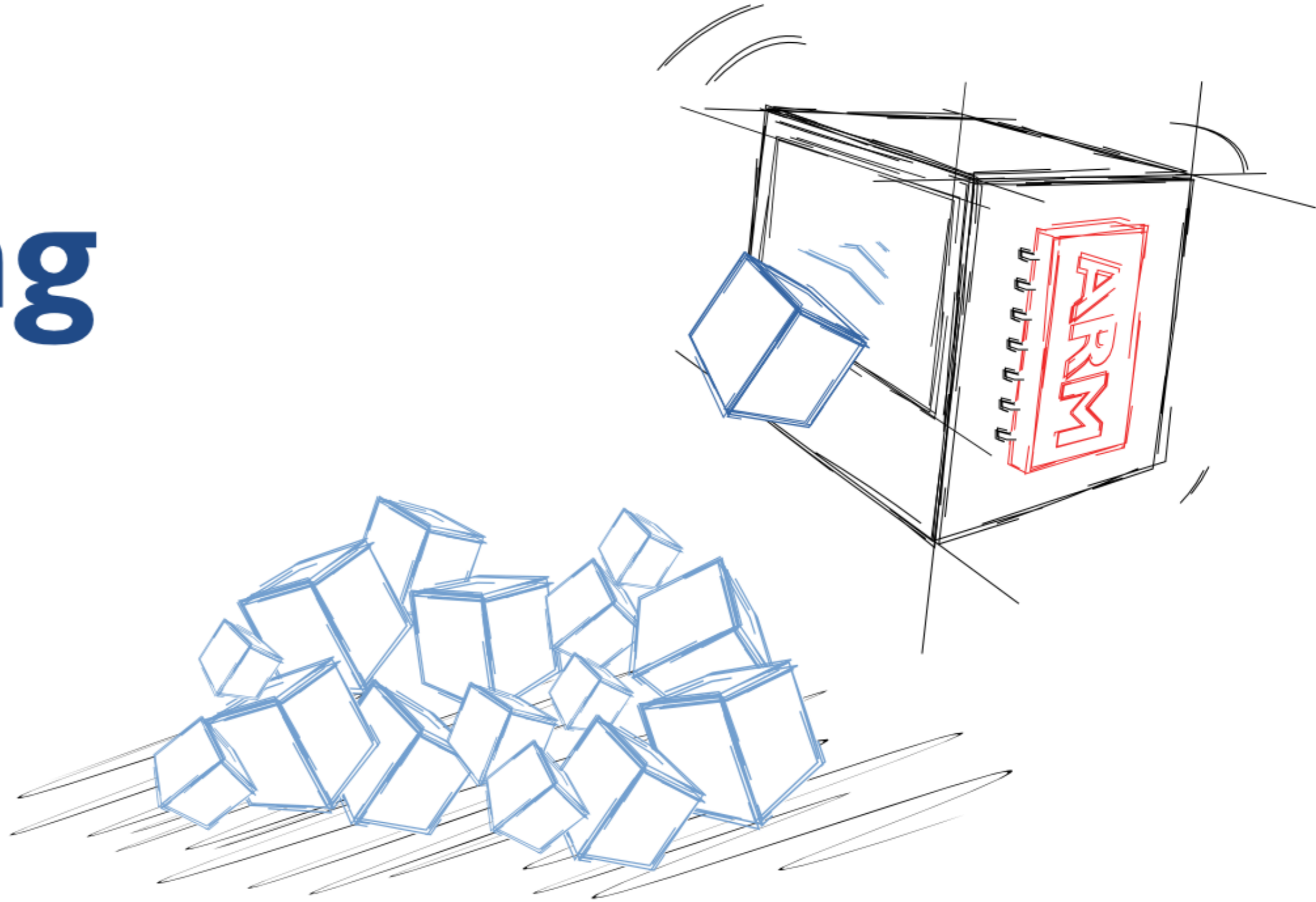
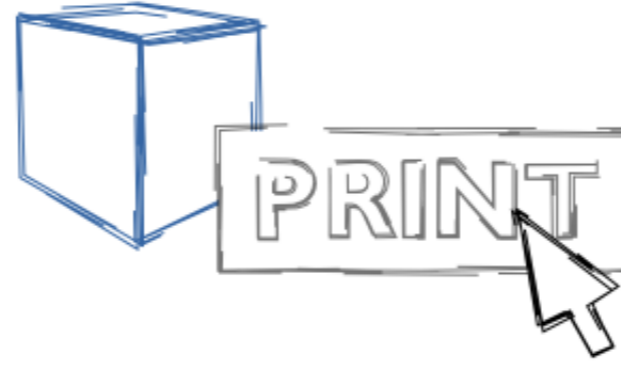


