Maharaja Agrasen Institute of Technology
ETCS 211
Computer Graphics & Multimedia
UNIT 3

Multimedia Software

Objective

- Multimedia Software
- Familiar Tools
- Authoring Tools
- Types of Authoring Tools
- Authoring Capabilities
- Features of Authoring Tools
- Multimedia Hardware Peripherals
- Q & A

Multimedia Software

- Familiar Tools
- Multimedia Authoring Tools
- Elemental Tools

Familiar Tools

Word Processors
- _ Microsoft Word
- _ WordPerfect

Spreadsheets
- _ Excel

Databases

Presentation Tools
- _ PowerPoint

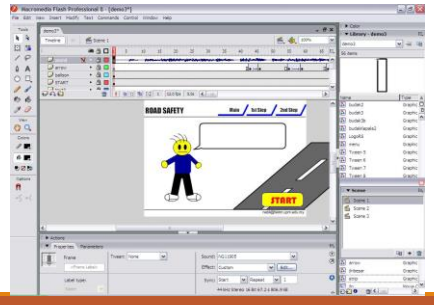
Authoring Tools

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).

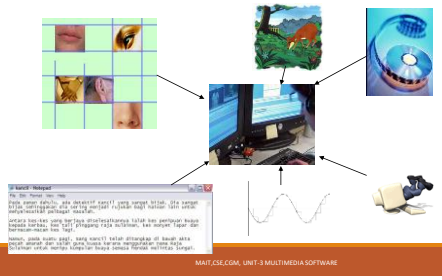
Example:
- Macromedia Authorware
- Macromedia Director
- Macromedia Flash
- Microsoft Power Point

Authoring Tools



What is an Authoring Tools

The tools by which various media components are brought together (integrated) into a structure and flow.



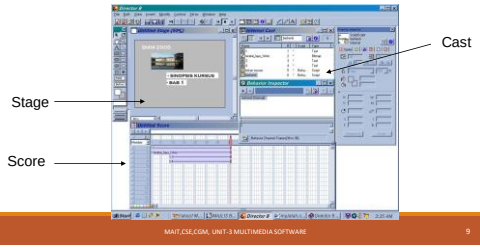
Authoring Metaphors

Most media integration tools will take or use one of the following metaphors:

a) Movie screen metaphor
b) Slide show metaphor
c) Linked screens

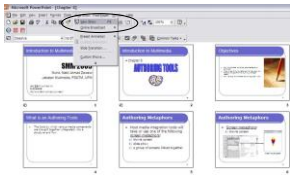
Authoring Metaphors

a) Movie screen metaphor
- Movie refers to the product of the authoring:
  - Linear/Interactive movie
- Also refers to authoring tools paradigm that contains Cast/Score/Scripting
- Example: Macromedia Director



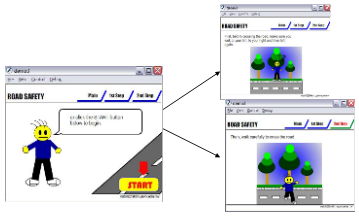
Authoring Metaphors

b) Slide show metaphor
- A linear presentation
- Example: Powerpoint



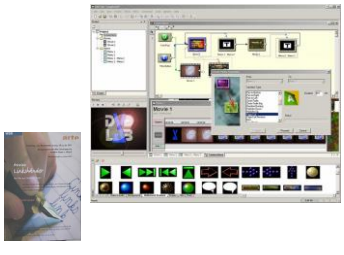
Authoring Metaphors

c) Linked Screens
- A group of scene linked together



Types of Authoring Tools

1. Card based
2. Icon based
3. Time based
4. Object based



1. Card Based

Cards are developed that have different elements associated with them.

Cards are put in stack.

Cards or pages combine to make up a book.

- example of authoring tools
  - HyperCard (Mac)
  - ToolBook (Mac / Windows)

2. Icon Based

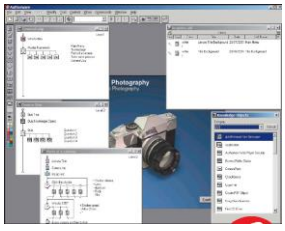
Icons are gathered along the line.

