OPEN SOURCE IN 3D PRINTING

WHAT IS 3D PRINTING?

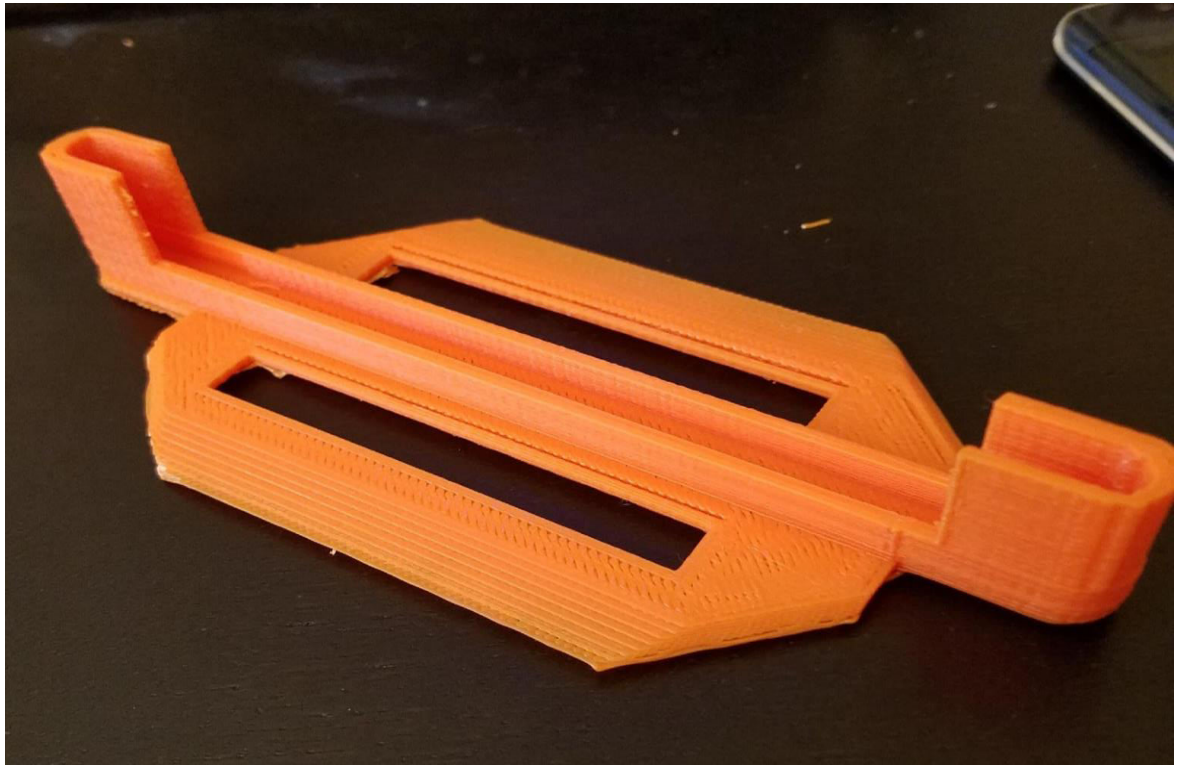
HOW IT WORKS

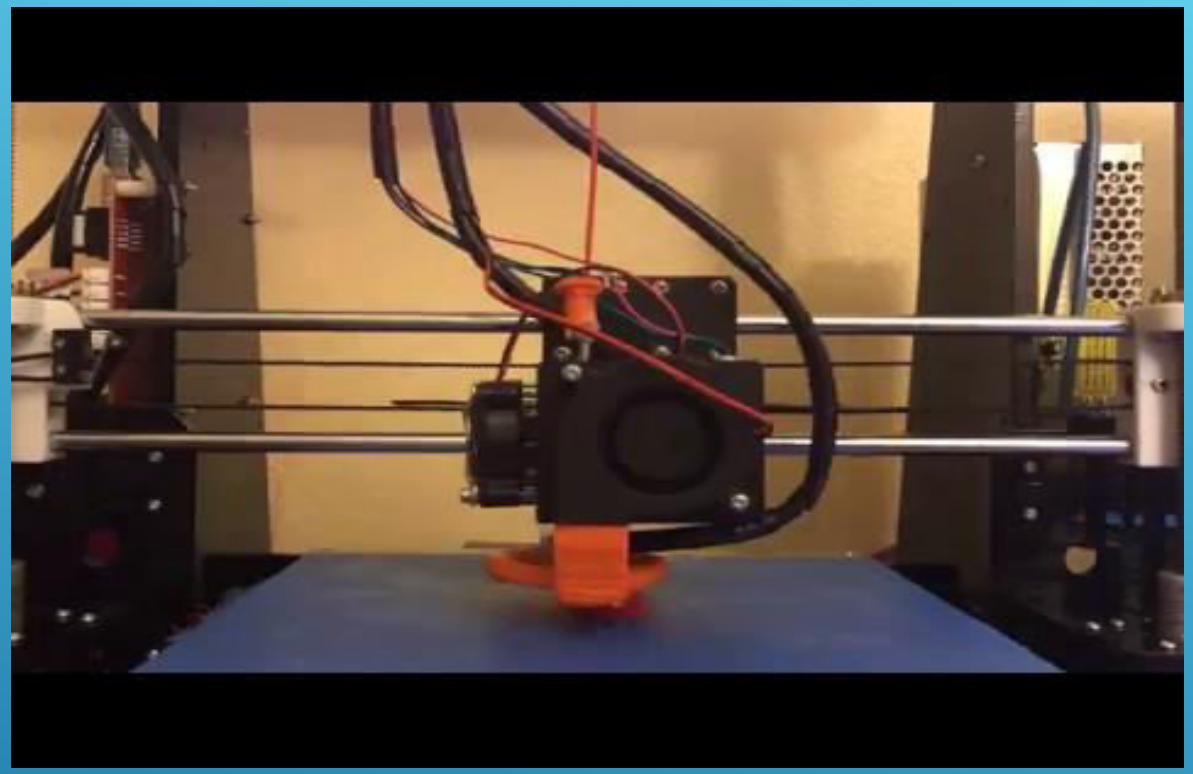
1. Grabs information from computer, on-board system, SD card
2. Prepares filament for printing
3. Heats extruder to desired temperature
4. Prints object

STEPS IN 3D PRINTING

- 1. Create object in CAD (Computer Assisted Design)
- 2. Convert the object into STL (standard tessellation language)
- 3. Open the STL file in a program that controls the 3D Printer
- 4. "Slice" or process the STL file into G-code for the printer to map out its strokes
- 5. Ready the printer for printing (loading filament, checking the belts, cleaning the build bed)
- 6. Print the object
- 7. Remove the object from the build plate
- 8. Use the print in your intended purpose

AFTER PRINTING





Timelapse of calibration print

PLA (Polylactic Acid)

Metal

ABS (Acrylonitrile butadiene styrene)

