COMP3320 Computer Graphics 2018
Blender Tutorial

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Outcome:

a. Know basic commands
b. Know how to import background images
c. Know how to create vertices, shapes and shading
d. Explore file formats available to port Blender models into OpenGL

Revised for Blender 2.68a

Blender 3D Tutorial: Modelling a face

"Blender is a free and open-source 3D computer graphics software product used for creating animated films, visual effects, art, 3D printed models, interactive 3D applications and video games. Blender's features include 3D modeling, UV unwrapping, texturing, rigging and skinning, fluid and smoke simulation, particle simulation, soft body simulation, animating, match moving, camera tracking, rendering, video editing and compositing. It also features a built-in game engine." . . . [1]

This tutorial is a derived from [2], to provide students with a complete walk through of modelling a human face from scratch.

*Common Commands - *Always refer back to them throughout the tutorial:*

TAB – Switches between Object Mode and Edit Mode.

Right Mouse Click – Selects object/vertices.

Shift + Middle Click Drag – Pan View

Mouse Wheel Up/Down – Zooms in/out

Shift + Mouse Wheel – Pans up/down.

Ctrl + Mouse Wheel – Pans left/right.

Hold Shift – Allows you to select additional objects/vertices.

Ctrl + Left Mouse Click – Creates new vertices.

A – Toggles select all or select none vertices/objects.

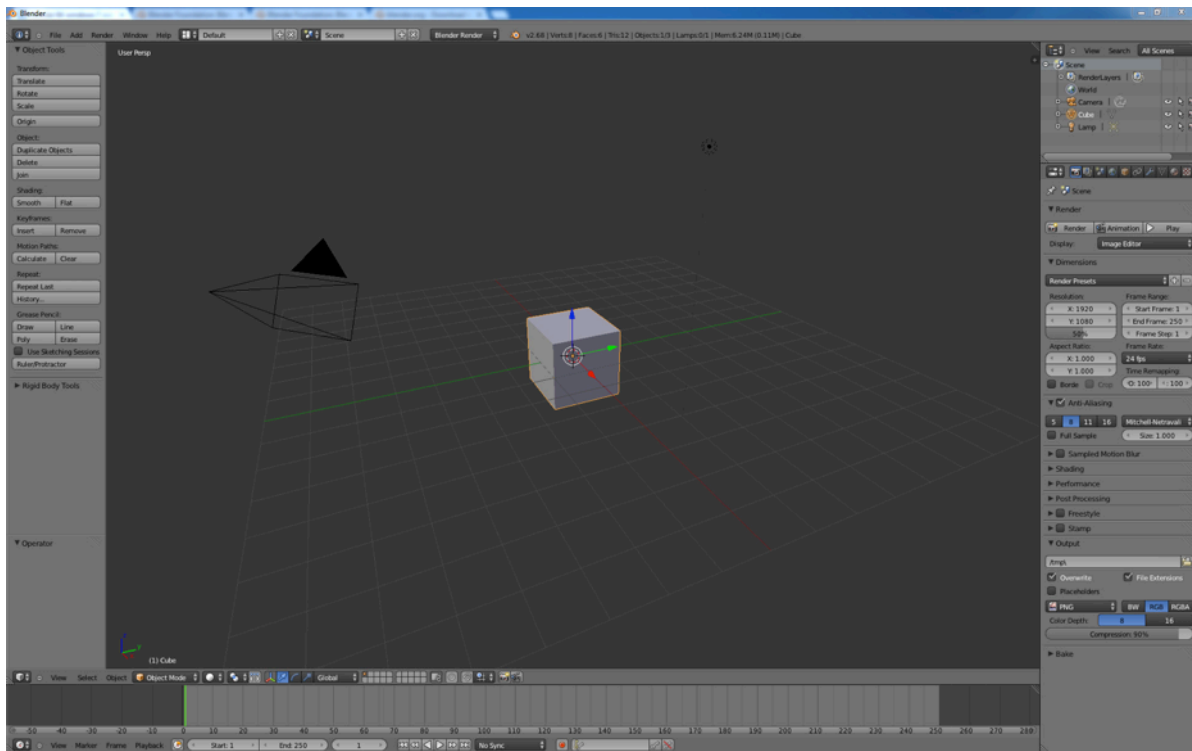B – Selects vertices/objects within the border of the box you create with your mouse.

