Multimedia Authoring and Tools

2.1 The Core Concepts in Multimedia Production

Authoring is the process of creating multimedia content such as text, audio, images, animation, and video into a single, interactive presentation or application.

Authoring System is the complete software environment, including tools, scripting languages, and frameworks, that allows developers or designers to build and manage multimedia projects. It provides all the necessary components editors, timelines, scripting interfaces, media libraries, and playback systems to design, test, and publish multimedia applications. (platform)

Authoring Tools are the software applications within or part of an authoring system that allow users to create, edit, and integrate multimedia content without needing deep programming knowledge.

2.2 The characteristic of an authoring system

1. **Integration of Multiple Media Elements:** The system allows you to import, combine, and synchronize various types of media: Text, graphics, images, audio and video, and animation. It provides a unified workspace where all these elements can be managed together.
2. **Ease of Use**: Offers graphical interfaces, drag-and-drop features, and templates, allowing non-programmers to create multimedia applications easily. Reduces the need for deep coding knowledge.
3. **Efficient Multimedia Integration**: synchronize multimedia elements for example, matching narration with animation or background music with scene changes.
4. **Reusability and Modularity**: Supports reusable media components (e.g., templates, slides, video clips) that can be used across multiple projects.
5. **Cross-Platform Compatibility**: Ensures the final product can run on multiple platforms (Windows, macOS, mobile, or web).

6. **Help to speed up programming**: Advanced authoring systems provide scripting languages (like ActionScript, JavaScript, or flowchart-based logic) to control user interaction and system behavior.

2.3 The Characteristics of Authoring Tools

A good authoring tool **should be able to**:

1. ***Integrate*** text, graphics, video, and audio to create a single multimedia presentation
2. ***Control*** interactivity by the use of menus, buttons, hotspots, etc.
3. ***Publish*** as a presentation or a self-running executable; on CD/DVD, Intranet, WWW.
4. ***Be extended*** through the use of pre-built or externally supplied components, ***plug-ins***.

2.4 Multimedia Authoring Paradigms

The authoring paradigm, or authoring metaphor, refers to the **approach** that defines **how** the multimedia author interacts with the authoring system to design and organize the project. There are various paradigms:

2.4.1 Scripting Language

Closest in form to traditional programming. Usually use a powerful, object-oriented scripting language. Multimedia elements and events become objects in a hierarchical order. In-program editing of elements (graphics, video, audio, etc.) tends to be minimal or non-existent.

Examples:

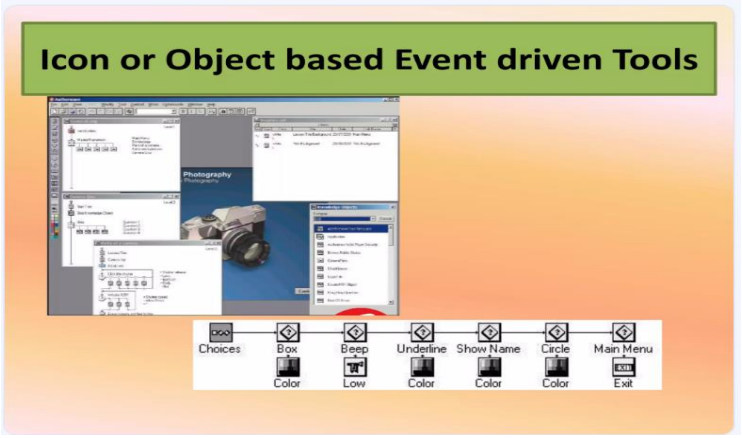
• The Apple's HyperTalk for HyperCard,
• Asymetrix's OpenScript for ToolBook and
• Lingo scripting language for Macromedia Director
• ActionScript for Macromedia Flash

Here is an example lingo script to jump to a frame:

```
global gNavSprite
on exitFrame
go the frame
play sprite gNavSprite
end
```

2.4.2 Iconic/Flow Control Tools

In these authoring systems, multimedia elements and interaction events are providing visual programming approach to organizing and presenting multimedia.



The core of this paradigm is the icon palette. You build a structure and flowchart of events, tasks, and decisions by dragging appropriate icons from icon palette library. These icons are used to represent and include menu choice, graphic images, sounds, computations, video, etc. The flow chart graphically depicts the project logic. Tends to be the speediest in development time. Because of this, they are best suited for rapid prototyping and short-development time projects. These tools are useful for story boarding because you can change the sequence of objects, restructure interaction, add objects, by dragging and dropping icons.

