Learning the Internet of Things

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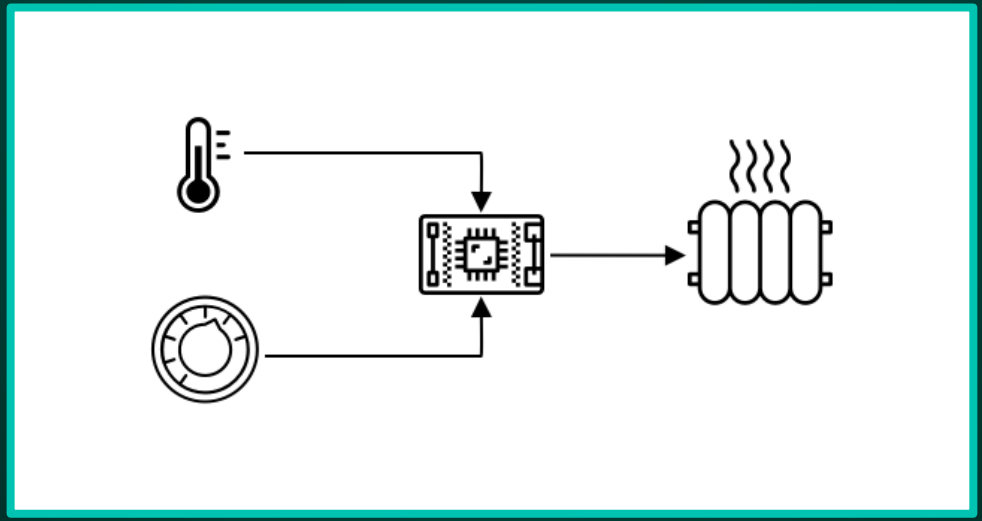
ABOUT US

KEY CONCEPTS

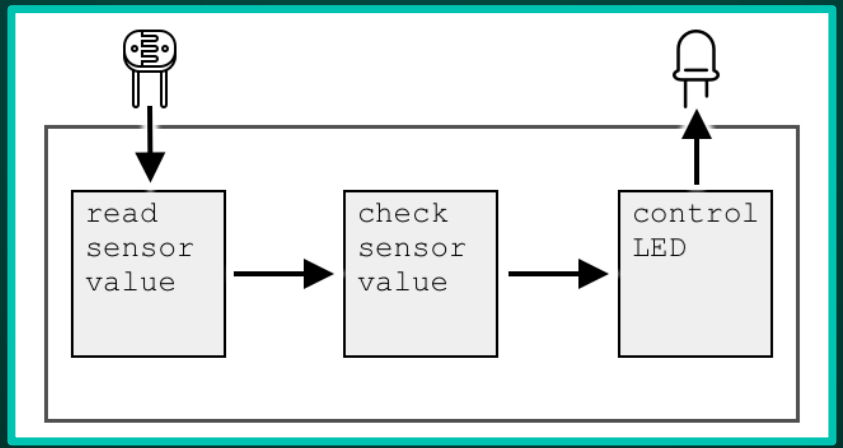
What is the Internet of Things (IoT)

- The Internet of Things (IoT) refers to a network of physical devices (Things) that are connected to the Internet and can collect, share, and process data.



How IoT works

1. Sensors collect data from the outside world.
2. Data is sent over the Internet to cloud servers or other connected devices, where processing and analysis take place.
3. Actions are performed based on the data.



What is Internet and what is Things?

What is in the Internet?

- Cloud Computing
  - Microsoft Azure
  - Google Cloud
  - AWS
- Communication Protocols
  - MQTT

What is in the Things?

- Smart Fridge
- Video doorbell
- Security cameras
- Lights

What are Sensors?

