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 – 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 Vennevar 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)
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)

Multimedia HyperCard 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

[Image of Flash interface with code snippet]

```
on (release) {
  _root.gotoAndPlay("Peppers");
}  
```
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
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:

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