

5 History of Multimedia Programming

5.1 The Ancestors: Alto and Smalltalk



5.2 Graphical Authoring Tools: The Road to Flash

5.3 Degrees of Interactivity

Timeline of Multimedia Programming History

- 1963 – Sutherland: Sketchpad
- 1968 – Engelbart: NLS
- 1972 – Kay: Dynabook, Smalltalk
- 1979 – Xerox PARC: Alto
- 1982 – Brown: Guide authoring system
- 1985 – Sparks: VideoWorks
- 1987 – Atkinson: Apple HyperCard
- 1988 – Macromind Director
- 1989 – Kretz: Start of work on MHEG
- 1990s – Various multimedia education and gaming applications (CD-ROM)
- 1995 – Kay/Ingals/Kaehler: Squeak
- 1996 – Ackermann: MET++ Framework
- 1998 – W3C: SMIL
- 1997 – Macromedia Flash (*ex FutureSplash Animator ex SmartSketch*, by J. Gay)
- 2001 – Reas/Fry: Processing
- 2004 – ISO: MHEG-5
- 2004 – Adobe Flex
- 2004 – Bederson/Grosjean/Meyer: Piccolo framework
- 2005 – Oliver: F3 (later called JavaFX)
- 2007 – Microsoft Silverlight
- ? – HTML5 + JavaScript + Multimedia Frameworks

Ivan Sutherland's Sketchpad, 1963



- First object-oriented drawing program
- Master and instance drawings
- Rubber bands
- Simple animations



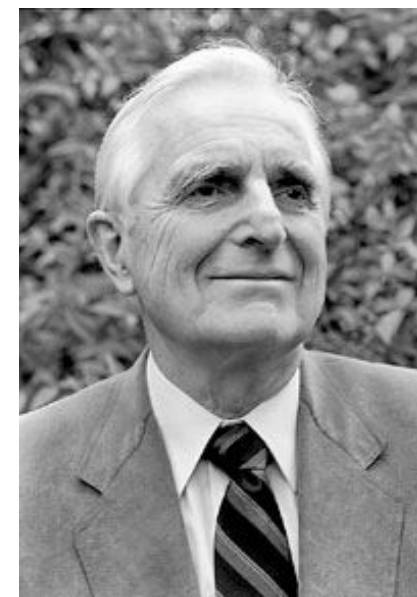
Video Demo Sketchpad (1962)



