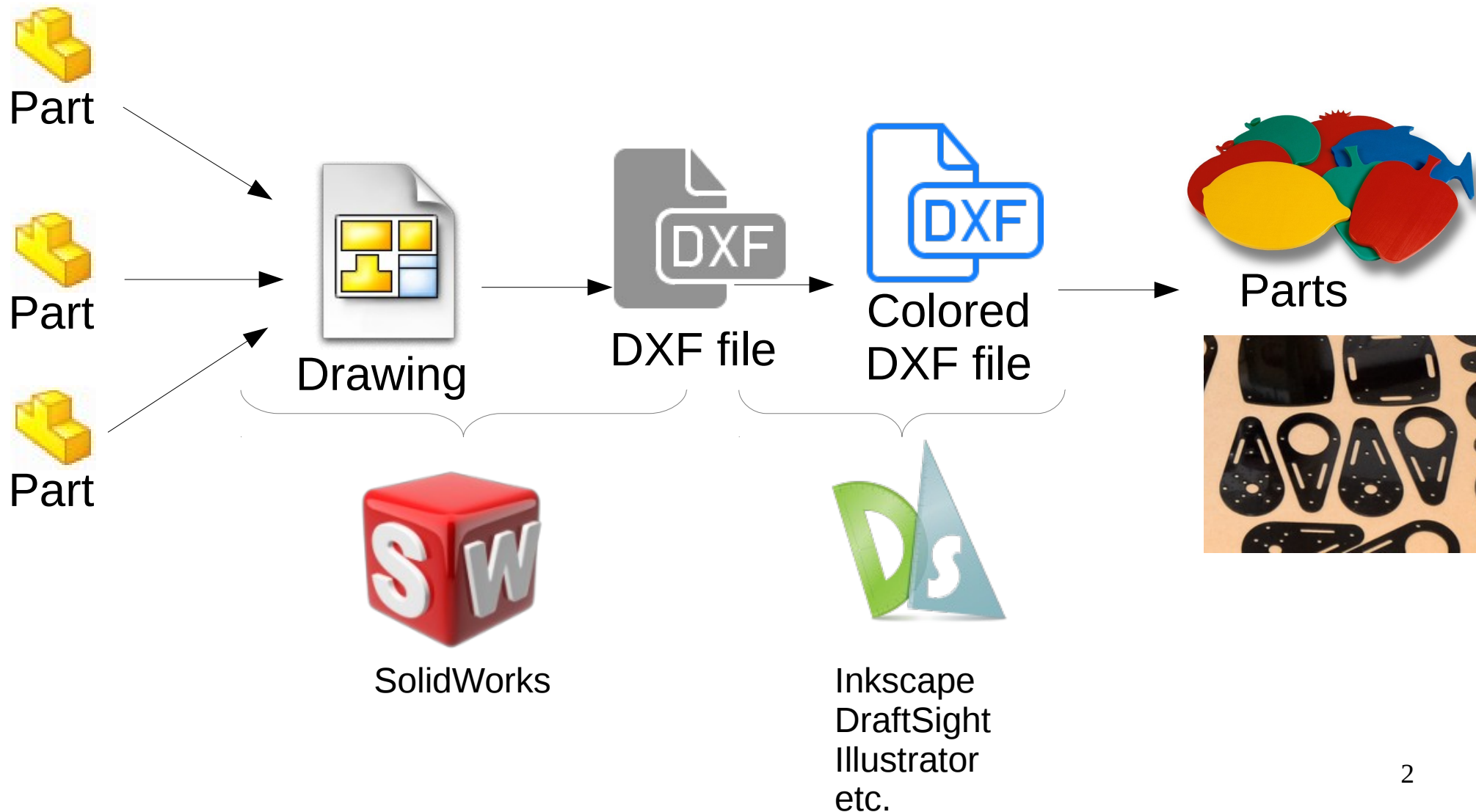


99-353 SolidWorks and Laser Cutting

Laser Cutter Intro

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From Design to Plastic



Making A Drawing (1/2)

- In SolidWorks: File → Make drawing from part
- Uncheck “Display sheet format” box
- Set custom size to 4” x 4”
- Right click on Sheet1, select Properties, and make sure the scale is 1:1
- Insert your part (front view).
- Hit escape to stop inserting views.
- Click on the drawing and verify that “Use sheet scale” is selected.

