

# Agenda

- Introduction
- Content production process
- Tools
- Barriers
- Development areas

# Introduction

- Multimedia applications are produced with different kinds of authoring tools
- Hand coding is just too expensive
- Applications are interactive:
  - + multimedia products
  - + multimedia presentations
- 3D virtual environments are a new application area

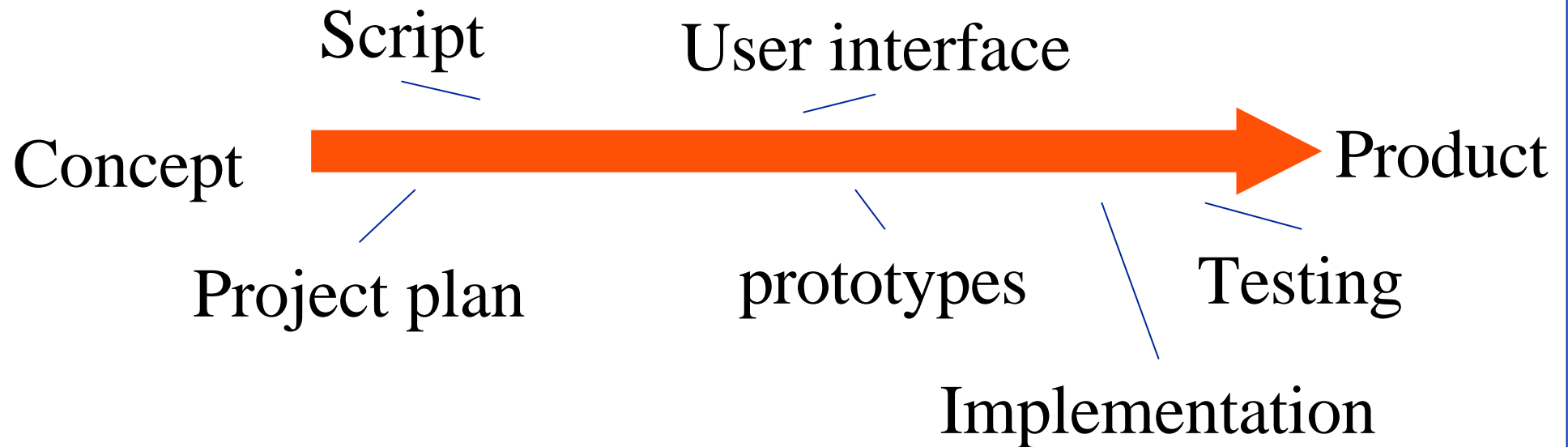
# Historical development

- First applications are from 60s
  - + CDC Plato (mainframe software and hardware)
- Interactive analog video came in 70s
  - + MITRE TICCIT educational system
- Multimedia presentations came in end of 70s
- Lack of standards is a problem
- Development tools were developed in 80s, when graphical user interfaces came available

# Content production process

- Multimedia content production is something between software and audio/visual production
- Clear multimedia production model does not exist
- In addition, different professionals participate in the development process
- Projects might emphasize, e.g., software, communications, or graphical know-how

# Content production phases



# Concept

- Usually, production has customer and producer
- In addition, there can be several subcontractors
- The production is usually implemented as project, for which the following issues have to be defined
  - + objective
  - + timetable
  - + resources
  - + costs
- Different issues should be written on a paper

# Project plan

- The objective of project plan is to make a clear contract about the production
- Project plan should define the concept as project that can be implemented
- The project plan makes the core of the contract between the producer and customer
- It defines also required information to start the project

# Script

- Often, a multimedia service has a script
- Then, the service is more like traditional audio/video production
- Script can be written as screenplay
- Interactive plot requires interactive script
- Then, script resembles chopped TV document or hypermedia document



# User interfaces

- Usually, the user interface of multimedia service is an interactive graphical user interface
- The input and output devices are different
  - + television, mobile phone, etc. screen
  - + touch display, remote control, data glove, etc.
- Usability has to be considered in the design of the user interface

# User interface implementation

- User groups
- Scenarios
- Task analysis
- Key displays
- Prototypes
- Iterative implementation

