

3D printing workshop 1

By Friend

Workshops

1. Find a model, getting printing profile, slicing, removing item from bed, safety
2. Area explanation, safety, removing support, cleaning bed, changing filament, swapping extruder head, troubleshooting
3. Blender basics, stitching models together

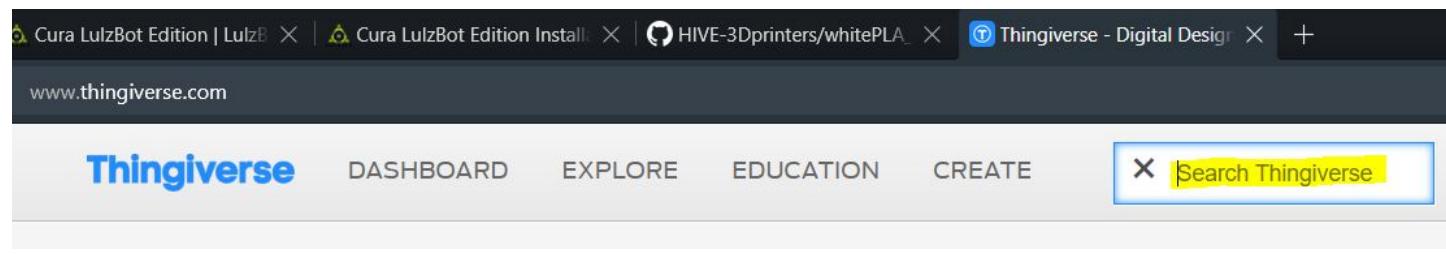
After these three workshops, you should be able to do these by yourself: take the idea you have, make a model, print it out, simple post-process. This should help cut down time in our development cycle from initial ideas discussion, to us starting the discussion iterating from first working prototype you've made.

If there's a word you don't understand in the slide, let me know and I'll add it here

- .stl, .obj: common file types for 3D models
- Slicing: turning the model into printing instructions
 - You slice the model into layers of flat planes, stacked on top of each other, hence slicing
- Repository: a type of file organizer (can be online) that helps keep track of which version the files are
- OS: Operating system (ex: Windows, Mac, etc.)
- .gcode: common file type for 3D printing instructions

Find a model

- You'll get to print a small model today (yays!)
- Go to "thingiverse.com"
- Search for something you want
 - Some ideas: pen cap, loaded dice, lowpoly dog, low poly dog, utility knife, cable clip, cable wrapper



Find a model

- I did 3Dbenchy
- If you can't think of anything, you can use this as well
- Scroll down until you find something you like and click on it

The screenshot shows a web-based platform for 3D printing models. At the top, there is a navigation bar with tabs labeled "EXPLORE", "EDUCATION", and "CREATE". A search bar contains the text "3dbenchy". Below the search bar, a filter button labeled "Relevant" is visible. Two 3D printing models are displayed as cards:

- #3DBenchy - The jolly 3D printing torture test** by CreativeTools (Apr 9, 2015). This card features a green 3D-printed boat-like object being held by a person's fingers. It includes a blue star icon, 30764 likes, 40214 views, and 323 comments.
- Smartphone Photo Studio** by CreativeTools. This card shows a smartphone mounted on a tripod, with a red funnel-shaped object nearby. It includes a blue star icon, 13215 likes, and 13195 views.

Find a model

- Scroll down and click on “Thing Files”

CT #3DBenchy - The jolly 3D printing torture-test

by [CreativeTools](#) Apr 9, 2015



Creative-Tools.com #3DBenchy (3DBenchy.com)



Thing Details	Thing Files	Apps	323	3185
			Comments	Makes

Find a model

- Scroll through the list and click on the one you actually want
- Make sure it's either .stl or .obj
 - Those two formats are the easiest for Cura (and other printing software) to read
- Clicking on it will download it

The screenshot shows a user interface for managing 3D printing files. At the top, there are three tabs: "Thing Details" (with a book icon), "Thing Files" (with a folder icon), and "Apps" (with a cube icon). Below the tabs, the "Thing Files" tab is active, indicated by a blue background. The main area displays a list of files under the heading "File Name".

The first file listed is "3DBenchy_Broschüre_3DBench...", which has a small thumbnail image of two interlocking gears next to it. Below the file name, it says "Last updated: 04-09-15".

The second file listed is "3DBenchy.stl", which has a small thumbnail image of a blue 3D-printed benchy character next to it. This file name is highlighted with a yellow rectangular box. Below the file name, it says "Last updated: 04-09-15".

File Name	Last updated
3DBenchy_Broschüre_3DBench...	04-09-15
3DBenchy.stl	04-09-15

Getting print profile

- Go to
“github.com/rprakitpong/HIVE-3Dprinters”
- It’s a repository I use to keep things related to the printer at HIVE
 - There a lot of stuff on there for you to explore after the workshop
- Click on “Taz 6”
 - It’s the name of our printer

General info on operation and maintenance of HIVE 3d printer(s)

