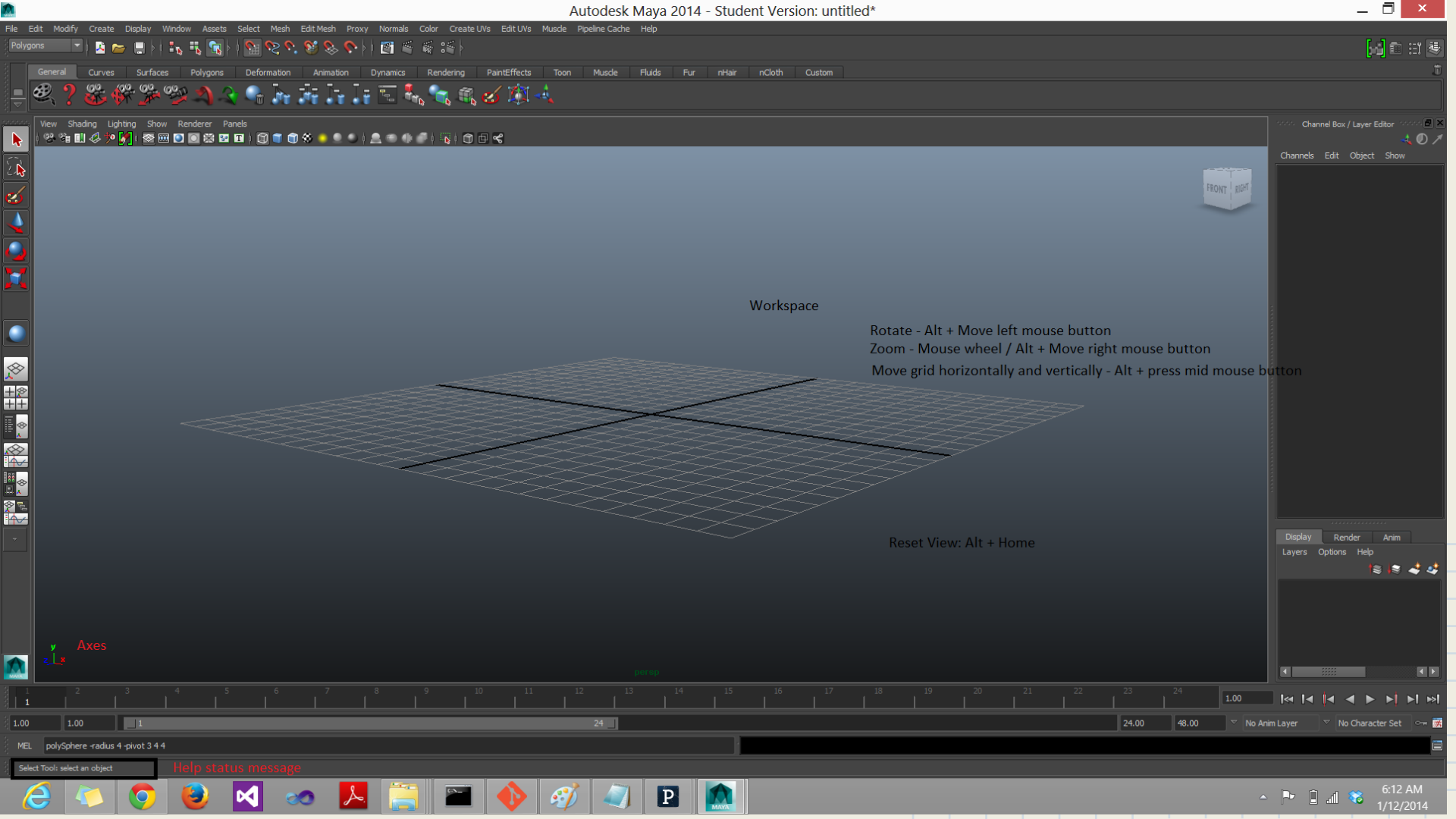