G – Moves the selected vertices/objects.

F – Fill command. Works as follow:

- If 2 vertices are selected, and you press 'F', a line is drawn.
- If more than 2 vertices are selected, a surface is drawn.

Walkthrough:

1. Start Blender 3D

2. The start up screen looks like this:

The screen is divided into 3 parts. The top part is the 'Info Window', the middle is the '3D Window', and the bottom is the 'Buttons Window. A cube is drawn in the '3D Window' in 'Top View'.

3. We will delete the cube later in later steps. For the moment leave it there.

4. The default view should be Perspective which is indicated on the top left corner of the `3D Window' as `User Persp'. For the background images to appear (in later steps) we need to be in orthographic view. Select `View->View Persp/Ortho'. The top left hand corner should now say `User Ortho'.

5. Ideally for this exercise we should have two views. 'Front View' and 'Side View'. So we have to split the current '3D Window' into two. Position the cursor of the mouse to the border line between the top and middle part or the middle and bottom part; Right click then select 'Split Area'. The outcome should look like this:
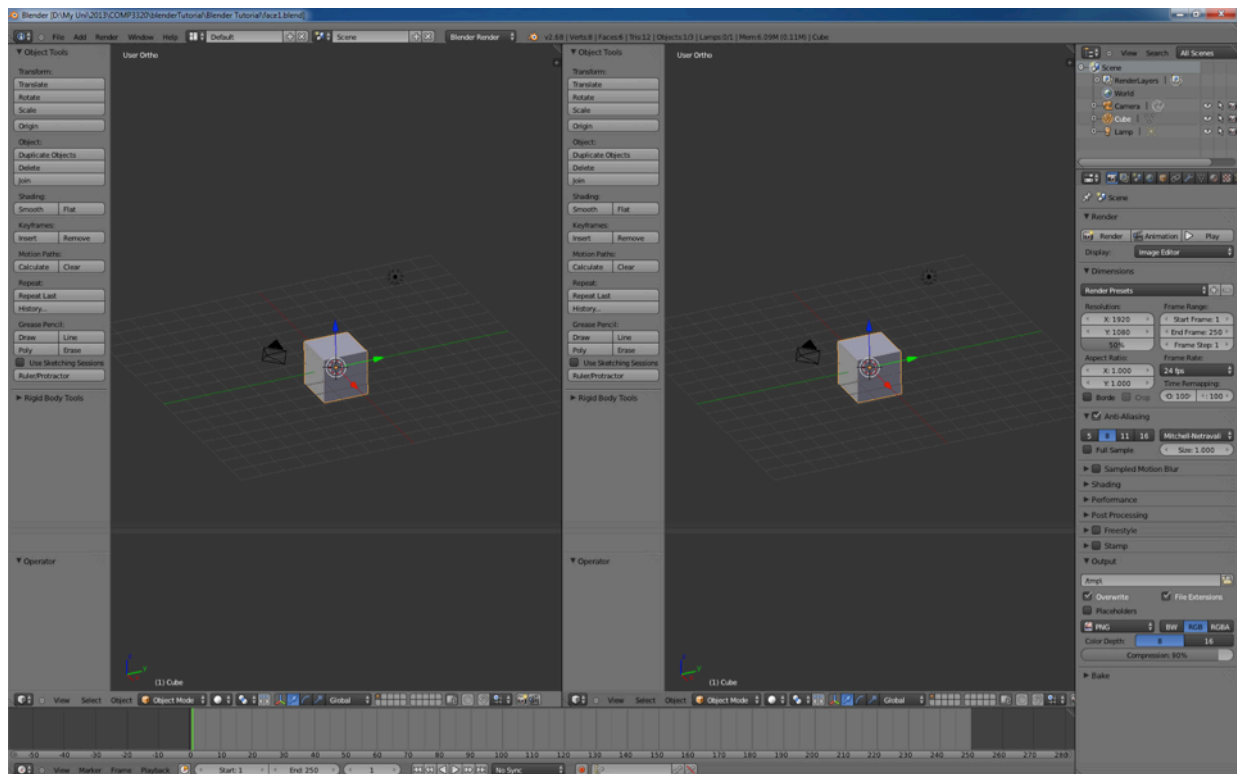
6. We'll make the left '3D Window' as the 'Front View'. Select 'View->Front'; and the right 3D windows as the 'Right View'. Select 'View->Right'.

