SCHOOL OF COMPUTING & IT

DEPARTMENT OF COMPUTER SCIENCE, INFORMATION TECHNOLOGY, AND BUSINESS INFORMATION TECHNOLOGY

MODULE:
MULTIMEDIA & COMPUTER GRAPHICS

From Saturday: 05th April 2025 - To : Sunday 27th April 2025

By MWESIGE THIERRY, MScIT

CAT DATE: 20th April 2025 & Exam Date: 27th April 2025

“CHAP I: INTRODUCTION TO MULTIMEDIA”

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By MWESIGE THIERRY

1.1 What is Multimedia System?

If asked to define the term "digital media," most people would probably think of the creation of digital images, music, and videos. However, digital media is not only about production.

When different people mention the term multimedia, they often have quite different, or even opposing, viewpoints.

- A computer vendor: a PC that has sound capability, a DVD-ROM drive, and perhaps the superiority of multimedia-enabled microprocessors that understand additional multimedia instructions.
- A consumer entertainment vendor: interactive TV cable with hundreds of digital channels available, or a TV cable like service delivered over a high-speed internet connection.
- A computer Science (CS) student: applications that use multiple modalities, including text, images, drawings (graphics), animation, video, sound including speech, and interactivity.

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1.2 Components of Multimedia

- Multimedia involves multiple modalities of text, audio, images, drawings, animation, and video.
- Examples of how these modalities are put to use:
  - Video teleconferencing Live exchange of information among several persons .
  - Distributed lectures for higher education.
  - Tele-medicine.
  - Searching in (very) large video and image database for target visual objects.
  - Augmented reality: placing real-appearing computer graphics and video objects into scenes.

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1.2 Components of Multimedia

- Building searchable features into new video, and enabling very high- to very low-bit-rate use of new, scalable multimedia products
- Making multimedia components editable
- Building "Inverse-Hollywood" applications that can recreate the process by which a video was made
- Using voice-recognition to build an interactive environment, say a kitchen-wall web browser.

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1.3 History of Multimedia

The term "multimedia" was first used in 1965 to describe a performance that combined music, lights, cinema, and performance art.

- ✓ **Newspaper:** perhaps the first mass communication medium, used text, graphics, and images.
- ✓ **Motion pictures:** a series of still images which, when shown on a screen, creates the illusion of moving images
- ✓ **Wireless radio transmission :**
- ✓ **Television:** the new medium for the 20th century, established video as a commonly available medium and has since changed the world of mass communications.

Multimedia is a fairly new field, and its growth should continue to keep pace with new technologies. Multimedia designers perform an essential task when they merge different types of media for presentation to the public.

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1.4 World Wide Web

- **Goals for the WWW.**
  - Universal access of web resources (by everyone everywhere)
  - Effectiveness of navigating available information
  - Responsible use of posted material

- **History of the WWW.**
  - 1960s – Charles Goldfarb et al. developed the Generalized Markup Language (GML) for IBM
  - 1986 – The ISO released a final version of the Standard Generalized Markup Language (SGML)
  - 1990 – Tim Berners-Lee invented the HyperText Markup Language (HTML), and the HyperText Transfer Protocol (HTTP).
  - 1993 - NCSA (National Center for Supercomputing Applications) released an alpha version of **Mosaic** based on the version by Marc Andreessen for X-Windows – the first popular browser

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HTTP (HyperText Transfer Protocol)

- HTTP is a protocol that was originally designed for transmitting hypermedia, but can also support the transmission of any file type.
- Is a stateless request/response protocol: no information carried over for the next request
- The URI (Uniform Resource Identifier): an identifier for the resource accessed, e.g. the host name, always preceded by the token http://.
- Two commonly seen **status codes:**
  - **200 Ok –** the request was processed successfully
  - **404 Not Found** – the URI does not exist

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HTML (HyperText Markup Language)

- Is a language for publishing Hypermedia on the World Wide Web – defined using SGML:
  - HTML uses ASCII, it is portable to all different computer hardware
  - The current version of HTML is version 5.01
  - The next generation of HTML is XHTML – a reformulation of HTML using XML

- HTML uses **tags** to describe document elements
  - <token params> - defining a starting point,
  - </token> - ending point of the element
  - Some elements have no ending tags

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- A very simple HTML page is as follows:

```
<html>
  <head><title>
   A sample web page
   </title>
   <meta name =“Author” content=“Cranky Professor”>
   </head> <body>
      <p> We can put any text we like here, since this is
        a paragraph element.
      </p>
   </body>
</html>
```

Naturally, HTML has more complex structures and can be mixed in with other standards

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- **XML (Extensible Markup Language)**
- X ML: a markup language for the WWW in which there is modularity of data, structure and view so that user or application can be able to define the tags (structure).

