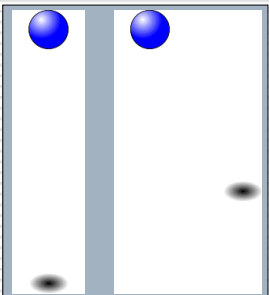# Introduction to Computer Animation

Module Coordinator: John McQuillan
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Lecture 2

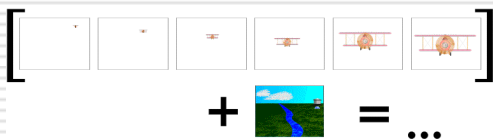## Last Week…

Animation Techniques 1

☐ Basic principles still the same
☐ Frame-by-frame

Terminology

☐ Keyframes
☐ Tweening
☐ Cel

Cels

Complete

Keyframes & Inbetweening

Start Keyframe
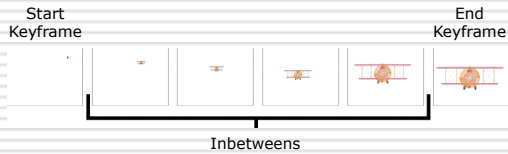
End Keyframe

Inbetweens

Computer Animation

- ☐ Similar to traditional methods
  - ■ Frame-by-frame
  - ■ Keyframes
  - ■ Tweening
  - ■ Cel = Layer
  - ■ Ink = RGB pixel values
- ☐ Timeline

Advantages of using a computer

- ☐ Fast tweening
- ☐ Consistent colours
- ☐ Consistent lighting
- ☐ Accurate layout

Two Dimensions

- ☐ Flat
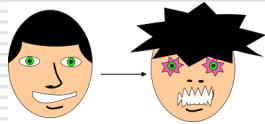- ☐ Up-Down, Left-Right
- ☐ Uses perspective for depth

Three Dimensions

- ☐ Up-Down, Left-Right, Backwards-Forwards
- ☐ Computer deals with perspective (big advantage)
- ☐ Stop motion
- ☐ Stereoscopic

Tweening and Morphing

- ☐ The computer takes the pain out of tweening but sometimes requires strict supervision…
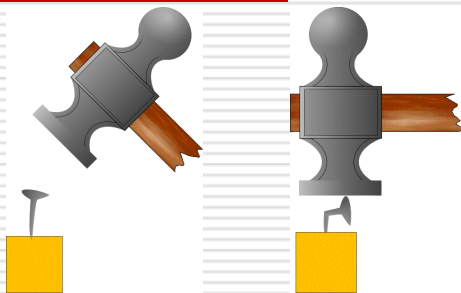
Going from one image to another
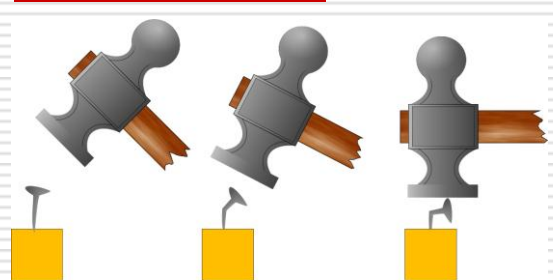

Getting the Computer to Tween

Classic Example!

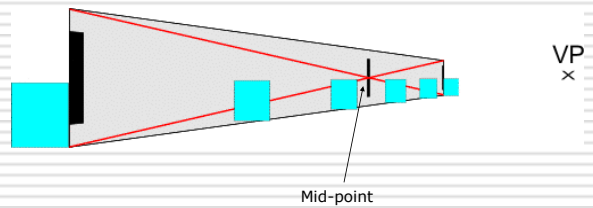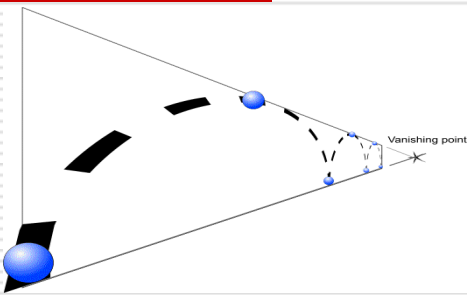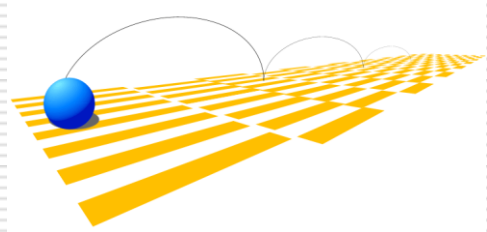Start Keyframe   End Keyframe

WRONG!

Incorrect Tween

Correct Tween

Perspective

- In 2D animation we are reliant on rules of perspective to achieve depth
- Some 2D packages do perspective scaling for us: Toon Boom Studio, US Animations, etc…
- Others don't: Flash, Xara X

