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// written with intentional simplicity with non-coder types in mind

// libraries needed for the script

#include <SD.h> //standard with Arduino release 1.8.5 and through Arduino Web Editor

#include "DHT.h" // available at github.com/adafruit/RTClib

#include <Wire.h> // standard with Arduino release 1.8.5 and through Arduino Web Editor

#include "RTClib.h" // available at github.com/adafruit/DHT-sensor-library

#include "LiquidCrystal.h" //standard with Arduino release 1.8.5 and through Arduino Web Editor

//start the clock

RTC\_DS1307 RTC;

// start temperature/humidity sensor

#define DHTPIN 2 //output PWM pin for DHT sensor

#define DHTTYPE DHT11 // type of DHT sensor being used

DHT dht(DHTPIN, DHTTYPE);

//start SD card reader/writer

const int chipSelect = 10; // chip select pin for SD card

//start LCD display

LiquidCrystal lcd(3, 4, 8, 7, 6, 5);

// setup channel counters

int count1=0;

int count2=0;

int count3=0;

int count4=0;

int count5=0;

int count6=0;

//identify variables for temperature and humidity monitoring

long nexttime = 0; //datalogging TempInterval setup (defines parameter to store data)

long TempInterval = 59; // variable to TempInterval in seconds - 1

// setup debouncing criteria

long Debounce1 = 0;

long Debounce2 = 0;

long Debounce3 = 0;

long Debounce4 = 0;

long Debounce5 = 0;

long Debounce6 = 0;

void setup()

{

// set up the LCD's number of rows and columns:

lcd.begin(20, 4);

Wire.begin();

RTC.begin();

//define timing variables for temperature measurements

DateTime now = RTC.now(); //get current time

unsigned long nexttime = now.unixtime(); //set baseline time

//check RTC operation

if (! RTC.isrunning()) {

lcd.setCursor(0, 0);

lcd.print("clock error");

}

lcd.setCursor(0, 0);

lcd.print("Initializing SD card...");

// check SD card operation

pinMode(53, OUTPUT); // chip select pin for SD card

// see if the card is present and can be initialized:

if (!SD.begin(chipSelect)) {

lcd.setCursor(0, 1);

lcd.print("Card failed, or not present");

Serial.println("Card failed, or not present");

// don't do anything more:

return;

}

lcd.setCursor(0, 1);

lcd.print("card initialized.");

// initialize real time clock

dht.begin();

// intital setup of LCD screen

lcd.clear();

lcd.setCursor(0, 0);

lcd.print("#1: ");

delay (1000);

lcd.setCursor(0, 1);

lcd.print("#2: ");

delay (1000);

lcd.setCursor(0, 2);

lcd.print("#3: ");

delay (1000);

lcd.setCursor(10, 0);

lcd.print("#4: ");

delay (1000);

lcd.setCursor(10, 1);

lcd.print("#5: ");

delay (1000);

lcd.setCursor(10, 2);

lcd.print("#6: ");

delay (1000);

lcd.setCursor(0, 3);

delay (1000);

lcd.print("last: ");

}

void loop()

{

// reaad all IR sensors

int sensorValue1 = analogRead(A0);

int sensorValue2 = analogRead(A1);

int sensorValue3 = analogRead(A2);

int sensorValue4 = analogRead(A3);

int sensorValue5 = analogRead(A6);

int sensorValue6 = analogRead(A7);

DateTime now = RTC.now(); //get current time

// following section to record temperature/humiidity values at the proper timing interval

if (now.unixtime() > nexttime) { //decides if the TempInterval has been long enough

nexttime = now.unixtime() + TempInterval; // resets if above argument has been reached

//read everything if it's time to do so

DateTime now = RTC.now(); //get current time

float h = dht.readHumidity();

float t = dht.readTemperature();

File dataFile = SD.open("tempdata.txt", FILE\_WRITE);

// if the file is available, write to it:

if (dataFile) {

dataFile.print(now.month(), DEC);

dataFile.print('/');

dataFile.print(now.day(), DEC);

dataFile.print('/');

dataFile.print(now.year(), DEC);

dataFile.print(';');

dataFile.print(now.hour(), DEC);

dataFile.print(':');

dataFile.print(now.minute(), DEC);

dataFile.print(':');

dataFile.print(now.second(), DEC);

dataFile.print(";");

dataFile.print(t);

dataFile.print(";");

dataFile.println(h);

dataFile.close();

}

}

// following section to record IR events as they occur

if(sensorValue1<500){

DateTime now = RTC.now(); //get current time

if (now.unixtime() > Debounce1) { //decides if the TempInterval has been long enough

