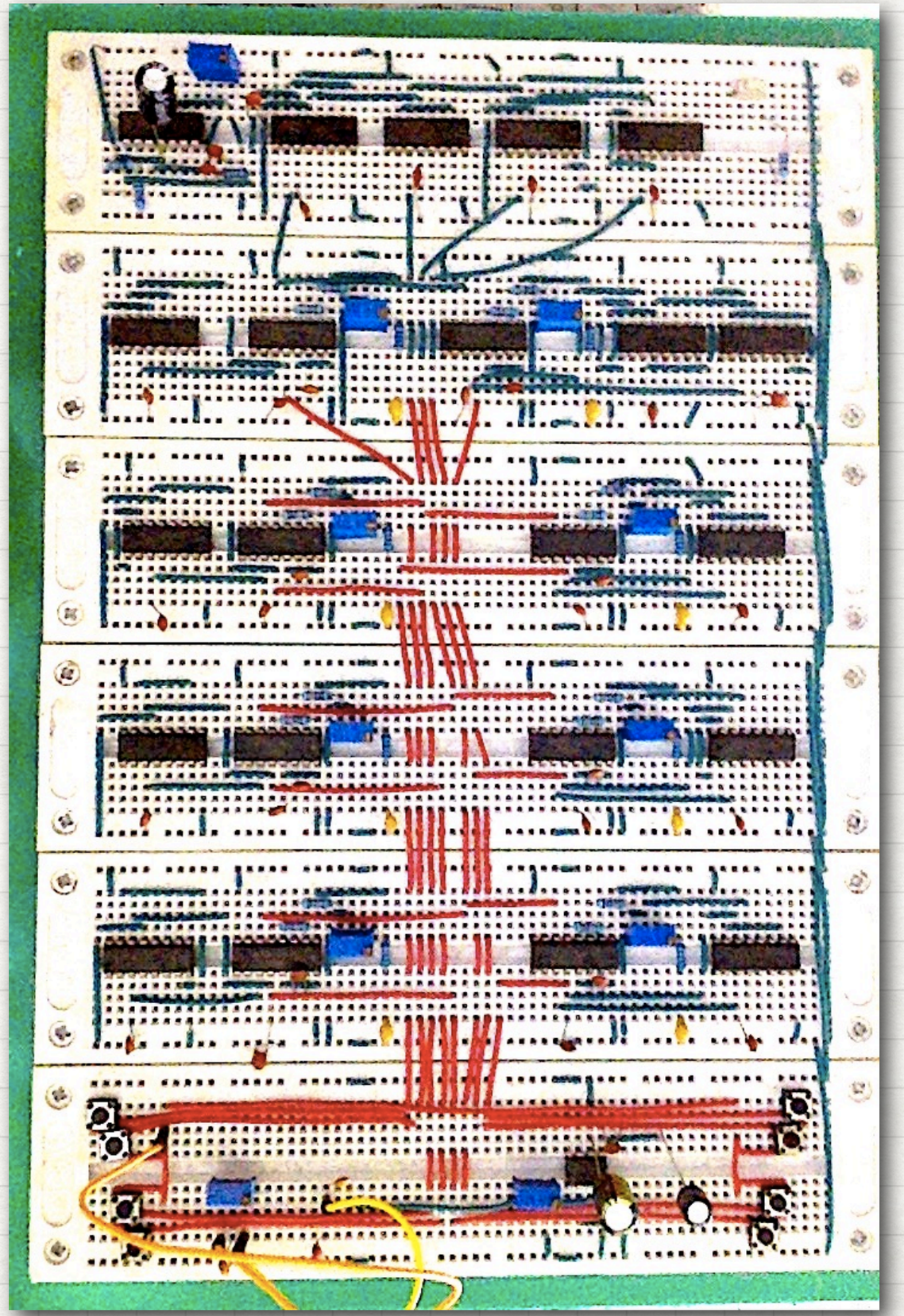
WELCOME TO

PROJECT PRACTICE!