Intro:
Alan Kay
in 1987

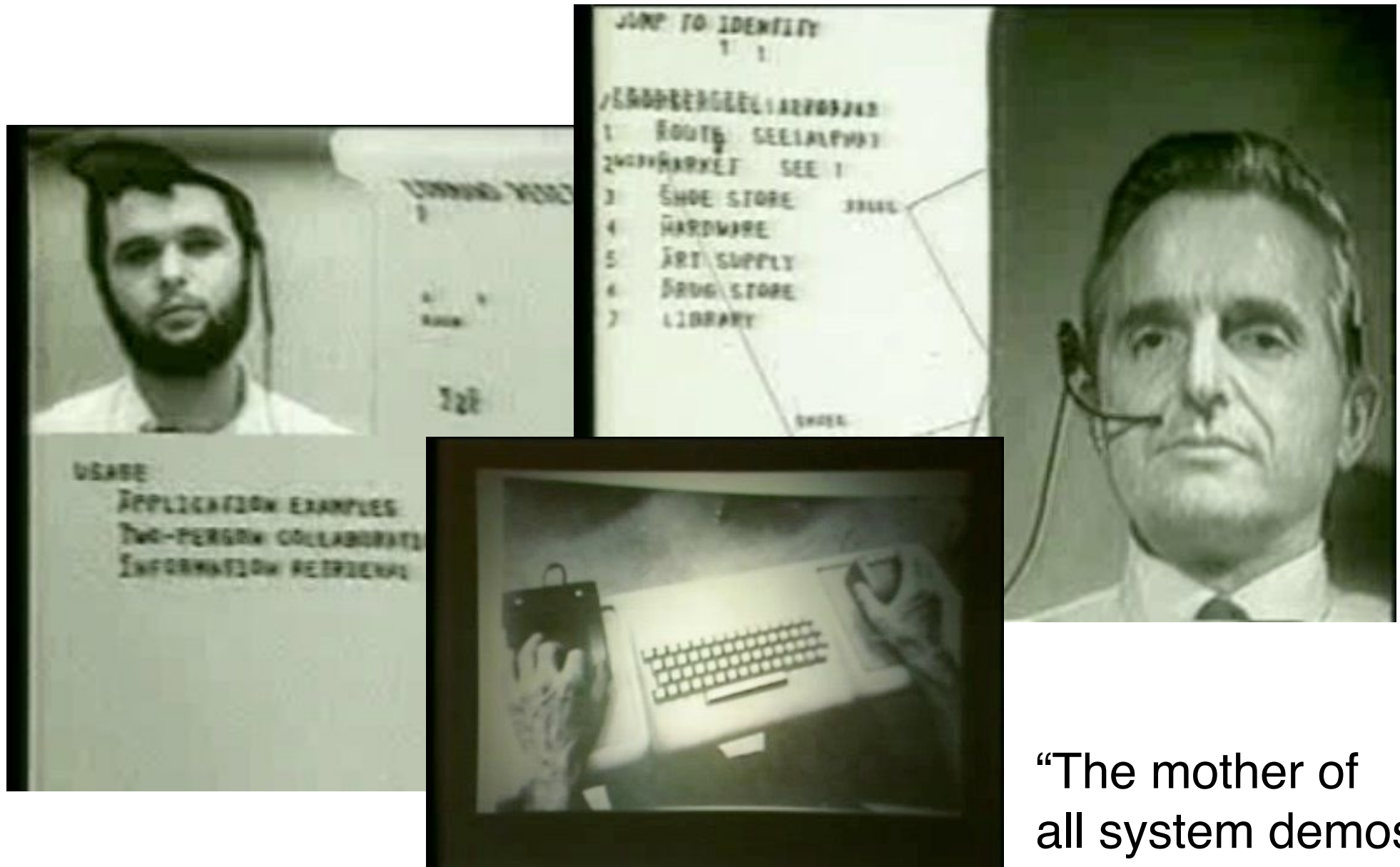
Douglas C. Engelbart 1962

- Lived 1925–2013, Ph.D. Berkeley 1955, Turing Award 1997
- Influenced by Vannevar Bush's article "As We May Think" (1945)
- 1962: Research Project at SRI (Stanford Research Institute): "Augmenting Human Intellect: A Conceptual Framework"
 - Research support triggered by the "Sputnik shock" (1957)
- Basic ideas:
 - Computer supported learning
 - Computer supported collaboration
 - Seamless integration of computer interaction into workflows
- Development of the "NLS" (oNLine System)
 - Demonstrated 1968 in Brooks Hall, San Francisco
- 1970: Patent application for "X-Y pointing device" (mouse)



<http://www.bootstrap.org/augdocs/friedewald030402/augmentinghumanintellect/ahi62index.html>

NLS Demo 1968



“The mother of all system demos”

Video Demo NLS 1968



Intro:
Alan Kay
in 1987

Alan C. Kay



- U. Utah PhD student in 1966
 - Read Sketchpad, Ported Simula
 - "Flex: A Flexible Extendible Language"
- Saw "objects" as the future of computer science
- Dissertation (1969): "The Reactive Engine" propagates an object-oriented *personal* computer
 - A *personal* computer was a radical idea then!
 - How radical?

"There is no reason anyone would want a computer in their home."
(Ken Olsen, Digital Equipment Corp, 1977)

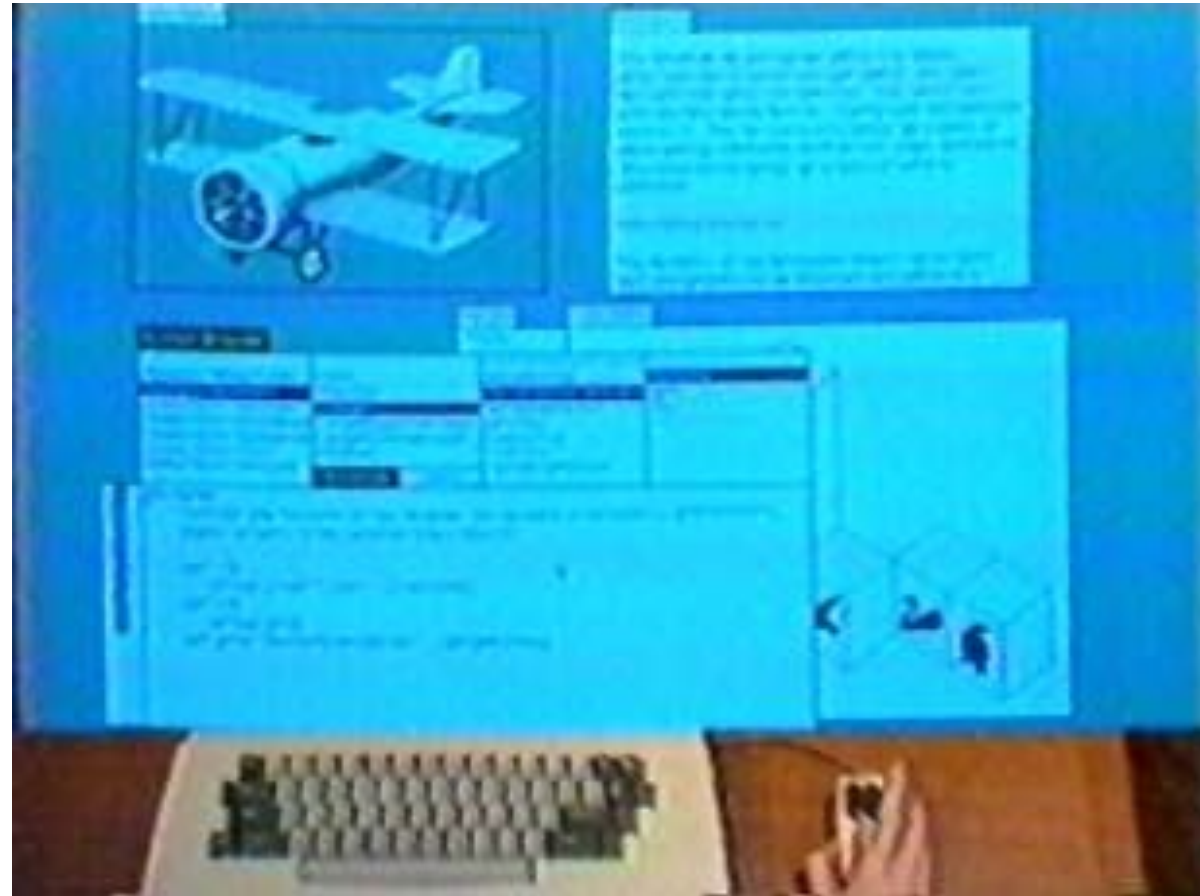
Further stations of Alan Kay's life:

- Stanford Artificial Intelligence Laboratory
- **Xerox PARC**
- Atari
- Apple
- Disney Interactive
- Viewpoints Research Institute
- Hewlett-Packard

from M. Guzdial

Xerox PARC Learning Research Group:

- Object-oriented programming system
 - Mouse
 - Windows
 - Icons
 - Pop-up menus
- Uses simple object-oriented language “Smalltalk”
- Idea of user interface: Make computers easy to use for everybody
- Idea of language: make programming both more simple and more powerful (e.g. include *multimedia: sound*)

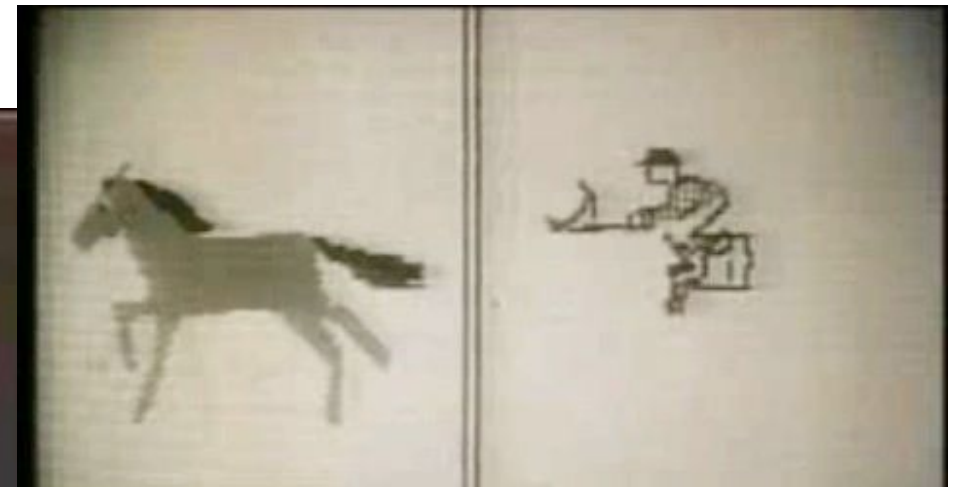


The Alto

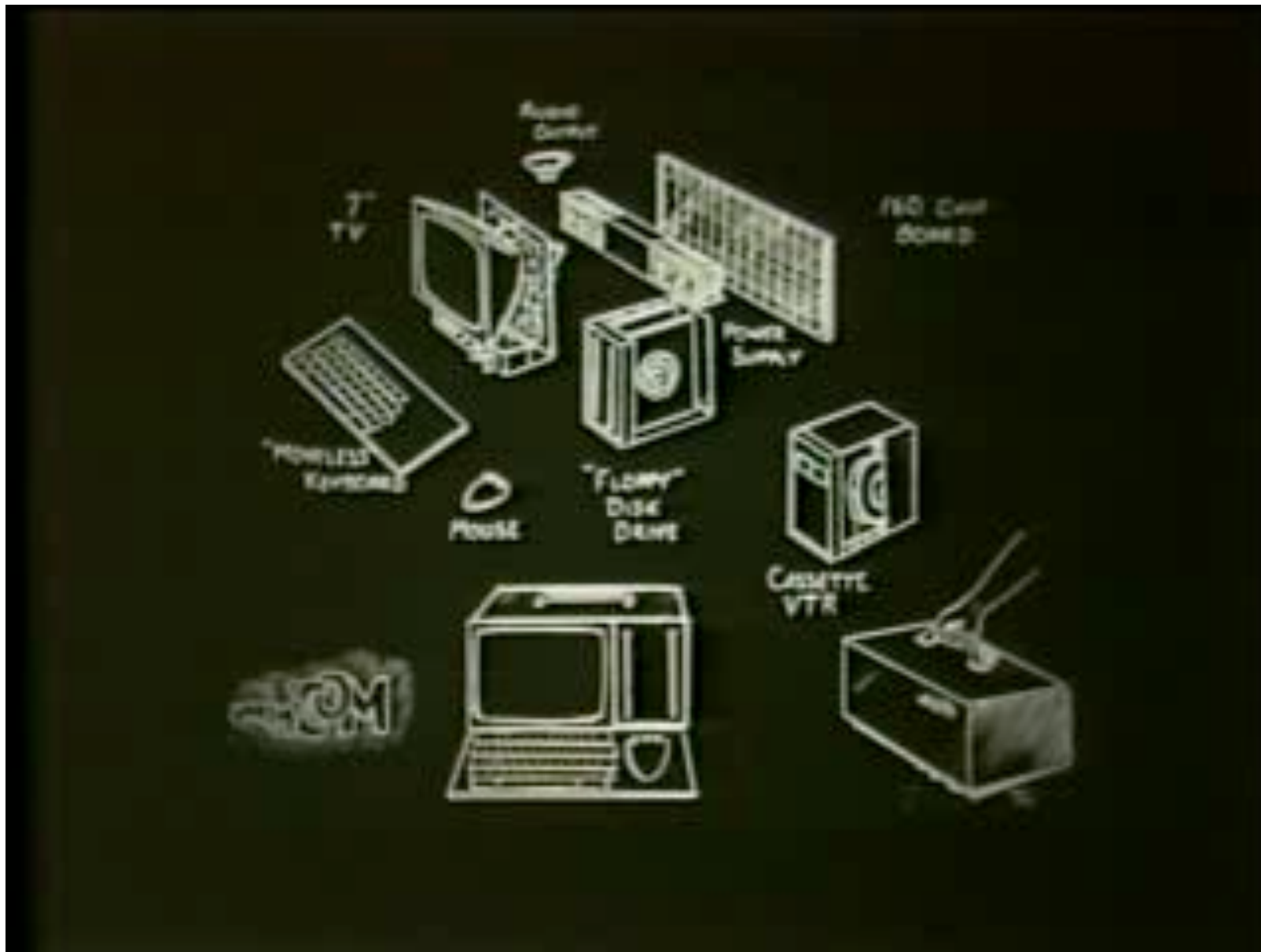
- The machine the prototype of which impressed Steve Jobs so much that he decided to produce the Lisa/Macintosh kind of computers for the mass market (1979)
 - Graphical user interface
 - Networked via Ethernet
 - Programming language Smalltalk
- Hardware:
 - 800 x 600 display
 - Data General 16 Bit processor
 - 400.000 instructions/second
 - 256 kByte – 512 kByte RAM
 - 2 x 2,5 MByte Festplatte