Provide visual development.

Flow chart is created to show the organisation of icons or elements:

- including activity list, results and done with dragging the icon/elements along the lines
- each Icon represents a particular event – button, graphics, text, video
- examples of authoring tools
  - Authorware(Mac/Windows)
  - IconAuthor (Windows)

2. Icon Based



3. Time Based

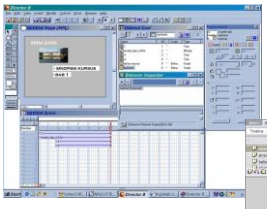
The most popular used.

Using "*timeline*" for organizing activities

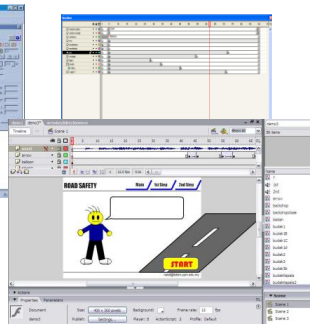
Also using "*framing*" – timely adjusted depending on the frame size

Example:- Macromedia Director / Flash (Mac/Windows)

3. Time Based



Macromedia Director



Macromedia Flash

4. Object Based

Support *environment* based on object.

Every object is modified using ***properties*** & ***modifiers***

The environment is based on 'Hierarchy' (section and sub-section).

Examples of the tools :

- mTropolis (Mac/Windows)
- AppleMedia Tool (Mac/Windows)
- MediaForge (Windows)

4. Object Based

Authoring Capabilities

Authoring tools should possess the following capabilities:

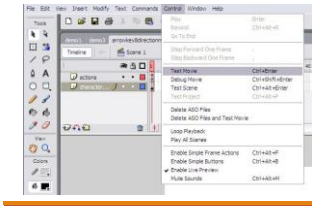
1. Interactivity
2. Playback
3. Editing
4. Programming / Scripting
5. Cross Platform
6. Internet Playability

Authoring Capabilities

1. Interactivity
   - *Simple Branching*
     - *Ability to jump to any part of the pro*
     - *Eg:-* by mouse click, keyboard input
   - *Conditional Branching*
     - *Ability to jump to any part of products if agreed to certain condition (statement IF-THEN)*
   - *Structured Language*
     - complex programming to enable the interactivity and navigation

Authoring Capabilities

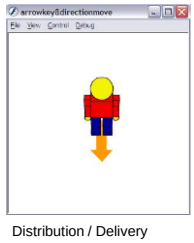
2. Playback
   - Ability to see and to test the ongoing or the completed project.



Playback (timeline / movie tester)

3. **Distribution / Delivery**

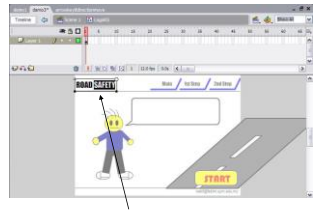
- Able to create a 'RUN TIME' mode.
- This will exclude the need of the authoring tools during execution.



Distribution / Delivery

Authoring Capabilities

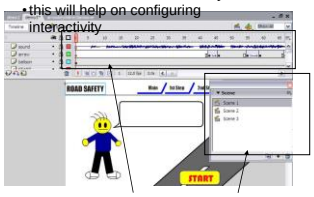
4. **Editing**
   - generally, authoring tools are capable on text and image editing
   - capable on doing other editing too, depending on the software used



Editing

5. Project Organization

- *FLOWCHARTING* and *STORYBOARDING availability*
- this will help on configuring interactivity



Flowcharting / Storyboarding

Authoring Capabilities

6. Programming
   - Programming used for flexibility.
   - Authoring tools offers an easier and less time consuming to develop:-
     - *Visual Programming* - Using icon, button, drag & drop graphic, audio .
       - Eg: Authorware
     - Scripting - programming language for authoring tools.
       - Eg: Director = **LINGO**, Flash = **ActionScript**
     - Support basic programming language - C, BASIC
       - to make it more flexible
     - *Document Development Tools*
       - Authoring tools that able to merge documents, indexing, search engine and linking

