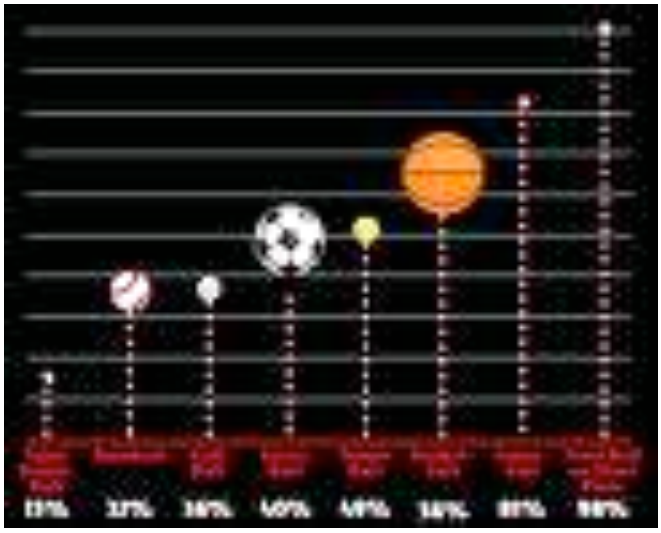
## Homework 2: Bouncing Ball



A bouncing ball is a classic place to begin animating. If you can make a bouncing ball look convincing, you can apply the same skills to more complex objects. In this assignment you will: (1) learn a bit about the Maya animation module, how to create projects, save work and set key frames, (2) work with the graph editor, (3) refine your understanding of the animation principles and forces, (4) learn how to work with controls and a rig, and (5) learn how to create a playblast.

**Part 1 Due Monday, January 14**

**Assignment:** Lorie will bring in several balls: ping pong ball, basketball, bowling ball, tennis ball, balloon, golf ball, beach ball, etc. Watch them bounce on various surfaces. Notice the reactions to different surfaces such as concrete, wood, grass, sand. Notice the change when you bounce from above, at an angle, with strong force or a light lob.

Now try to recreate the motion. We will assign the type of ball using numbers like we used for the first assignment. Make a bounce animation, considering all the forces at work here. Remember, this is just like the Gravity assignment, in that you are creating the sense of weight and forces through timing and spacing.

You'll start by simply moving the ball from its starting place to its ending place, setting keys along the path. This is the timing which reflects the force being applied to the ball.

Next you will work on the spacing by adjusting the anim curves in the graph editor. This changes the spacing between the key frames to add the sense of weight and force as the ball bounces off the ground surface.

