COMP27112 Coursework Assignment 2

This material is examinable (the ideas, not the details)

Aims

The purposes of this Assignment are to:

- Get some experience of 3D modelling using a professional tool (AC3D)
- To gain an understanding of the practicalities of 3D modelling
- To think about the issues of 3D modelling. Is it "hard"?

Introduction

You'll be using AC3D (www.inivis.com). This is a sophisticated 3D modelling system that provides many of the standard operations on 3D models. Of course in this Assignment we have time only to scratch the surface of what AC3D can do, just to give you some experience. We'll be working on Linux, as usual.

Task 1: Get AC3D up and running. In your shell (assuming your prompt is **$**) type:

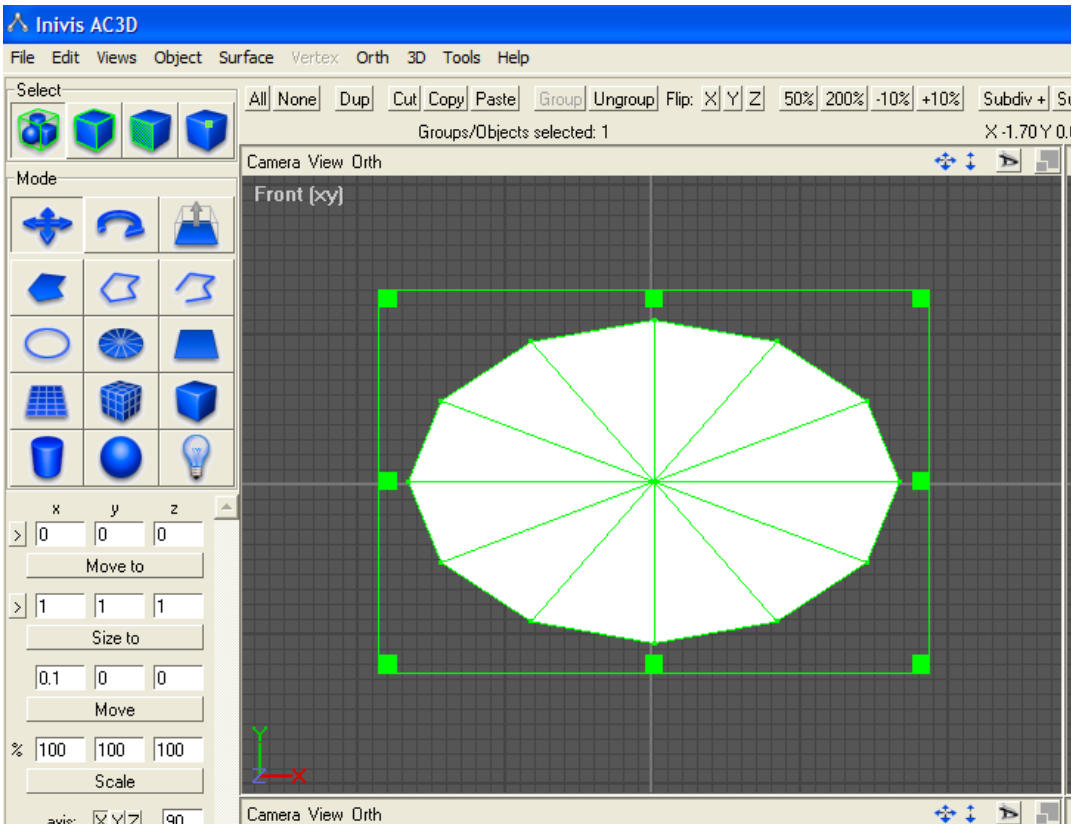
```
$ export AC3D_HOME=/opt/ac3dlx
$ /opt/ac3dlx/ac3d
```

then maximise the AC3D window, and familiarize yourself with the screen layout. Unless you already know what you're doing, **don't be tempted** to press buttons and fiddle about at this stage – you'll get into a horrible mess! Just go though the next few tasks slowly. If a **Tips** window comes up, close it. Look at the four sub-windows. There are three "orthographic" views, and in the bottom right sub-window, a perspective view. Why **three** orthographic views, do you think?

Task 2: Let's get going. In the top left corner of the screen you'll see these object shapes:

A. Mouse over the cylinder icon, the bottom left of these objects, and a tool tip “Cylinder – Draw a cylinder” will pop up.

B. Now left-click the cylinder icon and it will highlight. Now move your mouse into the top left “Front (xy)” sub-window, left-click a bit underneath where it says “Front (xy)”, and keeping the mouse button pressed, drag out the cylinder towards the bottom right of the sub-window. You should see the cylinder displayed in all 4 sub-windows, but perhaps not very clearly yet. Your top-left sub-window should look a bit like this:



Task 3: Look at the bottom-right sub-window. At its top right you should see:

A. Left-click on the left-most (blue circular arrows) icon, and **keeping your button pressed**, move the mouse around and observe the result. Now, release your mouse button, and then left-click and do the same experiment with the next two blue arrow icons. You’ve seen now how to rotate the object, shift it around in **X** and **Y**, and move it back and forwards in **Z**.

