Computer Animation

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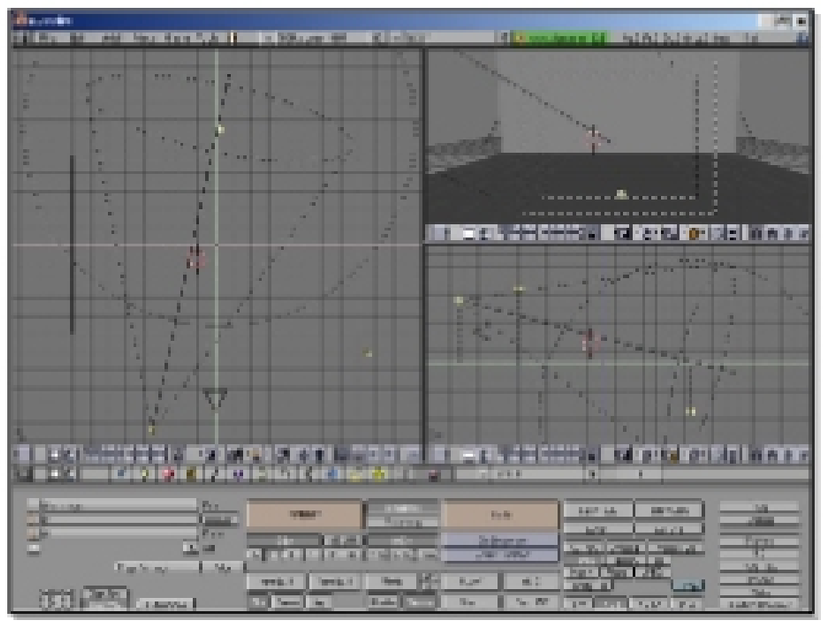
Advertisement



Computer Animation

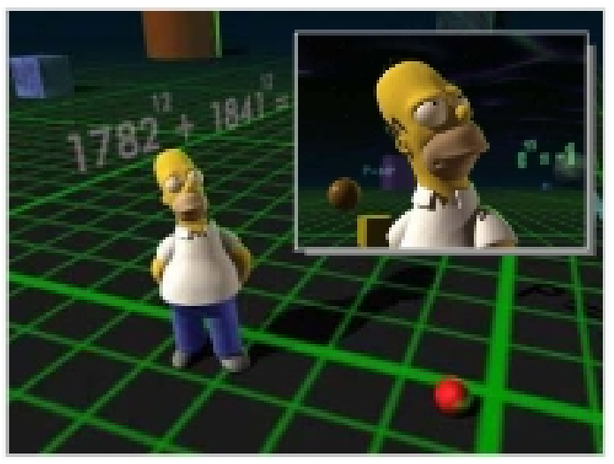
- What is animation?
  - Make objects change over time according to scripted actions

Pixar

- What is simulation?
  - Predict how objects change over time according to physical laws

University of Illinois

3-D and 2-D animation

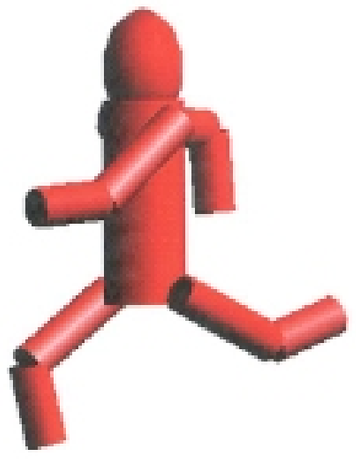


Homer 3-D

Homer 2-D

Outline

- Principles of animation
- Keyframe animation
- Articulated figures
- Kinematics
- Dynamics



Angel Plate 1

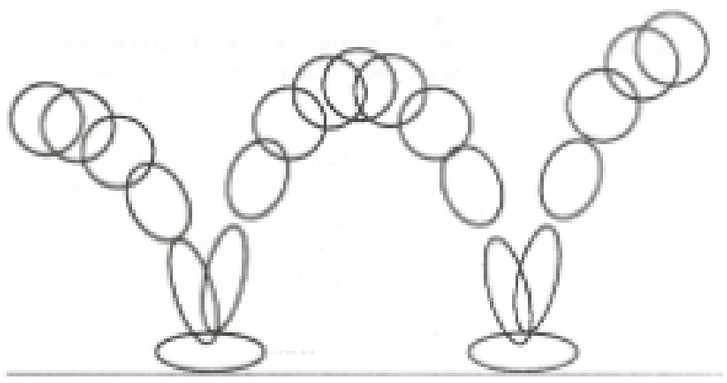
Principles of Traditional Animation

- Squash and stretch
- Slow In and out
- Anticipation
- Exaggeration
- Follow through and overlapping action
- Timing
- Staging
- Straight ahead action and pose-to-pose action
- Arcs
- Secondary action
- Appeal

Disney

Principles of Traditional Animation

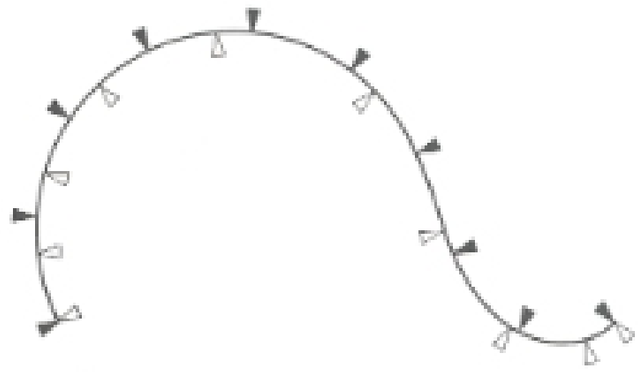
- Squash and stretch



Lasseter '87

Principles of Traditional Animation

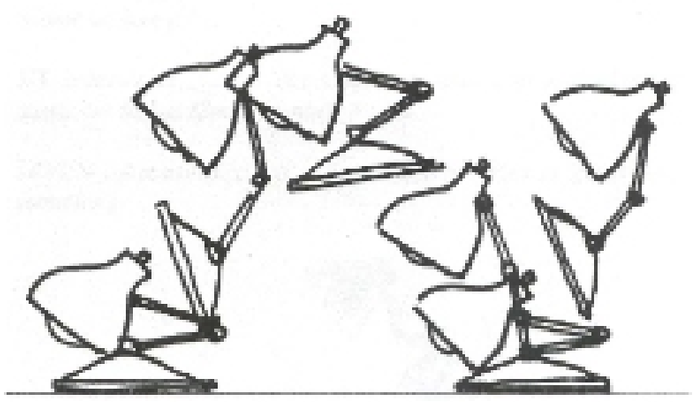
- Slow In and Out



Watt Figure 13.5

Principles of Traditional Animation

- Anticipation (and squash & stretch)



Lasseter '87

Principles of Traditional Animation

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Disney

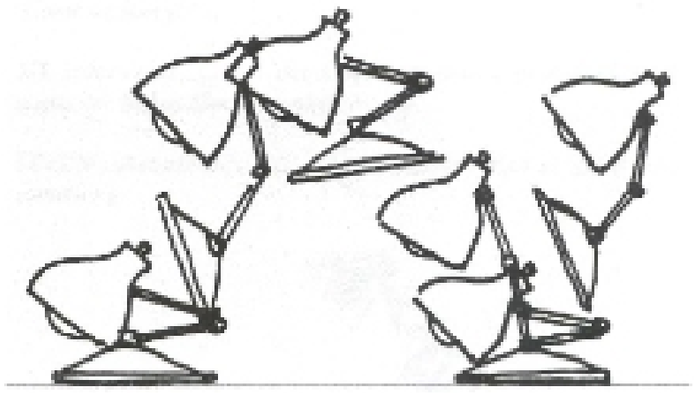
Computer Animation

Animation pipeline
- 3D modeling
- Articulation
- Motion specification
- Motion simulation
- Shading
- Lighting
- Rendering
- Postprocessing
  - » Compositing

Pixar

Keyframe Animation

- Define character poses at specific time steps called "keyframes"



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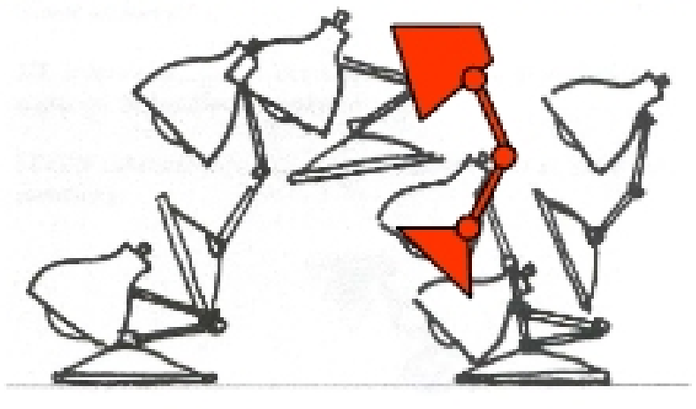
Keyframe Animation

- Interpolate variables describing keyframes to determine poses for character "in-between"