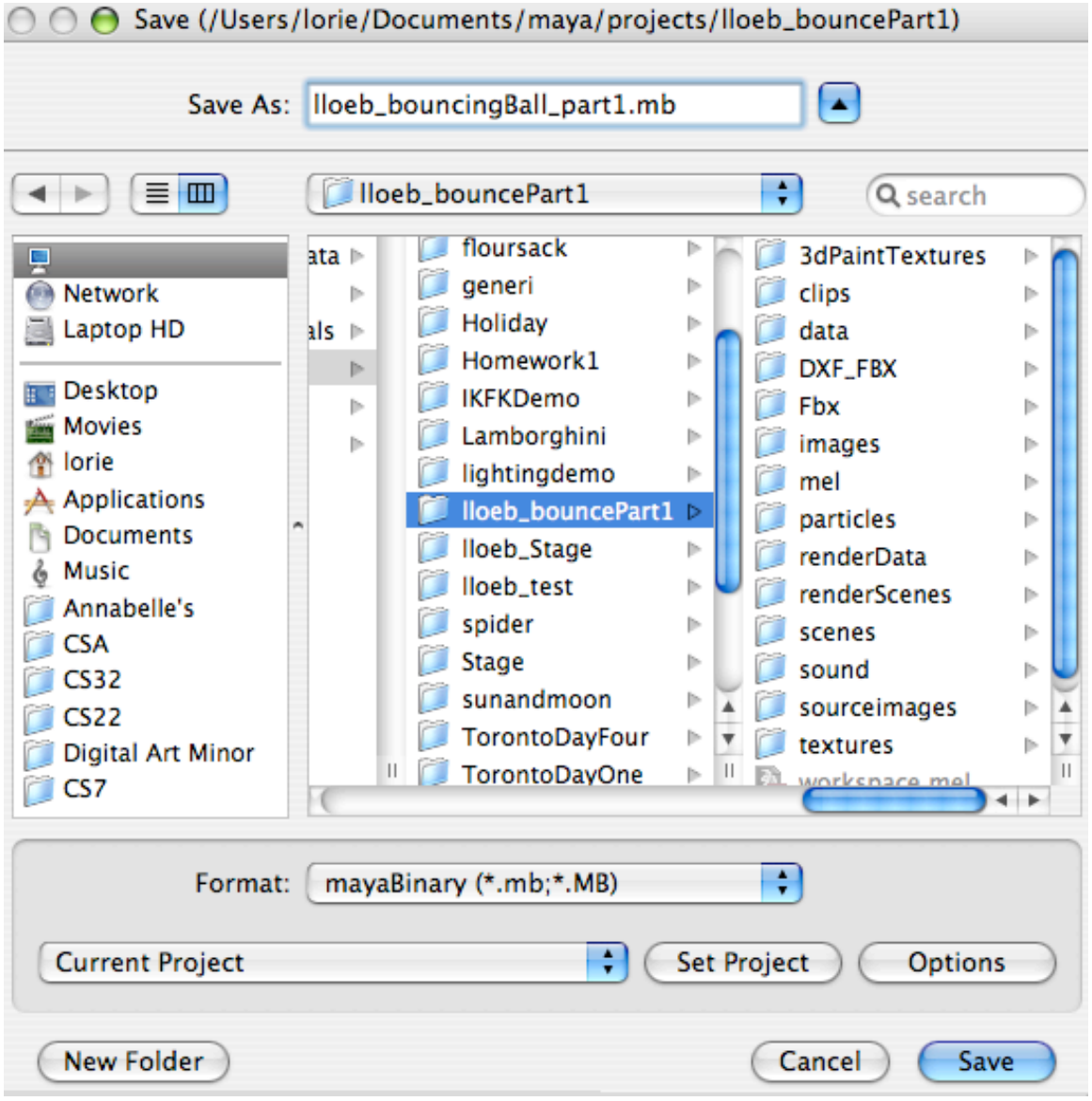
Use the hi-res NURBS ball, provided, for this assignment. The NURBS ball is fully rigged. To get to it, download it from the class website www.cs.dartmouth.edu/~cs24/models. The model you will use is called "ball_rig_v1.mb".

We will complete work in class that will prepare you for this assignment. This is a critical week as we will begin working with the graph editor. Don't miss class this week—this is the week that sets the foundation for the rest of the term!

## Set up your project:

Create a new project (File>Project Window). Create a new project for the Bouncing Ball Assignment (be sure your name is part of the name) Use the default settings and accept. Be sure it is saved in the proper location under imac>users>documents>maya>projects. Open the ball_rig_v1.mb file, which can be found on the class website on the Models page http://www.cs.dartmouth.edu/~cs24/Models.html

Go to File>Save Scene As, Make sure the project is set to the project you just created, name your scene using the same naming convention (your name then the name of the scene), then hit Save.

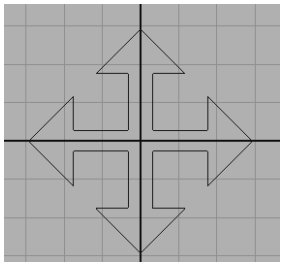



## Using the file to make your animation:

This is a gorgeous ball animation rig, made for your use. Play around with it BEFORE you start your animation. You will notice that you cannot select the ball geometry. This is because it has been put in a layer and made a reference. When a character, like the ball, is rigged, you do not move the geometry directly, but instead you move the controls. The ball geometry is linked to the controls so that when the controls move, the ball moves appropriately.

