5 History of Multimedia Programming

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
- 1997 – Macromedia Flash (ex *FutureSplash Animator* ex *SmartSketch*, by J. Gay)
- 1998 – W3C: SMIL
- 1990s – Game development frameworks (SDL 1998)
- 2001 – Reas/Fry: Processing
- 2004 – ISO: MHEG-5
- 2004 – Bederson/Grosjean/Meyer: Piccolo framework
- 2005 – Oliver: F3 (later called JavaFX)
- 2007 – Microsoft Silverlight
- 2014 – 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)

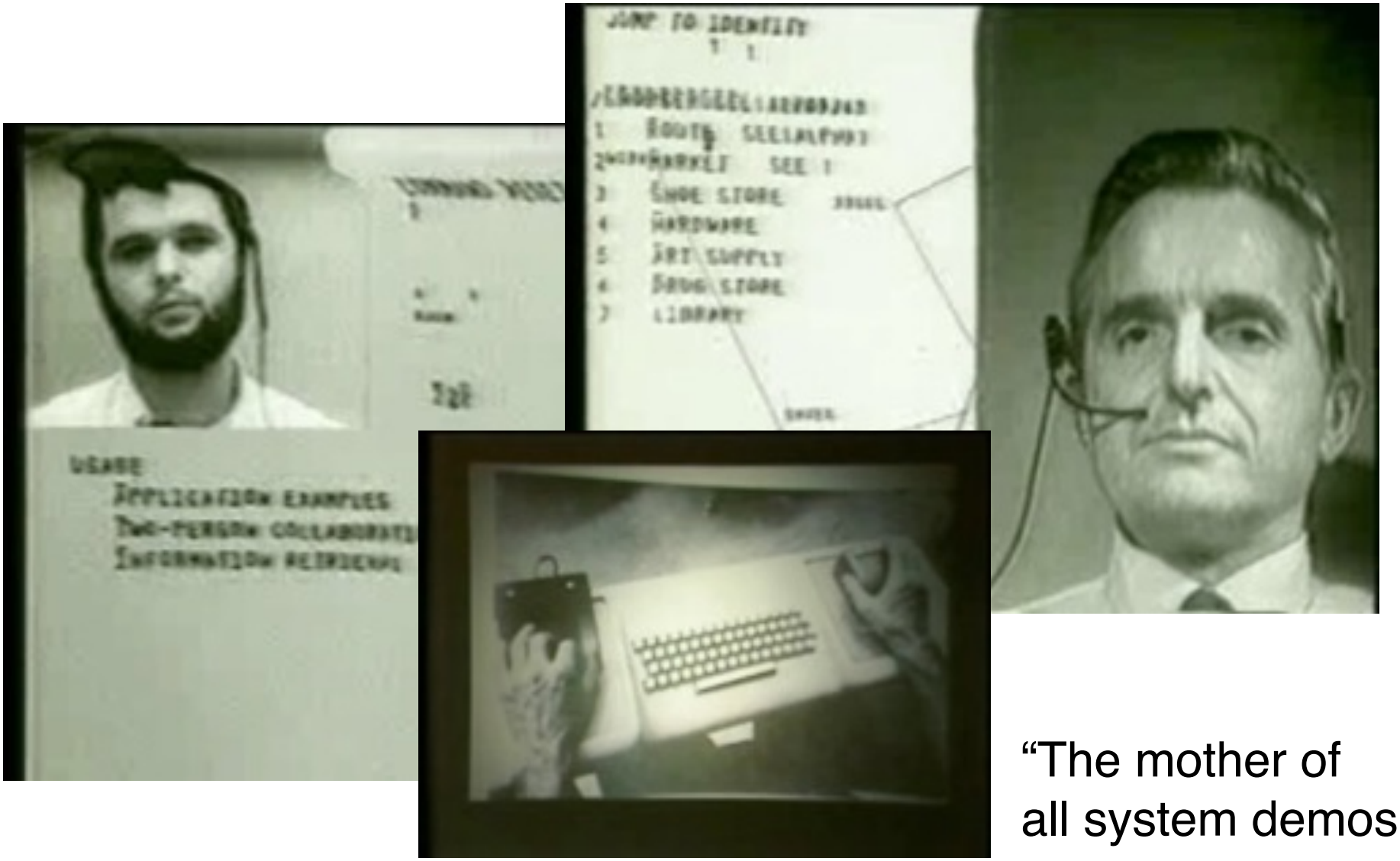
Intro:
Alan Kay
in 1987

Douglas C. Engelbart 1962

- Lived 1925–2013, Ph.D. Berkeley 1955, Turing Award 1997
- Influenced by Vennevar 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?