Authoring Capabilities

```
// Part 1 -- Setting up the objects
var board:Sprite = new Sprite();
var myPoint:Sprite = new Sprite();

this.addChild(board);
board.addChild(myPoint);

board.graphics.lineStyle(1,0);
board.x = 10;
board.y = 10;

myPoint.graphics.lineStyle(1,0);
myPoint.y = 50;
```

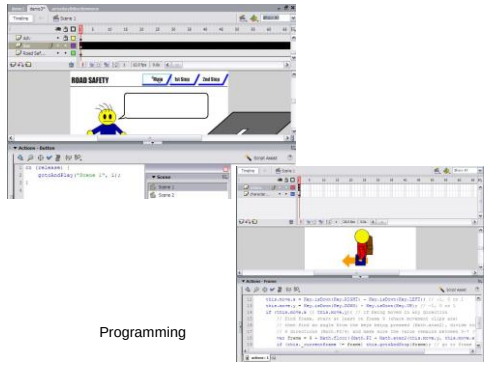
```
// Part 2 -- Add drag-and-drop functionality

myPoint.addEventListener(MouseEvent.MOUSE_DOWN, startMove);

function startMove(evt:MouseEvent):void {
myPoint.startDrag();
}

myPoint.addEventListener(MouseEvent.MOUSE_UP, stopMove);

function stopMove(e:MouseEvent):void {
myPoint.stopDrag();
}
```

Programming

Authoring Capabilities

Html code:

```
<html>
<body>
The content of the body element is displayed in your browser.
</body>
</html>
```

Result:

The content of the body element is displayed in your browser.

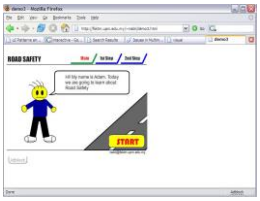
Authoring Capabilities

7. Cross Platform
   - Ability to perform on all platforms including MAC and Windows.

Cross Platform

8. Internet Playability

- Ability to create the output for web enabled application.
- Eg:- **HTML**



Internet Playability

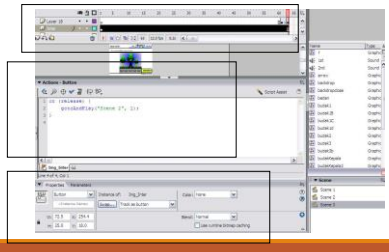
Features of Authoring Tools

Most Authoring tool have the following features in their development interface:

1. A list of media events
2. Iconic flowchart / timeline
3. Card stack
4. A series of figures

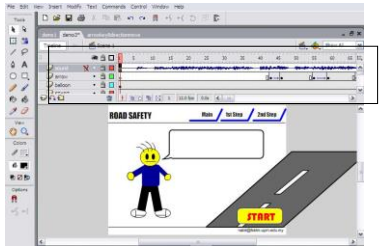
Features of Authoring Tools

1. A list of media events
   - Occurrences of scene, images, sound,action in the end product.



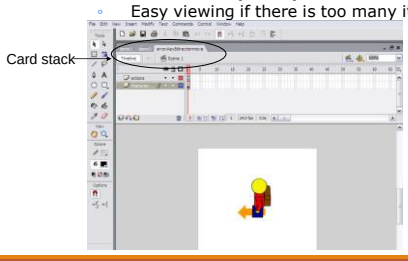
Features of Authoring Tools

2. Iconic flowchart / timeline
   - Controls event sequence.



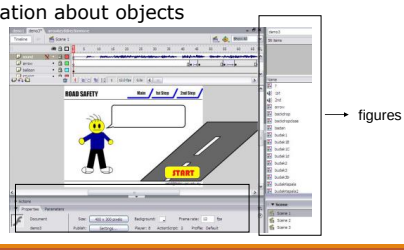
Features of Authoring Tools

3. Card stack (tabs)
   - Easy viewing if there is too many item on screen.



Features of Authoring Tools

4. A series of figures
   - List of images / objects in the project
   - Information about objects



Categories of Authoring Tools

Can be categorized into

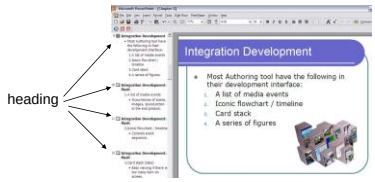
1. Presentation software
2. Tools for creating production
3. Interactive training and education

- Some authoring tools can fit into more than one category.