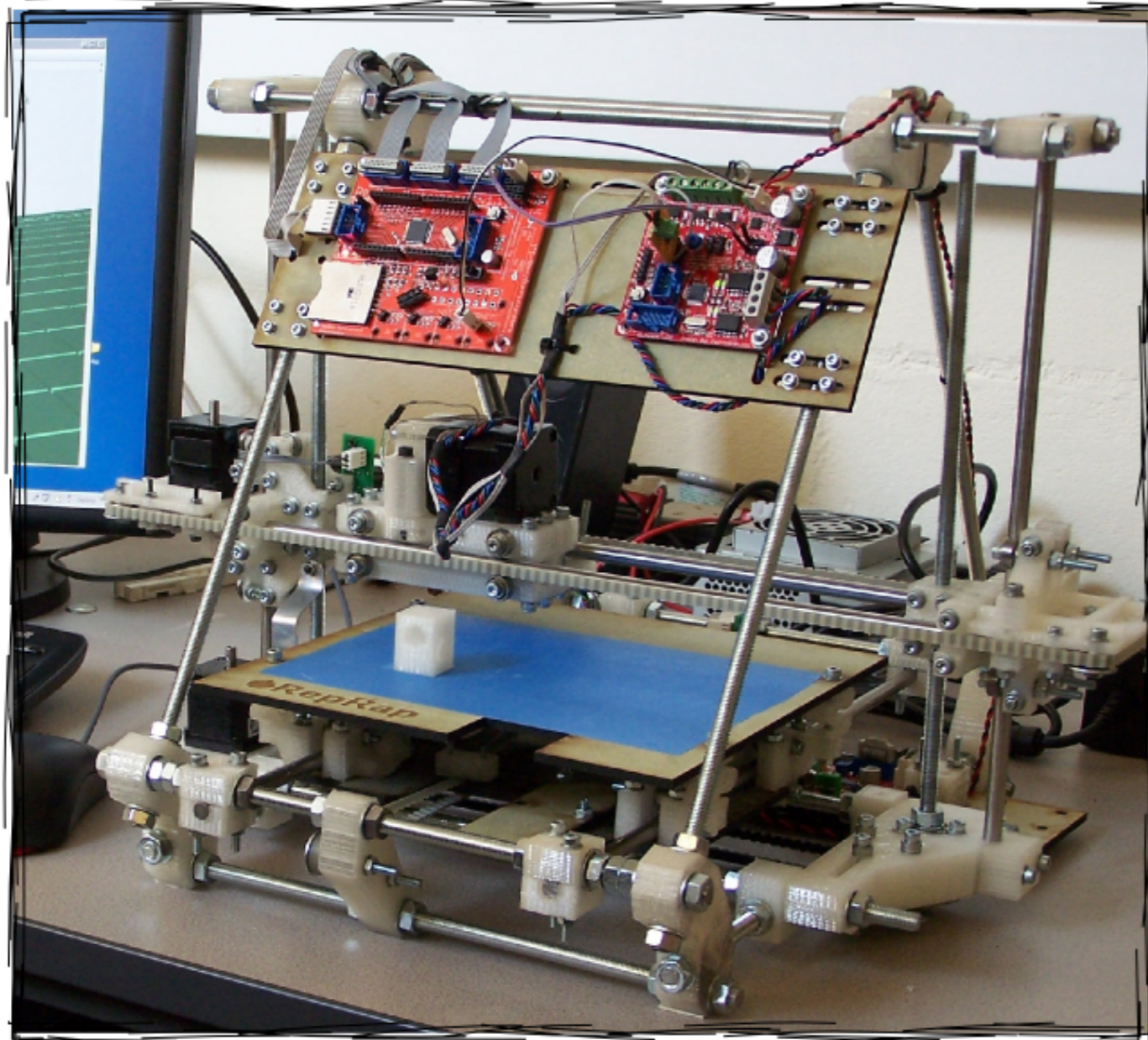
ARM Powered 3D Printing

Jonathan Heathcote

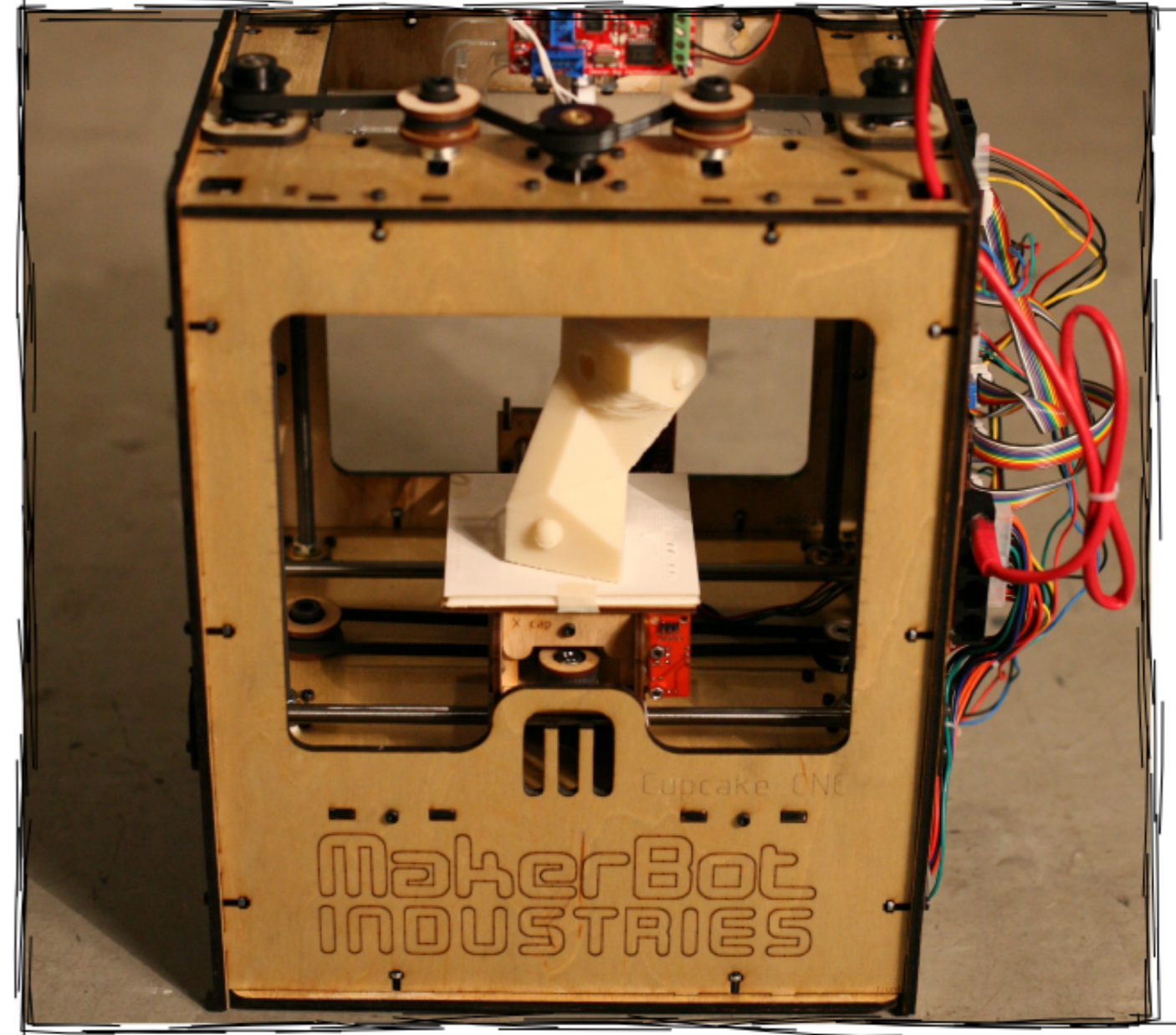