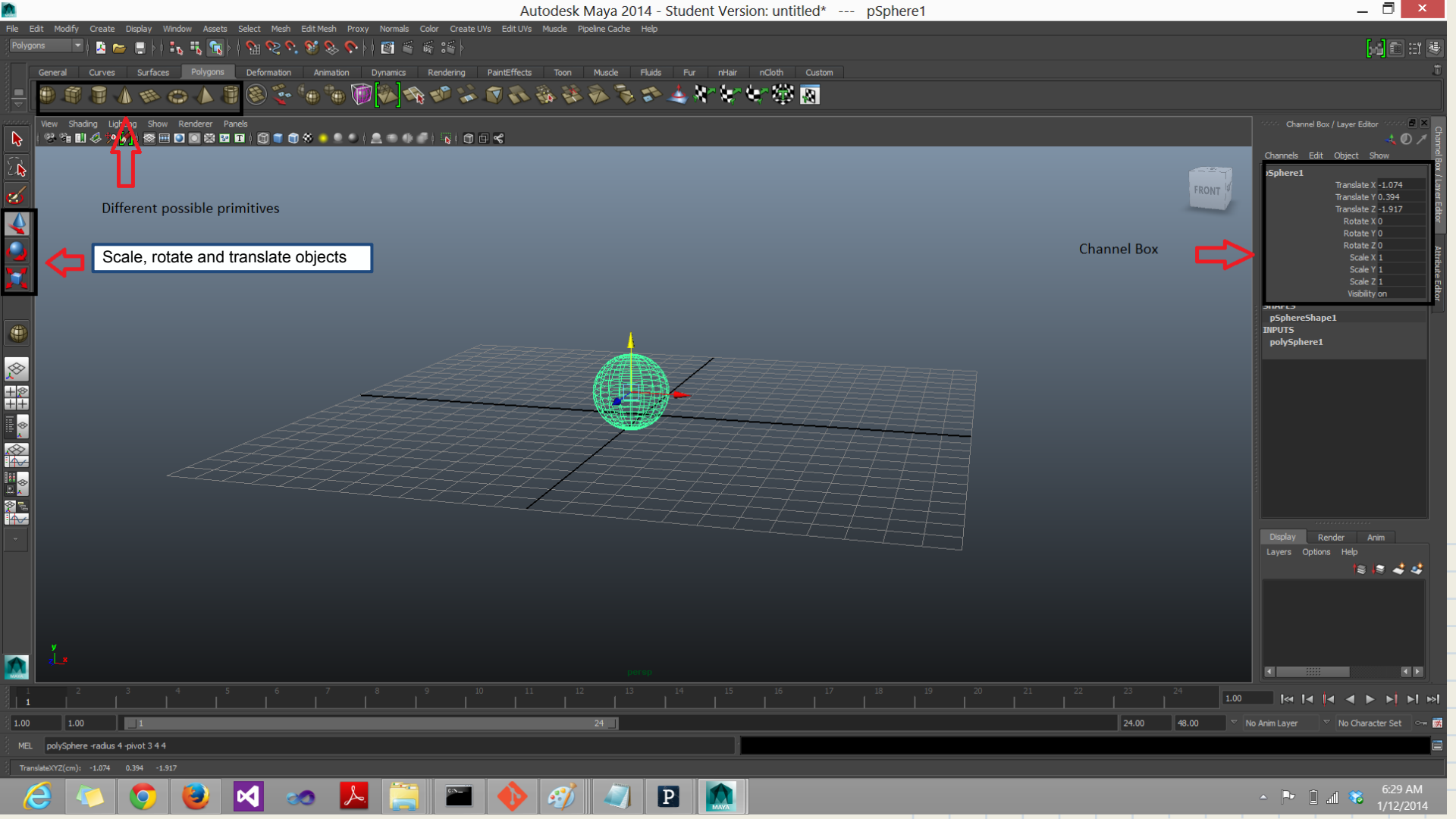
Maya Tutorial

