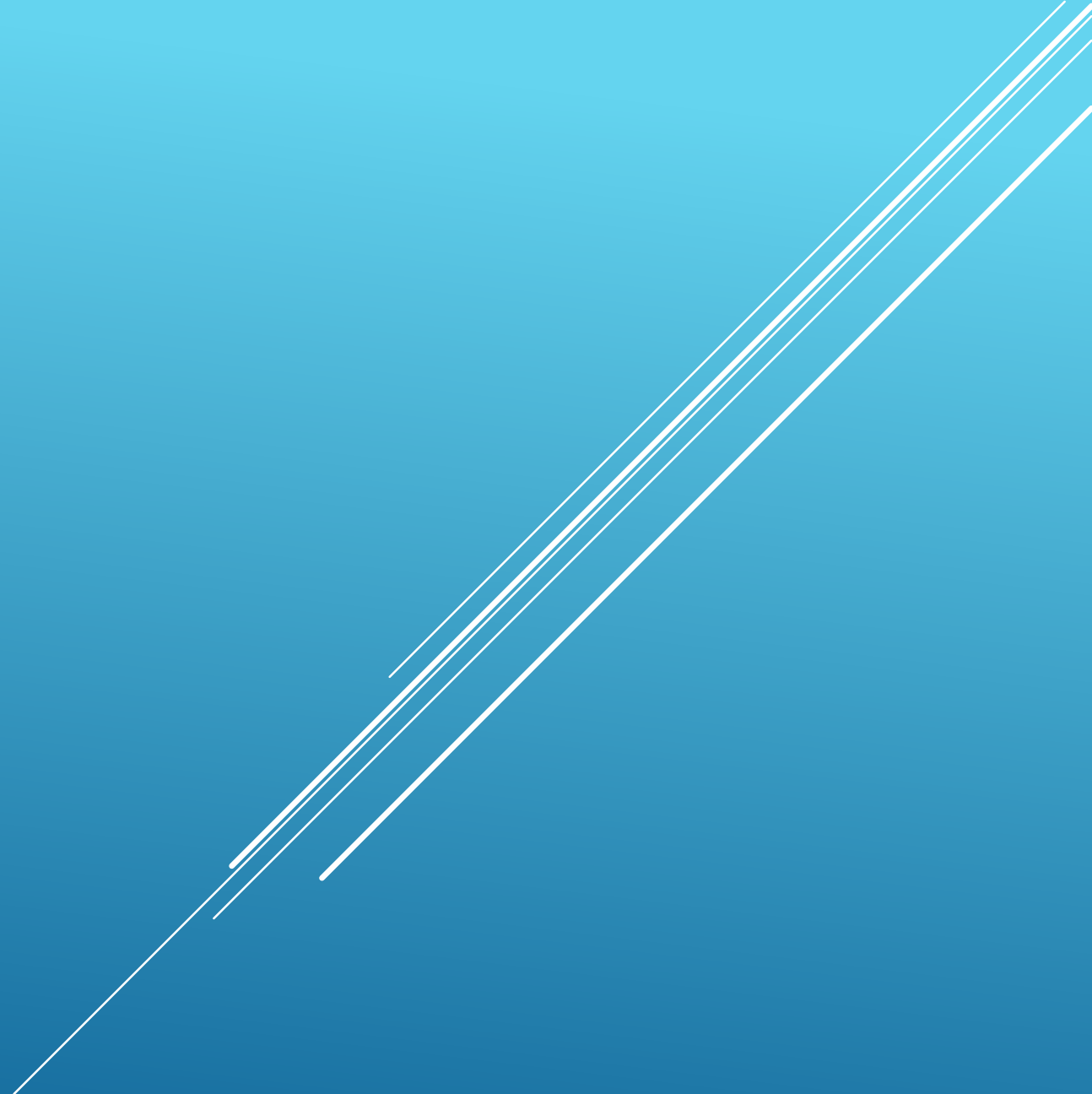# 3D PRINTER

Overview

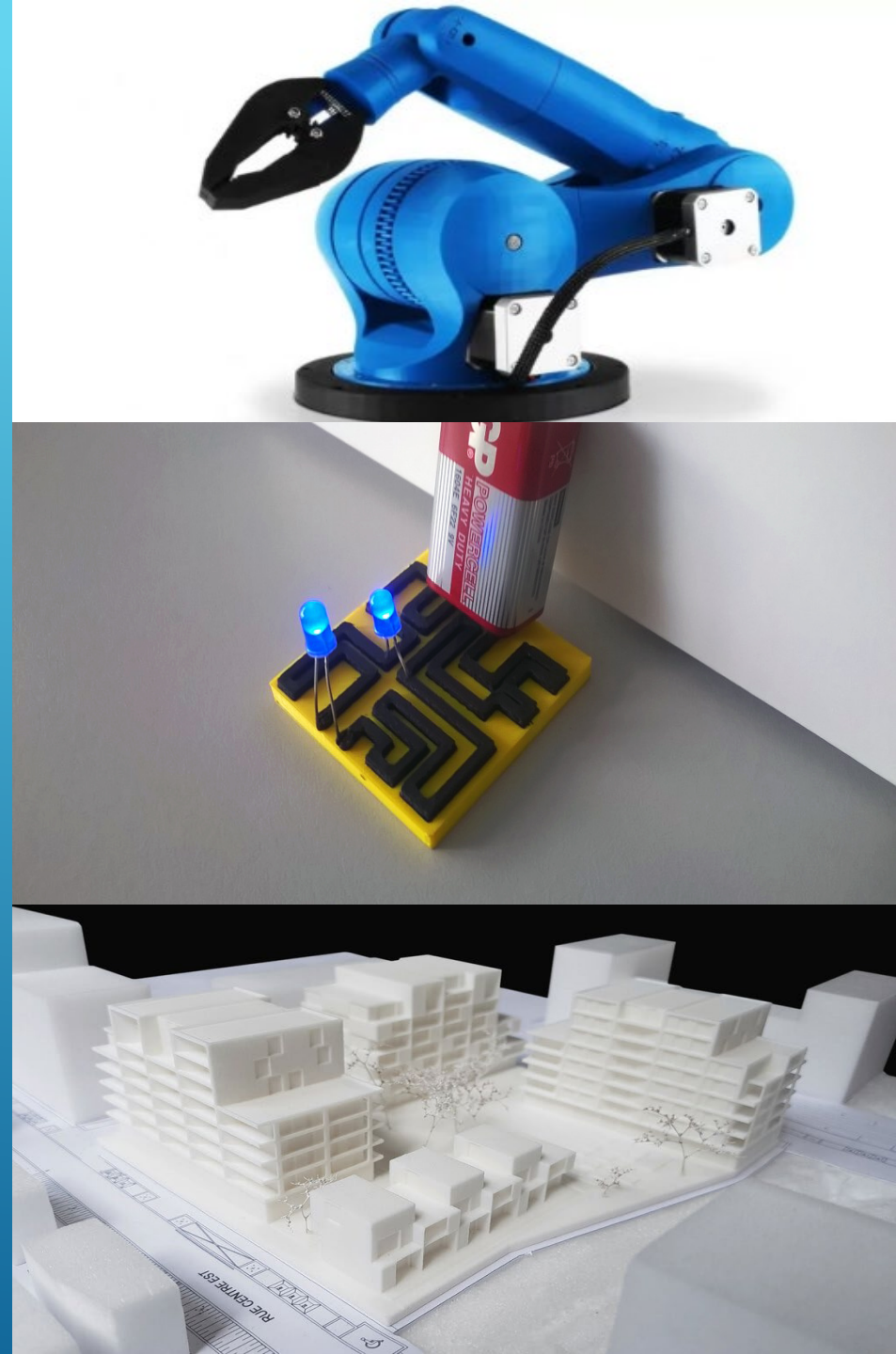# CONTENT

- Filament Types
- 3D Modeling
- Cura 4.0 Open Source Printing Software
- GCode

FILAMENT TYPES

- ABS
- PLA
- PVA
- PET
- PETG
- PETT
- HIPS
- NYLON
- Wood
- Sandstone
- Metal
- Magnetic Iron
- Conductive PLA
- Carbon Fiber
- Flexible(TPE/TPU)
- Glowing In The Dark
- Amphora