Supervised by Alasdair Rawsthorne



DIY Printers

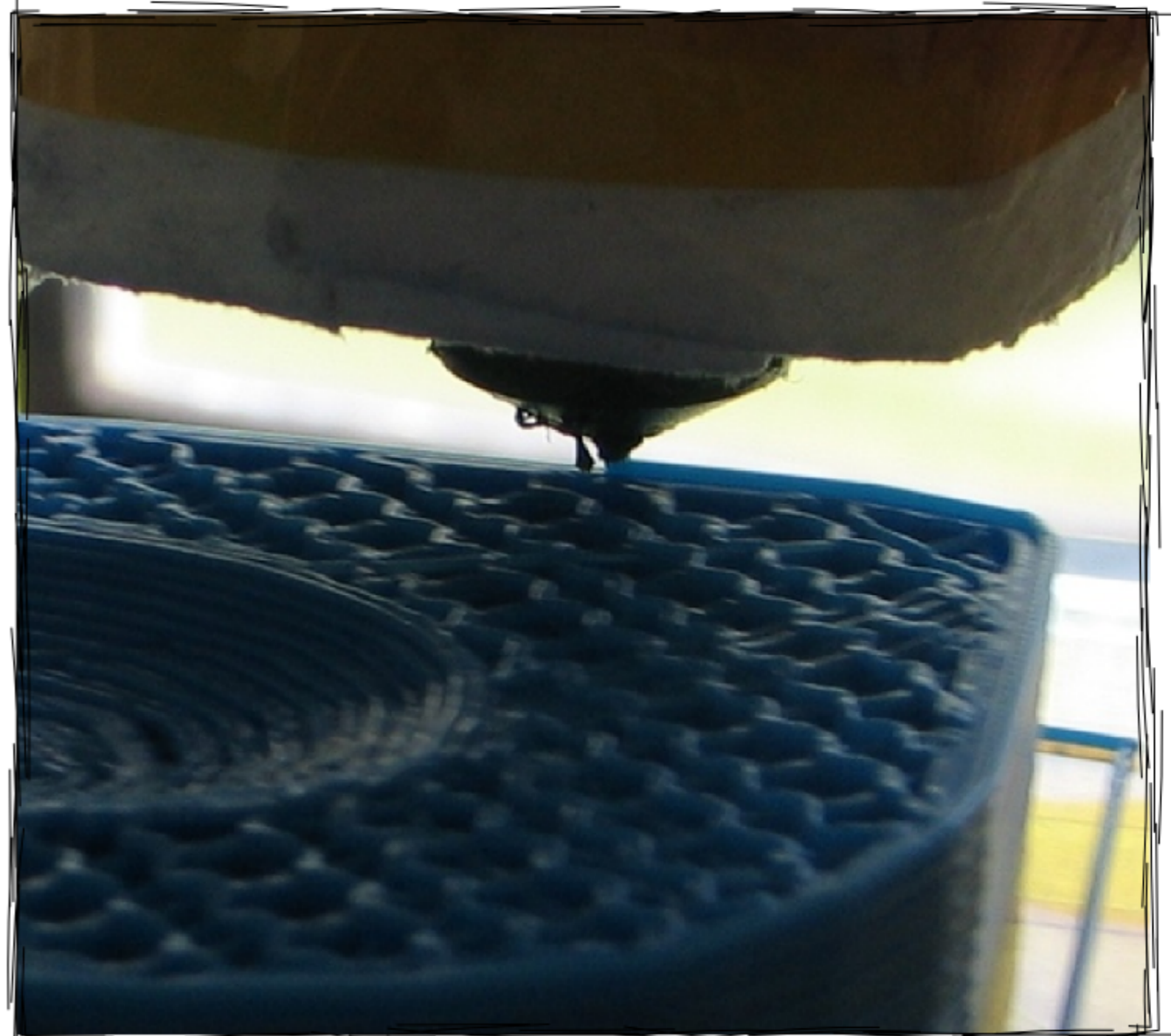
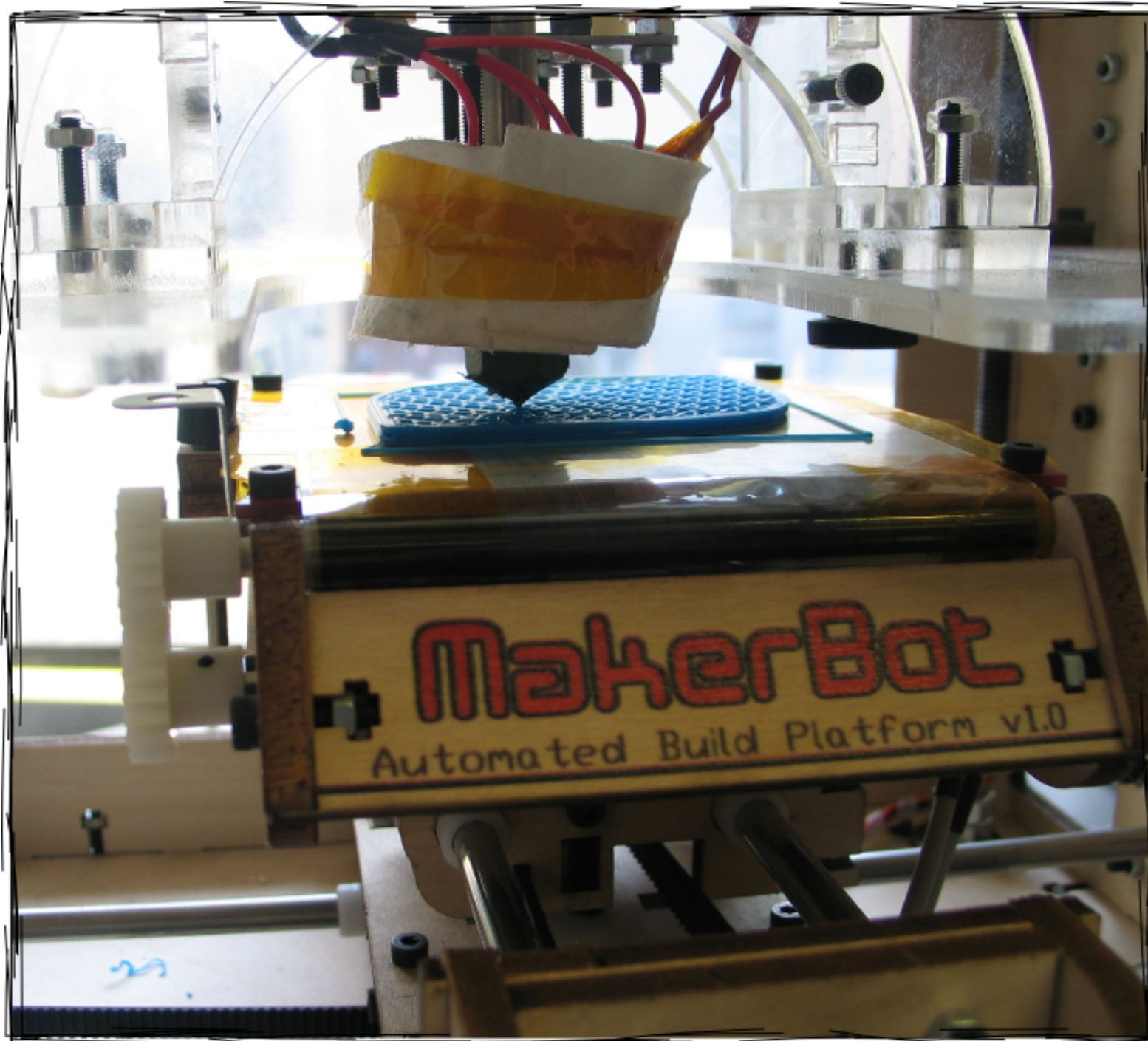


