3D Printing Of Geometric Shapes

From Processing Code to Model Slicing and 3D Printing Considerations

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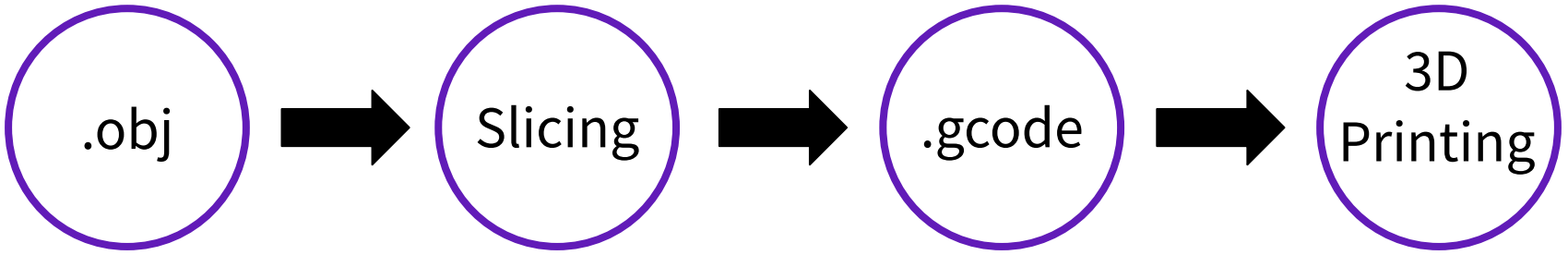
Preparing Processing For 3D Object Exporting

1. **Install** the OBJExport library
   a. In Processing go to Sketch -> Import Library -> Add library -> Search for “OBJExport” -> Install
2. **Import** the OBJExport library into your code
   a. In Processing go to Sketch -> Import Library (select OBJExport) This puts the line “import nervoussystem.obj into the top of the code.
   b. Before any draw commands add the the command beginrecord(“nervoussystem.obj.OBJExport”, “*filename.obj”);*
   c. After all draw commands add the command “endRecord();”
3. **Save** your Code then **run** the code with the beginRecord() and EndRecord() commands in the proper place.
4. You now have an .obj file of your 3D object!
5. **Send** this .obj file to rkurtz@amherst.edu with your full name and choice of material color (Blue/Green/Clear/Red)

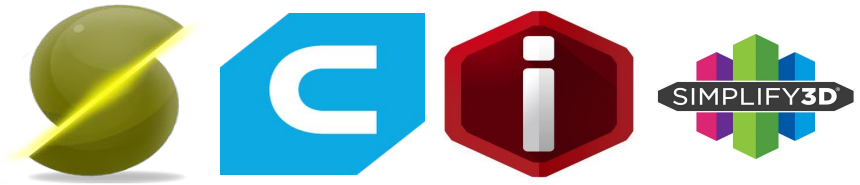
.OBJ Files and converting them to .GCODE

1. .obj files must be converted to the .gcode file format to be 3D printed
   a. .obj files contain data about 3D objects including 3D coordinates, texture maps, polygonal face data and other details.
   b. .gcode is a file that details a tool path and other parameters pertinent to 3D printing, CNC machining and other additive/subtractive manufacturing technologies.
2. Processing a .obj file (or any other 3D model file) into a .gcode is done through a "Slicer" program.



Slicing Considerations

1. Many slicing programs available
   a. Slic3r -> PrusaSlicer
   b. Cura (Ultimaker)
   c. IdeaMaker (Raise3D)
   d. Simplify3D



2. Primary FDM (Fused Deposition Modeling) printing setting to consider

Extrusion Temperature	PLA: 190-220	Retraction	Variable
Bed Temperature	PLA: 0-60	Platform Additions	None/ Skirt/ Brim/ Raft
Layer Height	0.2mm	Supports	Off/On -> Density (%)
Printing Speed	~60mm/sec	Cooling	0% -> 100%
Infill	0%-100% (15%)	Shell Thickness	1 - 3 paths

3D Printing Technologies on Campus

Creality Ender 3 Pro (FDM)

- 220x220x250mm build volume
- Flexible magnetic bed
- Nozzle temperature up to 240℃
- Bed temperature up to 110℃
- 0.1-0.3mm layer height

Raise3D E2 (FDM)

- 220x220x250mm build volume
- Flexible magnetic bed
- Nozzle temperature up to 240℃
- Bed temperature up to 110℃
- 0.1-0.3mm layer height
- Independant Dual Extrusion
- Remote operation via cloud platform

Elegoo Saturn (SLS)

- 192x120x200mm build volume
- UV curing at 405nm in ~3sec
- 0.05-0.1mm layer

The Project in a nutshell...

- 24 Cubes - 12 clear translucent, 4 blue translucent, 4 red translucent, 4 green translucent
- 12 student designed geometries
- 1 Name cube with all participants names embedded
- LED lighting for pizzaz

Questions or thoughts about the project?
Questions on 3D printing in general?
Future project ideas?