Debounce1 = now.unixtime() + 1; // resets if above argument if 1 second has passed

count1 ++;

lcd.setCursor(0, 0);

lcd.print("#1: ");

lcd.print(count1);

lcd.setCursor(0, 3);

lcd.print("last: ");

lcd.print(now.month(), DEC);

lcd.print('/');

if(now.day() < 10){

lcd.print("0");}

lcd.print(now.day(), DEC);

lcd.print("; ");

if(now.hour() < 10){

lcd.print("0");}

lcd.print(now.hour(), DEC);

lcd.print(':');

if(now.minute() < 10){

lcd.print("0");}

lcd.print(now.minute(), DEC);

File dataFile = SD.open("tempdata.txt", FILE\_WRITE);

dataFile.print(";;;;;");

dataFile.print("1");

dataFile.print(" ; ");

dataFile.print("#");

dataFile.print(count1);

dataFile.print(" ; ");

dataFile.print(sensorValue1, DEC);

dataFile.print(";");

dataFile.print(now.month(), DEC);

dataFile.print('/');

dataFile.print(now.day(), DEC);

dataFile.print('/');

dataFile.print(now.year(), DEC);

dataFile.print(";");

dataFile.print(now.hour(), DEC);

dataFile.print(':');

dataFile.print(now.minute(), DEC);

dataFile.print(':');

dataFile.println(now.second(), DEC);

dataFile.close();

}}

if(sensorValue2<500){

DateTime now = RTC.now(); //get current time

if (now.unixtime() > Debounce2) { //decides if the TempInterval has been long enough

Debounce2 = now.unixtime() + 1; // resets if above argument if 1 second has passed

count2 ++;

lcd.setCursor(0, 1);

lcd.print("#2: ");

lcd.print(count2);

lcd.setCursor(0, 3);

lcd.print("last: ");

lcd.print(now.month(), DEC);

lcd.print('/');

if(now.day() < 10){

lcd.print("0");}

lcd.print(now.day(), DEC);

lcd.print("; ");

if(now.hour() < 10){

lcd.print("0");}

lcd.print(now.hour(), DEC);

lcd.print(':');

if(now.minute() < 10){

lcd.print("0");}

lcd.print(now.minute(), DEC);

File dataFile = SD.open("tempdata.txt", FILE\_WRITE);

dataFile.print(";;;;;");

dataFile.print("2");

dataFile.print(" ; ");

dataFile.print("#");

dataFile.print(count2);

dataFile.print(" ; ");

dataFile.print(sensorValue2, DEC);

dataFile.print(";");

dataFile.print(now.month(), DEC);

dataFile.print('/');

dataFile.print(now.day(), DEC);

dataFile.print('/');

dataFile.print(now.year(), DEC);

dataFile.print(";");

dataFile.print(now.hour(), DEC);

dataFile.print(':');

dataFile.print(now.minute(), DEC);

dataFile.print(':');

dataFile.println(now.second(), DEC);

dataFile.close();

}}

if(sensorValue3<500){

DateTime now = RTC.now(); //get current time

if (now.unixtime() > Debounce3) { //decides if the TempInterval has been long enough

Debounce3 = now.unixtime() + 1; // resets if above argument if 1 second has passed

count3 ++;

lcd.setCursor(0, 2);

lcd.print("#3: ");

lcd.print(count3);

lcd.setCursor(0, 3);

lcd.print("last: ");

lcd.print(now.month(), DEC);

lcd.print('/');

if(now.day() < 10){

lcd.print("0");}

lcd.print(now.day(), DEC);

lcd.print("; ");

if(now.hour() < 10){

lcd.print("0");}

lcd.print(now.hour(), DEC);

lcd.print(':');

if(now.minute() < 10){

lcd.print("0");}

lcd.print(now.minute(), DEC);

File dataFile = SD.open("tempdata.txt", FILE\_WRITE);

dataFile.print(";;;;;");

dataFile.print("3");

dataFile.print(" ; ");

dataFile.print("#");

dataFile.print(count3);

dataFile.print(" ; ");

dataFile.print(sensorValue3, DEC);

dataFile.print(";");

dataFile.print(now.month(), DEC);

dataFile.print('/');

dataFile.print(now.day(), DEC);

dataFile.print('/');

dataFile.print(now.year(), DEC);

dataFile.print(";");

dataFile.print(now.hour(), DEC);

dataFile.print(':');

dataFile.print(now.minute(), DEC);

dataFile.print(':');

dataFile.println(now.second(), DEC);

dataFile.close();

}}

if(sensorValue4<500){

DateTime now = RTC.now(); //get current time

if (now.unixtime() > Debounce4) { //decides if the TempInterval has been long enough