Manage topics

51 commits 3 branches

Branch: master New pull request

rprakitpong all files from ishan

Helpful.stl organize phineas gage skull files

Projects all files from ishan

Taz6 reorganized maintenance info sheets

README.txt removed sd card holder from todo

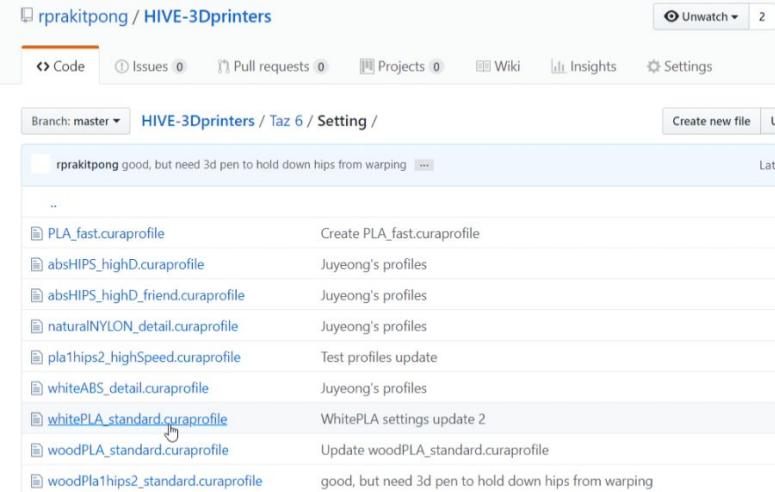
README.txt

Taz 6 is the first printer we have. We have both dual and single head ext folder.

TODO:

Getting print profile

- Click on “Setting” -> “whitePLA_standard.curaprofile”
- Plastic filament varies by type, brand, color, etc. so we develop our own settings for our own plastic
 - This is the setting for our generic PLA filament



A screenshot of a GitHub repository page for 'rprakitpong / HIVE-3Dprinters'. The repository has 2 stars and 0 issues. The user is on the 'master' branch. The 'Setting' tab is selected. A message from 'rprakitpong' says 'good, but need 3d pen to hold down hips from warping'. Below is a list of cura profiles:

Profile Name	Description
PLA_fast.curaprofile	Create PLA_fast.curaprofile
absHIPS_highD.curaprofile	Juyeong's profiles
absHIPS_highD_friend.curaprofile	Juyeong's profiles
naturalNYLON_detail.curaprofile	Juyeong's profiles
pla1hips2_highSpeed.curaprofile	Test profiles update
whiteABS_detail.curaprofile	Juyeong's profiles
<u>whitePLA_standard.curaprofile</u>	WhitePLA settings update 2
woodPLA_standard.curaprofile	Update woodPLA_standard.curaprofile
woodPla1hips2_standard.curaprofile	good, but need 3d pen to hold down hips from warping

Getting print profile

- Click on “Download” to download

A screenshot of a GitHub repository page. At the top, there is a dropdown menu labeled "Branch: master" and a URL "HIVE-3Dprinters / Taz 6 / Setting / whitePLA_standard.curaprofile". Below the URL, there is a small profile picture icon followed by the text "RP WhitePLA settings update 2" and the number "7098a" at the far right. Underneath this, it says "0 contributors". Further down, it shows the file size "1.2 KB" and a "Download" button. At the bottom of the screenshot, there is a link "View raw".

Slicer set up

- Go to “lulzbot.com/cura”
 - Or in my case, google “cura lulzbot”
- Cura is one of the free, popular slicers
- Our printer’s company has their own version of Cura that works better with our printer



Google

cura lulzbo

ห้วยแม่ คันธูป ข่าวสาร วีดีโอ ข้อบอกร้าว เพื่อแม่

ผลการค้นหาประมาณ 63,700 รายการ (0.33 วินาที)

กำลังแสดงผลการค้นหาสำหรับ [cura lulzbot](#)
ค้นหาคำเท่านี้แทน [cura lulzbo](#)

[Cura LulzBot Edition | LulzBot](#)
<https://www.lulzbot.com/cura> ▾ แปลงหน้า

Find the latest updates for the [LulzBot](#) edition of [Cura](#) to keep your printing 3d objects! This software is free to download.
คุณเคยไปที่หน้าเว็บนี้หลาຍครັ້ງ "ໄປຄົງລາສຸດເມື່ອ: 20/3/19

Slicer set up

- Click on “Download” -> “Cura (the OS you’re using)” -> “+ Download Installer” -> “Cura Lulzbot Edition: (the OS you’re using)”
 - Each click will bring you to a new page (except “+ Download Installer”)
- Save and run the installer

The screenshot shows a web browser window with the URL www.lulzbot.com/cura. The page displays a navigation bar with links for "QUICK START GUIDE (VIDEO)", "WHAT'S NEW", and "DOWNLOAD". Below the navigation bar, it says "Legacy CURA LULZBOT EDITION V2.1.00.". There are four download buttons for different operating systems: "CURA LulzBot Edition DEBIAN", "CURA LulzBot Edition UBUNTU", "CURA LulzBot Edition WINDOWS", and "CURA LulzBot Edition MAC OS". A large green button labeled "- Download Installer" is positioned below the OS-specific buttons. To the right of this button, text reads "Download Cura LulzBot Edition for Windows by clicking on the button below. Save". A green button at the bottom right is labeled "CURA LULZBOT EDITION: WINDOWS" with a mouse cursor icon pointing to it.