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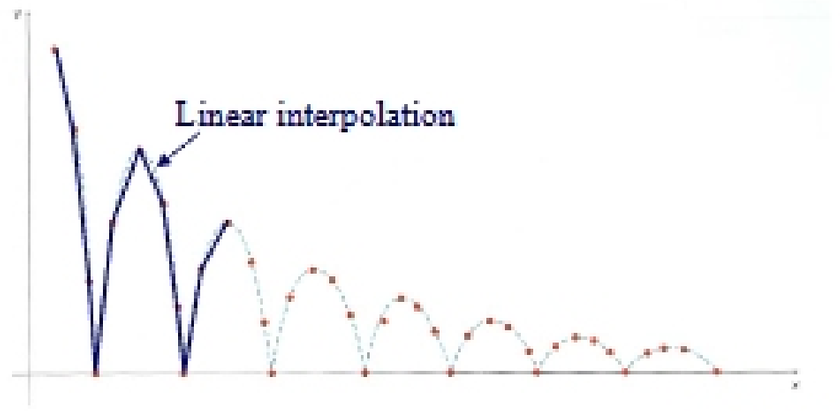
Keyframe Animation

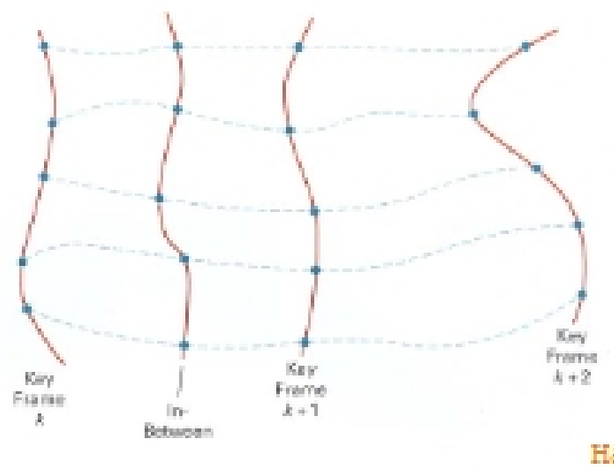
- Inbetweening:
  - Linear interpolation - usually not enough continuity



H&B Figure 16.16

Keyframe Animation

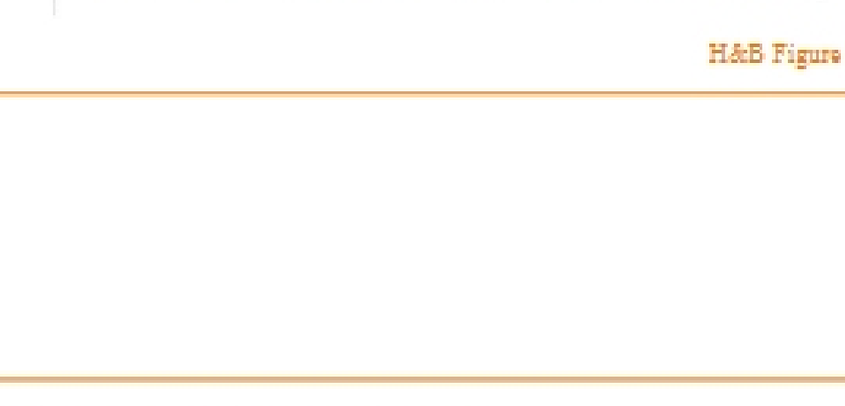
- Inbetweening:
  - Spline interpolation - maybe good enough



H&B Figure 16.11

Keyframe Animation

- Inbetweening:
  - Cubic spline interpolation - maybe good enough
    - » May not follow physical laws



Lasseter '87

Keyframe Animation

- Inbetweening:
  - Cubic spline interpolation - maybe good enough
    - » May not follow physical laws

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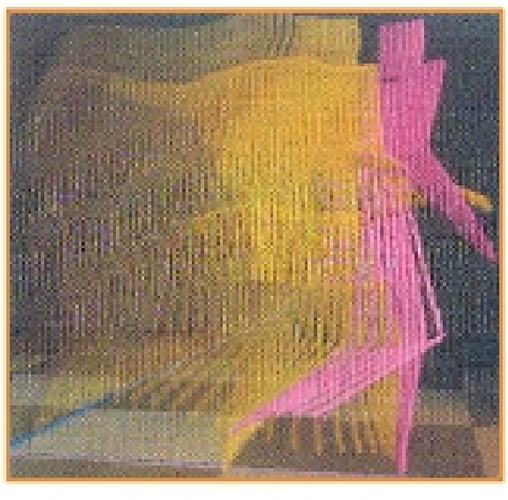
Keyframe Animation

- Inbetweening:
  - Inverse kinematics or dynamics



Rose et al. '96