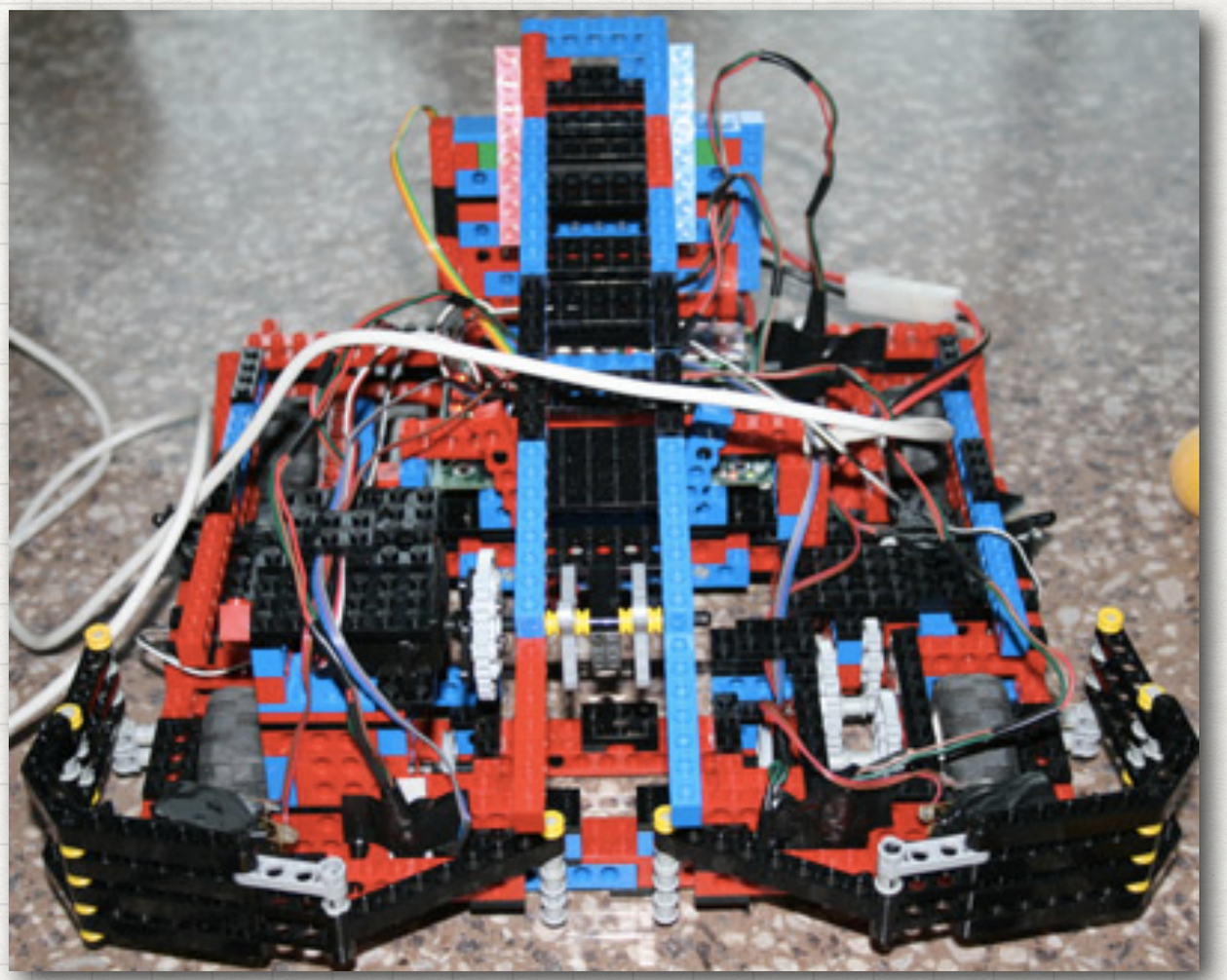
FIRST, SOME BACKGROUND



PRACTICE/CONTEST CLASSES

WITH A LONG HISTORY AROUND GLOBAL

- 6.270@MIT
  - 3 students form a group.
  - A contest rule and goal is set.
  - A set of LEGO, Happyboard, and sensor/motor are provided.
- ME310@Stanford
- ENGIN@UCBerkeley
- …

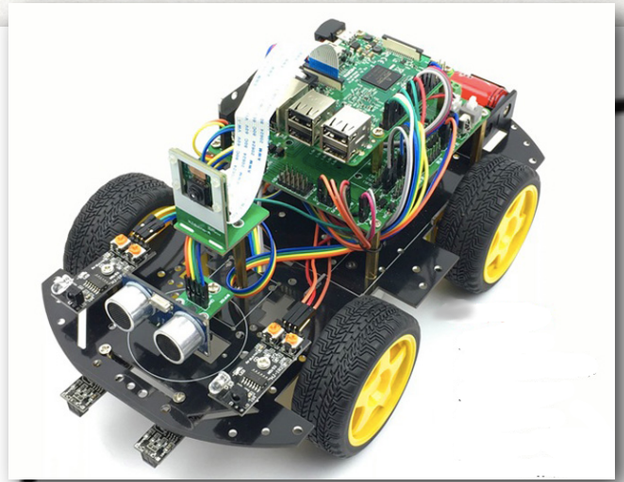


TO BE OR NOT TO BE

- This class is not
  - a theory biased class.
  - a validation oriented lab session.
- This class is
  - made by YOU!
  - flexible: both contest and entrepreneurship are supported.
  - rigid: strive for excellent work and present it both in oral and written form.

