DrawingTests-Copy1

September 2, 2017

1 Drawing Tests

1.1 Object

- Play around with drawing things.

2 Code:

```
In [95]: import GCode
         import GRBL
         import numpy as np
         from utils import picture
         cnc = GRBL.GRBL(port="/dev/cnc_3018")

         print("Laser Mode: {}".format(cnc.laser_mode))

         from enum import IntEnum
         class Tool(IntEnum):
             SPINDLE = 0
             LASER = 1

         from enum import IntEnum
         class LaserPower(IntEnum):
             CONSTANT = 0
             DYNAMIC = 1

         LaserPower.CONSTANT

         def init(power_mode = LaserPower(0), feed = 200, pwm = 1):
             program = GCode.GCode()
             program.G21() # Metric Units
             program.G91() # Absolute positioning.
             program.G1(F=feed) #
             if power_mode==LaserPower.CONSTANT:

                 program.M3(S=pwm) # Laser settings
```

```
    else:
        program.M4(S=pwm) # Laser settings
    return program

def end():
    program = GCode.GCode()
    program.M5() # Laser settings.
    return program

def square(size=0.25):
    program = GCode.GCode()
    program.G1(X=size)
    program.G1(Y=-size)
    program.G1(X=-size)
    program.G1(Y=size)
    return program
```

```
Laser Mode: 1.0
```

2.1 Test Setup

Power Supply: - CicuitSpecialists CSI3010SW @ 12V - PostIt Note Grid notes. .25" grid. Position the paper & other things.

```
In [81]: def laser_on(pwm):
             if int(pwm) != np.uint8(pwm):
                 raise(Exception("UINT8! {}".format(pwm)))
             # Set minimal power setting to focus and position laser
             cnc.cmd("M3 S{:03d}".format(np.uint8(pwm)))
             cnc.cmd("G1 F10") # Laser On

         def laser_off():
             cnc.cmd("M5") # Laser off
```

```
In [34]: cnc.cmd("$X")
```

```
Out[34]: ['ok', 'ok']
```

```
In [35]: cnc.cmd("G1 F10")
```

```
Out[35]: ['ok', 'ok']
```

```
In [22]: laser_on(1) # Position the axis by hand
```

```
In [21]: laser_off()
```

```
In [54]: tests_x = 10
         tests_y = 7
```

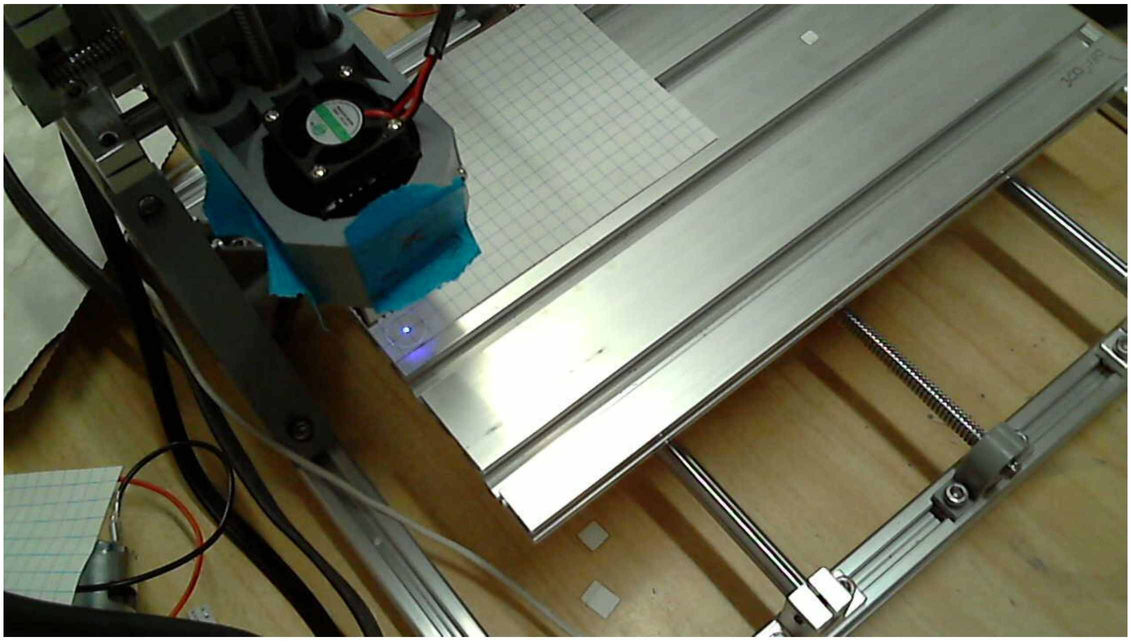
```
In [40]: cnc.run(init(laser=0.1)+square(0.25))
```

```
Out[40]: 0.8319504261016846
```

```
In [23]: def jogx(x=10):
             program = GCode.GCode()
             program.G0(X=x)
             cnc.run(program)
         def jogy(y=10):
             program = GCode.GCode()
             program.G0(Y=y)
             cnc.run(program)
         def jogz(z=10):
             program = GCode.GCode()
             program.G0(Z=z)
             cnc.run(program)
```

