



**ARDUINO: QUE O LADO PYTHON DO FIRMATA
ESTEJA COM VOCE**



ALEX AQUINO

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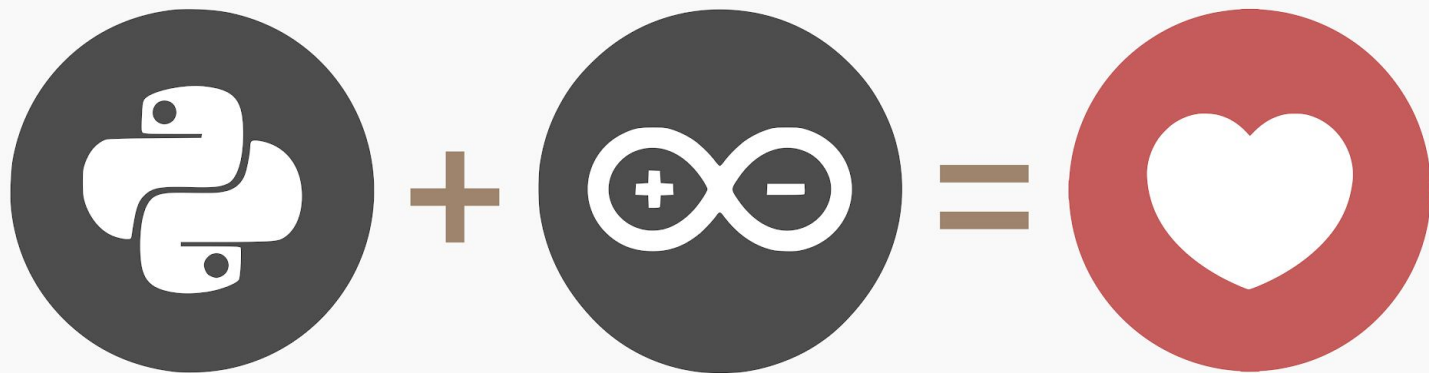
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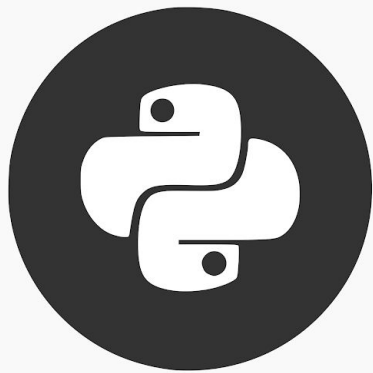


```
>_ python com arduino
```





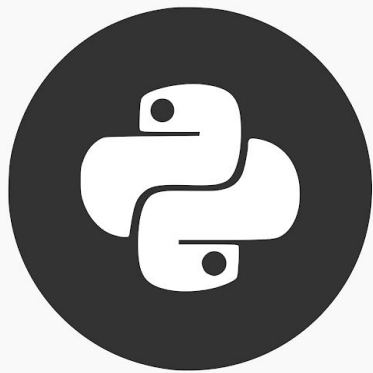
```
>_ python?!
```



- Fácil de ler e entender;
- Permite prototipagem rápida;
- Reduz o tempo de desenvolvimento;
- Universo de bibliotecas;
- Comunidade gigantesca;
- Multiparadigma e Multiplataforma;
- Open Source...



```
>_ python helloworld
```



```
print("Hello World")
```



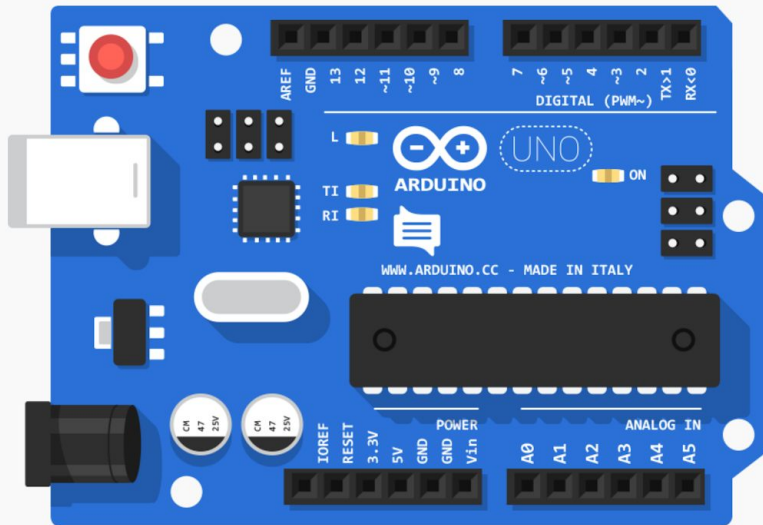
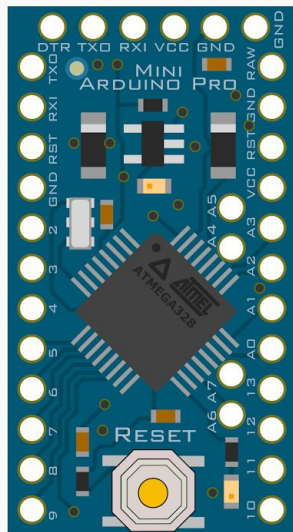
```
#include <iostream>
using namespace std;
int main() {
    cout << "Hallo World" << endl;
    return 0;
}
```



```
public class HalloWorld {
    public static void main(String[] args) {
        System.out.println("Hallo World");
    }
}
```