- Example of using XML to retrieve stock information from a database according to a user query.
  1. First use a global Document Type Definition (DTD) that is already defined
  2. The server side script will abide by the DTD rules to generate an XML document according to the query using data from your database
  3. Finally send user the XML Style Sheet (XSL) depending on the type of device used to display the information

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- **Difference between HTML and XML**

	HTML	XML
Definition	Markup language for displaying web pages in a web browser. Designed to display data with focus on how the data looks.	Markup language defines a set of rules for encoding documents that can be read by both humans and machines. Designed with focus on storing and transporting data
Date when invented	1990	1996
Extended from	SGML	SGML
Type	Static	Dynamic
Usage	Display a web page	Transport data between the application and the database. To develop other mark up languages

Difference between HTML and XML (cont.)

	HTML	XML
Processing/ Rules	No strict rules. Browser will still generate data to the best of its ability	Strict rules must be followed or processor will terminate processing the file
Language type	Presentation	Neither presentation, nor programming
Tags	Predefined	Custom tags can be created by the author

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SMIL (Synchronized Multimedia Integration language)

- Standard markup language for timing and controlling media clips.
- It is also desirable to be able to publish multimedia presentations using a markup language
- A multimedia markup language needs to enable scheduling and synchronization of different multimedia elements, and define their interactivity with the user
- The W3C established a Working Group in 1997 to come up with specifications for a multimedia synchronization language .
  - SMIL 2.0 was accepted in August 2001

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- SMIL 2.0 is specified in XML using a modularization approach similar to the one used in xhtml:
  1. All SMIL elements are divided into modules – sets of XML elements, attributes and values that define one conceptual functionality
  2. In the interest of modularization, not all available modules need to be included for all applications
  3. Language Profiles: specifies a particular grouping of modules, and particular modules may be integration requirements that a profile must follow
  3. SMIL can be embedded in any media player.

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1.5 Overview of Multimedia Software Tools

- The categories of software tools briefly examined here are:
- Music sequencing and Notation,
- Digital Audio,
- Graphics and Image Editing (Adobe Illustrator, Adobe Photoshop, Macromedia Fireworks, Macromedia Freehand, etc)
- Video Editing,
- Animation (Java3D, DirectX, OpenGL, Softimage XSI, 3D Studio Max, etc)
- Multimedia Authoring (Macromedia Flash, Macromedia Director, flash player)

