Introduction to Multimedia System

A multimedia system supports the integrated storage, transmission and representation of the discrete media types text, graphics and image and the continuous media types audio and video on a digital computer.



# History of Multimedia Systems

Newspaper were perhaps the first mass communication medium to employ Multimedia, they used mostly text, graphics, and images.

In 1895, Guglielmo Marconi sent his first wireless radio transmission at Pontecchio, Italy. A few years later (in 1901) he detected radio waves beamed across the Atlantic. Initially invented for telegraph, radio is now a major medium for audio broadcasting.

Television was the new media for the 20th century. It brings the video and has since changed the world of mass communications.

- ❑ **The term “MULTIMEDIA” was first used by BOB GOLDSTEIN in July 1996 to promote opening of his light works.**
- ❑ **In 1970s the term was used to describe presentations consisting of multi-projector slide shows timed to an audio track.**
- ❑ **In 1990s ‘multimedia ‘ took on its current meaning.**
- ❑ **TAY VAUGHAN declared “Multimedia as combination of text, graphic art, sound, animation, and video that is delivered by computer.**
- ❑ **In common usage, the term multimedia refers to an electronically delivered combination of media including video, still images, audio, text in such a way that can be accessed interactively.**
- ❑ **Computers marketed in 1990s were referred to as “MULTIMEDIA COMPUTERS” because they contained a CD-ROM drive.**

# MULTIMEDIA

- **Multimedia** is media and content that uses a combination of different content forms.
  
- The term is used in contrast to media which only use traditional forms of printed or hand-produced material.
  
- Multimedia includes a combination of
  - Text
  - Audio
  - Still images
  - Animation video
  - Interactivity content forms.

# Types of multimedia

## LINEAR MULTIMEDIA

Linear active content progresses without any navigational control for the viewer.

Cinema presentation is an example of linear multimedia.

## NON-LINEAR MULTIMEDIA

Non-linear content offers user interactivity to control progress as used with a computer game .

Hypermedia is an example of non-linear multimedia.

# Characteristics of a Multimedia System

A Multimedia system has four basic characteristics:

- Multimedia systems must be ***computer controlled***.
- Multimedia systems are ***integrated***.
- The information they handle must be represented ***digitally***.
- The interface to the final presentation of media is usually ***interactive***



# CURRENT DEFINITION OF MULTIMEDIA IN ICT

In the field of Information and Communication Technology, multimedia means more than the use of the various media. A computer user interacts with the computer to perform tasks such as finding information or play games to develop a skill. Thus, the meaning of multimedia has changed as technology advanced in our lives.



# HARDWARE AND EDITING SOFTWARE FOR MULTIMEDIA PRODUCTION

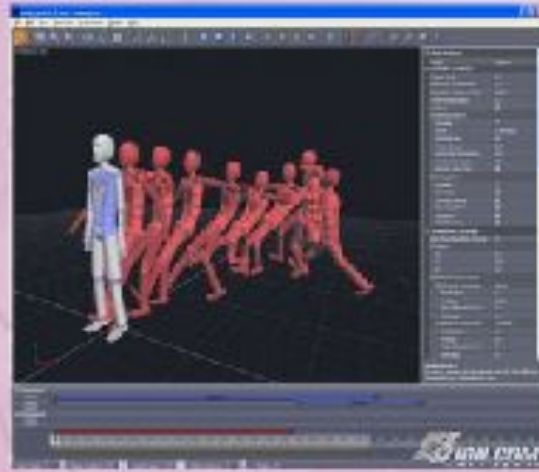
In producing a multimedia program, we need to: collect data for the 5 basic elements of multimedia: text, animation, graphics, video and audio by using hardware.



To edit the elements, we need special editing software.



**Text Editor**



**Animation Editor**



**Graphic Editor**



**Audio Editor**



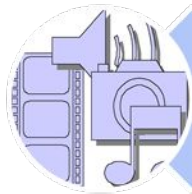
**Video Editor**

# TYPES OF MULTIMEDIA

□ Multimedia formats include



AUDIO



CAPTURE ON TAPE



FUNCTION OF PHOTOGRAPHY



SIDESHOWS

□ The following extensions commonly used to lay up multimedia documentation:

- MOV
- MP4
- 3GP
- VOB
- FLV.