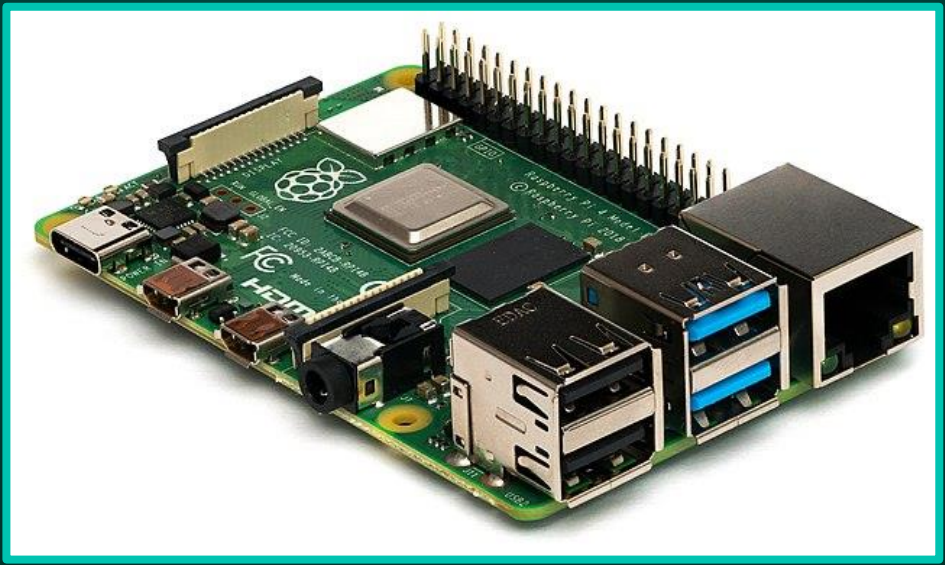
- Sensors are hardware devices that take in information from the physical world and send the information to an IoT device.
  - Examples of Sensors in Our Daily Lives are...
    - Buttons, Cameras, Microphones, and Light Sensors
  - The information sensors collect are often turned into data for the IoT device to process.

What are Actuators?

- Actuators are output devices that convert the information stored in the IoT device into an interaction with the physical world.
  - Examples of Actuators in Our Daily Lives are...
    - LEDs, Speakers, Screens, and Motors

What is a Raspberry Pi?

- A Raspberry Pi is a single-board computer that contains all the important components of a full computer on a single small board.



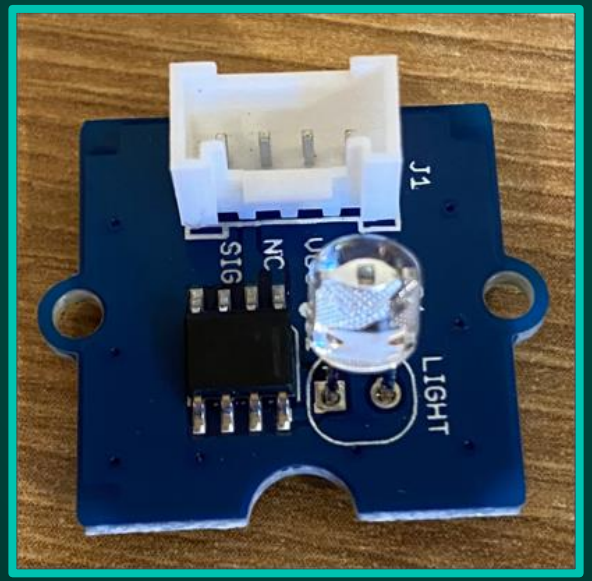
What is Python?

- Python is a high-level, interpreted programming language.
- As an interpreted language, Python relies on indentation to define code blocks, making it easy to read and reducing the need for brackets.

HARDWARE SETUP

Setting Up the Grove Light Sensor

- Attach the cable in the pouch to the Grove Light Sensor.