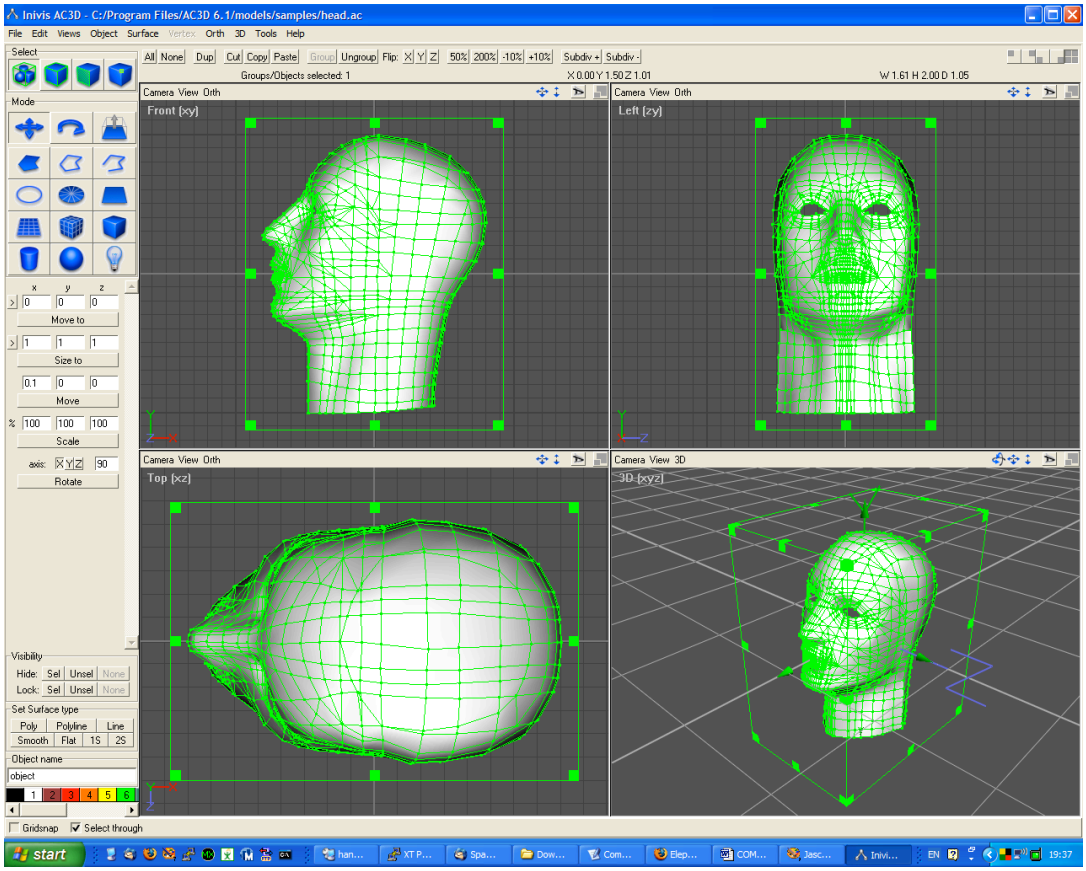
B. Now left-click the “eye” icon – it removes all the background things so you just see the object. Click it again to toggle back. Now try the right-most “window” icon. It toggles between the sub-window display and the full-window display.

C. Now try the icons in each of the other 3 orthographic sub-windows too, and see what happens. These other windows are 2D-only, of course. Make sure you understand the different views each window gives you of the same 3D object.

D. Finally, in each of the orthographic views you’ll see little filled-in green squares click and drag them and see what happens.

Task 4: Now to try some editing.

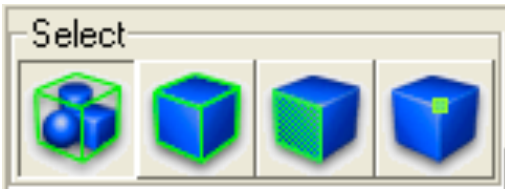
A. From the main menu select **File > Open**. At this point a dialog box “Save changes to current model?” pops up. Say no (what a pity). Then the file selector dialog appears. Choose **models>samples>head.ac**. You should now have something like this:



B. Before we do anything, use the icons like in Task 3 to move the object around and get a feel for its shape.

C. Most people aren't completely satisfied with the way they look, and our friend Mr Nutt is no exception. He's not at all satisfied with his nose, and says he'd like it significantly longer.

