UNIT 4 MULTIMEDIA DEVLOPMENT- ISSUES AND SUGGESTIONS

Structure

4.0 INTRODUCTION

Multimedia design and development involves lot of creative activities. While Developing multimedia many a times you are provided with many unrelated Multimedia elements. Even in the developed multimedia many a time's difficulties such as navigation through large amount of text, non-existent online help, poor documentation, and non-coordinated video and audio sequences exist. Therefore, for creation of good multimedia one must try to follow the process of multimedia development. In addition, one must also be exposed to basic principles of learning as that contributes in having a good presentable academic session through multimedia. In this unit, we will be discussing about these types of concepts relating to multimedia Development

4.1 OBJECTIVES

At the end of this unit, you will be able to:

- Discuss the issues relating to learning interface design
- Describe planning the production of your application
- Discuss creating the multimedia building blocks
- List copyright issues and its management

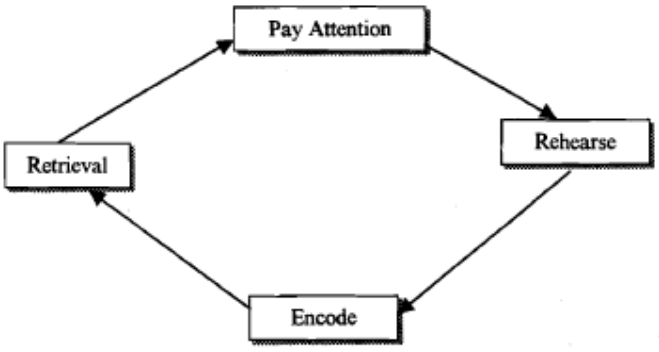
4.2 LEARNING INTERFACE DESIGN

The term multimedia interface design refers to the means through which a user interacts with application content or information. Through the interface you may be provided with navigation buttons, text fields, instruction, graphics, animation, audio recourses and other means of support to help users achieve the goals of application. Since, one of the main uses of multimedia is in education and training, therefore, the basic concepts of how learning takes place is helpful and even necessary in designing a meaningful and useful multimedia application interface. In the following subsection let Us explore the basic principles of the psychology of learning and its application to interface design.

4.2.1 Interface design and the psychology of learning

Multimedia involves multi-sensory experiences. Multimedia content reaches users in many different forms, therefore, providing an enhanced learning environment. But how does we learn in a learning situation?

The first step in the cyclic process of learning is attention to information. The human brain obtains information through senses, fundamentally through our eyes and ears. However, the information is accepted only if one is paying attention. The information so gathered is transferred to the local working memory. This local memory is to be continuously refieshed; otherwise the information so gained may be lost. %s process is called rehearsal. The rehearsal process may cause transfer of information to short term memory to the long-term memory of the human. This process is termed as encoding. For using encoded information it must be retrieved fiom the long-term memory and delivered to the working memory for the processing, thus, completing the cycle of learning.



The following figure shows the learning cycle:

A well designed multimedia programme demands the simultaneous attention of several senses through process of appealing to more than one sense simultaneously, facilitating the rehearsal process. Even the process of retrieval is facilitated for the concept being presented by the power of multiple media. Thus, multimedia enhances the retention of knowledge. Another important issue for multimedia application design is the amount of information

that can be assimilated at a given time; this is referred to as the cognitive load. Too much of information in a multimedia presentation may overload users cognitive abilities, thus, making learning less effective. This will defeat the basic design objectives.

4.2.2 Working with learning styles

The individual style of learning has got different dimension. Some people learn by graphic learning while others learn primarily by reading, seeing, or visualizing. Some of the learner learns more effectively through physical movement or touching, these are called kinesthetic learners. To get a general feeling of the learning styles of the users, you may ask the following question to the intended audience of the multimedia: "How do you learn? What kinds of books do you prefer? Do you like the Books with lots? pictures and diagrams? Do you learn better by watching video? etc.

