



PART 1C: DIGITAL FABRICATION

DIGITAL FILE DUE: THURSDAY, FEBRUARY 09

PHYSICAL 3D PRINT DUE: APRIL 27

BACKGROUND:

Architecture relies on a wide array of tools and techniques to make physical space. Many of these modes of production take countless hours of skilled tradesmen to bring to fruition, but we can also work through digital fabrication techniques to have a more direct relationship with production. In this portion of the assignment, we will optimize, and nest the jewel you have designed for 3D printing, using the FormLabs Form 2 printers and FormLabs PreForm.

SKILLSETS + TOOLSETS:

Rhino3D, FormLabs PreForm or Lulzbot Cura

SKILLS LEARNED:

Rhino – mesh shelling, constructing vents, surface normals, welding

PreForm – importing geometry, orientation tools, support generation, nesting

Lulzbot Cura – importing geometry, orientation tools, support generation

EXERCISE:

You will need to scale your jewel so that it is at $\frac{1}{4}''=1'-0''$. Following that, you will need to set your units to millimeters to match the Form2 Printer. In doing this, please be sure to rescale your Rhino3D file. Once you have scaled the file, move your object to the origin in Rhino3D, and export it as an OBJ file following the prompts we outlined in the video tutorial. You will work with your instructor to combine your jewel with several other students so that we can print multiple jewels at once.

Due to the high number of students needing to 3d print, the physical prints are not due until Final Review on April 27th. Thus, you have the rest of the semester to schedule and oversee the printing process.

STEPS:

- + Make copies of your selected jewels and prepare them for 3D printing.
- + Scale the object to $\frac{1}{4}''=1'-0''$ and use the mesh, and offsetmesh commands to create hollow objects. Use the volume command to check their overall volume and note that in the file.
- + Make a SaveAs file of your existing work and delete everything that you will not be 3D printing.
- + Run the Purge command to remove any extraneous layers and data that will not be used.
- + Scale your object so that it is at $\frac{1}{4}''=1'-0''$. You can do this by scaling it by $\frac{1}{12}$ and then by $\frac{1}{4}$.

- + Change your Rhino units to millimeters
- + Move your object to the origin – 0,0,0
- + Run UnifyMeshNormals
- + Run audit and confirm there are no errors
- + Export your file as an OBJ

- + Use PreForm to import your OBJ model. Orient your model so the base is facing down and use PreForm's tools to generate supports and check printability. If your model has errors, use PreForm's help file and tools to correct the errors and reimport the model if needed.

- + Once PreForm confirms that the model is ready for printing, save your PreForm file and upload both it and your .OBJ file to your instructor's submission folder so they can be batched into larger runs.

DELIVERABLES + SUBMISSION FORMAT:

- + One 3D print-ready .Form & .OBJ file uploaded to your instructors OneDrive folder by 7 pm Thursday, February 09.
- + Please use the nomenclature "**P01c_lastname_first initial.form**" for the file name. If, for example, your name is "Bob Smith" you will save your work using the nomenclature "**P01c_Smith_B.OBJ.**"
- + After finalizing your print file, you have until April 27 to print your 3D object.