

# 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,

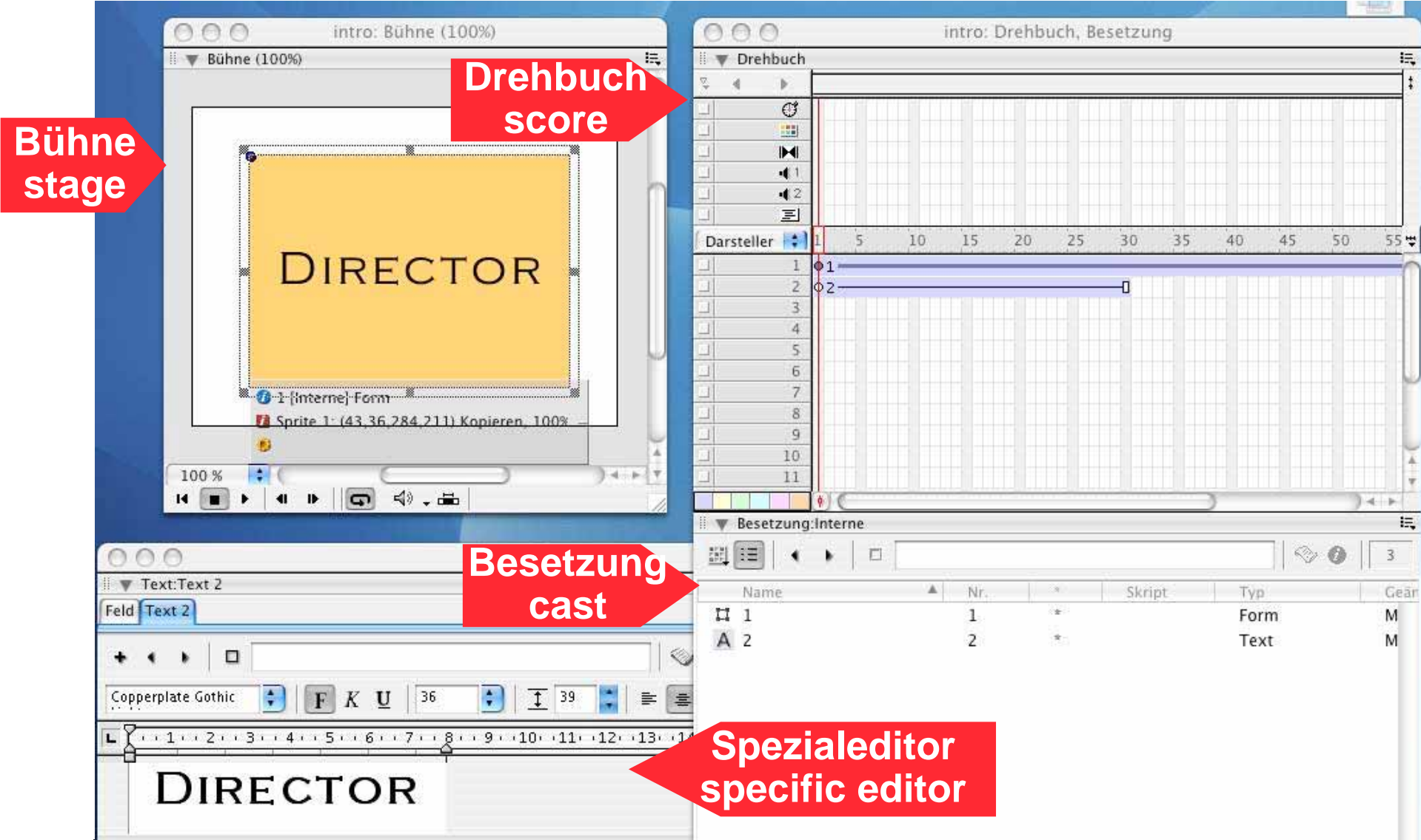
Markt+Technik 2003

# 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 “Star Trek 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)