You will discover that the intended audience of your multimedia package follows a variety of learning styles, that is, they learn and prefer to learn in different ways. The Design of your application must incorporate different multimedia building blocks that in turn appeal to different learning styles. Therefore, you must use effectively text, audio, graphics, animation, and digital video such that your multimedia application is more meaningful to the people having different learning styles.

4.2.3 Considering interface design

Designing the computer-based instructions required the fundamental rules:

- Keep low cognitive load. Keep a simple, consistent screen design
- Do not divide the learner's attention; you must use various media elements such as text, graphics, and sound to reinforce a concept rather than introducing different types of concepts.
- You may use colour, special effects, and sound to direct the learner's attention to important areas of the presentation. However, use them only if it is essential.
- The information, which a learner may need to undertake an activity must be available on the screen, for example, the reference information for answering a feedback form must be available.
- Encourage fiequent revision /rehearsals by the learner.
- Encourage reinforcement of learning by using concrete words and different media to reinforce the message.
- Avoid repetition in interactions.
- For imparting procedural skills simulation can be used. Simulation should be as close as possible to the actual job environment.

4.3 PLANNING THE MULTIMEDIA PROGRAMME1 APPLICATION

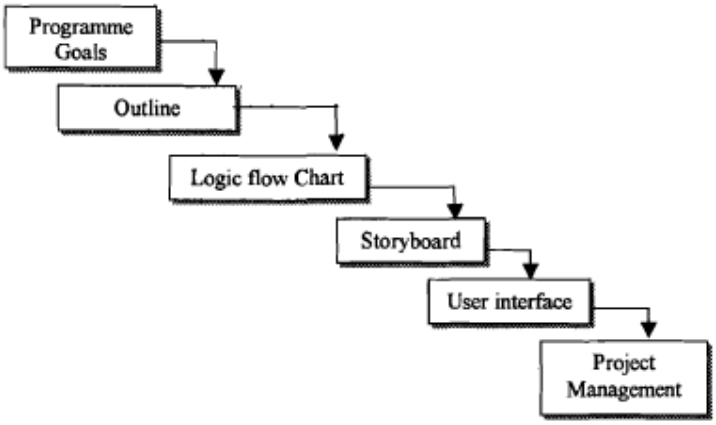
A multimedia development team consists of many different skill oriented people, who include a producer, educational consultant, media consultant, media designers, media specialists, Webmaster etc. However, the whole team works for a single objective that is creation of an effective multimedia application. Therefore, one of the major issues for Multimedia production is to plan an application. Let us discuss it in greater details in this section.

To start the authoring process of multimedia application development without planning all the components of the project is a major mistake as it may lead to an insufficient application being developed. A multimedia project should be planned through following stepwise process:

- Develop the Multimedia programme/application concept.
- Outline your programme.

- Develop a flowchart.
- Develop programme storyboard.
- Plan the user interface.
- Consider copyright issue.
- Plan the production of text, graphics, animation, audio, and
- Prepare the project budget and time schedule.

This planning process is also presented in figure given below.



4.3.1 Defining the Goal

The Goal of a multimedia application is defined by the scope of work, which is a Written description of the proposed multimedia project. The scope of work clarifies Your ideas and goals regarding the proposed project. It also helps the development team members to visualize the basic objectives of the programme.

The following example illustrates the scope of an application, which may be designed to teach a Programming Language at graduate level.

"The textbooks and instruction materials of the Programming emphasise mainly the Basic components and syntax of a programming language. However, one of the skills Where students are facing difficulties is the problem solving skill, which is essential in order to solve various problems. Since the goals of the this course is not only to Develop know how of a Programming language but also to enable student to solve Problems using the programming language, we expect that a multimedia based tutorial which helps the student to solve problems using data structures and programming language may be extremely useful. We except that by making a direct correlation between the general principles of problem solving using data structure, and the concepts of a programming language, the student will be able to develop better problem solving skills that will develop his confidence in Computing. This will also result in better student motivation, and will help in reducing the dropout rate."

