Lab 06: 3-D Printer Operations

I. Purpose
- A.)   Provide an introduction to the 3-D printer software
- B.)   Provide experience designing and programming parts for production on the laboratory's 3-D printing equipment

II. Practice

Your lab team is to produce nested and oriented dice for the 3-D printer(s) in preparation for automated production. You are to document the processes in your engineering notebooks.

3-D Printer

Using one of the Fujitsu T-901 tablets, open the file ***DiceLab.sldprt*** in SolidWorks. This file should be located on the desktop or in your team folder.

1. Go to: File> Save As> Save As Type> STL (*.stl)

2. Click on the button for Options …

3. Verify that the Output is Binary, that the Resolution is Custom, and that it will Show the STL info before file saving. Leave the Deviation Tolerance at 0.00154647 in and the Angle Tolerance at 30.00000 deg. Then click the button for OK.

4. Select your team folder, then change the file name to DiceLab + your initials.

5. Click the button for Save, and note the format of the Die image – a tessellated solid (STL format). Click on the Yes button.

Exit the SolidWorks program, and then start the MakerBot MakerWare from the desktop. When the MakerWare software loads:

1. Go to Devices> Select type of device> MakerBot Replicator 2X (Disconnected)*

2. Go to File> Open and find your STL file

3. Click on your object within the MakerBot screen image (edges will turn yellow)

4. Click twice on the **Scale** icon (left side of window)
    - a. Verify that the object is correctly sized (19.05 mm per side)
    - b. If not correctly sized, try clicking the **inches>mm** button
    - c. Click on **X** to exit this box

5. Click twice on the **Turn** icon (left side of window)

    a. Verify that the object is correctly oriented on the build plate
    b. If not correctly oriented, click on the rotate buttons as necessary to optimize the build
    c. Click on the **Lay Flat** button to position the rotated object onto the build plate
    d. Click on **X** to exit this box

6. Click twice on the **View** icon (left side of window)
    a. Click on the **Top** button to see the build plate layout from above
    b. Click on **X** to exit this box

7. Click twice on the **Move** icon (left side of window)
    a. Click on the **Center** button to center your object on the build plate
    b. Click on the **On Platform** button to position the moved object upon the build plate
    c. Drag your object as necessary to nest it on the build plate with any other objects to be built at the same time
        i. Make sure to minimize the clear distance between objects to decrease travel time
        ii. Make sure to locate taller objects near other taller objects to decrease travel time
        iii. Try to center the entire build upon the build plate
    d. Click on **X** to exit this box

8. Click twice on the **Home View** button (left side of window)

    If nesting parts, use the **Add File** button (top of window) to add additional objects. (Repeat steps 2 – 8 as needed in this section)

9. Click on the **Settings** button (top of window)
    a. Turn OFF the **Raft** button (or verify that it is off)
    b. Turn OFF the **Supports** button (or verify that it is off)
    c. Select the **Standard Resolution**, and verify that
        i. **Infill** is 15%
        ii. **Number of Shells** is 2
        iii. **Layer Height** is 0.20 mm

10. Click on **Save as type**: Makerbot print (*.makerbot)

11. Click on Export Part File button (top of window)
    d. Note that Print Time is about 17 min (each part)
    e. Note that the Filament is about 3.09 g (each part)

12. Save your **.Thing** files to the jump drive for the lab.

    Print your dice files as directed by the TA / Instructor to complete this lab.
    Save your parts in your team box for grading. There is no report for this lab.