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#include <Arduino_HTS221.h>//Apply sensor library
float temp[1000],humi[1000];// setup a storage
int T=100;//10k signal
int T1=0.25*T;//'0'
int T2=0.75*T;//'1'
int dex = 0;
int dex1 = 0;
int dex2 = 0;//index number
char str1[4];//temporary array.
int rece[4];//temporary array.
char strttemp_sum[2000];//temporary array.
void ftos(float,char);//data convert
void writechar(char);//data convert
void flash(boolean,boolean,boolean,boolean);//led blink function
int ledPin= 3; //signal sending pin
int interruptPin = 10;//signal receiving pin.

void setup() {
  Serial.begin(9600);
  pinMode (interruptPin,INPUT_PULLUP);
  pinMode (ledPin,OUTPUT);
  attachInterrupt(digitalPinToInterrupt(interruptPin),receiving,RISING);
  //While there having coming signal from 10 port, receiving function
  start work.
}

void loop() {
  float temperature = HTS.readTemperature();//collect data.
  float humidity    = HTS.readHumidity();
  temp[dex] = {temperature};//store temperature data.
  humi[dex] = {humidity};
  dex++; //track nuber collected.
  delay(1000*60*10);// 10minutes break.
}

void receiving(){
  for(int i = 0; i < 4; i++){
    delayMicroseconds(40);
    rece[i] = digitalRead(interruptPin);// detect the middle point of
    signal.
  }
  if (rece[0] == 1 && rece[1] == 0 && rece[2] == 0 && rece[3] ==
0){//while receiving 1000, sending stored temperature data.
    Serial.println("Beginning sending temperature data");// correct!
    temp_process();
  }
  if (rece[0] == rece[3] == 1 && rece[1] == rece[2] == 0){//while
receiving 1001, sending stored humidity data.
    Serial.println("Beginning sending humidity data");// correct!
    humi_process();
  }
}

void temp_process(){
  for(int j = 0 ; j < dex ; j++ ){

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    ftos(temp[j],dex1);//convert float value to character value.
    dex1 = dex1 + 4;
}
char str_temp[dex1];// Total converted character value
for(int i = 0 ; i < dex1 ; i++){
    str_temp[i]=strtemp_sum[i];
}

stod(str_temp, dex1);//convert string value to digital value.

}
void humi_process(){
    for(int j = 0 ; j < dex ; j++){
        ftos(humi[j],dex2);//convert float value to character value.
        dex2 = dex2 + 4;
    }
    char str_humi[dex2];// Total converted character value
    for(int i = 0 ; i < dex2 ; i++){
        str_humi[i]=strtemp_sum[i];
    }

    stod(str_humi, dex2);//convert string value to digital value.

}
void ftos(float f,int index){
    int a1 = f*100;
    int f4 = a1%10;
    int f3 = ((a1-f4)/10)%10;
    int f2 = ((a1-f3-f4)/100)%10;
    int f1 = ((a1-f2-f3-f4)/1000)%10;
    strtemp_sum[index] = char(f1)+48;
    strtemp_sum[index+1] = char(f2)+48;
    strtemp_sum[index+2] = char(f3)+48;
    strtemp_sum[index+3] = char(f4)+48;
}
void stod(char term[],int dex){

    for(int i = 0 ; i < dex ; i++){
        if(term[i]-'0' == 0){
            writechar('0');
        }
        if(term[i]-'0' == 1){
            writechar('1');
        }
        if(term[i]-'0' == 2){
            writechar('2');
        }
        if(term[i]-'0' == 3){
            writechar('3');
        }
        if(term[i]-'0' == 4){
            writechar('4');
        }
        if(term[i]-'0' == 5){

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        writechar('5');
    }
    if(term[i]-'0' == 6){
        writechar('6');
    }
    if(term[i]-'0' == 7){
        writechar('7');
    }
    if(term[i]-'0' == 8){
        writechar('8');
    }
    if(term[i]-'0' == 9){
        writechar('9');
    }
    if(term[i]-'0' == -2){
        writechar('.');
    }
}
}

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void writechar(char str){
    switch(str - '0'){
        case 0:
            flash(false,false,false,false);//0000
            break;
        case 1:
            flash(false,false,false,true);//0001
            break;
        case 2:
            flash(false,false,true,false);//0010
            break;
        case 3:
            flash(false,false,true,true);//0011
            break;
        case 4:
            flash(false,true,false,false);//0100
            break;
        case 5:
            flash(false,true,false,true);//0101
            break;
        case 6:
            flash(false,true,true,false);//0110
            break;
        case 7:
            flash(false,true,true,true);//0111
            break;
        case 8:
            flash(true,false,false,false);//1000
            break;
        case 9:
            flash(true,false,false,true);//1001
            break;
        case -2:
            flash(true,false,true,false);//1010
    }
}

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        break;
    }
}

void flash(boolean a,boolean b,boolean c,boolean d){
    if(a == true){
        digitalWrite(ledPin,HIGH);
        delayMicroseconds(T2);
        digitalWrite(ledPin,LOW);
        delayMicroseconds(T1);
    }else{
        digitalWrite(ledPin,HIGH);
        delayMicroseconds(T1);
        digitalWrite(ledPin,LOW);
        delayMicroseconds(T2);
    }
    if(b == true){
        digitalWrite(ledPin,HIGH);
        delayMicroseconds(T2);
        digitalWrite(ledPin,LOW);
        delayMicroseconds(T1);
    }else{
        digitalWrite(ledPin,HIGH);
        delayMicroseconds(T1);
        digitalWrite(ledPin,LOW);
        delayMicroseconds(T2);
    }
    if(c == true){
        digitalWrite(ledPin,HIGH);
        delayMicroseconds(T2);
        digitalWrite(ledPin,LOW);
        delayMicroseconds(T1);
    }else{
        digitalWrite(ledPin,HIGH);
        delayMicroseconds(T1);
        digitalWrite(ledPin,LOW);
        delayMicroseconds(T2);
    }
    if(d == true){
        digitalWrite(ledPin,HIGH);
        delayMicroseconds(T2);
        digitalWrite(ledPin,LOW);
        delayMicroseconds(T1);
    }else{
        digitalWrite(ledPin,HIGH);
        delayMicroseconds(T1);
        digitalWrite(ledPin,LOW);
        delayMicroseconds(T2);
    }
}
// All these codes have not been verified on lab.

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