6.1 Animation on the Web

Web Animation

- Sometimes it is essential, and most times it is misused and abused
- The goal of most Web sites is to get us to stay, learn, return, and maybe buy
- Spinning logos, blinking banners, and sparkling bullets may divert attention from a site's content
- Use animation in support of your goals
- Make sure your animation has a theme, story, and point
- Watch download size and rendering time
- Know your audience
- Use the right animation technology for your message

GIF89

- Not a great animation medium
  - Large file size
  - No sound capabilities

- Animated GIFs can be seen on every browser
- OK for small animations
- GIF compression algorithm works best with flat color graphics

... GIF89

- Design around the disadvantages
  - Use as few frames as possible
  - Frame optimization
  - Transparent images
  - Stretching and scaling
  - Timing and loading
  - JavaScript Mouseover
- GIF animation tools
  - Ulead GIF Animator

Dynamic HTML (DHTML)

- Key features
  - Document Object Model (DOM)
    - Dynamic content
    - Dynamic styles
    - Absolute positioning
  - Data Binding
  - Scriptlets
- The easiest way to make pages interactive
- Open technology
- DHTML is fast and small
- Microsoft and Netscape have different implementations of DHMTL

… Dynamic HTML (DHTML)

- Common tasks authored by DHTML
  - Fly text
  - Fly text in geometric pattern
  - Fly text through an oval path
  - Animate a sequence of elements
  - Apply a transition on a image
  - Dynamic table of contents
  - Change text color character by character
  - Manipulate text effects in response to mouse evenets
- Visual Filters and Transitions
- DHTML editors
  - Macromedia Dreamweaver

Virtual Reality Modeling Language (VRML)

- VRML is:
  - A simple text language for describing 3-D shapes and interactive environments
- VRML text files use a .wrl extension
- What do I need to use VRML?
  - You can view VRML files using a VRML browser:
    - A VRML helper-application
    - A VRML plug-in to an HTML browser
  - You can view VRML files from your local hard disk, or from the Internet
- Navigable 3D scenes on the Web
- 3D models have six directions
- New visualization experience
- VRML 1 standard
- VRML 2 standard 1996
  - Event model to address interactivity

... VRML

- How can VRML be used on a Web page?
  - Load directly into a Web browser, filling the page
  - Embed into a page, filling a page rectangle
  - Load into a page frame, filling the frame
  - Embed into a page frame, filling a frame rectangle
  - Embed multiple times into a page or frame
- What do I need to develop in VRML?
  - You can construct VRML files using:
    - A text editor
    - A world builder application
    - A shape generator
    - A modeler and format converter
- How do I get VRML software?
  - The VRML Repository maintains links to available software:
    - http://www.web3d.org/vrml/vrml.htm

VRML File Structure

- VRML files contain:
  - The file header
  - Comments - notes to yourself
  - Nodes - nuggets of scene information
  - Fields - node attributes you can change
  - Values - attribute values
  - more. . .
- A sample VRML file

```
#VRML V2.0 utf8
# A Cylinder
Shape {
    appearance Appearance {
        material Material { }
    }
    geometry Cylinder {
        height 2.0
        radius 1.5
    }
}
```

… VRML File Structure

- Using nodes

```
Cylinder {
    }
```

  - Nodes describe shapes, lights, sounds, etc.
  - Every node has:
    - A node type (Shape, Cylinder, etc.)
    - A pair of curly-braces
    - Zero or more fields inside the curly-braces

- Using fields and values

```
Cylinder {
    height 2.0
    radius 1.5
    }
```

  - Fields describe node attributes

- Summary
  - The file header gives the version and encoding
  - Nodes describe scene content
  - Fields and values specify node attributes

VRML Scenes

- One or more WRL files (worlds)
  - Text files (UTF8)
  - Nodes to define scenes
  - Each node has a list of fields to define the properties of the node
  - Scene graph
  - Shapes are the building blocks of a VRML world
- Primitive Shapes are standard building blocks:
  - Box
  - Cone
  - Cylinder
  - Sphere
  - Text
- A Shape node builds a shape
  - appearance - color and texture
  - geometry - form, or structure

```
Shape {
    appearance . . .
    geometry   . . .
}
```