Put together from material at: http://download.autodesk.com/us/maya/Maya_2014_GettingStarted/index.html

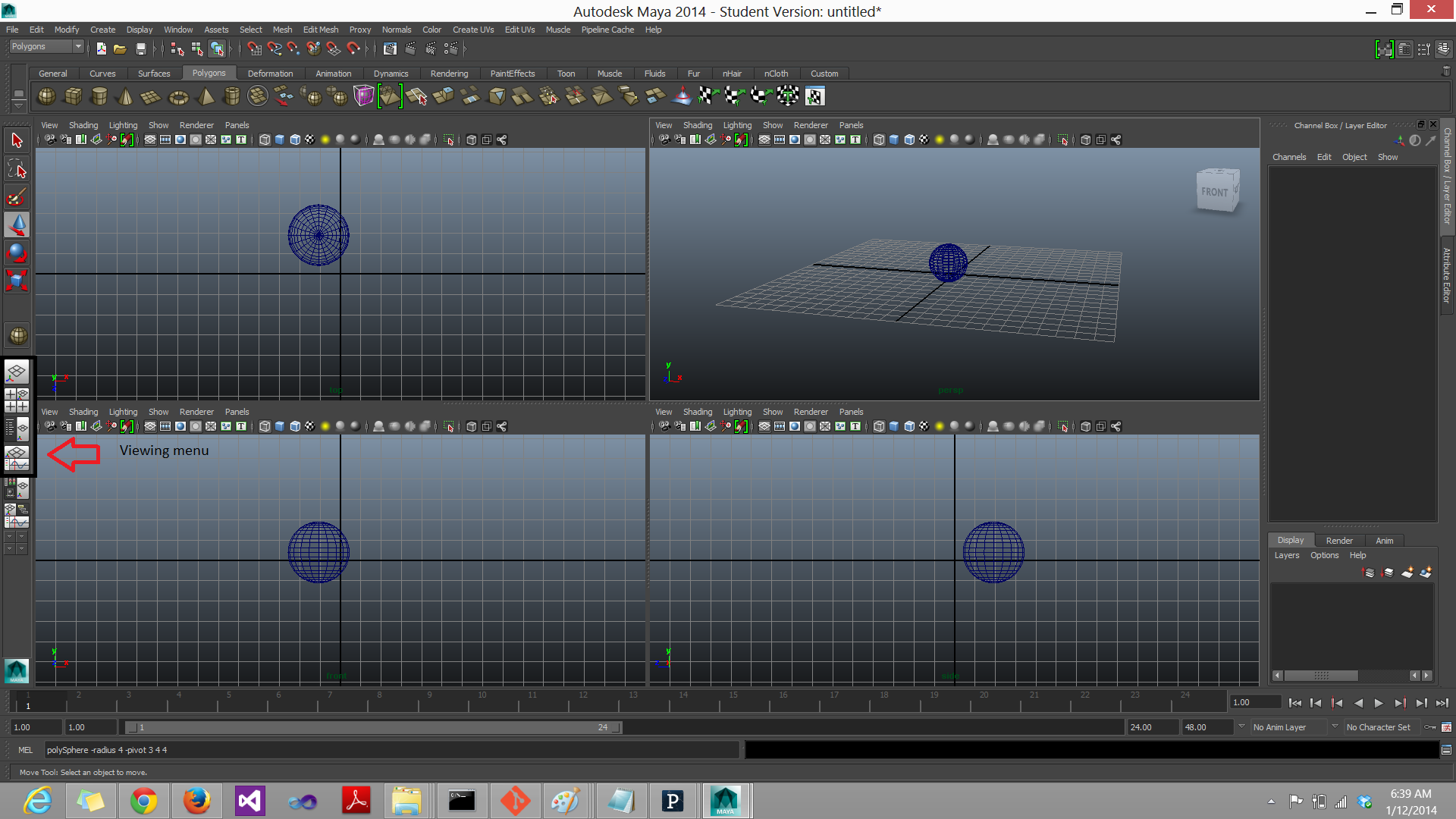
Getting your bearings


Autodesk Maya 2014 - Student Version: untitled*
File Edit Modify Create Display Window Assets Select Mesh Edit Mesh Proxy Normals Color Create UVs Edit UVs Muscle Pipeline Cache Help
Polygons
General Curves Surfaces Polygons Deformation Animation Dynamics Rendering PaintEffects Toon Muscle Fluids Fur nHair nCloth Custom
View Shading Lighting Show Renderer Panels
Workspace
Rotate - Alt + Move left mouse button
Zoom - Mouse wheel / Alt + Move right mouse button
Move grid horizontally and vertically - Alt + press mid mouse button
Reset View: Alt + Home
Axes
Channel Box / Layer Editor
Channels Edit Object Show
Display Render Anim
Layers Options Help
MEL
polySphere -radius 4 -pivot 3 4 4
Select Tool: select an object
Help status message
No Anim Layer
No Character Set
6:12 AM
1/12/2014

Adding objects


Autodesk Maya 2014 - Student Version: untitled* --- pSphere1
Different possible primitives
Scale, rotate and translate objects
Channel Box
FRONT
Channel Box / Layer Editor
Channels Edit Object Show
pSphere1
Translate X -1.074
Translate Y 0.394
Translate Z -1.917
Rotate X 0
Rotate Y 0
Rotate Z 0
Scale X 1
Scale Y 1
Scale Z 1
