4 Overview on Approaches to Multimedia Programming

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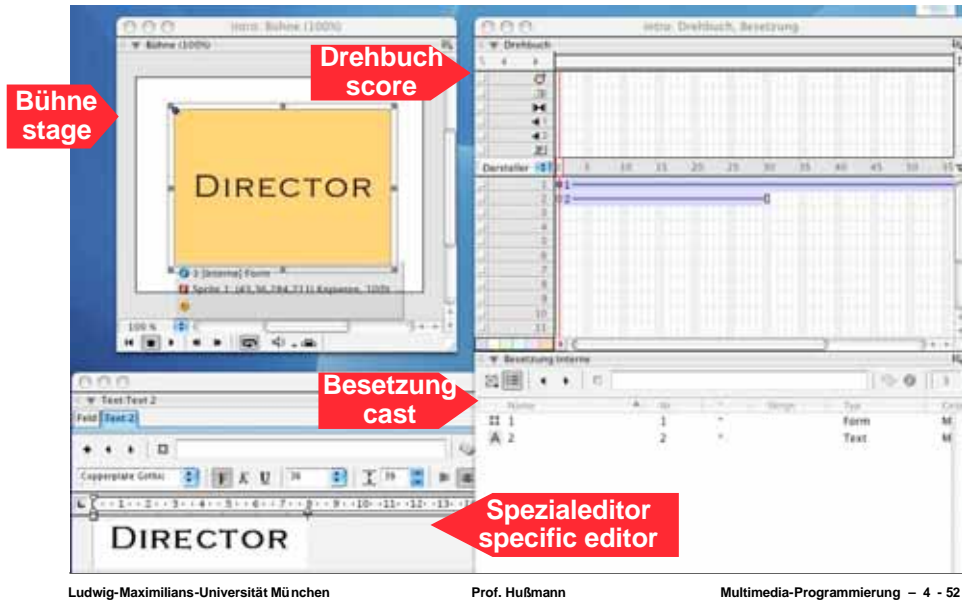 (In German:) M. Eberl, J. Jacobsen: Director MX and Lingo,
  Markt+Technik 2003

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?

Director Arbeitsumgebung (German Version)

Bühne / **stage**

Drehbuch / **score**

Besetzung / **cast**

Spezialeditor / **specific editor**

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
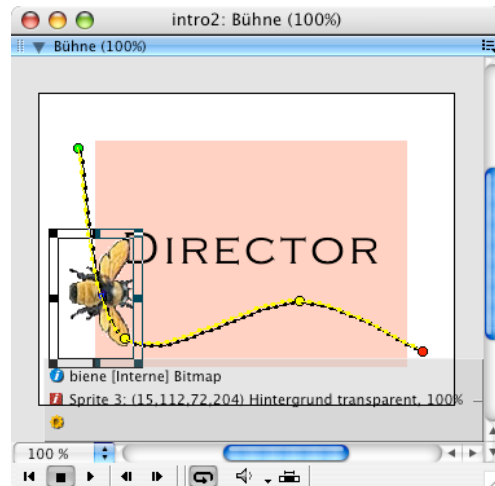- Details of sprite tweening:

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
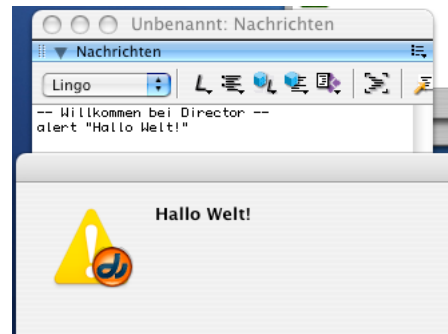
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4.1 History of Multimedia Programming

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

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Lingo interpreted

- There is a "message" window which allows a direct dialogue with the Lingo programming/scripting language
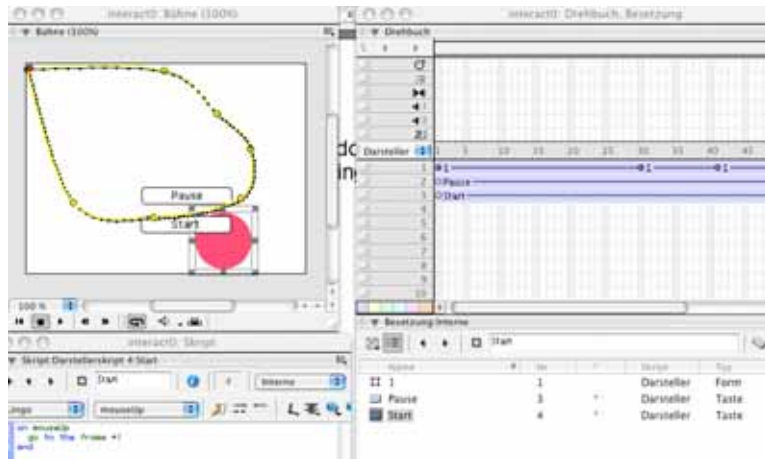

The Lingo Paradigm

- 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"

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:
```
global myCounter
on mouseUp
  set myCounter = myCounter + 1
  put myCounter
end
```

Object-Orientation in Director: "Parent-Child Programming" (1)

- "Parent script" (class):

```
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):

vorname, nachname
are text input fields

```
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
```

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

- Local script for enter button:

```
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!

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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…