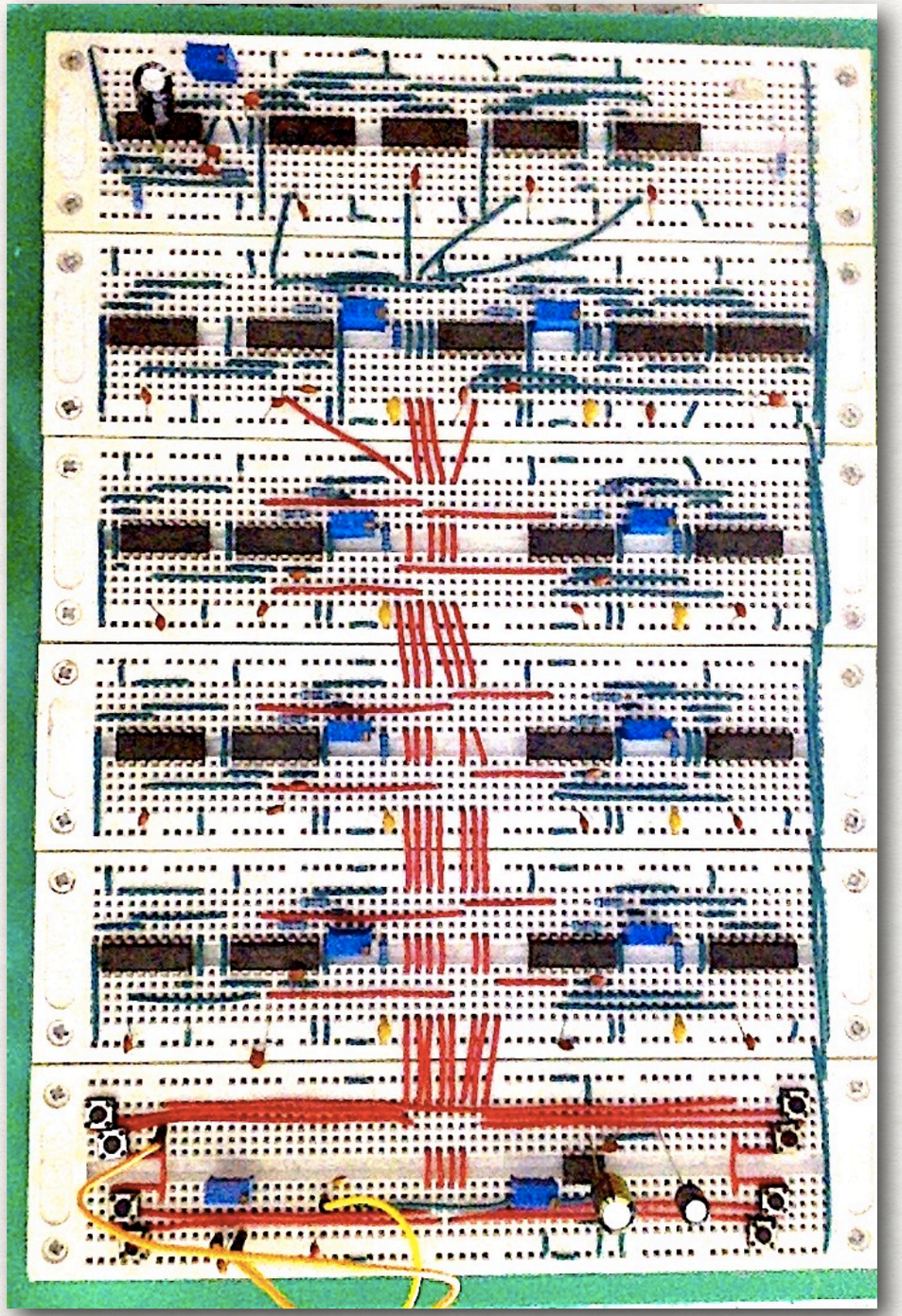
SOME EXAMPLE

THE E-CAR



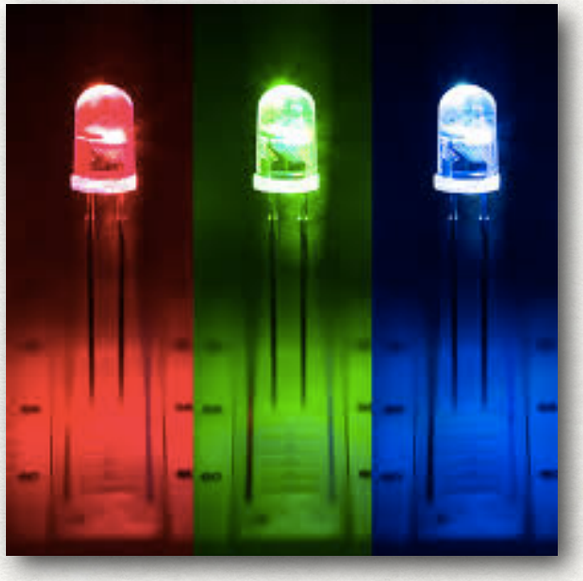
SOME EXAMPLE

THE E-PIANO



SOME EXAMPLE

LIFI

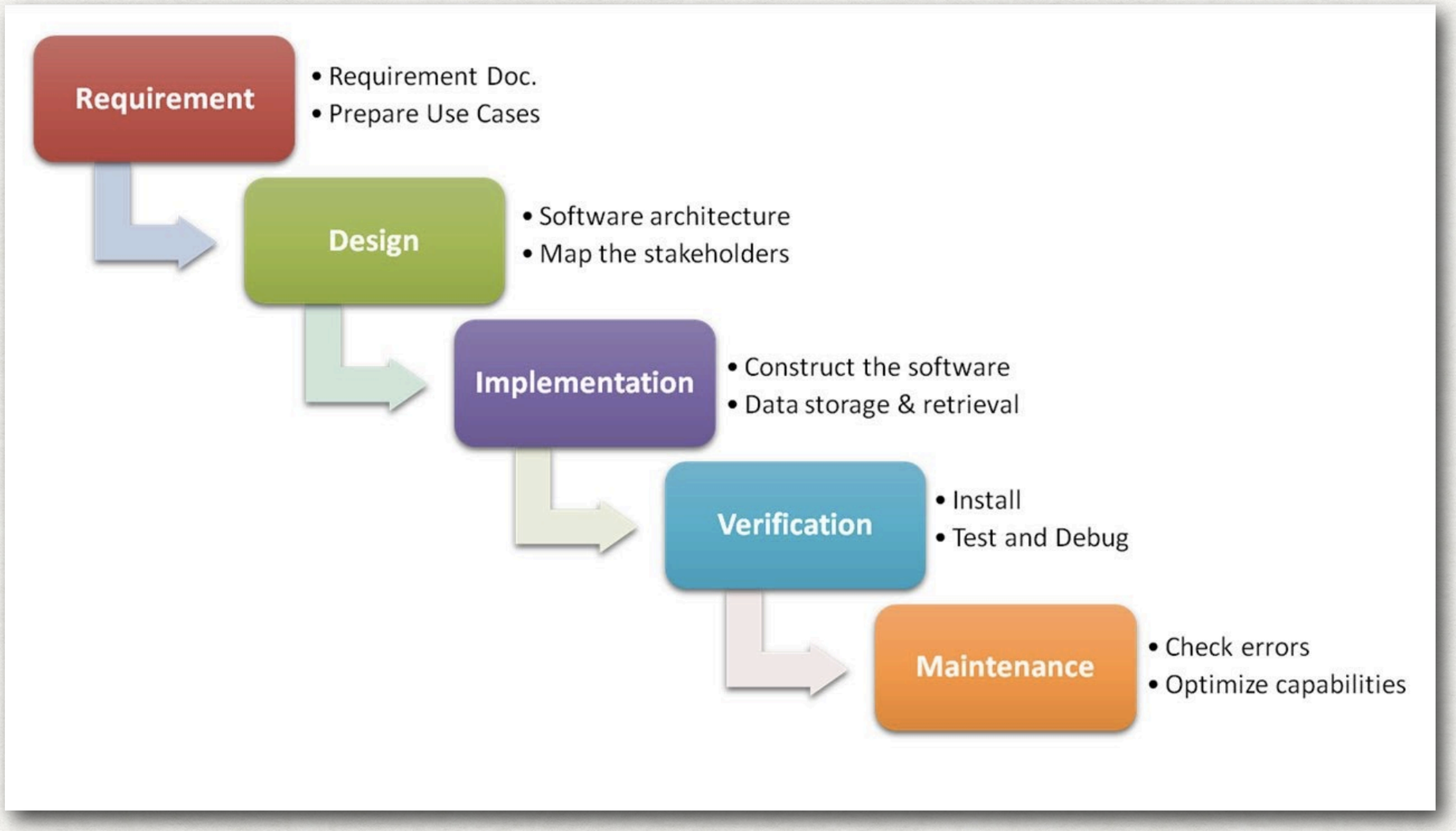


SOME EXAMPLE

3D SCANNER