Wood

COMMON TYPES OF FILAMENT

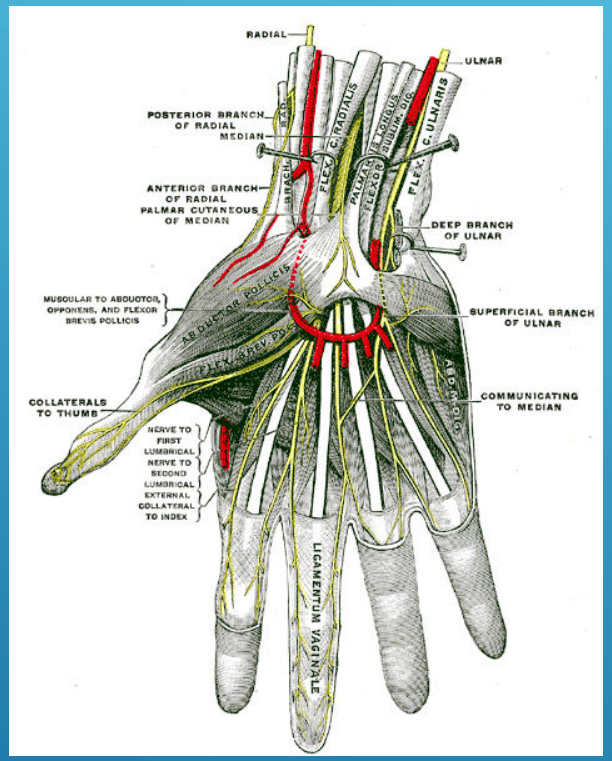
DEMONSTRATION OF SOFTWARE

- TinkerCAD
- Repetier-Host
- Slic3r

YOUR TURN!

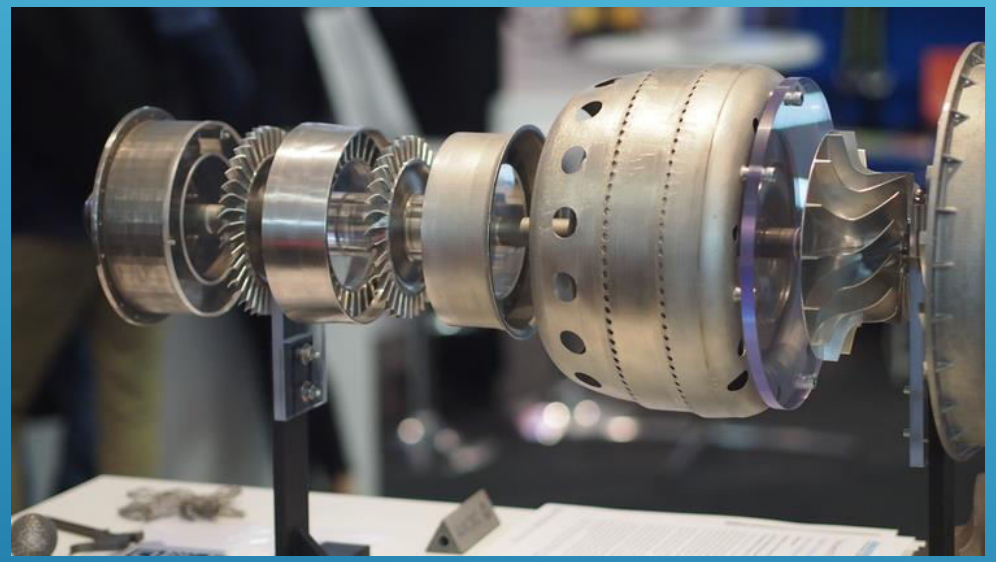
- Go to https://www.tinkercad.com/
- Create an AutoDesk account
- Create your object!

BENEFITS OF 3D PRINTING



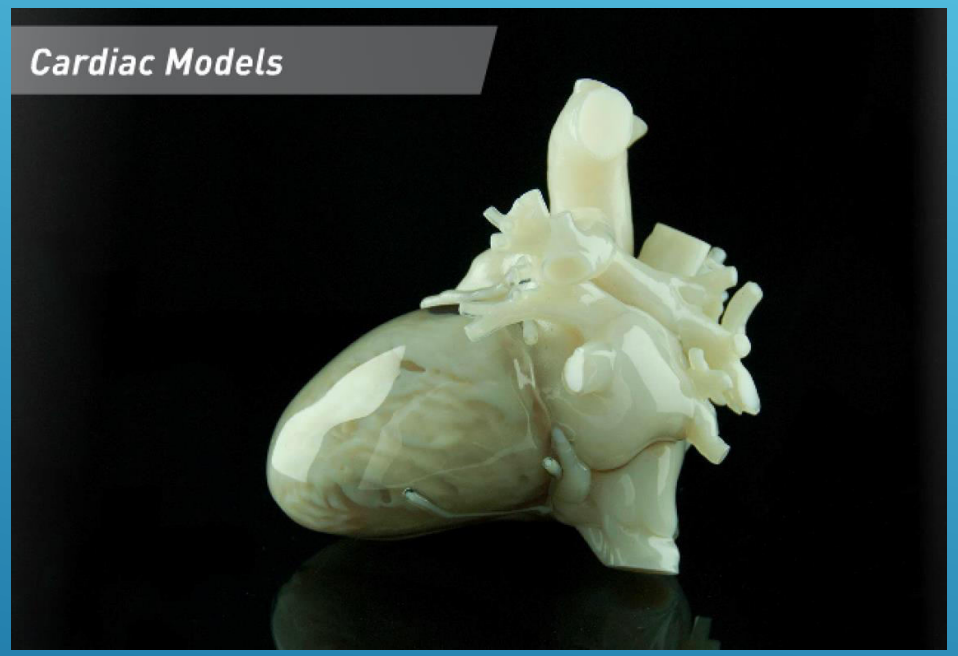
3D Printing may potentially assist Medical Students

Education



First 3D Printed Jet Engine

Engineering



Doctors may potentially use 3D printed models to find anomalies in the body

Medical

Art

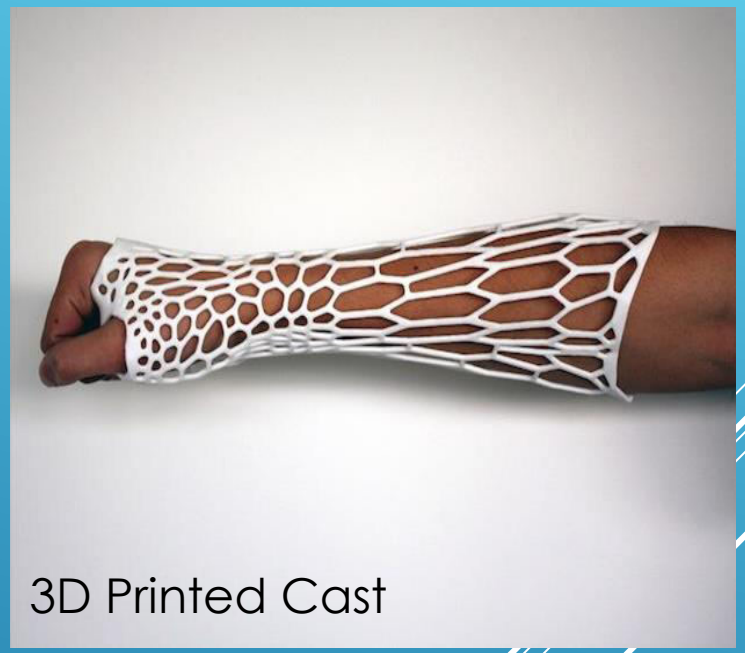
3D Printed Pangolin Art

Credit: Hairy Lion by _primoz_

DOWNSIDES

- Copyright and intellectual infringement
- Ability to manufacture illegal goods at home

DO THE BENEFITS OUTWEIGH THE DOWNSIDES?



YES, YES THEY DO

OPEN SOURCE: REPRAP

RepRap – Rapid Replication

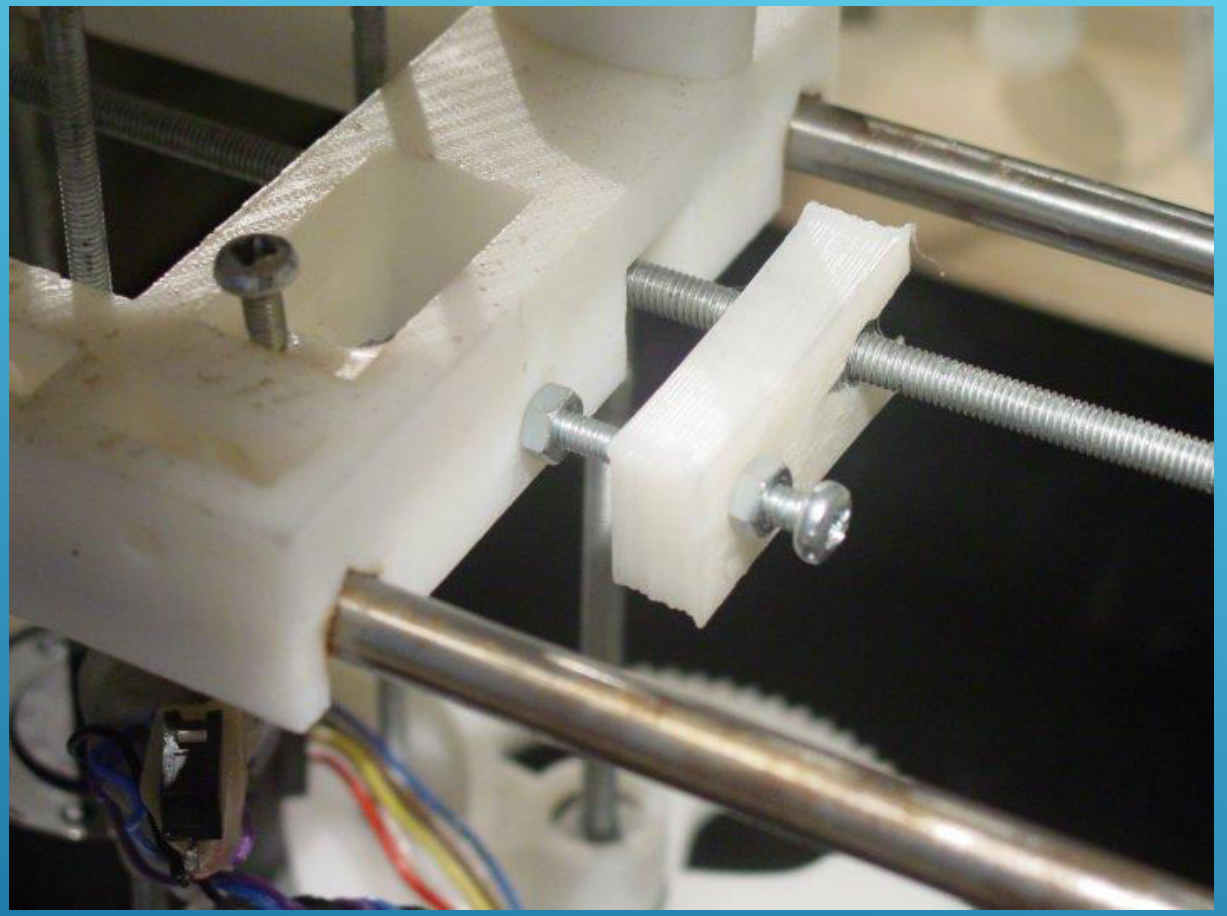
- Open Source community
- Goal: Develop a 3D printer that is able to produce a pure self-replicating device for it to be accessible for anyone
- Self-replication machine

