Arduino – Raspberry Pi Web Fan Control with MySQL

Eli the Computer Guy *NEW, Arduino, Arduino - Serial Communication

Arduino - Raspberry Pi Web Fan Control with MySQL

1:06:36

With this project we create an IoT Environmental control device that uses a MariaDB (MySQL) database as the datastore. This allows you to use database functionality to create log files and be able to corrrelate data.

This project creates a web accessible dashboard that shows the current temperature, and gives the ability to turn a fan on or off.

Prerequisites

- Arduino – Send Commands with Serial Communication
- Arduino – Read Serial Communication with Raspberry Pi
- Arduino – Send Serial Commands from Raspbery Pi

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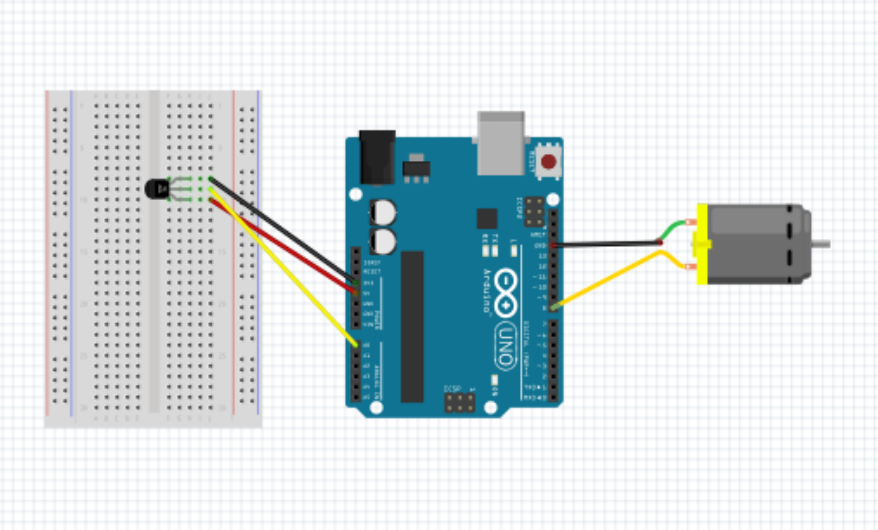
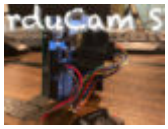
- Arduino – Bidirectional Serial Communication with Raspberry Pi
- Arduino – Temperature Web App with Raspberry Pi
- Arduino – Raspberry Pi Web Based Fan Switch
- MySQL Series

Functional Parts in the Project:

- Arduino Uno – https://store.arduino.cc/usa/arduino-uno-rev3
- 560 Piece Jumper Wire Kit – https://amzn.to/2MsCLjL
- Breadboard Kit – https://amzn.to/2Xih5ei
- Analog Temperature Sensor – https://amzn.to/2Rkkl3k
- Raspberry Pi
- USB Cable
- DLI IoT Relay – https://amzn.to/2zPR3ou
- Fan or Other Plugin electric Device



Linux – Start, Stop, Restart Services (Systemd, systemctl, service, init.d)

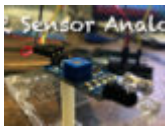


Arduino ArduCam – Save Images to SD Card

Cloud Computing – Virtualization Introduction

Linux – Find Files in Linux (find, whereis)

