Computer Animation I   Fall 2004

Assignment 3: Bouncing Balls

This assignment is intended to give you experience with:
- building your own shot
- the animation principles of staging, timing, squash and stretch, and exaggeration.

Your goal is to animate two *distinctly different* bouncing balls. One could be heavy like a bowling ball and the other could be squishy and bouncy, for instance.

Plan out what you want your shot to look like. Sketches can help. The restrictions are:
- The shot shouldn't be any longer than 5 seconds.
- Your camera must be static (i.e., not animating).
- Your shot should be rendered at a resolution of 320 x 240 pixels and at a frame rate of 24 frames per second (fps).

Once you have a clear idea of how you want to present your two bouncing balls, you are to build your own scene file using the two objects in the project folder ("assignment_03"). It is fine to load the same object multiple times to do this, but please do not use other objects. The idea here is for you to come up with a shot that is interesting because of the placement of the camera and the motion of the objects ONLY.

DUE Wednesday October 13th at the beginning of class

Hand in your final rendered movie AND your final scene file. The assignment won't be considered complete without both a movie and a scene file.

Step 0: get everything you need to do the assignment, run Maya, set up your scene
- The project folder is called "assignment_03"
- To import objects into Maya, use **File->Import…** (or the hotkey **Apple-i**).
- To create your own camera, go to **Create->Cameras->Camera**. Look through it by finding the **Panels->Perspective->** menu in a particular viewing window.
- Make sure you're working at 24 frames per second (**Maya->Preferences…** then **Settings**. Look for **Time** and select **Film [24 fps]**).
- Set the end time of your animation in the End Time window just below and to the right of the timeline. Note: you can raise or lower this value and you can change your mind later.
- Remember that the camera is probably the biggest contributor to the final "look" of the shot! So get the camera figured out early (position, orientation, focal length) and stage the other objects to the camera you've chosen (pay attention to the principle of **staging**). If you've forgotten about how to transform the camera, re-read the first assignment sheet.
- Under the Render Global Settings panel (see prior assignment sheets for how to find this window), click the **Common** tab. Under **Resolution** find the **Presets** box and select **320x240**.
- SAVE your scene file frequently. IF YOU HAVE PROBLEMS SAVING YOUR SCENE FILE CONTACT JOSH OR MYSELF IMMEDIATELY! I strongly encourage turning on Incremental Saves by selecting the options box under **File->Save Scene []** so you can go back to a previous version of your scene if you have a problem.

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Step 1: animate
- One of the challenges in this assignment is creating the right kind of motion curve for a bouncing ball. Remember our in-class demonstration earlier in the term: linear interpolation is NOT good for bouncing balls! They accelerate into the impact point and decelerate out of it. A good way to create this kind of curve is to break the tangents at the impact keyframes and drag the handles to make a speed in/speed out kind of curve. The icons for breaking tangents are in the top of the graph editor (use the Help Line to find them). To move keys and tangents, use the move tool in the graph editor. Left mouse selects keys/tangents, middle mouse moves them.
- Another big challenge is using squash and stretch effectively. For the squishy ball (and even the heavy one if you think it's appropriate), use the x, y, and z scale parameters ("r") to reshape the ball during it's flight. See the diagram below for ideas! NOTE: the keyframes required for good squash and stretch are not the same as those required for good ball movement This means that you MUST take care to set only position keyframes when animating the position (shift-w) and only scale keyframes when animating scale (shift-r).
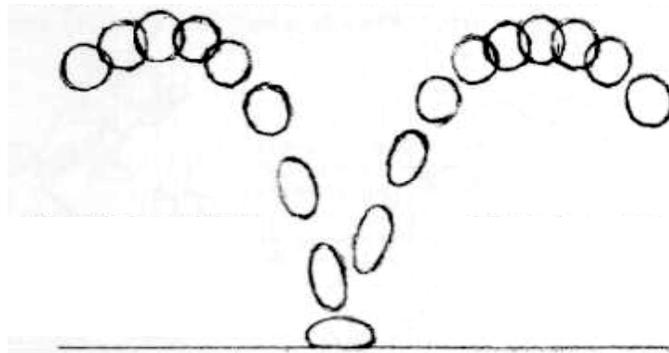
Step 2: render
- When you like your motion (be sure to preview with **Window->Playblast…** instead of just hitting the play button), render out a final movie. Only render the frame range that you were animating, of course. These ranges are set in the **Render Globals** window again. Go to the **Common** tab. Under **Image File Output** make sure the **Image Format** is **Quicktime Movie [qt]** and the **Frame/Animation Ext** is set to **name.ext [Multi Frame]**. Then set **Start Frame** and **End Frame** accordingly.
- Follow the instructions from the last assignment, and be sure to play your movie before handing it in to be sure that it's working!

Step 3: hand in the movie and the scene file
- Rename your scene file to something appropriate ("ChrisPerryA3.mb").
- Drop both the movie and the scene file into the hand-in folder on urza.

Helpful resources, as always:
  The Maya PDF manual.
  Class email list (cs174f04@lists.hampshire.edu)
  Josh (jmarvel@hampshire.edu)
  Me (perry@hampshire.edu)