Examples

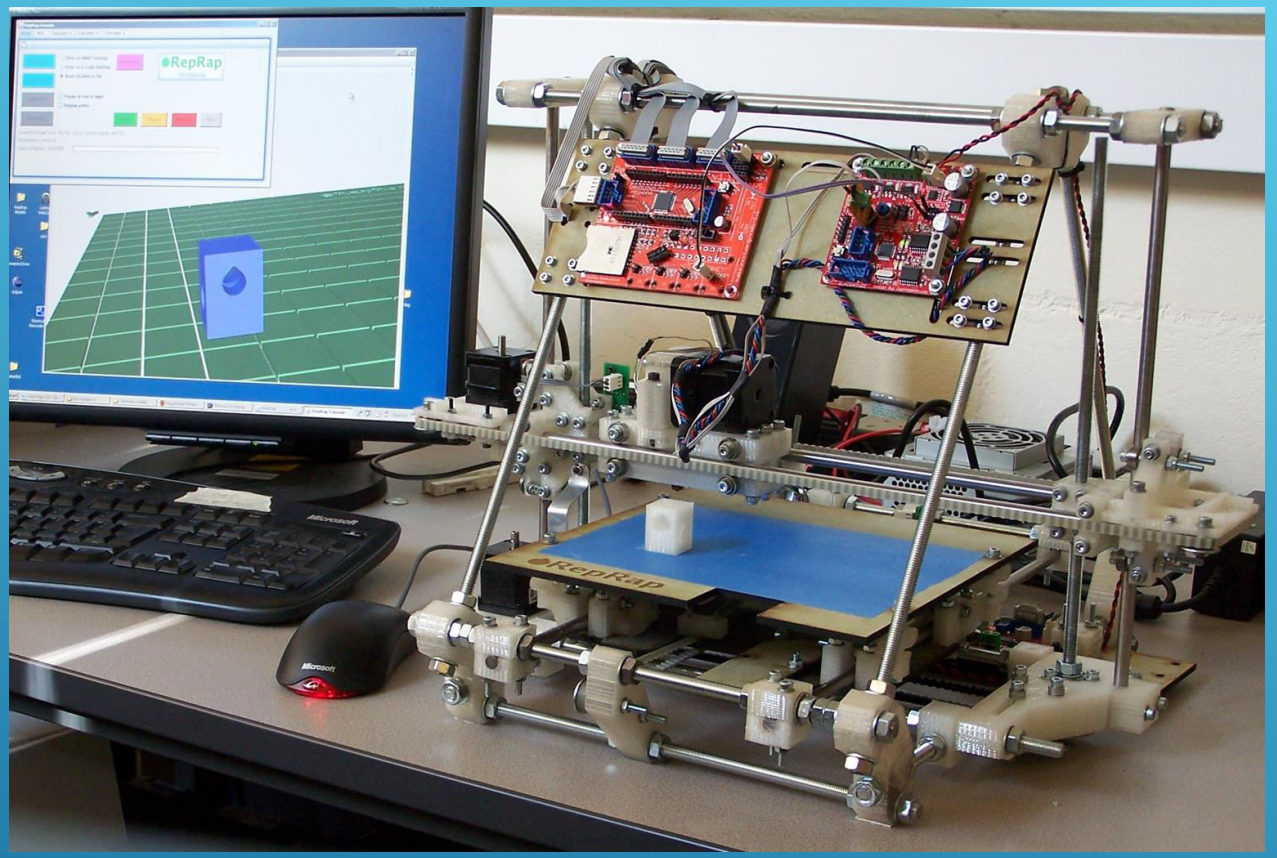
- Prusa i3
- Darwin
- Mendel

HISTORY

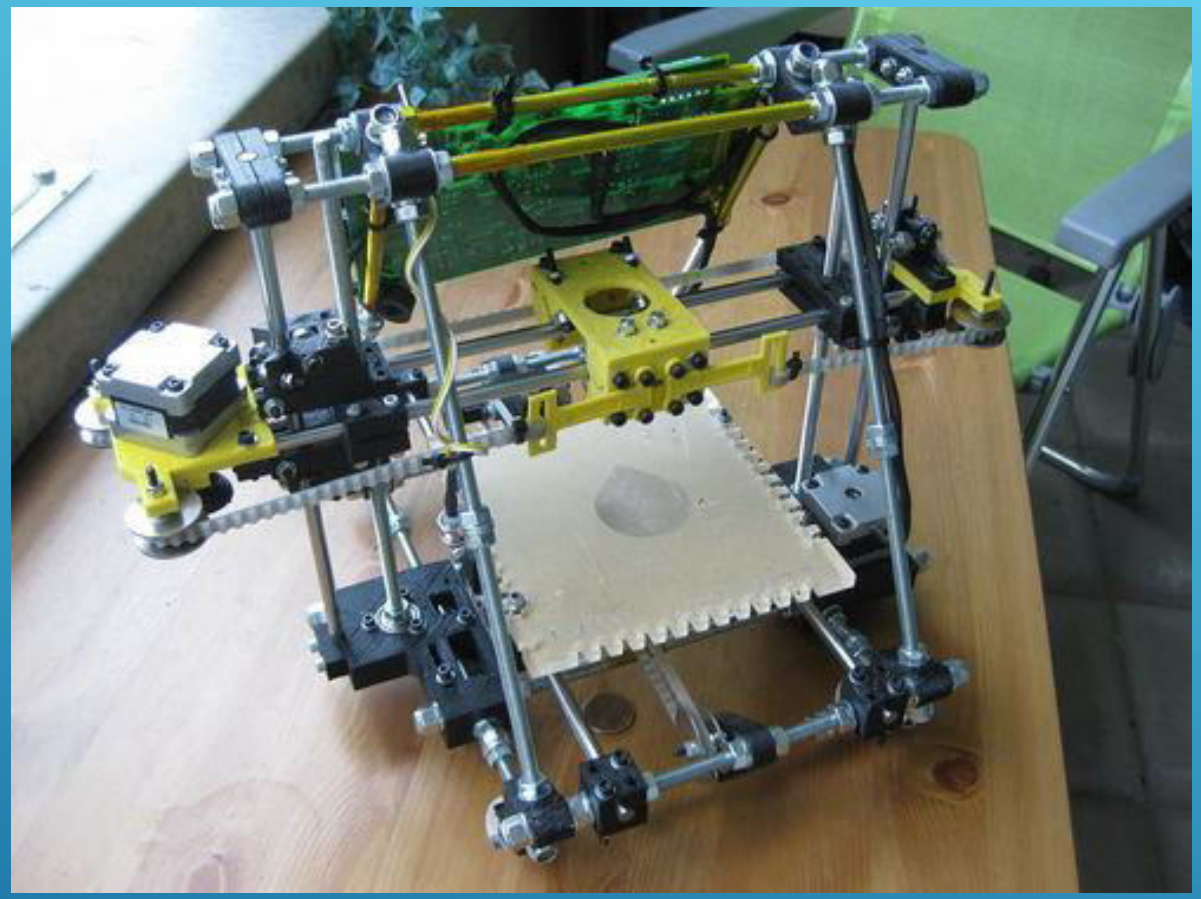
- Founded in 2005 by Dr. Adreian Bowyer, a mechanical engineering lecturer at the University of Bath in England
- Sept. 13 2006 – RepRap 0.2 prototype [Zaphod prototype] printed the first part of itself
- April 14 2008 – The first user item is made by a RepRap: A clamp for the iPod to attach to a Ford Fiesta's dashboard
- Oct. 2 2009 – RepRap 2.0 [Mendel] printed its first part
- Aug. 31 2010 – RepRap 3.0 [Huxley] was named and developed



REPRAP'S FIRST PART



REPRAP MENDEL



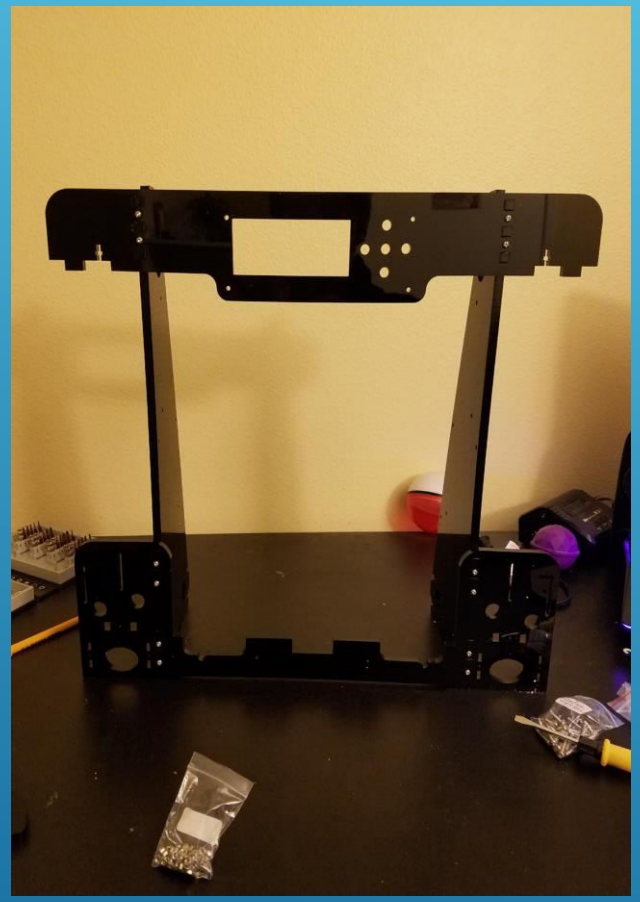
REPRAP HUXLEY

BENEFITS OF OPEN SOURCE 3D PRINTING

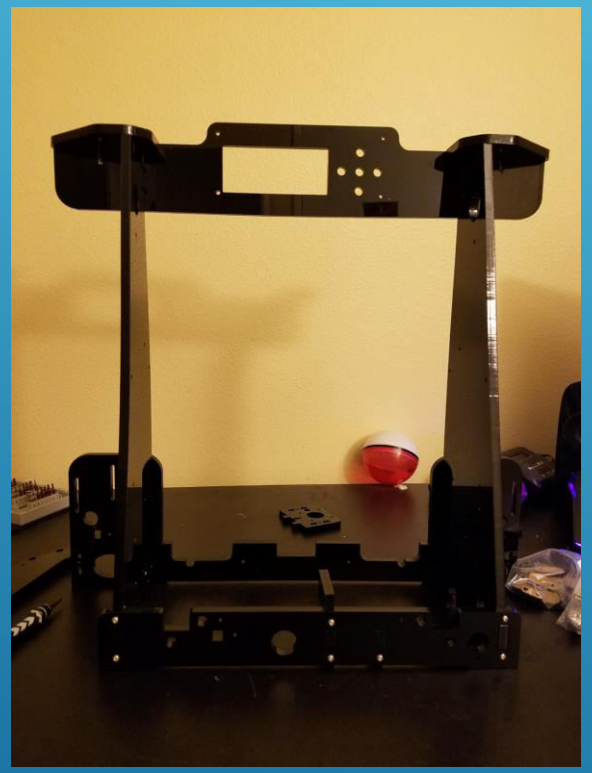
- Accessible
- Affordable
- Documentation
- Ability to “evolve”