… VRML Scenes

- 3D space is defined along three axes
  - x (left to right), y(down to up), z (back to front)
  - Points is space defined as (x, y, z) are combined to create solid objects
- Each visual object has color and texture
- Lighting nodes
- VRML Viewpoint

Transforming Shapes

- By default, all shapes are built at the center of the world
- A transform enables you to
  - Position shapes
  - Rotate shapes
  - Scale shapes
- The Transform group node creates a group with its own coordinate system
  - children - shapes to build
  - translation - position
  - rotation - orientation
  - scale - size

What is Flash?

- Flash is the standard for interactive vector-graphics and animations on the internet. Web-designer use Flash to create attractive, scalable and extreme compact navigational surfaces, technical illusions, long-term-animation and for other fascinating effects. (Source: Macromedia)
- Flash does not require programming skills and is easy to learn
- Very small size
- Much easier than DHTML
- Creation of simple banner, complex animations or whole websites
- Comparison of different formats

FLA (Flash)	SWF (Flash-Export)	Animated GIF	uncompressed AVI
5 KB	3 KB	46 KB	999 KB

Why Flash?

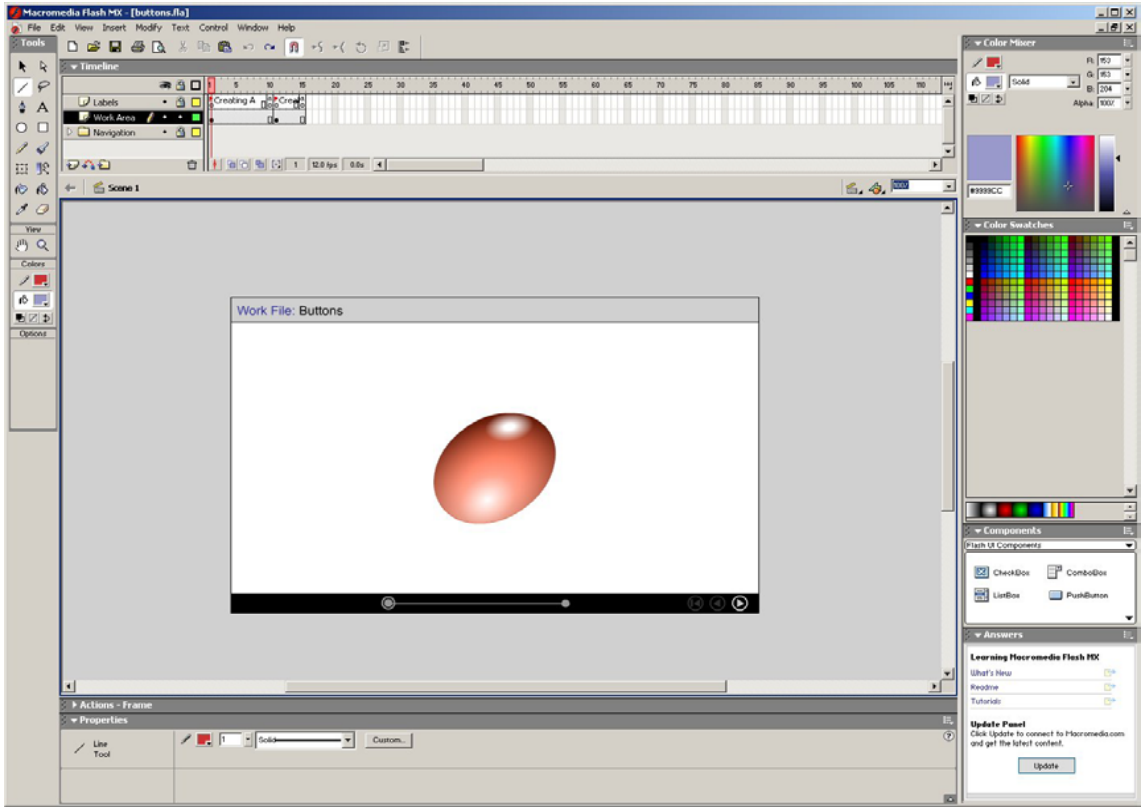
- Designed from the start for streaming media over the web
  - Simple web interfaces
  - Small file size
  - High quality animations with audio
  - Slide shows
  - Simple games
- Flash 5 has basic programming language
- Actionscript