1. Presentation software

Enable users to create and deliver business presentations in the form of the slide show.

Each major heading is the beginning of a new slide.

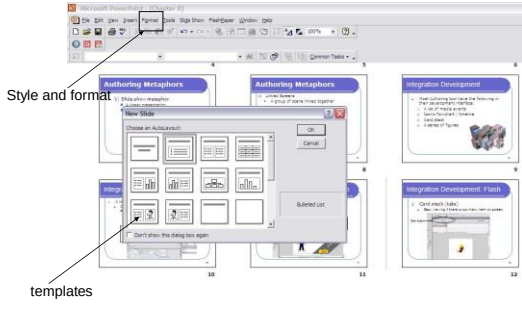


1. Presentation software

Templates are used to determine how the heads and subheads are formatted and displayed over backgrounds, including: (etc PowerPoint)

- position
- size
- font
- style
- color

Example: PowerPoint Interface



2. Tools for creating production

Typically oriented toward producing content that is more ambitious than the slide-show level
- (more interactive & dynamic)

Usually integrate all types of multimedia data into a multitrack timeline that determines the evolution of events

- Interactivity takes the form of conditional branching (multiple linking) that can make navigation decisions based on user input and other conditions
- Production software creates dynamic content
  - EXAMPLE: mTropolis / AppleMedia Tool / MediaForge

3. Interactive training and education tools

To create education or training content.

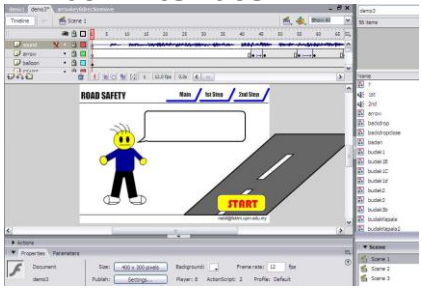
Designed primarily to present information in an Interactive book.

Multimedia-oriented programming languages such as Visual Basic represent another authoring alternative.

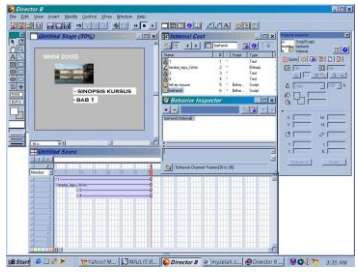
Offers the higher flexibility, performance speed and power

Example: Macromedia Flash, Authorware & Director

Flash Interface



Director Interface



Multimedia Hardware Peripherals

Multimedia Hardware Peripherals

Input devices

Output devices
Storage devices

Communication devices
_Modems
--Network Interfaces

Input Devices

- Keyboards
- Mice and Trackballs
- Touch screens
- Magnetic Card Encoders and Readers

Graphic Tablets

Scanners

- Optical Code Recognition (OCR)Devices
- Infrared remotes
- Voice Recognition Systems
- Digital Cameras
- Lightpens

Output Devices

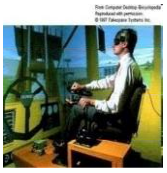
- Audio Devices
- Amplifiers and Speakers
- Monitors
- Video Devices
- Projectors
  - CRT – cathode ray tube
  - LCD – liquid crystal display
- Print ers
  - Injet
  - laser

Output Devices

VR helmet and VR immersive display
Video Devices

Output Devices

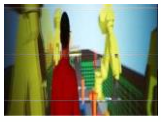
VR helmet



Output Devices

Immersive Environments and Display Systems

- We create dynamic, audio visual displays which immerse users into a virtual world.
- Using single lens or multi-projector technology, we are able to create immersive digital signage, interactive museum exhibits, flight simulators, 3D immersive user and gaming experiences.



