Lecture 17:
3D Modeling, Formats and Tools

November 1, 2016
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 / SkechUp Pro

SketchUp Pro Available to CS 410 students on Windows Machines in USB 110.
SketchUp History

@Last Software

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

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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 any functionality of SketchUp Pro, but including integrated tools for uploading content to Google Earth and 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

- 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
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

```
[dhcp217:~/Desktop] ross% grep 'v' test05.obj
v 2 2 0
v 2 0 0
v 0 2 0
v 0 2 2
v 2 0 2
v 2 2 2
v 0 2 2
v 0 0 2
[dhcp217:~/Desktop] ross%
```
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
Stonehenge
Stonehenge 2014
Learning More