

WokiWi

Pi Pico-W

Team-2

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Develop an intelligent Bathroom Ventilation Fan Controller that optimizes indoor air quality and energy efficiency by automating fan operation based on real-time environmental data.

```
import machine
import dht
import time

# Setup DHT22 sensor on GPIO 15
dht_sensor = dht.DHT22(machine.Pin(21))

# Setup PIR sensor on GPIO 14
pir_sensor = machine.Pin(22, machine.Pin.IN)

# Setup Servo motor on GPIO 16
servo = machine.PWM(machine.Pin(19))
servo.freq(50) # Servo motors typically use a 50Hz frequency

def set_servo_angle(angle):
    # Convert angle to duty cycle (assuming 0-180 degrees range)
    min_duty = 1000 # Min pulse width in microseconds
    max_duty = 9000 # Max pulse width in microseconds
    duty = min_duty + (max_duty - min_duty) * (angle / 180)
    servo.duty_u16(int(duty))

while True:
    try:
        # Measure temperature and humidity
        time.sleep(2) # Ensure delay before reading the sensor
        dht_sensor.measure()
        temp = dht_sensor.temperature()
        hum = dht_sensor.humidity()
```

```

print(f'Temperature: {temp}°C, Humidity: {hum}%')

# Check motion detection
motion_detected = pir_sensor.value()
print(f'Motion detected: {motion_detected}')

# Control logic for the fan based on sensor data
if motion_detected:
    print("Motion detected, setting fan to high.")
    set_servo_angle(180) # Set fan to high position
elif hum > 60:
    print("High humidity detected, setting fan to medium.")
    set_servo_angle(90) # Set fan to medium position
else:
    print("No motion or high humidity, setting fan to low.")
    set_servo_angle(0) # Set fan to low or off position

except OSError as e:
    print('Sensor error:', e)
    # Retry reading the sensor after a short delay
    time.sleep(2)

```

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main.py diagram.json

```

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4
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22 while True:
23     try:
24         # Measure temperature and humidity
25         time.sleep(2) # Ensure delay before reading the sensor
26         dht_sensor.measure()
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28         temp, hum = dht_sensor.temperature(), dht_sensor.humidity()
29         print(f'Temperature: {temp}°C, Humidity: {hum}%')
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31         # Check motion detection
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48         # Retry reading the sensor after a short delay
49         time.sleep(2)

```

Simulation

07:26.234 100%

```

Temperature: 25.1°C, Humidity: 46.5%
Motion detected: 0
No motion or high humidity, setting fan to low.
Temperature: 25.1°C, Humidity: 46.5%
Motion detected: 1
Motion detected, setting fan to high.
Temperature: 25.1°C, Humidity: 46.5%
Motion detected: 1
Motion detected, setting fan to high.
Temperature: 25.1°C, Humidity: 46.5%
Motion detected: 1
Motion detected, setting fan to high.
Temperature: 25.1°C, Humidity: 46.5%
Motion detected: 1
Motion detected, setting fan to high.
Temperature: 25.1°C, Humidity: 46.5%
Motion detected: 1

```