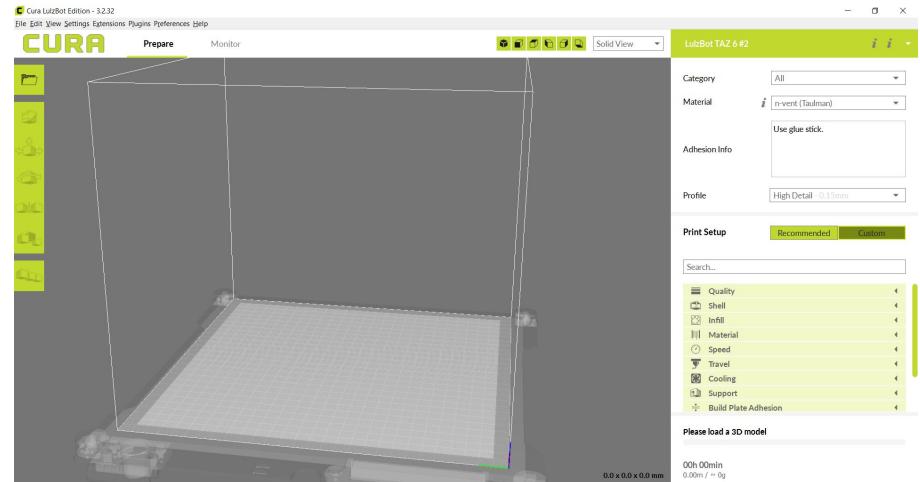
Slicer set up

- This window should pop up since this is the first time you open the software
- Select “Lulzbot TAZ 6”, “Single Extruder”
- Click “Add Printer”



Slicer set up

- This page should pop up
- It's a blank that will show up every time you open Cura
- It might look a bit different from this since we might be using a different version of Cura



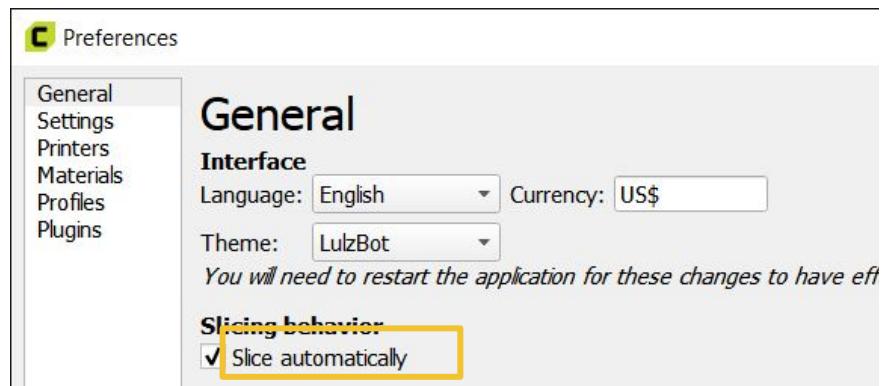
Disable automatic slicing

- Automatic slicing makes Cura slice the model everytime a model changes
 - Even when you make small reposition or rotation
 - Could slow you down significantly with big models/slow computer
- Go to toolbar and click on “Preference” -> “Configure Cura...”