Animation Software on the Alto



Video Demo Animation/Alto



Intro:
Alan Kay
in 1987

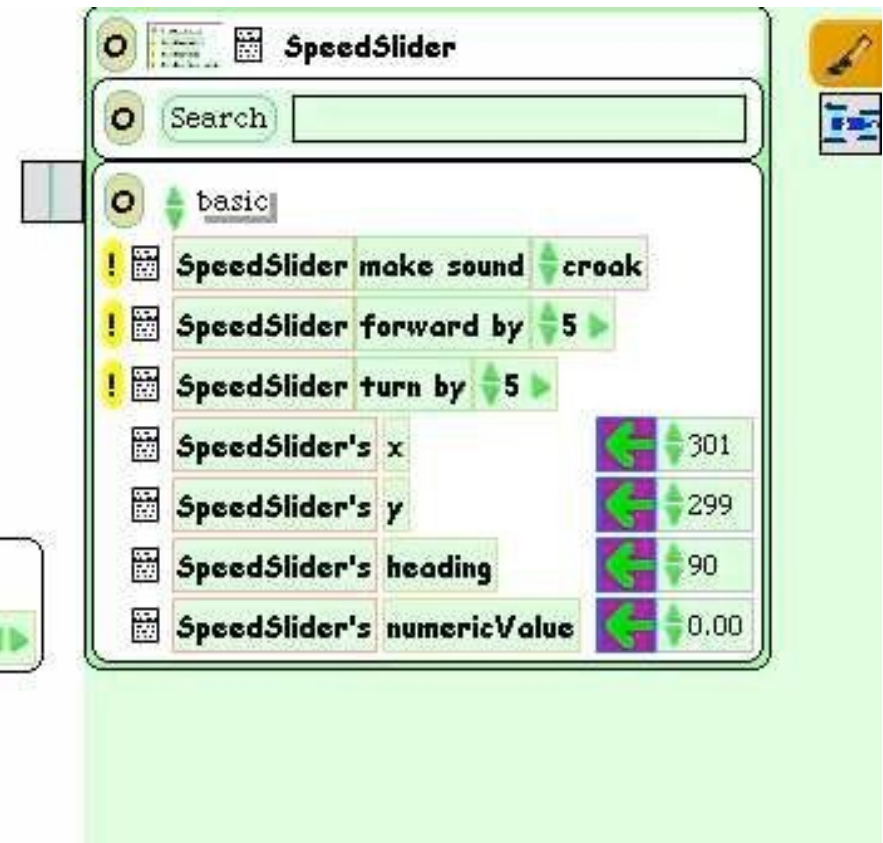
Visual Multimedia Programming in Squeak

- 1995: Alan Kay, Dan Ingalls, Ted Kaehler at Apple
- Reintroducing multimedia features into Smalltalk
- Programming environment targeted at children (primary school level)



