**Exp no: 8**

Cloud Application using Adafruit IO Cloud

### **Aim:**

To connect a Raspberry Pi 4 with a DHT11 Temperature & Humidity Sensor and send real-time sensor data to Adafruit IO Cloud for monitoring and visualization.

## **Apparatus / Requirements**

1. **Hardware**
   * Raspberry Pi 4 with Raspbian OS installed
   * DHT11 Temperature & Humidity Sensor
   * Breadboard and Jumper Wires
   * Internet connection
2. **Software**
   * Python 3.x
   * Adafruit IO account (https://io.adafruit.com)
   * Python libraries (install using terminal): pip3 install adafruit-io adafruit-circuitpython-dht adafruit-blinka

## **Theory**

In IoT, **cloud applications** enable devices to collect and transmit data for remote access and visualization.  
 **Adafruit IO** is an IoT cloud platform that provides:

* **Feeds** → storage for sensor data
* **Dashboards** → visualization (charts, gauges)
* **Triggers & Automation** → notifications and actions

In this experiment, the **Raspberry Pi 4** reads **temperature and humidity** from the **DHT11 sensor** and sends it to Adafruit IO feeds using the **Adafruit IO Python client**. The data is displayed on an **Adafruit Dashboard** in real-time.

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## **Circuit Connections:**

* DHT11 VCC → 3.3V (Pin 1)
* DHT11 GND → GND (Pin 6)
* DHT11 DATA → GPIO4 (Pin 7)

## **Procedure**

1. Create Adafruit IO account and note down:
   * Username
   * AIO Key
2. Create two feeds:
   * temperature
   * humidity
3. Write the Python Program on Raspberry Pi
4. Save the program as dht\_adafruit.py.
5. Run it with:  
    python3 dht\_adafruit.py
6. Go to Adafruit IO Dashboard, add Line Chart / Gauge blocks, and select the temperature and humidity feeds.
7. Observe real-time updates on the dashboard.

## **Result**

Successfully read real-time temperature and humidity from the DHT11 sensor using Raspberry Pi 4 and uploaded the data to Adafruit IO Cloud for visualization.

import time

import board

import adafruit\_dht

from Adafruit\_IO import Client

# Adafruit IO credentials

aio = Client("YOUR\_USERNAME", "YOUR\_AIO\_KEY")

# Initialize DHT11 sensor on GPIO4

dht = adafruit\_dht.DHT11(board.D4)

while True:

try:

# Read data from DHT11

temp = dht.temperature

hum = dht.humidity

# Send data to Adafruit IO feeds

aio.send("temperature", temp)

aio.send("humidity", hum)