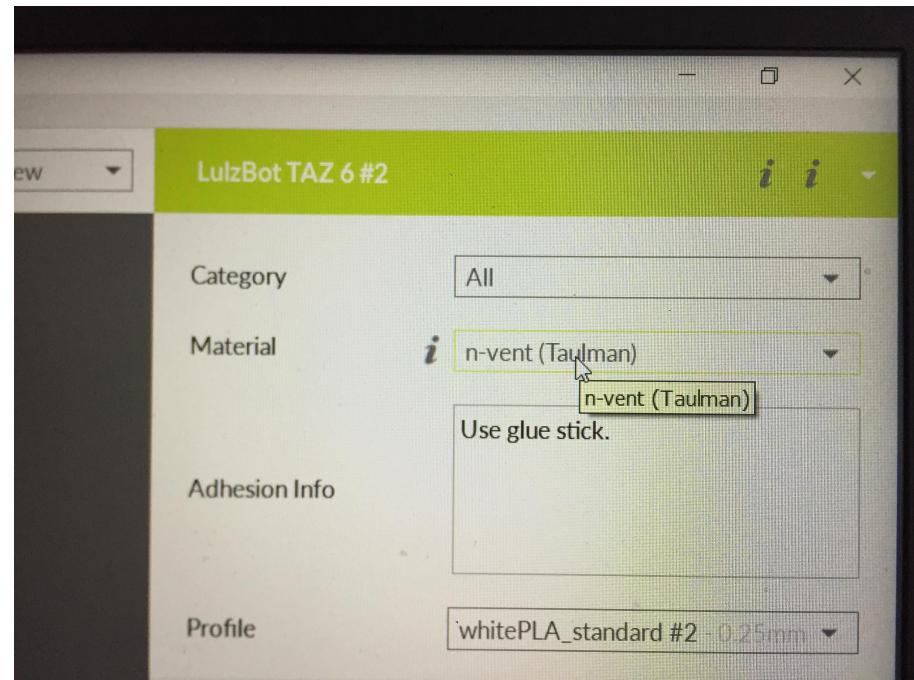
Disable automatic slicing

- A window will pop up
- Untick “Slice automatically”
- Close the pop up window



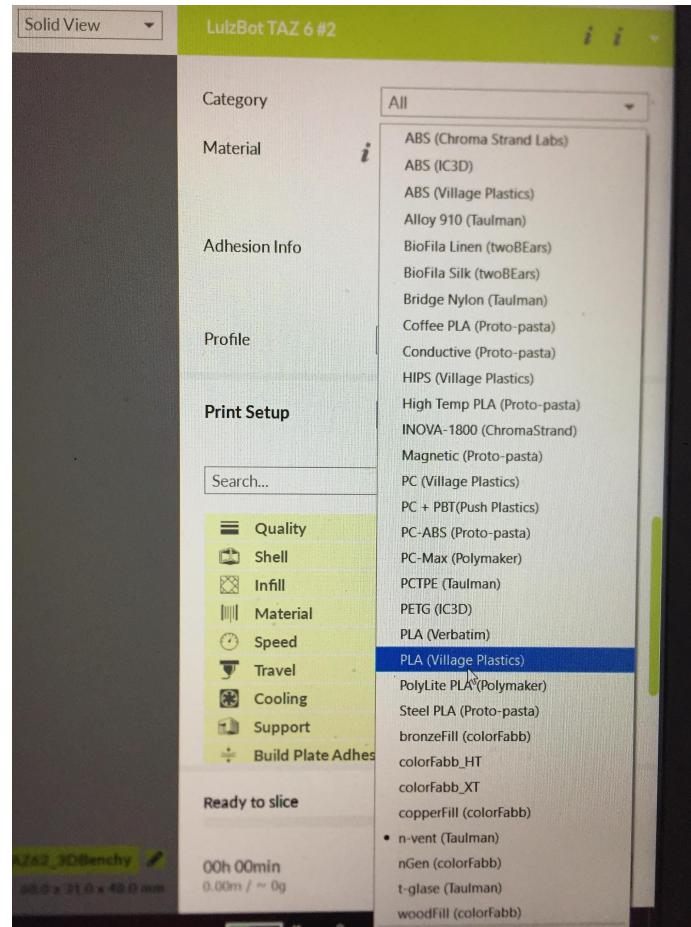
Loading profile

- On the right sidebar, click on Material's drop down menu



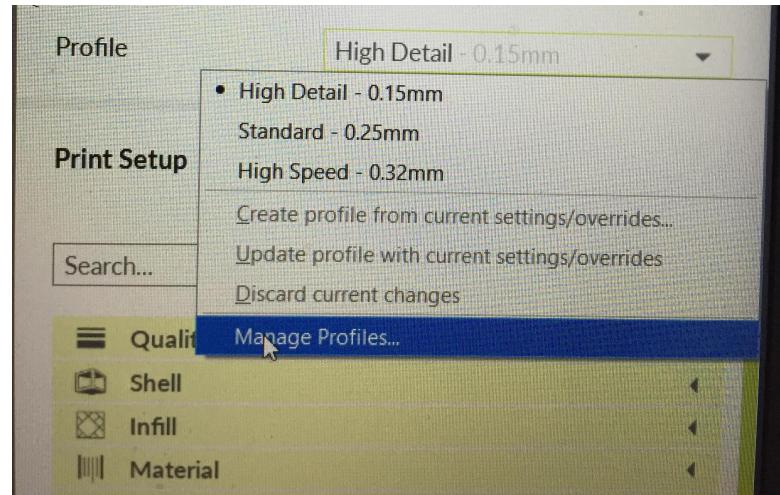
Loading profile

- Change material to “PLA (Village Plastics) ”
 - For a reason, we base most of our own settings on this default material



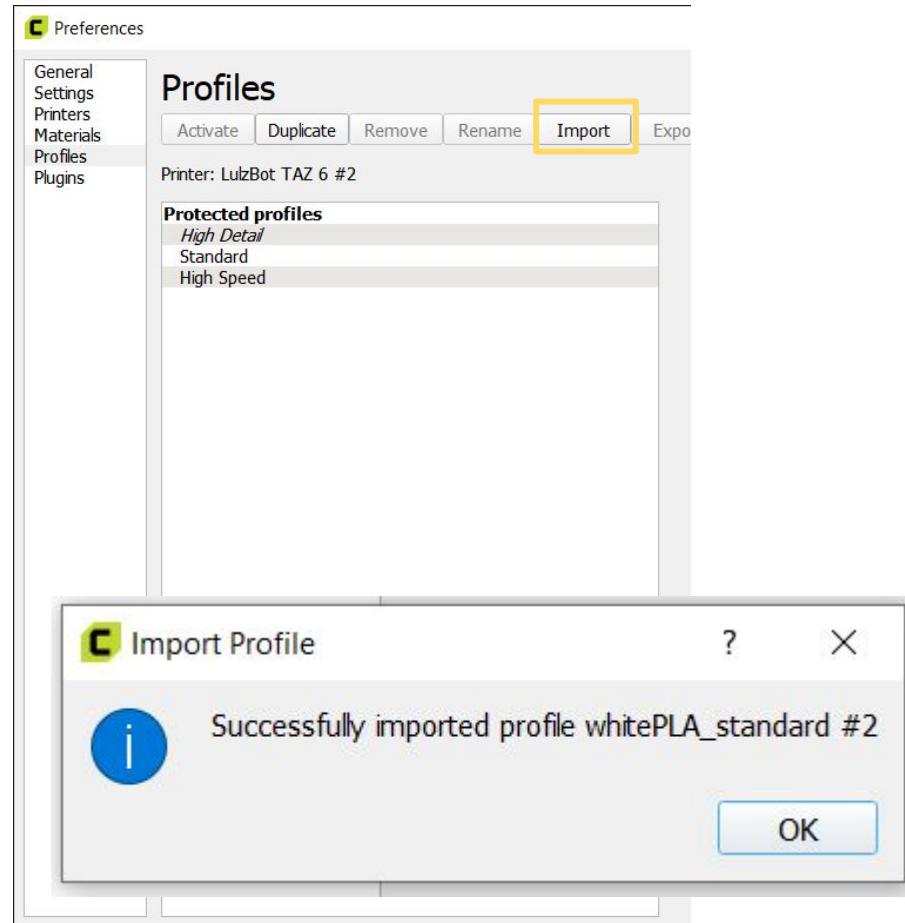
Loading profile

- Click on Profile's drop down menu, then click on “Manage Profiles...”



