***A beginners guide to using blender:***

Most features are never used. Hence, we would use the 80/20 rule, where 80% of the results comes from the features.

Understanding the features common to a lot of people using blender:

* Modelling
* Lighting
* Create materials

Area we look through is called the 3D viewpoint. The properties panel is to the right of the viewpoint which contains a lot of buttons to control the properties of your models.

By clicking on the mesh, then going to the material properties, you can change some of the features including the colour or the texture of the mesh.

**\*\*Required: a mouse\*\***

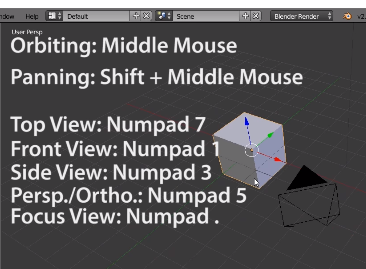
**You can change your user preferences to emulate a numpad, as this has shortcuts that are otherwise unable to repulicate.**

**\*\*Required: a numpad\*\***

Go to file, user preferences (Control alt u), input and check emulate numpad and change the mouse settings to click from left, as their default is right.

After emulating the num pad, you can click 1 to get the viewpoint of the x and the z axis (front view), 3 to get the y and z axis (side) and 7 to get the x and y axis (from above)

To move around the viewpoint, press the middle button on the mouse to move in viewpoint direction and hold shift as well act as a scroll from item to item.

The period button is the dot button. To look at any item, you click on it and press period.

By clicking the space bar, it allows you to type in what you what to achieve.

Keyboard shortcuts: <file:///C:/Users/user/college_y2/UnityStuff/BlenderHotkeyReference.pdf>

To scale an mesh, press **S** and the object will start to scale in all directions based on your mouse movements.

Control changes it to incremental steps, while shift makes subtle movements.

After adding a new object, for some objects, you will see an options bar to the side that allows you to determine the resolution of the object by deciding the amount of vertices on the object. A good tip is to have a low res object then modify it later (more below).

You can also fiddle with the position of the object using the axis of the object by clicking on the axis associated with the object and dragging it across that axis.

In blender, the axis represents the following:

Z: height/depth

Y: width

X: length

By clicking g, the object will move according to your mouse. To position it so it stops moving according to the mouse, press g again.

You can also move the object according to the axis by tapping that letter on your keyboard or holding down the middle button on the mouse and push it towards the direction which you want it to go (eg the x axis).

You can also rotate by clicking the r button, and it start to rotate base upon your mouse. The good news is you can rotate, scale and move by the three axis by clicking on the object and clicking the appropriate buttons required for the functionality. The is a widget on the bottom as well for you to do the same stuff, but it is quicker to do via button shortcuts.

On the properties panel, you can click on the screwdriver-looking thingy and add modifiers.

Using the modifier, you can modify your objects in any shape. Because these are extra features, you have full control, where as you didn’t by applying similar original features in the beginning of the objects life. To smooth the object out using the modifier, you use the subdivision modifier.

In regard to software, to play animation, you press alt + a.

When it comes to subdivision, there are two parts: view and render. The view is what it looks like to you as you are working with it, while the render is the final part. The higher the subdivision, the more poly used, more resolution and more smoother it looks.

There are two buttons as well that could disable the modifier to one or both viewpoints. One is the camera button (disables the render) while the other is the eye (disables the viewpoint)

We are now going to move to edit mode, which everything we did currently was done in object mode. To activate this mode, tap tab button. By pressing tab again, we go back to object mode. We can use the button at the bottom to go through the same process. While in edit mode, you can only work with the specific object and not any other object. The difference between edit mode and object mode is edit mode allows you to change the shape of the object.

While in edit mode, you can select the vertices, edges and faces of the objects. To click more than one, hold down shift and to select the entire row, press alt as well. There are buttons at the bottom that allow you to change mode within edit mode allowing you work decide what way is most efficient.

While using any of the three modes, you can use the scaling, rotate and move features which we have been working with by (just remember the keyboard shortcuts prior to these steps).

By pressing the o key on your keyboard, you enter proportion edit mode, which the area affected by your editing is in a circle. The circle grows and shrinks based upon your choice as you use the middle button on mouse to scroll with.

There is a button on the bottom with a line on it that allows you to change the lines looks. By default it is smooth looking.

By clicking b, you enter box select mode. With the left/right button, you can select areas covered by the box. If there are those you want to deselect, you can do the same process except change the button to middle mouse. Pressing A selects all and press a again deselects all. Another button, c, is known as circle select which allows you to select based on what in scrolled into the mouse.