Flash vs. Shockwave

- Flash-Files
  - You can't directly create SWF-files with Flash
  - You get a Flash-file (.fla)
  - Flash can be compared to the source code of a program
  - Contains all the information
  - To play Flash files you have to export them into Flash-Player-Movies (.swf)
- Shochwave-Files (.swf)
  - the expression doesn't exit anymore
  - are just called SWF-Files
  - cannot or can only with restrictions be edited
  - Shockwave has it's origin from Macromedia Director
  - the plugin for Director Files was called Shockwave
  - another plugin was the FutureSplash-Player, later called Shockwave Flash
  - technologies are very similar
  - names lead to confusion, so Macromedia included the Flash-Player into the Shockwave Director plugin

The Flash MX Workspace

- Stage
- Toolbox
- Panels
- Timeline
- Layers
- Library
- Property Inspector
- Action Script



Flash Basics

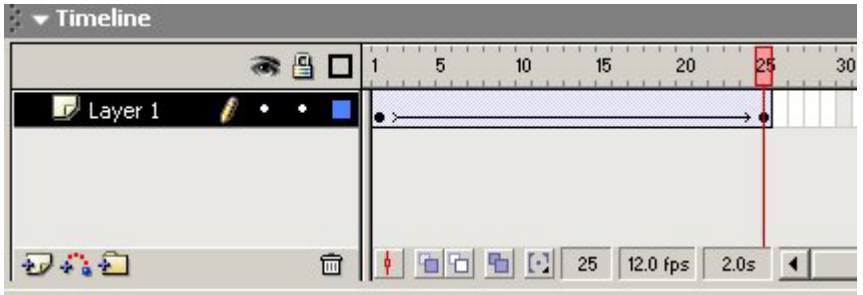
- Frame based animation - Key Frames
- Vector graphics
- Layers for each component
- Interactivity via ‘ActionScripts’
- Media on Stage converted to symbols
- Library to collect all symbols

Flash : Vector Graphics

- Vectors - tiny file sizes - fast web loading
  - Circles,squares,polygons,lines
  - Import: Freehand, Illustrator, EPS
  - ‘Libraries’ of other graphic ‘symbols’
  - Imported bitmaps can be converted

Frame based Animation

- Animate along a time-line
- Animate between Key-frames
- Motion-Tween - Creates in-between animations between 2 Key-frames
- Button scripts to stop,start and move



Flash Interactivity

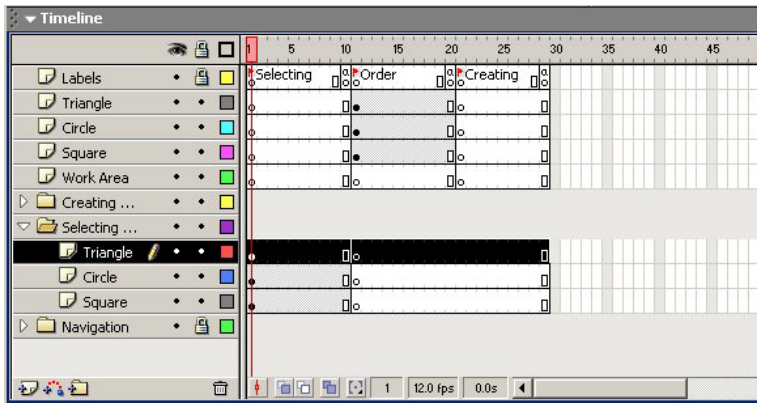
- Frames can have simple scripts
  - Stop - Play - Goto
- Buttons can have simple scripts
  - Actionscripts to start / stop
  - Actionscripts to move to different frames
  - Actionscripts to play sounds