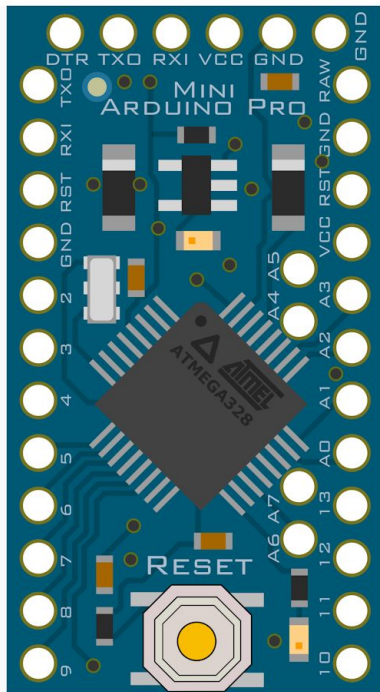
>_ arduino, limitações e tudo mais..



ATmega 328 - 16 MHz - 32KB Flash (sketch) - 2KB SRAM
20 Pinos I/O: 14 Digitais (6 PWM) e 6 Analógicos



>_ arduino blink

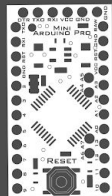


```
void setup() {  
  pinMode(13, OUTPUT);  
}
```

```
void loop() {  
  digitalWrite(13, HIGH);  
  delay(1000);  
  digitalWrite(13, LOW);  
  delay(1000);  
}
```



```
>_ firmata?!
```



Firmata é um protocolo para comunicação
com microcontroladores a partir de software em um computador (device).



```
>_ pyfirmata?!
```

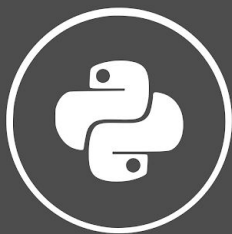


PyFirmata conversa com o Arduino via serial

você carrega a aplicação `firmata` no Arduino e depois utiliza o `pyFirmata` no PC para enviar "Comandos" para o Arduino



>_ o que precisamos?



