Blender

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1 Introduction

Blender is a powerful tool worth learning.

2 Navigation and Interface

- Left click to select and left click empty space to deselect.
- A to select all. Alt A to deselect all.
- B to box select. C to circle select. Shift + B/C to deselect.
- use wireframe mode to see through objects. You can use Z to open the pi menu to select render mode.
- To rotate use middle mouse button.
- To pan use shift + middle mouse button.
- Use period key on numpad to frame selected object.
- To zoom use scroll wheel or ctrl + middle mouse button.
- The camera button puts you in camera view.
- the grid button switches between orthographic and perspective view.
- Viewport is where you see the 3D model.
- T expands the quick tools menu, which includes the tool shelf. You can also use shift + space to expand the quick tools menu where your cursor is.
- N can be used to expand additional quick settings, which include object transformation data tool settings and other options.

- 3D cursor is where new objects are placed and can be used as a pivot point for transformations. Use shift and right-click to place the 3D cursor. You can get further options for the cursor using shift + S.
- Ctrl + scroll can be used to zoom in and out of the timeline.
- Collections contains all the objects in the scene. Layers or groups in other software.
  - Right-click and select move to collection to move an object to a collection.
- Properties tab containes properties for selected tool and object.
  - Tool tab contains properties for the selected tool.
  - Render tab contains properties for rendering.
  - Output tab contains properties for outputting the render.
  - View layer tab contains properties for the view layer to separate background and character passes.
  - Globe tab contains properties for the world (sky and fog or mist).
  - Object data tab contains properties for the object (SE(3), parent child relationship, which collections it belongs to and visibility).
  - Modifiers tab contains properties for the modifiers applied to the object.
  - Particles tab contains properties for the particles applied to the object.
  - Physics tab contains properties for the physics applied to the object.
  - Object constraints tab contains properties for the constraints applied to the object.
  - Mesh data tab contains properties for the mesh data of the object (geometry).
  - Material tab contains properties for the material of the object.
  - Texture tab contains properties for the texture of the object.
  - Lamp data tab contains properties for the lamp data of the object.
  - Camera data tab contains properties for the camera data of the object.
- To translate object use G. To rotate object use R. To scale object use S.
- Use X, Y, Z to constrain transformations to the respective axis and shift X, Y, Z to move in the plane orthogonal to the axis.
- Use magnet icon to toggle snapping.
- shift + A to add new object at the cursor.
- shift + D to duplicate selected object.
- X to delete selected object.
- Tab to toggle edit mode.
- X in edit mode to delete specific geometry.
  - If you delete vertices, you will delete connecting edges and faces.
  - If you delete edges, you will delete connecting faces but not vertices.

  - If you delete faces, you will not delete boundary edges or vertices.
  - Vertices ¿ Edges ¿ Faces.
  - dissolve vertices/edges/faces to remove them without changing the shape of the object.
  - edge collapse to remove an edge and merge the vertices at the ends of the edge.
  - edge loops are the functional inverse of an extrusion.

3 Modelling

Manipulating meshes to create geometry.

- In edit mode, you can select vertices, edges, and faces.
- In object mode, you can select objects.
- Armatures also have an edit mode.
- You can edit multiple objects at once.
- If you want to connect multiple objects use join in the object menu or use Ctrl + J.
- You can separate objects using seperate in the object menu.
- You can select the mode of the object using options in the top toolbar. You can select more than one at a time. 1, 2, 3 keys can be used to switch between modes. Shift + 1, 2, 3 can be used to select multiple modes.
- Alt + left click to select loops. In vertex and edge mode, the loop is along the edge selected. In face mode, the loop is perpendicular to the edge of the face selected.
- Extrude tool can be used to extrude faces.
- Extrue along normals can be used to extrude along the normal of all selected faces but still keep the faces connected.
- The loop cut tool can be used to add a loop cut to the mesh. You can use scroll wheel to add more loop cuts. Use ctrl + R to activate the tool.
- You can use the bevel tool to create a chamfer. Use ctrl + B to activate the tool.
- You can use the knife tool to cut the mesh. Use K to activate the tool. Double left click to restart the knife selection. right-click to cancel. Enter to confirm.