FILAMENT USED IN INDUSTRY

▶ PolyPropylene (PP): is processed in packaging and ropes

▶ PolyOxyMethylene (POM): is processed in the automotive and machine building industry

▶ PolyEtherImide (PEI): is processed in medical and chemical instruments

▶ PolyAmid (PA) aka Nylon: is processed in textile and in machines

▶ PolyEtherEtherKeton (PEEK): is processed in the medical, aerospace, aviation and chemical industry

▶ PolyCarbonate (PC):is processed in CD's and DVD's, in the construction industry and light industry
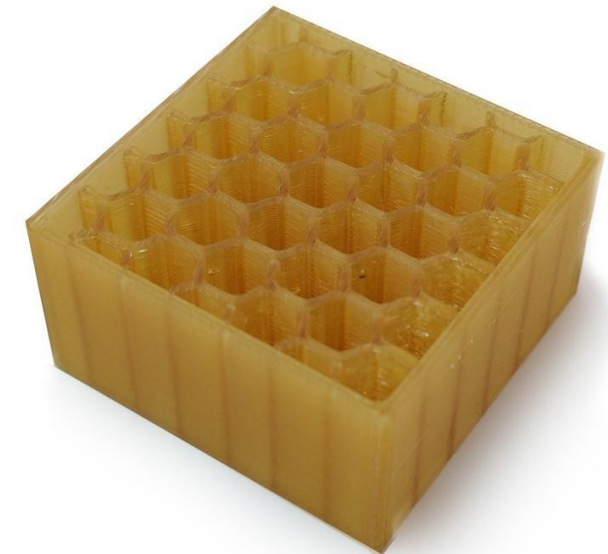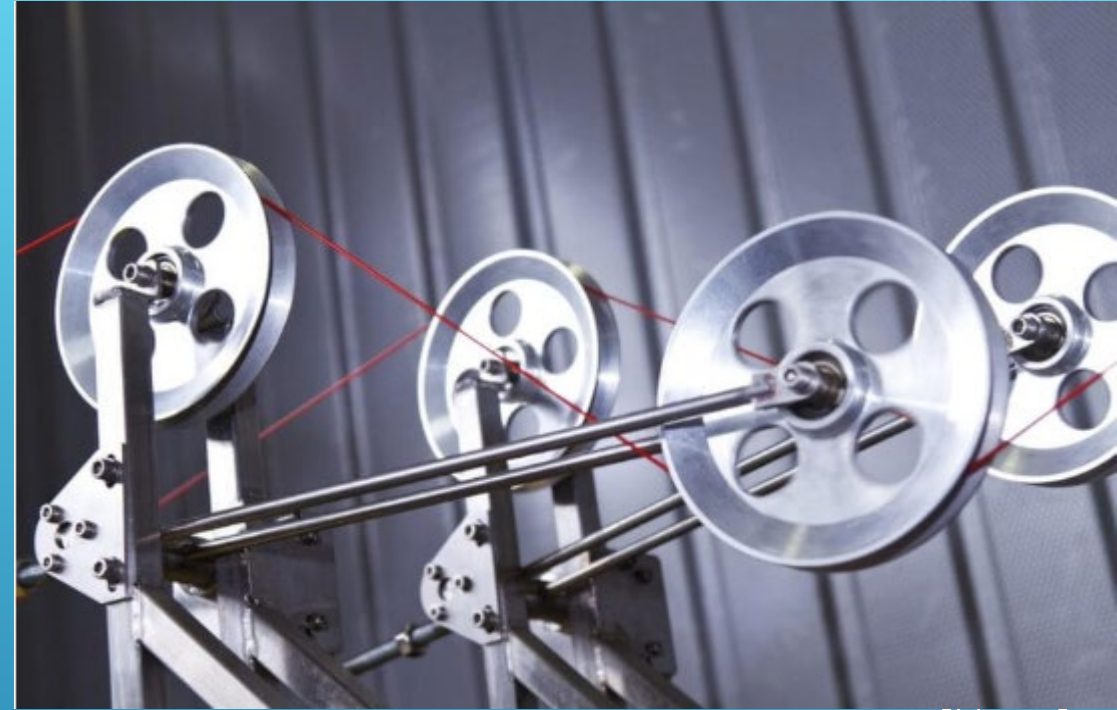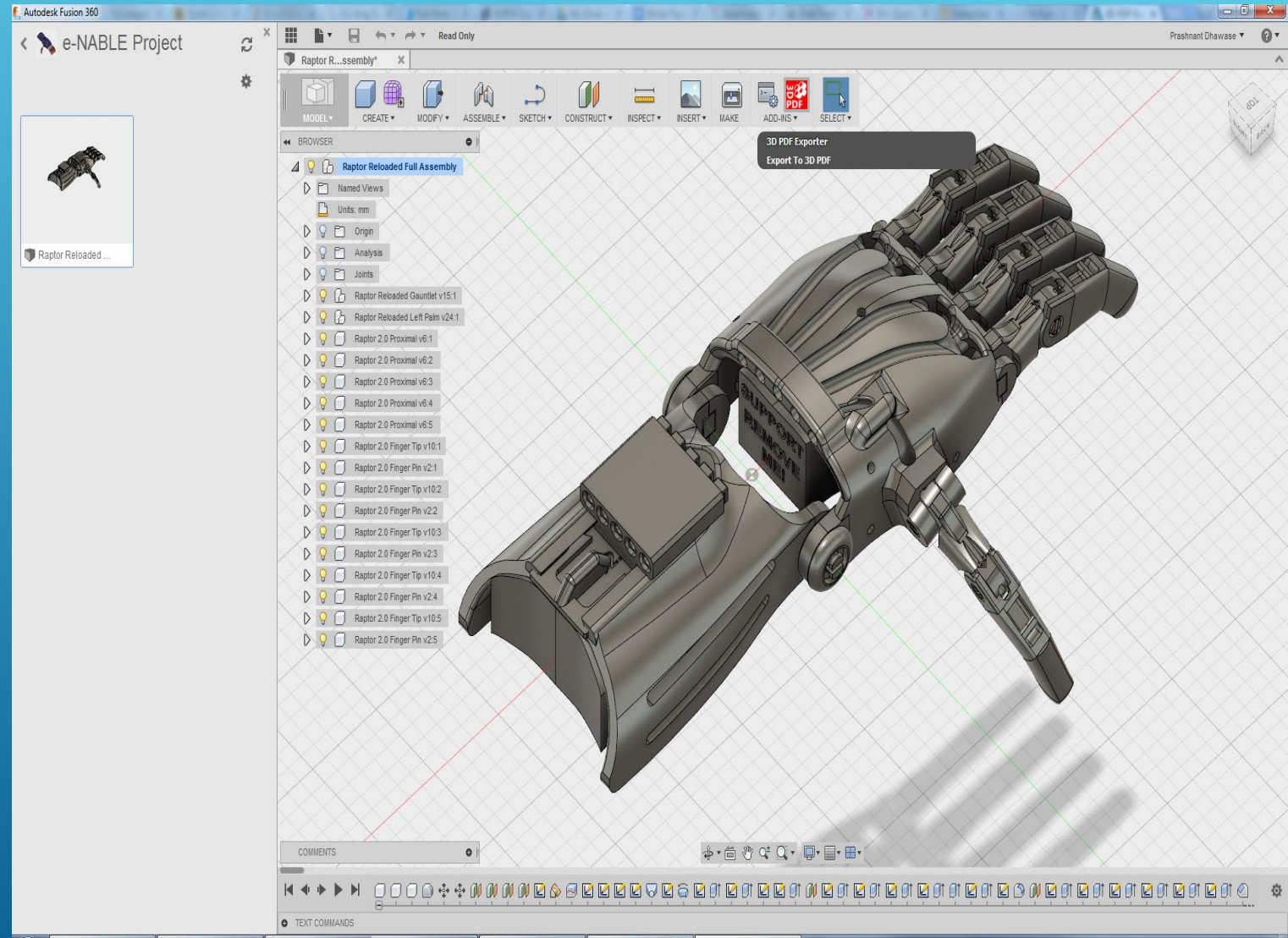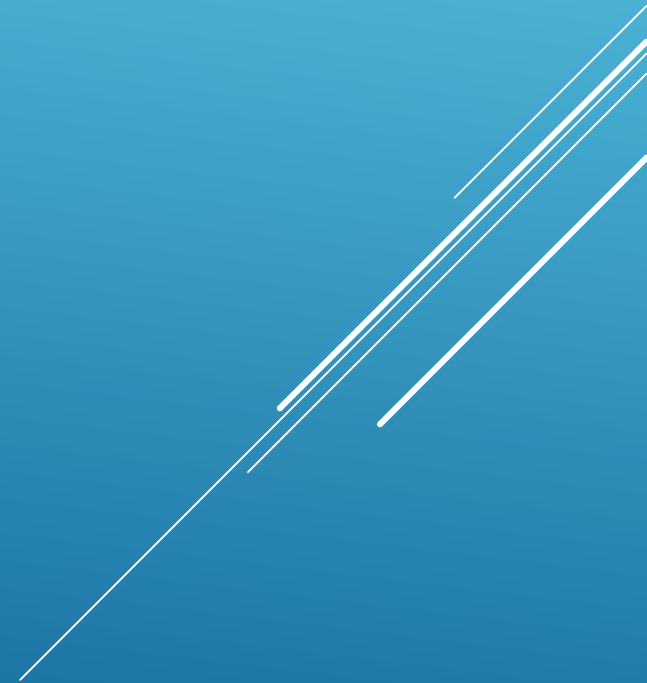
EXAMPLES
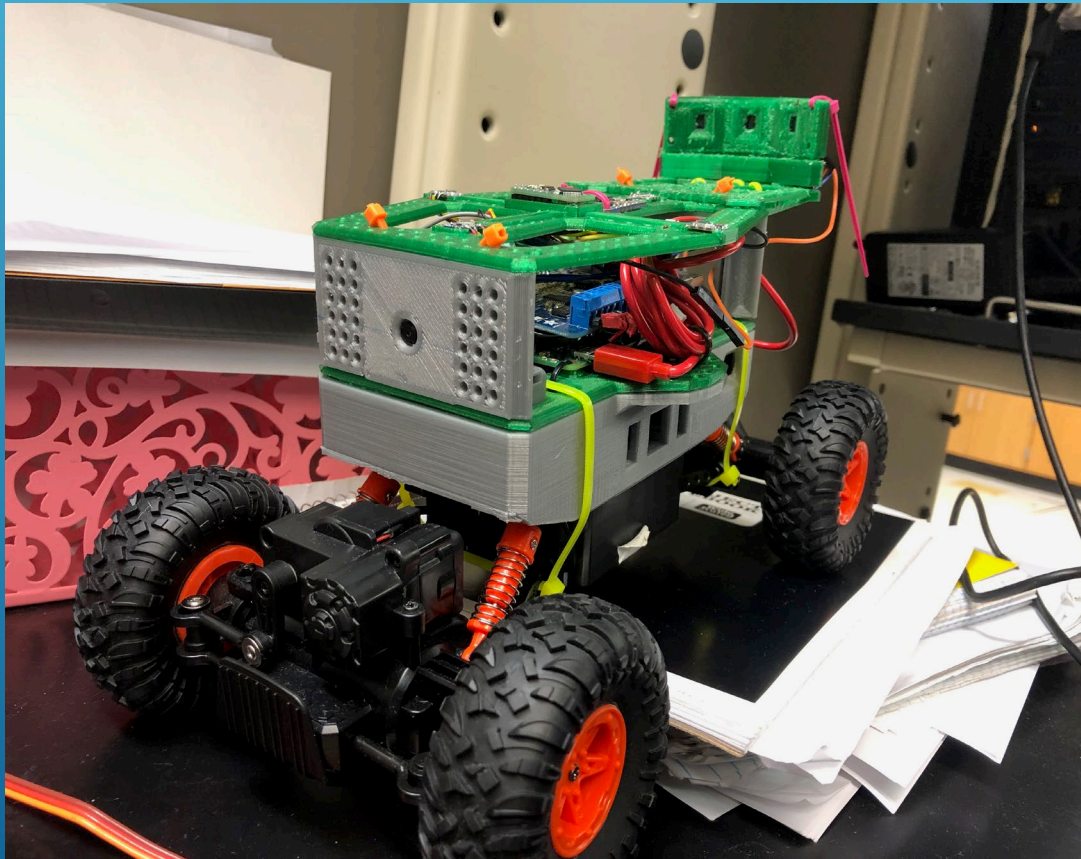
EXAMPLES
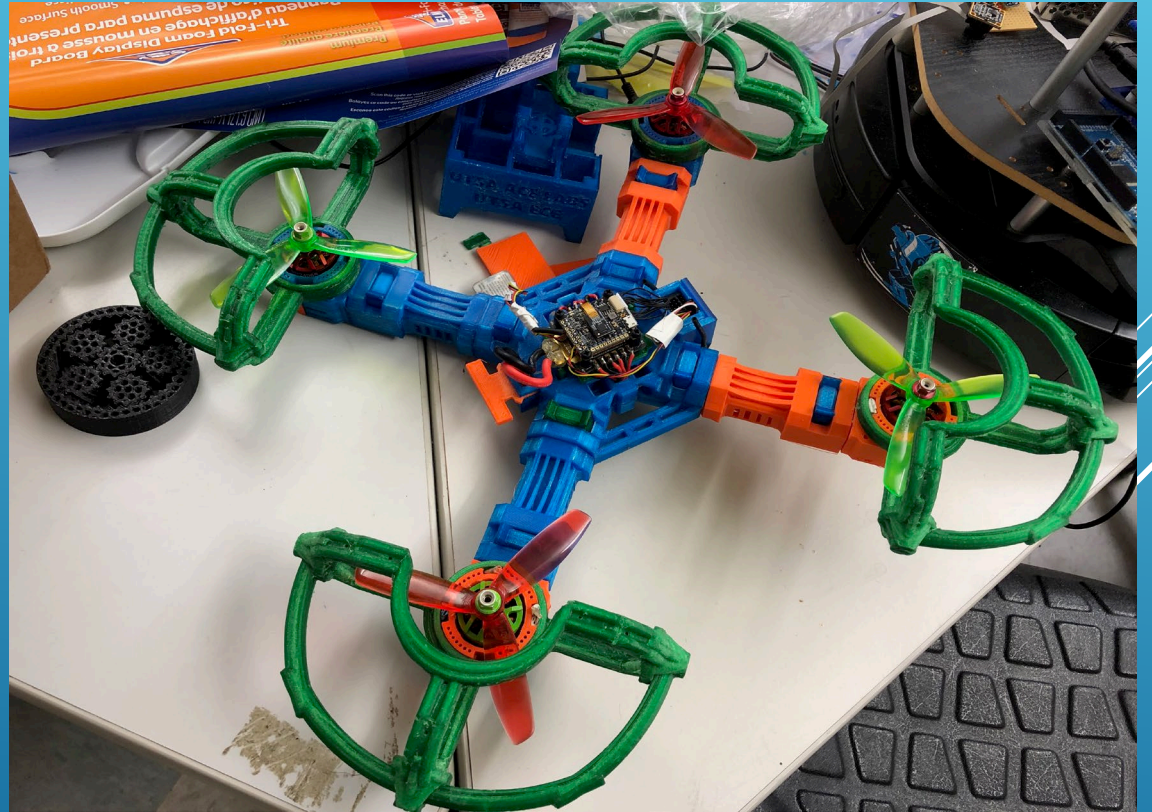
3D MODELING
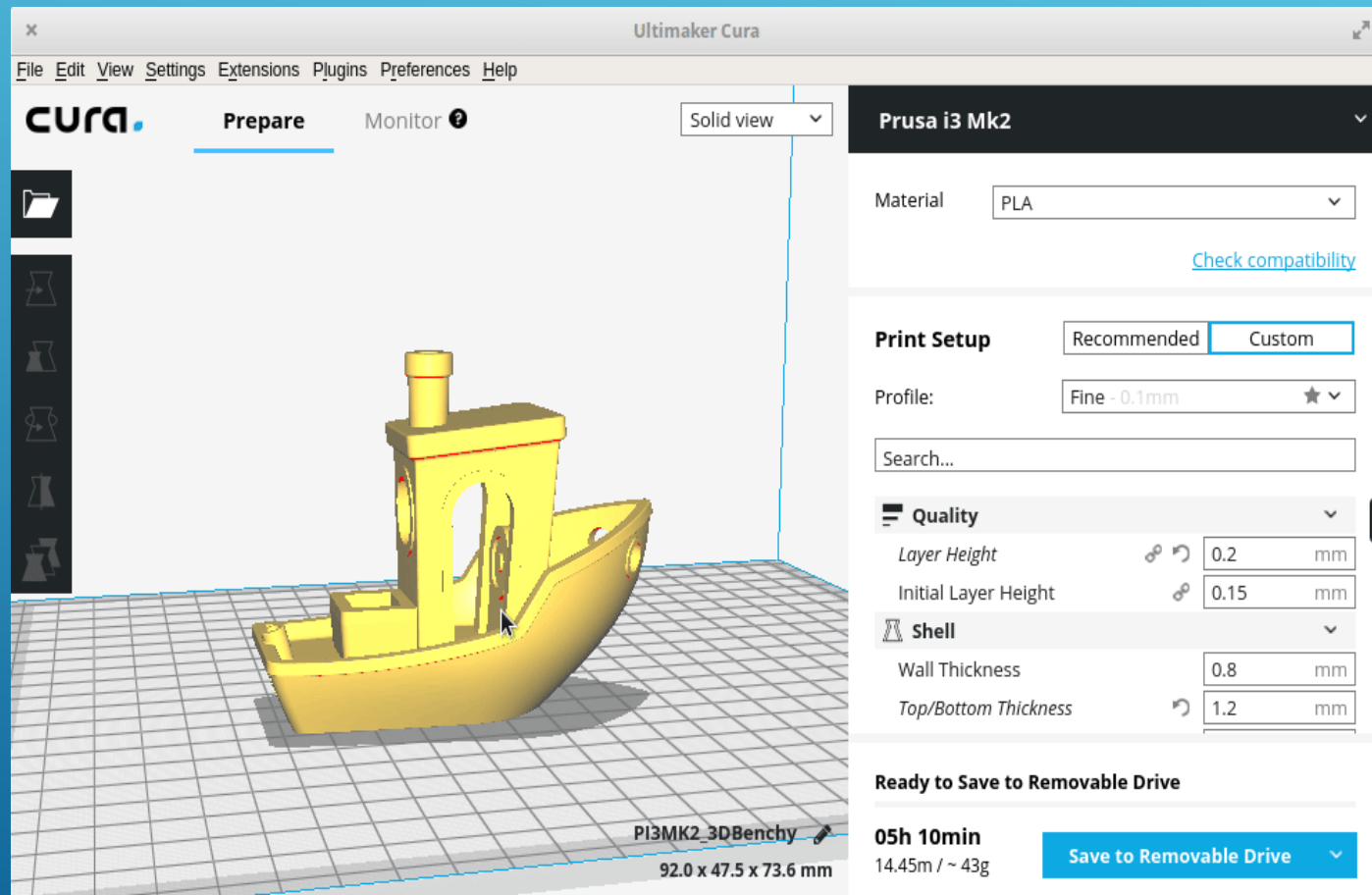
- Cura
- Fusion 360
- Solidworks
- AutoCAD
- CATIA