Project outcomes

"The objective of this project is to developed one experimental module referring to ' , Problem solving using a Programming Language. This experimental module will mainly focus on the concepts of pointers and related data structures. This module will be used by the instructor in a classroom. Integration of multimedia in teaching of Programming language will allow the instructor to reach students with a diversity of

Learning styles; this module will be tested in the classroom, and evaluated. It will be Revised on the basis of evaluation of faculties and students."

4.3.2 Outlining

Once the goal and the objectives of the programme are clear, the next step is to create Outline of the project. An interactive multimedia presentation may not necessary be Linear presentation like a slide show or a video programme. It has the capacity of Branching. The outline of a programme represents branching in a Multimedia Programme. The content specialist does the outlining.

Developing an outline for an interactive multimedia project is almost the same as that Of developing an outline for a chapter of the book. However, the outlining of Multimedia structure is translated into branches or points of decision on the screen. Even the main outlining headings may become options available to the user in the main menu of the Multimedia presentation program with sub-heading becoming the Sub-Menu entries.

To continue the example, the outline of this program is:

Problem solving using Pointers

1. **Pointer Basics**
    - Introduction
    - Pointers and Addresses
    - Pointers and Function Arguments

2. **Pointers and Simple Arrays**
    - Address arithmetic
    - Character Strings
    - Pointer arrays
        1. Definition
        2. Features
        3. Implementation issues
        4. Usage examples and situations

3. Multi-dimensional Arrays using Pointers

- Definition of Multidimensional Arrays
- Initialization Issues
- Implementation using Pointers
- Command line arguments

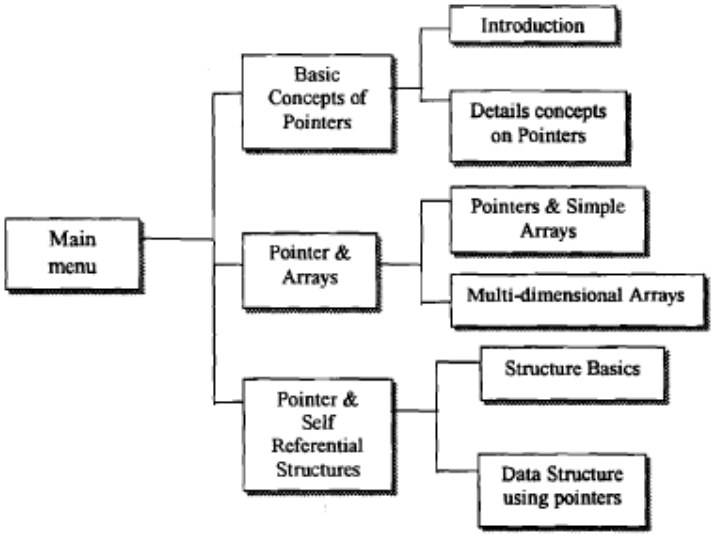
4. Pointers and Self Referential Structures

- Basic of Structures
- Pointers to structures
- Self-referential structures
- Implementation of Simple Lists using Pointers
- a Implementation of binary tree using pointers

An outline is further developed to include some details of the information to be Provided to the intended audience on each screen, which may have multiple media Forms in it.

4.3.3 Logic flow chart –

The logic flow chart is an important component of an Interactive Multimedia Programme. A flow chart is a graphical road map of the proposed application. The Authoring team takes the help of this flowchart to produce the final multimedia Application. A flow chart represents the choices available from each topic to other Topics. The complexity of these flow charts is dependent on the applications being Developed. The flowcharts, which illustrate games, are among the most complex flowcharts. The flow chart shown below extends the example project about Programming language



4.3.4 Program storyboard

The storyboard is a graphical representation of the proposed multimedia project. The Storyboard is an extension of ideas presented in the programme script. It is presented With a series of templates used for various purposes. Some of the common templates, Which are required to represent a complex application, are?

- Logic flow and branching sequence templates
- The storyboard template
- Animation sequence templates
- Button details template
- Audio/ video scripting templates

We are including few sample templates here. Please note that these are not standard Templates, the format of such template changes as per the requirements and practices at various multimedia organisations.