SOME EXAMPLE

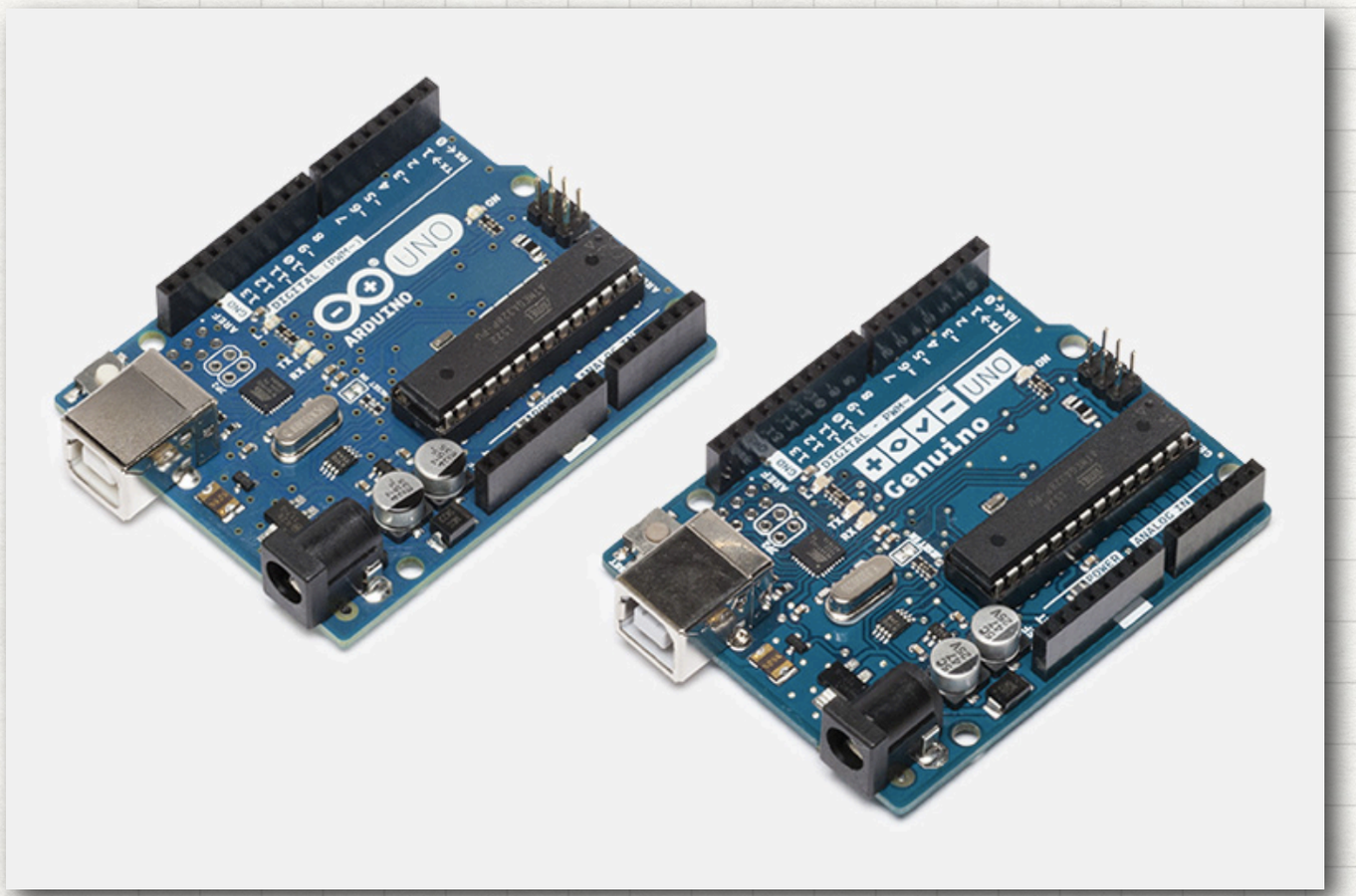
INTRODUCTION TO SOFTWARE ENGINEERING



SOME EXAMPLE

USE PYTHON FOR STOCK PRICE PREDICTION

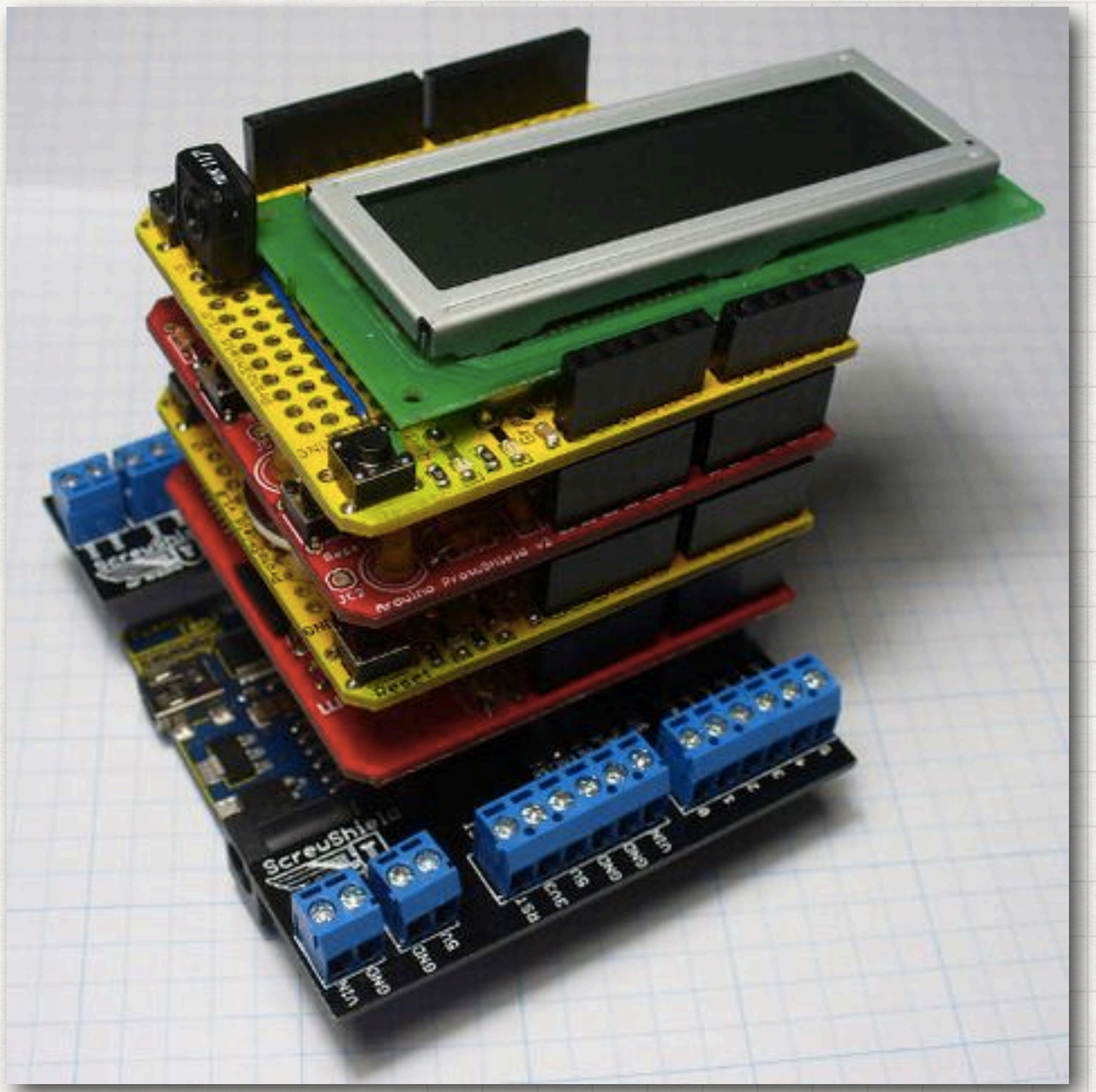
TOOLS IN THE TOOLBOX