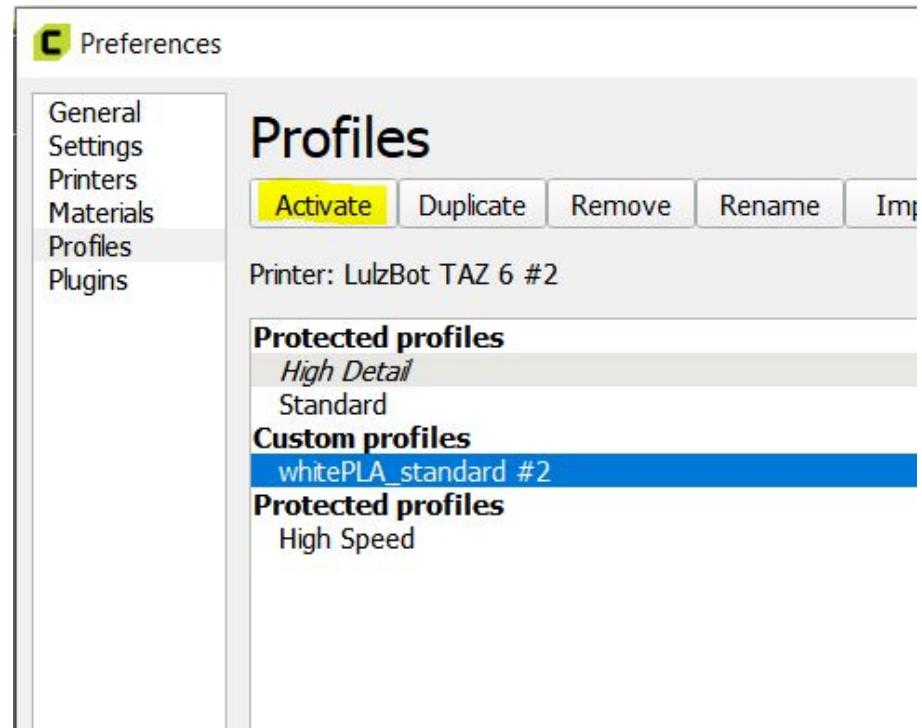
Loading profile

- This window should pop up
- Click on “Import”
- Find the PLA profile you’ve saved from earlier and select it
- A window should pop up once you’ve imported it successfully
- Click “OK” to close that pop up



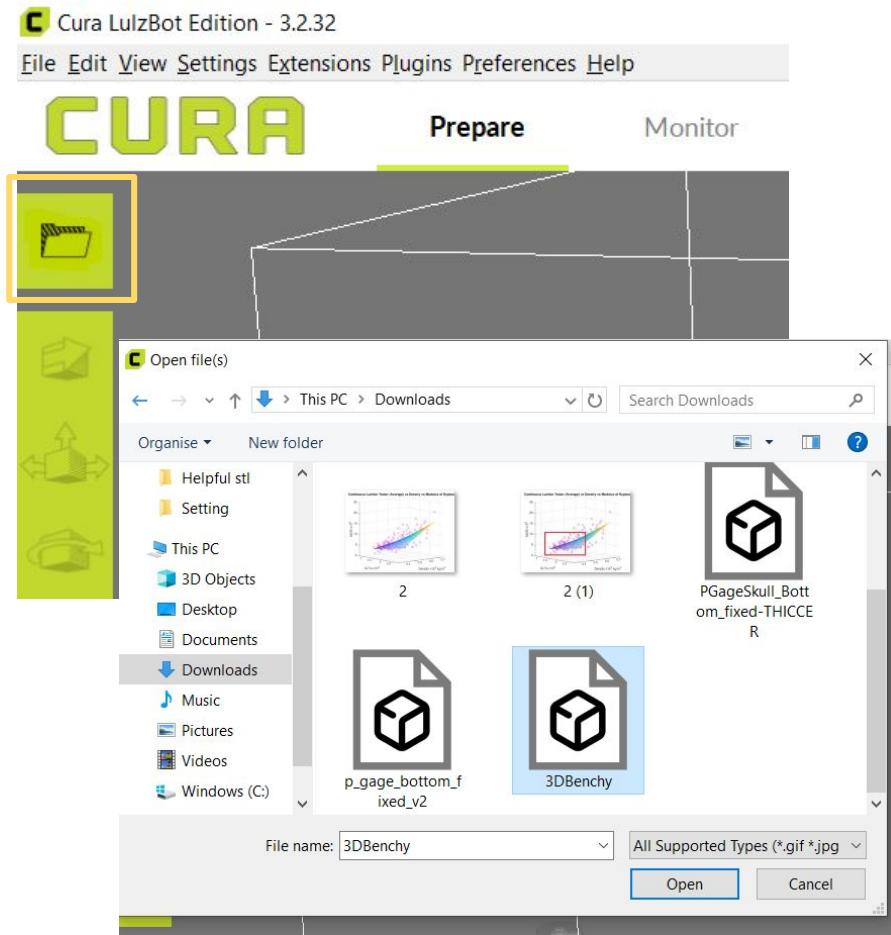
Loading profile

- Click on “Activate” to activate the profile you’ve just imported
- Close the pop up after you’ve activated it