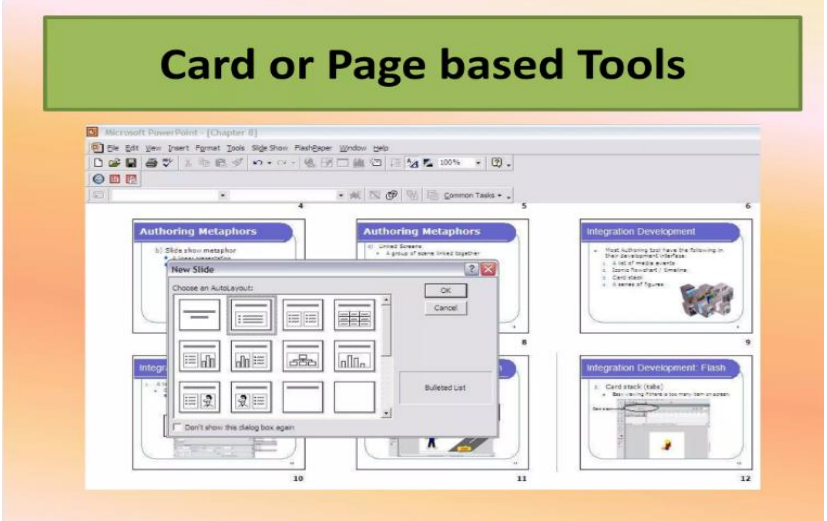
Examples:

- Authorware
- IconAuthor

2.4.3 Card and Page based Tools

They are multimedia authoring systems that organize content into discrete units, such as cards, slides, or pages. These tools allow users to present information in a structured,

navigable format where each card or page represents a section or segment of the content. They are especially useful for creating linear or non-linear presentations, e-learning modules, and interactive stories.



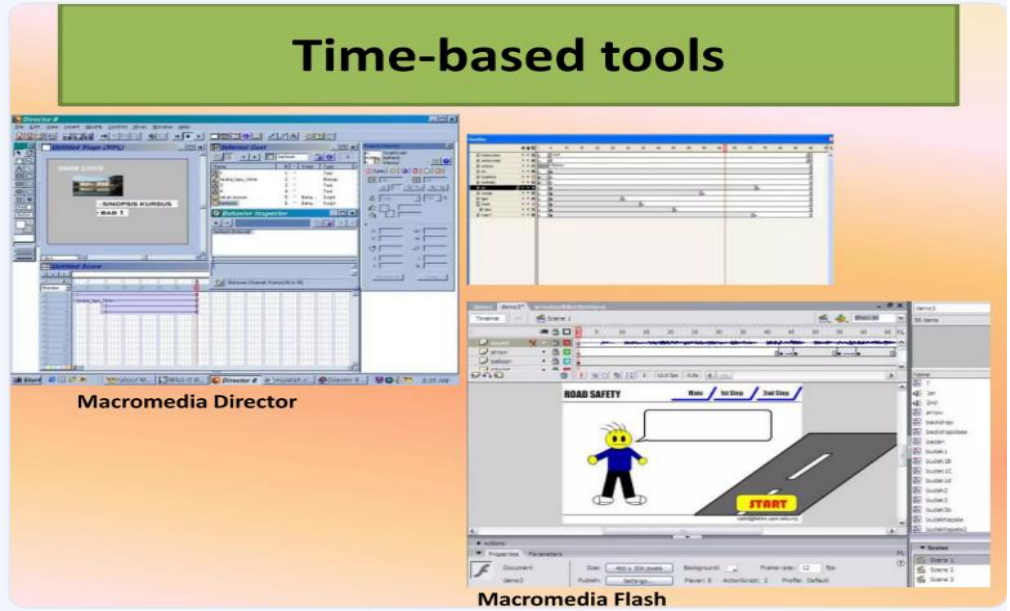
Well suited for Hypertext applications, and especially suited for navigation intensive applications. They are best suited for applications where the bulk of the content consist of elements that can be viewed individually. All objects (including individual graphic elements) to be scripted; organized as objects in a structural framework. Each object may contain programming script that is activated when an event occurs.

Examples:

- HyperCard (Macintosh)
- SuperCard(Macintosh)
- ToolBook (Windows).