□ Files with augmentation (дополнением) **MOV** are used to lay up capture on film and song in order.

□ **MP4** is fundamentally identical to MOV format and lone differs by provided that roughly added metadata.

□ MP4 put on record augmentation is supported by multiple applications with Apple iTunes, Xbox 360.

□ **MPEG** is a align of compressions methods designed for audio and visual data.

□ **3GP** on PC may perhaps be viewed VLC media player, RealPlayer, QuickTime, GOM Player and Media Player Classic.

□ File Extension **VOB** (Video Object) is commonly locate such documents in DVD-Video media.

□ File Extension **FLV** is used to deposit Macromedia Flash Player collection. It can define vector graphics, stream videocassette, audio and text.



- Text
- Audio
- Pictures
- Video
- Animation
- Interactivity



TRIPLE CHIEF'S CHAMPIONS  
TEARS EVER NEVER THE MAN  
WILDEST european  
SURRENDER ELVIS KING  
SPACE THE LOVE ONES  
DUTY KISS INNOCENCE CHILD  
WORLD design  
GROWS A of  
awards HERO  
THIS! TORY YET QUEEN DID  
WORSE LADY SEAT BACK  
THE FOG RUM! LOVE  
GREAT IN FOR 0 8

# TEXT

- Text is the most widely used and flexible means of presenting information on screen and conveying ideas.
- Text is an essential aspect of presenting the information.
- Like each element of the multimedia design, effective use of text can either direct users/readers attention or divert (отвлекать) it.



# TEXT



# AUDIO

- ❑ Audio refers to sound. Multimedia can include files which contain sounds.
- ❑ Audio songs also come under the heading multimedia.
- ❑ Multimedia presentations often have some audio tracks which makes it easier for people to understand.
- ❑ Multimedia phones have music players to run audio music.
- ❑ Various audio software include VLC media player, real player, etc.

# AUDIO



WavePad



Adobe Audition



Acoustica Digital Audio Editor



AVS Audio Editor



Sound Forge



Diamond Cut



WaveLab



GoldWave Digital Audio Editor



MAGIX Audio Cleaning Lab

# PICTURES



- ❑ Pictures(images) is a two-dimensional screen display, and as well as a three-dimensional, such as a statue or hologram.
- ❑ Graphs, pie-charts, painting etc. all come under images.
- ❑ Images are a very useful feature of multimedia. Multimedia presentation uses pictures or clip-art to make people understand.
- ❑ Various file formats of images are .jpg, .png, .gif etc.



# PICTURES



AUTODESK<sup>®</sup>  
PIXLR<sup>®</sup>



AFFINITY  
PHOTO



AFFINITY  
PHOTO



# VIDEO

- A video is unedited material as it had been originally filmed by movie camera or recorded by a video camera.
- The embedding of video in multimedia applications is a powerful way to convey information which can incorporate a personal element which other media lack (отсутств.)
- Video improves, dramatizes, and gives impact to your multimedia application.
- The advantage of integrating video into a multimedia presentation is the capacity to effectively convey a great deal of information in the least amount of time.

# VIDEO



Vegas Pro



pinnacle



SONY  
Movie Studio  
PLATINUM

SONY



Adobe  
Premiere Pro



AVS Video Editor

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# ANIMATION



- ❑ **Animation** is the rapid display of a sequence of images of 2-D or 3-D artwork or model positions in order to create an illusion of movement.
- ❑ The effect is an optical illusion of motion due to the phenomenon of persistence (стойкость) of vision.
- ❑ Animation adds visual impact to the multimedia project.
- ❑ Animation are used in cartoons, scientific





# ANIMATION



FlipBook



The TAB



CrazyTalk Animator



NewTek



SideFX



Maxon



3DS MAX



MAYA



The Foundry



Autodesk



MUDBOX



Toon Boom



Anime Studio



DrawPlus



MotionArtist



Stopmotion Studio



Animation Workshop

# INTERACTIVITY



- ❑ Interactivity can be termed as the dialog that occurs between an individual and a computer program.
- ❑ Interactive multimedia refers to the multimedia applications that allow users to actively participate rather than being passive recipients of information.
- ❑ Technologies such as DVDs and digital TV are classic examples of interactive media devices, where a user can control what they watch and when.
- ❑ Interactivity also relates to new media art technologies where humans and animals are able to interact with and change the course of an artwork

