//3D PRINT YO BRAIN
//By Keiland C
//nov16 vs

//Programs needed:
//Freesurfer -open source mri software
//MRIcron (needs NIFTI format) or matlabs version -easily convert images
//meshlab or autodesk -open source still viewer and manipulator

//links
https://en.wikipedia.org/wiki/Magnetic_resonance_imaging
http://freesurfer.net/
***http://freesurfer.net/fswiki //this was the most helpful
https://surfer.nmr.mgh.harvard.edu/fswiki/recon-all //this details the all in one step, it describes in more detail what it is doing, perfect if you want to customize a step
http://people.cas.sc.edu/rorden/mricron/index.html
https://www.mathworks.com/matlabcentral/fileexchange/42997-dicom-to-nifti-converter--nifti-tool-and-viewer
http://meshlab.sourceforge.net/
http://www.autodesk.com/

//Convert the images, freesurfer gets weird with dicoms for some-reason
//test out different micron settings, this will depend on the type of scanner used
//I think i ended up going with **SFL/SPM8** , I need to read up

more on this though
//something funny happens with dti vs normal imaging around this or the next step

//freesurfer code:
//I had to move the free surfer install to the documents folder due to permissions errors
//sudo wouldn't fix it…
//use the mail archives to fix errors
https://mail.nmr.mgh.harvard.edu/pipermail//freesurfer/2012-July/024750.html
//make sure the tutorials work on your machine, this could save a lot of time (trust me)
//recon-all is amazing and will automate pretty much everything,
//especially the scull stripping stage
//(it seems mri scientists are fairly lazy as well)
//check the docs if need to segment out or edit the process

**recon-all -s {your name here} -all -i {path to your newly converted file}**

**//**this will process for awhile (no really, took like 16+ hours on my mbp)
//and then save a folder that you named after yourself,
//into the subjects folder

**//**to convert pial to stl etc.

**mris_convert {path to freesurfer}/subjects/mybrain/surf/rh.pial rh.stl**

//use the same code with the lh.pial to lh.stl

//import the stl's into meshlab or whatever software you choose
//run a smoothing algorithm on it and maybe reconstruct if the file is unseemly large

//It's best to print hemisphere by hemisphere, then glue

//TODO

//figure out how to print the cerebellum with free surfer,
//(i don't want the 3d me to be shaky)

https://mail.nmr.mgh.harvard.edu/pipermail//freesurfer/2016-May/045371.html
//use mri_tessellate?
https://surfer.nmr.mgh.harvard.edu/fswiki/mri_tessellate
https://surfer.nmr.mgh.harvard.edu/fswiki/tessellate

//figure out the problems with the DTI anatomy images,
https://mail.nmr.mgh.harvard.edu/pipermail//freesurfer/2012-July/024750.html
//print the DTI connectome?!?!?!?!?!?!?