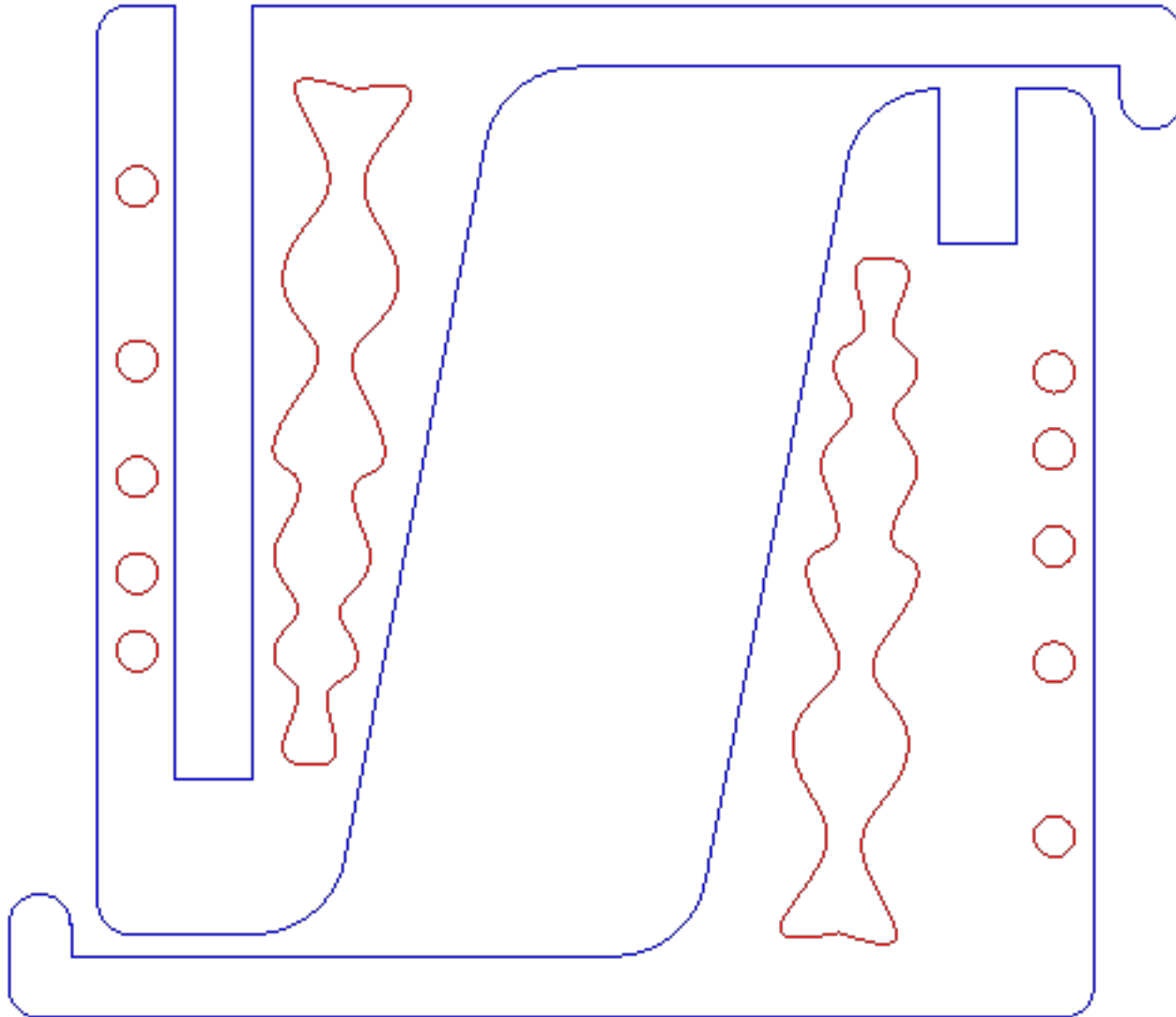
Making A Drawing (2/2)

- Click and drag to select the centerlines and hit Delete to remove them.
- Save as MyFrob.SLDDRW
- Then do “Save As” and select DXF file type.

What the Colors Mean

- On older laser cutters, color meaning is fixed:
 - Red means “cut”
 - Black or blue means “engrave”
- On modern laser cutters, color meanings are user-definable.
 - Use color to define the cut ordering.
 - Always cut the holes first, then cut the outline.
 - Example: holes = red, outline = blue.
 - So tell the cutter to do red first, then blue.

Cut the Holes First, Then the Outline



Coloring Your Drawing (1/2)

- Run Inkscape
- Open MyFrob.DXF. Set manual scale factor to 25.4.
- Type control-A to select everything.
- Hold the shift key and click on blue to set stroke color.
- Press escape to deselect.
- Click and drag to select specific internal features.
- Hold the shift key and select a new stroke color for them.
- If you forget to hold the shift key, you set the fill color. Click on the X in the dialog box to remove the fill.