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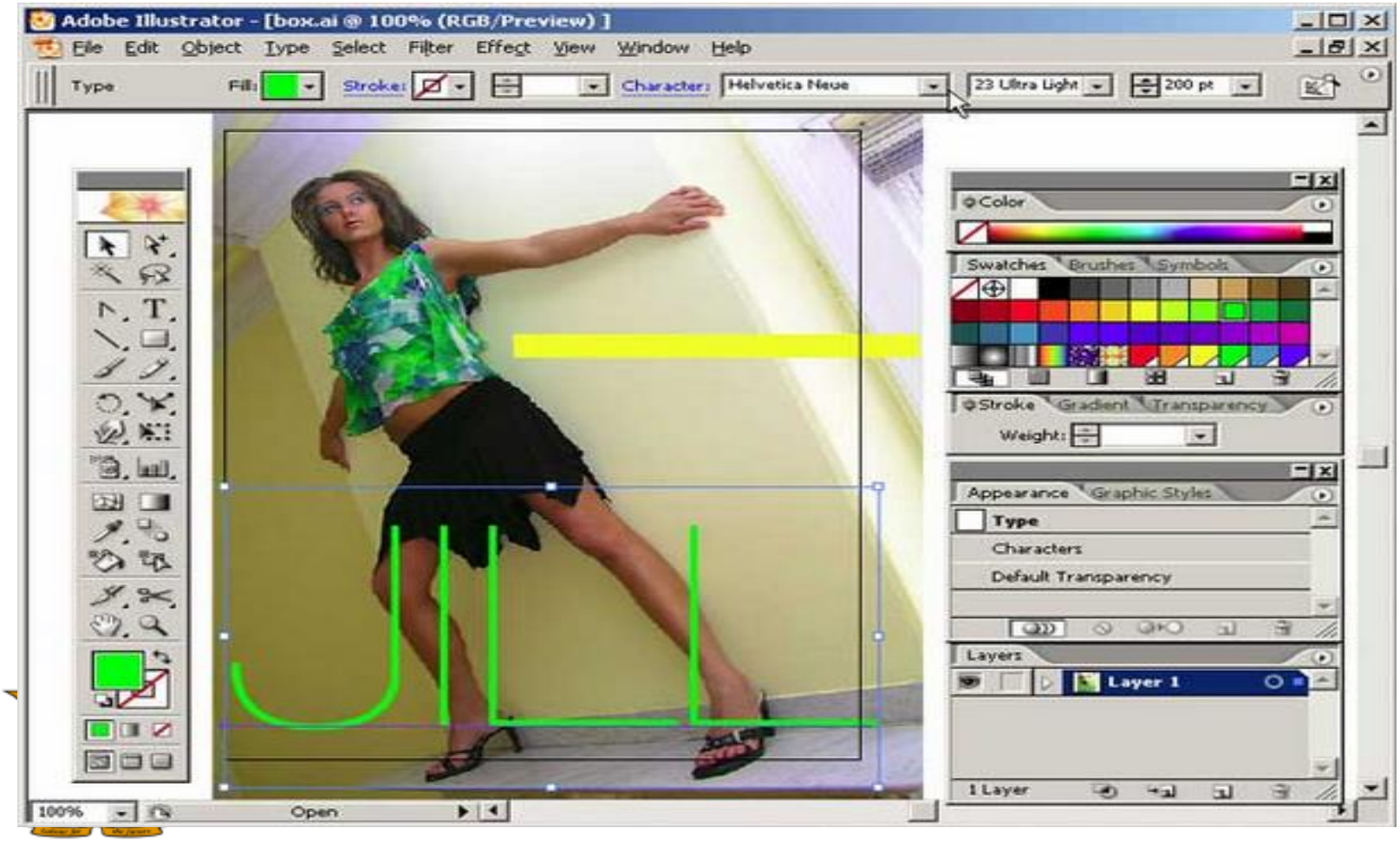
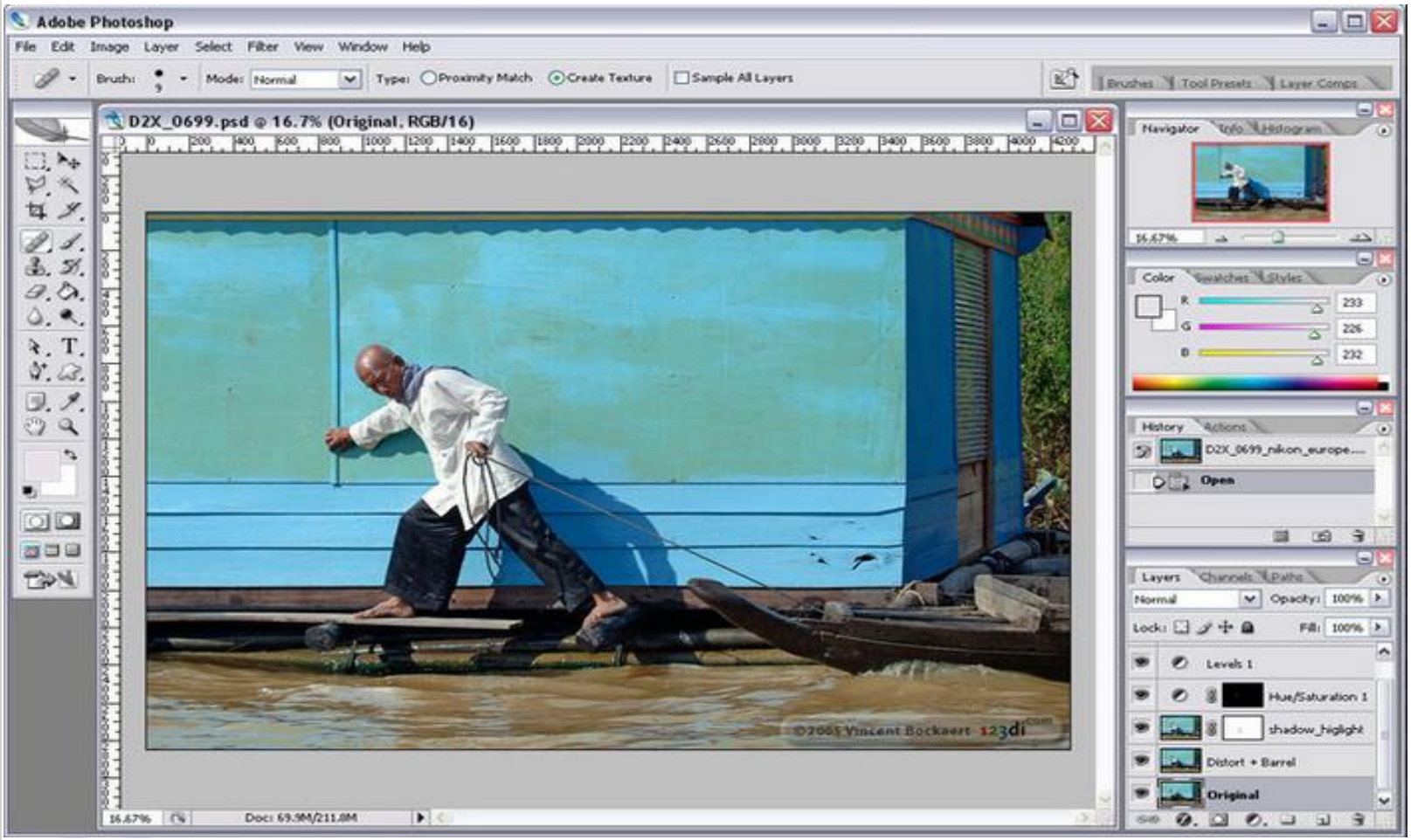
1.5.1 Graphics and Image Editing

