**Blender Basics: Cup Tutorial**

Part 1: <https://www.youtube.com/watch?v=y__uzGKmxt8>

Part 2: <https://www.youtube.com/watch?v=ChPle-aiJuA>

Getting Started:

In your Blender folder, create a new folder called “loginname\_cup.” Open a new Blender document and save it within this folder as “cup” Once you’ve finished modelling your cup, you will render an image (title it whatever you want) and save it inside this folder, as well!

In this tutorial, you will learn how to:

* Use the NumPad to toggle 3D views (Num1, Num3, Num7, ctrl + Num1/Num3/Num7)
* Use the Loopcut & Slide (ctrl + R), Extrude (E), Merge (ctrl + M), & Smooth Edges tools
* Use the Box Selection (B), Conversion (alt + C), Join (ctrl + J), Add Faces (F) commands
* Move/Rotate/Scale by typing in numbers while modelling
* Add and manipulate Curve objects (in addition to Mesh objects)
* Apply materials and shaders in Cycles Render
* Add light sources via emission materials
* Lock Camera to View (Move the your scene while looking through the camera)
* Render using the Cycles Render Engine (which allows for more photorealism)

Supplementary Notes:

These notes are meant to provide 1) a sort of table of contents, 2) information that will help you understand what you are doing in each step of the tutorial, 3) sidebars that will help you follow along with the tutorial, 4) shortcut keys and additional information. Notes are placed in chronological order, and are organized by the time at which they occur in the video.

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**REMEMBER: If you forget where something within your Interface is, what part of the Interface is called, or what a shortcut key is, you may refer back to the diagram and list of hotkey shortcuts you created when we started Blender**

**REMEMBER: SAVE, and SAVE OFTEN. You should be saving your work every 2-5 minutes.**

**REMEMBER: Undo SC = Ctrl + Z, Redo SC = Shift + Ctrl + Z**

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PART 1

2:10 – **Toggling from Object to Edit Mode**

* SC – Tab
* ONLY the single object you had selected in OBJECT mode will be editable once you’ve entered into EDIT MODE

2:21 – **Toggling from Solid to Wireframe Mode**

* SC - Z

2:35 – **Using the NumPad to change View Modes**

* Num1 = front view ctrl + Num1 = back view
* Num3 = right view ctrl + Num3 = left view
* Num7 = top view ctrl + Num7 = bottom view
* Num5 = orthographic/perspective view

3:25 – **Tool Bar: Loop Cut & Slide (aka Subdivide Loops)**

* SC – ctrl + R

3:40 – **Select/Deselect All Command**

* SC – A

NOTE: @ 3:40, press the left mouse button twice to apply the Loop Cut & Slide

4:10 – **Multiple Selection Commands**

* Use the Box Selection Command by clicking and dragging to select multiple edges/faces
* SC – B
* Another type of selection you can use is the Circular Selection Command
* SC – C (use the scroll wheel to make the selection larger/smaller; press ESC to exit)
* Yet another type of selection you can us is the Select Linked Command
* SC – C + LMB

4:15 – **Move/Scale/Rotate by Typing Numbers While Modelling**

* Use either NumPad OR Top Number Keys to enter dimensions while using G/S/R
	+ Example: 0.8 = 80% scale/8 degrees rotation
	+ Example: 1.5 = 150% scale/15 degrees rotation

6:15 – **Adding Curve Objects** (in addition to Mesh Objects, which you already know about)

* Curve objects allow you to actually draw your own objects, then model them using Bezier Curves (which are popular in Desktop Publishing/Illustration software)

NOTE: @ 6:15, make sure that your Cup Model is facing the right way (this caused me a bit of grief while I modelled mine)… If you are in Front View (Num1), you should be seeing your green dimension (y) and your blue dimension (z)

6:30 – **Manipulating Curves** (using nodes) in Edit Mode

* In edit mode, you are able to transform your curve path by clicking and dragging the individual nodes that make up the path!

9:35 – **Applying Geometry to a Curve**

* Use the Object Data Panel in your Properties Editor to apply the Bevel function to your curve’s geometry (pretty cool, hey?)
* You must use Bezier Curves when using the Bevel Object function in this way

10:30 – **Conversion Command**

* SC – Alt + C (or Editor’s Menu: Object > Convert to > Mesh from Curve)
* This is how you can take the Curve object (path) you created, and convert it into a Mesh, like the 3D ones you’ve played around with in the past
* This adds polygonal geometry (vertices, edges, faces) to your object

**NOTE:** If your origin point (the little yellow dot that every object comes with) gets out of whack (too far away from your object’s center point), you can realign it by selecting the object, then following this pathway in the Editor’s Menu: **Object > Transform > Origin to Geometry**

**NOTE:** If the ends of your handle are too curved or don’t align properly with your cup you may fix this by selecting and transforming (grab, rotate, scale) the outer edges in Edit Mode.

12:00 – **Join Command**

* SC – Ctrl + J (or Editor’s Menu: Object > Join)
* This is how you can join multiple, separate, objects into one single object that can be manipulated together in Edit Mode (note: objects DO NOT have to be touching to be joined into one “single object”)

12:30 – **Selection Modes**

* SC – Ctrl + Tab (or Bottom Viewport Panel > Vertices, Edge or Face icon)
* While working in Edit Mode, you may manipulate your geometry by selecting one of the 3 different parts of the polygons that compose it (vertices, edges, faces).