Perspective 2

Vanishing point

VP

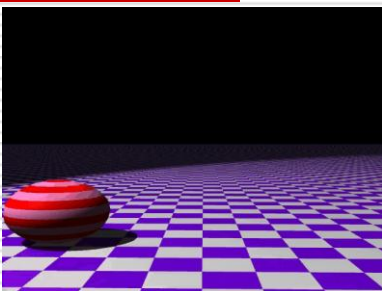Mid-point

Done in 3D:
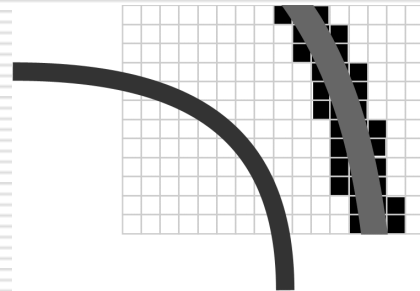

Image File Formats

Vectors & Bitmaps
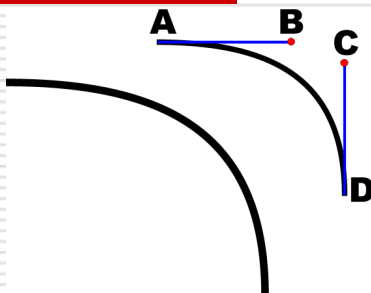
Vectors & Bitmaps

- ☐ Image formats
  - ■ Raster (also called 'Bitmapped')
    - ☐ Grid of numbers – pixel colour values
  - ■ Vector
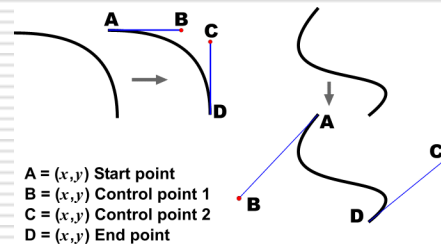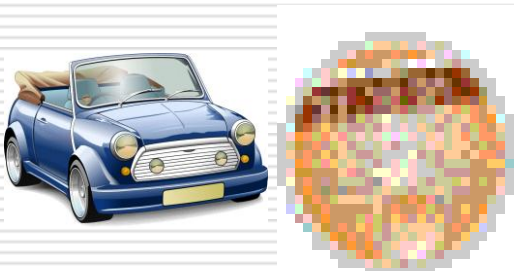   - ☐ Mathematically defined, plotted points, lines and colour values

Bitmap grid

Vector Definition

Bézier Curves

A = (x,y) Start point
B = (x,y) Control point 1
C = (x,y) Control point 2
D = (x,y) End point

Bitmap

Vector

Image File Formats

- □ .tiff, .bmp, .wmf, .psd, .tga, .pcx, etc…
- □ On the Web…
  - ▪ Joint Photographics Experts Group
    - □ .jpg, .jpe, .jpeg
  - ▪ Graphics Interchange Format
    - □ .gif
  - ▪ Portable Network Graphics
    - □ .png

JPEG

- □ Graphics with millions of colours!
- □ Compressed
  - ▪ 100 levels of compression
  - ▪ 'Lossy' at higher levels
- □ Good for
  - ▪ Photographic images
  - ▪ High quality, high colour art work

GIF

- □ Graphics with less than 256 colours.
- □ Compressed
  - ▪ One level of compression
  - ▪ 'Lossless'
- □ Good for:
  - ▪ Limited transparency and animation
  - ▪ Images with large areas of 'flat' colour

PNG

- □ Good for everything!
- □ …But not animation!

Vector formats online

- □
- □ Adobe Flash
  - ▪ Small, animation, scaleable.
  - ▪ Easy to create
- □ Scaleable Vector Graphics (SVG)
  - ▪ New W3C standard
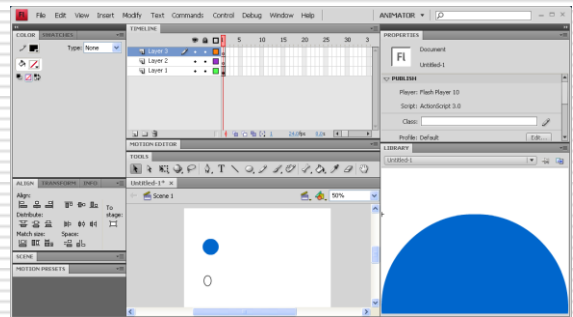 - ▪ Object based, animated, programmable.

Advantages/Disadvantages

- □ Vectors
  - ▪ Small size – quick download
  - ▪ Scaleable
  - ▪ Can be interactive and animated
  - ▪ Not so good for photographic detail
- □ Bitmaps
  - ▪ Tend to be large
  - ▪ Compressing them can lose data
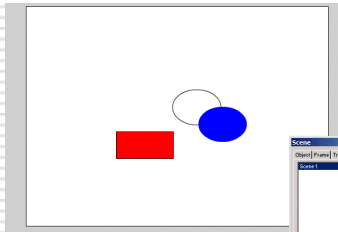 - ▪ Good for photographic images

Adobe Flash

- ☐ Web multimedia authoring environment
- ☐ Vector based (small file size)
- ☐ Powerful animation tools
- ☐ Not so powerful drawing tools
- ☐ Easy to create interactions
- ☐ Comes with a scripting language
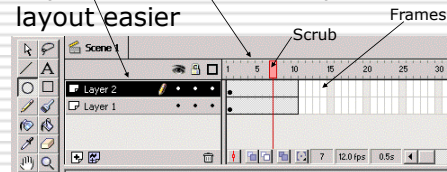 - ■ ActionScript

Interface

Stage

- ☐ The stage allows the layout of objects spatially

Timeline & Layers

- ☐ Uses a timeline to layout objects temporally
- ☐ Layers make scene composition and layout easier

Frames

Scrub

Tools

- ☐ Conventional drawing tools
  - ■ not particularly great!
  - ■ Can export drawings from Xara in a compatible format

Lab 2

- ☐ Material on Blackboard
- ☐ More complex animation using Flash
  - ■ Introduction to tweening