`python.org`



`arduino.cc`



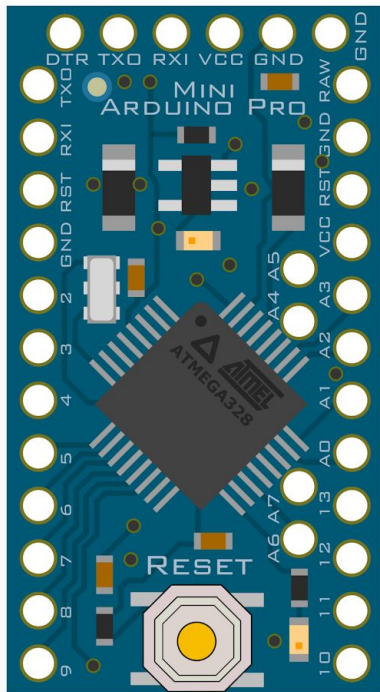
`pip.pypa.io`



`pip install pyfirmata`

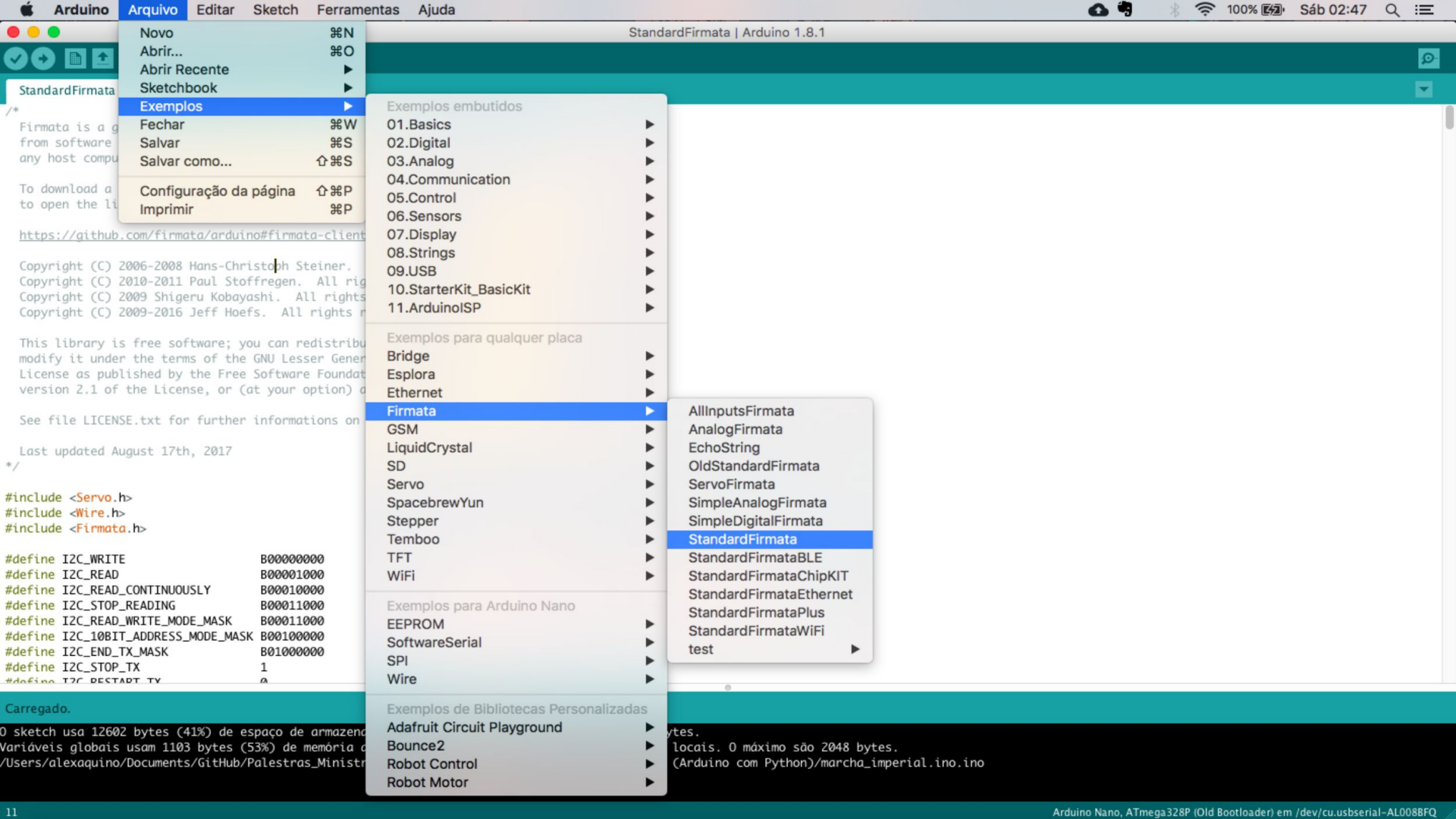
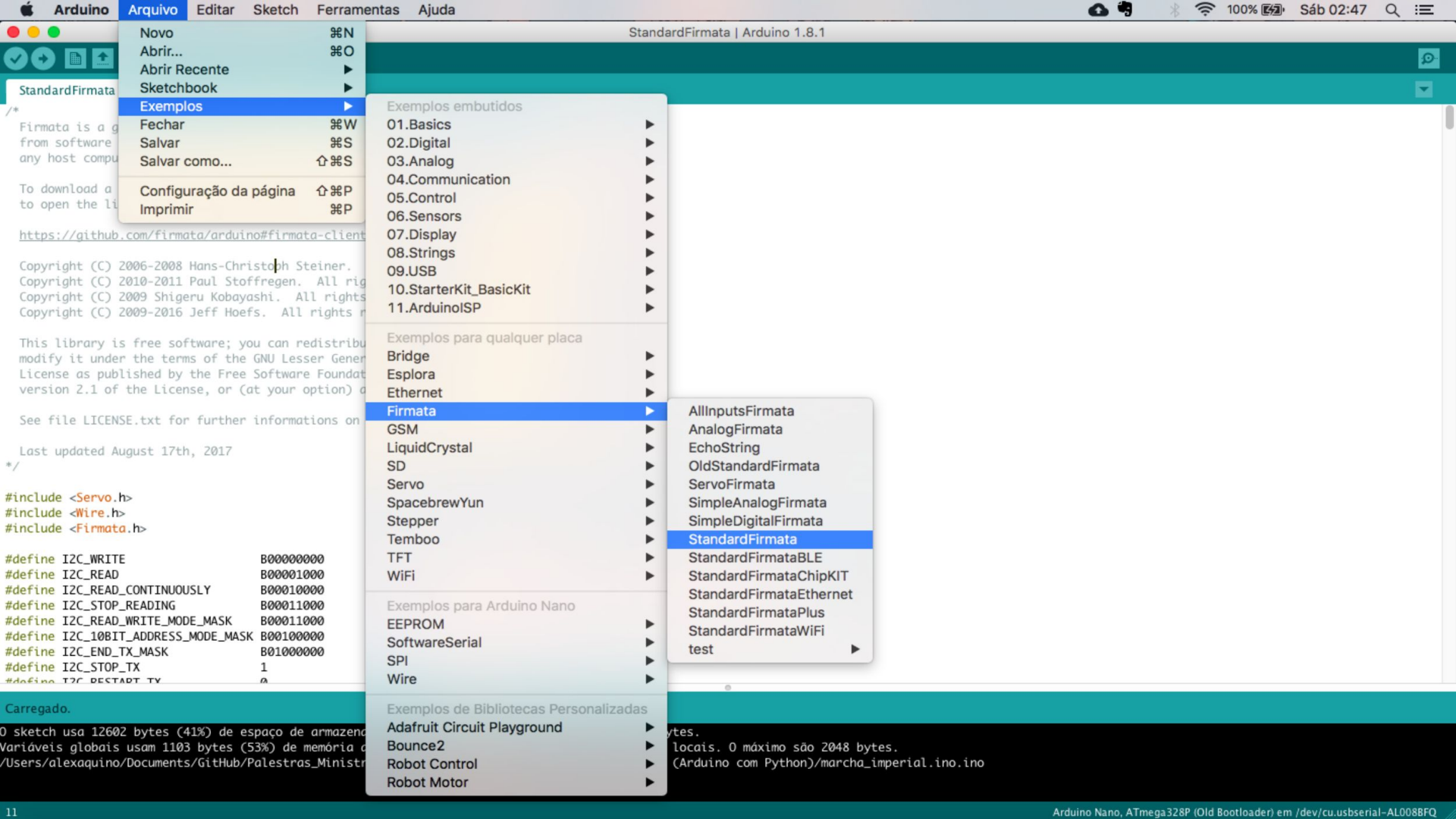