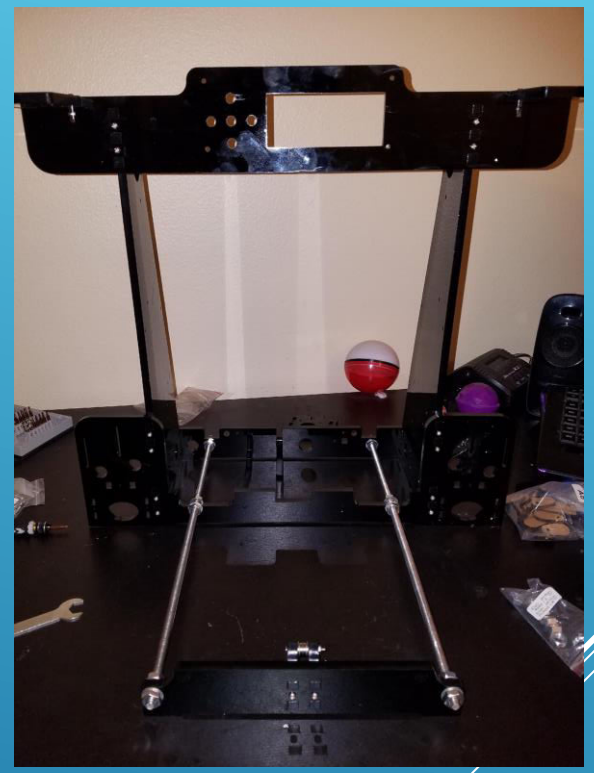
- Developer: Josef Prusa
- Parts can be found on GitHub as STL files
- One of the most popular designs
  - Many derivatives (ex. Anet a8, mini i3, Graber i3)

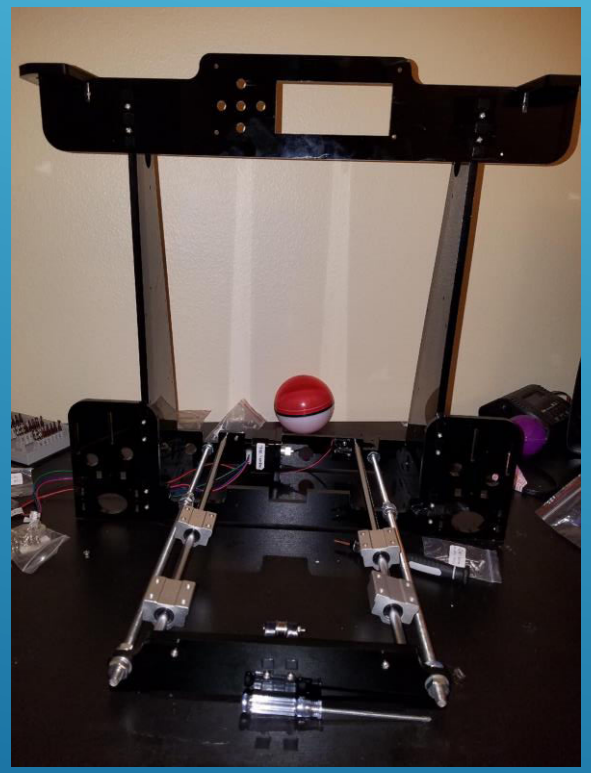
PRUSA I3

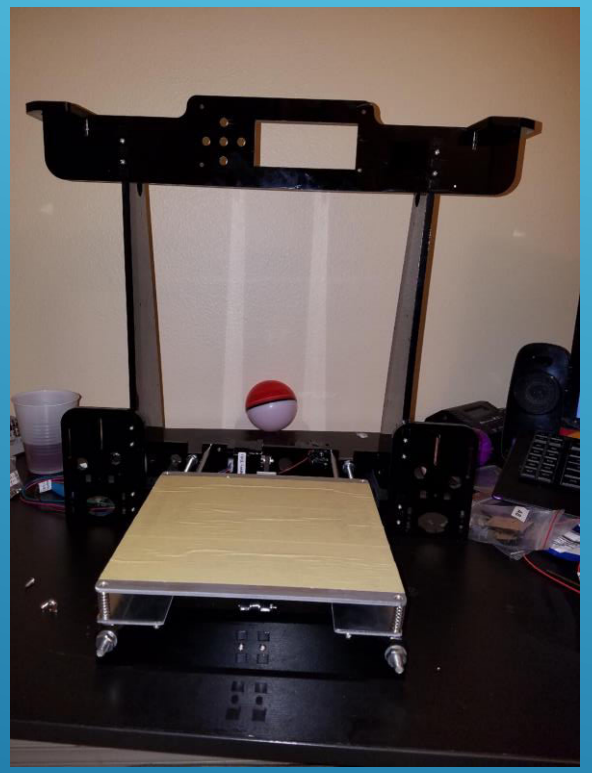


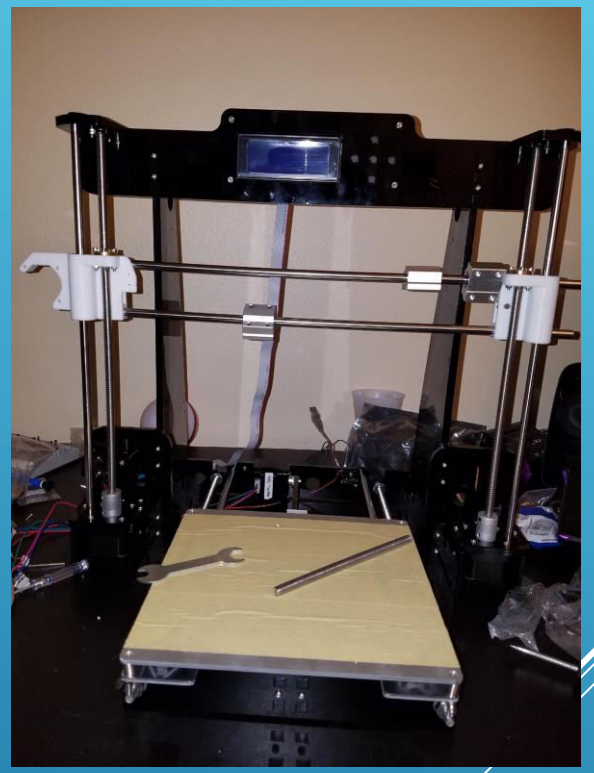
My Attempt (Anet A8)

