Character Modeling: Key Frame Animation

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CS395: Intro to Animation

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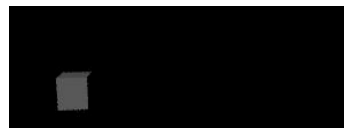
3D Animation

Rendering

- 3D Scene and Motion
- Sequence of Frames
    - Rates: Video 30fps, Film 24fps
- Persistence of Vision

Animator must create ..

- Illusion of Life
- Weight

Animation

- Almost every property of every object in the scene can be animated (changed through time)
  - Models, cameras, …
  - Transformations: '
    - Move
    - Rotate
    - Scale
  - Modifications/Deformation: edits, bends, twists, manipulating a skeleton
  - materials, colors, textures

Animation

- 3D Scene does not have
  - Gravity
  - Weight
  - Force
  - interactions between objects
  - (bit of a lie)
- You must make it seem so!

Preproduction Phases

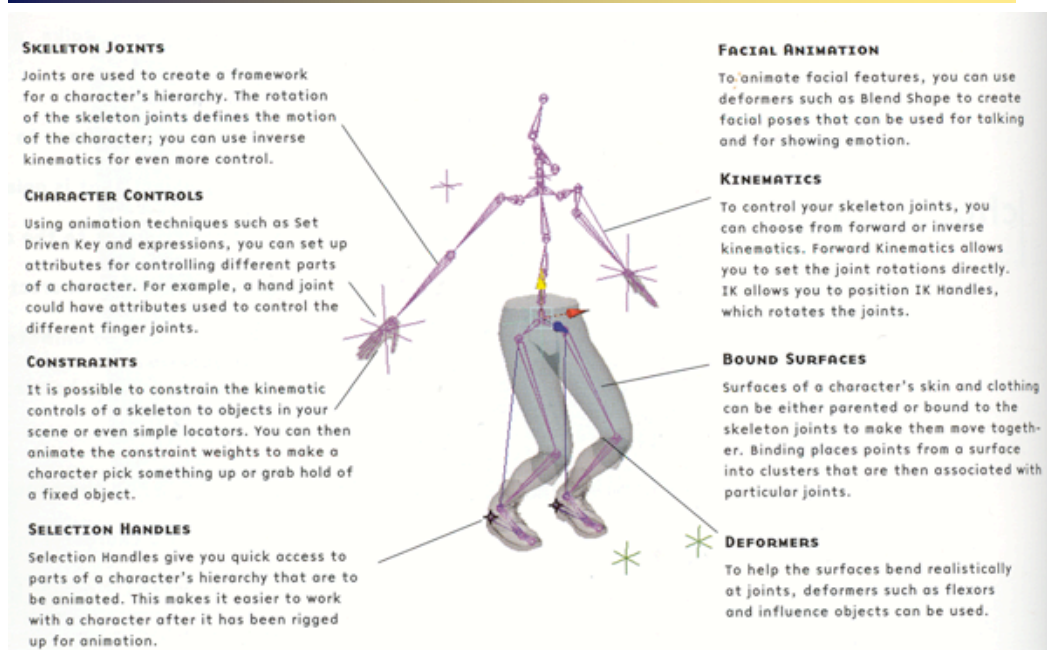- Screen-play
- Storyboards
- Character development
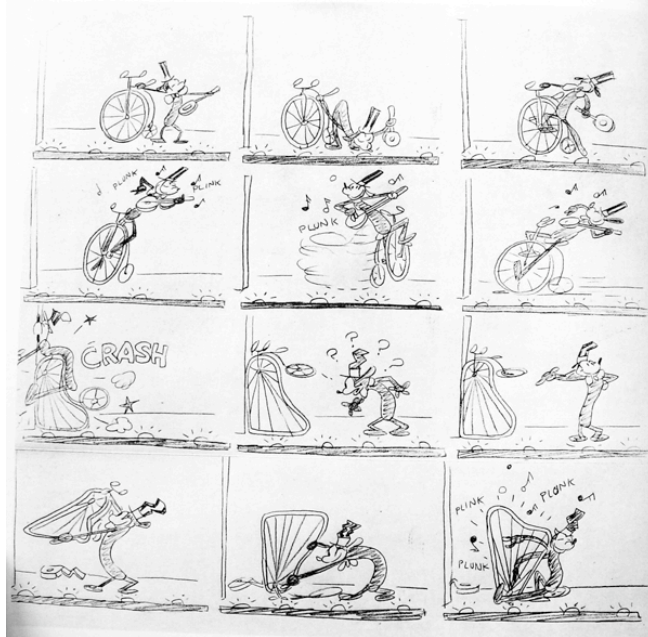
3D Characters

- Digital actor
  - Tin can
  - Sack of flower
  - Butterfly, beetle
  - Bird
  - Flower
  - Robot
  - Humanoid
  - Etc…

Typical Character

- Mechanics of movement must be convincing
- Skin and clothing moves & bends appropriately
- This process of preparing character contaols is called rigging
  - Fully rigged character has
    - Skeleton joints, surfaces, deformers, expressions, Set Driven Key, contraints, IK, Blendshapes, etc

Typical Character

SKELETON JOINTS

Joints are used to create a framework for a character's hierarchy. The rotation of the skeleton joints defines the motion of the character; you can use inverse kinematics for even more control.

CHARACTER CONTROLS

Using animation techniques such as Set Driven Key and expressions, you can set up attributes for controlling different parts of a character. For example, a hand joint could have attributes used to control the different finger joints.

CONSTRAINTS

It is possible to constrain the kinematic controls of a skeleton to objects in your scene or even simple locators. You can then animate the constraint weights to make a character pick something up or grab hold of a fixed object.

SELECTION HANDLES

Selection Handles give you quick access to parts of a character's hierarchy that are to be animated. This makes it easier to work with a character after it has been rigged up for animation.

FACIAL ANIMATION

To animate facial features, you can use deformers such as Blend Shape to create facial poses that can be used for talking and for showing emotion.

KINEMATICS

To control your skeleton joints, you can choose from forward or inverse kinematics. Forward Kinematics allows you to set the joint rotations directly. IK allows you to position IK Handles, which rotates the joints.

BOUND SURFACES

Surfaces of a character's skin and clothing can be either parented or bound to the skeleton joints to make them move together. Binding places points from a surface into clusters that are then associated with particular joints.

DEFORMERS

To help the surfaces bend realistically at joints, deformers such as flexors and influence objects can be used.

Character Resolution

- Use low resolution character that has surfaces "parented" to skeleton
  - Allows interactive animations
  - Switch to full resolution character later
- Rag Doll; Skeleton by Proxy tutorial
  http://www.goldenxp.com/tutorials/ragdoll/ragdoll1.htm

Typical Character Animation Workflow

- Character Design
- Model
- Skeleton Rigging
- Binding
- Animation
- Integration
- Rendering

For Project 4

- Concentrate on
  - Character Design
    - Model Sheet with poses
  - Modeling (simple)
  - Skeleton Rigging
  - Binding

SQUASHED   &   STRETCHED   &   TWISTED

DEJECTED   JOY   TANTRUM   CURIOUS

COCKY   LAUGHTER   BELLIGERENT   MORE LAUGHTER

The famous half-filled flour sack, guide to maintaining volume in any animatable shape, and proof that attitudes can be achieved with the simplest of shapes.

CRYING

HAPPY