

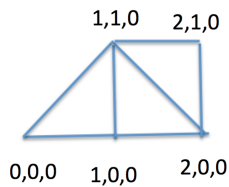
Submit via classesv2.

1. A simple slicer for a very small mesh:

Write C/C++ code that takes as input the three dimensional coordinates of 5 points pt1 to pt 5 and a directional vector v. The program should find the average of the 5 points, and then find the intersection of the edges of the three triangles pt1,pt2,pt3; pt2,pt3,pt4 and pt3, pt4, pt5 defined by the five points, and a plane passing through the average points with a normal in the direction v. Your program should handle general 3D points. However, if the input were:

0 0 0 1 0 0 1 1 0 2 0 0 2 1 0 0 1 0

The triangles would be



The average point is $(6/5, 2/5, 0)$, and the four intersection points are $(2/5, 2/5, 0)$; $(1, 2/5, 0)$, $(7/5, 2/5, 0)$ and $(2, 2/5, 0)$.

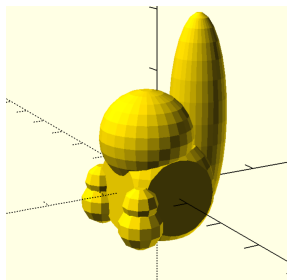
If the 5 points are coplanar in a plane with the same normal as the input direction vector, the program should return "Error".

Upload your source code, and an exe file to run it on a Zoo machine with the command line
simp_slice points.txt

Where simp_slice is the executable, and points.txt is the plain text file with the input.

2. Simple design and 3D print:

Use OpenSCAD to make a model that looks something like a squirrel. It should have at least a head, body, arms, legs and tail. Export the model as STL, and input it to Cura. Position and scale your model so that it will print in 30 minutes or less, and export the GCODE. Turn in your scad, stl and gcode files. Also turn in screen shots of your model in OpenSCAD and Cura. Here is a very crude model, yours should be more detailed and squirrel-like. Yours should also somehow embed one of your initials.



3. Technical papers: some history

Read Jarvis, 1983 (on Resources, classesv2). Summarize the types of "range finding" strategies described and their advantages/disadvantages.

Read Kodama, 1981 (on Resources, classesv2). Summarize the three approaches implemented and what was learned from them.

4.. The big picture:

Download and skim through “Imagine Design Create” from Autodesk (on Resources, classesv2). This has a lot of pages, but actually not a lot of text. It has a lot of Autodesk promotion in it, but also a lot of interesting design examples. In a half page or so, describe which design example appealed to you the most, and why. Describe the computational tools that were particularly important in realizing the application.