7. Next we import the frontface.jpg in the left window.
   Firstly, `View->Properties'. Then `Expand' `Background Images'
   Select 'View->Background Image-> Use Background Image->Load', locate the file and click on 'Select Image'.
   You can align the frontface.jpg using 'X Offset' such that the red line of jpg file aligns with the vertical axis.

   Likewise, import the sideface.jpg in the right window. Afterwards, you can hide the 'Properties' tab by selecting `View->Properties'.
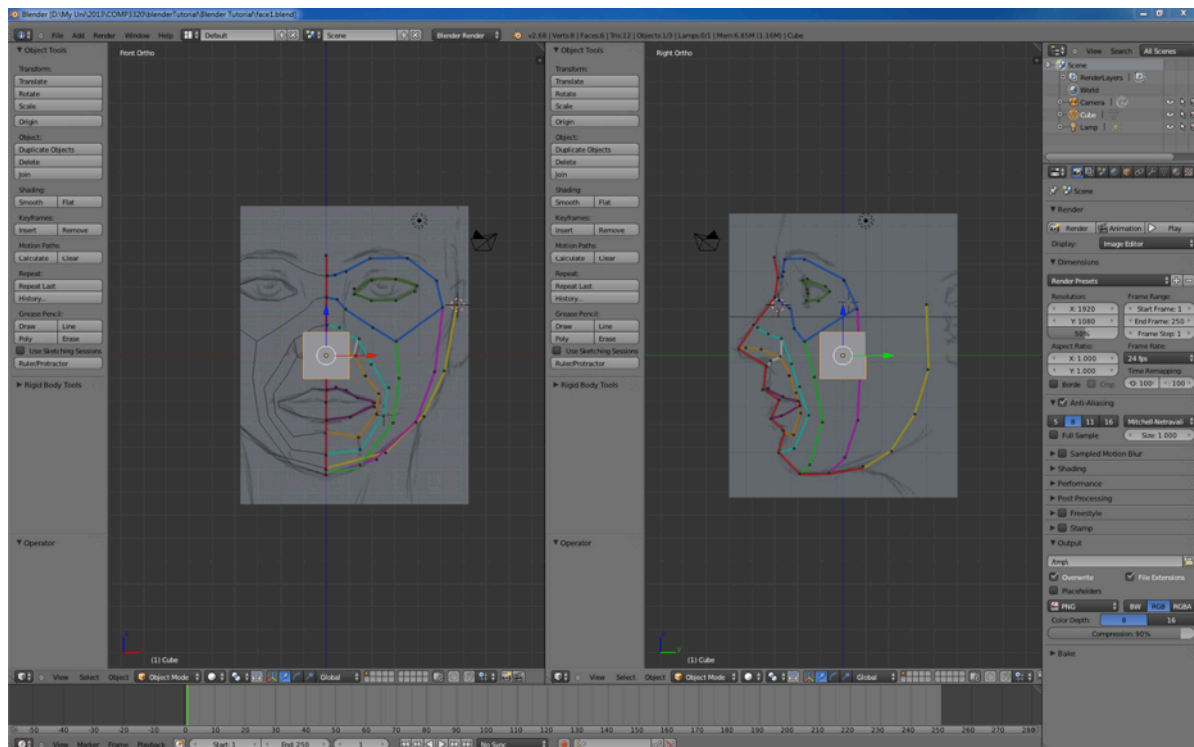
8. Currently there is already an object present (the cube). Let's manipulate this object to become a face.

9. Make sure the cube is selected, then we switch to 'Edit Mode' (Using TAB).

10. Here we can delete vertices of the Cube. If not selected, use 'A' to select all, then press `Delete', follow by selecting 'Delete->Vertices'.

