IDM2

Introduction to Digital Media 2

Carnegie Mellon University
School of Architecture
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Week 3: Handout

Goal:

Assignment 1 clarification
Understanding ways to output files using Rhino

Assignment recap.

Demo, sample assignment piece

- Begin with 10"X15" site, two bookends
- Draw polylines (instead of curves)
- Make it stable with at least 3 supporting points touching the table top

5 main steps to complete assignment 1

1) Drawing ***polylines*** within the condition
   : create shapes within the specified 'site' using the 'bookends' at given 'interval'
2) Surface ***lofting*** from the polylines
   : make surfaces from lines
3) Prepare model for ***RhinoNest***
   : RhinoNest is a third-party Rhino plug-in that will slice and efficiently organize and label your sections
4) ***Nesting*** in RhinoNest
   : fitting your sections within your material constraints
5) ***Printing*** them to the lasercutter
   : verifying your nested sections, and using the appropriate lasercutter settings for fabrication

Possible problems (from the Tutorial)

When lofting a surface, choose option 1) straight section

Preparing for RhinoNest

Several steps are needed to prepare your model for slicing and nesting in RhinoNest:

- All lofted surfaces must be joined
- Your NURB surface must be a mesh (Command: Mesh)
- Your model must then be scaled by 8 (Command: Scale > Scale factor: 8)
  - RhinoNest cannot slice to a three-decimal point precision. In our assignment we need to take slices ever 1/8" (or 0.125"), so we will scale by 8, slice every 1 unit, then scale back down by 1/8 after we have already generated our 2D sections *(see below)*
- You must then rotate your scaled model about the X-axis
  (In FRONT view, Command: Rotate > choose your 1st reference point > Angle : 90)
  - Your model should look like it is 'standing up'. RhinoNest can only slice vertically.

RhinoNest

Use dFab lab workstations
A few points to prevent from having problems:

- Redraw problem pieces
- Explode text to save printing time
- Color coding to distinguish objects to cut / engrave

RhinoNest Commands:

- Select your geometry and click Slice 3D on the RhinoNest toolbar. Follow the prompts in the pop-up window. *Remember*, in the previous step we scaled our model by 8, so our distance will be 1. Label your slices using the Polyline Label option (3rd option).
- After your 2D sections are generated, make sure that all the sections are aligned in the same direction.

- You will need to Ungroup your sections, select all your text labels, put them on a new layer, then Group all of your sections and text together.
- After, scale your sections by 1/8 (or .125) – (now our sections are back to the original, printable size)
- Select your grouped 2D sections and click Nest on the RhinoNest toolbar. Follow the prompts in the pop-up window. *Remember*, your material is 36" in the (x) and 24" in the (y), your Freedom should be set to 180°, and you should have Delete Original checked.

Output using Rhino

Output options: Save / Export / Print (take a look at possible file types for each)

- save: keep the information following the program's format
- export: requires file format translation between compatible programs (might run into file corruption)
- print: output to an external device

Export Selected / with Origin: create a new file with selected objects only / from the origin point

File format

- Particular ways of encoding information (down to bits and bytes level)
- Some file formats are designed to store specific information only
  e.g. jpeg (images only), gif (still image and animation), text files (characters), etc…
- Why are there more formats than what's necessary? Patent on encoding algorithm
- Some formats we will frequently encounter later in addition to image formats
  e.g. .dwg (stands for DRAWING, 2-D and 3-D AutoCAD file), dxf (2-D drawing exchange format), .svg (for most 3-D printers)…

Print Options

Destination

- printer or file (e.g. print to create PDFs, Limited version Acrobat allows 3D PDF that can be rotated)
- Vector or Raster image (resolution issue)

View and Output Scale

- View (Viewport – choosing from the 4 views / Extends – stretch / Window – select a portion)
- Linetypes and Line Widths
  (AutoCAD differentiate line widths using color. Rhino requires a plug-in to create PLT files.)

Joseph's presentation (on laser cutting)