13:25 – **Add Faces Tool**

* You can add faces too your object’s existing geometry by shift-selecting multiple edges or vertices and “adding faces” when in Edit Mode
* SC – F (or Editor’s Menu: Mesh > Faces > Make Edge/Face)

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PART 2

0:50 – **Extrude Tool**

* This allows you to expand or contract an object’s vertices/edges/faces, just like the push/pull tool in SketchUp. The difference is that extruding in Blender adds another set of vertices/edges/faces to your object’s geometry (so make sure not to overdo it).
* SC – E (or in the Tools Region: Tools tab > Extrude Region)

3:00 – **Merge Tool**

* Allows you to merge (or, combine) parts of an object’s geometry together into a single point (in this case, at center)
* SC – Alt + M (or in the Tools Region: Tools tab > Merge > At Center)

3:40 – **Smooth Edges Tool**

* This allows you to permanently smooth out your object’s geometry, making it look less boxy and more realistic
* In the Tools Region: Tools tab > Shading: Smooth

3:45 – **Modifiers: Subdivision Surface**

* In the Properties Panel: Modifiers (wrench icon) > Add Modifier > Subdivision Surface
* Like the Smooth Edges Tool, this modifier makes your object’s edges smoother. Unlike the Smooth Edges Tool, a modifier does not permanently alter your object’s geometry – they can be added or removed very easily
* There are many different Modifiers in Blender. Modifiers modify/change the appearance of your model, often by adding the illusion of additional geometry. Modifiers can be viewed inside your workspace (View) and/or when rendering (Render).
* **NEVER actually Apply a Modifier** unless told to, since this will actually apply the additional geometry created in the illusion to your model, vastly increasing file size. Also, the action of Applying cannot be undone.

**NOTE:** @ 4:13, select the Cycles render from the top of your Blender Interface (where it currently says Blender Render). Make sure that you do this BEFORE you apply a new material to your cup (otherwise, the options you need to apply materials/shading in Cycles might not work)

4:15 – **Cycles Render: Materials and Shading**

* To render your robot, you used the default Blender Render. To render your cup, you will be using the Cycles Render. For the rest of the projects we tackle in this course, we will use Cycles Render, because though the rendering time is significantly longer, it is a much more powerful rendering engine and can produce very photorealistic images.
* In the Properties Panel: Materials (purplish circle icon) > Materials > New

**NOTE:** @ 5:50, the “Fac” section of the Mixed Shader Surface option acts like a spectrum that determines how much power each of the two shaders has over the appearance of the object. A value of 0 represents the first shader, so if you wanted this shader to be dominant, you would set the Fac closer to 0. A value of 1 represents the second shader, so if you wanted this shader to be dominant, you would set the Fac closer to 1.

**NOTE:** @ 6:02, you must click on the 3D View screen before you can actually press Num1 to change your view

7:15 – **Adding a Light Source via Emission Material**

* In addition to adding a Light Object (like we did with the Robot) you can apply a specific (emission) type of material to a mesh, or plane object in order to light your scene
* Placing the light source behind the camera ensures that it will not appear in your render

8:45 – **Lock Camera to View**

* This allows you to move your scene while looking through your camera (after pressing Num0 to look through your camera’s viewfinder). This is an easy way for you to reposition your camera for rendering by zooming/panning/orbiting
* While in Num0: Editor’s Menu: View > Properties > (check) Lock to Camera View

9:30 – **Rendering in Cycles**

* This is more of a reminder than it is new information, since rendering using Cycles Render is just like rendering using Blender Render (which you used for your Robot)
* The major difference between Blender Render and Cycles Render (as you will notice) is that Cycles takes a lot more time to Render your images – especially with a large number of Samples (like the 250 you will be using to render your cup)
* Properties Panel: Render (camera icon) > Render button
	+ SC: F12 (render), ESC (cancel render or go back to 3D View), F11 (toggle between most recent render and 3D View)

12:00 – **Save a Render as an Image**

* Again, this is more of a review
* Image Editor (accessed by rendering model): Editor’s Menu: Image > Save as Image
	+ SC: F3 (to save as image when in Image Editor)

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SAVING & HANDING IN

Create a folder called “3D\_Cup\_YourName.” Inside this folder place 2 items:

1. Rendered 2D Image (in either PNG or JPEG form)
2. .blend file (working file that you’ve been saving throughout)

Hand this folder in to Ms. Hammond’s Hand In folder

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Questions:

1. What is the difference between object and edit mode?
2. What is the difference between perspective and orthogonal mode?
3. What is the advantage to making selections in wireframe mode?
4. If you wanted to scale an object to be 50% of its original size, what number would you enter on the keyboard? If you wanted it to be 2x its original size? If you wanted to rotate an object 45 degrees?
5. How were you able to turn the handle of the cup from a 2D curve into a 3D mesh?
6. What is the point of joining two separate objects together if they are not touching one another? What is the point of joining two objects together if they are touching one another?
7. What does “extruding” a selection allow you to do with it?
8. What are the major differences between the Blender and Cycles render engines?
9. When is it a good idea to render using a low amount of samples? When is it a good idea to render using a high amount of samples? What are the drawbacks of each option?