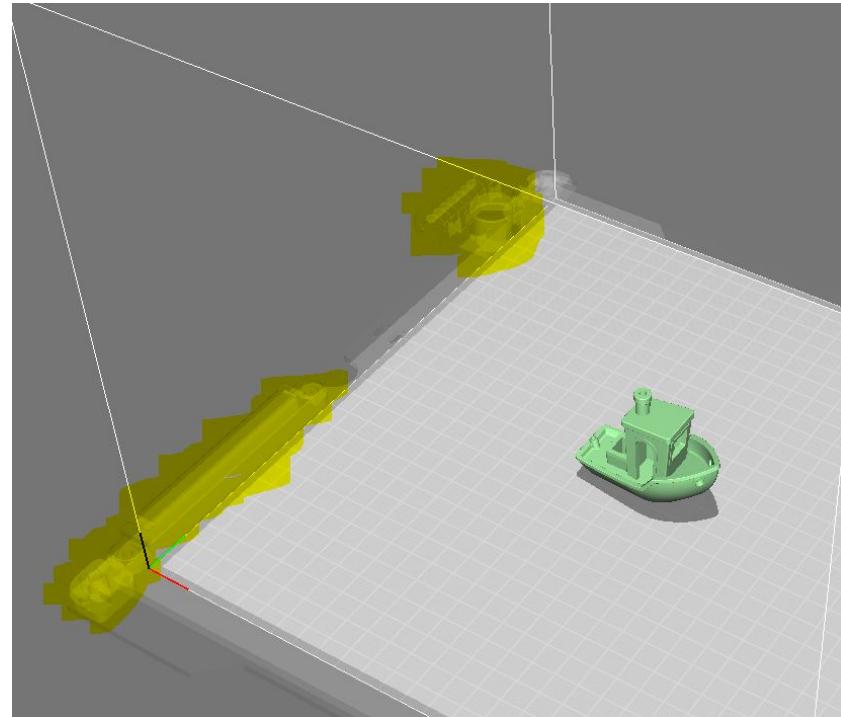
Loading model

- Click on the folder icon on the top left corner
- Select the model you've saved



Loading model

- The model should pop up in the middle of the bed
- Right mouse click to rotate view
- Middle mouse click to move view
- You can use the nozzle wiper and the bed calibration button to reference the position of your model



Loading model

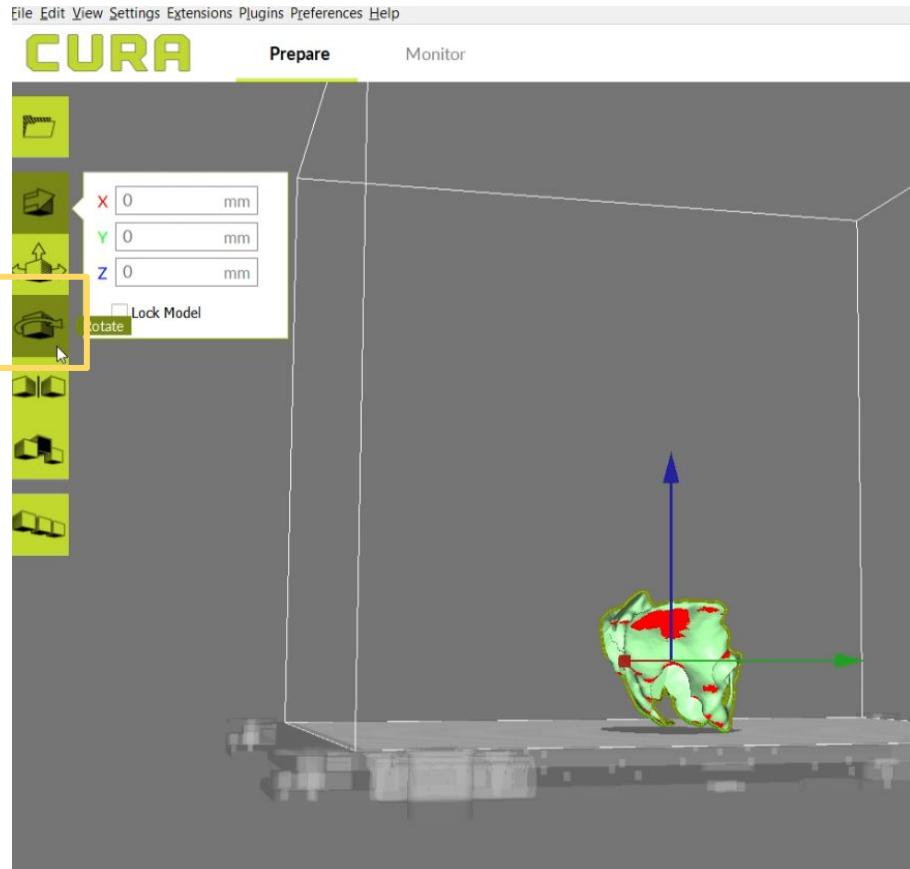
- Click on the icons on the left sidebar to manipulate the model
- You'll mostly use the top three icons
 - Move
 - Scale
 - Rotate