“Halo” menu

Visual scripts



5 History of Multimedia Programming

5.1 The Ancestors: Alto and Smalltalk

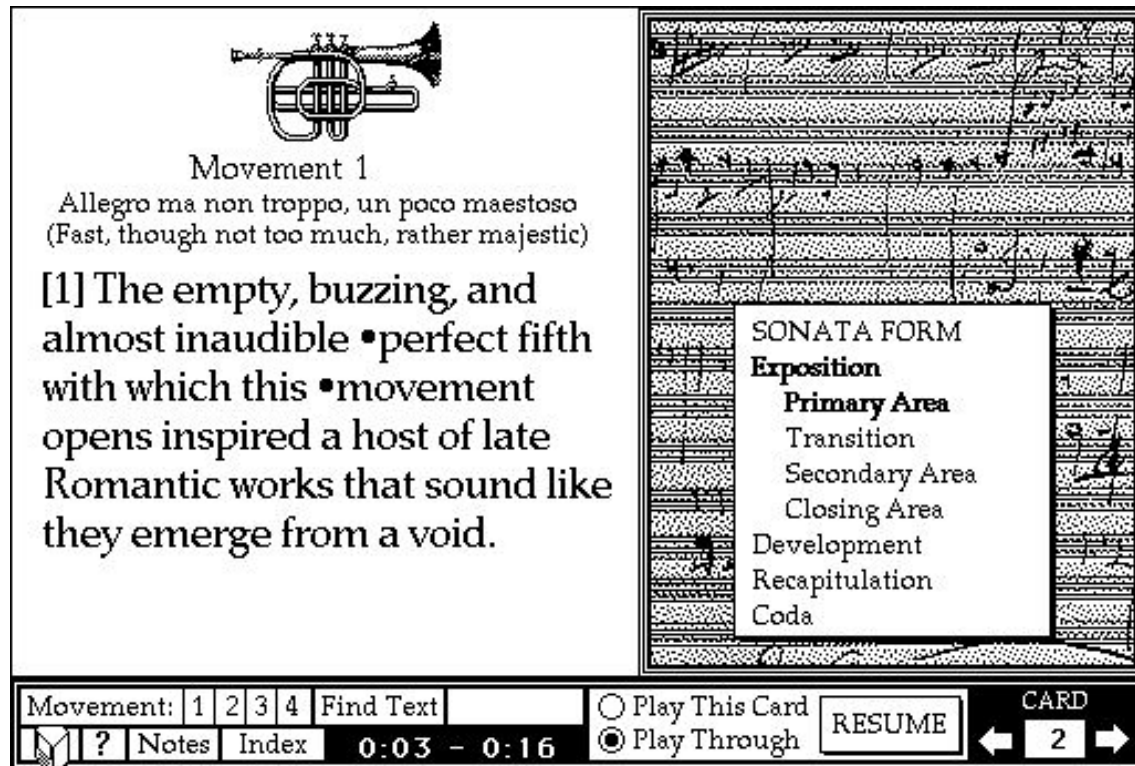
5.2 Graphical Authoring Tools: The Road to Flash



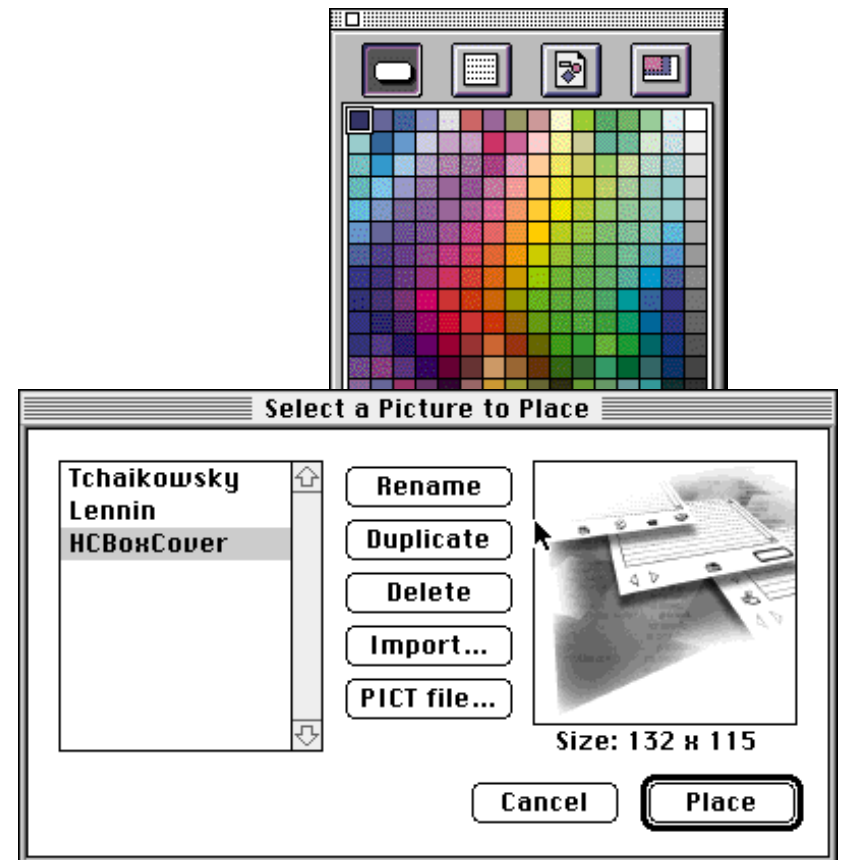
5.3 Degrees of Interactivity

Hypertext Authoring Tools

- Visual design of user interface, integration of media (images, sound):
 - 1982, Peter Brown (Kent): Guide authoring system
 - 1987, Bill Atkinson (Apple): HyperCard authoring system (*HyperTalk* scripting)