Memory and Storage devices

- Sufficient memory must be allocated for storing and archiving files.
- Memory requirements of a multimedia project depend on the project's content and scope.
- RAM,ROM
- Floppy and Hard Disks — Zip, Jaz and Syquest
  - Zip – 100MB
  - Jaz – 1 GB
- Optical Storage CD, CD-R,WORM
- RAID(redundant array of inexpensive drives)
- DVD (Digital Versatile Disk) upto 1GB
  - DVD-video,DVD-ROM etc.

Memory and Storage devices cont..

- **Magneto-optical drives** -MO discs were WORM (write once, read many) drives, but later read/write MO drives became available.
- The disc consists of a ferromagnetic material sealed under a plastic coating.
- the older type of magnetic diskette can store 1.44 megabytes (MB) of data, an MO diskette can store many times that amount, ranging from 100 MB up to several gigabytes (GB).

MIDI

Musical Instrument Digital Interface

Specification for physically connecting different devices, and for communicating between them.

Designed for real-time keyboard performance.

Control Language

- Doesn't transmit sound
- Transmits performance instructions

History (the old days)

No synthesizer could communicate with another synthesizer.

Each synth would have its own keyboard, controlling its own synthesis system, with its own sequencer.

'70s Rock - wall of keyboards

Birth of MIDI

Several synth makers came together to agree on MIDI standard in 1981 (after development of inexpensive microcontrollers).

Designed to be relatively inexpensive.

First MIDI instruments available in 1983.

Yamaha DX7 was first "killer" device (1984).

MIDI is still the main way musical hardware and software communicates today.

Also used for control of show lighting.

MIDI Transmission

Binary (like all digital)

Serial - one bit at a time.

Asynchronous - devices can send messages whenever the device decides.

One way - MIDI cables only carry messages in one direction.

16 logical channels.

Transmission speed (original standard) - 31,250 bits per second (31.25 kbits).

MIDI Hardware

Computer interfaces (with USB and Firewire, can be built into keyboards and other devices).

Ports

Cables

Ports

Port sends and receives MIDI messages.

Basic hardware ports include IN, OUT, THRU.

5-pin DIN connectors

UART chip main microcontroller (Universal Asynchronous Receiver/Transmitter)

Computer Interfaces

Usually serial, originally connected to modem ports of a computer.

Modern way is usually USB (Universal Serial Bus); sometimes Firewire (IEEE 1394).

Communication between computer and interface can be at whatever speed devices support.

Common to build interface into keyboard or other device. Doesn't do away with computer interface - integrates it into keyboard.

Cables

5-pin cable was a type of audio cable used in Europe.

2 of the pins are never used.

Designed to run to at least 15 meters.

Common MIDI Messages

*****Keyboard performance*****

Note-on/Note-off (note number, key velocity)

Polyphonic and Channel Key Pressure (aftertouch)

(Continuous) Control change. CC.

Pitch Bend

Program Change

System Exclusive (escape hatch)

Representation of Data

Numbers

- Pitch: note number 60 equals middle C

Most values use a range of 128, from 0 - 127. (7 bits)

Pitch bend usually has more values.

Structure of a MIDI message

Messages are sent as 10-bit words.

First and last bit are stripped by UART chip. 8 bits (1 byte) remain.

Status byte/Data byte determined by first bit of byte. (1 for status, 0 for data)

Status byte indicates a function (note on, note off, cc change, etc.)

Data bytes contain values associated with function in status byte.

The Good

Allows for one-to-many control.

Control is independent of synthesis.

Digital representation of data allows for computer generation, control, and editing.

MIDI data is "portable."

Data can control anything that understands MIDI.

Q & A

Q1. The viewer of a multimedia project to control what and when the elements are delivered, it is called _____
a) interactive
b) Selective
c) onscreen
d) portable

Q2. Multimedia elements are typically sewn together into a project using _____.
a) multimedia tools
b) authoring tools
c) audio tools
d) video tools

Q3. RAM Stands for _____.
a) Random-Order Memory
b) Real-Access Memory
c) Random Access Memory
d) Raster-Output Memory

Q4. What does GUI stand for?
a) Gaming User interface
b) Geometric User Interface
c) Graphical User Interface
d) Guidance User Interface

Q5. Type of multimedia
a) Interactive
b) Hyper
c) Linear VS Non-Linear
d) All of the above