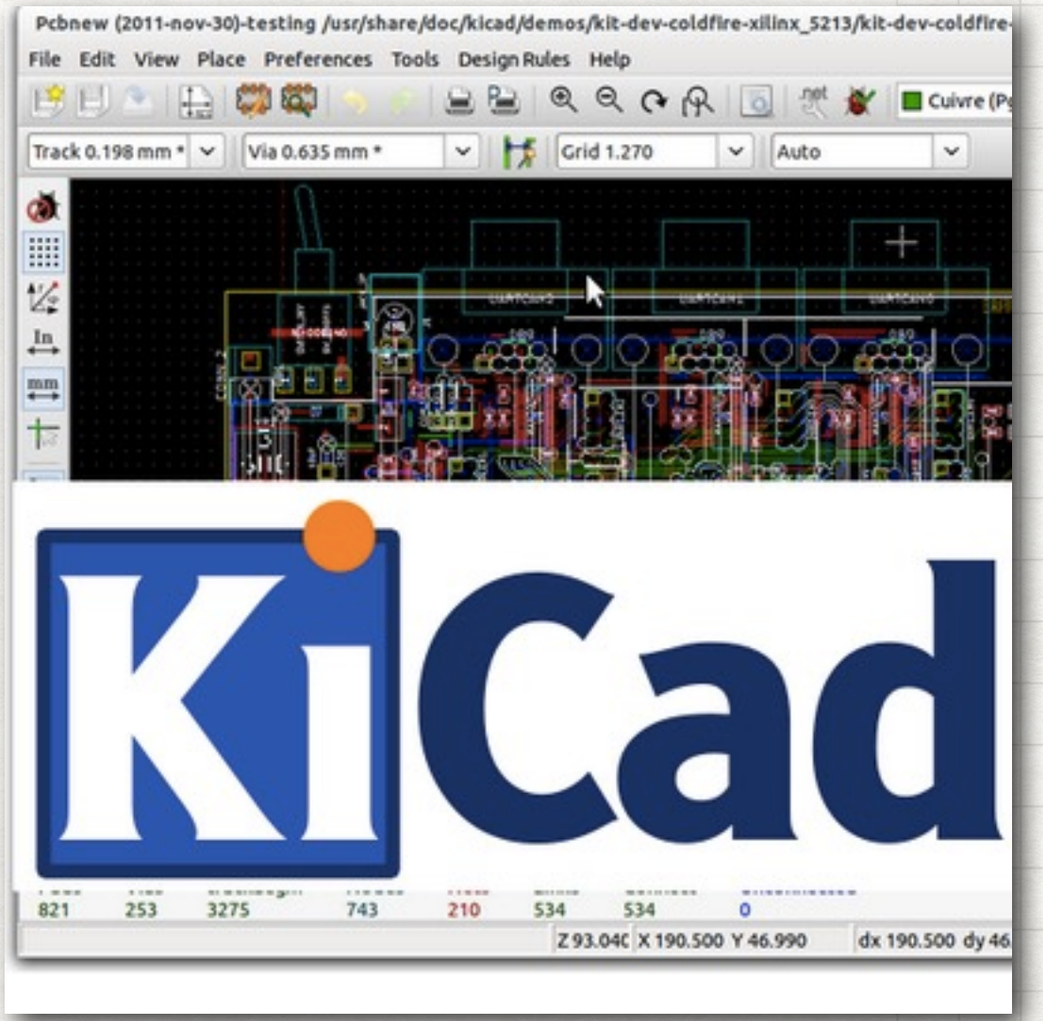
ARDUINO UNO

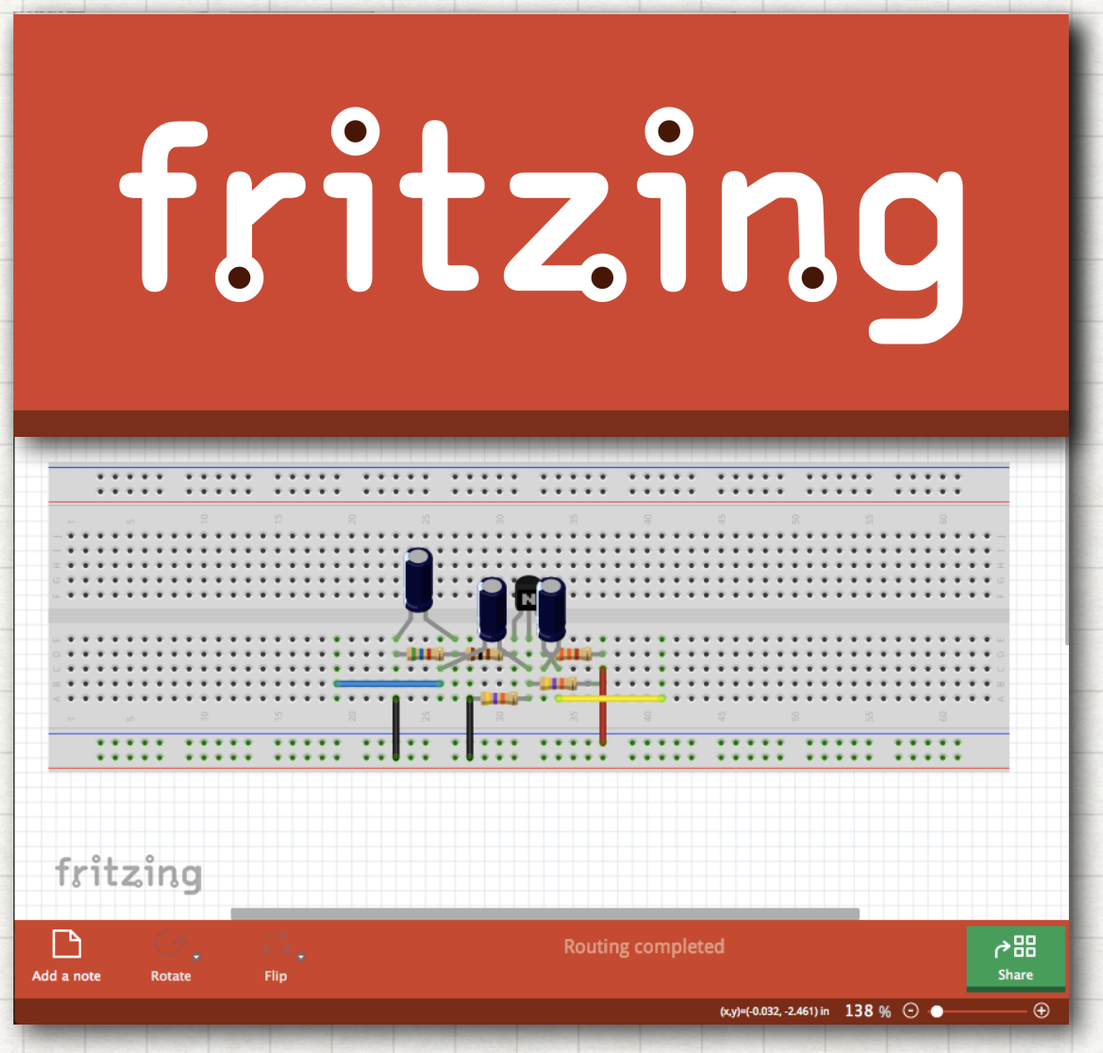

Arduino Uno R3 Pinout
IOREF
RESET
3.3V
5V
GND
GND
VIN
A0 14 PC0
A1 15 PC1
A2 16 PC2
A3 17 PC3
SDA A4 18 PC4
SCL A5 19 PC5
PC6
PC5 19 A5 SCL
PC4 18 A4 SDA
AREF
GND
PB5 13 SCK
PB4 12 MISO
PB3 11 MOSI
PB2 10 SS
PB1 9
PB0 8
PD7 7
PD6 6
PD5 5
PD4 4
PD3 3 INT1
PD2 2 INT0
PD1 1 TX
PD0 0 RX
AVR
DIGITAL
ANALOG
POWER
SERIAL
SPI
I2C
PWM
INTERRUPT
2014 by Bouni
Photo by Arduino.cc

