

Computer Animation I

Assignment 4: A Ball-Whacking Mechanism

In this assignment, you are to design, model, and animate a 3D hierarchical mechanism for whacking a ball. You will be given a pre-rigged 3D ball model to use.

This assignment is intended to give you experience with:

- building models out of simple primitives that have been scaled, rotated, and/or translated,
- importing pre-built models into a scene file,
- constructing transformation hierarchies (naming groups, placing pivots, etc.), and
- the animation principles of anticipation, follow-through, overlapping action, and staging.

Assignment requirements:

- Your mechanism must be constructed in a multi-level transformation hierarchy, and you must animate at least two nodes to make the device hit the ball.
- You need to animate the ball responding to the hit.
- You need to hand in both a Maya ASCII file (.ma) and a QuickTime playblast of your device hitting the ball. Although there is no maximum duration, at a minimum your scene should be at least a second long.
- You have to build your mechanism from scratch: no using pre-existing geometries or transformation hierarchies.
- You need to name your objects and nodes clearly in the outliner (aka “BasePivot,” etc.).

The ball lives in the file named “ball.ma.” It is a 3D version of the 2D ball you’ve been using.

Step 1: get everything you need to do the assignment, run Maya, load the scene file

- Download the project folder from the course website or the handouts folder.
- Follow the instructions from the last assignments 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 two balls sitting on a simple ground plane, waiting to move.

Step 2: planning and building the geometry for your device

- Figure out what you want to do on paper before you begin modeling. Once you know what you want, switch Maya to the **polygons** menu and start building your primitives. They are accessible via **Create->Polygon Primitives** menu.
- Remember that each primitive will come out at the same hierarchical level and will have a (bad) default name. Rename as appropriate. Use the move, rotate, and scale tools to position the primitives relative to each other the way your design specifies.
- As you build, be sure to look through more than one view so that you know you’re building your object properly.
- Save frequently, and turn on incremental saving via **File->Save Scene []**. This will allow you to go back if you make a big mistake or if your file gets corrupt.
- Stop once your primitives are all where you want them to be in space.

Step 3: build the transformation hierarchy for your device

- Referring to your design, figure out which nodes are subordinate to which other nodes.
- Start middle-dragging objects under other objects in the outliner (or using **Edit->Parent []**) to arrange your primitives into a transformation hierarchy.
- If you need an empty group (aka a **null** object) you can create one using **Create->Empty Group**, or, you can grab a bunch of objects that you want to be siblings under a

Computer Animation I

Assignment 4: A Ball-Whacking Mechanism

- shared parent and go to **Edit->Group**. Remember to name things clearly so you don't get confused!
- By default, objects will pivot around their centers. This is verly likely NOT what you want to have happen. To relocate the pivot for any object or group, select that object/group, then hit the **home** key on the keyboard. This will move you into pivot-editing mode. You can move the pivot around to the place where you want it, then hit **home** again.
 - Test your mechanism by grabbing the nodes you will be animating and move/rotate them around. If it doesn't work properly, fix it before moving to the next step!! You might need to **Modify->Freeze Transformations** to "bake in" scale and/or rotation changes on parent objects, otherwise those transformations will cascade down to the children.

Step 4: import the ball object and stage a shot

- Go to **File->Import** and bring in the file named ball.ma.
- Create a camera by going to **Create->Cameras**, set its focal length, and position it relative to your mechanism and ball. Your goal here is to create a good composition for your mechanism in action (reread Lasseter about **staging** for helpful ideas).
- If you want to build a floor/room or other props for your shot, feel free.

Step 5: animate (keyframes)

- Whack the ball with your mechanism. You should work your way down the hierarchy, animating the mechanism first, before doing the ball. Do the ball last.
- Playblast frequently to see your mechanism and ball animation at the appropriate speed.
- Be sure to remember the 6 principles of animation being highlighted in this assignment: squash and stretch, timing, anticipation, follow-through, overlapping action, and staging.
- Be sure you are animating so that things look correct through your camera!

Step 6: hand in your scene file and playblast

- When you like the motion you have, save the playblast using a name like **PerryA4.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, but I'd like you to start using Maya ASCII files now (**File->Save As []**, set to Maya ASCII): **PerryA4.ma**.
- Connect to the shared network disk and drop both your .ma and .mov file into the handin folder.

DUE Wednesday October 1st at the beginning of class