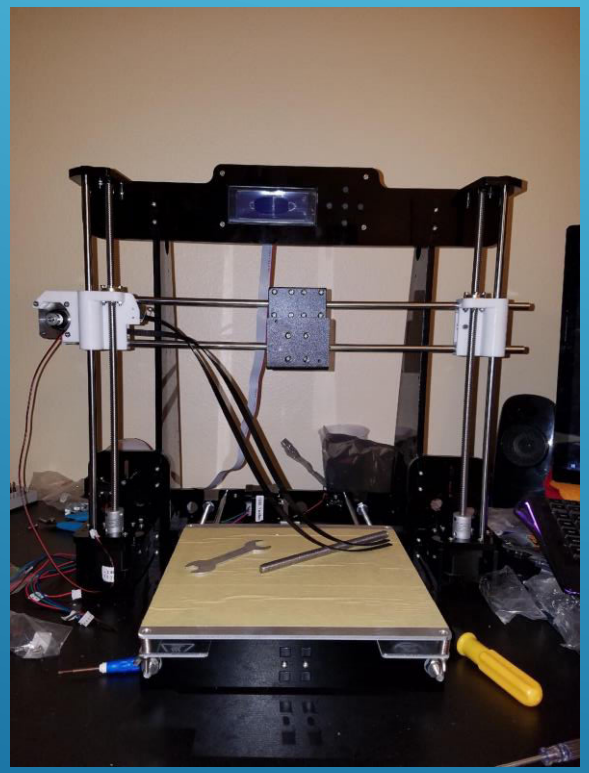


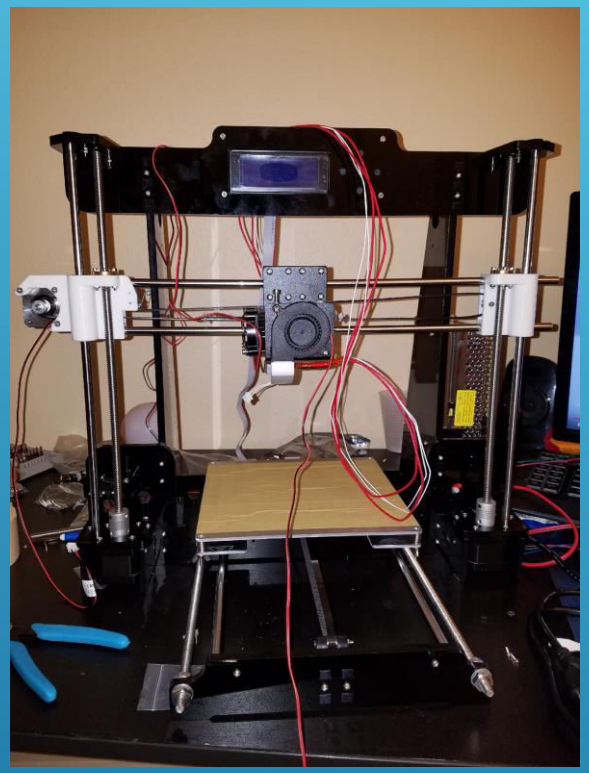


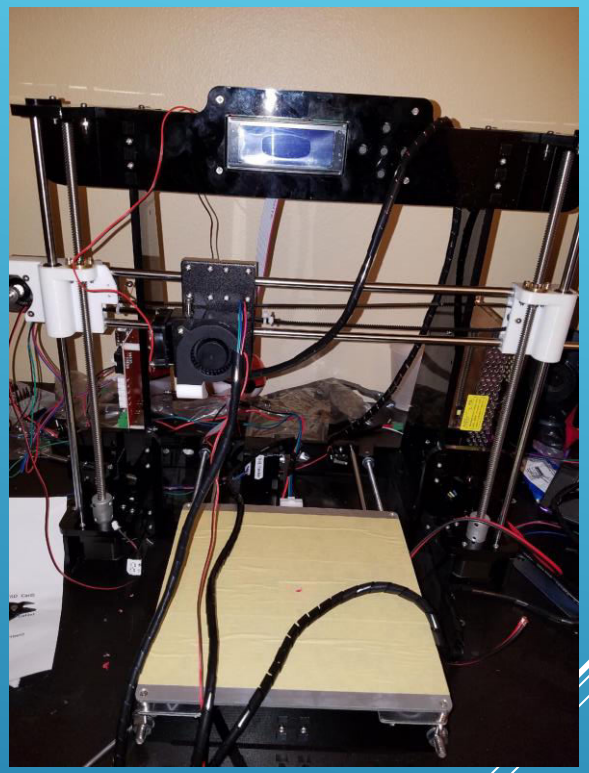


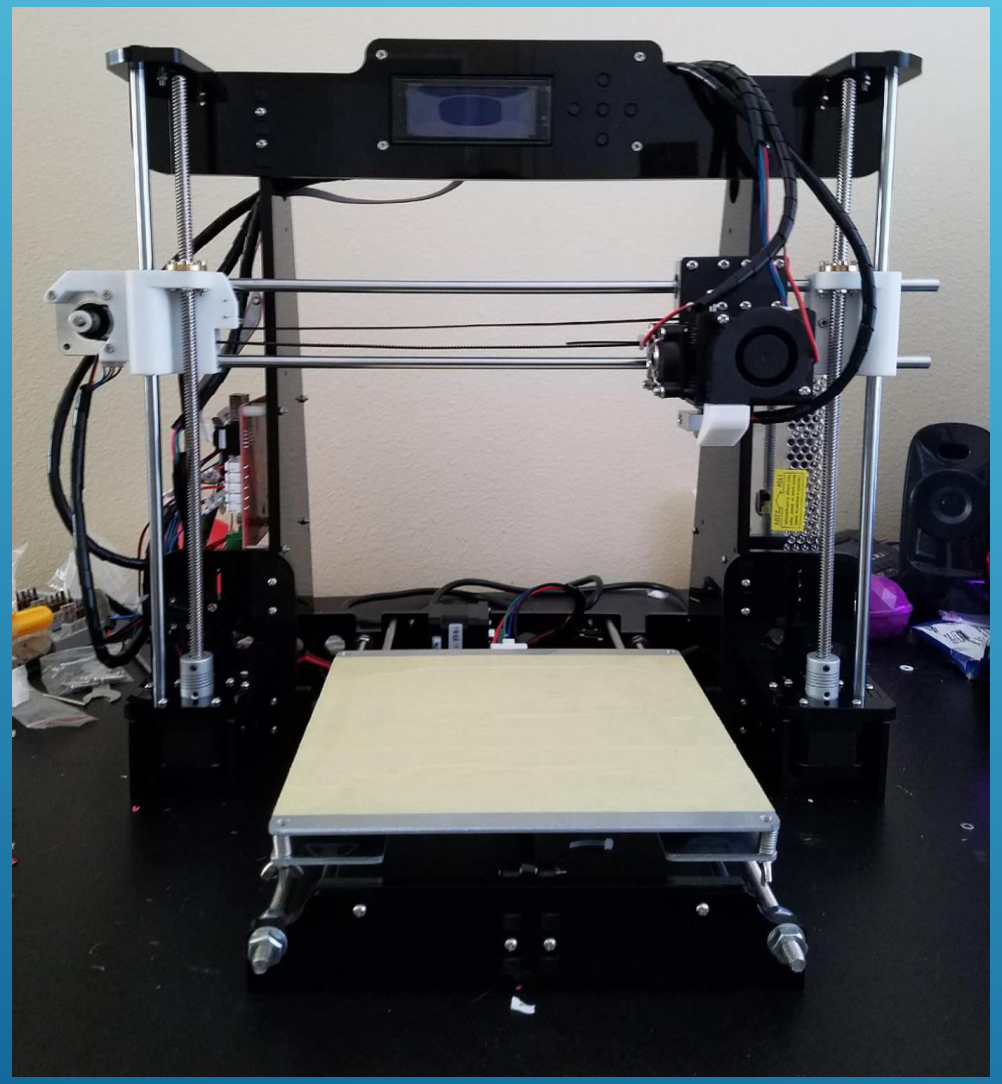






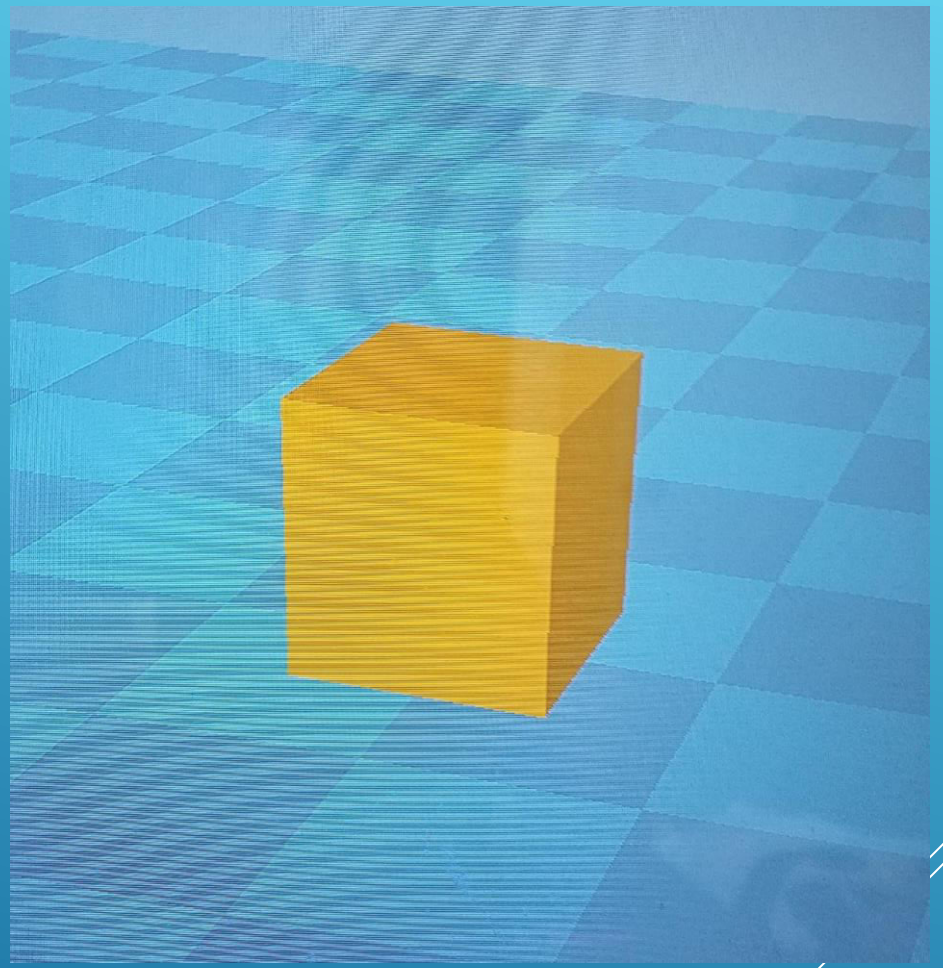


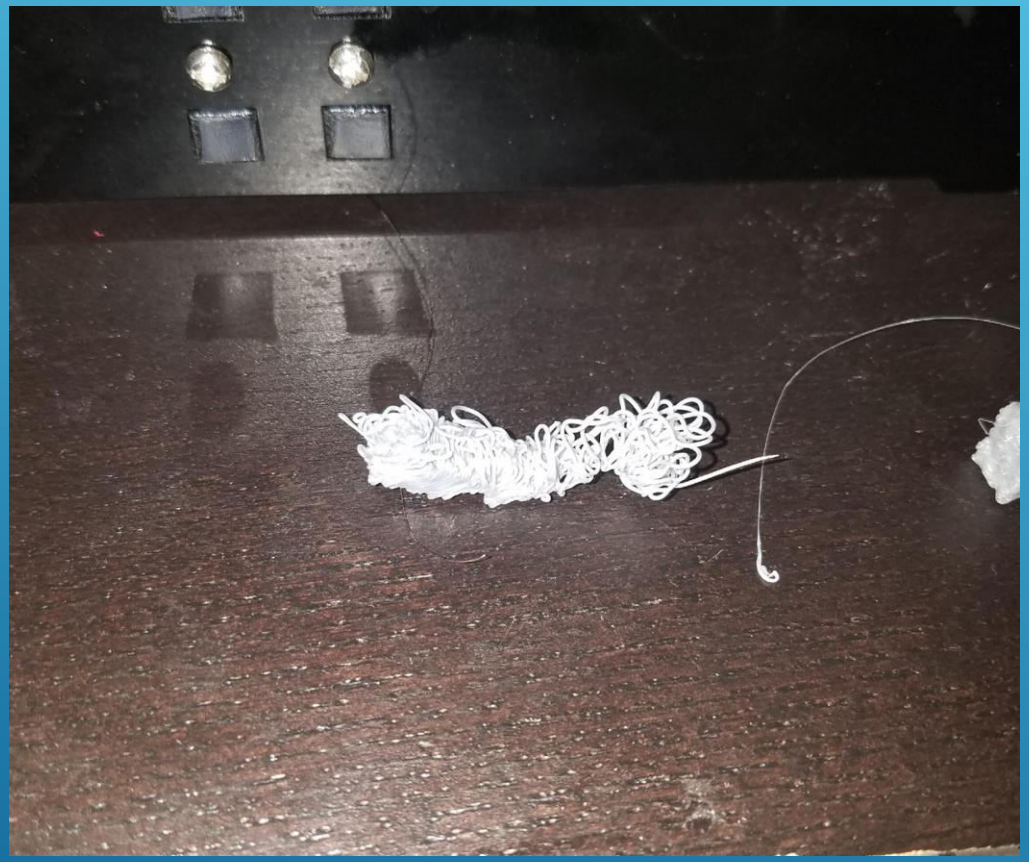




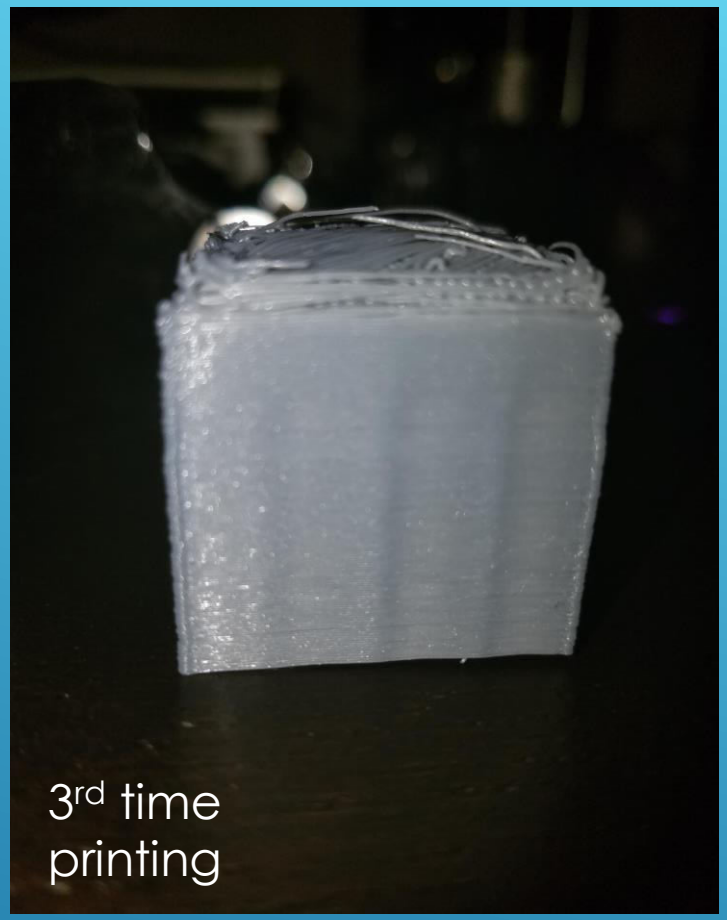
FINISHED (TOTAL TIME: ~13 HRS)