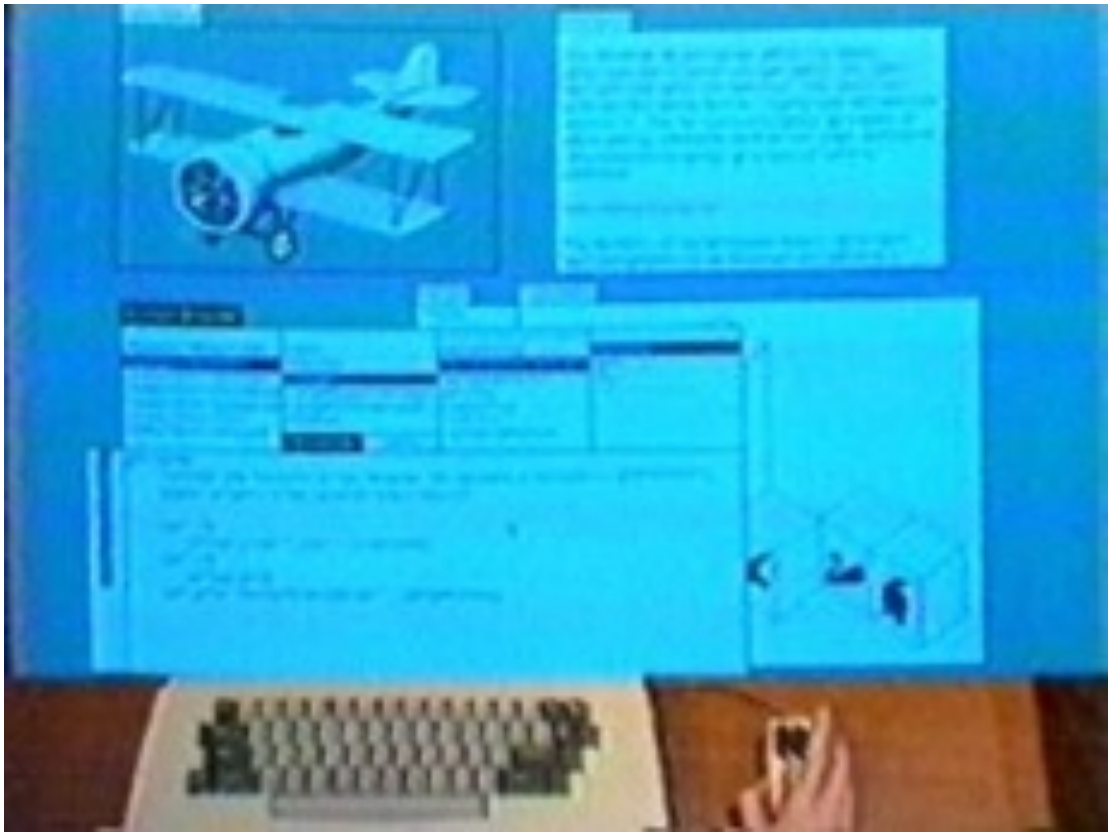
"There is no reason anyone would want a computer in their home."
(Ken Olsen, Digital Equipment Corp, **1977**)

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:

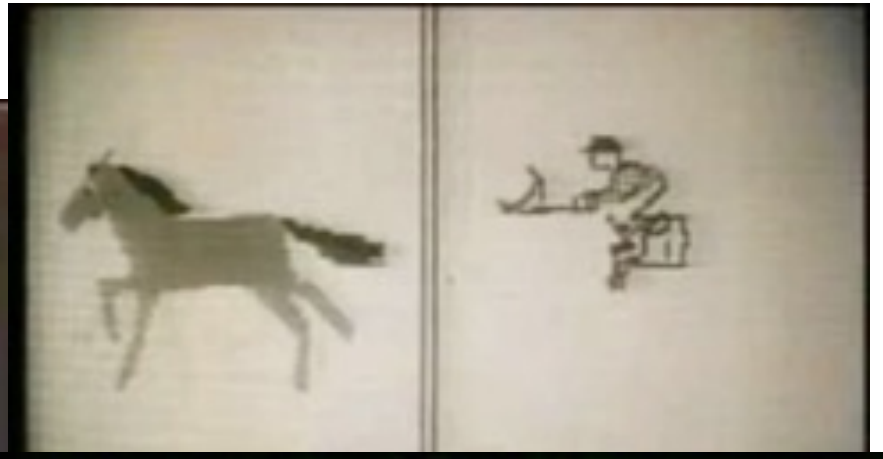
- Object-oriented programming system
  - Mouse
  - Windows
  - Icons
  - Pop-up menus
- Uses simple object-oriented language “Smalltalk”
- Idea of user interface: Make computers easy to use for everybody
- Idea of language: make programming both more simple and more powerful (e.g. include *multimedia: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