Setting Up the Grove LED Actuator

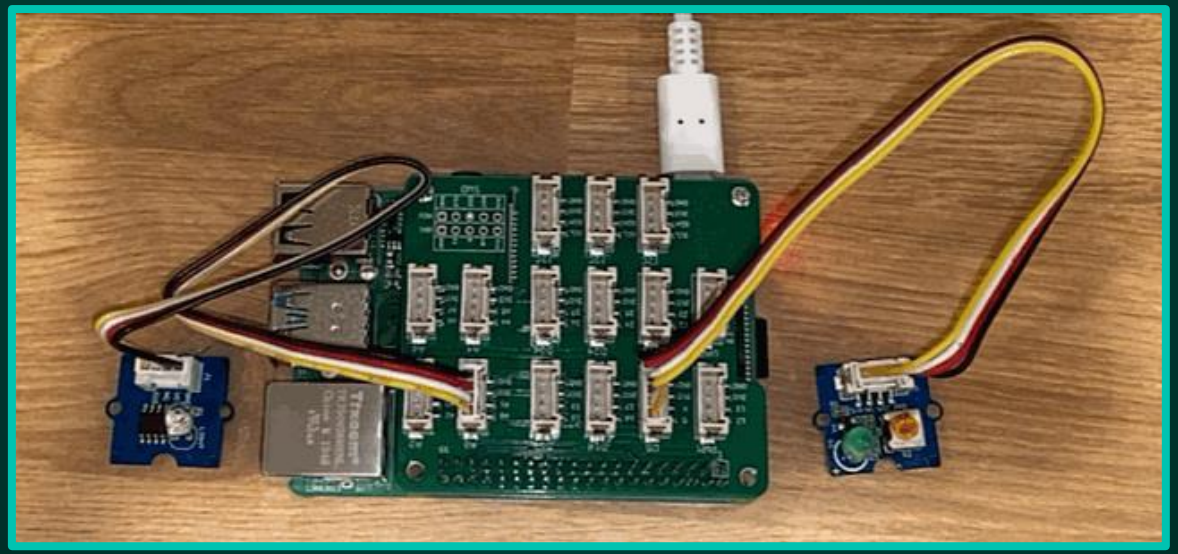
- Place the green LED light onto the board.
  - Make sure the shortest leg on the LED is to the left.
- Attach the cable in the pouch to the Grove LED Actuator.

Setting Up the Raspberry Pi - STEP 1

- Attach the Light Sensor to the socket marked A0 on the Grove Base Hat.
- Attach the Grove LED to the socket marked D5 on the Grove Base Hat.

Setting Up the Raspberry Pi - STEP 2

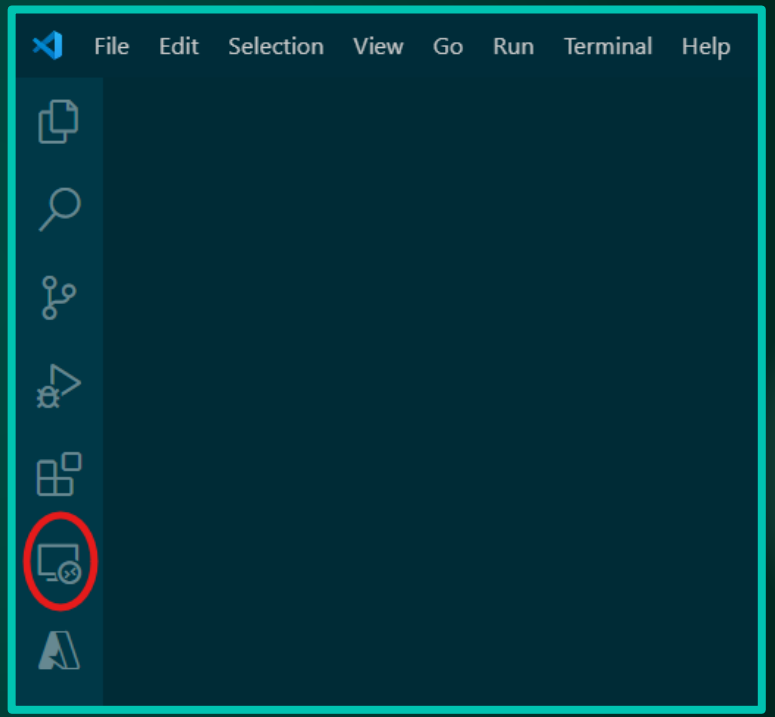
- Connect the Raspberry Pi to the USB-C power supply.
  - Your Raspberry Pi should look like this:



SOFTWARE SETUP

Setting Up VSCode - STEP 1

- Open VS Code
- Click Remote Explorer icon



Setting Up VSCode - STEP 2

- Go to IP Address, Click Connect in Current Window
- Type password: **pi**
- Open terminal

Setting Up VSCode - STEP 3

- Type in the terminal: mkdir nightlight
- Type in the terminal: cd nightlight
- Type in the terminal: touch app.py

Setting Up VSCode - STEP 4

- Type in the terminal: code .
- Retype password in new window: **pi**

CODING IN PYTHON

Programming app.py File - STEP 1

import time

from grove.grove_light_sensor_v1_2 import GroveLightSensor

from grove.grove_led import GroveLed

```
import time
from grove.grove_light_sensor_v1_2 import GroveLightSensor
from grove.grove_led import GroveLed
```

Programming app.py File - STEP 2

light_sensor = GroveLightSensor(0)

led = GroveLed(5)

```
light_sensor = GroveLightSensor(0)
led = GroveLed(5)
```

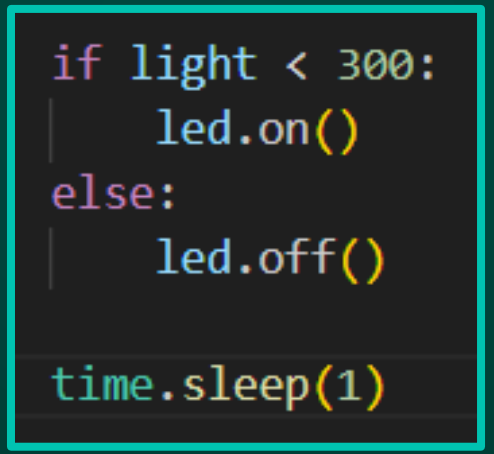
Programming app.py File - STEP 3

```
while True:
    light = light_sensor.light
    print('Light level:', light)
```


```
while True:
    light = light_sensor.light
    print('Light level:', light)
```

Programming app.py File – STEP 4

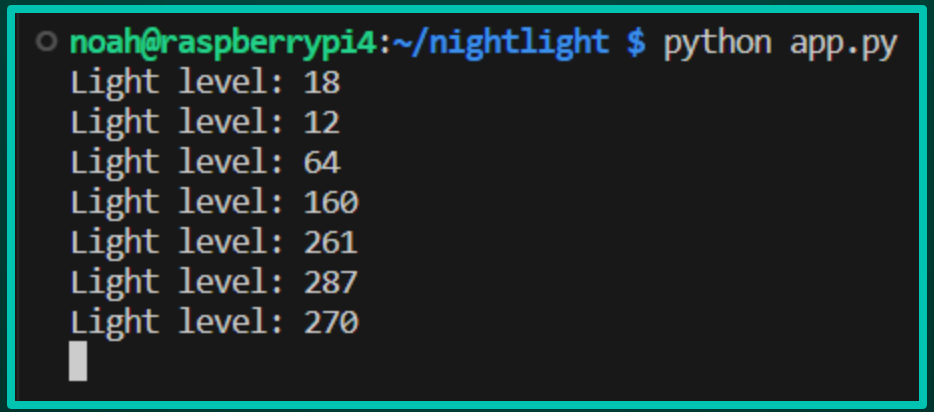
```
if light < 300:
    led.on()
else:
    led.off()
time.sleep(1)
```



LET’S RUN THE CODE!

IoT in Action!

- In the terminal type: python app.py
- The result below should appear in your terminal:
- Now, look at your LED Light and play with the LED Sensor!



THANK YOU

DOES ANYONE HAVE ANY QUESTIONS?