RepRap¹

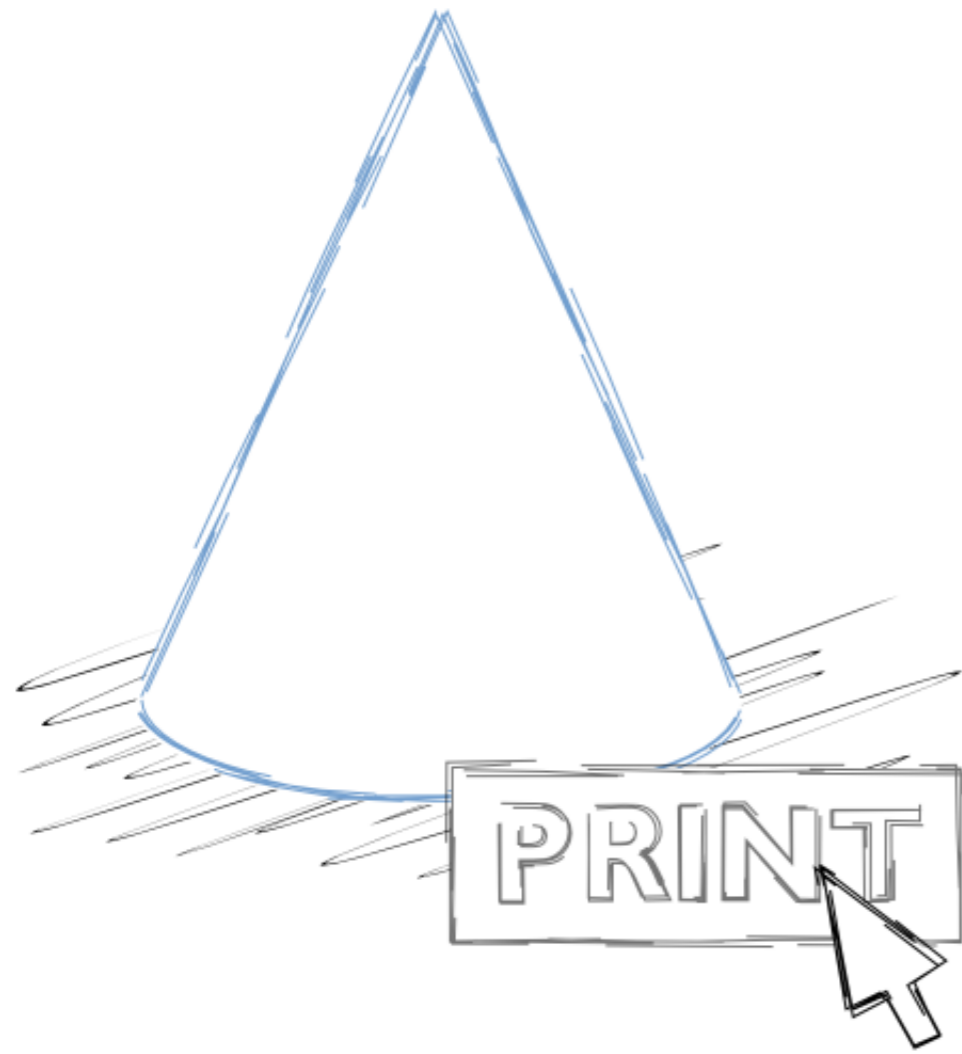


MakerBot²

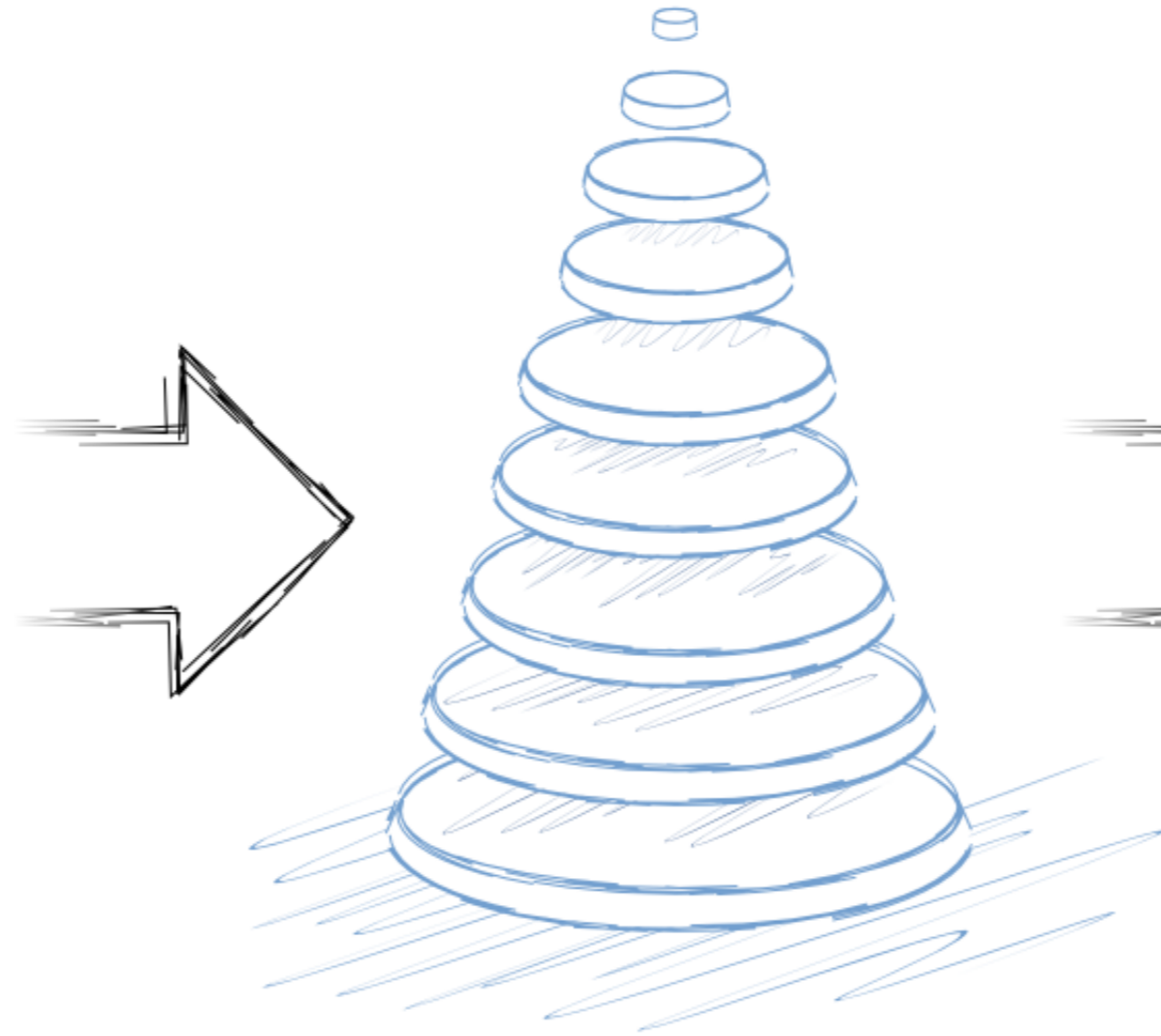
Easter Egg Mould



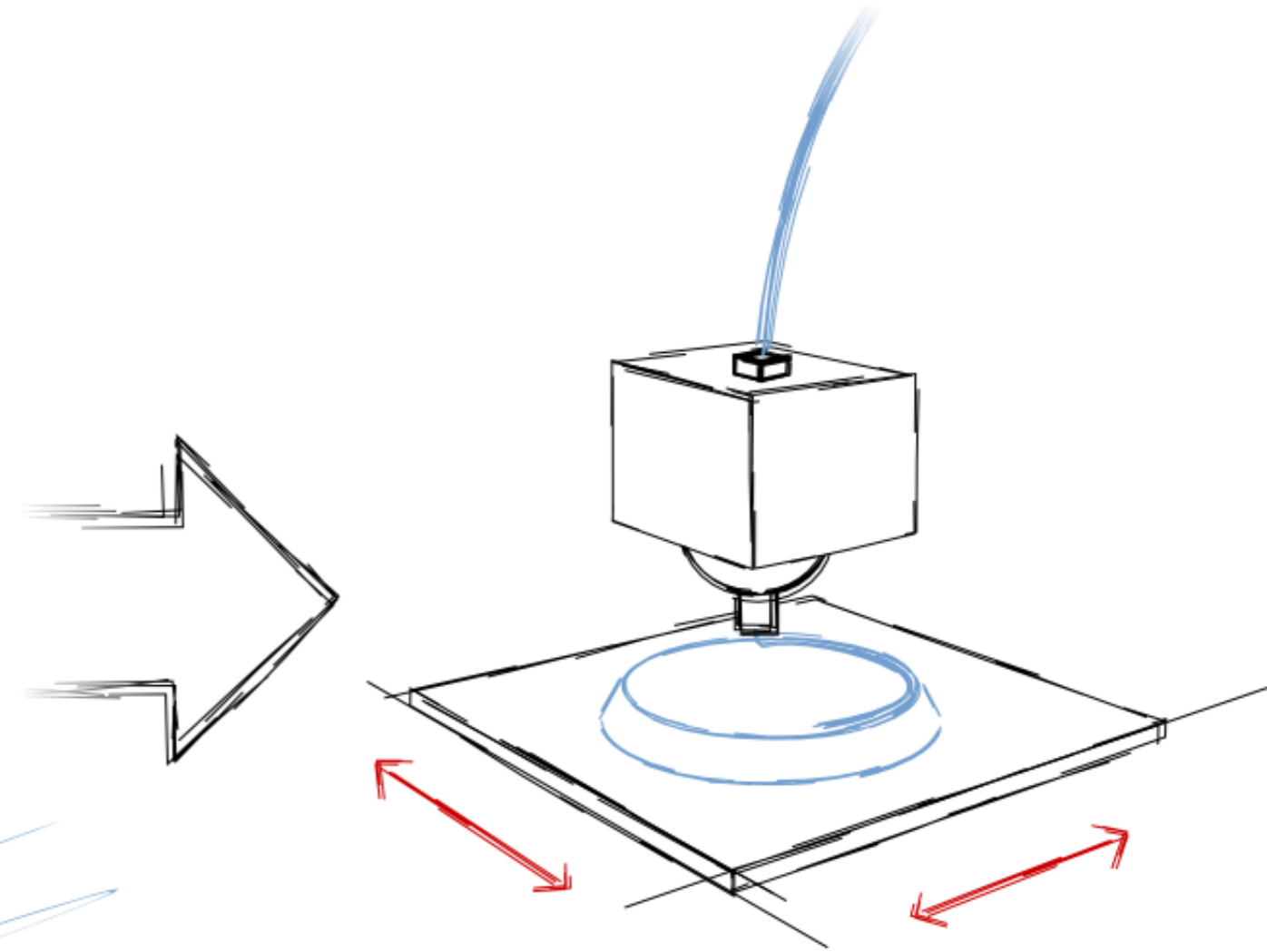
The basic idea...