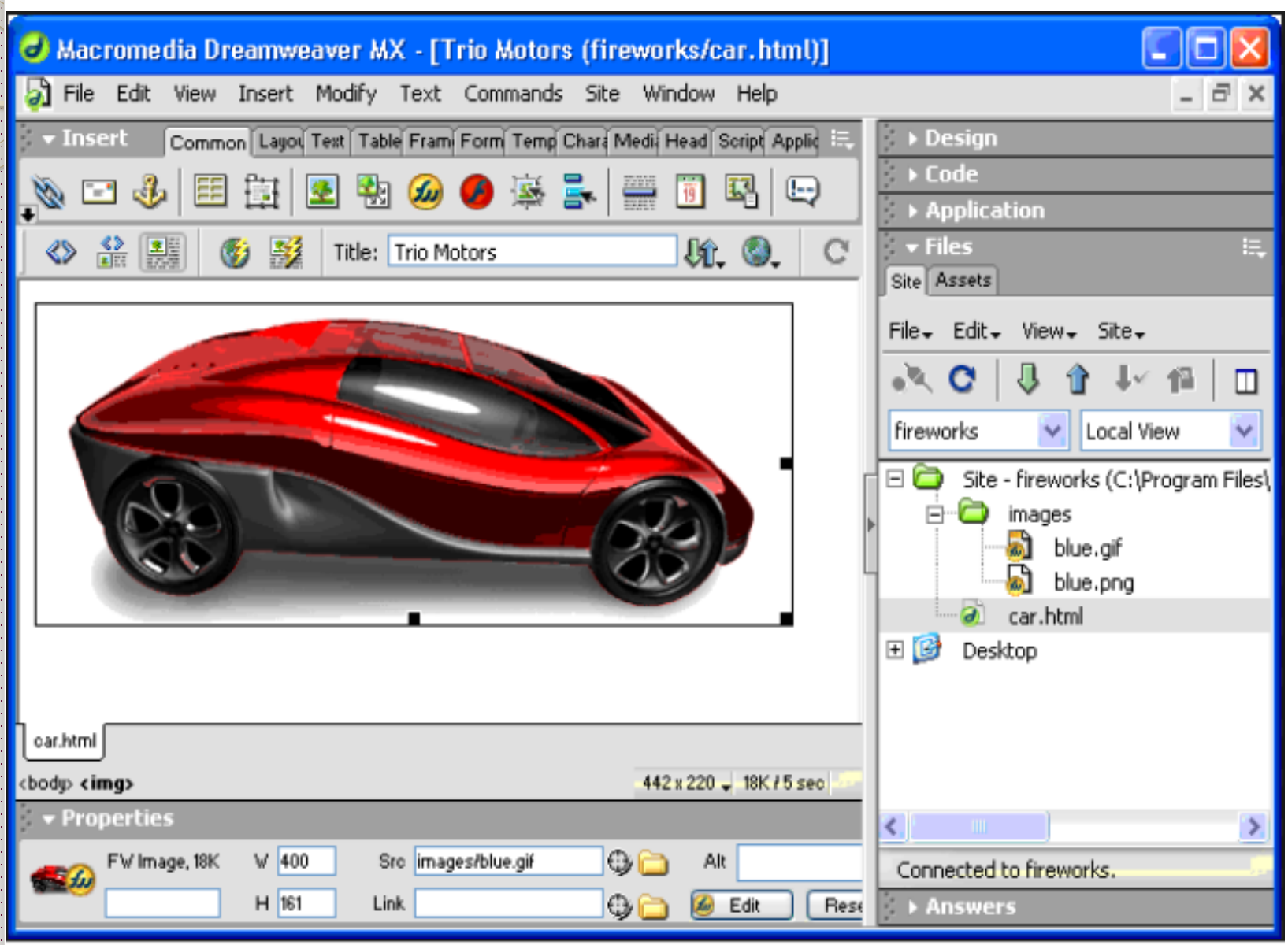
- **Adobe Illustrator**: a powerful publishing tool from Adobe. Uses vector graphics; graphics can be exported to Web.