Cura LulzBo
File Edit View



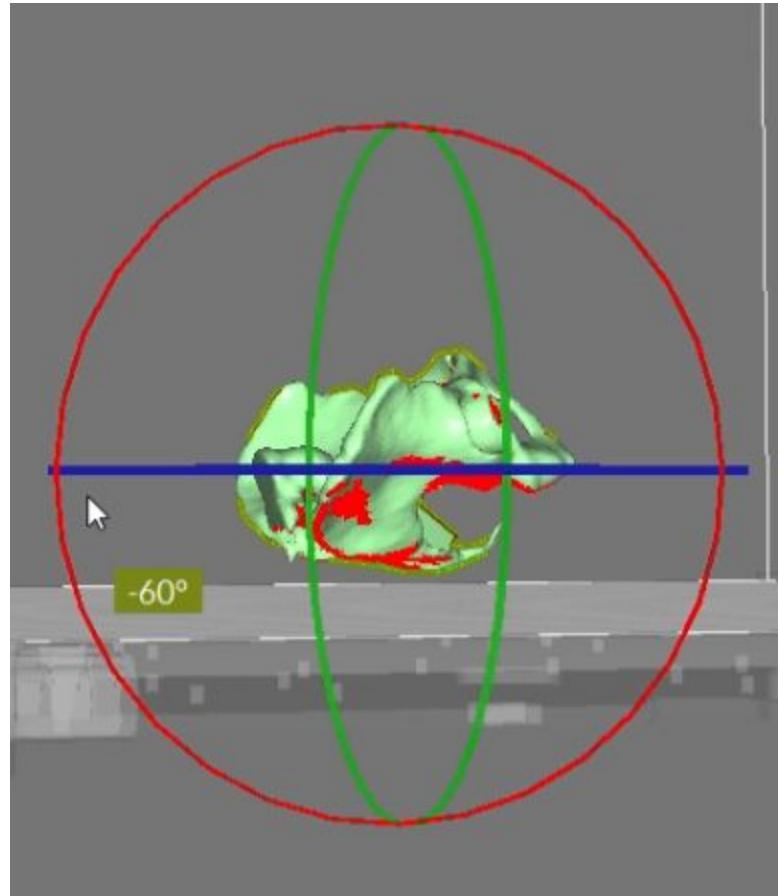
If your model isn't flat

- If your model isn't flat, it might be placed in an orientation that causes it to vibrate more/use more support
 - This happens often with organic shapes like body parts
- Cura has a neat way to rotate it in a way that makes it as flat as possible, so it doesn't vibrate as much/use less plastic for support
- Click on the rotate icon
- I'm using the pelvis model for this example



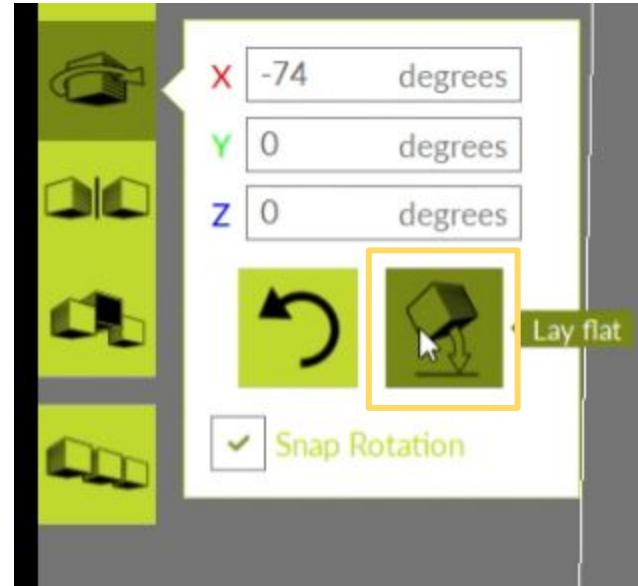
If your model isn't flat

- Rotate it manually to the orientation it is approximately the flattest



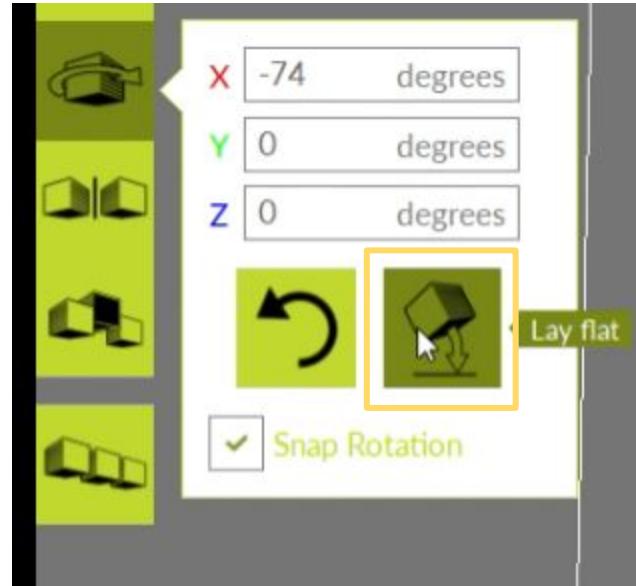
If your model isn't flat

- Rotate pop up as a lay flat feature
- Click on its icon to make it automatically lay flat