Visibility on
pSphereShape1
INPUTS
polySphere1
Display Render Anim
Layers Options Help
persp
MEL
polySphere -radius 4 -pivot 3 4 4
TranslateXYZ(cm): -1.074 0.394 -1.917
No Anim Layer
No Character Set
6:29 AM
1/12/2014

Viewing and positioning


Autodesk Maya 2014 - Student Version: untitled*
File Edit Modify Create Display Window Assets Select Mesh Edit Mesh Proxy Normals Color Create UVs Edit UVs Muscle Pipeline Cache Help
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General Curves Surfaces Polygons Deformation Animation Dynamics Rendering PaintEffects Toon Muscle Fluids Fur nHair nCloth Custom
View Shading Lighting Show Renderer Panels
FRONT
Channel Box / Layer Editor
Channels Edit Object Show
Display Render Anim
Layers Options Help
Viewing menu
MEL
polySphere -radius 4 -pivot 3 4 4
Move Tool: Select an object to move.
6:39 AM
1/12/2014

Useful points

Can edit properties of an object (its position, its scale, etc) using the channel box as well as the transformation icons.

Move mouse over a view <perspective, top, front, etc> and press space to have it occupy the entire workspace. Press space to toggle back to four views.

Can toggle snap to grid to move/scale by integral grid points.

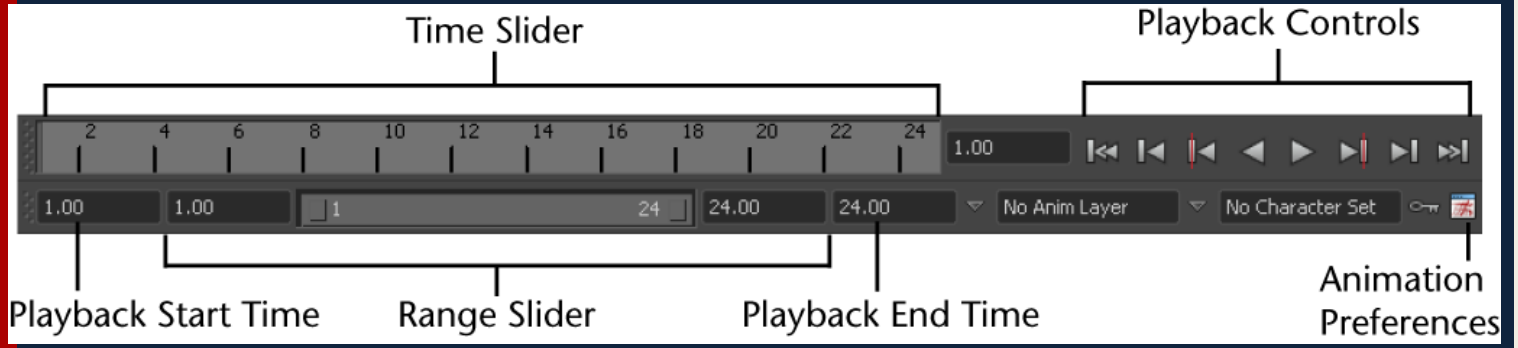
Can press ‘a’ to frame current scene.