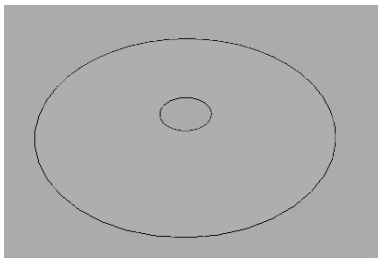
**The Controls:**

**Important: YOU WILL ONLY USE THE BALL_ANIM CONTROL FOR THE FIRST PART OF THIS ASSIGNMENT. I WILL TELL YOU ABOUT OTHER CONTROLS, BUT YOU WILL USE THEM IN PART TWO OF THE ASSIGNMENT!!!!**



**ball_anim:** The arrow control is called the "ball_anim"

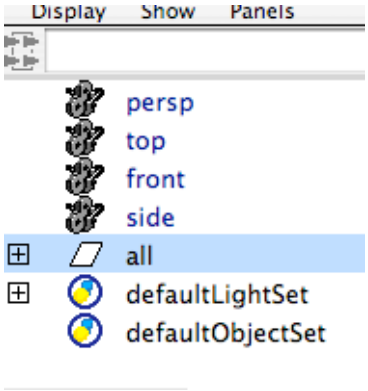
--This control is used to translate the ball. You also use it to rotate the ball.



**squash_anim** The orange disc is called "squash_anim"

--You will use this after you set your rotations. This control is used to squash and stretch the ball.

You change values and set keys on the control attributes in the channel box! Use the Virtual slider and MMB drag in the viewport. The ball and the value change with the motion of your mouse as you drag.




**all: This is not a control.** It is a group containing the ball controls and the ball geometry. It was created to clean up the rig and make a neat and tidy file with easy to find objects. When you select "all" in the outliner, you are selecting all the elements in the group, including the controls and the geometry.

**--**Before you begin, if you want to scale the ball to make it smaller or bigger, you can do that by selecting "**all**" in the outliner, making sure that "all" is in the channel box name. You can now scale, translate or rotate, to set the ball into place to begin your animation.

You will use the **ball_anim** control to animate the ball in Part 1 of this assignment**.** Click on it, making sure the channel box name says ball_anim. You will translate the ball_anim in just the same way we did with the practiceBall, setting the keys for the animation, setting the first and last keys

first, then going through and setting the keys for the contact positions and then for the top of the bounces.

Once you set the keys, use the graph editor to adjust the interpolation curves so the bounce looks right for your ball, the surface it is bouncing on and the force it has been thrown/hit/set into motion with.

***Be sure to save often. Even with auto save, it is good to save on your own as soon as you've done something you like and would be sad to lose if Maya were to crash.***

## Turning in your work:

A playblast is a screen capture of your animation. You are basically playing your animation and Maya is taking pictures of the viewport as it plays. Whatever shows in the viewport, shows in the playblast.