There is another mode known as wireframe mode. To enter this, you press z while in edit mode. The removes the faces and only shows the skeleton.

To duplicate objects, you press shift d. To put it in its original location, press esc button.

If you press esc and want to get the object back, you can remove the object linked to it by pressing l or grab the object itself by clicking control l.

There is a button to remove duplicate vertices. It does this so there would be no flickering in the rendering scene.

If you duplicate an object, you can make it own by clicking p and picking an option. The most common is by selection.

After created the second object, you can use modifiers to make them attach to the previous item. This is known as solidifier.

Afterwards, if you want it to go outwards, you change the offset value from -1 to 1. This pushes it outwards.

Afterwards, you can change the thickness level to the desired level using the thickness.

The order of the modifiers is from top to bottom. On each modifier, there are an up and down buttons which would allow you to change the order of the modifiers.

Another modifier is the array modifier which allows you to create duplicates of the original object.

Rendering the image:

To do this, you click the render button, which brings you to the rendering engine. There are multiple slots which allows you to compare each engine. One could be better quality in terms of its calculations. However, that one would take longer to render.

To switch between them, have multiple slots (you need to have clicked render for each part). To switch between each slot, press j.

To escape the render mode, press esc.

To hide an object, press h. To bring it back, alt h brings everything back. To add materials to your object, you go over to the properties bar and click the material bar then click new. You can set values like the colour of the material etc. To preview it, click on the bottom circle and click rendered. To look at the object from the camera prospective, press 0.

To smooth the items, press the smooth bar at the side instead of turning up the resolution. To trigger the toolbar (on or off) press t.

Shortcut for switching between the rendered viewpoint an object viewpoint: shift z.

To enter more than one mode, you click the side circle which gives you a bunch of options. To apply more than one feature, you go into Node editor. To hide the side bar that appears beside the node editor, you click n.

Once in node mode, you can add another feature by pressing shift a.

When connecting nodes, you connect them to another of the same colour/type.

To split the screen, grab the top left corner of the screen and drag it across until you are happy with it. With each new screen, there are independent of each other. This means you can view in multiple ways of an singular object. You can also work in many different modes at the same time.

At the bottom of blender, there are box looking object. They are known as layers. To open more than one layer, hold down shift and to move objects from one layer to the next, press m.

While in viewpoint, you can open and close the properties bar by pressing n. These work with the object you are currently working with. Within the properties bar, you can add images by clicking the background image box then click add images. This will allow you to search for the desired image. You can change the axis of the image so it can only be looked at from one side. Also images can be only seen from autographic mode.

To add a loop while modelling, you press control + r. Then click it upon the desired location. First time you click it decides whether it vertical, horizontal etc depending on the edges around it. After that it follows the mouse until you click again. If you accidently clicked an undesired part, click g twice. Shortcut for subdivision modifier. Control + the number lever desired. To tighten the subsurf, you press control + r, then click and drag. Let go at the desired location then tap tab. To inset an object press I. This allow you to move objects by scaling in or out without affecting the entire object itself. To extructurd an object press e. This allow you to move entire object in effect to change the shape. To do this faster, press control + right click. This allow it to follow the mouse. To save it, press f2 then if there is an number in the name, you can press +/- to increase the number. To connect objects, you select four vertices then press f.

Shortcut to switch between node editor and viewpoint:

* To node editor: shift f3
* To viewpoint: shift f5

To get textures, you can search it on [www.poliigon.com](http://www.poliigon.com).

To apply an image, you open another window and apply the image to an image texture node. Once that is connected, you connected it to you node that controls the colour of your node. However, you need to translate it to unwrap a uv. To do this step, you need to open the image editor,, click the x( as ir automatically displays the render part, which you need to get rid of. To get the uv mapping menu, you need to go into edit mode, then press u. To apply to a 3d object, select the edges you want then press control e and mark seams. This tells it where to apply the wrapping. You would use the diffuse map to apply the look, then use the normal map to apply more of the texture. Then you plug the image into the normal texture. What this does is apply the image as defining the texture (such as bumps etc). Then feed it through the normal map node and set the colour of it to none-colour data. You can drag info from one window into blender, such as an image etc. There is a texture node which allows you to control the image data without using the node editor.

To scale among more then one axis, you press shift + the letter of the undesired axis. When making more than one of the same type/ faces, you can use the mirror modifiers to duplicate your original effort, such as the face of a character. After that, move the object part the origin, then click clip and move back. This will remove the duplicate vertices.