3 Test Setup

```
In [49]: picture()
```



```
In [100]: def test_program(power_mode=0, feed=100, pwm=1):
              program = GCode.GCode()
              program += init(power_mode=power_mode, pwm=pwm, feed=feed)
              negX = 0
              negZ = 0
              for dZ in [5, 5, 5, 5]:
                  dX = 10
                  program.G1(X=dX, Z=dZ, F=feed)

                  negX-=dX
                  negZ-=dZ
              program.G0(X=negX, Z=negZ)

              program += end()
              return program

In [101]: test_program()

Out[101]: <GCode>[cmds=10]

In [102]: test_program(pwm=50, feed=200)

Out[102]: <GCode>[cmds=10]

In [106]: # This test is going to immediately run out of Y axis. To test Ctrl-C and interrupting
          test_run = GCode.GCode()
          for pwm in [25, 50, 255]:
              for feed in [50, 100, 250, 500, 750, 1000]:
                  for power_mode in [LaserPower.CONSTANT, LaserPower.DYNAMIC]:
                      test_run+= test_program(pwm=50, feed=200)
                      test_run.G0(Y=10)

In [107]: test_run

Out[107]: <GCode>[cmds=396]

In [108]: test_run.save("DrawingTests-Copy1.gcode")

In [109]: test_run = GCode.GCode()

In [110]: test_run.load("DrawingTests-Copy1.gcode")

In [111]: test_run.buffer[0:5]

Out[111]: ['G21', 'G91', 'G1 F200', 'M3 S50', 'G1 F200 X10 Z5']

In [113]: cnc.reset()

In [114]: cnc.status

Out[114]: '<Idle|MPos:0.000,0.000,-5.000|Bf:15,127|FS:0,0|WCO:0.000,0.000,0.000>'

In [115]: from time import sleep
In [121]: while 1:
              try:
                  cnc.run(test_run)
                  while 1:
                      print(cnc.status)
                      sleep(5)
              except KeyboardInterrupt as error:
                  print("Feed Hold")
                  cnc.cmd("!")
                  print("^C")
                  break
              except:
                  raise
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Feed Hold
^C
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```
In [124]: cnc.cmd("?")
          # .status does not return 'ok'/'ok' when this requested on hold.
```

```
Out[124]: ['<Hold:0|MPos:21.548,70.000,5.774|Bf:12,0|FS:0,0>']
```

GRBL Source that controls this string: https://github.com/gnea/grbl/blob/master/grbl/report.c
Bf = Plan block buffer available. FS = real-time feed rate & spindle speed.

4 New Test Setup!

This notebook's structure makes it much easier to run tests and debug before exceuting the tests.

- Makes it easier & safer to interrupt test (ˆC / interrupt)
- Saves the GCode for version control.
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