These templates are very useful information and help the developer to keep a production log or history of the work. They also help in keeping track of the production design and help in identifying the design parameters for the application development. Throughout the authoring process, the development team should discuss progress on the multimedia development project with the client or with the members of application target group.

Multimedia Application Development Template
Logic Flow and Branching sequence

Project Name: ----------

Intended Audience:----------

Prepared By:----------

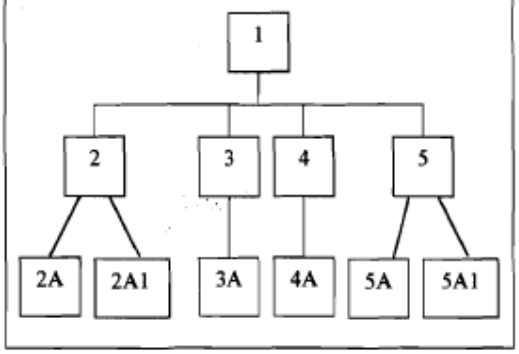
Moderation Date:----------
Moderated by:----------
Received for authoring on:----

Script No:---------- page No:----------

Application outline

Braching in Application

Example Braching Sequence



Multimedia Application Development Template
Audio Description Template

Project Name:----------

Intended Audience:----------

Prepared By:----------

Moderation Date:----------
Moderated by:----------
Received for authoring on:---

Script No.:---------- Page No.----------

Audio script

Audio Source s if already exist

Audio CD:_____

MIDI:_____

Computer Sound File:_____

Video Sound File:_____

Copyright ownerships of the Resources:_____

_____

When to play Audio:_____

Multimedia Application Development Template
Storyboard Description Template

Project Name:----------

Intended Audience:----------

Prepared By:----------

Moderation Date:----------
Moderated by:----------
Received for authoring on:---

Script No.:---------- Page No.----------

STAGE

Text:

Colour of Background, paragraphhulleted text, Title.
Any other text format
Position of text on the stage.
Write the script of the text

_____
_____

Audio:

Resource based or to be recorded
Attach the Audio description sheet reference number

Graphics:

Source and type of graphics
Position on the stage using a sketch

Video Stills

Source and position of video still window on the stage.

Video:

Play frames fiom starting to end position
The position of video window on the stage

Animation:

Attach the Animation template reference number

Transition effects:

Attach details special effects required for graphics transitions

Branching:

1 Attach the template reference

Buttons:

Attach the template reference

4.3.5 Planning For Creation Of Multimedia Building Blocks

The development of multimedia building blocks is an extensive process and requires a number of production steps. In the planning phase of it, the basic script or content of this element is defined. For example, a proposed script for the Programming Language Project may be:

"Pointers is a variable in a programming language which contains the address of a Variable. They are used because:

- They usually help in development of more compact Program code.
- They result in development of more efficient Program code.
- They sometimes are the only way to express a computation.
- They 'allow implementation of call by reference.

Pointers and Addresses
A pointer is a variable location, which holds the address of a memory location. For example, if c is a character type and p is a pointer type and if we say that p points to c it means that the pointer named p is holding the address of memory location which is also referred to as variable name c. (A graphics in this respect can be shown) . . . . . ."

Please note that in various situations the details given through textual Component may be different. For example, since this multimedia package is to Be used for classroom presentations the text is presented in short phrases or Bullets.

Even the basic formats for Graphics and video scripts may be planned at this juncture. The content specialist may be requested to provide such information. Availability of already available resources should also be indicated at this level.

4.3.6 Copyright Issue and Its Management

While designing multimedia application, copyright issue plays a crucial role because of two fundamental reasons.

- Multimedia involves use of multiple media each of that media element may be protected under the copyright laws.
- Original multimedia works are also protected by copyrights.