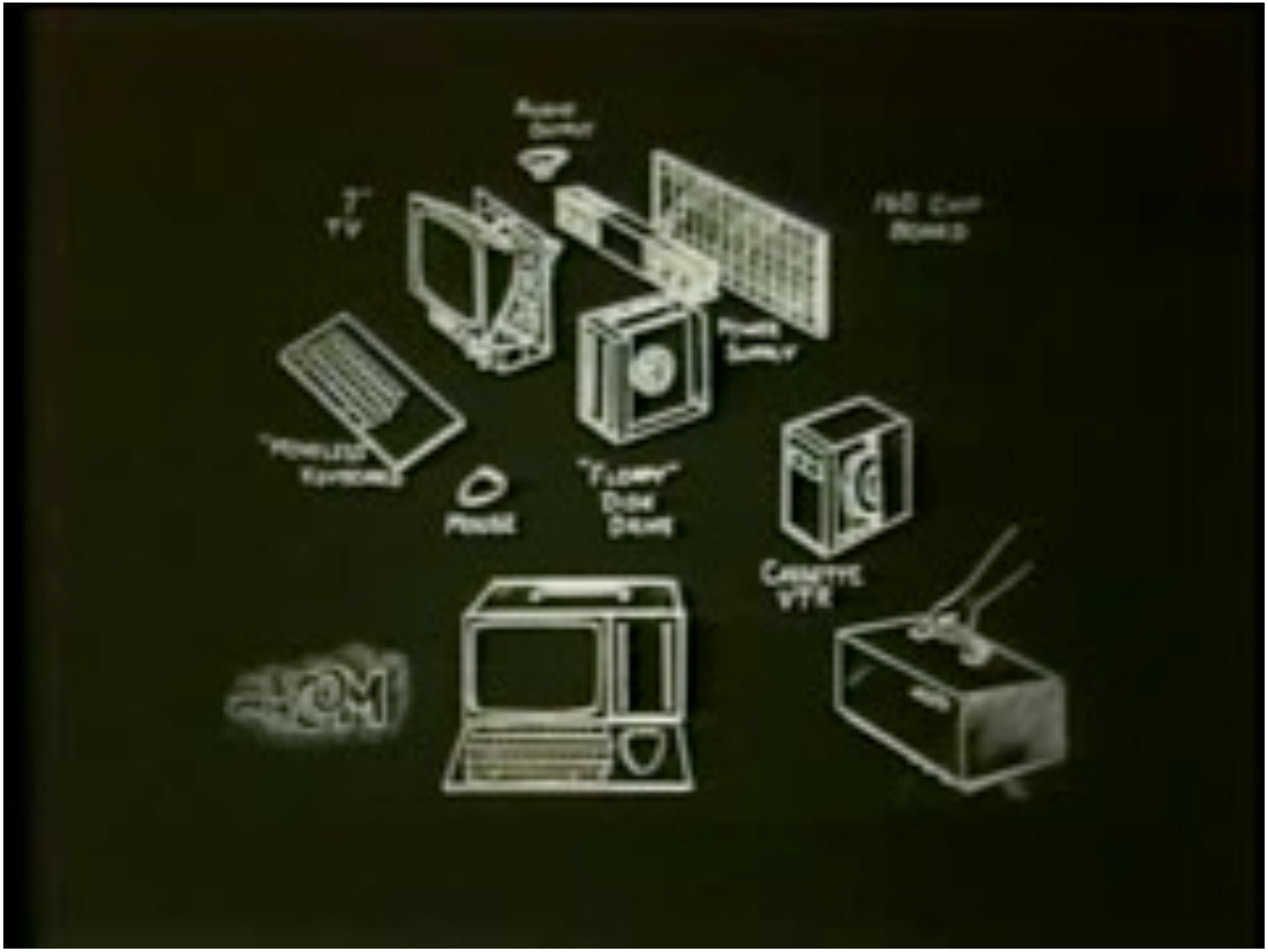
The Alto

- 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



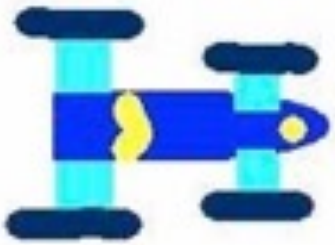
Intro:
Alan Kay
in 1987

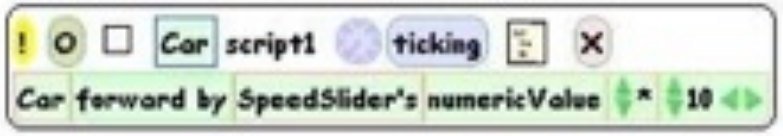
Visual Multimedia Programming in Squeak

