

NOISE MONITORING

Building an IoT Noise Monitoring system involves multiple steps, and I can provide you with an outline for Phase 3, Development Part 1.

Creating a complete Noise Monitoring project using Python code requires an extensive implementation involving various hardware components and sensors. However, I can provide you with a sample code snippet that demonstrates a basic functionality using a simulated occupancy sensor. Please keep in mind that this is a simplified example, and you would need to adapt and expand it based on your specific project requirements

Monitoring noise using Python typically involves capturing audio data and analyzing it for noise levels. You can use libraries like ``PyAudio`` to record audio and ``numpy`` for data analysis. Here's a simple example to get you started:

```
import pyaudioimport
numpy as np# Parameters
for audio
recordingFORMAT =
pyaudio.paInt16CHANNEL
S = 1 # MonoRATE =
44100 # Sample rate
(samples per
second)CHUNK = 1024 #
Size of each audio
chunkTHRESHOLD = 2000
# Adjust this threshold
based on your noise
leveldef record_noise():
audio = pyaudio.PyAudio()
stream =
audio.open(format=FORM
AT, channels=CHANNELS,
rate=RATE, input=True,
frames_per_buffer=CHUN
K) print("Recording
noise...") while True:
data =
```

```

stream.read(CHUNK)
audio_data =
np.frombuffer(data,
dtype=np.int16)    rms =
np.sqrt(np.mean(audio_dat
a**2))    print(f"RMS:
{rms}")    if rms >
THRESHOLD:
print("Noise detected!")
stream.stop_stream()
stream.close()
audio.terminate()if __name__
== '__main__':
record_noise()

```

In this example, we continuously record audio in chunks, calculate the root mean square (RMS) of the audio data, and compare it to a predefined threshold. If the RMS value exceeds the threshold, it indicates noise. You may need to adjust the `THRESHOLD` value based on your specific use case. Remember to install the required libraries using pip if you haven't already: `pip install pyaudio numpy`. Please note that this is a basic example. In a real-world application, you may want to log and analyze noise data over time, create more advanced detection algorithms, and visualize the results.