CURA 4.0 OPEN SOURCE SOFTWARE

▶ Cura prepares a model for 3D printing. Also, it's open source, which means that original source code is made freely available. Additionally, Cura contains an algorithm such that optimizes 3D printing by finding the quickest path.

CURA FILE TYPES

- File Types for 3D Printing
  - OBJ
  - 3MF
  - STL

- File Types for 2D Printing
  - BMP
  - GIF
  - JPG
  - PNG

WEBSITES TO DOWNLOAD STL FILES

1. Cults
2. Thingiverse
3. YouMagine
4. Pinshape
5. MyMiniFactory
6. GrabCad
7. Autodesk 123D
8. 3Dagogo
9. 3DShook
10. Instructables

CUSTOMIZATION TOOLS

PREVIEW

- Slicing feature
- Support option
  - ON/OFF
  - What time of material
- Printing height
- Infill density
  - Infill pattern
- Printing speed
- Estimated printing time

GCODE

- **Gcode**: "Geometric Code." Instruct a machine, when, where, and how to move geometrically in 3 dimensions.

- Ex)
```
G1 X99.743 Y97.444 E0.40960
G1 X100.304 Y97.219 E0.48214
G1 X101.011 Y97.004 E0.57081
G1 X101.151 Y96.991 E0.58769
G1 X101.340 Y96.950 E0.61089
G1 X101.876 Y96.878 E0.67579
G1 X102.069 Y96.869 E0.69898
G1 X102.069 Y91.739 E1.31458
G1 X109.740 Y91.739 E2.23510
G1 X113.169 Y93.365 E2.69049
G1 X113.169 Y96.819 E3.10497
```

```
G1 X-9.2 Y-5.42 Z0.5 F3000.0 E0.0377
```

- **Interpretation**: move towards X=-9.2, Y=-5.42, and Z=0.5 in a straight line at a feed rate of 3000.0 while extruding 0.0377 mm of material.

VISUAL GCODE
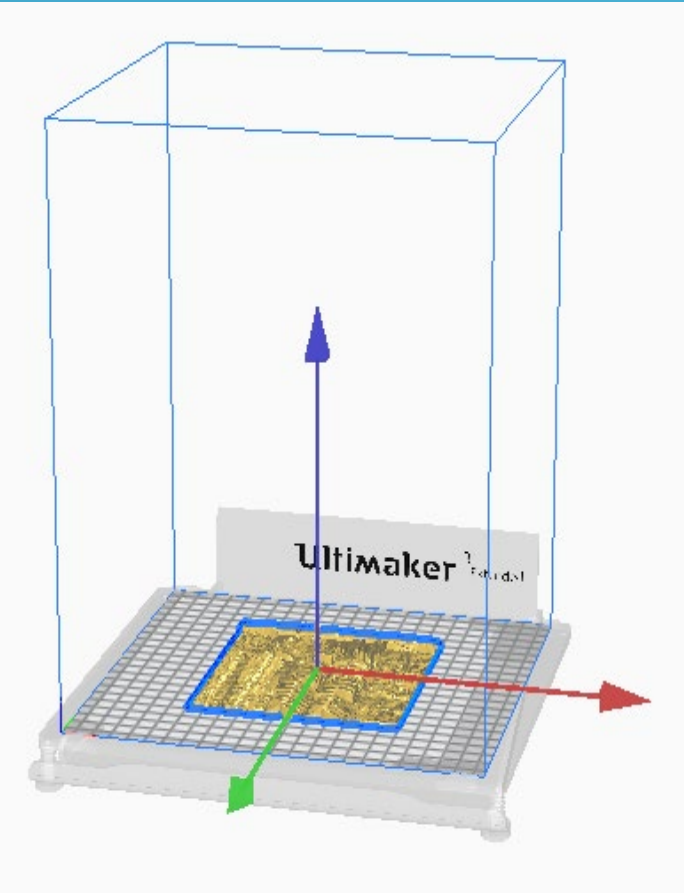
- Where x is Red
- Y is Green, and
- Z is Blue

THANK YOU!