Model

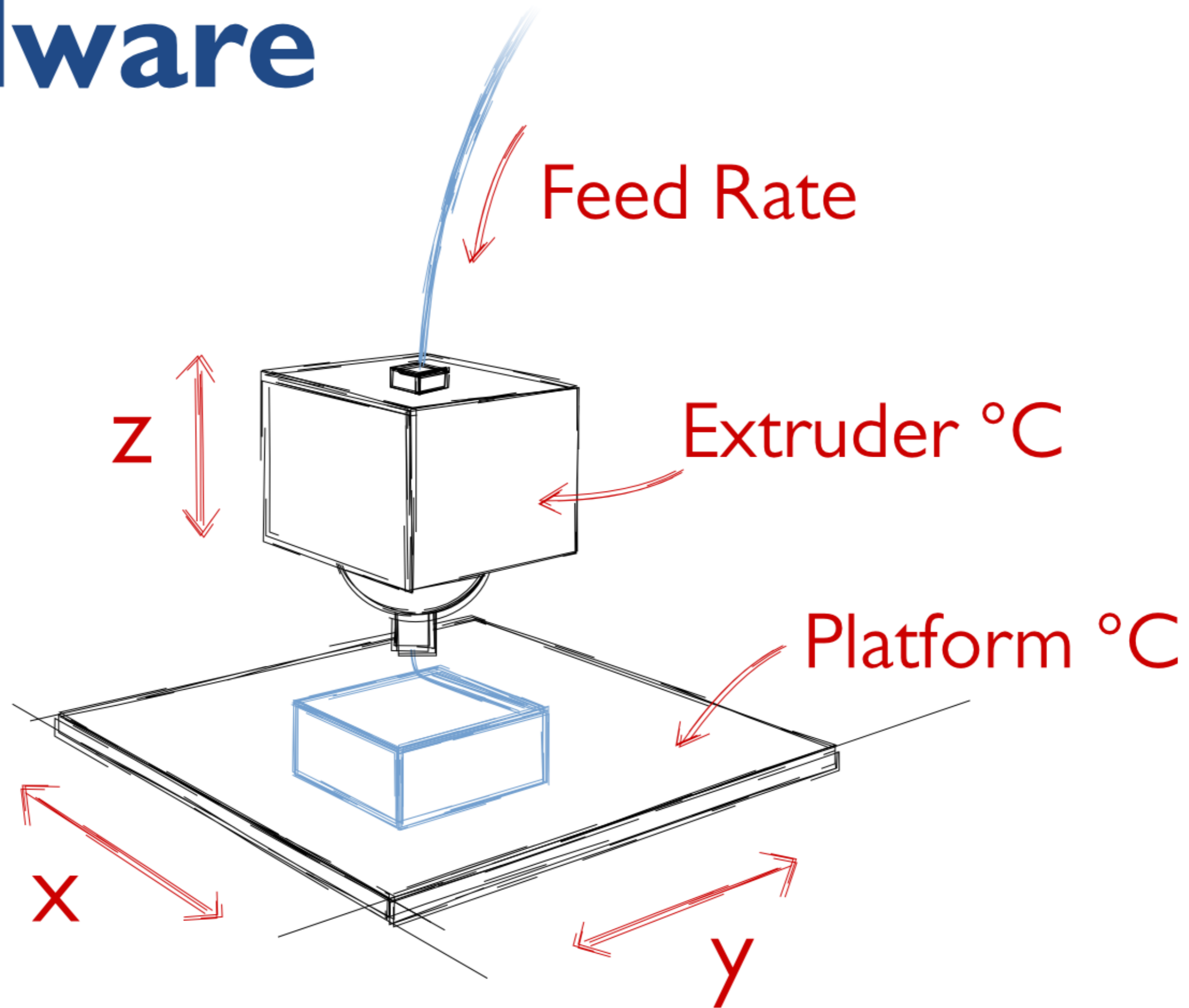


Slice

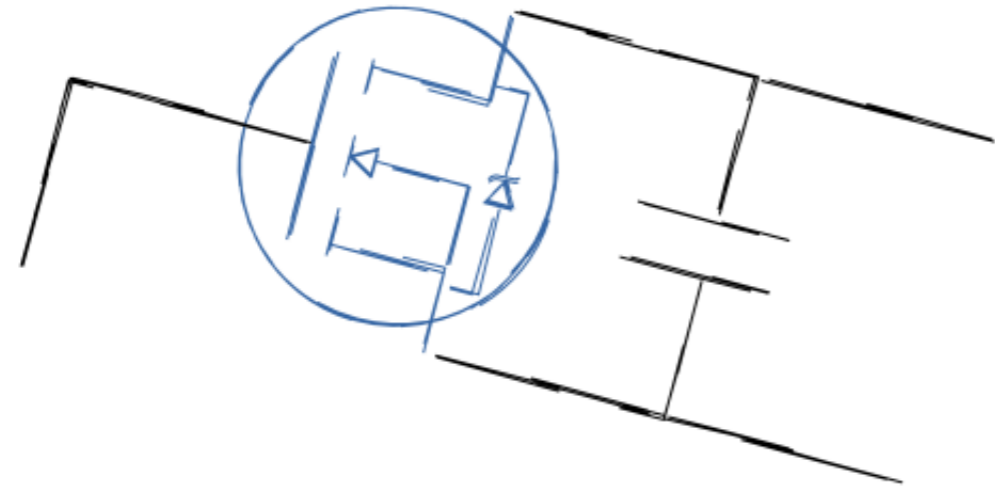


Print (FDM)