# Prototypes

- Prototypes can be used to develop both the user interface and technology
- The objective is to test key functions
- Prototypes can be tested with experts and also users
- The tests quarantine both the technical functionality and usability

# Implementation

- Implementation is usually iterative process
- Different product are required for different technologies and user groups
- Different versions are designed at the same time
- First, best available technology and most demanding user group is selected
- Product is versioned for other technologies and user groups

# Testing

- The usability of product should be confirmed already at development phase
- Actual software errors are also corrected at earlier phase
- The end testing should remove the final bugs
- Often, the product is already on the market before it is ready
- Then, new software releases have to be distributed to the end users

# Tools

- Tools are required for several purposes
  - + project management
  - + media processing
  - + product composition
- Usually, the tools are not integrated
- Integrated tools are for specific areas
  - + e.g., teaching, presentation, www

# Project management

- Project management means resource control
  - + budget, human resources, equipment, documents
- Common tools are, for example:
  - + office tools
  - + project planning and management
  - + work flow
  - + document management

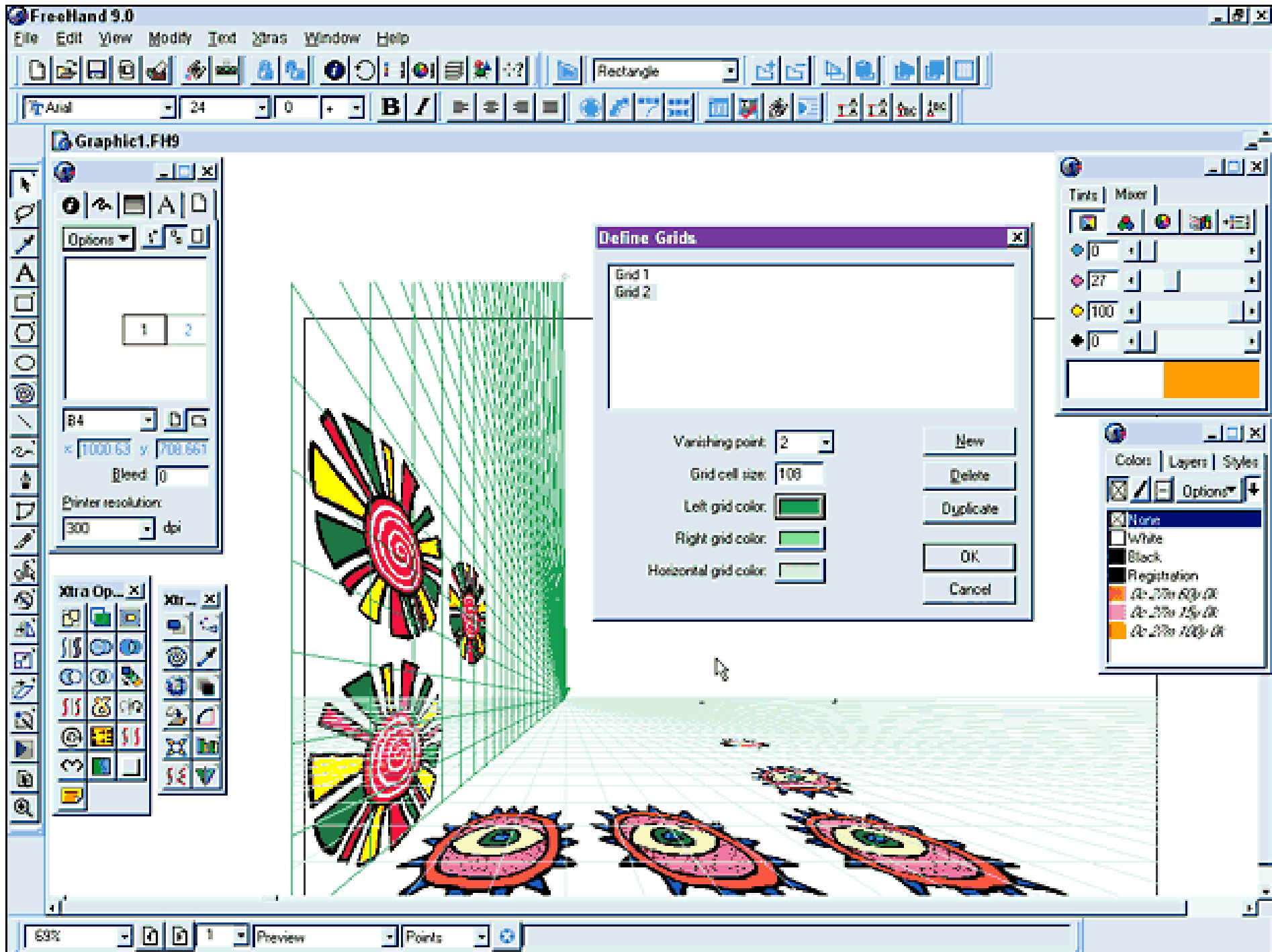
# Media processing

- graphics and animation
- 3D modeling
- images
- video
- audio



# Graphics and animation

- Drawing tools are used for production of graphics and animation
- Basic tools allow the creation of bit map graphics
- More powerful tools are used to create vector graphics
- Common drawing programs are, e.g., Adobe Illustrator, CorelDraw, and Macromedia Freehand
- For example, ULead GIF Animator supports animations



