Lab 2

Dimming LEDs

In [ ]:
```
import analogio
import pwmio
import time
from board import *

knob = analogio.AnalogIn(A0)
light = pwmio.PWMOut(GP15)

while True:
    light.duty_cycle = knob.value
```

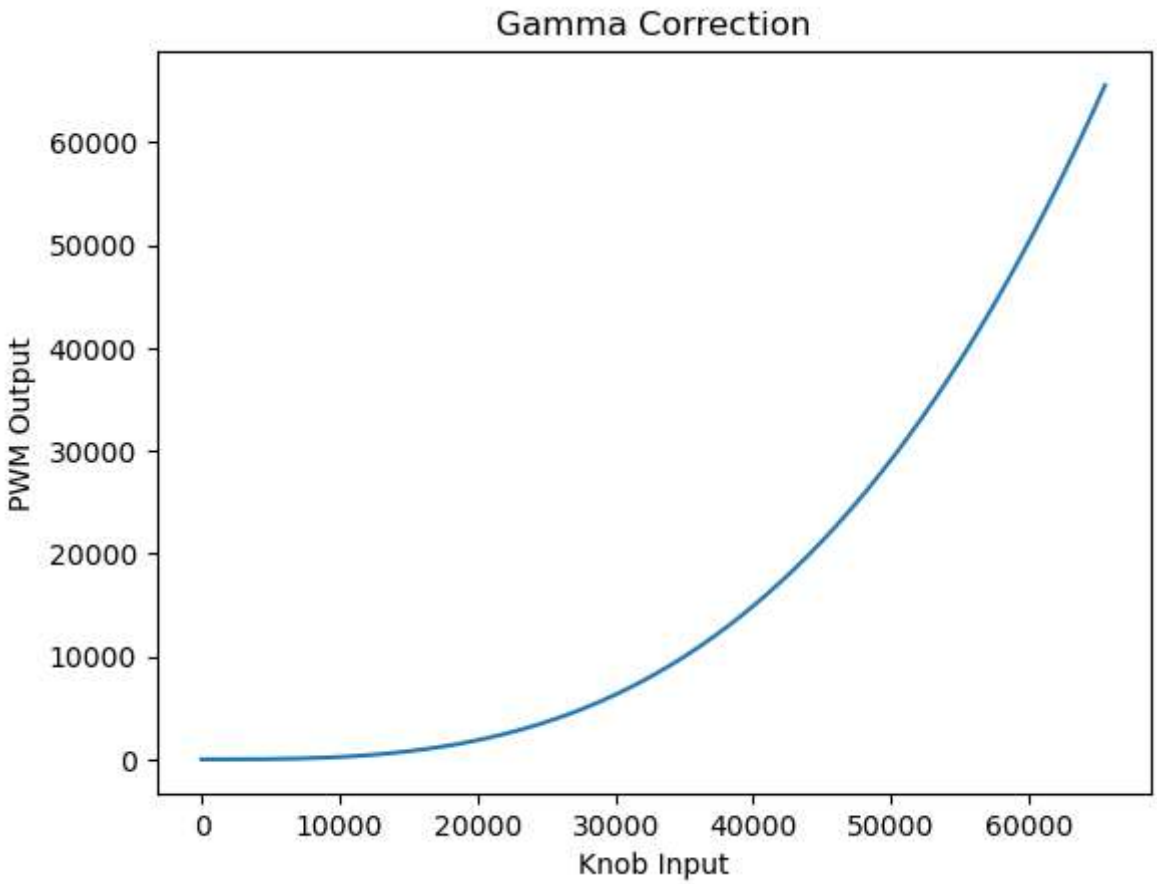
Gamma Correction

In [ ]:
```
import analogio
import pwmio
import time
from board import *

knob = analogio.AnalogIn(A0)
light = pwmio.PWMOut(GP15)

MAX = 2**16
GAMMA = 3.0

while True:
    value = knob.value
    gamma = ((value / MAX) ** GAMMA) * MAX
    print(gamma)
    light.duty_cycle = int(gamma)
    time.sleep(0.05)
```

Gamma Correction Plot

In [3]:
```
import matplotlib.pyplot as plt

GAMMA = 3.0
MAX = 2**16-1

values = list(range(0, MAX, 10))

# apply gamma correction to a new list
corrected_values = []

for v in values:
    new_value = ((v / MAX) ** GAMMA) * MAX
    corrected_values.append(new_value)

plt.plot(values, corrected_values)
plt.xlabel("Knob Input")
plt.ylabel("PWM Output")
plt.title("Gamma Correction")
```

Out[3]:
```
Text(0.5, 1.0, 'Gamma Correction')
```



Heart Beat

In [ ]:

```
import analogio
import pwmio
import time
from math import sin, pi
from board import *

knob = analogio.AnalogIn(A0)
light = pwmio.PWMOut(GP15)

brightness = []
values = list(range(1, 101))

for x in values:
    brightness.append(int((2**15)*sin(((2*pi)/100)*x) + 2**15))

while True:
    for x in brightness:
        if x < 2**16:
            light.duty_cycle = int(x)
            time.sleep(0.01)
```

Bonus

In [ ]:

```
import analogio
import pwmio
import time
from math import sin, pi
from board import *

knob = analogio.AnalogIn(A0)
light = pwmio.PWMOut(GP15)

brightness = []
values = list(range(1, 101))

for x in values:
    brightness.append(int((2**15)*sin(((2*pi)/100)*x) + 2**15))

MAX = 2**16
GAMMA = 3.0

while True:
    for x in brightness:
        if x < 2**16:
            value = knob.value
            percent = ((value / MAX) ** GAMMA)
            light.duty_cycle = int(x)
            time.sleep(0.1 * percent)
```