Coloring Your Drawing (2/2)

- When coloring is complete, choose “Save As”.
- Set file type to DXF.
- Set the output units to mm (not points).
- Save the file to your flash drive.

Rabbit Laser RL-80-1290

- 80 watt CO₂ laser
- 1200x900 mm bed
- Exhaust filter
- Chiller

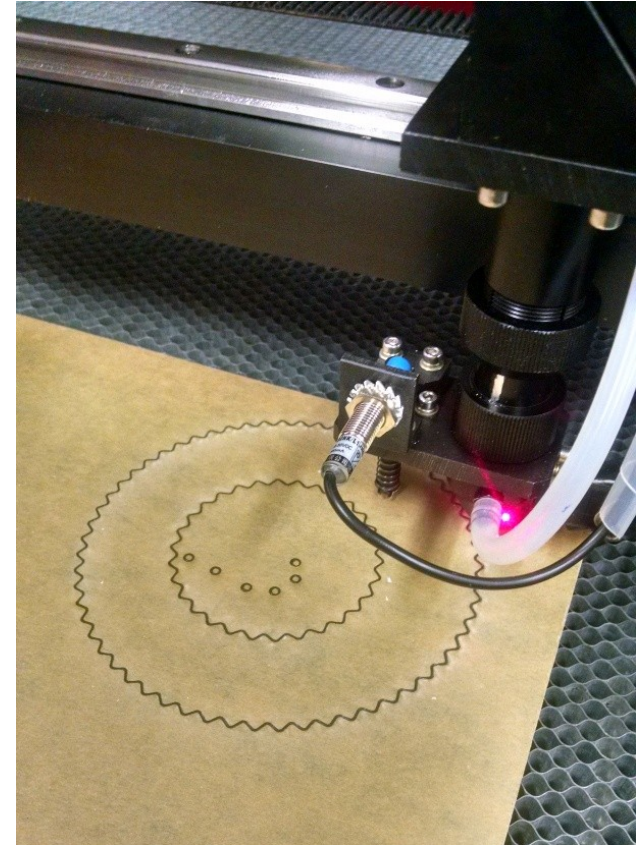


The Laser Tube



How It Works

- Pointing laser (red, low power)
- Cutting laser (invisible, high power, dangerous!)
- Coolant chiller (stay below 32° F)
- Compressed air to clear debris
- Exhaust system with filtration
- Settings based on type of material:
 - Power level (never go above 85%)
 - Cutting speed (slower speed cuts deeper)



RL-80-1290 Control Panel

Emergency Stop
(E-Stop) Button

- Leave the E-Stop on.
- Leave the key turned on.
- Use the three small buttons to turn the lighting, laser tube, and blower on or off.