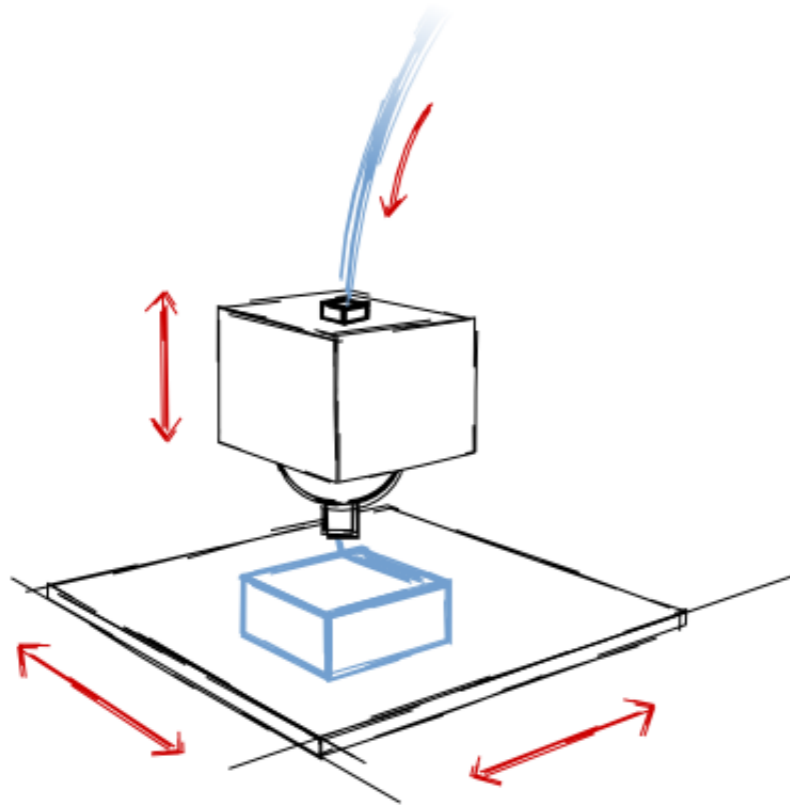
Hardware



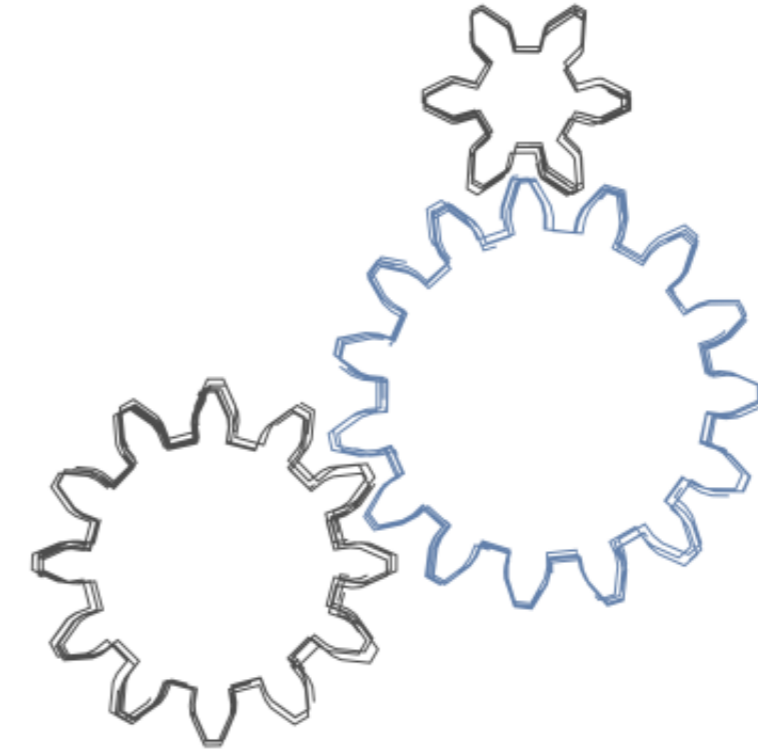
Plan



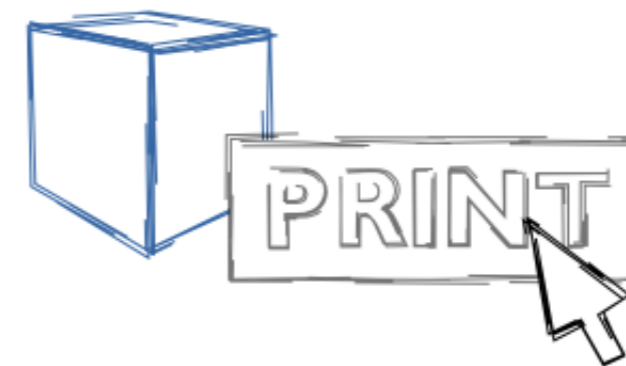
New Electronics



New Firmware

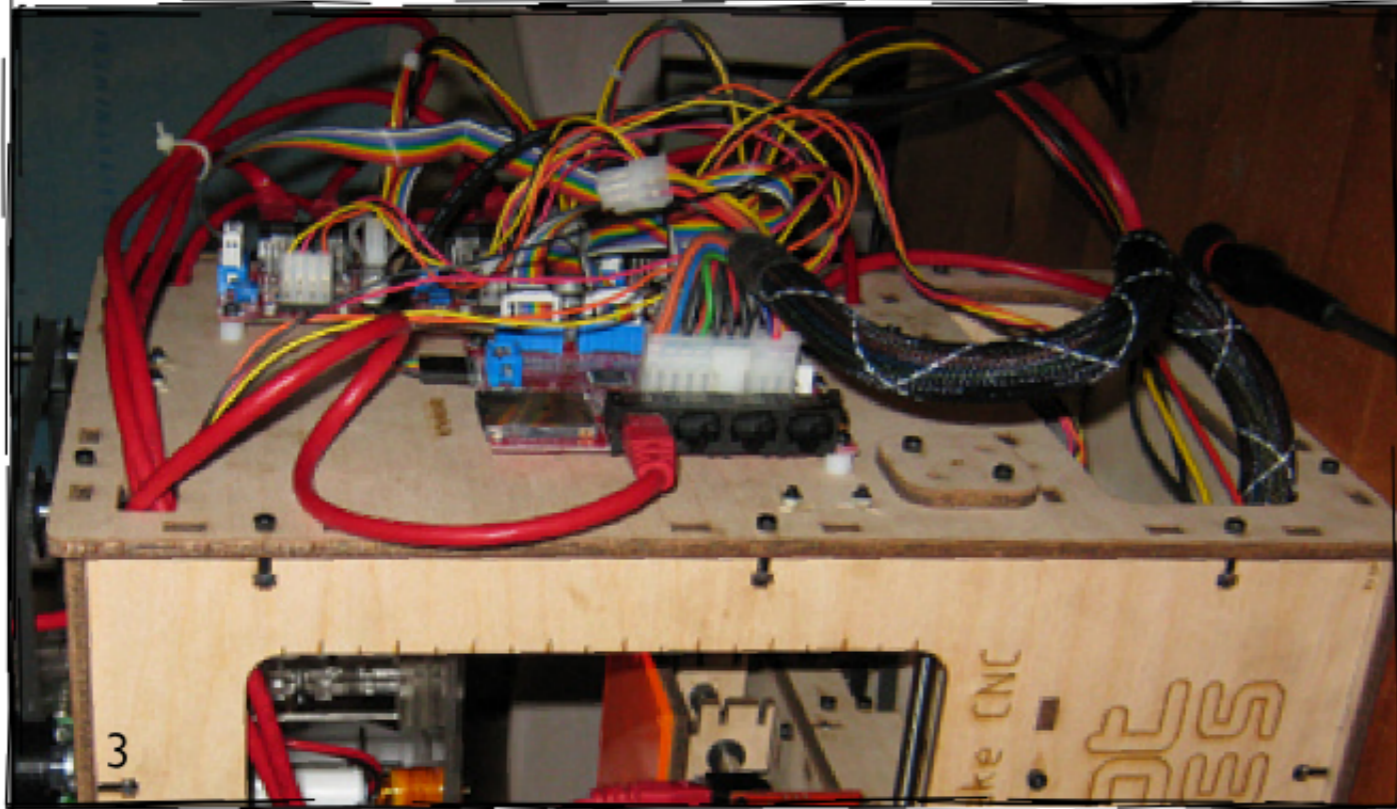


New Microcontroller

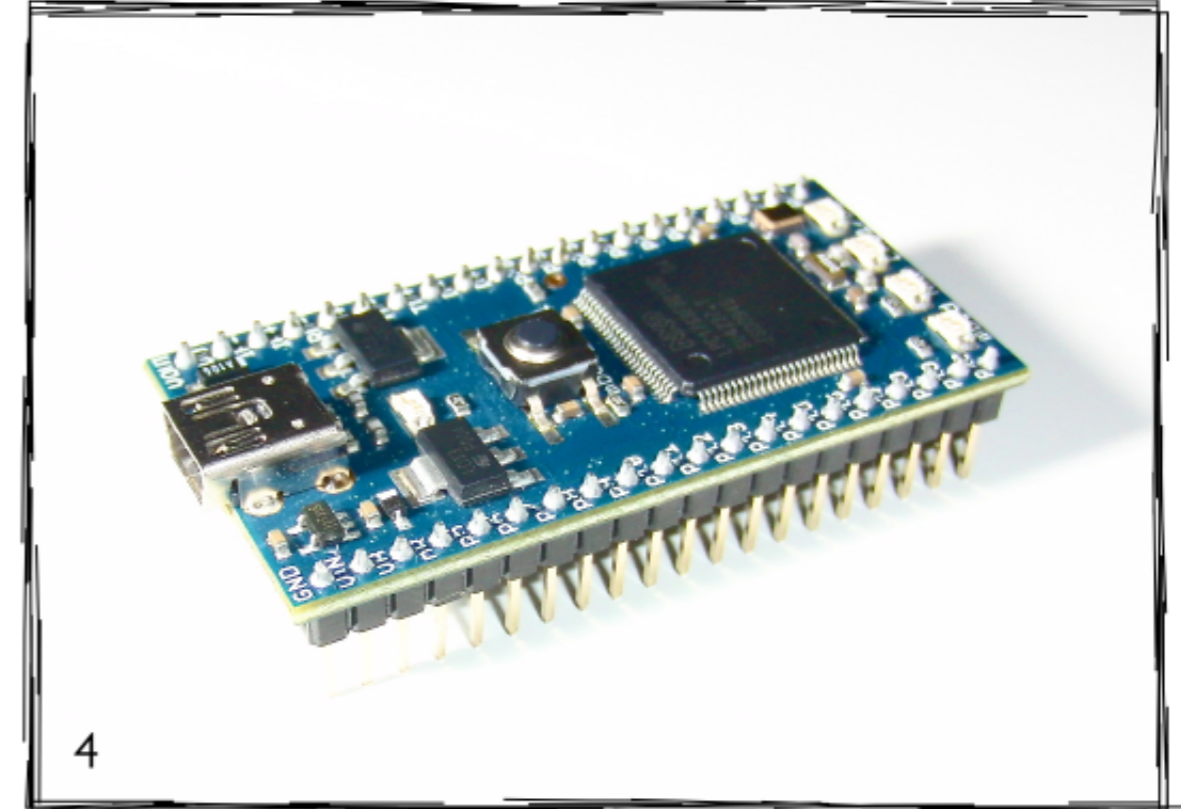


New Interface

Electronics



8-Bit (AVR/Arduino)
Slow Serial Interface
Mechanical Relays



32-Bit (ARM)
Ethernet
Solid-State MOSFET

G-Code

(set extruder temperature)
M104 S220 T0

(move to position)
G1 X-54.0 Y-30.0 Z6.0 F30.0

(extrude plastic)
M101

Why use an RTOS?