Flash Frame actions

- Use stop to rest the animation
- Use a button to start the animation
- Use Goto & Play to move to a different frame or URL
- Use Stop sounds to silence all sounds
- Use Play to trigger sounds at a frame

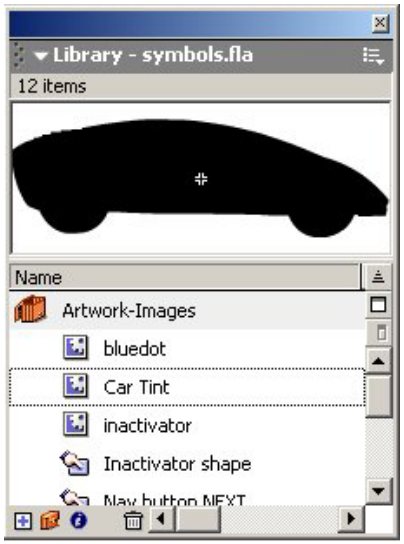
Flash Layers

- Layers separate objects (or interact)
- Each activity can have a layer
  - A symbol on the screen
  - A sound playing
  - A button
  - A piece of control script



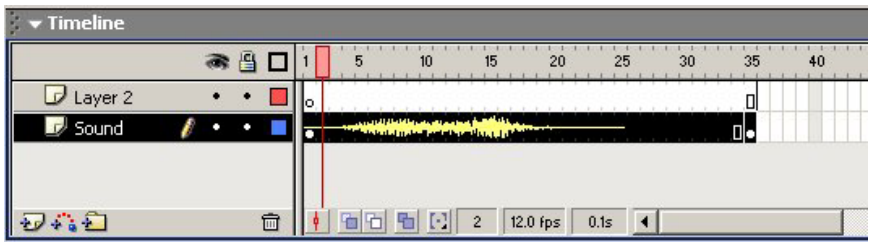
Flash Libraries of Symbols

- Collect all instances of graphics,buttons in the library
- Multiple libraries
- Keeps overall file size low
- Drag between libraries
- Drag and drop from library
- to the Stage work area



Flash - Sound

- Import .wavs or mp3
- Place on the timeline to be played
- Add sounds to buttons
- Trigger by Actionscripts
  - e.g stop all sounds
  - Event Sound downloads completely
  - Streaming Sound plays as soon as pos.



Flash Interactivity

- Action types
  - Frame Actions
  - Button Actions
- Basic Actions
- Buttons
- Interactivity with buttons
- On (MouseEvents)

Publishing your Flash movie

- Streamline playback for the web
- Publish as standalone Flash Player
- HTML publishing
- Alternative images
- Projectors
- Printing

SWF-Files

- Normally shown in a web-browser
- Can also run alone or in a program
- Can be included in a HTML-file, which determines size, background and alignment
- Can be controlled by a pop-up-menu in your browser
- Combine vector- and bitmap-data, therefore quality loss in the bitmap part after zooming or enlarging
- When viewed in a browser without HTML, the SWF-file takes the size of the browser

Flash File Format

- The SWF file format
- Goals
  - On-screen display
  - Extensibility
  - Network delivery
  - Simplicity
  - File independence
  - Scalability
  - Speed
- Compression Strategy
  - Reuse
  - Compression
    - Bitmaps can be compressed with JPEG or a PNG-like zlib compression. Sound is compressed with various levels of ADPCM compression. Shapes are compressed using a very efficient delta encoding scheme
  - Bit Packing
  - Default values
  - Change Encoding
  - Shape Data Structure

Sample SWF File

```
FWS
File version    3
File size       741
Movie width     550
Movie height    400
Frame rate      12
Frame count     10
tagLen        3: tagSetBackgroundColor  RGB_HEX ffffff
tagLen       10: tagPlaceObject2        flags 1     depth 26
                 tag 1
                 pos matrix hex [ a_fixed   b_fixed] = [00010000
00000000]
                                [ c_fixed   d_fixed]   [00000000
00010000]
                                [tx_fixed  ty_fixed]   [000010a4
00000410]
```