- **Adobe Photoshop**:
- standard in a graphics, image processing and manipulation.
  - 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

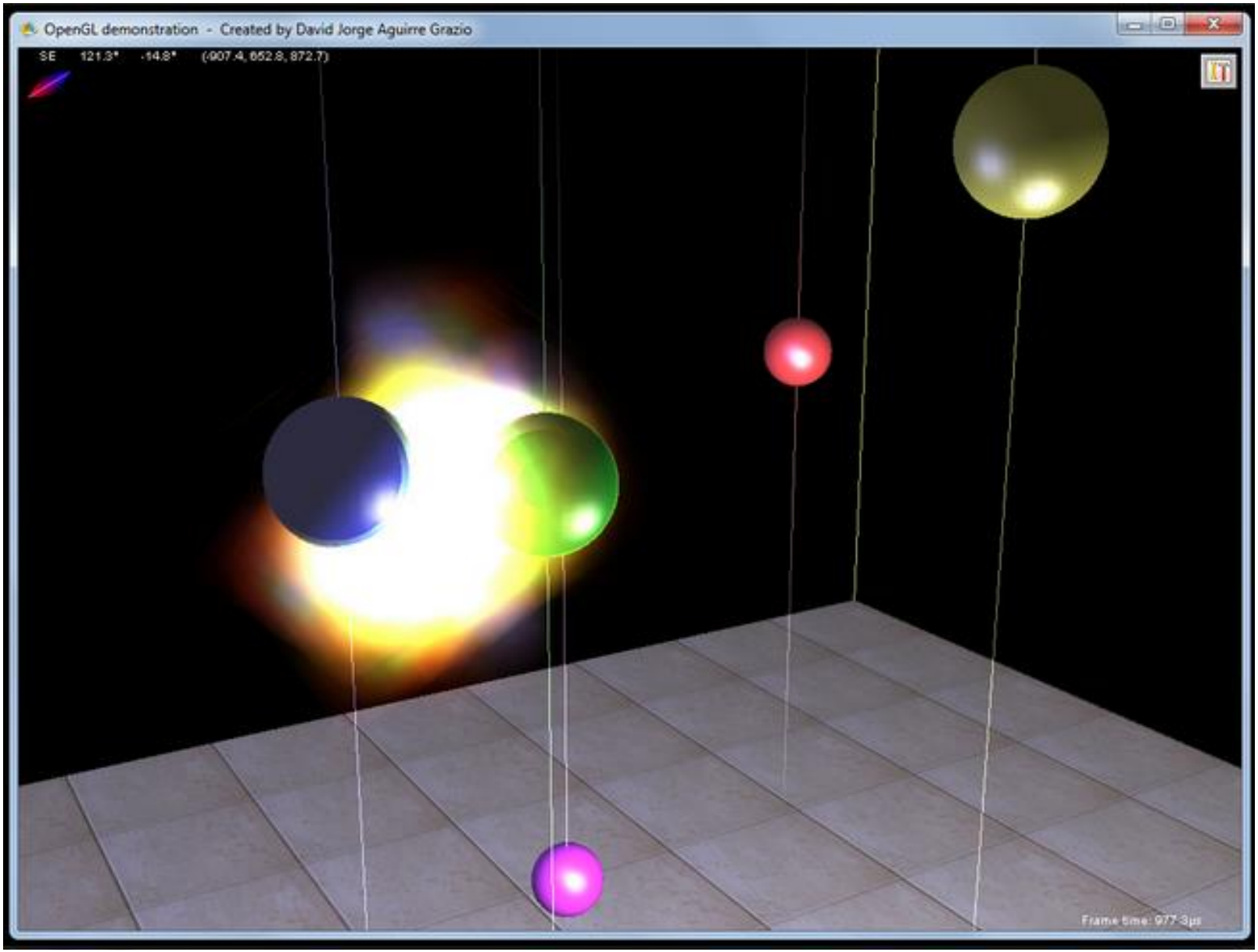


- **Macromedia Freehand**: a text and web graphics editing tool that supports many bitmap formats such a GIF, PNG, and JPEG

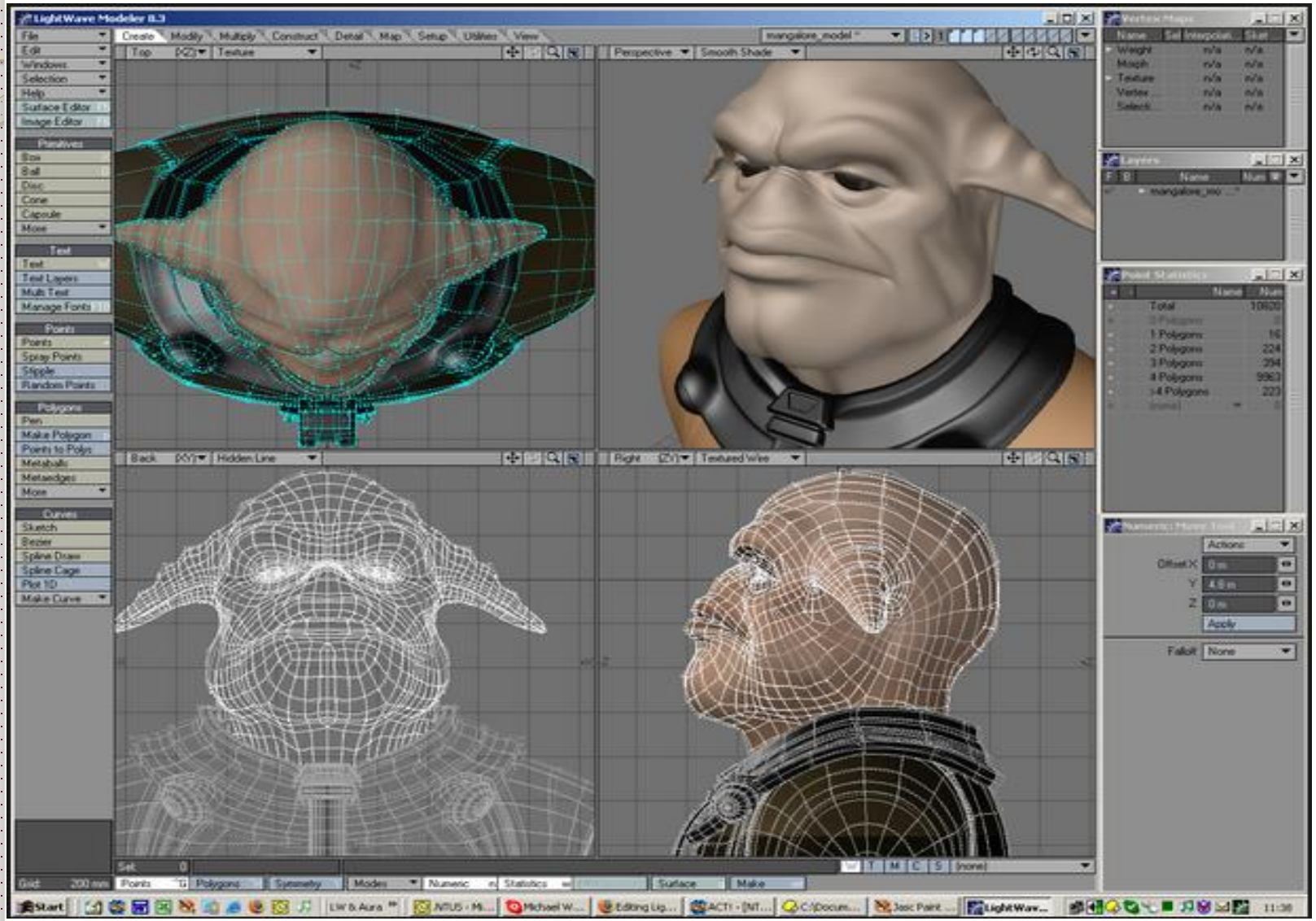
- **Java3D:** API used by Java to construct and render 3D graphics, similar to the way in which the Java Media Framework is used for handling media files
  - Provides a basic set of object primitives (cube, splines, etc) for building scenes
  - It is an abstraction layer built on top of OpenGL or DirectX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