The Copyright laws protect the following types of works:

- Printed or Electronic text of the form of prose, poetry, newspaper articles, Magazine articles, books, computer software, etc.
- a Musical works such as Songs, advertisements Recording of music, sounds, or words etc.
- Dramatic works such as plays, skits etc.
- Dances and mime works.
- Pictorial, graphics, and sculptural works such as photographs, posters, maps, Paintmgs, drawings, graphic arts, display ads, cartoon strips, and cartoon Characters, stuffed animals, status, paintings, works of fine arts etc.
- Motion picture. re. S and others audiovisual works including Multimedia.

Therefore, it is important that during the planning phase you sort the copyright issues Relating to getting permissions of using copyright material from its owner. Please make sure that you have the licensed copies of all the software that are required for the development of Multimedia.

4.4 DEVELOPMENT TIPS OF MULTIMEDIA BUILDING BLOCKS

Once the planning phase is over, the multimedia building blocks are to be developed. In the subsequent subsections we will discuss about the important issues relating to Various multimedia components.

4.4.1 Text

Text is one of the primary mediums of communication of information. Text can also be used for reinforcing a concept. Text for multimedia can be produced using a number of I Word Processing Software. Many newer authoring packages also allow most of the Word processing facilities. While developing text for Multimedia application please make sure that the text format, which you have developed, is compatible to the Authoring tool text format.

Some of the tips for creation of textual information are:

- The amount of text put in a Multimedia application may be limited to short Paragraphs or point wise lists.
- The font size should be large enough to be read easily by the Multimedta user.
- For example, the application, which is to be used for the training of a group the Minimum point size, should be 20 points so that it is visible from a distance.
- The text styling and formatting should be consistent over the complete Application.
- The special effects on text should be used to highlight important concepts or Messages, but do not overdo them.
- Use font types (bitmapped or outlined fonts) and point sizes, which are Commonly available. This will make sure that the text looks the same as it was designed.

4.4.2 Graphics in Multimedia

Graphics is the most predominant component of a Multimedia. Graphics may be used In many forms such as photos, Charts for illustration and summarization numerical Data, environments simulation, logos, and colors that illustrate the content of the Application. The content specialist provides these elements to the production team, who / then balances and integrates the graphics content in the application.
Graphics help people to learn and retain more information from other forms of Information. There are many kinds of graphics that are integrated into multimedia Application. These are:

- Background
- Pictures, photographs and 3d pictures
- Charts, Flow charts and Organizational charts
- Buttons.

Background

Background of an application may establish the tone and the theme of an application. The background of various applications may vary from solid colors to highly complex graphics, incorporating photographs, maps, and logos. Following are some tips for designing background of an application:

- It should not be too complex to leave strain on eyes on continuous use.
- It should in some way reflect the theme of the application
- It should not involve high storage capacity, for applications, which are to be Delivered through the net a complex background may increase the download Time.
- It should not exceed the display capabilities of display devices.
- It should not be packed with the text.

Pictures, photographs, and 3 d graphics

These resources can be drawn from a variety of resource banks. Some of these resource banks are:

- Commercially available ClipArt's, which are a collection of drawings, usually available as black-and-white or 4-bit (16 color) images in ESP (Encapsulated Postscript format), PIC (Macintosh Pictures), and BMP (Bitmapped Graphics)
  Formats and are classified in categories.

- Photo CDs consists of professional quality photos, which are normally classified by topics.

- Online Web based resources, which are available in many different types of Format.

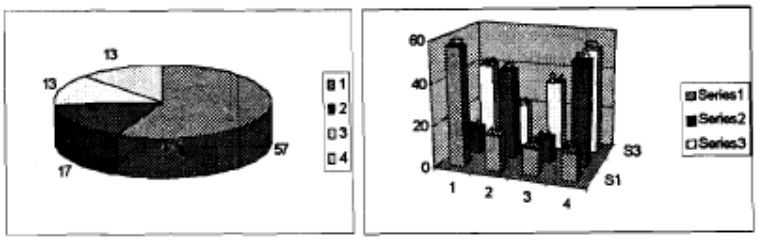
- Digital Still photographs are the user created resource. The photographs can be obtained either from the digital cameras or captured from video still images. Portable, small digital cameras of companies like Apple, Casio, and Kodak etc. are available in the market at affordable prices. This camera can be connected to one of the serial port of the computer and software can be used to get an image file.

