HOW TO - 3D printer

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STEP 1 : Draw your computer assisted drawing (CAD).

1. Draw your component on the software of your choice. We suggest to use Fusion360, which provides 1-year free licenses (renewable).
   `https://www.autodesk.com/education/edu-software/overview`
2. Verify that your piece is *printable* : are there parts that float in the air ? Does it respect the resolution limit of the printer (example : screw threads).

STEP 2 : Export your CAD.

1. On your CAD software, export your piece in the .STL format.
2. Download the Cura Software : `https://ultimaker.com/software/ultimaker-cura`. Just skip all of the steps to sign in and everything.
3. In Cura, select the right printer. In our case, we will select Ultimaker 2.
4. Import your .STL file in Cura
5. You can change the parameters of the printing by clicking on the white band in the top-right of your screen (Figure 1).

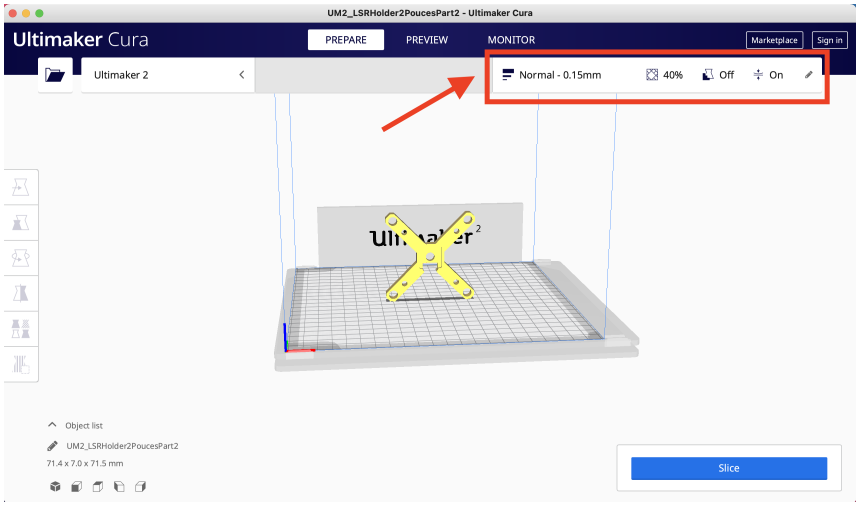

FIGURE 1

6. Take the SD card in the printer and plug it in your computer. *Note : the SD card should always (always !) stay in the printer, so that we don't lose it.*

7. Export the .gcode file from Cura by clicking on slice in the bottom-right of your screen (Figure 2). Then, click on Save to Disk. This automatically saves your project on the SD card.

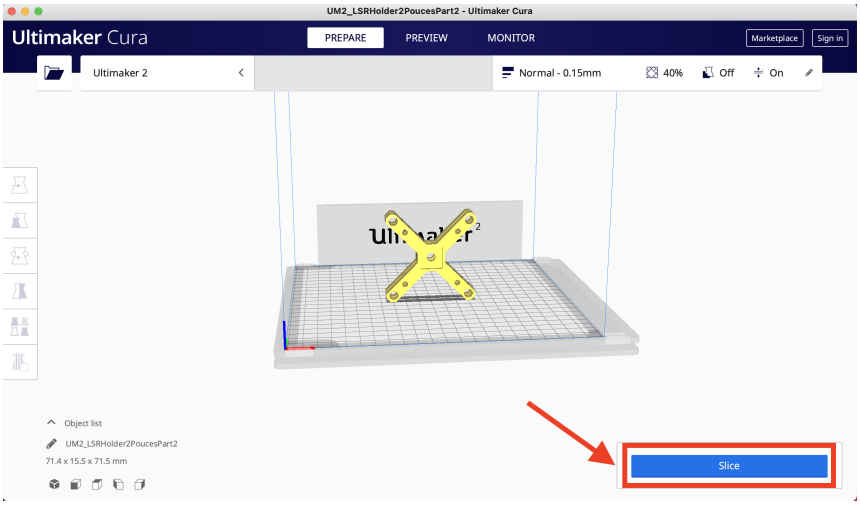

FIGURE 2

8. Export your SD card from your computer.

STEP 3 : Calibrate the printer. *This step might not be necessary if the printer is already calibrated. However, if the printer is not used often, this step is a must to ensure a good 3D print.*

1. Turn the wheel on the printer if nothing is displayed on the screen of the printer.
2. Select *Maintenance* by turning the wheel to change the selection and click on the wheel to select.
3. The same way, select *Build-plate*.
4. Follow the instructions on the screen of the printer (Figure 3). From experience, we recommend that the paper in stuck between the stage and the tip of the pen just enough to not be able to take it out ; one more rotation with the wheel would increase the space between the stage and the tip of the pen to allow the piece of paper to get out with scratches.

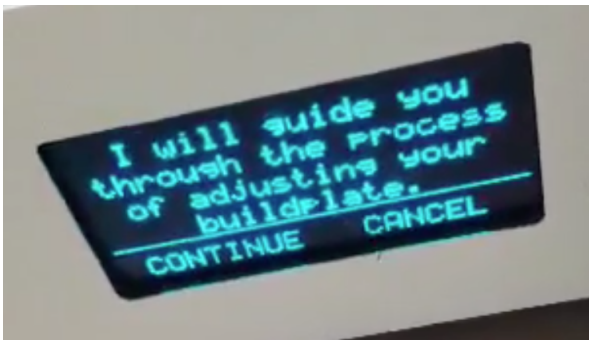

FIGURE 3

STEP 4 : Print your CAD.

1. Plug the SD card in the 3D printer.

2. From the main menu, select *Print* with the wheel.
3. A list of all the files saved in the SD card appears. Select your CAD by turning and clicking on the wheel. You might need to push a little the material in the tube in the first minutes of the printing. Check is if the material sticks to the stage when printing. If it doesn't, step 3 should be redone.

Important note : When printing with ABS filament, it is possible that the component peels off the stage during printing. This is caused by the cold air around the printing area causing the ABS to shrink. To prevent this, panels should be added around the printer to reduce heat loss around the printing area. This problem is not encountered with PLA filament