# MULTIMEDIA TODAY

- ❑ Multimedia and its related applications have almost become synonymous with modern technology; given the kind of explosion the technological realm has seen.
- ❑ Multimedia makes our life easier several times fold. It is through multimedia that mobile phones can be used for a number of purposes.
- ❑ With the introduction of newer generation of mobile phones and more advanced communication protocols, the number of multimedia uses that your phone can be put to keeps growing.
- ❑ Video conferencing which enables people across global borders to communicate with each other in real time is an excellent example of how multimedia has benefited the world of communications and telephony.

# SCOPE OF MULTIMEDIA

- ❑ The technology of multimedia design utilizes various features like animation, video, graphics, audio and sound to impress the users.
- ❑ Multimedia technology is used for 3D cinema applications and mobile 3DTV environments.
- ❑ Animation is also being used in titling films, creating special effects or in web entertainment programs. Thus scope of animation is huge in context to market.
- ❑ In the field of education multimedia is being used extensively especially for online courses and trainings.
- ❑ Multimedia is also used in advertising (рекл.) purposes.

# ADVANTAGES

- ❑ Multimedia enhances the effect of text presentations.
- ❑ Improves the quality of presentation and retains the attention of audience.
- ❑ It can be used for educational as well as entertainment purpose.
- ❑ It is quick and easier to operate for the instructor.
- ❑ Multimedia presentations can be modified very easily.
- ❑ Multimedia is Entertaining as Well as Educational.

# DISADVANTAGES:

- Non-interactive – if one-way, no feedback.
- Complex to create.
- Time consuming.
- Use of multimedia is expensive



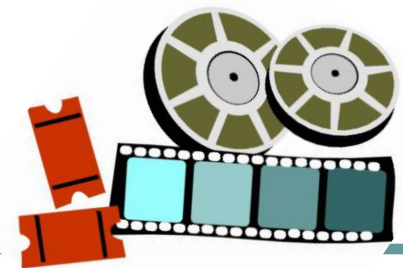
## □ COMMERCIAL

- Much of the electronic old and new media used by commercial artists is multimedia.
- Exciting (захватывающ.) presentations are used to grab and keep attention in advertising.



## □ ENTERTAINMENT AND FINE ARTS

- Multimedia is heavily used in the entertainment industry, especially to develop special effects in movies and animations.
- Multimedia games are also very popular.



## □ EDUCATION

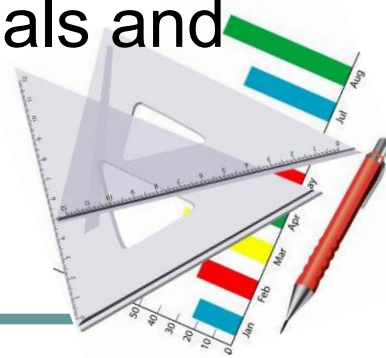
- Multimedia is used to produce computer-based training courses.

- Edutainment is an informal term used to describe combining education with entertainment, especially multimedia entertainment.

## □ ENGINEERING

- Software engineers may use multimedia in Computer Simulations.

- Multimedia for software interfaces are often done as a collaboration between creative professionals and software engineers.





- Design could profit tremendously (чрезвычай.) from open and collaborative multimedia research.
- Multimedia and graphics can be a very effective tool to communicate, educate, compel (принуждение) , and convince (убеждение) you and/or your audience.
- Multimedia can help to gain (привлеч.) and hold (удержание) attention, make points clearer, stimulate discussion, and in general, enhance (increase) the learning process, if it also includes the appropriate (соответств.) human elements.

# Components of a Multimedia System

## ***Capture devices***

Video Camera, Video Recorder, Audio Microphone, Keyboards, mice, graphics tablets, 3D input devices, tactile sensors, VR devices.  
Digitising/Sampling Hardware

## ***Storage Devices***

Hard disks, CD-ROMs, Jaz/Zip drives, DVD, *etc*

## ***Communication Networks***

Ethernet, Token Ring, FDDI, ATM, Intranets, Internets.

