**MAKING 3D OBJECTS WITH BLENDER**

Default Areas in Blender –

1. 3D Viewport – The center of the screen
2. Timeline – Bottom of the screen – Used for animations
3. Outliner – Top right of the screen – Gives the outline of the objects in the scene
4. Properties – Bottom right – Gives the properties of the selected object

Playing with the Default Areas –

1. We can change the existing areas displayed by clicking the small icon at the left top corner of the area and selecting the option of the area that we want to see. (In our case we replaced the timeline with another 3D Viewport)
2. We can split and unsplit areas by dragging and dropping with left mouse button by selecting the corner of the area.

Understanding Shortcuts –

* Shortcuts are really useful in Blender and there are many shortcuts – actually there is a shortcut for every action.
* There are alternatives that we can use from the interface for most of the shortcuts.
* Shortcuts are ‘Area Sensitive’ – The same shortcut can have different meanings when we hover over different areas on the screen.
* Shortcuts are ‘Mode Sensitive’ – The same shortcut can have a different action when in different modes.
* Shortcuts might differ on different Operating Systems.

Some Key Shortcuts –

1. Rotate – Middle Mouse + Move Mouse
2. Truck / Track and Pedestal (This is not ‘pan’) – Middle Mouse + Shift + Move Mouse
3. Dolly – Scroll Mouse – Also Shift + Ctrl + Middle Mouse + Move Mouse
4. Tilt and Pan – Need to go into Walk / Fly Mode – Can do this using Shift + `
5. Toggle between Perspective / Orthographic – Numpad 5
6. Moving the camera along the axes – Num 1, 3, 7 & Ctrl + Num 1, 3, 7
7. Switch to view from camera – Num 0
8. Getting back towards scene after getting lost – Shift + C
9. Focus on one object – Select with left mouse + ‘.’ In the numpad
10. Focus on one / more objects and hide everything else – left click and select + ‘/’ on the numpad
11. Select multiple objects – Shift + Left Click on all that we want to select. Although, at one time, there can be only one object that is active and the one that is active has an outline of another color
12. Select everything – A
13. Unselect everything – double A
14. Select everything in rectangle – B and drag
15. Select everything in circle – C and left mouse down and drag to select all within
16. Add object – Shift + A and select the option from the menu
17. Remove object – select the object and press ‘X’
18. Hide Object – Select and Press ‘H’
19. Unhide Object – Alt + H
20. Grab (Position) – Select object + G
21. Rotation – Select object + R
22. Scale – Select Object + S
23. Transformation about an axis – Select + Transformation Shortcut (G, R, S) + (X, Y, Z)
24. Transformation on axes except one – Select + Transformation key + Shift + Axis we don’t want to transform on
25. **Search Shortcut / Get Menu – F3**
26. Loop Cut – Ctrl + R

Different Modes in Blender Modeling –

* We can use Ctrl + Tab on the Viewport Area to change the mode with the help of a wheel menu
* In Edit mode we can switch between vertex, edge and face using the digits 1, 2 & 3 on the keyboard

1. Object Mode – This let’s us to apply transformations to the objects
2. Edit Mode – We can perform transformations on vertices, edges or faces of the objects as:
   1. Grab the vertex, edge or face and move it with the object along the axes (optionally)
   2. Remove a face from the object by selecting the face, then pressing Y and then grab and move the face – The face is detached from the structure
3. Sculpt Mode
4. Vertex Paint
5. Weight Paint
6. Texture Paint

Shaders in Blender –

* We can control shaders in the Object mode
* Use ‘Z’ as keyboard shortcut to open wheel menu for Shaders
* Types of Shaders –
  + Solid – This is the default shader for all the objects
  + Material – Like the solid shading but with the preview of the materials
  + Wireframe – Wireframe like in Three.js (We have quads instead of triangles here)
  + Rendered – Low quality render (Realistic but less performant)

Renderers in Blender –

* There are three main types of renderers –
  + Eevee – Weight: Light | Real Time Render: Yes | Render Quality: Medium
  + Workbench – This is the legacy renderer in Blender. Used occasionally
  + Cycles – Weight: Heavy | Real Time Render: No | Render Quality: Perfect

Properties Area in Blender –

* We can modify the scene, active objects using the Properties Area
* According to the type of the active object, the property options change
* Can be very useful to create realistic rendering and it has many features that make the scene very customizable and perfect

Key Tips While Modeling (Hamburger Example) –

* Set the scale of the object – To this, the best possible way is to set the Units property to None in the scene properties. By doing this, we have dynamic units to play with
* While changing the size of the object using scaling, always use the Edit Mode – This preserves the original scale of the object which would be helpful once we export the object
* We started with a cube instead of a cylinder for the base and then we use the Subdivision Surface Modifier and then made it smooth – By doing this, when we go to the Edit Mode, we can modify the shape of our sphere using the vertices, edges and faces of our cube
* Since we are using a shape modifier, we can control the number of quads using the loop cut feature to change the shape of the object – Shortcut: Ctrl + R