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4.500 Introduction to Design Computing
Fall 2008

3D Printing

Assignment #5

1 – VIRTUAL MODEL – is due on Stellar Tuesday October 28th, 9:30 am.
2 - PHYSICAL MODEL - is due in lecture on Tuesday, November 4, 9:30 am.

Models should be left on the shelves in Studio 7.

The work on digital fabrication starts with 3D printing, this assignment is design modeling and fabrication in one. As you will all see, models from the class will range results in size and shape. Printed models can also range in detail, best are models that walk a fine line between too much detail and strength in modeling.

A major advantage of u 3D printing is its ability to manufacture many different types of models. Although the model below appears to be the same model printed 4 times, each is a variation of the original design. Note - You are not required to model and print 4 designs you are only required to print one.

Carefully follow the steps on the proceeding pages they will help you get through production and manufacturing of your model. The quality of you model will be judged on its strength (did it break during extraction), detail and general architectural design. This is the best time to change the form of your design if the previous models were complex or unattractive.
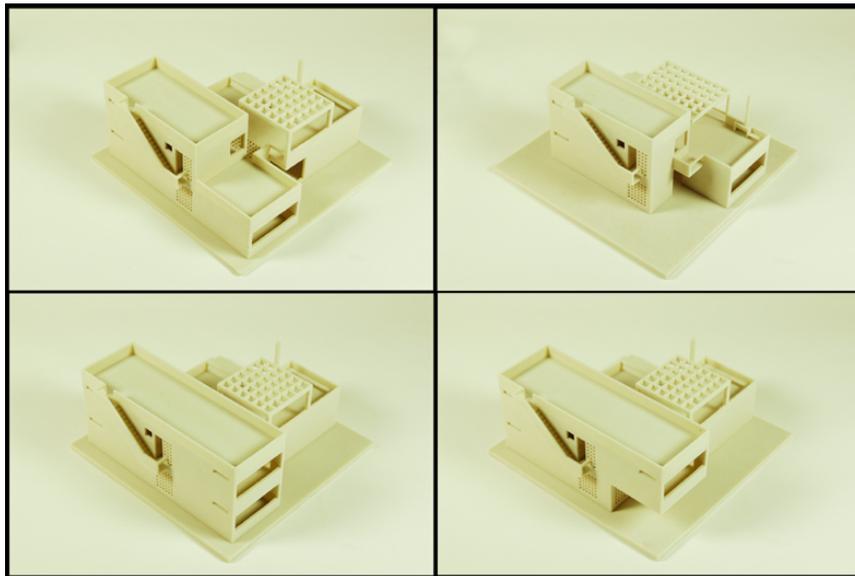
Follow these steps to prepare your design for 3D printing:

a) COPY ORIGINAL MODEL: Create a copy of your model and rename the copy to suite the purpose. For example your original model should be lableled: lsass_cottage_original.dwg
Your copy should be labeled: lsass_cottage_3D_print.dwg

b) SCALE MODEL: (fig. 1)
   a. Within the new model file create a new layer called "3DP-scale"
   b. Copy the original model and change all components to this new layer
   c. Construct a 5l" x 4w" x 8h" box at the 0,0 to simulate the volume of the 3D print area
   d. Create a new layer called "3DP-box" and change the new volume to that layer.
   e. Lock the box in the layer dialogue box.
   f. In AutoCAD scale the model by $1/60^{th}$ this should enable you to fit some part of the model within the envelope of the printer. Type "scale>>all>>basepoint – 0,0,0>>scale factor>>1/60.
   NOTE: Most people will not be able to fit the entire building within the print volume. You are expected to select an important section of the model.
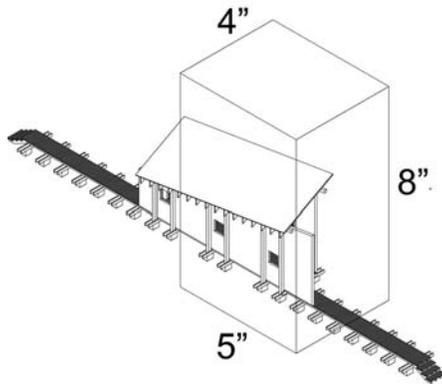
Fig. 1 scaled model by 1/60
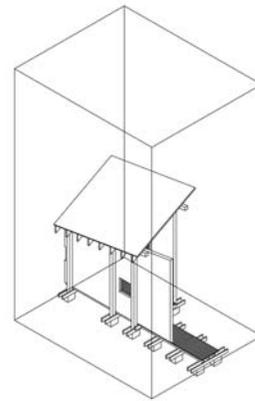
Fig. 2 cropped model

c) CROP: (fig 2)
   a. Cut off edges of model

d) COPY TO NEW LAYER
   a. Copy model to a new layer called "3DP_REMODELED"
   b. All parts need to be within the volume

e) UNION COMPONENTS (fig 3)
   a. Build a 4" x 5" x ¼" base from which the model will be attached. The base will help when extracting the model from the machine.
   b. Union parts together to create one solid model.
   c. Make sure that parts are thick enough to survive the printing and extraction process.

2,2,2
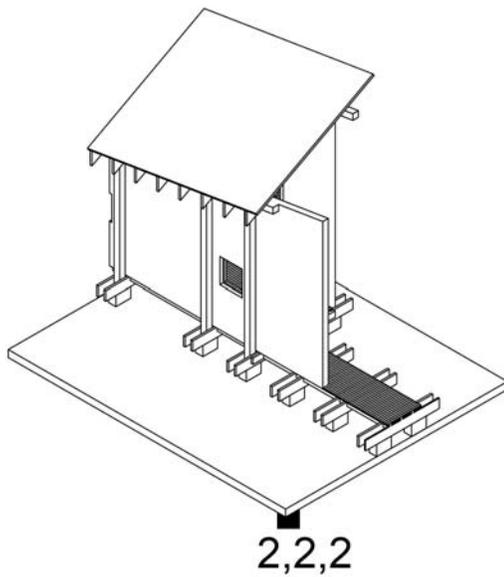
f) EXPORT STL
   a. Move the lower left hand corner of the union model to coordinate 2,2,2
   b. Type stlout and save
   c. Post file on the

g) FILE POSTING
Printing 3-D Models on the ZCorp 3-D Printer

Step 1: Prepare your model by creating an STL file

Step 2: Save your file as X.stl, where X is your username.
Your username is your email address without "@mit.edu".
Multiple files should be named X-01.stl, X-02.stl, etc.

Step 3: We will email you to inform you:
A. Signup for a time to print on the schedule posted on the door of 7-408 (printer room)
B. When you model has been sent to the printer
C. When you can remove your model – you have 1 hour to remove it or we will remove it for you. If it breaks you will not get a second chance to print.

h) FILE SIZE
a. Printing 3-D Models on the ZCorp 3-D Printer 150 square inches
b. To calculate type "area>>>object = square inches

PAPER TURNIN

Page 1:   *Print out of boxed area from the original model – Figure 1*
(exactly like figure a – with the box)

ONLINE TURNIN on Stellar

a) AutoCAD file of the union model
b) STL file uploaded to stellar, we will check your file before we print it.