## ***Computer Systems***

Multimedia Desktop machines, Workstations, MPEG/VIDEO/DSP  
Hardware

## ***Display Devices***

CD-quality speakers, HDTV, SVGA, Hi-Resolution monitors, Color  
printers *etc.*

# Multimedia products

## Features of Multimedia products

Combination in one product text, graphic, audio, video, animation

The presence of interactive mode of operation

The ability to quickly find information

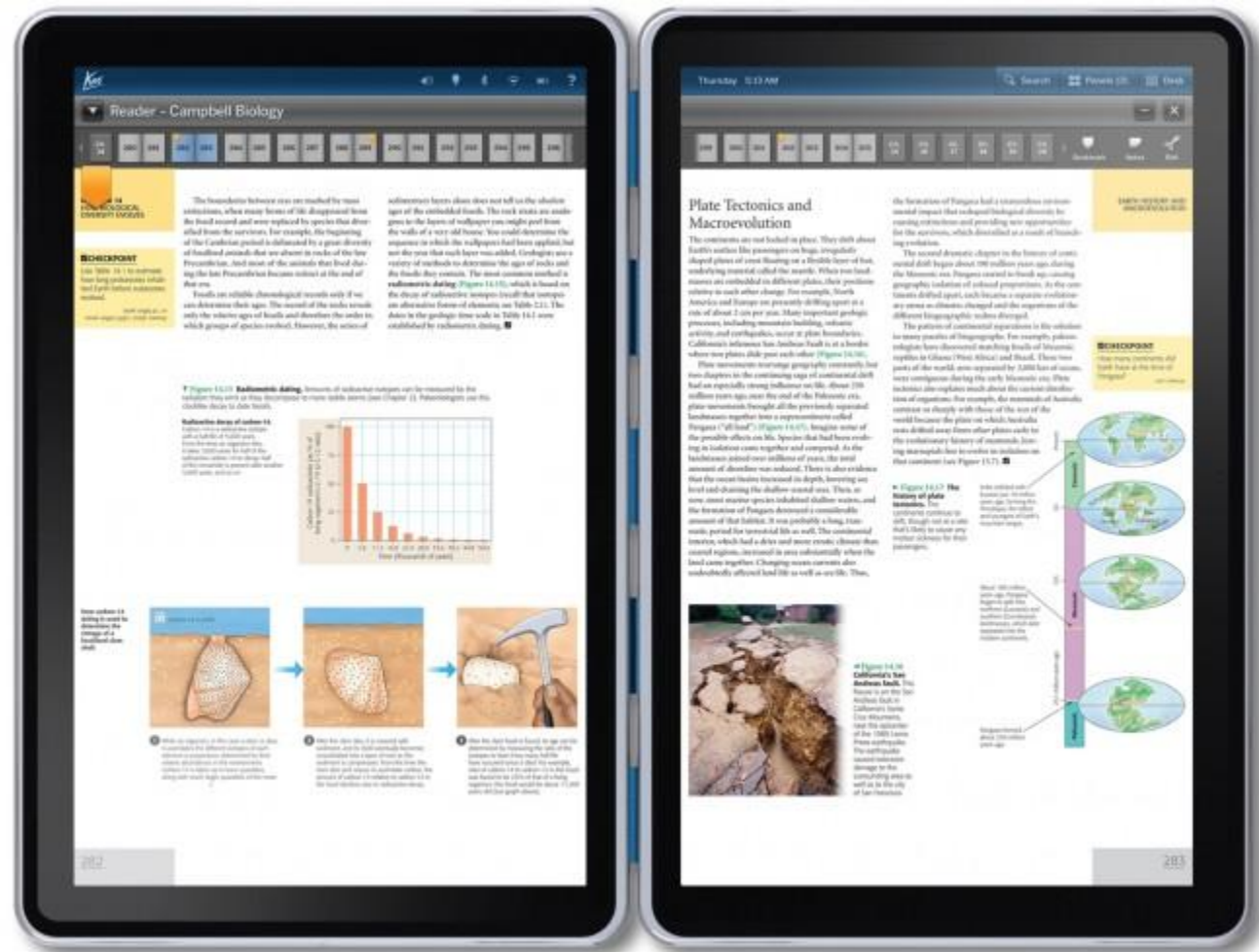
Extensive navigation options

Ability to work in real time, at a slowed or accelerated pace

Friendly User Interface

# Areas of use for multimedia

Educa  
tion



Electronic textbook

# Areas of use for multimedia

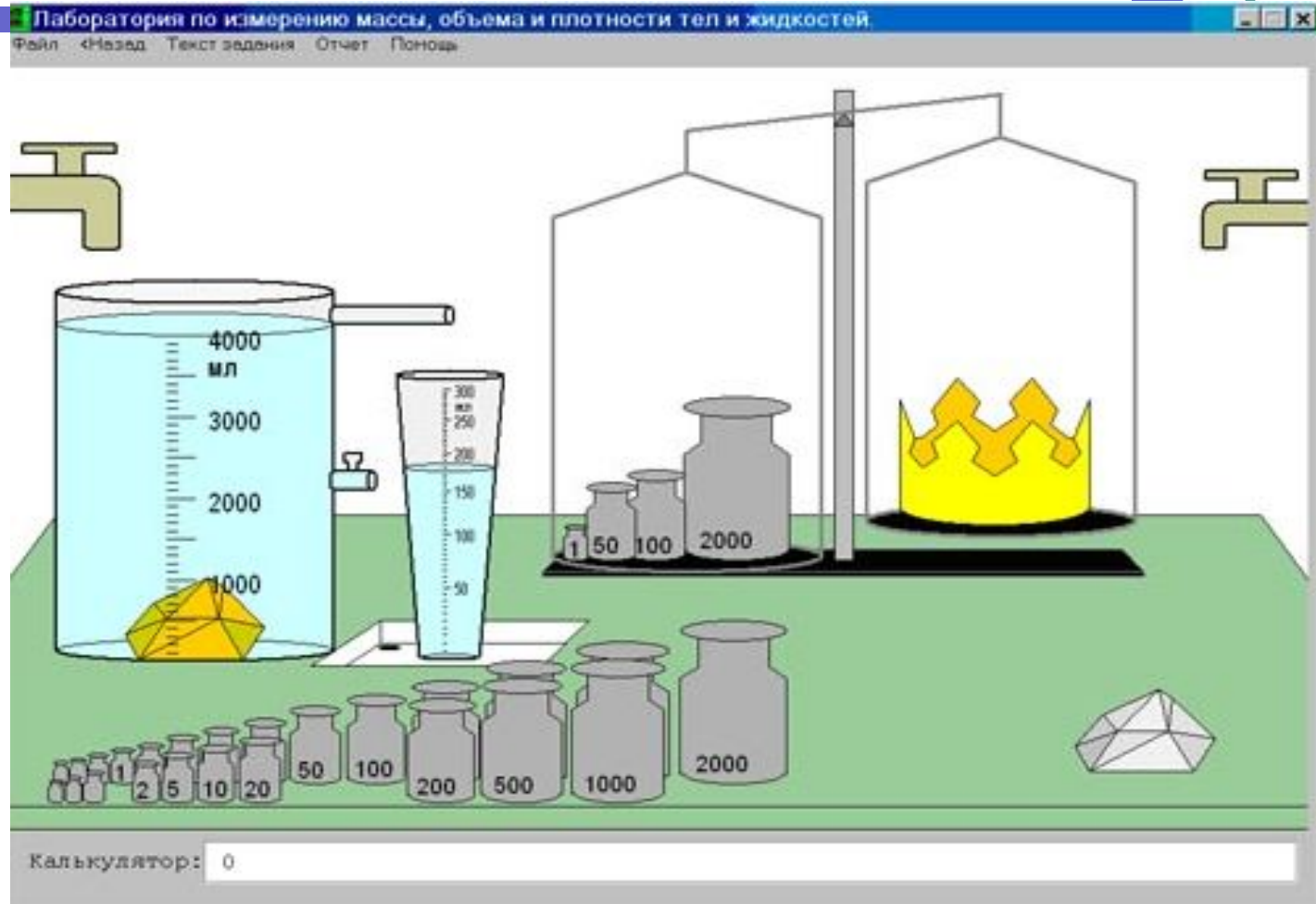
Education



Multimedia directory

# Areas of use for multimedia

Education



Virtual laboratory

# Areas of use for multimedia

Education