Debounce4 = now.unixtime() + 1; // resets if above argument if 1 second has passed

count4 ++;

lcd.setCursor(10, 0);

lcd.print("#4: ");

lcd.print(count4);

lcd.setCursor(0, 3);

lcd.print("last: ");

lcd.print(now.month(), DEC);

lcd.print('/');

if(now.day() < 10){

lcd.print("0");}

lcd.print(now.day(), DEC);

lcd.print("; ");

if(now.hour() < 10){

lcd.print("0");}

lcd.print(now.hour(), DEC);

lcd.print(':');

if(now.minute() < 10){

lcd.print("0");}

lcd.print(now.minute(), DEC);

File dataFile = SD.open("tempdata.txt", FILE\_WRITE);

dataFile.print(";;;;;");

dataFile.print("4");

dataFile.print(" ; ");

dataFile.print("#");

dataFile.print(count4);

dataFile.print(" ; ");

dataFile.print(sensorValue4, DEC);

dataFile.print(";");

dataFile.print(now.month(), DEC);

dataFile.print('/');

dataFile.print(now.day(), DEC);

dataFile.print('/');

dataFile.print(now.year(), DEC);

dataFile.print(";");

dataFile.print(now.hour(), DEC);

dataFile.print(':');

dataFile.print(now.minute(), DEC);

dataFile.print(':');

dataFile.println(now.second(), DEC);

dataFile.close();

}}

if(sensorValue5<500){

DateTime now = RTC.now(); //get current time

if (now.unixtime() > Debounce5) { //decides if the TempInterval has been long enough

Debounce5 = now.unixtime() + 1; // resets if above argument if 1 second has passed

count5 ++;

lcd.setCursor(10, 1);

lcd.print("#5: ");

lcd.print(count5);

lcd.setCursor(0, 3);

lcd.print("last: ");

lcd.print(now.month(), DEC);

lcd.print('/');

if(now.day() < 10){

lcd.print("0");}

lcd.print(now.day(), DEC);

lcd.print("; ");

if(now.hour() < 10){

lcd.print("0");}

lcd.print(now.hour(), DEC);

lcd.print(':');

if(now.minute() < 10){

lcd.print("0");}

lcd.print(now.minute(), DEC);

File dataFile = SD.open("tempdata.txt", FILE\_WRITE);

dataFile.print(";;;;;");

dataFile.print("5");

dataFile.print(" ; ");

dataFile.print("#");

dataFile.print(count5);

dataFile.print(" ; ");

dataFile.print(sensorValue5, DEC);

dataFile.print(";");

dataFile.print(now.month(), DEC);

dataFile.print('/');

dataFile.print(now.day(), DEC);

dataFile.print('/');

dataFile.print(now.year(), DEC);

dataFile.print(";");

dataFile.print(now.hour(), DEC);

dataFile.print(':');

dataFile.print(now.minute(), DEC);

dataFile.print(':');

dataFile.println(now.second(), DEC);

dataFile.close();

}}

if(sensorValue6<500){

DateTime now = RTC.now(); //get current time

if (now.unixtime() > Debounce6) { //decides if the TempInterval has been long enough

Debounce6 = now.unixtime() + 1; // resets if above argument if 1 second has passed

count6 ++;

lcd.setCursor(10, 2);

lcd.print("#6: ");

lcd.print(count6);

lcd.setCursor(0, 3);

lcd.print("last: ");

lcd.print(now.month(), DEC);

lcd.print('/');

if(now.day() < 10){

lcd.print("0");}

lcd.print(now.day(), DEC);

lcd.print("; ");

if(now.hour() < 10){

lcd.print("0");}

lcd.print(now.hour(), DEC);

lcd.print(':');

if(now.minute() < 10){

lcd.print("0");}

lcd.print(now.minute(), DEC);

File dataFile = SD.open("tempdata.txt", FILE\_WRITE);

dataFile.print(";;;;;");

dataFile.print("6");

dataFile.print(" ; ");

dataFile.print("#");

dataFile.print(count6);

dataFile.print(" ; ");

dataFile.print(sensorValue6, DEC);

dataFile.print(";");

dataFile.print(now.month(), DEC);

dataFile.print('/');

dataFile.print(now.day(), DEC);

dataFile.print('/');

dataFile.print(now.year(), DEC);

dataFile.print(";");

dataFile.print(now.hour(), DEC);

dataFile.print(':');

dataFile.print(now.minute(), DEC);

dataFile.print(':');

dataFile.println(now.second(), DEC);

dataFile.close();

}}

}