In [1]:
```
import pyaudio
import speech_recognition as sr
import time
import numpy as np
```

In [2]:
```
# Audio Configuration
CHUNK = 1024  # Audio chunks size
FORMAT = pyaudio.paInt16  # 16-bit audio
CHANNELS = 1  # Mono audio
RATE = 16000  # Sampling rate (Hz)
SILENCE_LIMIT = 1.5  # Seconds of silence to stop listening
```

In [3]:
```
# Initialize
r = sr.Recognizer()
audio = pyaudio.PyAudio()
```

In [4]:
```
# Microphone stream setup
def get_audio_stream():
    return audio.open(
        format=FORMAT,
        channels=CHANNELS,
        rate=RATE,
        input=True,
        frames_per_buffer=CHUNK
    )
```

In [5]:
```
# Real-time processing
def listen_and_transcribe():
    print("Listening... (Press Ctrl+C to stop)")
    stream = get_audio_stream()

    try:
        while True:
            print("\nSpeak now...")
            frames = []
            silent_frames = 0
            silence_threshold = 500  # Adjust based on your mic sensitivit

            # Record until silence or timeout
            for _ in range(0, int(RATE / CHUNK * 10)):  # Max 10 seconds
                data = stream.read(CHUNK, exception_on_overflow=False)
                frames.append(data)
                amplitude = np.frombuffer(data, dtype=np.int16).max()

                if amplitude < silence_threshold:
                    silent_frames += 1
                    if silent_frames > int(SILENCE_LIMIT * RATE / CHUNK):
                        break
                else:
                    silent_frames = 0

            # Convert to audio data
            audio_data = sr.AudioData(b''.join(frames), RATE, 2)

            try:
                text = r.recognize_google(audio_data)
                print(f">>> {text}")
            except sr.UnknownValueError:
                print("(Could not understand audio)")
            except sr.RequestError as e:
                print(f"(API Error: {e})")

    except KeyboardInterrupt:
        print("\nStopped listening")
    finally:
        stream.stop_stream()
        stream.close()
        audio.terminate()
```

In [6]:
```
# Start listening
listen_and_transcribe()
```

```
Listening... (Press Ctrl+C to stop)

Speak now...
>>> hello what are you doing

Speak now...
(Could not understand audio)

Speak now...

Stopped listening
```

In [ ]: