Notes

- Please find and read:
  - John Lasseter, “Principles of traditional animation applied to 3D animation”, SIGGRAPH'87
  - For SIGGRAPH papers, navigate to www.acm.org/dl on a UBC computer, and click on
     - Browse the Digital Library: Special Interest Groups
     - SIGGRAPH
     - Proceeding Series: SIGGRAPH
     - Archive: 1974-2003
  - Summarized in text, section 1.2.6 (pp. 10-12)
  - And for your interest, check out rest of chapter 1 on history, how production works, etc.

Assignment 0

- Find it on the web
- Get a strip of clear 16mm film leader at my office hours tomorrow
- Use felt-tip markers to draw an animation, frame by frame
  - Write your name at the start!
- Return to me on Monday in office hours
  - No late submissions accepted!
- Also a simple math problem (warm up), hand in on Monday too

Animation Basics

- Persistence of vision
  - We see a bright flash for a while after it's gone
  - A sequence of images shown fast enough is hard to distinguish from true motion
    - What is fast enough?
    - Foveal vs. Peripheral vision
- Frame rate (fps=frames per second)
  - Film: 24
    - Often shown at 48, each frame twice, to reduce flicker
    - Sometimes animated “on twos” = 12fps, “on threes” = 8fps, or even slower
  - TV: ~30 for NTSC, 25, for PAL
    - Interlaced - double the speed to reduce flicker
  - Computers: 60Hz or more, games prefer 60fps

Motion Blur

- Every bit of light persists in our vision for a while—fast moving objects leave a blurred streak
- Similarly, film/video cameras leave shutter open for a while
  - Moving objects blurred from position at start of shutter time to position at end
- Without motion blur (or tricks to simulate it) get strobing effect
  - Temporal aliasing -- akin to “jaggies”
  - Spinning wheels
  - Stop Motion vs. Go Motion
Aside: Rendering Motion Blur

- Note: if strobing not apparent, don’t bother
  - Also, sometimes already accounted for in animation (see later: “squash and stretch”, “exaggeration”)
- Ideally, figure out how to render to best fool the human eye
  - But nobody has figured that out: instead render to mimic a regular movie camera
- At each pixel, don’t just compute the light coming into the camera at an instant
- Instead sum up the light that hits the camera during the shutter time
  - Approximate with appropriate sampling

Next Class

- Splines: the basis for smooth movement
- Assignment 0 has a question on splines, along with a brief introduction
  - I’ll go through it in class on Friday