In addition, many application software are available to create and edit images in Different formats. One such very simple utility available is Paintbrush in Windows.

Charts, Flow-charts and Organizational charts

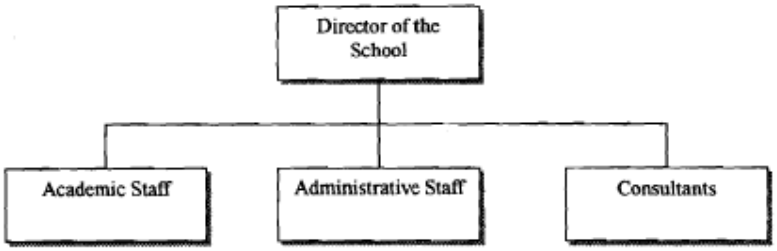
Charts are an appealing way of presenting numerical information visually. Charts can be developed using electronic spreadsheets, statistical programs, or integrated Applications. One important consideration while placing the chart in your multimedia Applications is its contrast with the screen background. You have to ensure the Visibility and readability on the charts.

Figures given below show the pic chart and bar chart



Flow charts are graphical stepwise representation of a logical process. The concept of Flowchart is not new for you. You may keep simple flowcharts making the details available once a user needs more details on a typical step of the process. Do not try to Put all the information on a single screen.

An organisational chart provides information on the hierarchical structure of the organisation. A simple organisation chart is shown in the following diagram:



These charts can also be created using the integrated packages, which are available With most of the presentation programs.

Graphics: the last tips

- Do not overburden your graphics screens with too much of simultaneous Information.
- Keep the graphics on the screen simple, clear, user-friendly, and elegant as Possible.
- Keep a check on screen resolution. Sometimes on reducing the resolution or
- Number of colours used in a graphics may result in loss of sharpness of original picture.

4.4.3 Sound and video in multimedia applications

Video and sound help in communicating a lot of information in a small time. Sound is a very exciting part of multimedia application. Your multimedia should be equipped with good supportive sound, however, please do not use excessive sound in your application. It may be annoying to the user. Video enhances the impact of multimedia application, especially in areas involving difficult concepts. However, please note that good quality digital video clips can be displayed only if there exist good hardware and software configurations in the client machine.

Some of the usage of audio and video in multimedia may be for:

- The background sound
- Sound video recordings of an eminent person.
- Narration of historical facts
- Narration of an Industrial process preferably through video
- A welcome message showing a walk through a building museum, historical place etc.

The Digital video

The digital video is represented as a sequence of frames having a rectangular screen With each pixel being represented by 8 bits (black and while video) or 24 bits (wloured video). Digital video can be acquired from either digital recording or by converting analog video footage of high quality into digital video. Adding a number of other interactive elements such as interactive glossary, graphics overlays, text bullets, or animation can further enhance the converted digital video? It also allows digital editing and incorporation of transition effect. There are many digital video formats available. The most common of those are Quick time, MPG and AVI.

Video Compression: A full screen video clip having a screen resolution of 800x600, Having 24 bit color at about 30 frames per second require about many MB of space. Even the disk transfer rates are not sufficient to support such kind of data rates. Thus, Without using data compression algorithms such motion pictures cannot be used in Digital systems. Common data compression standards are MPEG, JPEG, DVI etc.

The JPEG (Joint Photographic Expert Group) standard is for compressing continuous Still pictures. It is normally used to encode 24-bit RGB video images and will leave out some of the minor picture details for the sake of simplicity. It produces a compression ration of 20: 1 for still images without any appreciable degradation of pictures. This is a. popular standard on Macintosh and Amiga platforms.

MPEG (Moving Picture Expert Group) is compression standard for compressing video since 1993. MPEG was developed specifically for motion images. MPEG can compress both audio and video. It produces a compression ration of 50: 1 before the degradation in picture quality occurs. MPEG standard allows fast video and audio compression, and real time decompression. MPEG allows a decompression data rate of 1.2 to 1.5 M per second, thus, allowing full motion, full screen video.