- 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

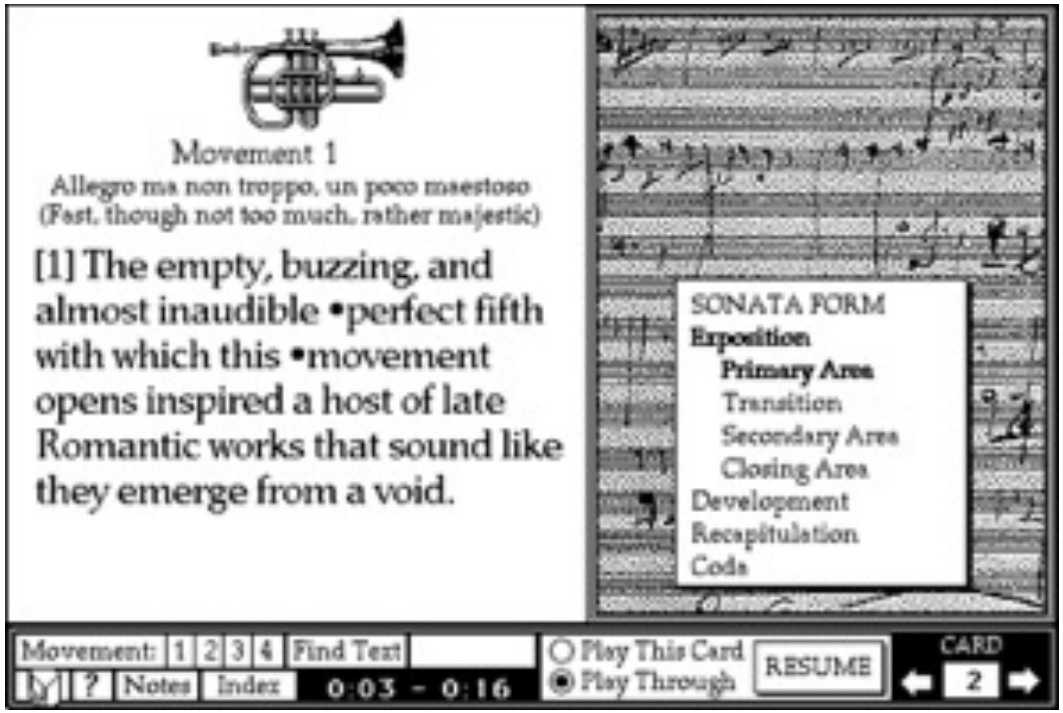




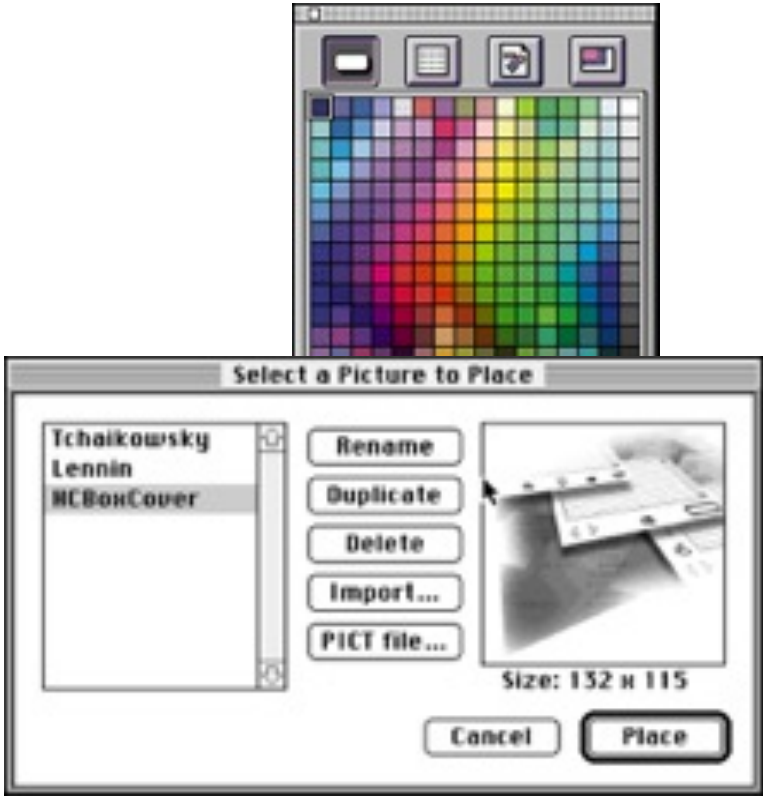
5 History of Multimedia Programming

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)