SHIELD

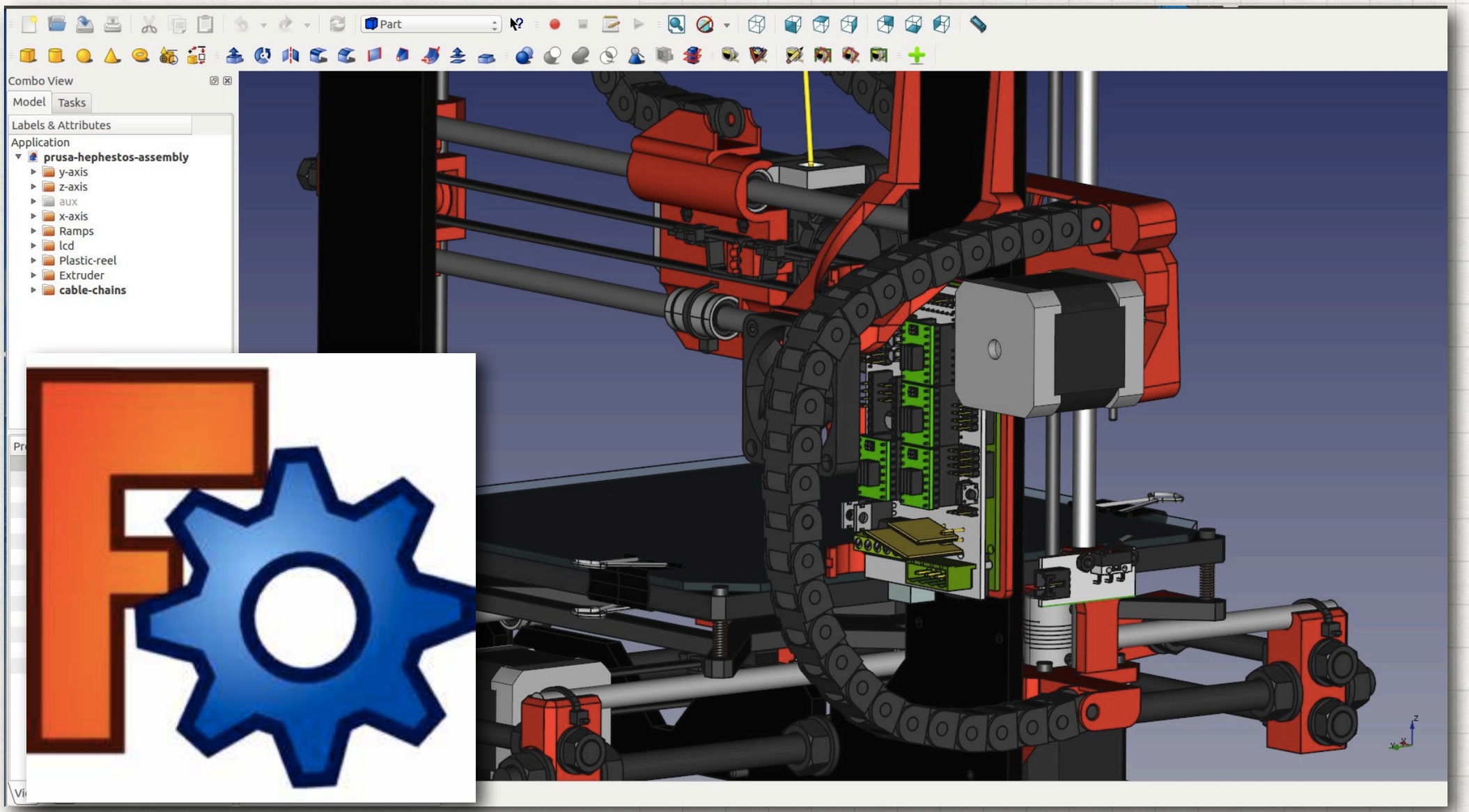


PCB CAD

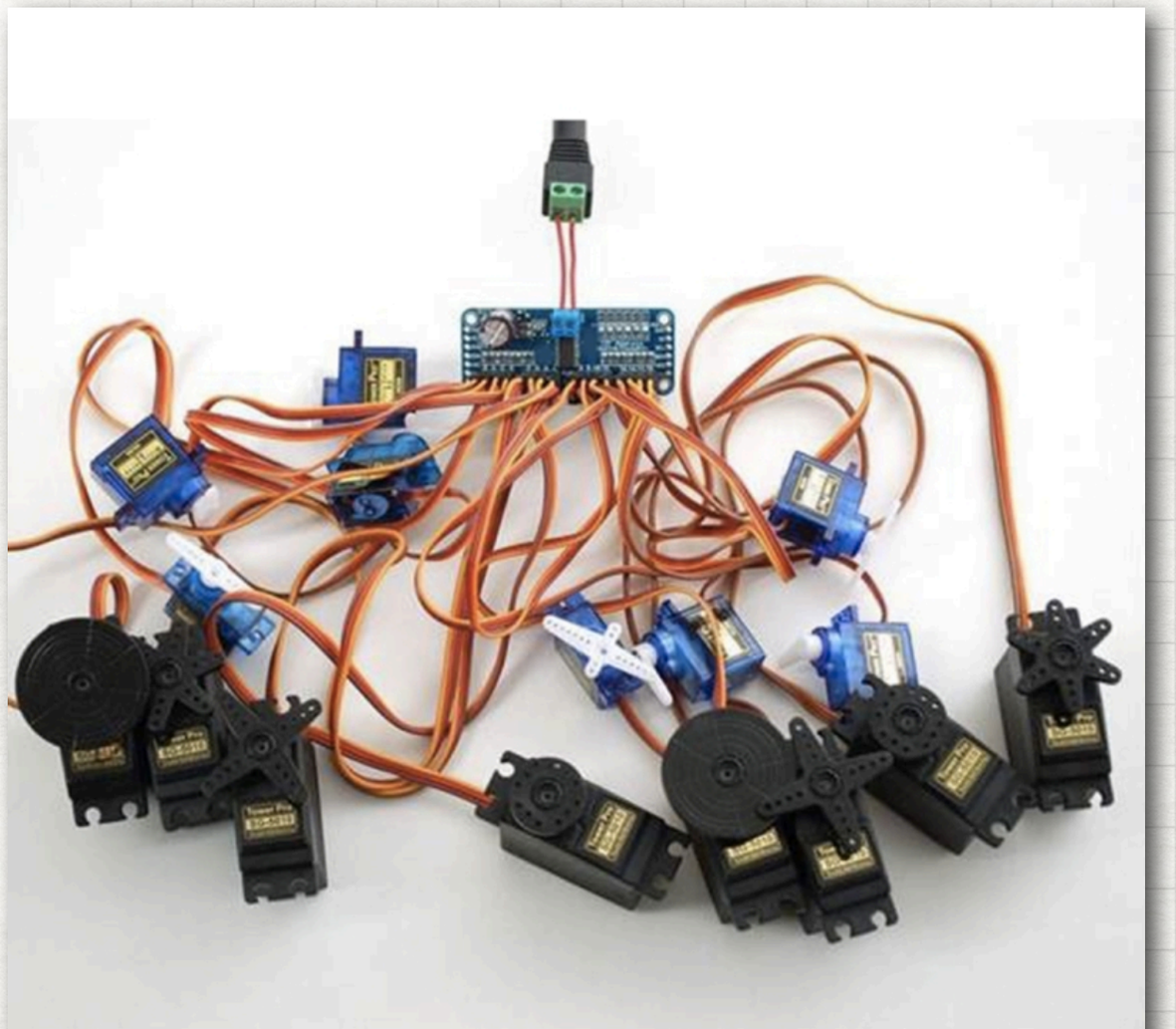

Pcbnew (2011-nov-30)-testing /usr/share/doc/kicad/demos/kit-dev-coldfire-xilinx_5213/kit-dev-coldfire-
File Edit View Place Preferences Tools Design Rules Help
Track 0.198 mm *
Via 0.635 mm *
Grid 1.270
Auto
KiCad
821 253 3275 743 210 534 534 0
Z 93.040 X 190.500 Y 46.990 dx 190.500 dy 46


fritzing
fritzing
Add a note
Rotate
Flip
Routing completed
Share
(x,y)=(-0.032, -2.461) in
138 %

3D MODELER


Part
Combo View
Model
Tasks
Labels & Attributes
Application
prusa-hephestos-assembly
y-axis
z-axis
aux
x-axis
Ramps
lcd
Plastic-reel
Extruder
cable-chains

