

```
1 from mqttclient import MQTTClient
2 from time import sleep
3 import math
4
5 server = "io.adafruit.com"
6 # update with your values from AdafruitIO ...
7 aio_user = "ashwin_kannan"
8 aio_key = "73609b18b6204c14aa793035fce4161d"
9
10 mqtt = MQTTClient(server=server, user=aio_user, password=aio_key, ssl=True)
11
12 for t in range(100):
13     s = math.sin(t/10)
14     mqtt.publish("{} /feeds/sms-feed".format(aio_user), str(s))
15     time.sleep(3)
```

```
1  from busio import I2C
2  from board import SDA, SCL
3  from adafruit_bme680 import Adafruit_BME680_I2C as BME680
4
5  i2c = I2C(scl=SCL, sda=SDA)
6  bme = BME680(i2c, address=0x76)
7
8  temperature = []
9  gas = []
10 humidity = []
11 pressure = []
12 altitude = []
13
14 while True:
15     temperature += [bme.temperature]
16     gas += [bme.gas]
17     humidity += [bme.humidity]
18     pressure += [bme.pressure]
19     altitude += [bme.altitude]
20     time.sleep(1)
```

```
1 from time import sleep
2 from machine import deepsleep, Pin
3 from board import LED
4
5 led = Pin(LED, mode=Pin.OUT)
6 led(1)
7 sleep(10)
8 led(0)
9 deepsleep(15000)
```

1.4.2

$$I_{avg} = (1-n) \cdot I_{off} + n \cdot I_{on}$$

$$40mA = (1-n) \cdot 100\mu A + n \cdot 200mA$$

$$40000\mu A = 100\mu A - 100n\mu A + 200000n\mu A$$

$$39900\mu A = 199900n\mu A$$

$$n = 0.199 \approx 0.2$$

$$n = 0.2$$

1.5

Backup battery