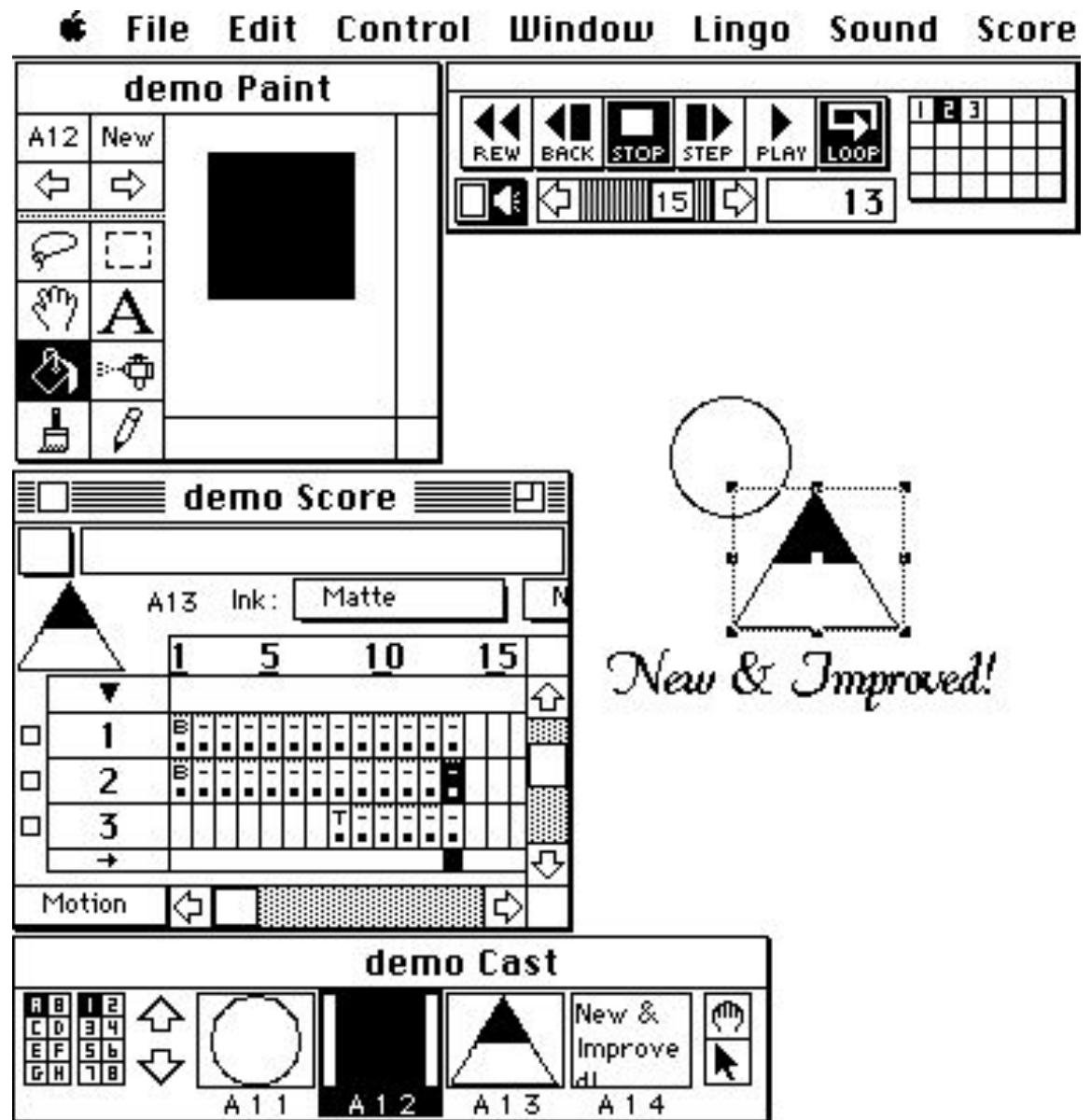
MultimediaHyperCard stack (Voyager 1989)
(Source for image: wapedia.mobi)



(Source for images: mactech.com)

Animation Authoring: VideoWorks

- Joe Sparks
- Macromind, 1985-88
- Later renamed to *Director*
- Introduces stage metaphor
- Used (for example) for multimedia tutorials on Apple MacOS
- Specialized scripting language *Lingo*