# Print on terminal

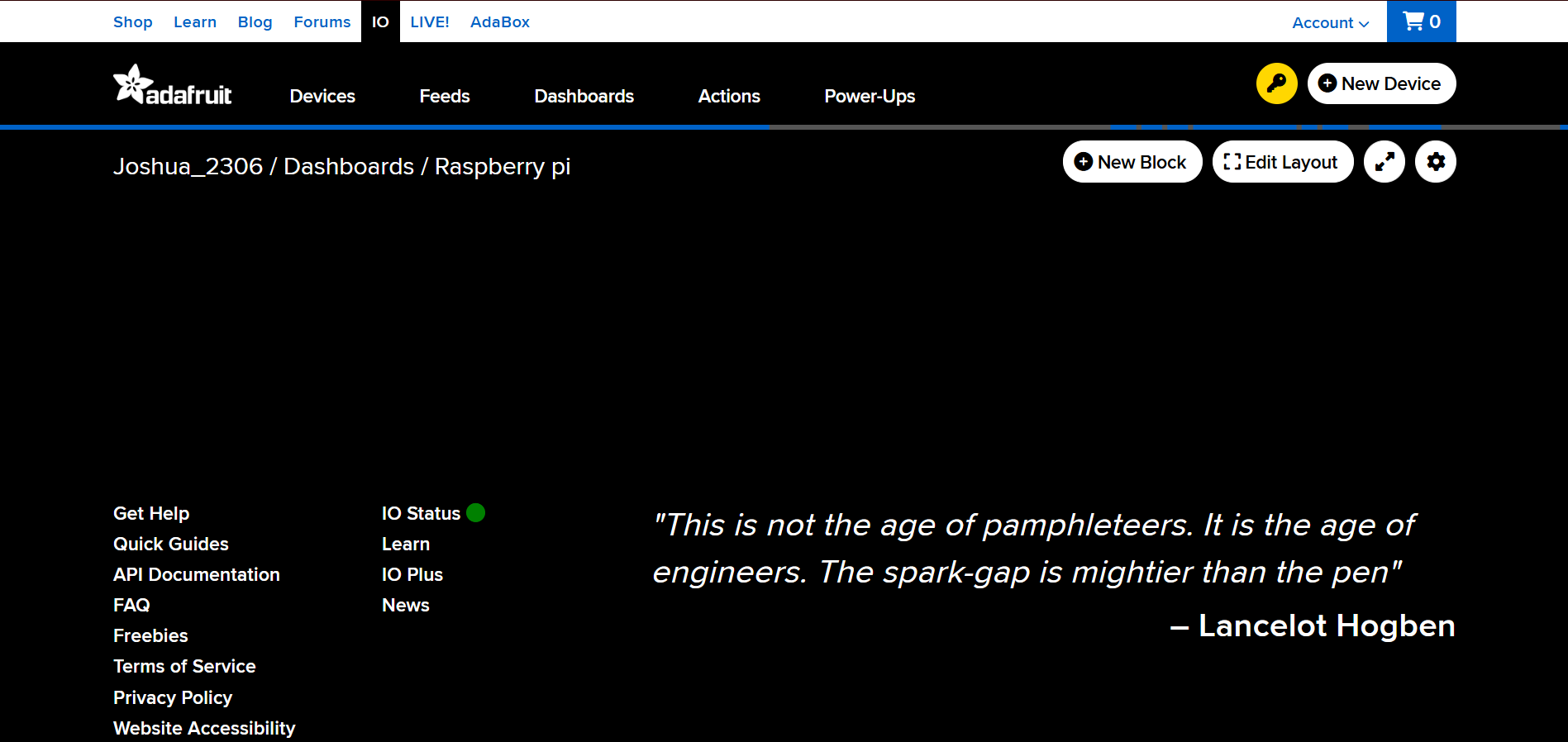
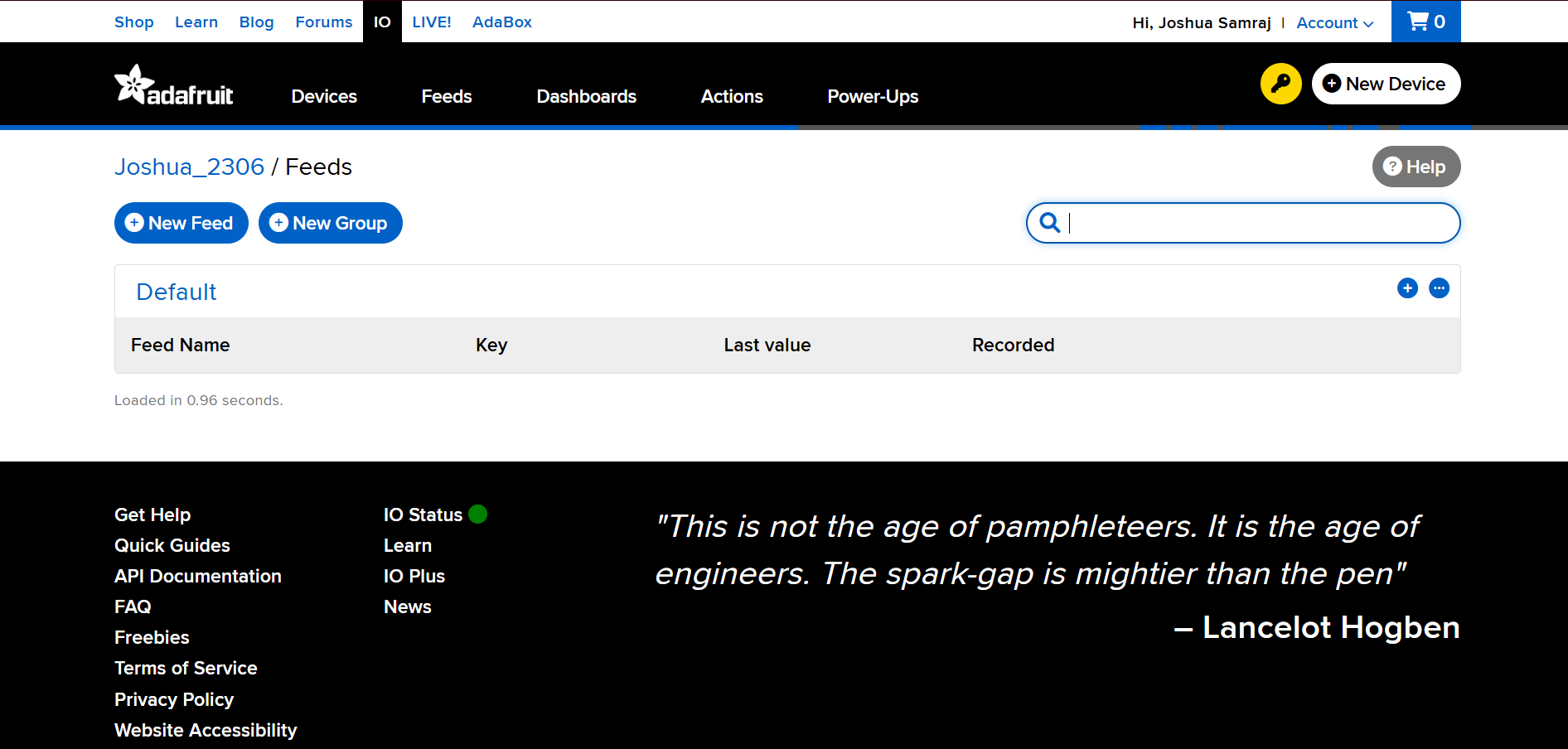
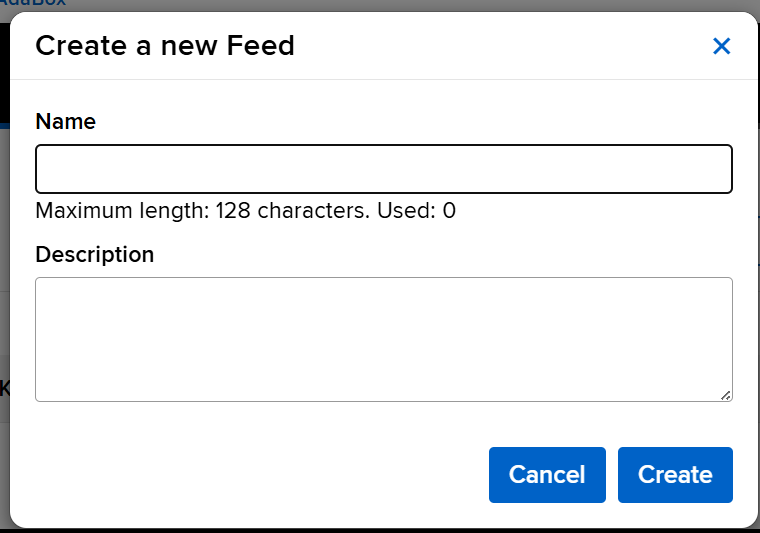