And many more that you’ll discover as you use Maya

Exercise

Create a sphere at (0,0,0) of radius 2 and a cube at (4,0,0) of side 1 each

Keyframe Animation


Time Slider
Playback Controls
2
4
6
8
10
12
14
16
18
20
22
24
1.00
1.00
1.00
1
24
24.00
24.00
No Anim Layer
No Character Set
Playback Start Time
Range Slider
Playback End Time
Animation Preferences

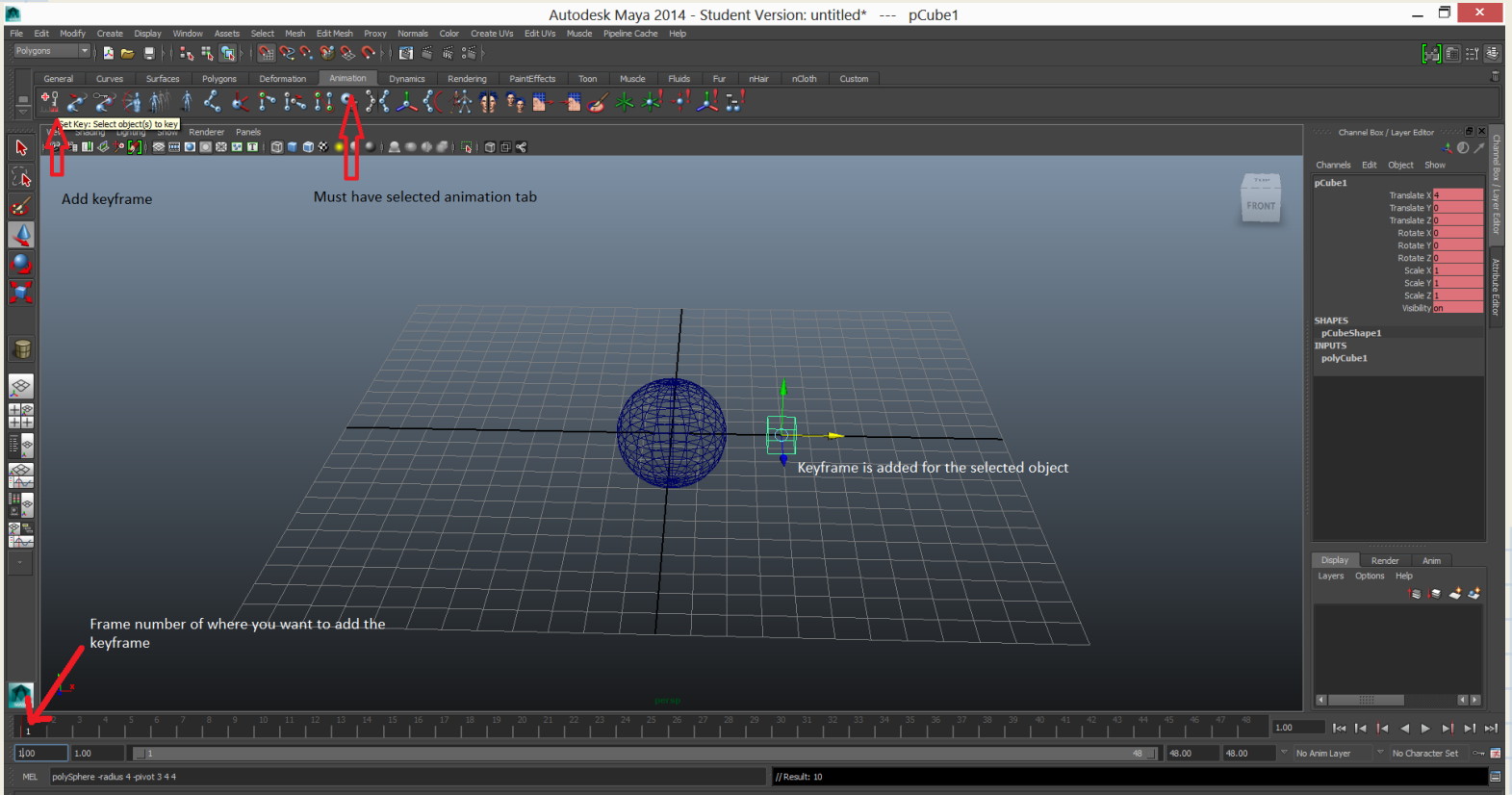
Keyframe Animation Basics

Set a couple of keyframes, where the values of the attributes you want to interpolate (x position, scale, etc.) are manually specified.

Maya does the interpolation automatically between these keyframes.

Generally 24fps for animations.

