Computer Animation I   Spring 2006

Assignment 2: 2D bouncing ball

This assignment is intended to give you experience with:
- using the graph editor
- the animation principles of squash and stretch and timing
- making a playblast to preview (and hand-in) your motion

Your goal is to animate one cycle of a bouncing ball in front of a static orthographic camera (one cycle means that the ball starts up high, bounces off the ground, and goes back up). Make use of the animation principle of squash and stretch to enhance your ball's motion, and concentrate closely on timing to make the ball bounce naturalistically.

The scene file you are starting with has a ball ready to go in the "side" view. Please keep the ball on-screen through the entire animation and do not animate the camera. The ball has two translation channels for moving it around and one scaling control to squash and stretch it. It also has a rotation control if you need it, but I would begin using just translation and scaling.

Step 0: get everything you need to do the assignment, run Maya, load the scene file
- The project folder on urza is called "assignment_02"
- Follow the instructions from the last assignment to copy this folder to your local machine's desktop, rename it, run Maya, set the project appropriately, and load the scene. You should see a ball sitting on a simple ground plane, waiting to move.

Step 1: planning
- Figure out what you want to do on paper before you start animating the ball. Where will you put your translational keyframes? Your scale keyframes? What should the interpolated curves look like? Why?

Step 2: practice making a PLAYBLAST
- Make sure you're looking through the orthographic **side** camera.
- Under **Window** in the main Maya menu bar is **Playblast**. Choose this to do a quick and dirty render of each frame so that you can watch your animation in real-time. In this case, real-time is 24 frames per second.
- If QuickTime Player doesn't pop up automatically when the playblast is completed, find it in the dock and click on it to bring it to the foreground. Then hit play to watch the animation.
- The current scene file has 24 frames (1 second). The ball isn't animated, so your playblast will show a ball just sitting there.
- Close the QuickTime Player window when you're done watching.

Step 3: animate
- You can choose the ball just by clicking on it. You shouldn't need the outliner window.
- Do your translational motion first. Get the timing of the bounces right before you mess with squash and stretch. To select the translation tool, hit "w". To set a translational keyframe at the current frame, hit Shift-w. If you move the ball and hit Shift-w again without changing the current frame, you will overwrite the previous keyframe for that frame.
- This assignment is ALL ABOUT learning how to change interpolation in the graph editor. If you can't control how the computer interpolates the keys you set, you won't get your ball to bounce well. Setting keys is only part 1: part 2 is going to the graph editor

- (**Window->Animation Editors->Graph Editor**) and changing the tangents at those keys to fit the motion you want.
- You can find the location of the existing keyframes by selecting the ball and looking for the red tick marks in the time slider. You can also find them in the graph editor.
- You can right-click in the time slider and select **Keys->Add Inbetween** or **Keys->Remove Inbetween** to change the number of inbetweens between two keys. This is a convenient way to re-time when you like the location of the ball but not the timing.
- If you want to see how your motion looks, go ahead and make another playblast. You can try just hitting the play button to the right of the time slider but DON'T TRUST the results you get! Even if Maya is trying to play back at 24fps (check in **Maya->Preferences->Timeline**), it may have to drop frames to achieve this rate. So playblasts are the most reliable.
- Save your work often!! I suggest using incremental file names so you can always go back to an earlier step if you want to (chrisPerry.2.mb, chrisPerry.3.mb, and so on). Maya can also do this for you if you look under the options for **File->Save Scene []** (click and drag to the little box on the right of Save and turn on incremental saves).
- To properly squash and stretch, you'll probably be setting scale keyframes more frequently than you set translation keyframes. If you set scale keys at the same time you have translation keys, your ball probably won't look right.
- Be sure to study the image of a squashing and stretching ball in the Lasseter reading.
- If you want to change the duration of your scene from 24 frames to accommodate your bouncing ball, set the start and end frames explicitly in the boxes just below the time slider.

Step 3: hand in your scene file and playblast

- When you like the motion you have, go to the Playblast option box (**Window->Playblast []**) and tell Maya to render the next playblast to a file. Use this format: **PerryA2.mov**. Save the file on the Desktop, and double-click on it to make sure it opens in QuickTime Player and looks the way you want it to look.
- Save your scene file with the same conventions: **PerryA2.mb**.
- Connect to the course storage disk on urza and drop both your .mb and .mov file into the handin folder.

DUE Wednesday February 15th at the beginning of class

THIS IS A HARD ASSIGNMENT. Don't wait until the last minute to start it. Allow yourself some time to get used to the Maya interface before trying to really finesse motion.

Helpful resources:
> The online Maya PDF manual.
> The sections of the Lasseter article on timing and squash and stretch.
> With Maya running, go to **Help->Tutorials** or search around on the internet.
> Class email list: cs174s06@lists.hampshire.edu
> The ASH lab monitors
> Chris Bishop (chb00@hampshire.edu)
> Me (perry@hampshire.edu)