# 3D modeling

- Special tools are used for 3D graphics
- Tools can be used to produce 2D images, 3D models, and even virtual environments
- Most common tool is 3D Studio Max

### Material Editor - Eye

Material Editor - Eye

Shader: Multi-Layer

Shader Basic Parameters

Diffuse Level: 80

First Specular Layer

Level: 58

Glossiness: 49

Second Specular Layer

Level: 10

Glossiness: 25

Opacity: 100

### Lights & Cameras

Lights & Cameras

Compounds

### Modifier Stack

Modifier Stack

\* Skin

Selection Level: Sub-Object

Bone01

Bone02

Bone03

Envelope Properties

Radius: 63.849

Weight Properties

Abs. Effect: 0.0

Paint Str: 0.1

Radius: 24.0

Feather: 0.7

Color Vertices Weights

Filters

Vertices

Envelopes

Cross Sections

Advance Params

Always deform

Ref. Frame: 0

# Images

- Computer can be used to either create new images or process natural images
- Most of the current tools support image processing
- Common tools are, e.g., Adobe Photoshop, Microsoft PhotoDraw, and Paint Shop Pro

# Video

- Video editors can be used to cut videos in digital format
- Videos are usually presented as tracks, which can be processed and mixed
- Different kinds of effects can also be used
- Common tools are, e.g., Adobe Premiere and ULead Media Studio Pro

Monitor



Timeline

Timeline interface showing a ruler and tracks for Video 2, Video 1, Audio 1, Audio 2, and Audio 3. A red 'Virtual Clip' is placed on the Video 2 track, spanning from 00:43:22 to 01:12:23. The ruler shows time markers at 00:00, 0:00:16:00, 0:00:32:00, and 0:00:48:00. The interface includes various control icons and a '4 Seco...' label at the bottom.

# Audio

- Audio can be either edited or produced with computers
- Audio editors resemble either video editors or audio mixers
- Computer music is produced with midi editors or synthesizers
- One of the best known tools is CakeWalk Pro Audio