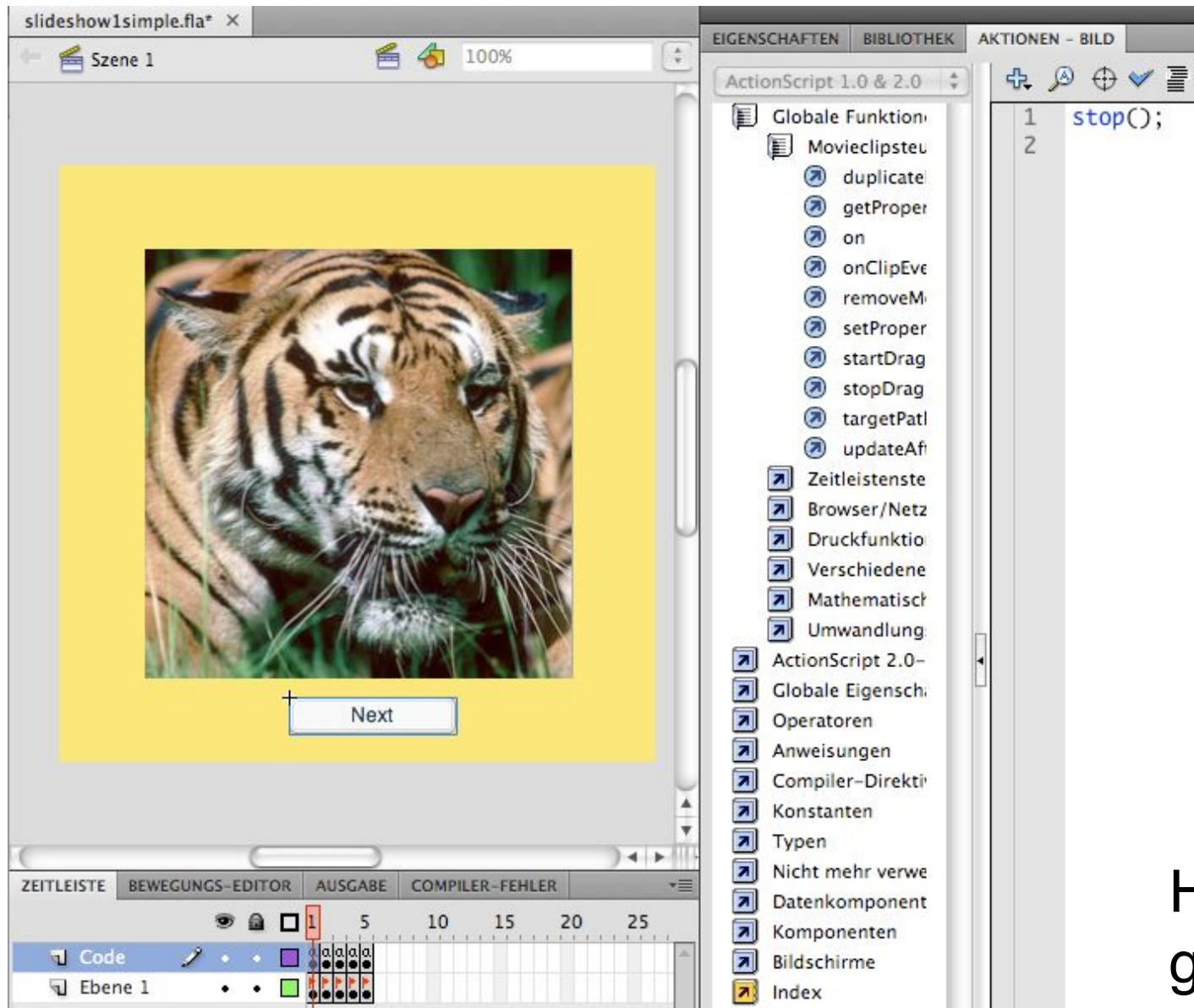


Flash: History

- Jonathan Gay:
 - Software developer for *Silicon Beach Software* (starting in high school...)
 - Involved in various ground-breaking Macintosh applications: Airborne!, DarkCastle (1987), SuperPaint II, IntelliDraw (drawings with behaviour)
- 1993: Foundation of *FutureWave Software*
 - Goal: Develop sketching software (*SmartSketch*) for the new “pen computer” and the PenPoint operating system from the company GO
 - GO (and later EO) computers failed
- 1995-96: *SmartSketch* becomes *FutureSplash Animator*
 - Ported to Macintosh and Windows
 - Extended with 2D animation features
 - From the beginning targeted at delivery over the Web
 - Well accepted by important customers (e.g. Microsoft, Disney)
- 1996: FutureWave bought by Macromedia
 - FutureWave Splash becomes *Macromedia Flash 1.0*
- 2005: Adobe acquires Macromedia and its product portfolio