- **DirectX**: Windows API (Application Programming
- Interface) that supports video, images, audio
- and 3-D animation

- **OpenGL**: the highly portable, most popular 3-D API



- **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.

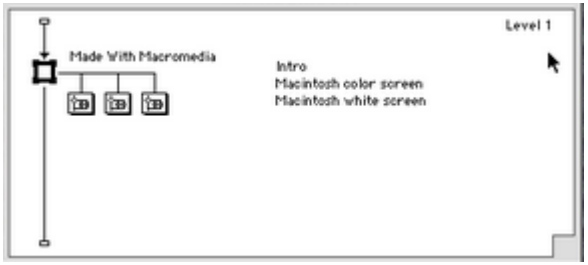
- **Maya**: competing product to Softimage; as well, it is a complete modeling package

- **RenderMan**: rendering package created by Pixar

- **GIF Animation Package**: a simpler approach to animation, allows very quick development of effective small animations for the web

1.4.4 Multimedia Authoring

- **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 – very powerful and includes a built-in scripting language, **Lingo,** that allows creation of complex interactive movies .
- **Authorware**: a mature, well-supported authoring product based on the **Iconic/Flow-control** metaphor
- **Quest:** similar to Authorware in many ways, used a type of flowcharting metaphor. However, the flowchart nodes can encapsulate information in a more abstract way (called frames) than simply subroutine levels



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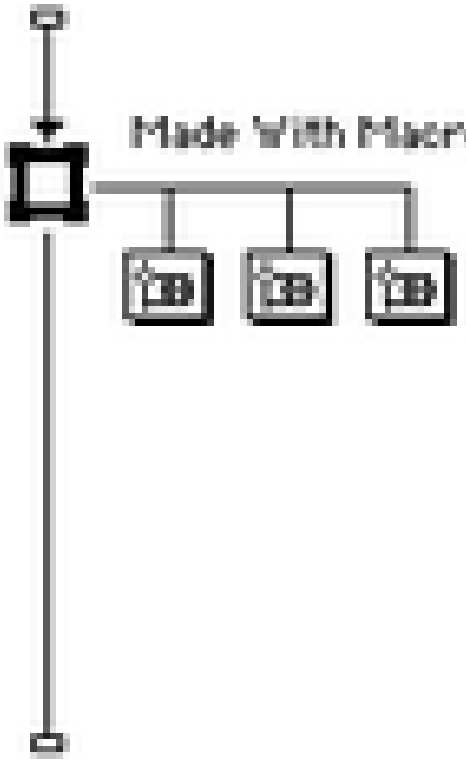

Level 1

Intro
Macintosh color screen
Macintosh white screen

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Assignment#1
[Individual]

Identify three novel applications of the Internet or multimedia applications.
And discuss why Adobe Photoshop is commonly used today as the photo editing software…

Submit, by Saturday On 12th April 2025

(Hard Copies)