11. Now it's a matter of creating the points and aligning them with the background image to create HALF of the face. We will then mirror the result.

    One possible method is start in the front view, create a new point (**CTRL + Left Mouse Click**) and follow a particular path by Keeping Hold of CTRL and using the Left Mouse Click on the next point. (**Note:** sometimes when the cursor is close to the selected vertex, you cannot create a new point by CTRL+Left Click. In this case, the function performed is a constrained movement of the selected vertex. The simplest solution is to zoom in until the desired new vertex is sufficiently distant.)

    You should realize that this trace method doesn't allow to close a path. For instance, if a circle is traced there be would an opening left. To complete the circle, you would require to select the start point and end point by Holding Shift and select the points using the **Right click**. Once both points are selected, press the `**F' (fill)** key.

    Once all the points in the front view have been traced, select individual vertices in the front view by Right Click, and align them in the side view (By pressing the **G (grab) key** in the right view and move the mouse) and then press the **Left click** to fix the point.

    To create a new line trace elsewhere make sure you have deselected any vertices (Toggle '**A**' until this is achieved), then you can start a line trace elsewhere on the screen using the **CTRL+Left Mouse Click** method.

Below is the first stage you should have reached.
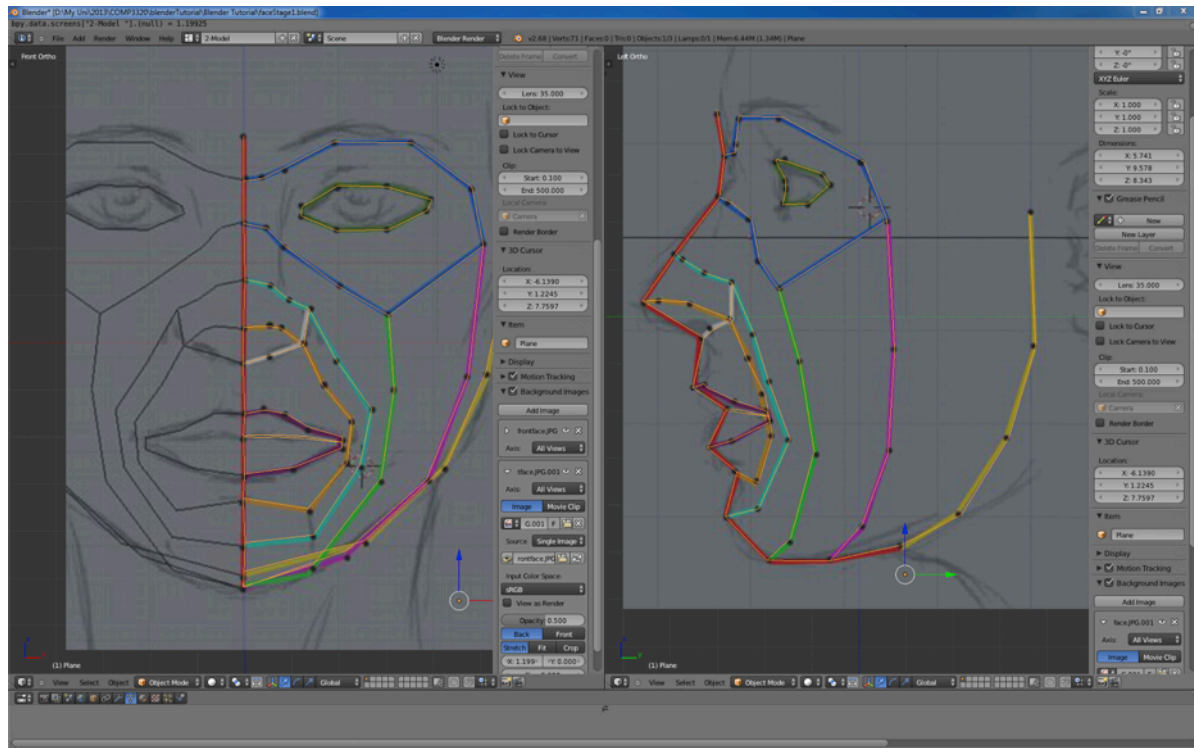
12. Now fill in the polygons by selecting the correct vertices (using **SHIFT + Right Mouse Click**), then press **'F'**. Below is a sample of how [2] filled their polygons. Alternatively you can try Select All vertices, then 'Mesh->Face->Fill', then 'Mesh->Face->Beautify Fill'.
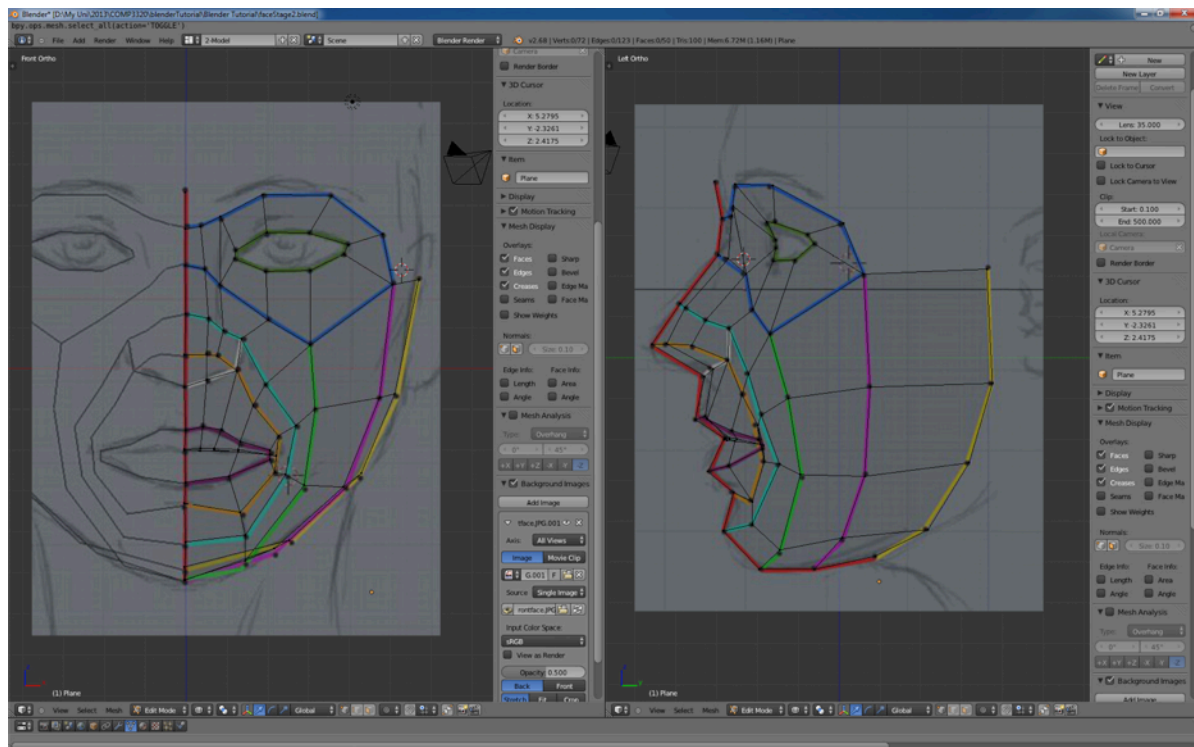

You may need to delete some edges because the eyes may be filled as well. To delete the edges, HOLD Shift + Right click on vertices, press delete then select `Edges'.