# 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:

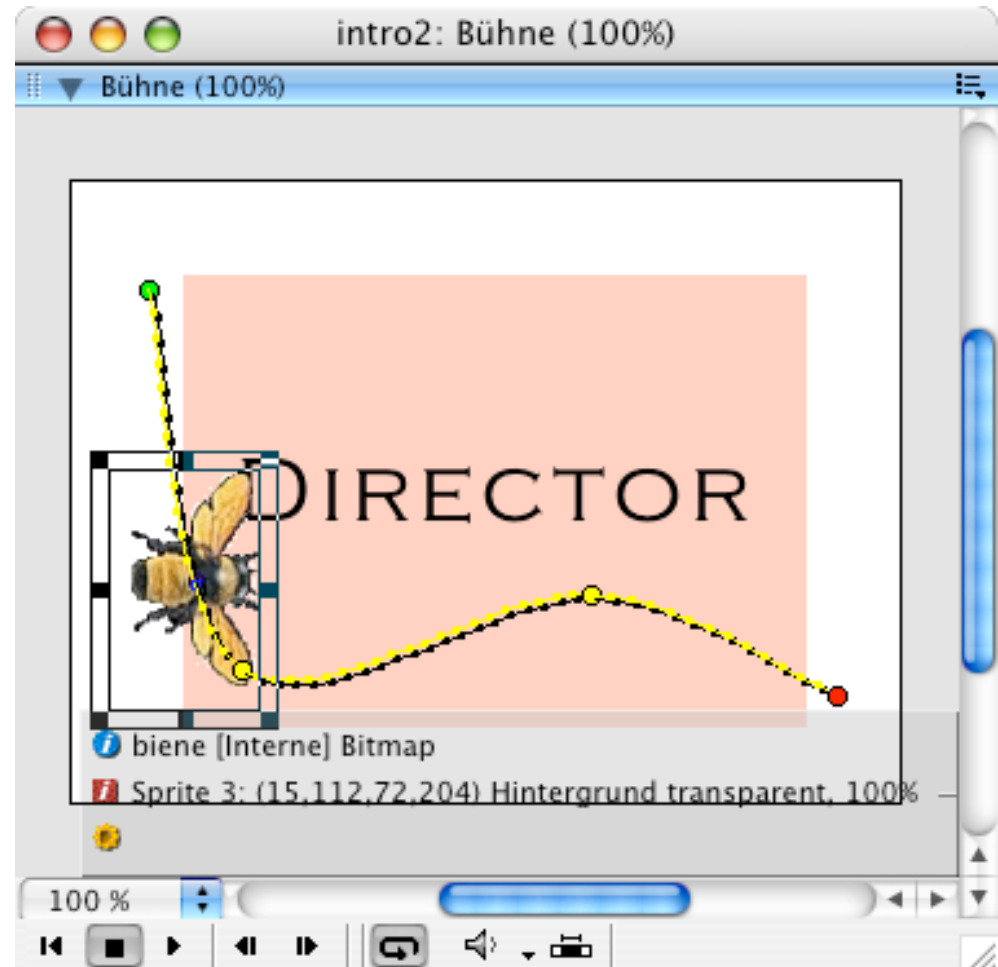


# Effect Channels

- *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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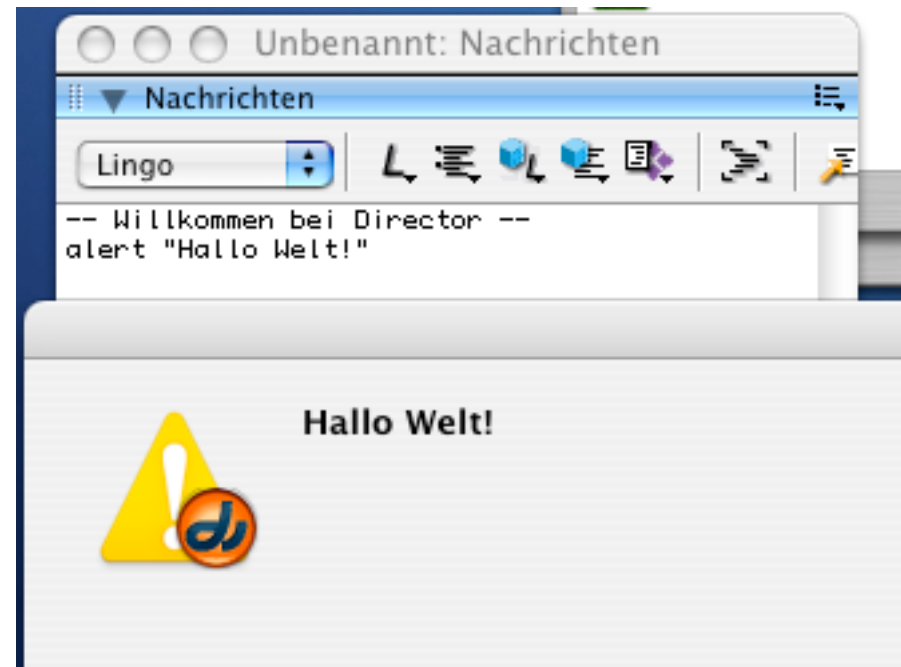
(In German:) M. Eberl, J. Jacobsen: Director MX and Lingo,