2.4.4 Time Based Authoring Tools

In these authoring systems elements are organized along a time line with resolutions as high as 1/30th second. Sequentially organized graphic frames are played back at a speed set by developer. Other elements, such as audio events, can be triggered at a given time or location in the sequence of events.



Examples

1) Macromedia Director

It was a powerful and complex multimedia application authoring platform, primarily used to create **interactive MM application** like animations, presentations, and video games. Three important things that Director uses to arrange and synchronize media elements:

- **Cast:** Cast is **multimedia database** containing **any media type that is to be included in the project**. It imports wide range of data type and multimedia element formats directly into the cast. You can also create elements from scratch and add to cast. To include multimedia elements in cast into the stages, you **drag and drop the media** on the stage.
- **Score:** it is where the elements in the cast are arranged. It is sequence for displaying, animating, and playing cast members. Score is made of frames and frames contain cast member. You can set frame **rate** per second.
- **Lingo:** Lingo is a **full-featured object oriented scripting language** used in Director. It enables interactivity and programmed control of elements. It enables to control external sound and video devices. It also enables to control operations of internet such as sending mail, reading documents, images, and building web pages.

2) Macromedia Flash

It is a multimedia authoring and animation software. It was widely used to create interactive web content, including animations, vector graphics, games, advertisements, and rich internet applications that could run inside web browsers using the Flash Player plugin. Uses a scripting language called ActionScript which gives greater capability to control the movie. Flash is commonly used to create animations, advertisements, to design web-page elements, to add video to web pages, and more recently, to develop Rich Internet Applications.

Flash uses:

1) Library: a place where objects that are to be re-used are stored.
2) Timeline: used to organize and control a movie content over time.
3) Layer: helps to organize contents. Timeline is divided into layers.
4) ActionScript: enables interactivity and control of movies

2.4.5 Tagging Tool

Tags in text files (e.g. HTML) to link to pages, provide interactivity, and integrate multimedia elements. Most of them are displayed in web browsers using plug-ins or the browser itself can understand them. This metaphor is the basis of WWW. It is limited but can be extended by the use of suitable multimedia tags.

Examples:

• SGML/HTML
• SMIL (Synchronized Media Integration Language)
• VRML
• 3DML

2.5 Selecting Authoring Tools

The multimedia project has its own underlying structure and purpose. When selecting tools for your project you need to consider that purpose. **Some of the features that you have to take into consideration when selecting authoring tools are:**

1) **Editing Feature**: editing feature for multimedia data especially image and text are often included in authoring tools. The more editors in your authoring system, the less specialized editing tools you need. The editors that come with authoring tools offer only subset of features found in dedicated in editing tool. If you need more capability, still you have to go to dedicated editing tools (e.g. sound editing tools for sound editing).
2) **Organizing feature**: the organization of media in your project involves navigation diagrams, or flow charts, etc. Some authoring tools provides a visual flowcharting facility. Such features help you for organizing the project. e.g IconAuthor, and AuthorWare use flowcharting and navigation diagram method to organize media.
3) **Programming feature**: there are different types of programming approach:
   a) **Visual programming**: this is programming using events, icons, and objects. It is done using drag and drop. To include sound in your project, drag and drop it in stage. Advantage: the simplest and easiest authoring process. It is particularly useful for slide show and presentation.
   b) **Programming with scripting language**: Some authoring tool provide very high level scripting language and interpreted scripting environment. This helps for navigation control and enabling user input.
   c) **Programming with traditional language** such as Basic or C. Some authoring tools provide traditional programming tools like program written in C. We can call these programs to authoring tools.
   d) **Document development tools**
4) **Interactivity feature**: interactivity offers to the end user of the project to control the content and flow of information. Some of interactivity levels:
   a. **Simple branching**: enables the user to go to any location in the presentation using key press, mouse click, etc.
   b. **Conditional branching**: branching based on if-then decisions
   c. **Structured branching**: support complex programming logic such as nested if-then sub- routines.

5) **Performance-tuning features**: accomplishing synchronization of multimedia is sometimes difficult because performance varies with different computers. In such cases you need to use authoring tools own scripting language to specify time and sequence on system.
6) **Playback feature**: easy testing of the project. Testing enables you to debug the system and find out how the user interacts with it.
7) **Delivery feature**: delivering your project needs building runtime version of the project using authoring tools.
8) **Cross platform feature**: multimedia projects should be compatible with different platform like Macintosh, Windows, etc.