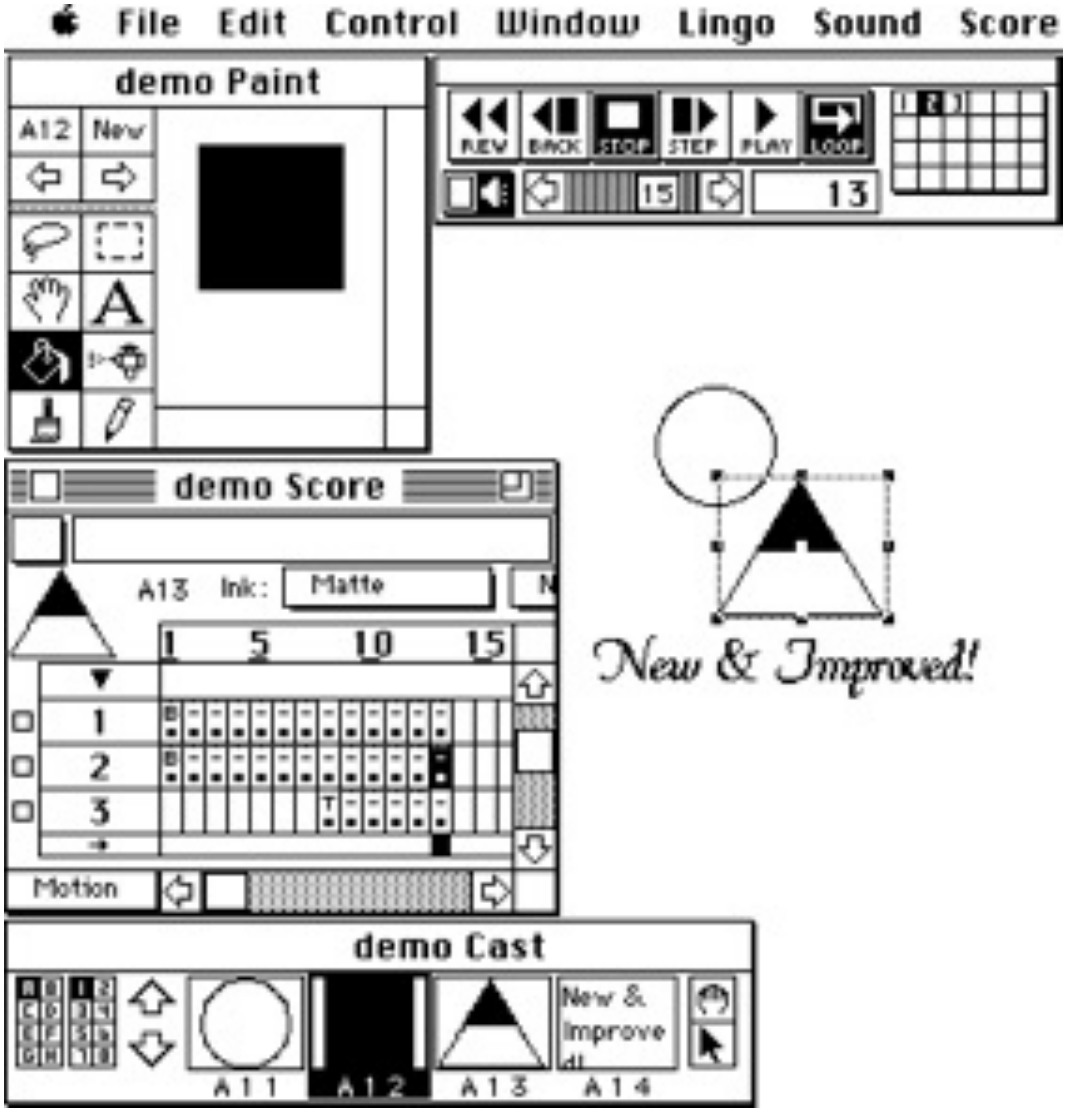
MultimediaHyperCard stack (Voyager 1989)
(Source for image: wapedia.mobi)