NOW, THE TARGET

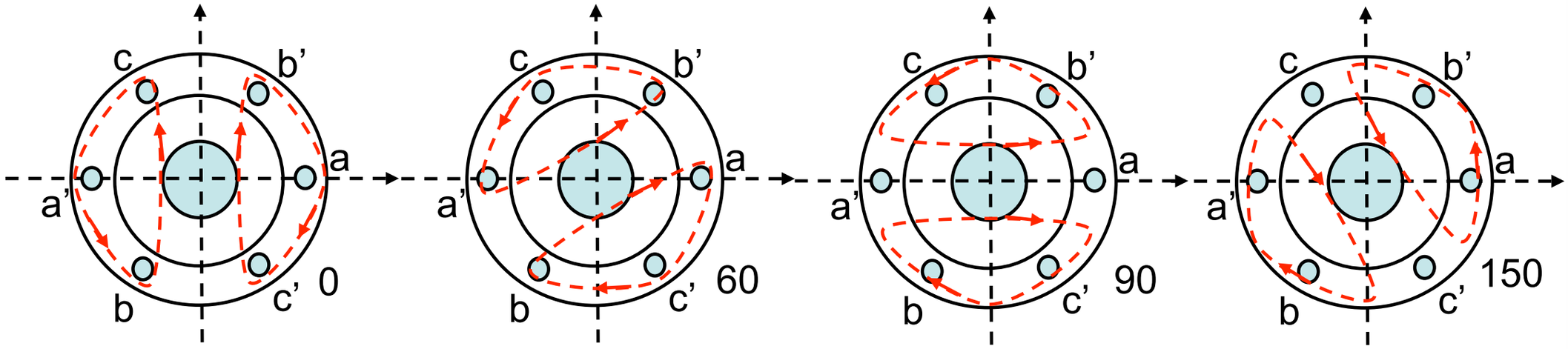


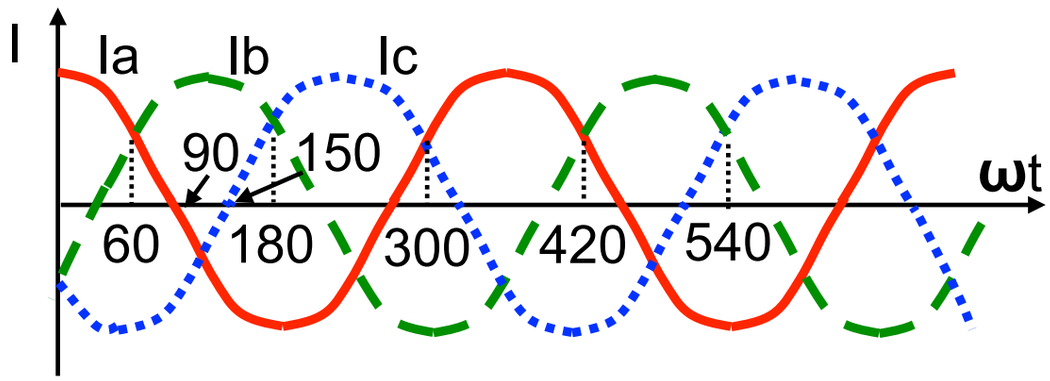
THE TARGET OF THIS TERM

- Develop your own Arduino shield to control 4 dc motors!
- Why? Build your own e-car based on your own 4-channel dc motor control shield in the next semester.
- Variations:
  - You can use Raspberry Pi. However, the cost is on your own.
  - Other motor options than dc motors, including BLDC, are encouraged. The cost may be covered upon confirmation.

Motor

- DC motor: structure similar to the AC generator
- Revolving magnetic field

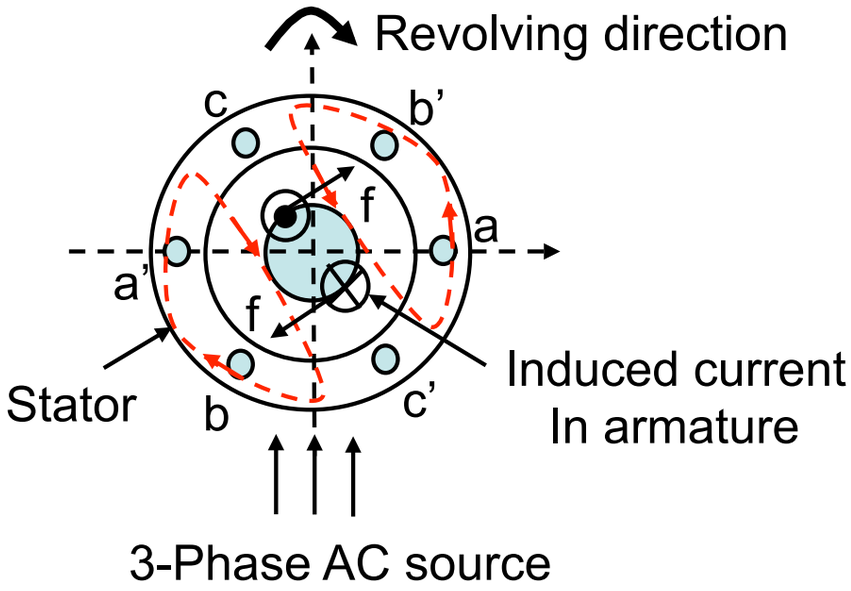


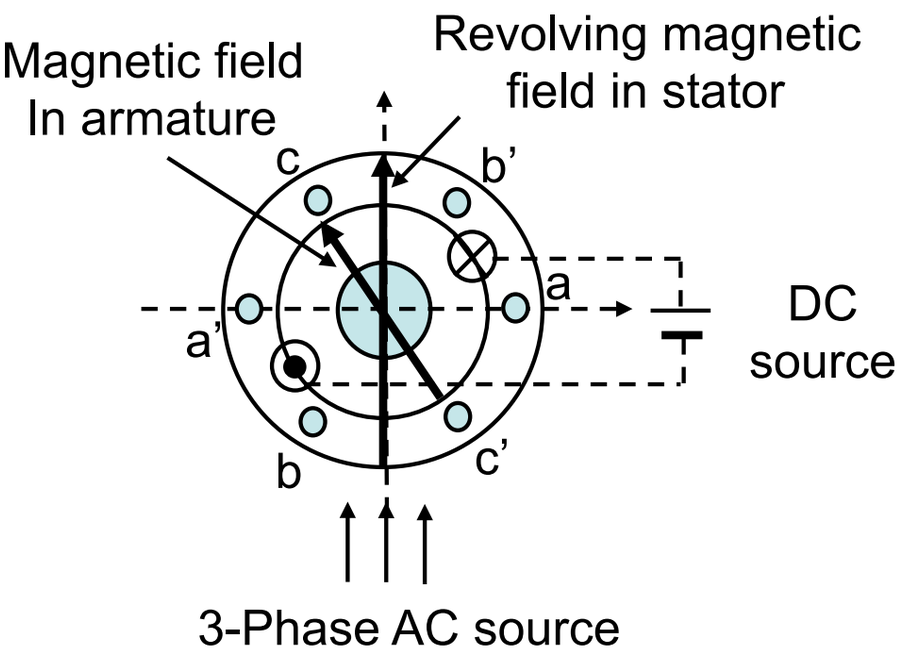


Ia – a in, a’ out
Ib – b in, b’ out
Ic – c in, c’ out

Motor

- Induction (asynchronous) motor
- Synchronous motor





REFERENCE BOARD

- https://www.waveshare.com/wiki/Motor_Control_Shield