Lecture 15:
3D Modeling, Formats and Tools

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Formats

• Some Formats to be aware of
  – PLY: Very simple and let us get started
  – OBJ: Still simple, better suited to specify material properties.
  – DXF: Also simple, a bridge from PLY to OBJ

• Tools
  – MeshLab runs on Mac and Windows
  – Sketchup Pro runs on Mac and Windows
  – Alas, neither runs on Linux
SketchUp Pro Available to CS 410 students on Windows Machines in USB 110.
SketchUp was developed by startup company @Last Software of Boulder, Colorado, co-founded in 1999 by Brad Schell and Joe Esch.[8][9] SketchUp debuted in August 2000 as a general-purpose 3D content creation tool, and was envisioned as a software program "that would allow design professionals to draw the way they want by emulating the feel and freedom of working with pen and paper in a simple and elegant interface, that would be fun to use and easy to learn, and that would be used by designers to play with their designs in a way that is not possible with traditional design software. It also has user friendly buttons to make it easier to use."[3]

The program won a Community Choice Award at its first tradeshow in 2000.[10]

Google acquired @Last Software on March 14, 2006 for an undisclosed sum,[11] attracted by @Last Software's work developing a plugin for Google Earth. On January 9, 2007, Google announced Google SketchUp 6, a free downloadable version of SketchUp, without some functionality of SketchUp Pro, but including integrated tools for uploading content to Google Earth and to the Google 3D Warehouse. A toolbox enables a viewer to "walk around" and see things from different viewpoints, and supports labels for models, a look-around tool, and an "any
Opening Move
Templates

SketchUp Preferences

- Applications
- Drawing
- Extensions
- General
- OpenCL
- Shortcuts
- Template
- Workspace

Drawing Template

- Google Earth Modeling - Meters
  Units: Meters
  Use this template if you are creating a model for use in Google Earth.

- Engineering - Feet
  Units: Feet
  If you are an engineer, this template is for you.

- Engineering - Meters
  Units: Meters
  If you are an engineer, this template is for you.
One Rectangular Face

• Exact values in the Dimensions Box.
• You will want to learn to enter values here.
Export to .obj format
Export to .obj format

• Note, this is why we use .obj files.
When Exporting Consider

• Do you export edges? (generally no)

• Are you two faced? (depends)

• How about only triangles?
  – This is particularly easy with rectangles.
  – May be helpful depending upon your ray tracer design and what you implement.

• We are not yet ready to say much about texture maps
Add Some Color

```
# Alias OBJ Material File
# Exported from SketchUp, (c) 2000-2012 Trimble Navigation Limited
newmtl _1
Ka 0.000000 0.000000 0.000000
Kd 0.000000 0.047059 1.000000
Ks 0.330000 0.330000 0.330000

---- test02.mtl  All (1,0)  (Text Fill)
# Alias OBJ Model File
# Exported from SketchUp, (c) 2000-2012 Trimble Navigation Limited
# File units = meters
mtllib test02.mtl
g Mesh1 Model
usemtl _1
v 0 1 0
vt 0 39.3701
vn 0 0 1
```

```
---- test02.obj  Top (1,0)  (Text Fill)
Beginning of buffer
```
Now, 7 things to learn …

• Canonical Views
• Rotating Views
• Zooming Views
• Extruding a 2D shape to produce 3D shape
• Selecting parts – faces
• Painting faces
• Removing a face
A Perfect Cube
Coloring A Face - How
Delete the Top Face
Scaling
Moving an Object

- Pay close attention
- Direction of move is guessed
- It is indicated in color of axis
- Changing viewpoint will probably change the defaults
Selection Parts and All
Cloning an Object

- Hold down the option key while dragging
Cloning Once, Why Not More

Note the magic "2x"
Make 5 – Select 5 – Repeat = 25
Rotation – This is Trickier
Learning More

Getting started with SketchUp - Part 1

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Learn the fundamentals of SketchUp by following along with this