Heater
Control

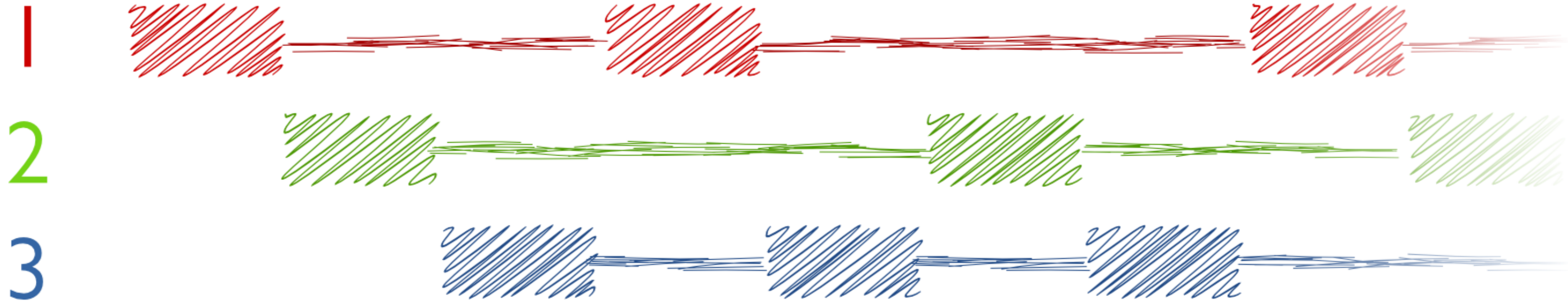
Network
Interface

Command
Buffer

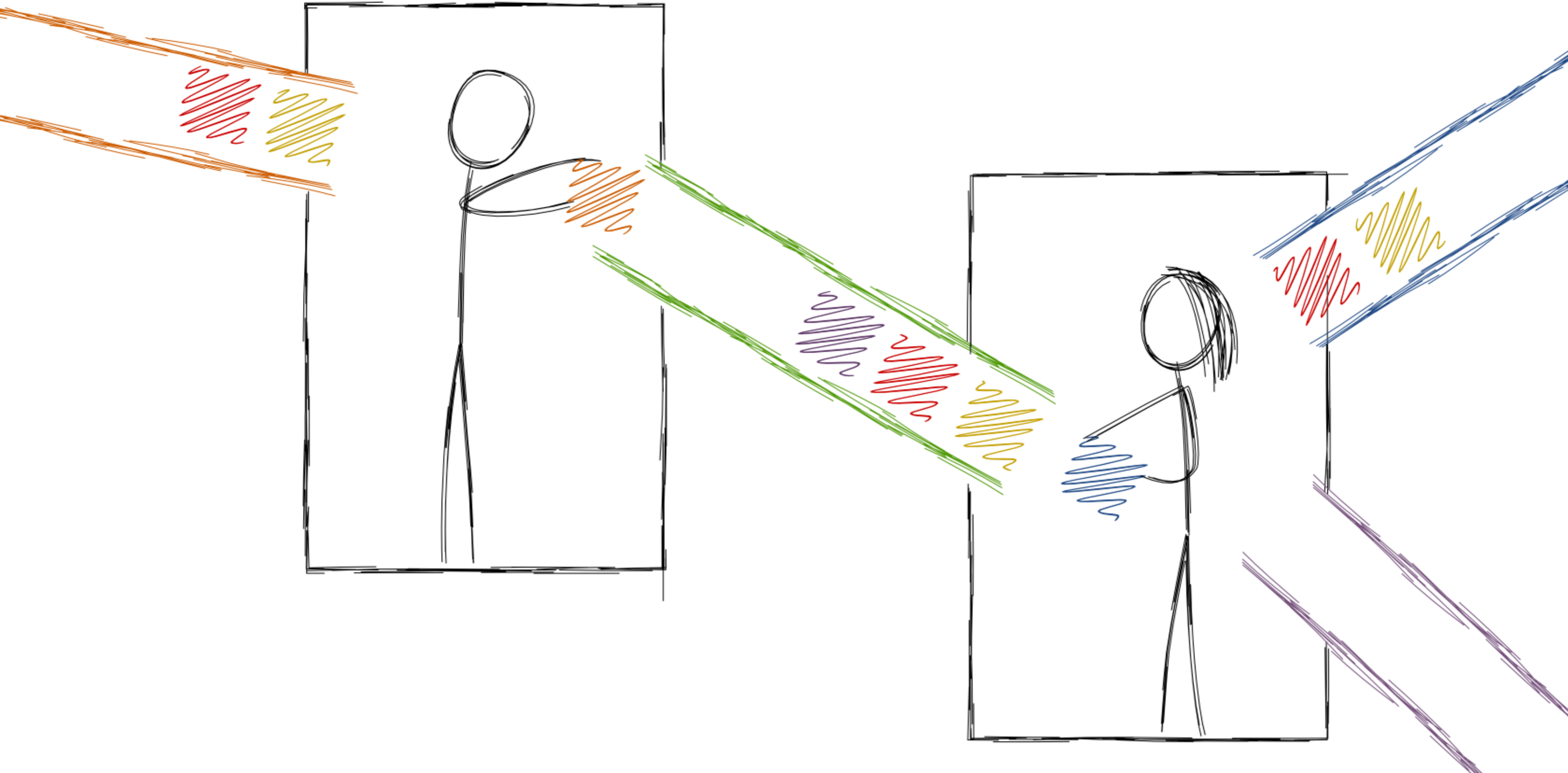
Temperature
Monitoring

Motor
Control

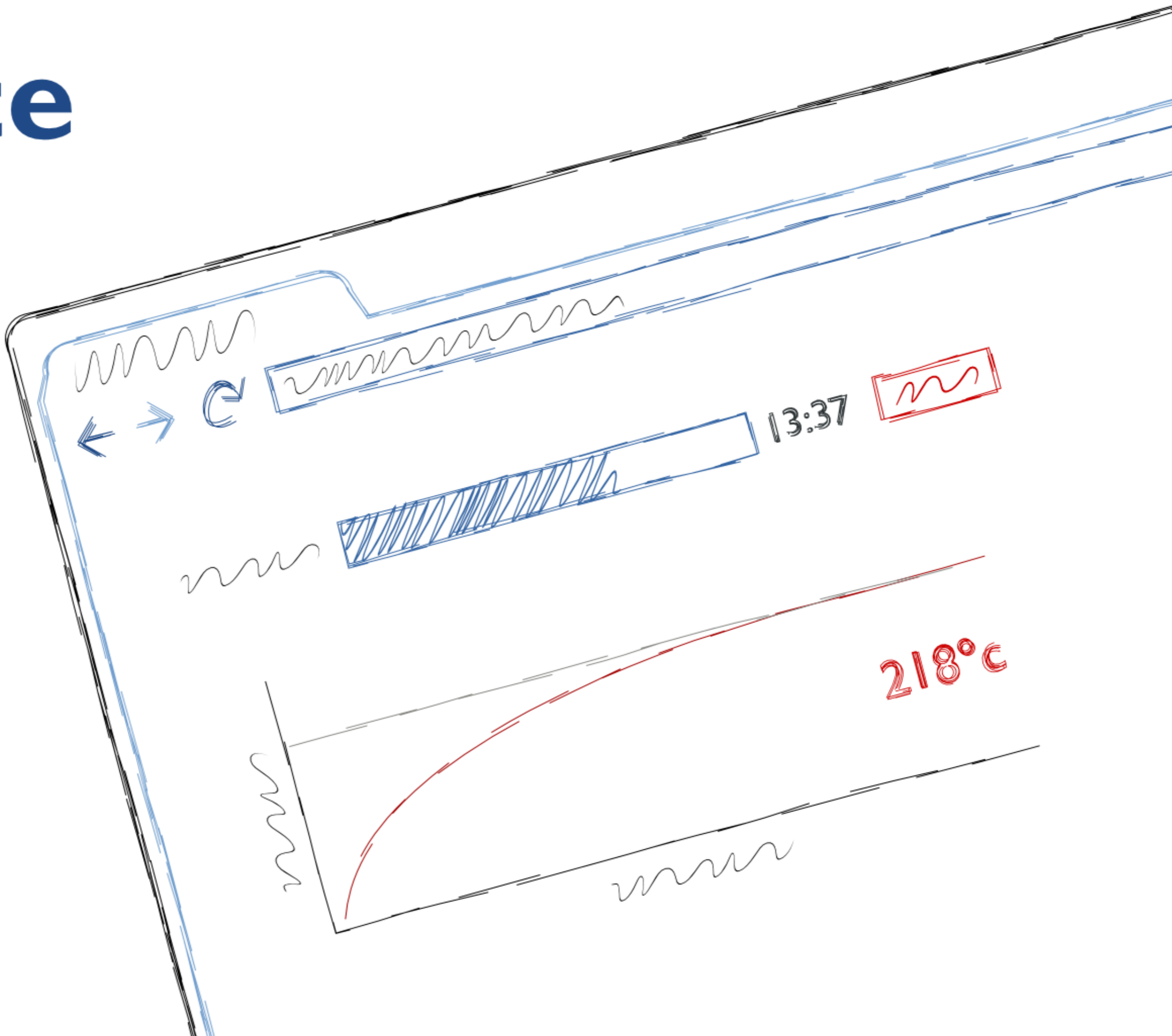
Scheduling



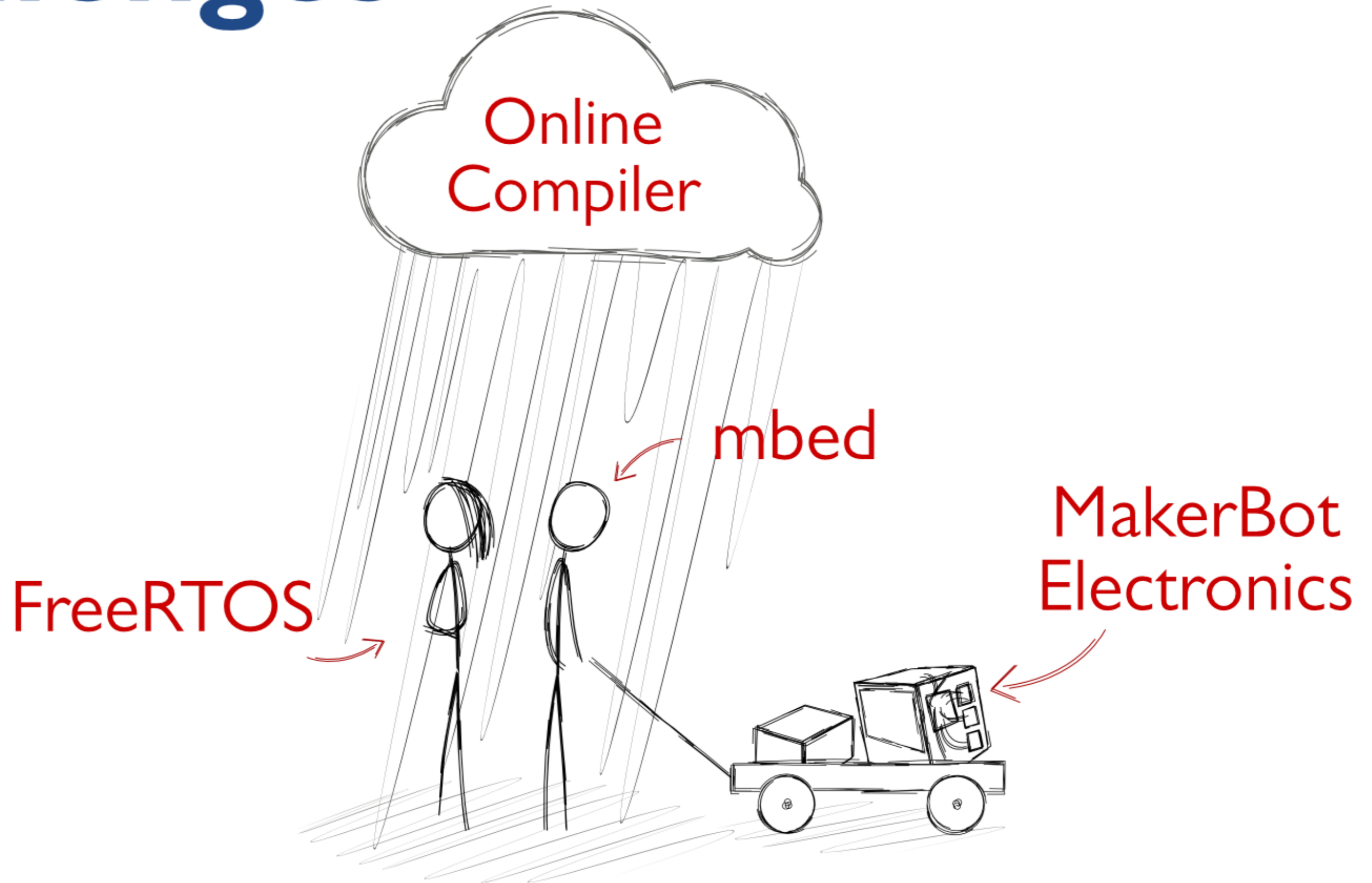
Communication