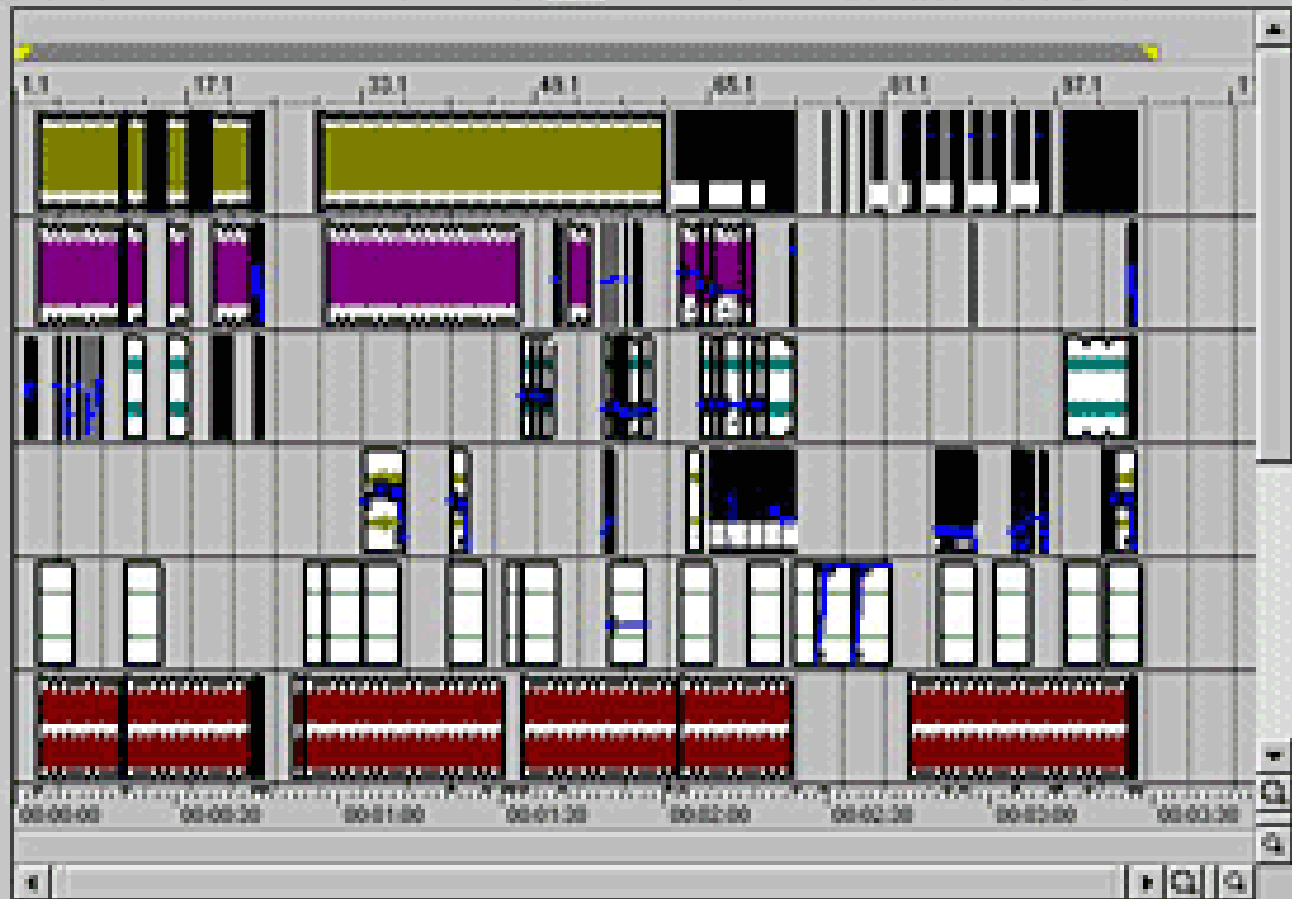




1.1.000

- Simplerock1** Vol: -14.6 dB
- ClassicRock 4** Vol: -19.8 dB
- Wah Ask Wah** Vol: -14.8 dB
- Solo 4** Vol: -8.2 dB
- ED Crash 2** Vol: -19.8 dB
- Straight Rock 1** Vol: -10.8 dB

119.854 BPM



- Product Information
- Twisted Reality
  - Big-Bang FX
  - Captured Motions
  - Creeps and Crawlers
  - Delusions of Grandeur
  - Infinite Noises

Moving01_s.WAV	Moving05_s.WAV	Moving09_s.WAV	Moving1
Moving02_s.WAV	Moving06_s.WAV	Moving10_s.WAV	Moving1
Moving03_s.WAV	Moving07_s.WAV	Moving11_s.WAV	Moving1
Moving04_s.WAV	Moving08_s.WAV	Moving12_s.WAV	Moving1

Master Volume: -14.0 dB

Auto Preview

# Composition tools

- Multimedia products are composed from individual media elements
- Special tools are used for composition
- At the composition stage, the spatial and temporal relationships of the media elements are defined
- In addition, interactivity is implemented