Video in Multimedia Application

Some of the basic considerations which need to addressed for integrating video in a Multimedia application are:

- Data transfer rate and capacity of the storage device
- Size of the Window to be used for display
- Frame rate and image resolution.

In a multimedia system one need a high data transfer rate and capacity to sustain full Motion video capabilities. The size of display window can be controlled to lower sizes to reduce the transfer rate requirements. A lower frame rate or resolution may reduce the data-handling rate but will result in poor quality of video.

Sound in multimedia

In a Multimedia application text, images, animation can be greatly complimented by The use of sound. Sound is an Integral part of videos also. Sound can be used in a Number of a ways in a multimedia application such as:

- Sound of the surrounding a Multimedia environment can be recorded, for Example, while showing a photograph of jungle the associated sound track can leave a lasting impression.
- Sound helps the users to receive and retain the multimedia message in a better way.
- Sound can also be used for catching attention in a boring graphics oriented Presentation.
- Sound may also break the monotony of Multimedia base tutors and enhance the learning process.

4.5 MULTIMEDIA AUTHORING

Once all the components of Multimedia have been developed, one has to use authoring tool to stitch the multimedia application, which also involves interactivity.

There are four basic function provided by almost all authoring software:

- Importing: It should be able to import various media elements, which may have been developed using other software package.
- Creating: It should allow some basic features for creation of text, graphics and may be sound if not video.
- Integrating: It should allow you to define sequences and provide linkages
- Delivering: It should allow developing self-running application and encryption of application data.

Let us briefly clearly the type of authoring tools available in the market.

Time-based authoring tools: They use timescale to decide duration of message on the Screen. Some of the authoring tools in this category are Macromedia action, Animation works Interactive etc.

Card-based or page based authoring tools: These tools allow information to be put in as stack of cards or pages. These pages and cards can further be linked with each other in predefined sequences. Even the cross linkages along with branching facility are also possible in such packages. Examples in this category are HyperCard by Apple, Asyrnetric tool book and many presentation software.

Icon-base authoring tools: These tools allow creation of an Icon based flow script Which is then converted to an application. Examples in the category are Macromedia Authoring professional, Icon Author etc.

Theatrical Authoring tools: These types of tools refers to media elements as Independent cast members, which are assembled using score which is a sequencer in Terms of time, linking and animation. Complex visual effects can be applied on these Scores to create powerful presentations. Macromedia director is one such package.

Now the question is which authoring software is most suitable for what applications? There are no standard guidelines; however, the following are some suggested usage.

Business applications	:	Time based authoring tools Con based authoring tools
Education	:	Icon based authoring tools Theatrical based authoring
Games Cyber art	:	Preferably Theatrical based authoring

Interactivity in an Application:

Most of the authoring tools of multimedia allow the following type of navigational Structures:

- Linear or sequential, mainly used in business and educational applications. Hierarchical, like a tree structure, used in educational and business applications
- Non-linear, like a graph, users select the path of its own, used in various encyclopedia development
- A combination of the above tools.

In most of the system interactivity is built by creating menu-based options or through Questions and their feedback.

4.6 SUMMARY

In this unit, we have presented brief outlines of the process of multimedia development we have covered aspects relating to planning, which is the most important activity of multimedia development. We have also presented many tips for creations of multimedia elements and authoring tools. You may explore any tool for multimedia for application development, but to begin with it is always advisable to start with the tools available in windows operating system. Please note that to create a good multimedia a proper plan and design is essential and you should pay more attention to such areas.

4.7 REVIEW QUESTIONS

1. How multimedia application is helpful for a student like you in day-to-day Learning?

2. List the legal issues related to copy right in multimedia application.

3. How, IGNOU, a distance learning institution may utilize the multimedia Application to facilitate the course delivery to its students? Prepare the Project outline, logic flow, and storyboard for the above in any chosen Subject of your. Create a prototype of the project using PowerPoint and Other available packages at your study center.