

Week 2: Computer Aided Design

2.2. 2015

Introduction of student projects

Revising practices of file management

To pull and push the content of your website:

- copy content from your website folder, the index file and all relevant files, into the
skulina/Document/Verkefni/2015_FabLab/eu_archive/students/hlif.kjar
tansdottir.skulina

The order of updating:

pull – update – commit – push

hg pull – enter

hg update – enter

hg status – enter

hg add – enter

hg commit – enter (:q – if this happens, , þýðir quit)

hg commit –m "load website"

hg push

Tortoise

Pull incoming changes

Right click tip – and update + tick merge

Commit (button to the right side, at the border)

Check left window at bottom, for any messages – did tick two instances of files that had been deleted – forget

Commit again

Check out – Terminal/Mac: <http://guides.macrumors.com/Terminal>

4.2.2015

Important issues on connection and connecting: mute before connecting, check Cisco's guidance on video conferencing and

Regional reviews: every student presents work every week, and MIT picks one. Now they pick best and worst, and one website.

Week's work of homework. This week only, meet the labs.

Then try out the many different applications as you can – suggested by the Facacademy:

I downloaded GIMP: <http://gimp.lisanet.de/Website/Download.html>
... and scaled one flower.

2D

2.5D – 2D with an amplitude (with added height)

3D

Sketch in a notebook, scan it in and fabricate from that.

2D Tools

GIMP – is freely available across platform bitmap tool
Open an image and do various image operations.

My Paint – designed to emulate the use of paint on paper

Krita – illustration tool

These can be used on any machines

2D Vector tools:

Inkscape – similar to illustrator: <https://inkscape.org/en/about/overview/> .
Useful for design: knows svg, can cut and merge. Snaps and has abilities to link.
Cloning, for making cut-outs. Adjusting possible by measurement. What sets
Inkscape apart is its use of [Scalable Vector Graphics](#) (SVG), an open XML-based
[W3C](#) standard, as the native format.

Learning resources: <https://inkscape.org/en/learn/>

Project next week will depend on an exercise with this. Inkscape keeps tracks of lines. Based on sgc as a format, a clean way to describe geometry.

Is similar to spirit as to Illustrator.

LibreOffice – similar to Microsoft Office suite

Scribus – desktop tool

LibreCAD -

QCAD -

FreeCAD -

Layout –

DraftSight -

These help with construction drawings, tangency, relationships.

3D:

Types:

Computational solid geometry

Hierarchy

Parametric – property like cardboard thickness

Procedural – you can describe ...

Boundary and function representation. In early days of CAD it settled for representing objects as surface. Wanting to represent object as volume.

The more you do with programming, the better. Series of relationship

Clicking and dragging - to scripts

Optimisation – describe how you want to make it and the tool looks for something to make it.

Tinkercad - <https://www.tinkercad.com/>

Sketchup - <http://www.sketchup.com/>

TinkerCAD –

Blender – not good for engineering modeling, but is good for expressive modeling, renders, lighting etc

FreeCAD –

Open

Rhino –

Grasshopper – extension to Rhino

Solidworks – is one of the most powerful and widely used modeling tools. Has donated licences to FabLab sites.

Inventor – from Autodesk. Gave up on educational use and have given it free now through its educational site. Fusion suite – engineering

AutoCAD –

Maya –

3ds Max –

Catia – is what airbus uses to design jumbo jets. Rockets. Very complex engineering projects being created with this program. Hard learning curve.

Creo –

NX -

AC3D –

Flood - <http://floodeditor.com/>

Fab Modules:

Hierarchical Volumetric...

FabServer – graphical interface

Antimony –

Surface represented as equations of polynomials ...

Functional representation... more powerful

Antimony is built around functional representation

From the class site you can go to the Antimony website, and build it locally.

Thorus example: adding pyramid, attach to a morphing node, varying weight. Because the shape is a function, it is possible to describe it with another shape. Possible to add or subtract. Possible to change the radius and view the development of the shape. Clearance operation – on the thorus, working on the state in between. If you want to make the thorus move with the pyramid, either can be made as an input to the other. Possible to link the object so that they move together. Adding script notes. Make input x – hierarchical relation. Transform command will then work on both, I guess. Possible to zoom in at any resolution.

Other functions. Arbitrate function. Shepa made out of an equation, change the equation, making different functions. Repulsion node, the object does not like it, the coordination system ...

Going back to Inkscape example –

2D version, rectangle being cut out by using other smaller rectangles.

Pyramid – twisting the shape. Go from 2D to 3D is possible. Revolving a triangle around the y-axis.

Export stl mesh possible... as stl

Mesh, nurbs and ASTM

ASTM is a format, stl is just triangles

Nurbs better than triangles, because you can render them

A lot of the messiness in a 3D model comes from the combination of nurbs and how to combine them.

Fabmodules.org: <http://fabmodules.org/>

Paint 2D files being dropped into ? – for making a 3D form

Open Scott ?

Next week, when we present the assignment – use different examples

Game engines:

Game engines – most have accessible versions

Possible to use a game engine as a ... modeling tool

Simulations:

Elmer

COMSOL

Audio/Video:

Audacity –

Kdenlive – a free and open source video editor for GNU/Linux and Free BSD

Lightworks

Mencoder – change format and compress resolution

Video players:

VLC – video player

Successes and failure

Websites

2014 students folder – the purpose of the site is to track your work, a notebook

In the archive there is a tutorial section – for the teacher to present their materials, like tutorials.

Next week – laser cutters, practical application

Unity games engine – MatterMachine, check.

6.2.2015

Installing Rhino, Sketchup

Inkscape

GIMP – installed GIMP

Gimpshop - <http://www.gimpshop.com/>

3D Warehouse – check out

OpenDesk – check out and become a member