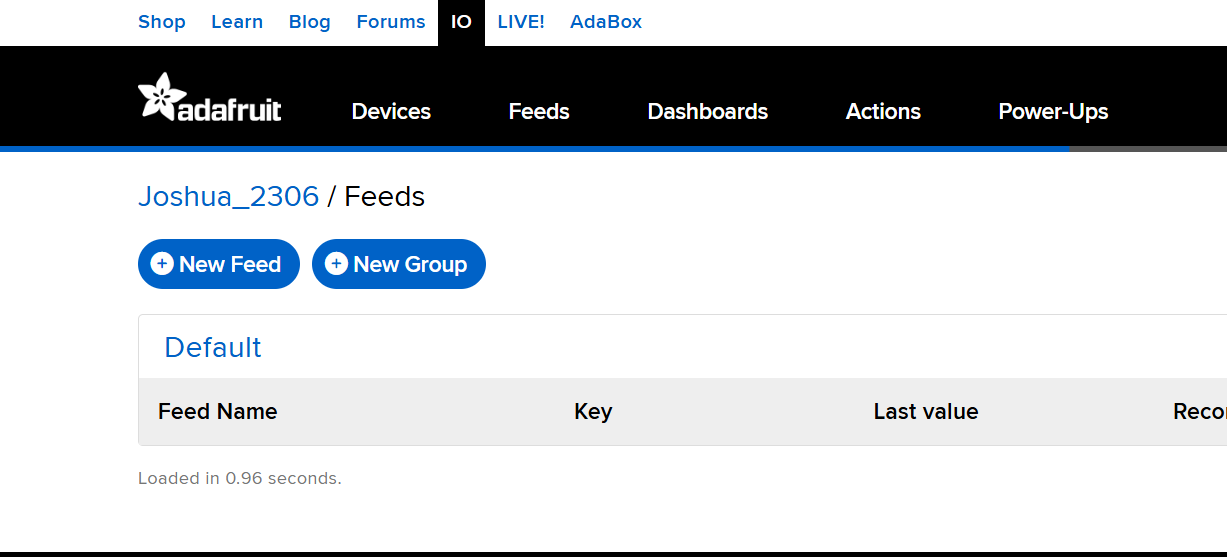
print(f"Sent -> Temperature: {temp} °C | Humidity: {hum} %")