Arduino Uno with WiFi Basic Setup

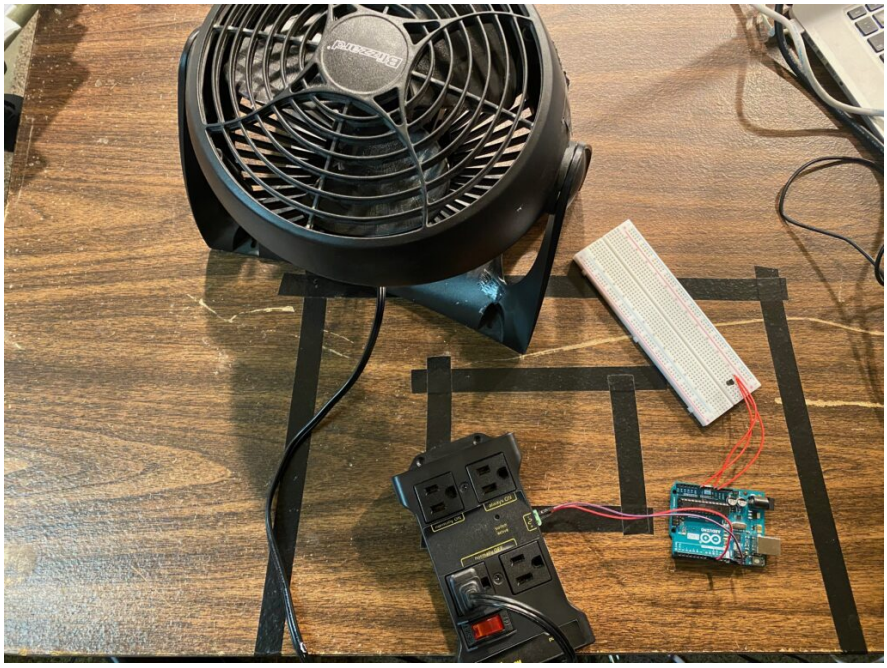


IR Sensor Analog Output on Arduino

DNS (Domain Name System) – Introduction

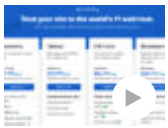
Linux – Cron Jobs for Scheduled Tasks (crontab)

ISO Disk Images for Copying CD and DVDs



Arduino Sketch

```
String command;

#define sensorPin A0
#define fan 8

void setup() {
  Serial.begin(9600);
  pinMode(fan, OUTPUT);
}

void loop() {
  int reading = analogRead(sensorPin);
  float voltage = reading * 5.0;
  voltage /= 1024.0;
  float temperatureC = (voltage - 0.5) * 100 ;
  float temperatureF = (temperatureC * 9.0 / 5.0) +
32.0;

  Serial.println(temperatureF);

  if (Serial.available()) {
    command = Serial.readStringUntil('\n');
    command.trim();
    if (command.equals("on")) {
      digitalWrite(fan, HIGH);
    }
    else if (command.equals("off")) {
      digitalWrite(fan, LOW);
```

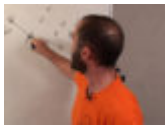



PHP – Shared Hosting for Running...

Linux – Task Manager and Kill Processes (top)

Arduino IDE Introduction

Arduino – Raspberry Pi Web Fan Control with MySQL



VPN – Virtual Private Networking

Broadband Technology – Introduction

```
    }
    else {
      digitalWrite(fan, HIGH);
      delay(500);
      digitalWrite(fan, LOW);
    }

  }
  delay(1000);
}
```

Raspberry Pi Setup

- Install Apache 2
- Install PHP
- Install MariaDB
- Install PHP and Python MySL Connectors
- Make Pi user owner of /var/www/html

```
sudo apt update

sudo apt-get upgrade

sudo apt-get install apache2

sudo chown pi /var/www/html

sudo apt-get install php

sudo apt-get install mariadb-server

sudo apt-get install php-mysql

Install Python Mysql Connector from in Thonny
   Tools -> Manage Packages
   mysql-connector -> Search on PyPI
   Click on Link
   Click INSTALL
```

MariaDB/MySQL Setup

- Note that this is not a secure MySQL setup. This is simply a basic installation to function for this project

```
sudo mysql

create database tempApp;

use tempApp;

create table temp(
        temp_id int auto_increment primary key,
        temp float,
        timestamp not null default
current_timestamp()
        );

create table fanStatus(
        status_id int auto_increment priamry key,
        status text,
        timestamp not null default
current_timestamp()
);

create user tempUser identified by '123456';

grant all privileges on tempApp.* to tempUser;
```