>_ arduino blink



```
void setup() {  
  pinMode(13, OUTPUT);  
}
```

```
void loop() {  
  digitalWrite(13, HIGH);  
  delay(1000);  
  digitalWrite(13, LOW);  
  delay(1000);  
}
```





```
from pyfirmata import Arduino

# setup()
board = Arduino("/dev/cu.usbserial-AL008BFQ")

# loop()
while True:
    # digitalWrite(6, 1);
    board.digital[6].write(1)
    # delay(1000);
    board.pass_time(1)
    # digitalWrite(6, 0);
    board.digital[6].write(0)
    # delay(1000);
    board.pass_time(1)
```



```
from pyfirmata import Arduino, PWM

darthVader = Arduino("/dev/cu.usbserial-AL008BFQ")

# setup()
darthVader.digital[6].mode = PWM

# loop()
for i in range(100):
    # Serial.print(i);
    print(i)
    # digitalWrite(6, i / 100.0);
    darthVader.digital[6].write(i / 100.0)
    # delay(50)
    darthVader.pass_time(0.05)
```



```
from pyfirmata import Arduino, util, INPUT
```

```
# setup()
```

```
mestreYoda = Arduino("/dev/cu.usbserial-AL008BFQ")
```

```
it = util.Iterator(mestreYoda)
```

```
it.start()
```

```
mestreYoda.digital[12].mode = INPUT
```

```
mestreYoda.digital[12].enable_reporting()
```



```
# loop()
while True:
    # pir = digitalRead(12);
    pir = mestreYoda.digital[12].read()
    # Serial.print(pir);
    print(pir)
    # delay(1000);
    mestreYoda.pass_time(1)
    # if(pir == HIGH);
    if pir is True:
        # digitalWrite(6, 1);
        mestreYoda.digital[6].write(1)
    # else
    else:
        # digitalWrite(6, 0);
        mestreYoda.digital[6].write(0)
```




```
from pyfirmata import Arduino, util

board = Arduino("/dev/cu.usbserial-AL008BFQ")
it = util.Iterator(board)
it.start()

board.analog[0].enable_reporting()

print("Iniciando...")
while True:
    print(board.analog[0].read())
    board.pass_time(1)
    if board.analog[0].read() < 0.5:
        board.digital[6].write(0)
    else:
        board.digital[6].write(1)
```



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Referência:



**Python Programming
for Arduino**

Develop practical Internet of Things prototypes and applications
with Arduino and Python