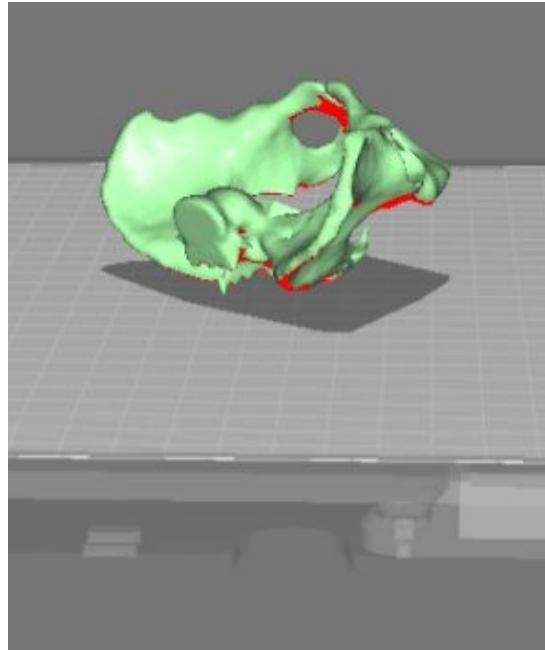
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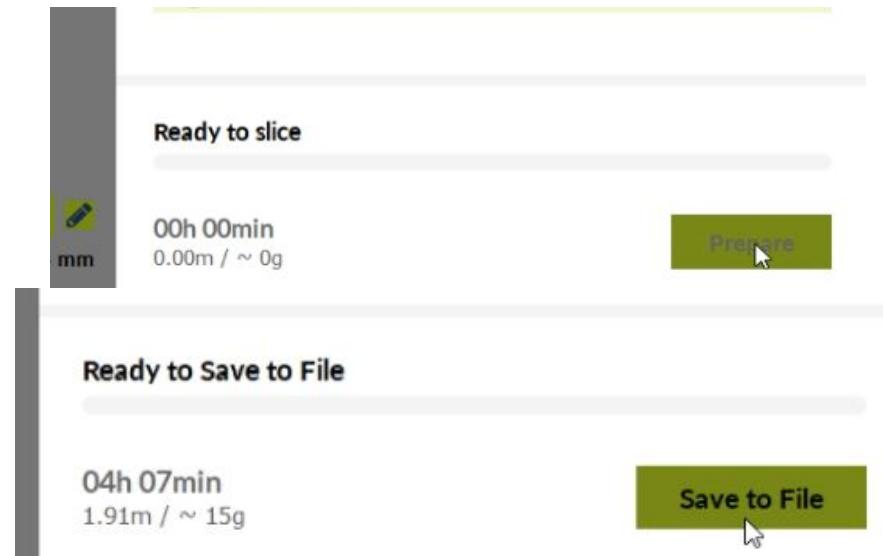
If your model isn't flat

- Rotate your view around to visually check that it's actually flat



Slicing

- On bottom right corner, click on “Prepare”
 - This will start slicing the model
- Once it’s done, you’ll get print time, filament length used, and filament used estimates
- If it’s over ~30g, please find another model
 - Let’s save the plastic
- “Prepare” should be replaced by “Save to File” (or “Save to (SD card directory)”) if you have an SD card connected to your computer)
 - Check if it saves as .gcode
- Save it to an SD card at the printer



Removing item from bed

- Normally, you can just tip the print to make it separate from the bed, or just pull it out
- However, some prints have a large surface attached to bed, so it sticks to bed more, and you can't just pull it out

Removing item from bed

- But if your item has a large surface attached to bed and you can't just pull it out:
- Knife (blue handle, found on bench) in one hand, glove in another
- Hold the item with the hand that has gloves
- Use knife to go under the print surface where the item attaches to bed
- Either flick it out (cantilever), or slice it out (glide blade along the bed)
- Be careful of damaging the print's bottom surface when using a knife

Safety

- Since you'll be using a knife to remove stuff from bed, we have to talk about safety
- Key points:
 - If you have something sharp in one hand, put gloves in the other
 - Don't directly touch hot stuff
 - Don't hesitate to call me if there's any issues
 - My number: 778-927-7563

Safety

- If you ever forget, here's where you can find the safety sheets
 - github.com/rprakitpong/HIVE-3Dprinters under "HIVE-3Dprinters" -> "Taz 6" -> "Documentations" -> "Maintenance" -> "Info sheets" -> "Super simplified safety sheet pdf.pdf"
 - Also located above the printer



Starting a print

- Facing the printer on your left side (right side of printer), there is an LCD screen, a power switch, and a scroll knob
- Around the corner, there's an SD card slot
- Put the SD card in

Image from youtu.be/lojprD2KvnU



Starting a print

- Turn on power switch and the power switch should light up red
- The LCD screen should light up like this

Image from youtu.be/lojprD2KvnU



Starting a print

- Press on the knob once to go to list of actions
- Turn the knob to scroll to “Print from SD”
- Press on the knob to click

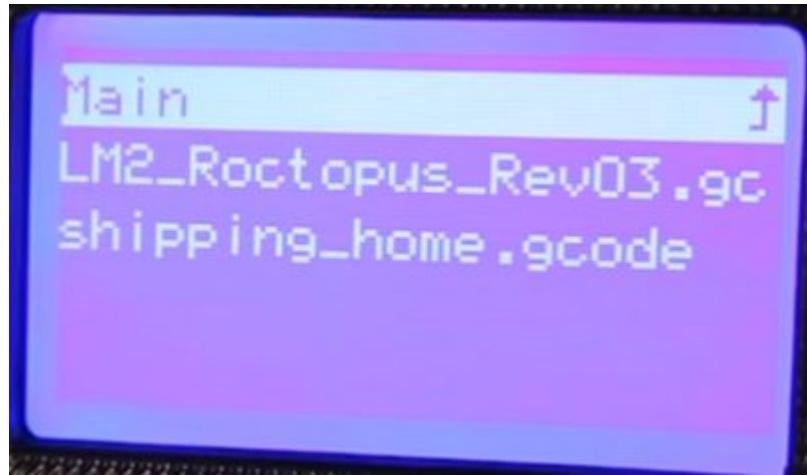
Image from youtu.be/lojprD2KvnU



Starting a print

- Turn the knob to scroll to the .gcode you've save to the card
- Press on the knob to select it

Image from youtu.be/3xa5F_WooU4



Print started

- Your print is started!
 - There's a bit of information on the LCD
 - You don't have to worry about these
 - It's quite automatic once we have the right profile for the filament
- Good practice to watch your first layer being printed, for if...
 - Plastic doesn't stick to bed
 - Weird temperature bump (ex: heat bed automatically jump to higher temperature)
 - Plastic bits ripping up stuff that already stuck to bed