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# Lingo interpreted

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

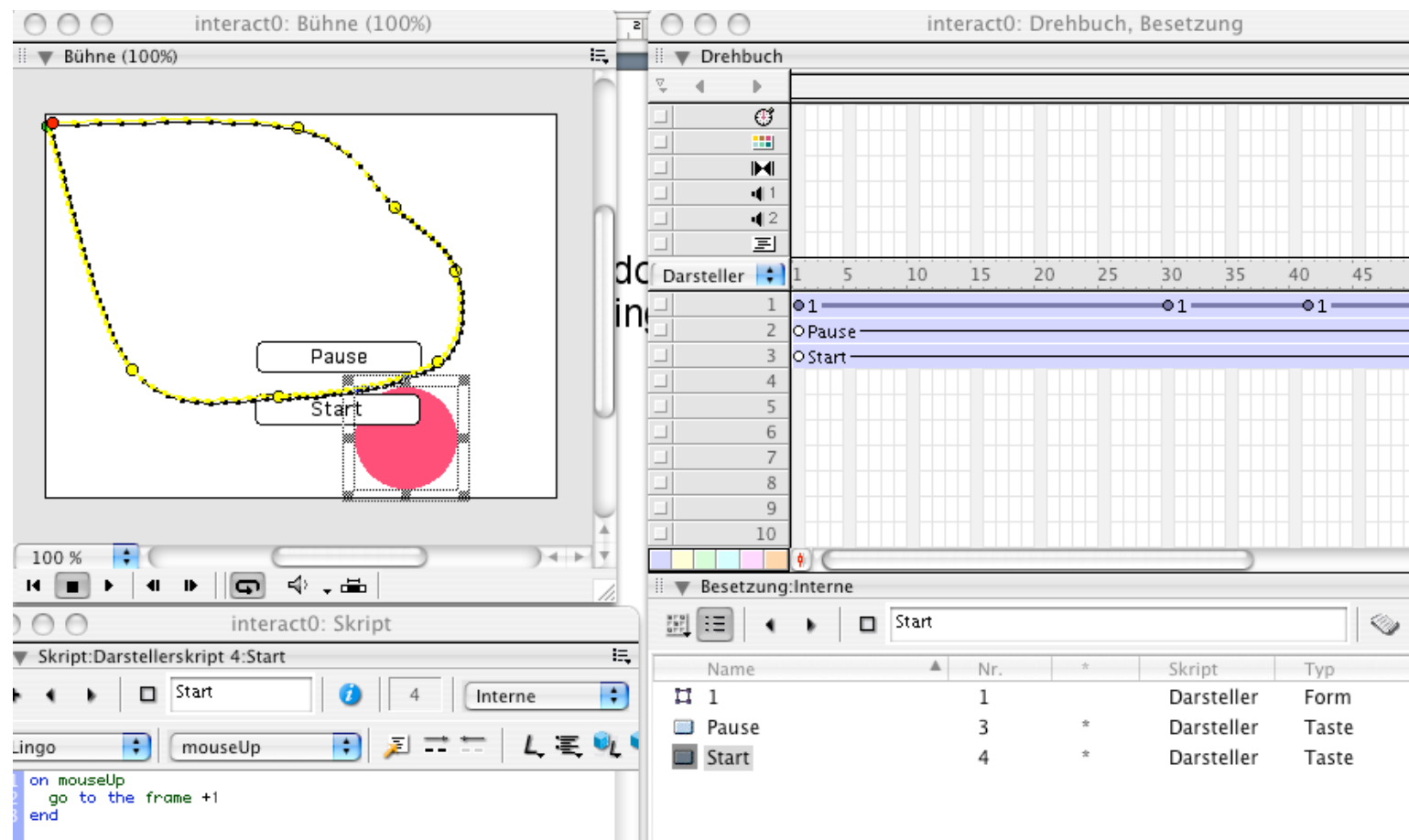


# The Lingo Paradigm

- 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):

```
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

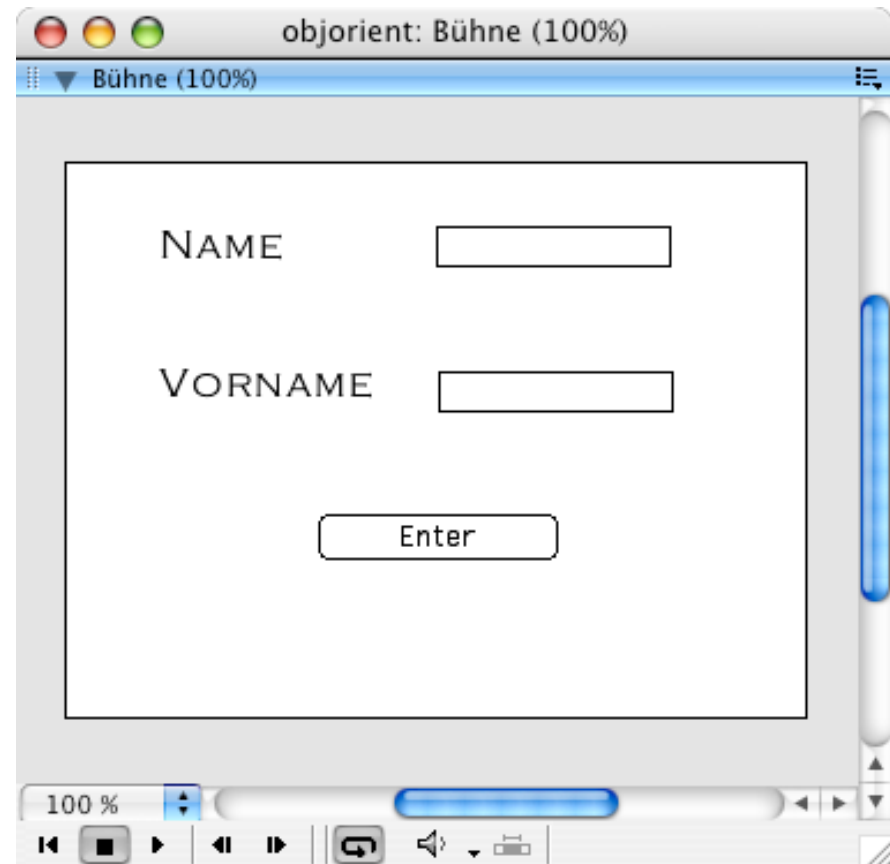
on clearFields
    member("vorname").text = ""
    member("nachname").text = ""
end
```

vorname, nachname  
are text input fields

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

- Local script for enter button:

```
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 nowadays’ development tasks but not a model for the future...