Flash: Control-Flow Based Scripting



Hybrid scripting/
graphic authoring

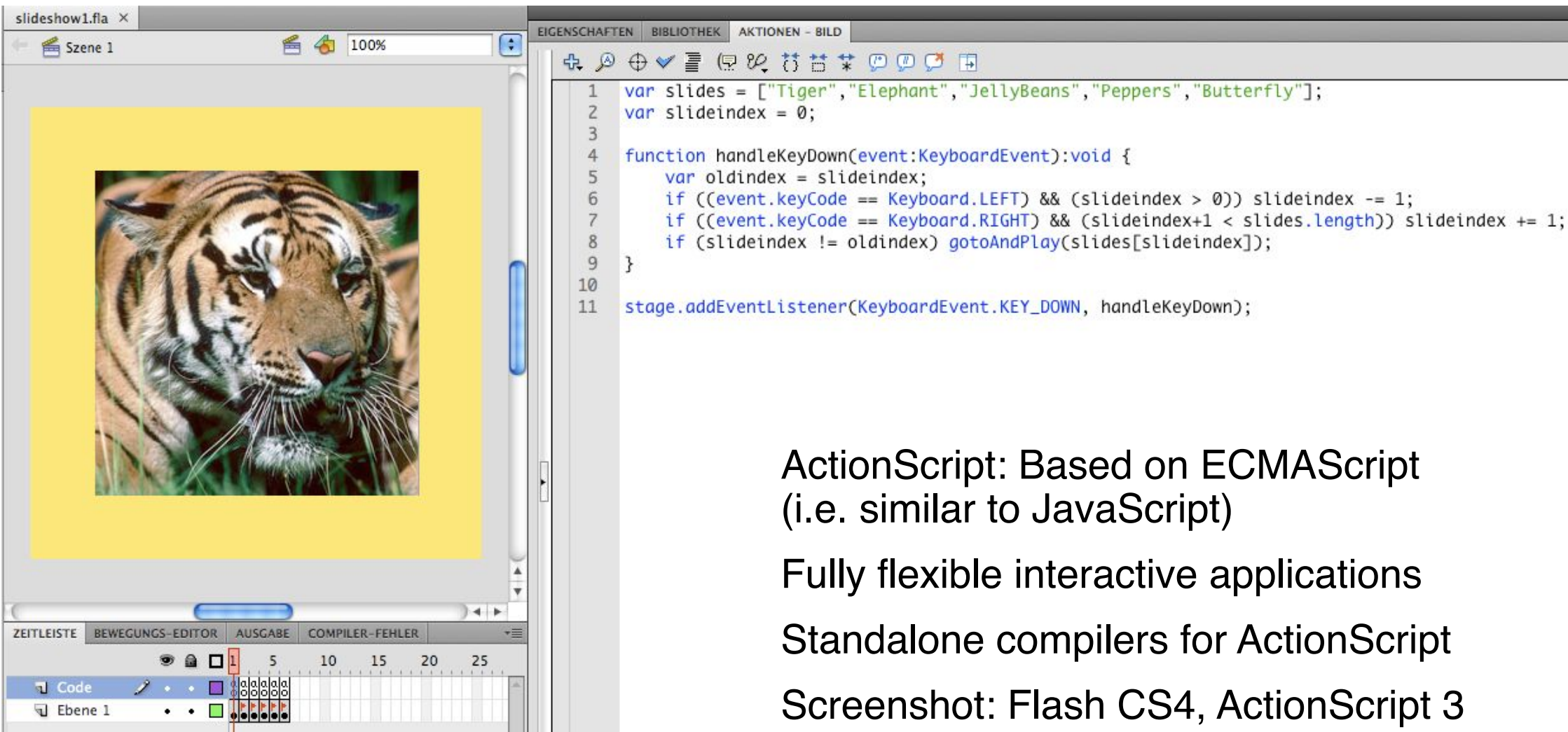
Flash: Object-Based Scripting

The screenshot displays the Adobe Flash IDE interface. The main stage shows a yellow background with a central image of colorful jelly beans. Below the image are two buttons labeled "Prev" and "Next". The right-hand side of the interface is divided into two panels: "EIGENSCHAFTEN" (Properties) and "AKTIONEN - KOMPONENTE" (Actions - Component). The "AKTIONEN - KOMPONENTE" panel is active, showing a list of ActionScript actions and a code editor. The code editor contains the following ActionScript code:

```
1 on (release) {  
2     _root.gotoAndPlay("Peppers");  
3 }  
4
```

The bottom of the interface shows the timeline and layers panels. The timeline is set to frame 1, and the layers panel shows a layer named "Ebene 1" with a keyframe at frame 1.

Flash/ActionScript: Object-Oriented Scripting



The screenshot displays the Adobe Flash CS4 interface. On the left, the 'Scene 1' stage shows a yellow background with a tiger image. The right panel, titled 'AKTIONEN - BILD', contains the following ActionScript 3 code:

```
1 var slides = ["Tiger", "Elephant", "JellyBeans", "Peppers", "Butterfly"];
2 var slideindex = 0;
3
4 function handleKeyDown(event:KeyboardEvent):void {
5     var oldindex = slideindex;
6     if ((event.keyCode == Keyboard.LEFT) && (slideindex > 0)) slideindex -= 1;
7     if ((event.keyCode == Keyboard.RIGHT) && (slideindex+1 < slides.length)) slideindex += 1;
8     if (slideindex != oldindex) gotoAndPlay(slides[slideindex]);
9 }
10
11 stage.addEventListener(KeyboardEvent.KEY_DOWN, handleKeyDown);
```

Below the code, the 'ZEITLEISTE' (Timeline) is visible, showing a single frame at 1 second. The 'Code' layer is active, and the 'Ebene 1' (Level 1) is visible in the layer panel.

ActionScript: Based on ECMAScript
(i.e. similar to JavaScript)

Fully flexible interactive applications

Standalone compilers for ActionScript

Screenshot: Flash CS4, ActionScript 3

5 History of Multimedia Programming

5.1 The Ancestors: Alto and Smalltalk

5.2 Graphical Authoring Tools: The Road to Flash

5.3 Degrees of Interactivity



Interactivity

- Degrees of interactivity (based on T.A. Aleem 1998):
 - Passive, Reactive, Proactive, Directive
- Application to multimedia (Heller et al. 2001) - Examples:

<i>Media type</i> ↓	<i>Passive</i>	<i>Reactive</i>	<i>Proactive</i>	<i>Directive</i>
<i>Text</i>	Sequential presentation	Page turner, Linear spacing	Browsing, Hypertext	Word processing
<i>Graphics</i>	Sequential presentation	Predefined changes (choice between graphics)	Change of colors, sizes, shapes, ...	Drawing graphics
<i>Sound</i>	Sequential presentation	Predefined changes (sound clip, volume)	Selection of track, fast forward, loop	Creation of sounds
<i>Motion</i>	Sequential presentation	Predefined changes (path, target of motion)	Start, stop, pause, forwd, reverse	Creation of animations