Adding a keyframe

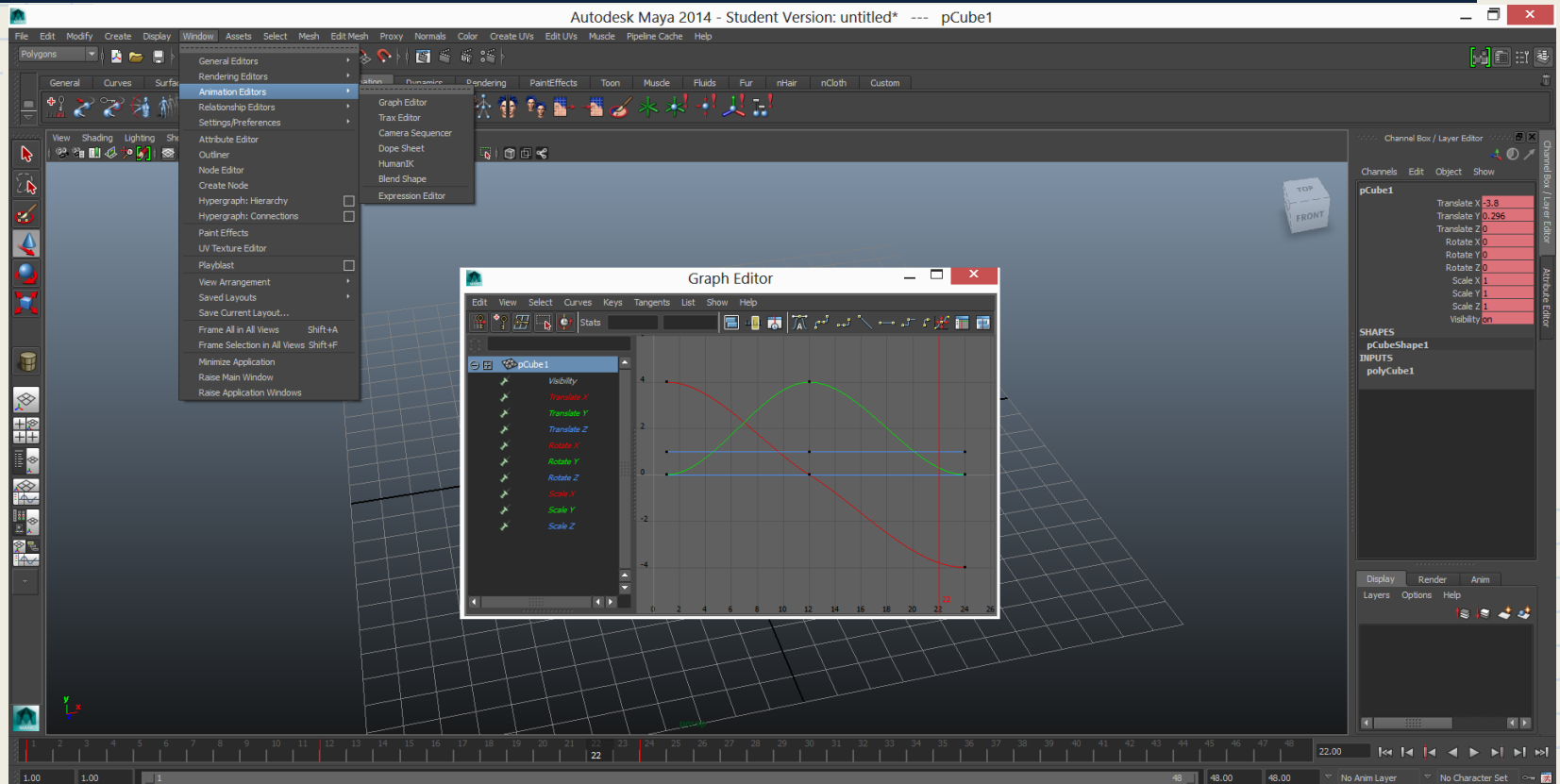


Exercise

Add three key-frames to make the box go over the sphere over 2 seconds

Additional stuff - s shortcut to add a keyframe

Viewing the interpolation curve



Useful points

Can edit the interpolation curve in the Graph Editor to tweak animation.

Can goto Windows>Playblast to quickly create a movie for the animation.

MEL <Maya Embedded Language> scripting

Window > General Editors > Script Editor.

History and script input areas.

Any command performed using the UI invokes a script - try adding a sphere and deleting it to see the sequence of scripting actions generated.

General syntax: command -<flag> <value> -<flag> <value> ...

MEL scripting basics

Variable types: int, float, string
Aggregate types: array, matrix

Created as: float $myRadius = 10.0;
Matrices: matrix $a[2][2] = <<1,2;3,4>> -- a[0][0] = 1, a[0][1] = 2, a[1][0] = 3...
Arrays: int $myArray[5] = {1,2,3,4,5};
size($myArray) => returns 5

MEL scripting basics

Procedures: proc <return_type> proc_name(arg1, arg2)
Eg: proc myProc1(int $var1, string $var2);
proc string myProc2(int $var1, string $var2);

Calling a proc: myProc 1 name -- all arguments implicitly converted to strings
myProc(1, “name”) -- need to explicitly convert to a string

Loops: for ($i = 0; $i < 10; $i++)
Additional constructs include: switch-case, while, etc -- similar structure to C++/Java.
print - prints values of variables

Exercise - Add a sphere using MEL scripting