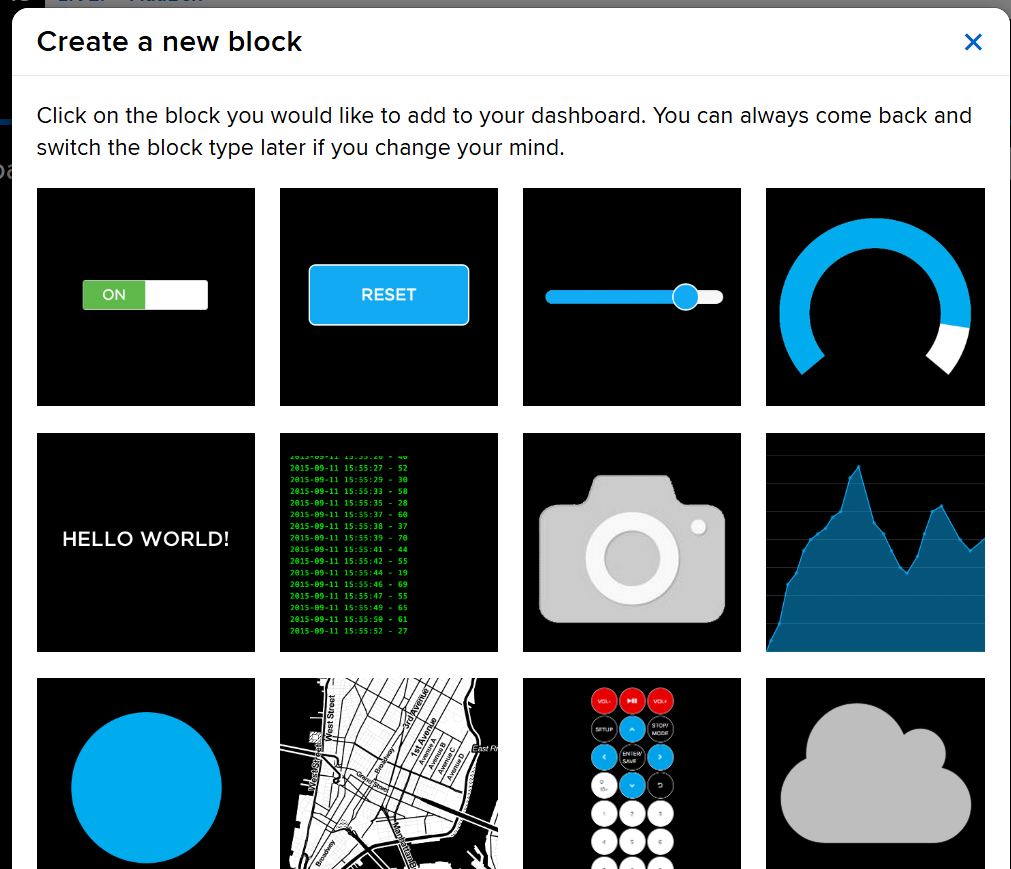
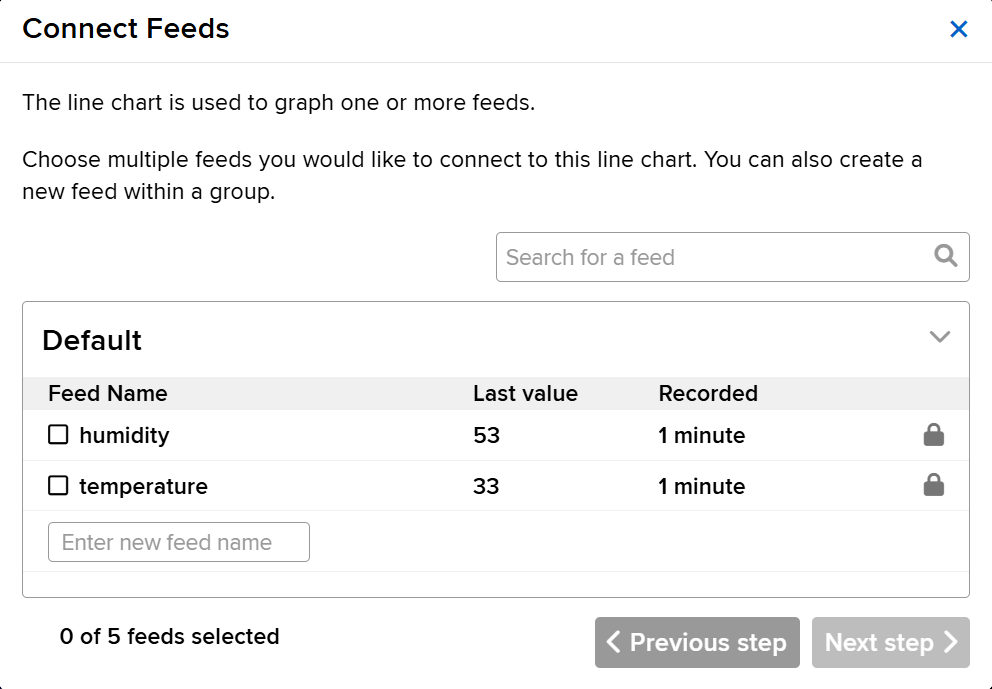
except Exception as e:

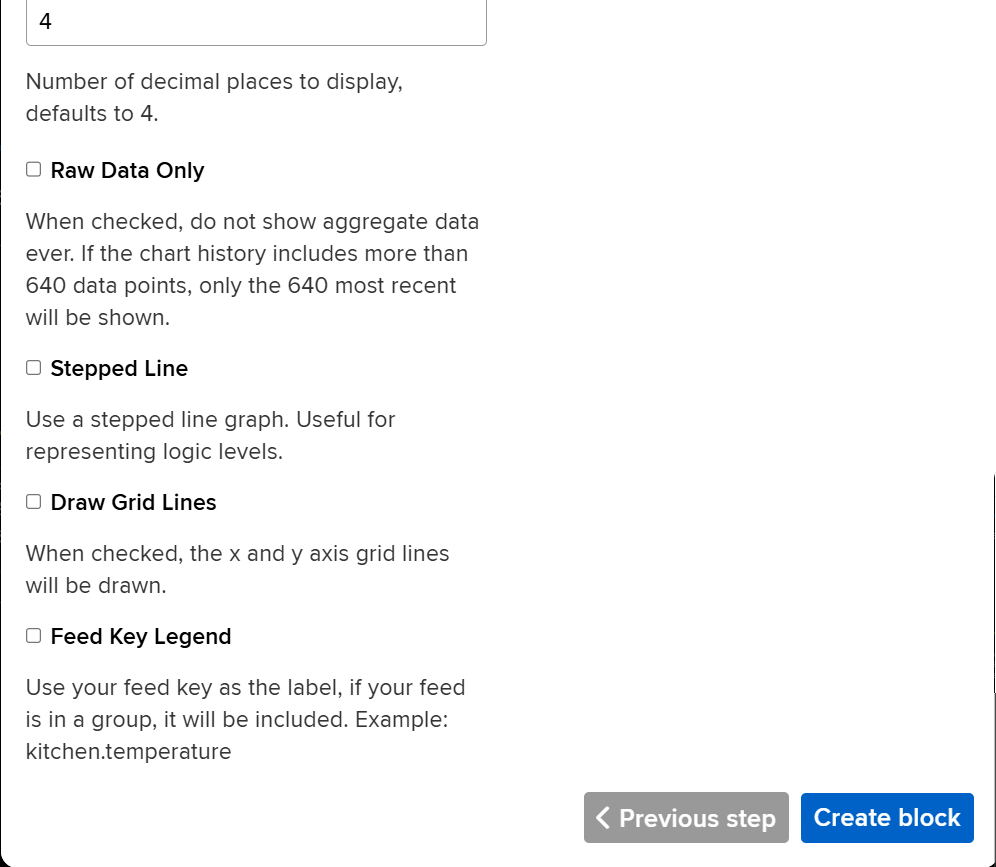
print("Error:", e)

# Delay for 10 seconds

time.sleep(10)





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