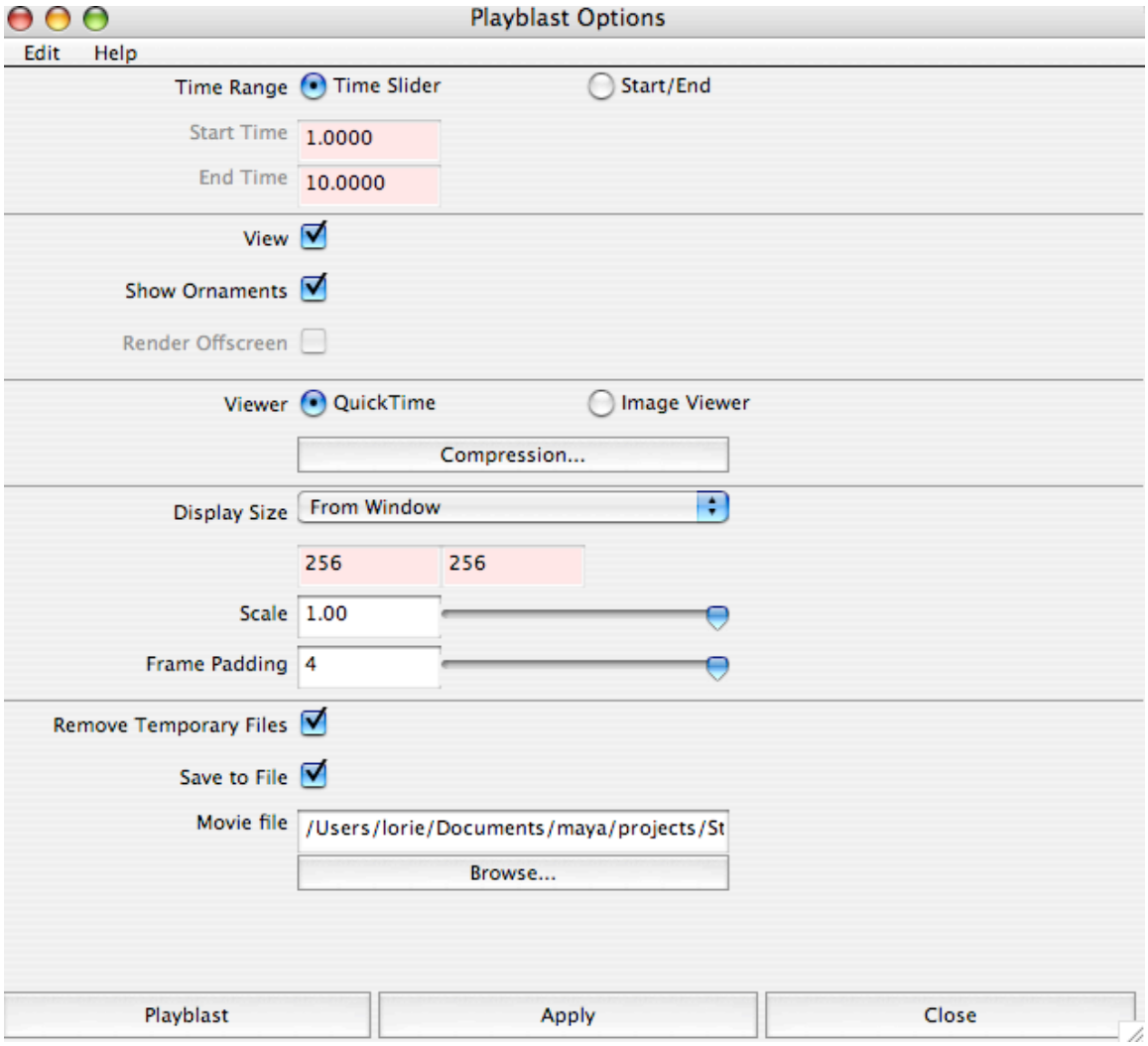
**Be sure to make the controls invisible for the playblast. Do this in the layers editor by turning off the visibility of the ball_anim layer.**

You will turn in a playblast of your bouncing ball. (Make sure it is saved with your name on it).

## To create a playblast:

In Maya's main menu go to Window>Playblast> (to open the options box)

Set up Playblast options as shown and hit the Compression button and choose H.264 compression. See example:




Hit the Playblast button and the playblast is created.
Save it using a name that includes your first initial.last name_bounce-any modifier (for example, lloeb_bounce-part1 or bouncingball1 or …)
The playblast will save a quicktime file, so the suffix should be .mov (example: l.loeb.bounce-part1.mov)

Use FETCH to turn in your homework. Complete instructions for turning in homework can be found on the tutorial page of the class website.

**For those who want an extra challenge here are some additional challenges:**

Advanced assignment1: For those who took CS22, you could also animate two balls as if they were feet walking forward. This is a great way to practice timing and spacing. Watch people walking. The feet are like bouncing balls, except they respond to the weight of the person. Make one ball the left foot and the other the right foot.