4 Overview on Approaches to Multimedia Programming

4.1 History of Multimedia Programming

4.2 Squeak and Smalltalk: An Alternative Vision

4.3 Director and Lingo: Advanced Multimedia Authoring
   An introductory example
   Lingo scripting
   Director behaviours

4.4 Frameworks for Multimedia Programming

Literature:
http://www.lingoworkshop.com/
(In German:) T. Hauser, C. Wenz, Director MX 2004
   Einsteigerseminar, bhv-Verlag 2004
(In German:) M. Eberl, J. Jacobsen: Director MX and Lingo,
   Markt+Technik 2003

Director: History

• 1984: Macromind (Jamie Fenton, Marc Carter, Mark Pierce)
• 1985: VideoWorks for “Guided Tour” to Apple Macintosh OS
• 1987: VideoWorks II (colour)
• 1988: VideoWorks interactive, renamed to Director
  – John Thompson, Erik Neumann: Object-oriented scripting language Lingo
  – Used to create the displays for “Startrek TNG”
• until 1997: Mainly used for multimedia CD-ROMS (games, infotainment)
• 1998: Director as part of the “Shockwave Internet Studio”
• 2000: Macromedia puts strong effort into the Flash platform
• 2004: Director MX 2004 supports JavaScript syntax as alternative to Lingo
• 2005: Adobe Director?
Pictures, Sprites and Cast

- *Cast members* may be of various kinds (media elements):
  - Bitmap, vector graphics, sound, ...
- A *sprite* is an instance of a cast member
- A *picture* contains a number of sprites (those currently on stage)
- A *score* (Drehbuch) is like the timeline in Flash
  - Lifetime of sprites can be easily adjusted by mouse movements
**Tweening**

- Tweening essentially works like in Flash
  - Key frames need to be inserted to modify sprite
  - Alternatively whole sprite can be converted to single pictures
- Details of sprite tweening:

**Effect Channels**

- *Effect channels* apply specific effects to the whole stage
  - Shown above the sprite channels, have to be made visible explicitly
- *Transition channel* (Übergangskanal):
  - Applies transitions like in movie editing
- *Tempo channel* (Tempokanal):
  - Pause, waiting for a cue point in some continuous media, waiting for user input, ...
- *Colour palette channel* (Farbpalettenkanal):
  - Defining a colour palette, creating colour effects
- *Sound channels* (Tonkanäle):
  - Two channels only
- *Scripting channel* (Skriptkanal):
  - See below
Motion Tweening

- Very similar to Flash but easier
  - Each sprite has a default registration point for a motion path
  - Drawing motion paths is straightforward
  - Key frames used to reshape motion path

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Lingo interpreted

• There is a “message” window which allows a direct dialogue with the Lingo programming/scripting language

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The Lingo Paradigm

• Lingo is very much inspired by “HyperTalk” (Apple)
• All programming is programming event handlers
• There is no main program
  – Effectively the event handler of “prepareMovie” is kind of a main program
• Program code is only meaningful together with project file of the authoring system
  – No stand-alone programs
• All code is scattered over the project
**Event Handler**

- Running animations can be influenced by event handler:
  - Lingo: “on mouseUp go to frame X end”

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**Types of Lingo Scripts**

- Hierarchical search for scripts (in this order):
  - Drehbuch scripts (behaviours)
    - Executed when respective sprite is active or when a specific frame is shown
    - (object scripts) contain keyword “me”
  - Cast scripts
    - Once defined for all instances
    - (class scripts)
  - Movie scripts
    - Global for the whole movie
- If no script is found, execution continues
- If a script is found, more general scripts are ignored
- Practical hint for working with scripts in Director:
  - Use Script window and adjust script type
Local and Global Variables in Lingo

• By default, all variables are local in procedure
• Variables can be declared global
  – but then are global for whole movie

• Example for global variables:
  
  ```lingo
  global myCounter
  on mouseUp
    set myCounter = myCounter + 1
    put myCounter
  end
  ```

Object-Oriented in Director:
“Parent-Child Programming” (1)

• “Parent script” (class):

  ```lingo
  property pVorname, pNachname
  
  on new me
    return me
  end
  
  on fill me, vorname, nachname
    pVorname = vorname
    pNachname = nachname
  end
  ```
Object-Orientation in Director: “Parent-Child Programming” (2)

- Global script (film script):

```ludwig
   global lUsers

   on prepareMovie
      lUsers = []
   end

   on fillOut
      temp = new(script "parent script")
      fill(temp, member("vorname").text, member("nachname").text)
      append(lUsers, temp)
      clearfields
   end

   on clearFields
      member("vorname").text = ""
      member("nachname").text = ""
   end
```

vorname, nachname are text input fields

Object-Orientation in Director: “Parent-Child Programming” (3)

- Local script for enter button:

```ludwig
   on mouseUp
      fillOut()
   end
```
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 Behaviours in Director

- Lingo programming is too tedious for many developers
- Pre-fabricated “behaviour” blocks (similar to software components)
- See Window->Library, several categories
- Application developer works by drag&drop
  - Select behaviour
  - Drag it onto object creating the firing event
- Example: Sound playing behaviour
  - Create an empty film
  - Create a button (“music”)
  - Import some music
  - Look for “play sound” behaviour in library
  - Drag it onto button
  - This is equivalent to a lot of Lingo programming!
Director & Lingo: Summary

- Lingo language was very innovative at its time but is outdated
  - Syntax was modernized
    » “the xy of abc” replaced by “abc.xy”
  - JavaScript alternative being introduced
- Conceptually very similar to Flash
  - Fusion of both programs apparently under way
- Nice ideas:
  - Effect channels
  - Drag & drop behaviours
- Interactivity only at runtime
  - very restrictive compared e.g. to Squeak’s mixture of development
time/runtime interaction
- Professional support for wide range of media and large built-in library
- An alternative for nowaday’s development tasks but not a model for the
  future…