RL-80-1290 Control Panel



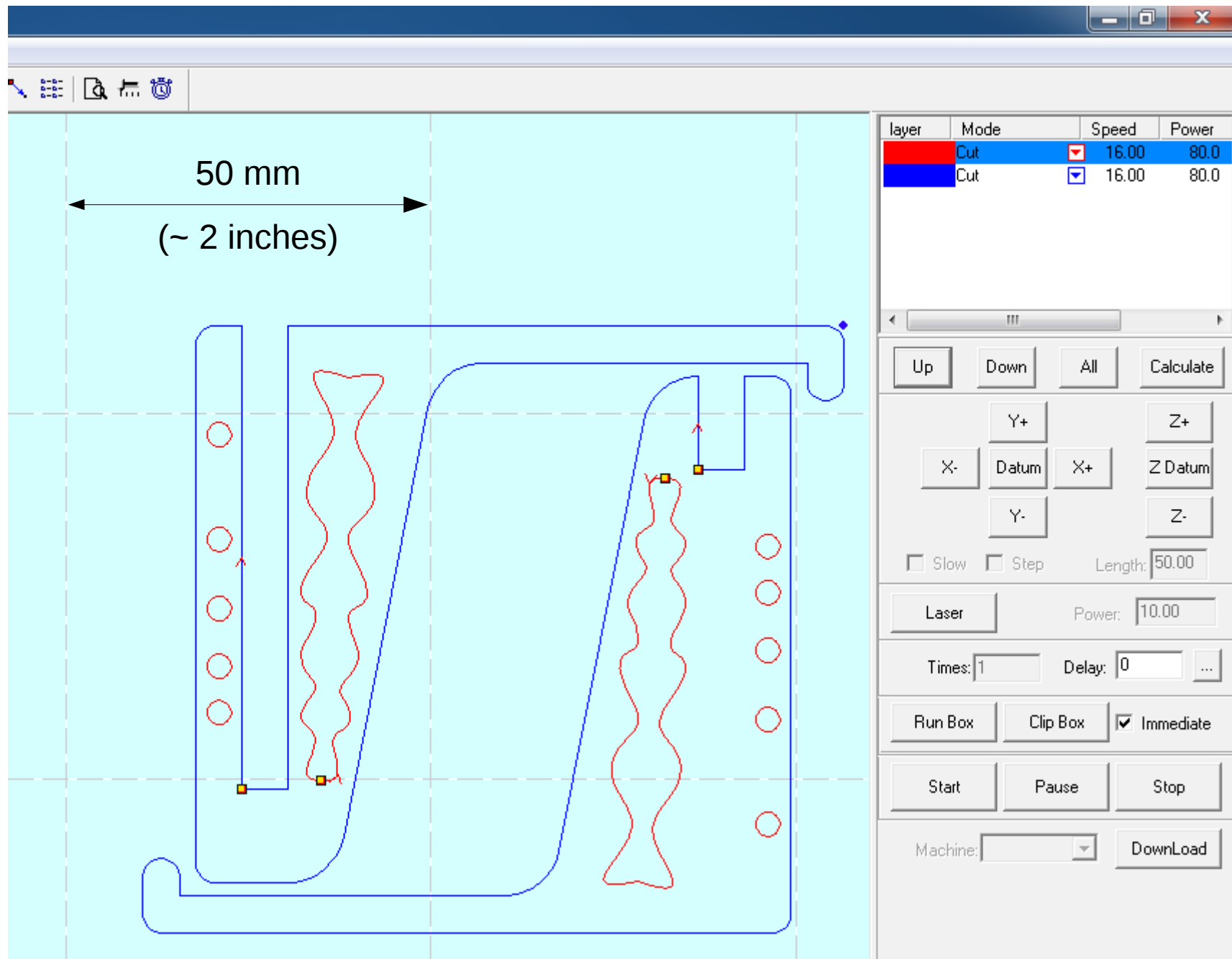
Safety

- Fire extinguisher and smoke/heat alarm.
- Remember the E-Stop button.
- Chiller temp must be below 32° F.
- Never open the door while the laser is active.
- Never cut materials not on the approved list:
 - Acrylic, Delrin, cardboard, thin wood, MDF (fiberboard), and Yupo paper are all okay.
 - Ask about other materials.
- Lots of stuff that's bad to cut:
 - ABS plastic will catch fire
 - PETG produces oily smoke that dirties the lens and mirrors
 - Anything with chlorine, e.g. styrofoam, vinyl: poison gas!

Cutting Wood

- We're using 1/8 inch plywood.
- Recommended power settings:
 - Cut: speed 12 mm/sec, power 80%
 - Engrave: speed 80 mm/sec, power 30%
- Cover the surface with masking tape to protect the wood from scorch marks.
- To cut thicker wood (up to 1/2 inch), use multiple passes.

Lasercut53 Client Program



Operating the Laser

- Full instructions and troubleshooting page are linked from the course home page.
- Also available in a three-ring binder in the laser room.
- The laser cutter control panel has two modes. Press the Escape button on the control panel (not the computer keyboard) to switch modes.

Preparing Material to Cut

- Remove paper backing if necessary.
- Lower the bed.
- Place material on the bed and position the cutting head over the material.
- Press the Z-0 (Z-home) button to set the bed height to focus the laser.

Laser Client Program (1/3)

- Start the client program on the computer next to the laser.
- Do File → Import (not File → Open) and import your DXF file.
- Do Tools → Unite Lines and accept the default tolerance of 0.01.
- Press Escape to deselect everything.

Laser Client Program (2/3)

- Set the cut order for the colors using the Up and Down buttons. *Do this after the “Unite Lines” step.*
- For each color, program the speed and power level. Leave the corner power at 10%.
- Press the Download button to send your file to the laser cutter.
- In the dialog box, press “Delete all” and then “Download Current”.
- On the laser, press the Test button on the control panel to see the bounding box for the cut area.

Laser Client Program (3/3)

- Move the material or the cutting head so that the bounding box falls in the right place.
- Close the lid and press the Start button.
- Wait for the beep indicating cutting is done, or press the little red Stop button to stop it.
- When you're done for the day, leave the laser cutter turned on, but turn off the three small buttons.
- Clean up your mess. Don't leave junk on the bed or laying around on the tables.

Assignment for Today

- Customize your keyring design.
- Cut and assemble your keyring.
- Upload your SLDPRT and DXF files to Autolab.
- Post a picture of your keyring to Piazza.