13. Now we duplicate the right half of the face and mirror it along the X global to form a complete face.

- In Edit Mode, make sure the your half face is aligned from the front view such that the object centre is on the nose.
- Press [TAB] to return to object mode.
- In the properties window, select Modifiers
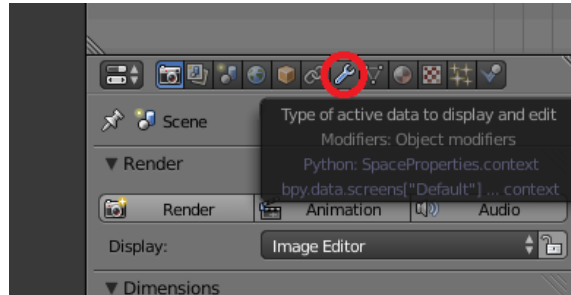
- Select Add Modifier->(Generate) Mirror. The X-axis should already be selected as the mirror axis
- Make sure Merge is selected and then increase the Merge Limit value until the vertices along the centre of the face are merged
- Press Apply when you are happy with the result
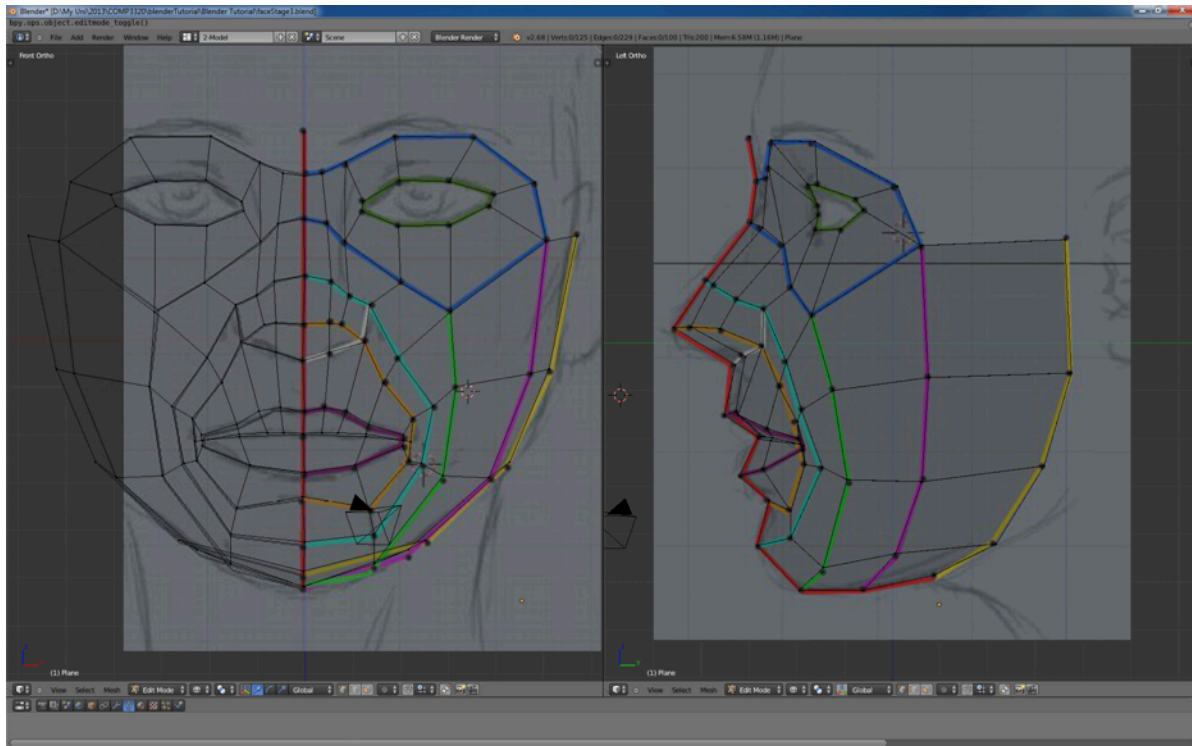
14. Now you have modelled the face.

USEFUL COMMANDS:

- Mesh -> Faces -> Triangulate faces
- Mesh -> Faces -> Tris to Quads

This concludes the Blender tutorials. Now you should do some research in figuring how to port Blender models into OpenGL.

Questions:
a) How will you incorporate colour and texture into your Blender models? Look for tutorials on UV mapping.

b) How will you import Blender models into OpenGL? Some options:
- You can write a parser for wavefront (.obj) files manually
- We recommend using the assimp library (http://www.assimp.org) to read in model data
- Use another asset library of your choice (just be sure to cite it in the reports!)

REFERENCE:

[1] http://en.wikipedia.org/wiki/Blender_(software)

[2] http://blenderartists.org/forum/showthread?t=20448 – No longer exists. Based on a very early version of Blender (back in 2009).