If you are resizing an object, click control a, then select apply scale to bring the new size as the main size now. To apply objects as particles, you click on the particles section and click new. Depending on whether you want the particles to move or not (Move = rain, station = hair). If the shading is off or the object seems to be displaced, maybe the normal are facing the wrong direction. To check this, go into edit mode, click the item to be displayed, click alt h, click n and scroll to mesh display and click the cube with the yellow face displayed. It will display blue lines to indicate where are the mesh normal are being displayed (Most of the time is interior or exterior). The normal tell the software the difference between the inside and the outside of the mesh. If the normal are pointing the wrong direction, you go to the toolbar and select flip direction. To clear the normal, control shift n.

To rename an object, click on the object, go to object settings and change the name. Then when rendering the particles, change the settings from path to object and select the desired object. To rotate it, click on advanced, then changed the initial orientation to the desired one. The first random changed the shape, while the second changes the direction. After changing this, go to the physics bar and change the size to the desired bar. To reference more than one object, you would group them together. To group them, select all the desired ones, then press control g. After just creating the group, by pressing t, you can rename the group. You can also click the object panel, scroll down and rename them that way as well. When changing the factor bar, or other bar, by holding down control, you move in .1, shift allows for smooth passage and the two allows for .01 movements.

If you want multiple objects to have the same materials, you click all of them, with the last material is the desired one already, then press control l, then select material. Shift d allows for duplicating objects. Then select one of them and change the name to make it a slightly different object. You need to click on the number and change the name afterwards.

Control tab enters you into Weight paint mode. You will see blue. That is a value of 0, where the value of vertex groups ranges from 0 to 1. As you paint, you give a certain value by pressing t and changing the value to the desired one. Vertex groups are found under object data.

Control J combines multiple object into one, but they must have the same modifiers for the look not to change.

There is different type of lamps. The default one is known as the point lamp. The other lamps can be accessed by selecting the object and clicking the lamp panel or shift a. The point lamp is like a blub and hits all areas of the scene. You would use different units for each of the lamps. The next lamp is the sun, which affects all areas and the lighting can be only changed from rotating the lamp. Otherwise it does not matter where you put the lamp. The next lamp is the spotlight. You would use the same measurements as the point, but it affects only the items in the spotlight. With this lamp, you can interact with the blend, which is the strength of the outskirts of the lamp, as well as seeing the cone, which shows you the interaction with the lamp and mesh. Hemi is no longer supported. The last one is area. This covers certain areas and not those undesired. The size if the lamp is the strength. The higher it is the soother the shadow or lower, the shaper. When it comes to lighting, the lower it is the more harsh the shadows on the skin looks, where the brighter the more smoother.

There is another contributing to the light and that is the world. By changing the colour, you change the world lighting as well. The strength can be applied too (in background and using nodes ). You can get 3d environment texture by getting pro lighting skies. Lighting can come through objects by means of emissions shade too. To change the viewpoint of the camera quickly, you can go control alt numpad 0. To tilt the camera, use r. To move where it is pointing to, r + middle mouse. To move the camera distance, use g + middle mouse.

When making a scene, you generally have one main lamp, where every other one assists it. At 37:29 of the tutorial

lhttps://www.youtube.com/watch?v=0rbPwn-I0oM&list=PLjEaoINr3zgHs8uzT3yqe4iHGfkCmMJ0P&index=9

you have two videos on furthering the knowledge if lighting. One is called Mastering lighting while the other is called How to correctly light a 3D model.

There is a way of assigning multiple shaders to the body of the mesh. When in edit mode, if you select a certain part of the mesh, or section by alt (look above for shortcut) you can create another material, then give it to that section by selecting assign. You can create another material under the moan one by selecting +. You can assign colour to your object in the viewport colour scheme.

There are two ways your device can render an object. It can render by the CPU or the GPU. The GPU is much faster. It can be changed by selecting the user preference, system scroll down to cycles compute device and click cuda. If this is unavailable then your device does not have a GPU. The way it works is through the tiles. The cpu works faster with smaller tiles, where as the GPU works better with bigger tiles (Hibert spiral). Under the resolutions the percentages changes the size of the image.

Two videos: Understanding colour and understanding Composition.

When it comes to the depth of field, you can change the focal by changing the distance of the camera or typing out the object name, then use the radius or f-stop in Apenture. You save images in blender using f3.

There is a composite node editor too will allows you to make the final adjustments to the render image.