IDM2

Introduction to Digital Media 2

Carnegie Mellon University
School of Architecture
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Week 2: Handout

Goal:
Basics recap.
Working between curves and surfaces, related functions, and understanding how they are converted into different types
Laser cutter miscellaneous

Recap. Basics
Browse through shape drawing menu with students: circle, ellipse, arc, polygon
Distance, angle, reference in operations (copy, offset etc)

Building up dimensions
As previously introduced:
> 1-D (no volume) - **Line** and **curve**, **poly line** (and more shapes)
> 2-D (no thickness) - Surface from 1) points, 2) curves (= edges)
> 3-D – solid from surfaces and meshes
> Coordinates (x, y, z of the mouse pointer shown at the bottom of the screen)

Implication of Point
Point (with x, y, y coordinates) is the basic element in 3-D (Rhino) space.
Line is made of two end-points.
Poly line is made of multiple lines (each line meets at least one other line.)
Curve is a more complicated form of Line. Complicated form requires more points as reference – less efficient or less precise when being efficient (less number of points).

Short intro to the origin of Control Point
Control point recap:
* Control point edit for curves (left icon) and surfaces (right icon)
* Control point is the most basic part of form editing in Rhino.
* Turn on and off the control points, move them to change the shape

Where it comes from:
> Rhino is NURBS (Non-Uniform Rational Basis-Spline) modeling tool.
> (http://en.wikipedia.org/wiki/Non-uniform_rational_B-spline)
> NURBS is a mathematical model developed for the representation of freeform surfaces such as ship hulls, aerospace exterior surfaces, and car bodies.
> Spline is made of multiple control points.
> The goal is to be expressive in terms of 3-D form…

What that means:
> Number of control points is an issue in representing precise shapes.
> Illustrator/Photoshop pen tool in creating paths is an example of same NURBS model (not very useful in those programs).
> Demo of Add/delete anchor points in making a path using Illustrator
> Demo of control point manipulating in Rhino

Curve Menu
Show/demonstrate the menu items inside
Curves from object (Curve → Curves from object, e.g. Silhouette)

Surface Menu
Surface can be made out of 1) points, 2) multiple edges of curves (boundaries), 3) planar curves
Planar curves are two-dimensional curves, curves that are lying in a plane.

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(Add a short explanation of planar curves)
Demo of the menu items inside

Operations (w/ demo on curve and surface type objects)
Extrude (+ solid from closed type planar curves)
Fillet /Patch
(Loft)

Object types when cut
Demo drawing and cutting 3-D form using 1) curve/line, 2) surface, 3) solid (and possibly simple mesh)
Explain differences when cut
- e.g. cutting curves adds new end-points to the objects, cutting surfaces adds curves to the objects, cutting solids adds surfaces (or meshes) to the objects
- This will relate the operation to the concept that can be used in sectioning and also higher level scripting

Keep it precise
Unit and Snap revisited
Offset curves and surfaces at distance
: type in exact distance then choose the side to offset the copy

Laser Cutter Miscellaneous
Safety issue first
Add more here

Possibly
Intro to Mesh type
Video from the course web, assignment related functions