Create a script to add a sphere to the workspace using MEL scripting using the following proc signature:

proc addSphere(int $radius)

call the proc to create 2 spheres of radius 3 and 5

Project Bootstrap

Look at the script given in the assignment as an example

Idea -

Query the number of keyframes <keyframe -query -keyframeCount>

Query the time and values at the keyframes <keyFrame -query -timeChange -valueChange>

Find out linearly interpolated values at each time instance between successive keyframes

Add these values as keyframes <setKeyframe -time <> -value <> >

Project -

Change the linear interpolation part to other forms of interpolation.

Exercise - Project Bootstrap

Copy the example given in the project description and try to run it <Ctrl+Enter> from the script editor to have the script stored.

Perform a linear interpolation of the height of the box that is jumping over the sphere and note the change in the animation curve in the graph editor to ensure that you've switched over to a linear interpolation.

Useful Links

Maya modeling and animation:

http://download.autodesk.com/us/maya/Maya_2014_GettingStarted/index.html - Maya Basics - Lesson 1 to 4, Animation - Lesson 1 particularly helpful for getting up and running.

MEL scripting:

http://download.autodesk.com/global/docs/maya2014/en_us/index.html?url=files/Background_MEL_for_programmers.htm,topicNumber=d30e788742

http://web.archive.org/web/20111120180214/http://caad.arch.ethz.ch/info/maya/manual/Commands/melCommands/melFAQ.html

Questions?