# Macromedia Director

- One of the best known tools is Macromedia Director
- Media elements are gathered together as library
- Library elements are placed on stage
- Temporal relationships are defined with track editor
- Interactivity is defined with special Lingo scripting language



File Edit View Insert Modify Control Extras Window

5:04 PM



### Internal Cast

on exitFrame go to 1

on mouseDown go to 2

on exitFrame go to 4

help

6

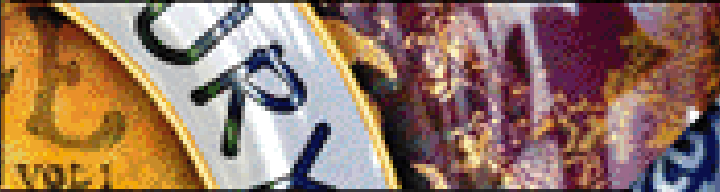
### Control Panel

0010

5

fps

fps



### ATTRACT Score

Sprite 5: Bitmap  
51  
Internal

ink: Copy 100 %

Editable Start: 10 X: 499 Y: 63

Moveable End: 10 Y: 265 H: 62

Traits

attract loop

Member	1	5	10	15	20	25	30	35	40	45	50	55	60	65
1	O2													
2	Ohelp													
3	Oquit													
4	OOForward Button Film Loop													
5	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO
6	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO	OOO
7														
8														

HELP

QUIT

# Barriers

- Material costs
- Quality
- Copyright
- Production costs
- Lack of standards
- Lack of ideas

# Material costs

- In multimedia production, broad know-how and different kinds of tools are required
- Projects are often large and difficult to manage  
+ planning, production, and distribution
- Subcontracting and ready-made components can be expensive
- In certain applications, run-time environment can be big investment

# Quality

- Good quality material is expensive to produce  
+ audio, video, animation, 3D graphics
- Highly specialized staff
- Special equipment
- Studio level premises

# Copyright

- The copyright issues of the material has to be resolved
- One should be careful in use of subcontractors, freelancers, and ready-made libraries
- Most sensible solution is to centralize the copyrights
- License agreements can be complicated
- Management and control of copyrights is difficult



# Production costs

- Tools are expensive and hard to learn
- Usability and versatility are often opposite requirements

# Lack of standards

- Wide distribution of applications requires standards
- There are several non-compatible platforms  
+ PC, TV, Internet, etc.
- Several standards are available, but only few can be used on more than one platform
- Compression standards are fortunately converging

# Lack of ideas

- There is a lack of good product ideas
  - + Edutainment
  - + Sociotainment
  - + Infotainment
- Products can be either stand-alone, hybrid, or networked
- Content product can also be interactive service
- Producers are looking for killer applications

# Research areas

- WYSIWYG editors
- Integrated tools
- Design process
- Production methods
- 3D virtual environments

# WYSIWYG editors

- Multimedia tools should function as publishing programs
  - + several easy-to-use tools
  - + What-You-See-Is-What-You-Get
  - + Drag-and-drop function
  - + Linking between different tools

# Integrated tools

- Multimedia applications are usually created as group work
- Each developer works on his own workstation
- Need for
  - + networked development tools
  - + version control
  - + project control

# Design process

- Two approaches
  - + multimedia presentations and applications
  - + structured documents
- New presentation formats are required
  - + definition of structure
  - + media editors
  - + temporal and spatial placement

# Production methods

- Development process contains usually several phases
  - + manuscript
  - + media components and their composition
  - + interactivity and timing
- In practice, iteration and several prototypes are required
- Current tools do not support hierarchical design well



# 3D virtual environments

- Most of the current applications are 2D (+ time)
- In the future, terminals will support also 3D graphics
- 3D virtual environments are coming
- Modeling is done with different kinds of tools
- Implementation of interactivity is difficult
- Interactivity means also interaction with other users

# Conclusions

- The development of multimedia applications and presentations require easy to use tools
- Digital format allows the use of several media at the same time
- Interactivity and synchronization requires either visual programming or scripts