

ECE/CS 433 Introduction to Computer Graphics

Class 27
November 27, 2007

Pradeep Sen
Advanced Graphics Lab



Announcements

- Meeting today and tomorrow for project meeting
- Next Thursday is the deadline!



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Good rules of thumb

- Try to have your base game done by Sunday night
- This will give you plenty of time for
 - Play testing
 - Making modifications, creating levels, extra content
 - Adding sounds and music
 - Porting it to the XBOX
 - Making all your deliverable materials



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Playtesting

- Tuesday December 4, 2007 after class



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Today

- Computer animation



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Computer animation

- Animation – the act of animating, or giving life to something that isn't alive
- Most people mistakenly refer to all of computer graphics as "animation"



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Animation is hard...

- *“There is no particular mystery in animation... It’s really very simple, and like anything that is simple, it is about the hardest thing in the world to do.”*
– Bill Tytla at Walt Disney Studios, 1937

What is animation?

- Rapid display of static images to give the optical illusion of motion
- Let’s take a look at some of the milestones in animation...

History of animation

- 1800’s: flip books



THE KITTROGRAPHE

source: Wikipedia

History animation

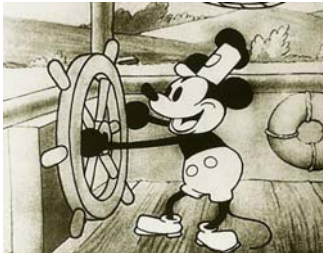
- 1900: Advent of motion pictures in the late 1800’s created a new medium
- 1914 – Gertie the dinosaur



source: Wikipedia

History animation

- 1920’s Walt Disney revolutionized the industry



Steamboat Willie – Walt Disney Studios (1928)

History of animation

- Just 10 years later...



Snow White and the Seven Dwarves – Walt Disney Studios (1937)

History of animation

- Traditional animation has been maturing ever since.



Who Framed Roger Rabbit? – Amblin Entertainment (1988)

History of animation

- Computer animation is much younger...



First CG animation – Zajac (1962)

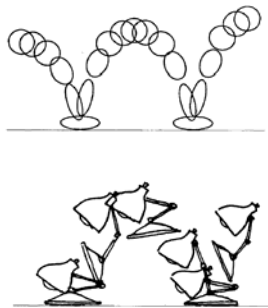
History of animation

- But it has also been maturing rapidly...

Fundamental principles of traditional animation

- Squash and Stretch - Defining the rigidity & mass of an object by distorting its shape during an action.
- Timing - Spacing actions to define the weight & size of objects & the personality of characters.
- Anticipation - The preparation for an action.
- Staging - Presenting an idea so that it is unmistakably clear.
- Follow Through & Overlapping Action - The termination of an action & establishing its relationship to the next action.
- Straight Ahead Action & Pose-To-Pose Action - The two contrasting approaches to the creation of movement.
- Slow In and Out - The spacing of in-between frames to achieve subtlety of timing & movements.
- Arcs - The visual path of action for natural movement.
- Exaggeration - Accentuating the essence of an idea via the design & the action.
- Secondary Action - The Action of an object resulting from another action.
- Appeal - Creating a design or an action that the audience enjoys watching.

Squash and stretch



Two kinds of animation

- Dynamics
 - What forces bring about the motion?
 - Calculate motion from physics
- Kinematics
 - Consider only the motion
 - Motion is determined by positions, velocities and accelerations

Passive Dynamics

- No external “intelligent action”
- Applies well to natural phenomena
 - Water
 - Fire
 - Cloth
 - Smoke