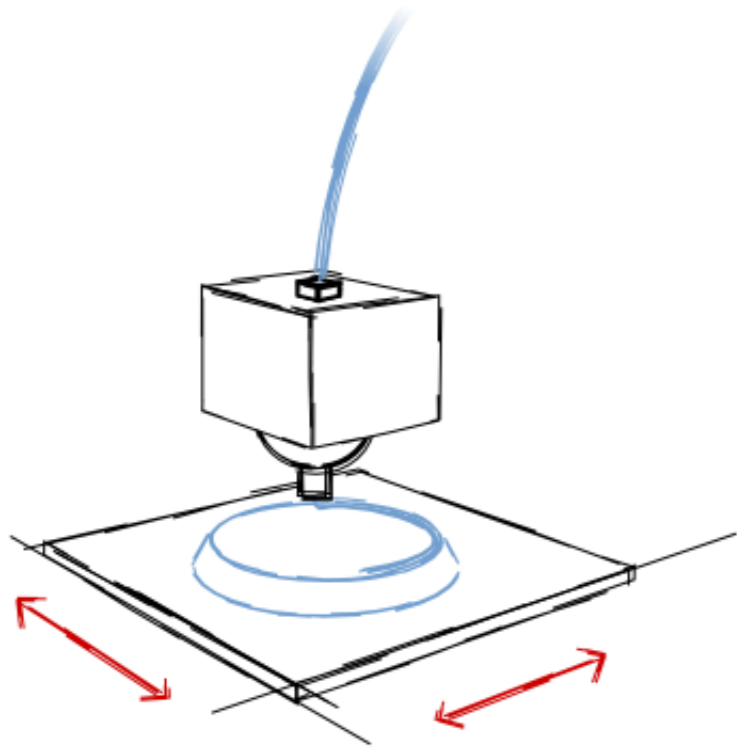
Interface



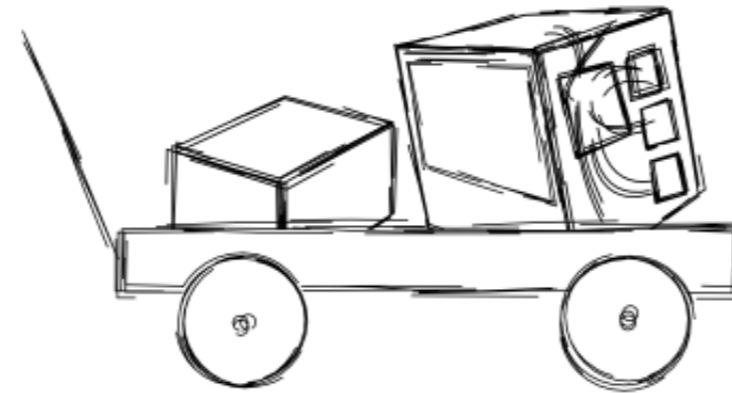
Challenges



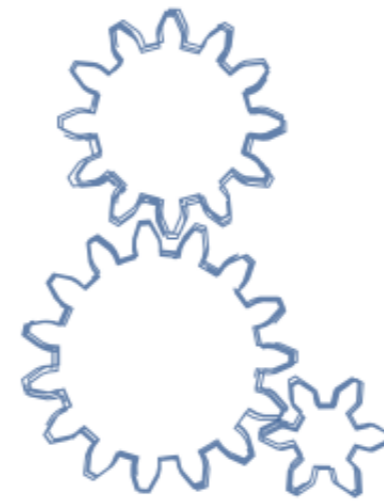
Summary



3D Printing



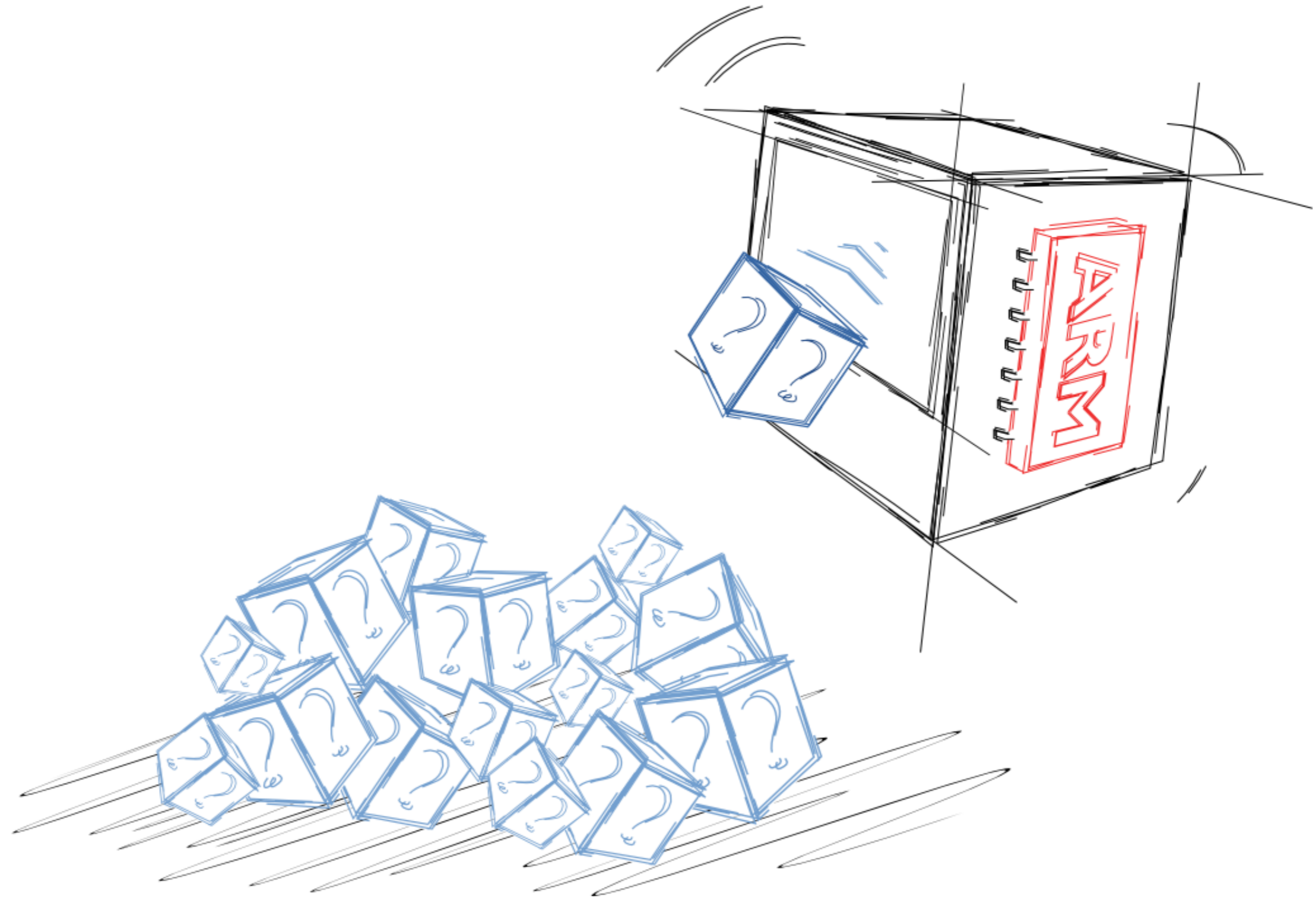
Electronics



Software



Challenges



Any Questions?