D. Look at the top left of the AC3D window, and locate these four buttons:

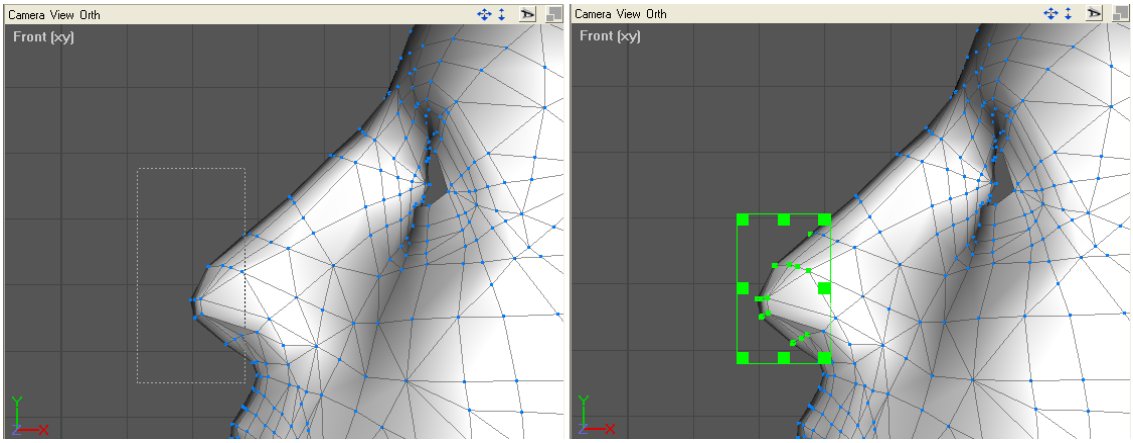


These control at what "level" we want to select the object for editing (from left: groups, whole objects, surfaces, vertices). Left-click the rightmost icon to select "vertices". You'll notice that all the vertices on display are now highlighted with those little green squares, also called "handles".

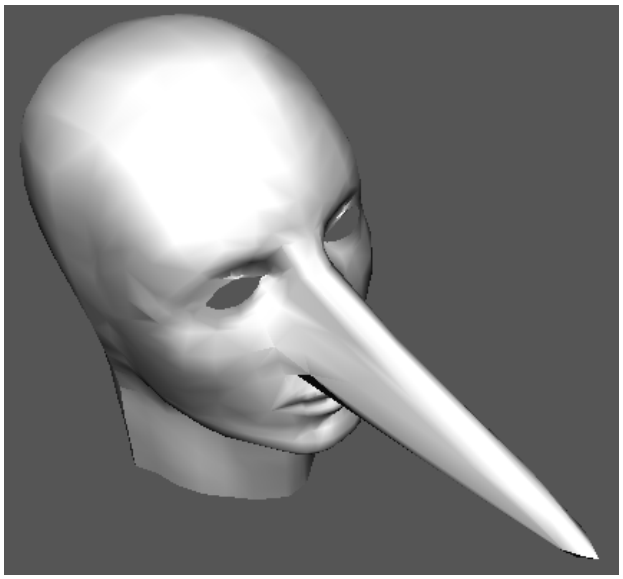
E. This is a bit distracting so left's turn all these handles off. From the main menu select **Edit > Select nothing**.

F. Now experiment with clicking on vertices in any of the orthographic views. Click on a vertex and it will be highlighted with a green square. Drag the square to drag the vertex, and you'll see the effect in all the windows simultaneously. This is probably horrible, so undo it by typing **control-Z**. Try this a few times.

G. Now for the nose job. If you look closely at Mr Nutt's nose in the **XY** orthographic view, you can see that its tip is defined by a collection of vertices. This time don't click on a particular vertex, but left-click to drag out a selection box around the vertices at the end of the nose (below, left). Release the button, and you should see the vertices selected (below, right).



H. Now drag the green handles to deform all the vertices together, as a group. Remember, you can always undo your operations with **control-Z**. And keep previewing the results in the bottom right perspective window, moving the view around. Can you get something a bit like this?



Task 5: Make some more "improvements" to Mr Nutt, however you like.

Task 6: Save Mr Nutt as an "obj" format file, as described in the "Polygons" lecture, using:

File > Export > Wavefront OBJ

Make a folder under your home directory called `COMP27112/cwk2/` and save the file in there as **cwk2.obj**.

Task 7: Open **cwk2.obj** in your favourite text editor and look at it. Can you make any sense of it?

Task 8: `Submit` **cwk2.obj**. You're finished.

Optional extras. If you'd like to try some optional extra things, here are a few ideas to get you going:

- Give Mr Nutt some ears, and perhaps a hat.
- Find a suitable body model (not necessarily human) and splice Mr Nutt's head onto it.