***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\*\***

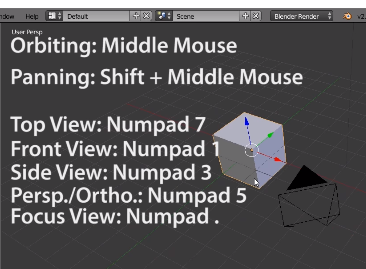
**You can change your user preferences to emulate a numpad, as this has shortcuts that are otherwise unable to repulicate.**

**\*\*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.