FIRST PRINT: 4MM CALIBRATION CUBE

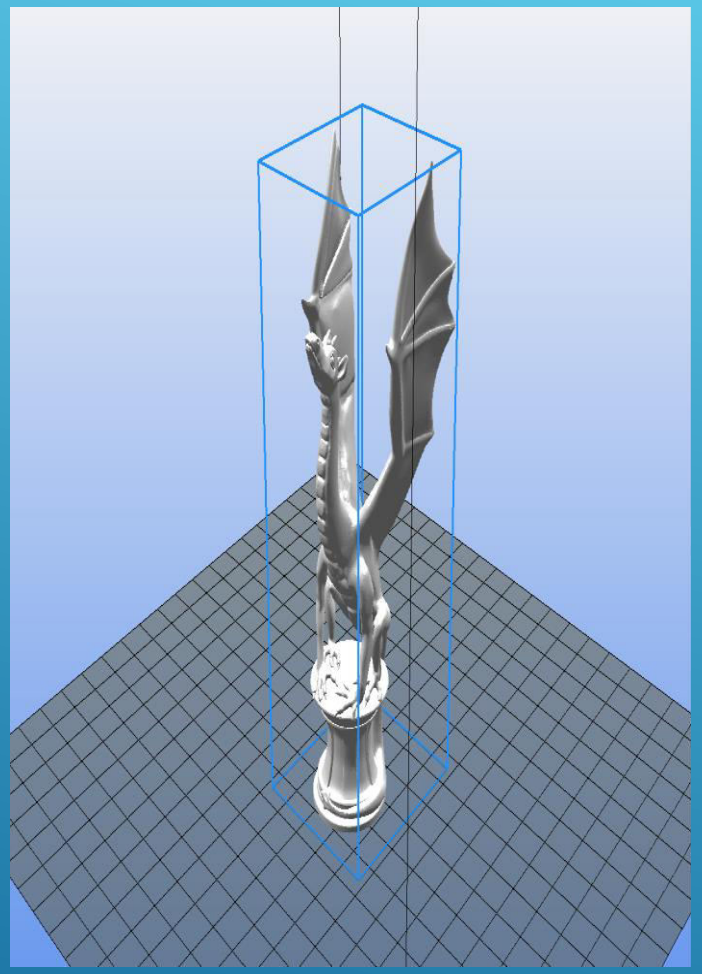




FACT: 3D PRINTING ISN'T PERFECT!

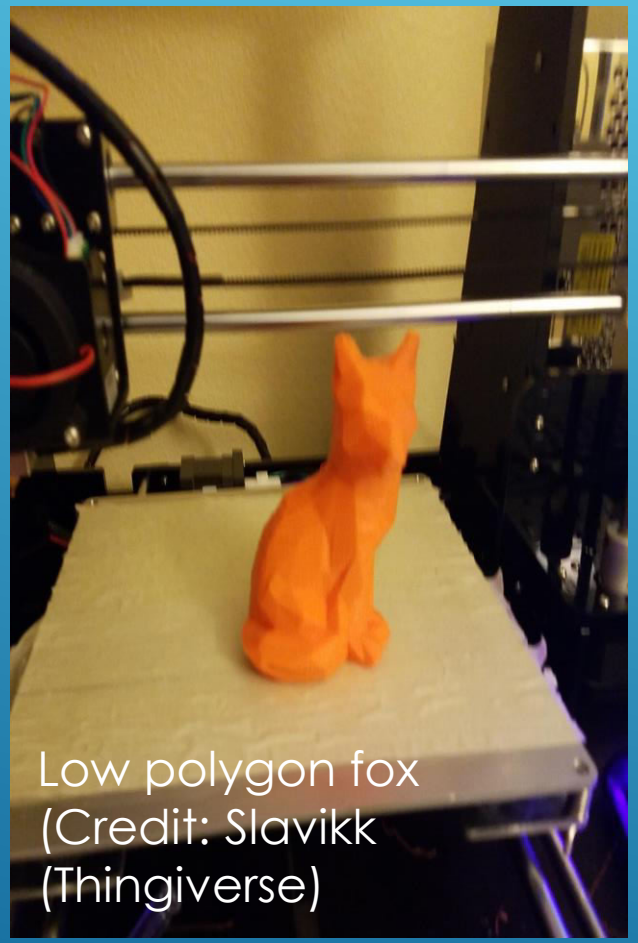


MORE PRINTS (AND CALIBRATIONS)



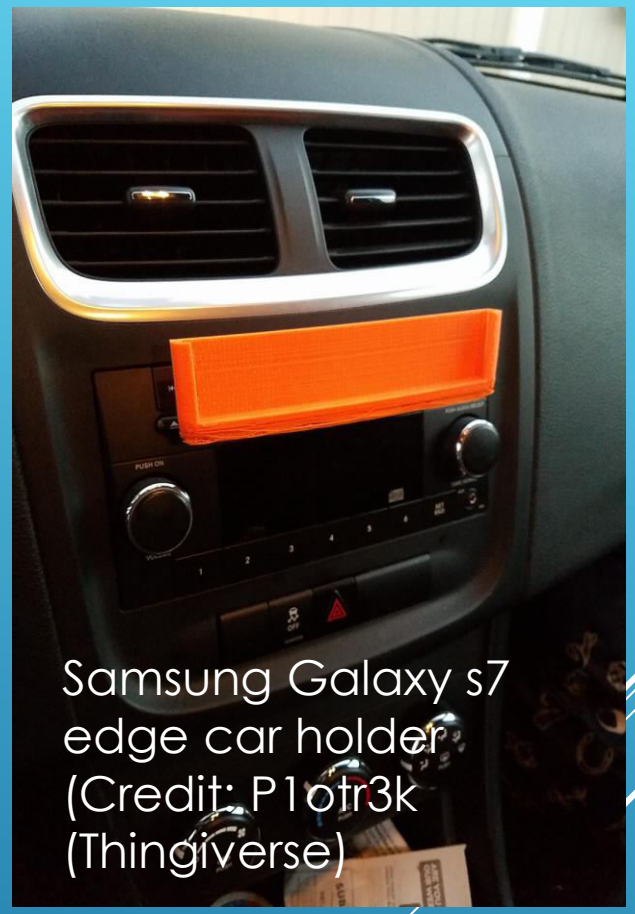
ATTEMPT AT DRAGON

Aria the Dragon (Credit: Loubie from Thingiverse



Low polygon fox
(Credit: Slavikk
(Thingiverse)

Low polygon dog
(Credit: 3DWP
(Thingiverse)



Samsung Galaxy s7
edge car holder
(Credit: P1otr3k
(Thingiverse)

MORE RECENT PRINTS

Credits

- Thingiverse
- Repetier-Host
- Slic3r
- Autodesk

Q&A