(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*

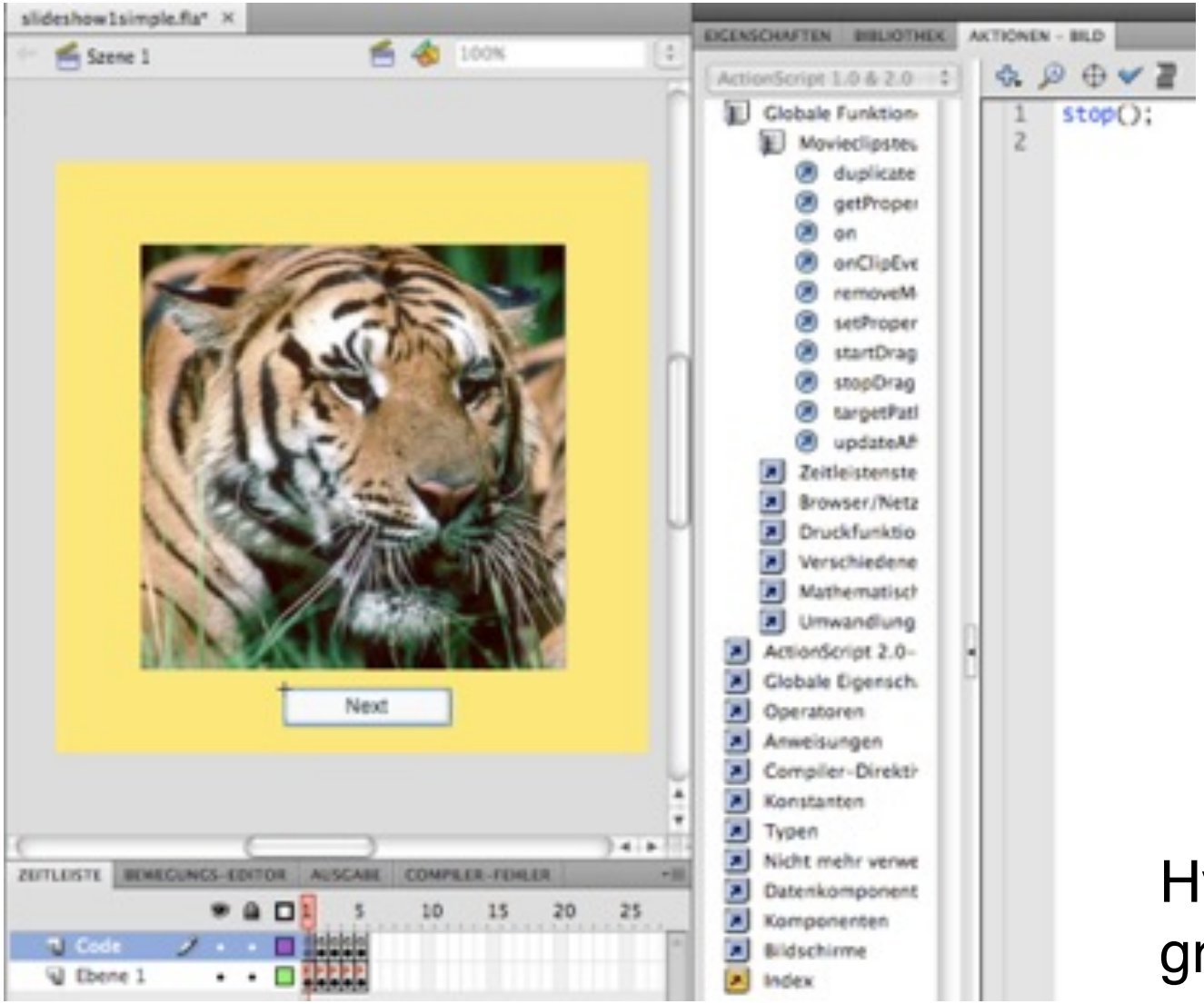


Flash: History

- Jonathan Gay:
  - Software developer for *Silicon Beach Software* (starting in high school...)
  - Developer for various ground-breaking Macintosh applications
- 1993: Foundation of *FutureWave Software*
  - Sketching software (*SmartSketch*) for the new “pen computer” from the company GO
  - GO (and later EO) computers failed
- 1995-96: *SmartSketch* becomes *FutureSplash Animator*
  - Extended with 2D animation features
- 1996: FutureWave bought by Macromedia
  - FutureWave Splash becomes *Macromedia Flash 1.0*
- 2005: Adobe acquires Macromedia and its product portfolio
- 2000 – 2007: Flash runtime and Flash animations broadly used in the Web
- 2007: Negotiations about Flash support for iOS fail, YouTube provides alternative
- Since 2010: “War” between Flash and HTML5/JavaScript
- Since 2008: Adobe AIR cross-platform runtime, e.g. for games

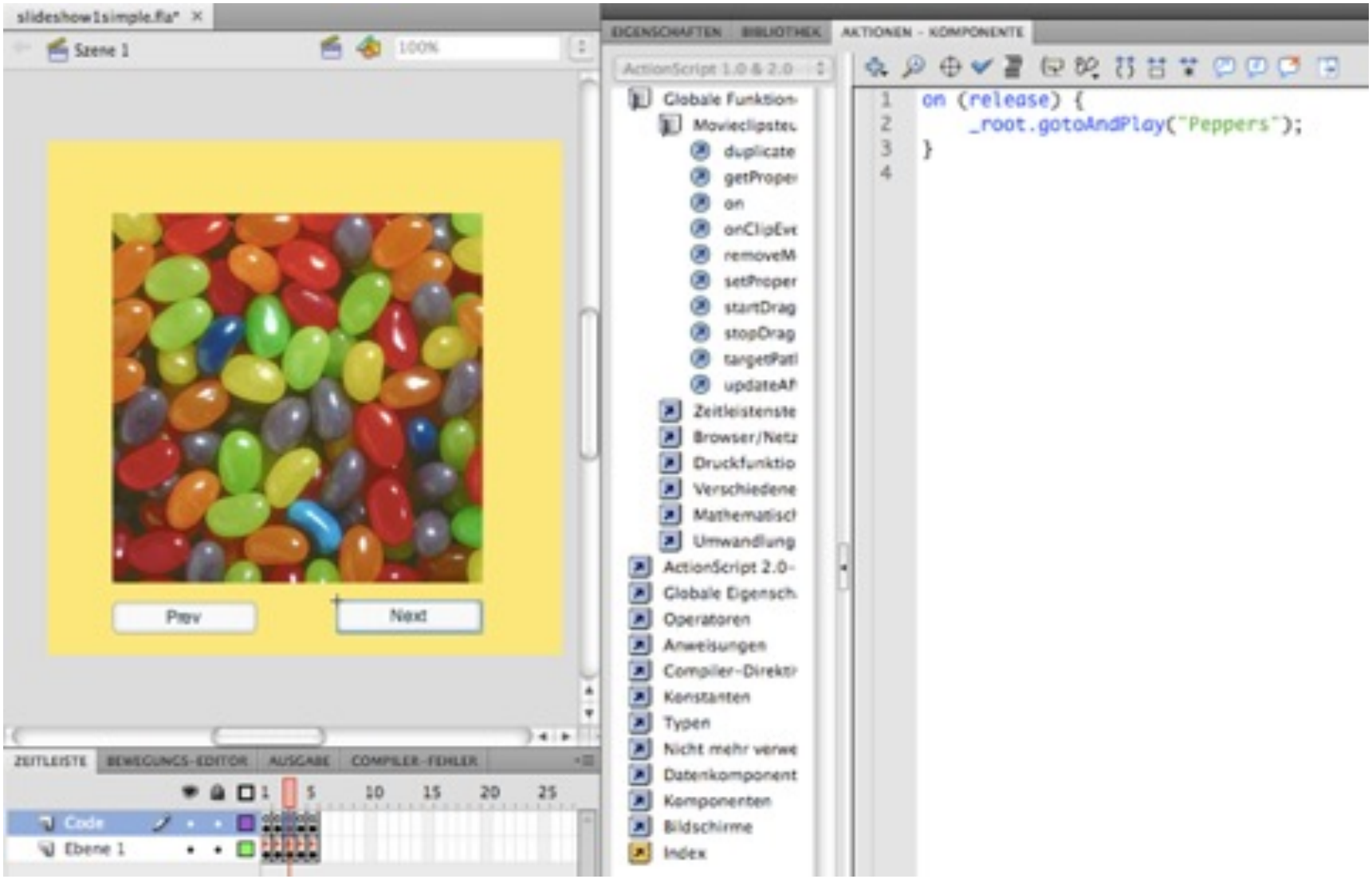
EO

Flash: Control-Flow Based Scripting

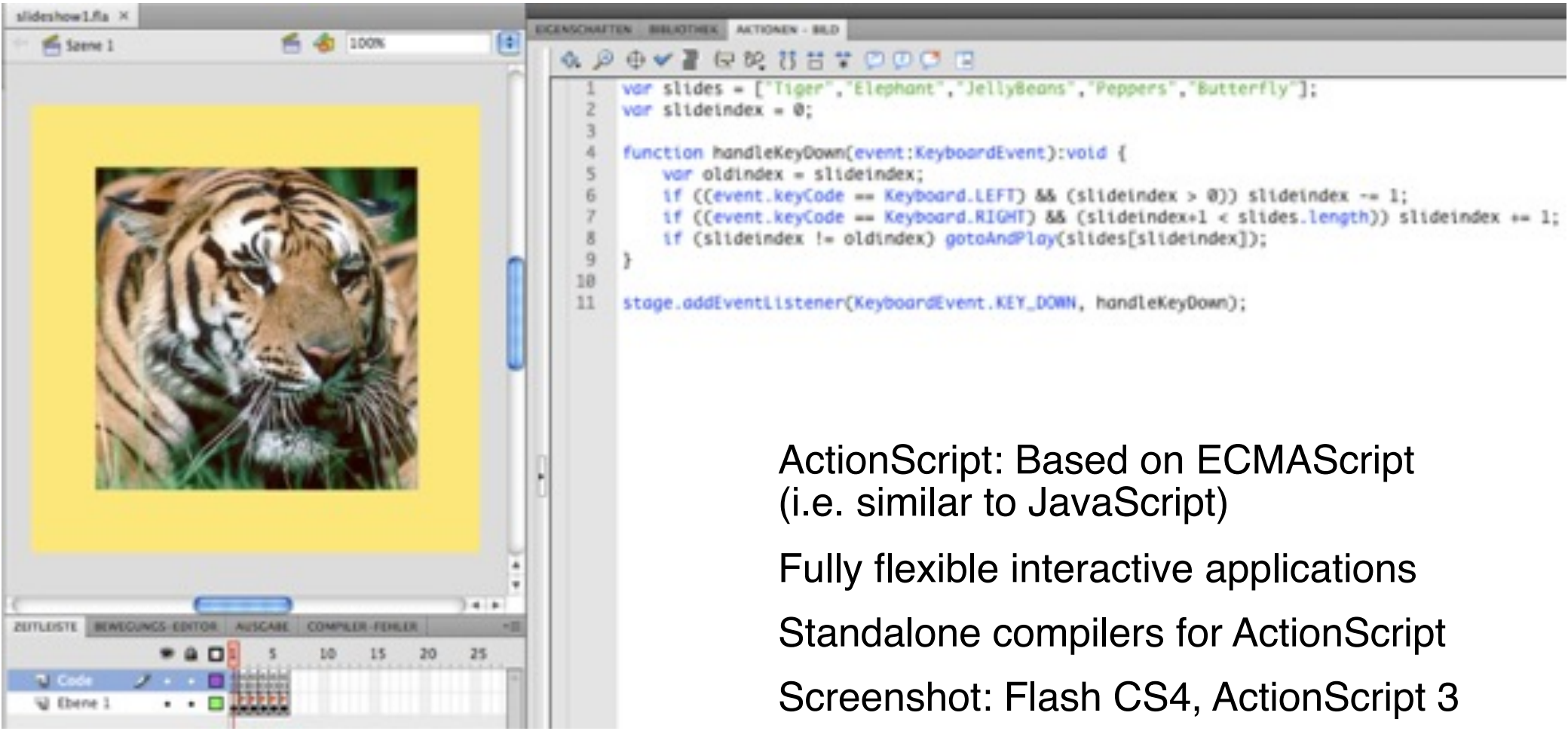


Hybrid scripting/
graphic authoring

Flash: Object-Based Scripting



Flash/ActionScript: Object-Oriented Scripting



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

Fully flexible interactive applications

Standalone compilers for ActionScript

Screenshot: Flash CS4, ActionScript 3

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JavaFX - Idea and History

- Chris Oliver, 2006 (?): “Form follows function” (F3)
  - Working for company “SeeBeyond”, but personal project
- Acquisition of SeeBeyond by Sun, 2005
  - F3 is not in the center of interest, apparently
  - First announcement of JavaFX (ex F3) May 2007 (JavaOne conference)
  - Multimedia applications across many platforms, including mobile devices
- In Versions 1.X:
  - Programming language JavaFX Script, similar to JavaScript
  - Compiled to Java byte code

```
import javafx.stage.Stage;
import javafx.scene.Scene;
import javafx.scene.text.Text;
import javafx.scene.text.Font;

Stage {
    title: "Hello World"
    width: 250
    height: 80
    scene: Scene {
        content: Text {
            font : Font {
                size : 24
            }
            x: 10, y: 30
            content: "Hello World"
        }
    }
}
```

JavaFX Script Example: Wikipedia

JavaFX Goes Mainstream

- January 2010: Oracle acquires Sun Microsystems
- JavaFX 2.0 (October 2011):
  - JavaFX as native Java library
  - Introduction of declarative FXML language
- Java SE7 update 6 (August 2012):
  - JavaFX (2.2) as native Java library
  - JavaFX contained in Java SE standard distribution
- Current version (renumbered): JavaFX 8 (March 2014)
- Many multimedia programming concepts:
  - Scene graph, stage
  - Timeline animations, key frames
  - Transitions: Fade, Fill, Path, Rotate, Scale, Stroke, Translate
  - Parallel and sequential composition of transitions