Multimedia encyclopedia

# Areas of use for multimedia

Science and  
Technology

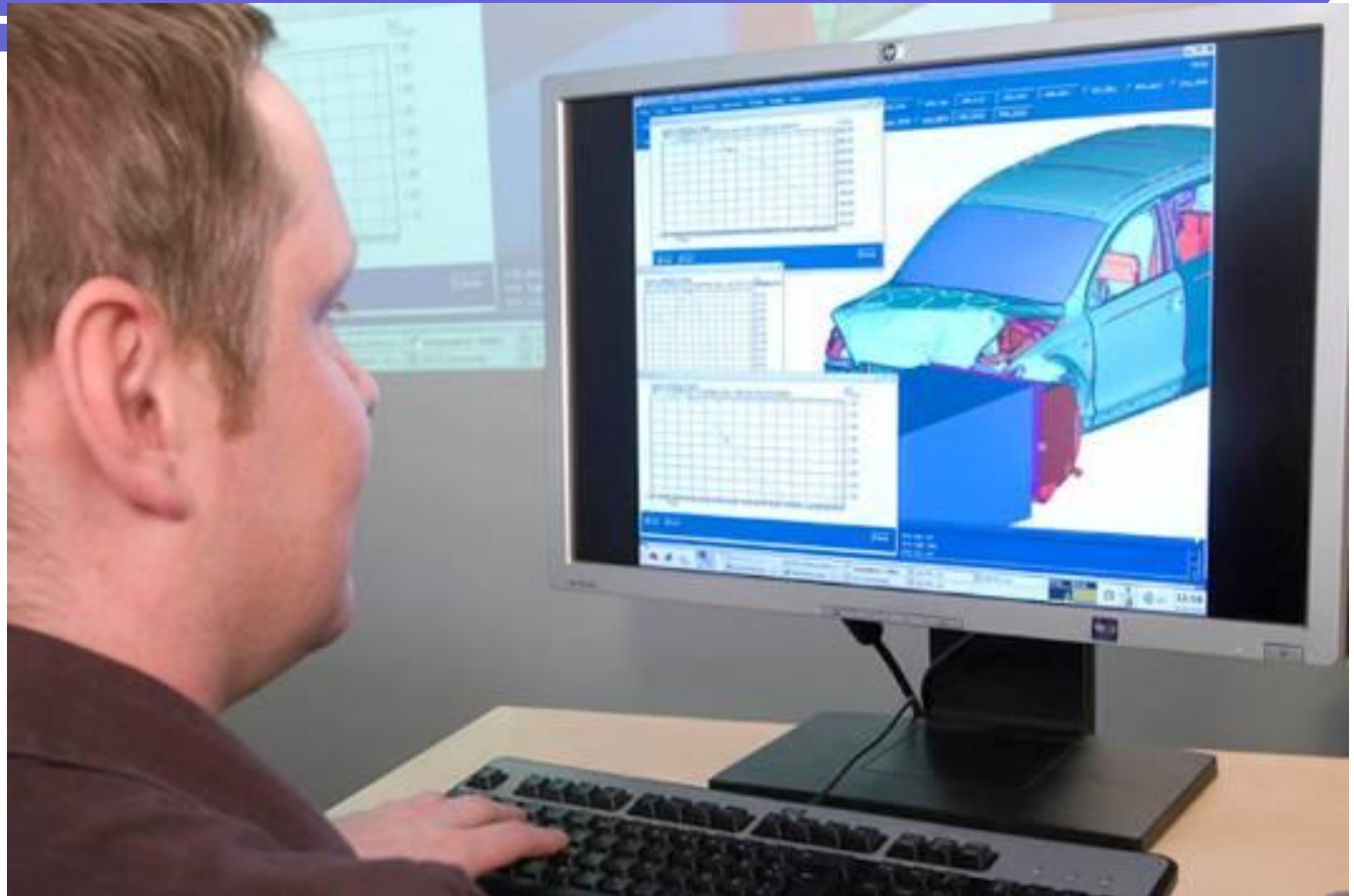


Expert medical systems



# Areas of use for multimedia

Science  
and  
Techno  
logy



Computer Simulation System

# Areas of use for multimedia

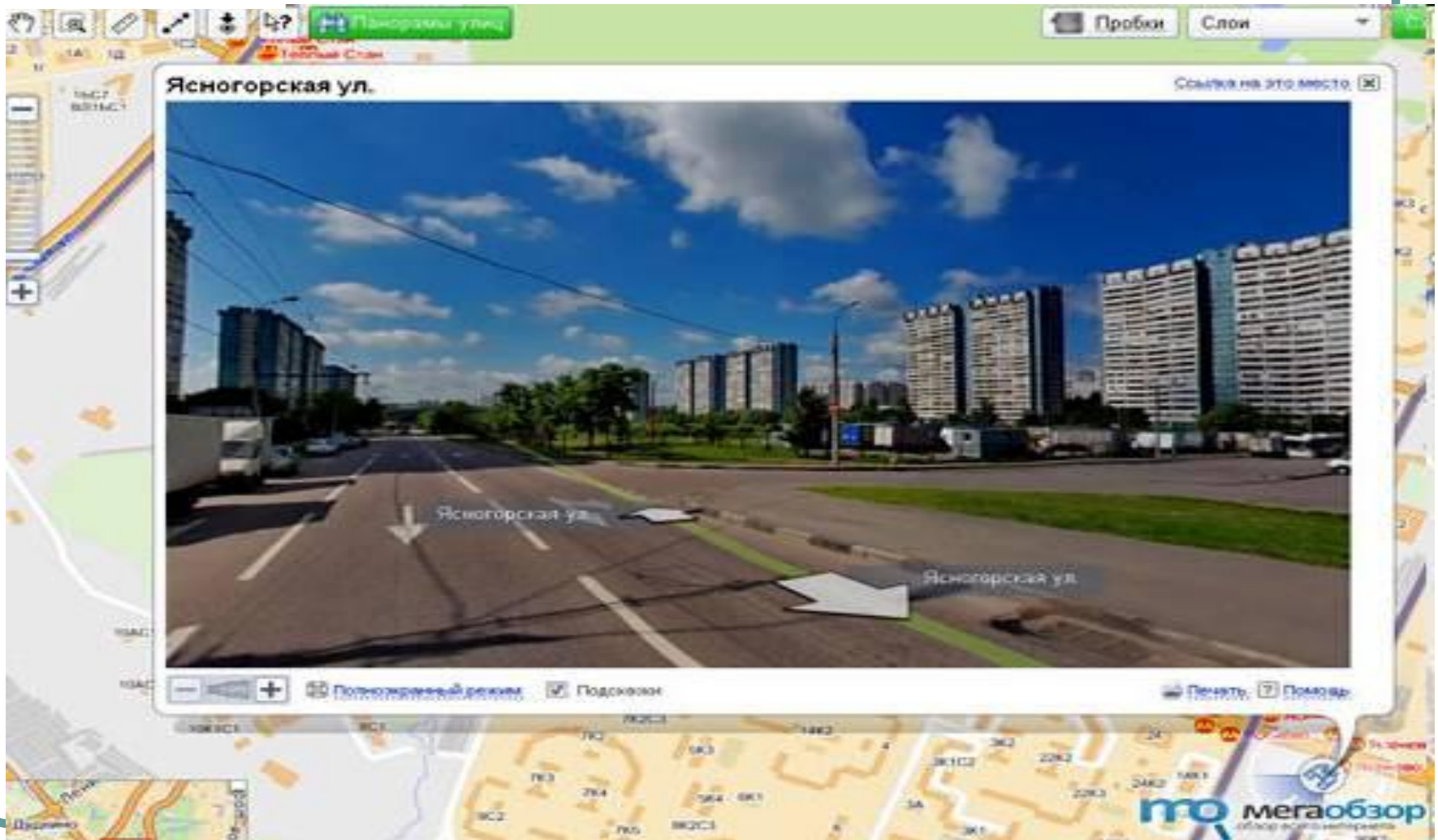
## Tourism



Virtual tours around the world (New York)

# Areas of use for multimedia

Tourism



Computer guide

# Areas of use for multimedia

Computer games



# Questions:

1. List the main components of media.
2. Give an example of a nonlinear and comment on multimedia.
3. Describe the advantages and disadvantages of vector graphics.
4. For what purpose uses interlaced scanning and why Currently?
5. What is the nature of the structural approach to design IP?



THANK YOU  
FOR YOUR ATTENTION!

