/\* Humidity Chamber Control Program V2.1

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This program uses the Arduino Uno to monitor humidity levels in a test chamber using a DHT22

humidity/temperature sensor. If humidity levels in the chamber drop below a specified level,

the Arduino microcontroler turns on a humidifier located in a seperate chamber, moist air is

then pumped to the test chamber. When the humidity reaches a specified shut off level, the

air pump and humidifier are then turned off. This cycle can be repeated until the testing is

completed.

V2.1 - Corrected control loops, utilizes improved circuitry.

V2.0 - Never used, control loops were improved, reduced # of LEDs

V1.0 - Initial humidity control program, works, but rough control loops

DHT22 Sensor:

Looking at the front of the sensor:

Connect pin 1 (on the left) of the sensor to +5V

Connect pin 2 of the sensor to a digital pin on Arduino

pin 3 LEAVE UNCONNECTED

Connect pin 4 (on the right) of the sensor to GROUND

Connect a 10K resistor from pin 2 (data) to pin 1 (power) of the sensor

DHT22 Sensor has a slow readout time, reading temperature or humidity takes about

250 milliseconds, and sensor readings may be up to 2 seconds old.

Humidity is in percent (%), Temperature is in degrees Celcius (C).

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#include "DHT.h"

#define DHTPIN 2 // Defining sensor arduino pin number

#define DHTTYPE DHT22 // Defining sensor type

DHT dht(DHTPIN, DHTTYPE);

int redLED = 11;

int greenLED = 10;

int humidify = 7; // Humidifier

int pump = 6; // Pump on LED light

float h; // Humidity variable

float diff; // diff = humidity reading (h) - humidity limit (HL)

float hyst = 1.5; // Hysteresis threshold on/off (HL +1.5%)

float HL = 10; // Humidity Limit

/\*=======================SETUP=========================\*/

// Loads once.

// Sets Arduino pins as outputs, begins Serial, Starts humidity sensor

void setup() {

pinMode(redLED, OUTPUT);

pinMode(greenLED, OUTPUT);

pinMode(humidify, OUTPUT);

pinMode(pump, OUTPUT);

Serial.begin(9600);

dht.begin();

}

/\*==================MAIN LOOP============================\*/

// Loops continuously

// Measures humidity levels compares to set humidity leve

// Controls ON/OFF of humidifier and pump depending on humidity readings

void loop() {

h = dht.readHumidity(); // FIRST h reading

float t = dht.readTemperature();

diff = h - HL; // FIRST diff calculated

Serial.print("Start Humidity: ");

Serial.print(h);

Serial.print("% \n");

if(h >= HL){setColor(255,0);}

if (diff >= hyst){ // IF h reading is HIGH

Serial.print("First IF, humidity level good \n");

setColor(255, 0); // Geen LED ON

delay(15000); // 15s delay between readings

}

else if (diff <= 0){ // IF h reading is LOW

Serial.print("First Else If, humidity level low \n");

setColor(0, 255); // Red LED ON

delay(1000); // 1s delay

digitalWrite(humidify, HIGH); // Humidifier ON

delay(2000); // 2s delay

digitalWrite(pump, HIGH); // Air pump ON

delay(5000); // 5s delay

h = dht.readHumidity(); // NEW h reading

t = dht.readTemperature();

diff = h - HL; // NEW diff calculated

Serial.print("Second Humidity Measurement: ");

Serial.print(h);

Serial.print("% \n");

if (diff >= hyst){ // IF h reading is HIGH

Serial.print("Humidity good, all off \n");

setColor(255, 0); // Green LED ON

delay(500);

digitalWrite(humidify, LOW); // Humidifier OFF

delay(250);

digitalWrite(pump, LOW); // Air Pump OFF

delay(15000); // 15s delay

}

else if (diff <= 0){ // IF h reading is LOW

do{ // Loops Amber LED flash while LOW humidity readings

Serial.print("Looping amber light, humidity read \n");

setColor(0, 0); // LEDs OFF

delay(1000); // 1s delay

setColor(255, 255); // Amber LED ON

delay(4000); // 4s delay

h = dht.readHumidity(); // NEW h reading

t = dht.readTemperature();

diff = h - HL; // NEW diff calculated

Serial.print("Amber Humidity Measurement: ");

Serial.print(h);

Serial.print("% \n");

if (diff >= hyst){ // IF h reading is HIGH

Serial.print("Amber Humidity good, all off \n");

setColor(255, 0); // Green LED ON

delay(500);

digitalWrite(humidify, LOW); // Humidifier OFF

delay(250);

digitalWrite(pump, LOW); // Air Pump OFF

delay(15000); // 15s delay

}

}

while (diff <= hyst); // If h reading is LOW, loop to begining of 'do'

}

}

}

void setColor(int green, int red){

analogWrite(redLED, red);

analogWrite(greenLED, green);

}