5 History of Multimedia Programming

5.1 The Ancestors: Alto and Smalltalk
5.2 Graphical Authoring Tools: The Road to Flash
5.3 From Niche to Mainstream: Example JavaFX
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 – 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 Vannevar Bush’s article “As We May Think” (1945)
  – 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
  - 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
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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)
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
Flash: Control-Flow Based Scripting

Hybrid scripting/
graphic authoring
Flash: Object-Based Scripting

Old versions of Flash (ActionScript 1 & 2)
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

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