tempMysqlPhp.py – Python Script

```
import mysql.connector
import serial

if __name__ == '__main__':
    ser = serial.Serial('/dev/ttyACM1',9600,
timeout=1)
    ser.flush()

mydb = mysql.connector.connect(
    host="localhost",
    user="tempUser",
    password="123456",
    database="tempApp"
    )
```

```
mycursor = mydb.cursor()

while True:
    if ser.in_waiting > 0:
        #Take Value from Arduino and Save to
Database
        line = ser.readline().decode('utf-
8').rstrip()
        temp = float(line)
        sql = "insert into temp(temp) values (%s)"
%(temp)
        mycursor.execute(sql)
        mydb.commit()

        #Read Fan Status from Database and Send
Command to Arduino
        mycursor.execute("select status from
fanStatus order by timestamp desc limit 1")
        fanStatus = mycursor.fetchall()
        fanStatus = fanStatus[0][0]
        if fanStatus == "on":
            ser.write(b"on\n")
        elif fanStatus == "off":
            ser.write(b"off\n")
        else:
            ser.write(b"error\n")
            print ("error")

        #Troubleshooting Procedure
        print(temp, " inserted. Fan Status
is",fanStatus)
```

tempMysqlPhp.php – PHP Script

```
<meta http-equiv="refresh" content="5">

<h1 style="text-align:center;">Database Temp
App</h1>

<?php

$fanStatusUpdate = $_GET["fanStatus"];

$servername = "localhost";
```

```
$username = "tempUser";
$password = "123456";
$db = "tempApp";

$conn = new mysqli($servername, $username,
$password, $db);

if($conn->connect_error){
        die("Connection failed ".$conn-
>connect_error);
}

$sql = "select * from temp order by timestamp desc
limit 1";
$result = $conn->query($sql);

if ($result->num_rows > 0){
while($row = $result->fetch_assoc() ){
        print "<p style='text-align:center; font-
size:200px; margin-top: 10px; margin-bottom:
10px;color:".$color.";'>".$row["temp"]."</p>";
        print "<p style='text-align:center; font-
size:50px; margin-top: 10px; margin-bottom:
10px;color:".$color.";'>".$row["timestamp"]."</p>";
}
} else {
        echo "0 records";
}

$sqlAvg = "select min(temp) as minTemp, max(temp)
as maxTemp, avg(temp) as avgTemp from temp";
$avgTemp = $conn->query($sqlAvg);

$avgResult = $avgTemp->fetch_assoc();
print "<div style='border: 1px solid black;
width:300px;margin-left:auto; margin-
right:auto;padding:10px;'>";
print "Average Temp: ".$avgResult["avgTemp"];
print "<br>";
print "Minimum Temp: ".$avgResult["minTemp"];
print "<br>";
print "Maximum Temp: ".$avgResult["maxTemp"];
print "</div>";

$sql = "select * from fanStatus order by timestamp
desc limit 1";
```

```
$result = $conn->query($sql);

print "<div style='border: 1px solid black;
width:300px;margin-left:auto; margin-
right:auto;padding:10px;'>";
if ($result->num_rows > 0){
while($row = $result->fetch_assoc() ){
        $fanStatus = $row["status"];
        $fanTimestamp = $row["timestamp"];
        if ($fanStatus != $fanStatusUpdate){
                $sqlFanStatus = "insert into
fanStatus(status) values('$fanStatusUpdate')";
                if ($conn->query($sqlFanStatus) ===
FALSE) {
                echo "GET Error";
}
}
}
} else {
        echo "Fan Status Log is Empty<br>";
}

if ($fanStatus == "on"){
        print "Fan is ON since: ".$fanTimestamp."
<br>";
        print "<a href='tempMysqlPhp.php?
fanStatus=off'>Turn Fan OFF</a>";
} else if ($fanStatus =="off"){
        print "Fan is OFF since: ".$fanTimestamp."
<br>";
        print "<a href='tempMysqlPhp.php?
fanStatus=on'>Turn Fan ON</a>";
}else {
        print "Fan Controller Error<br>";
                print "<a href='tempMysqlPhp.php?
fanStatus=off'>Reset Fan Communciation</a>";
}
print "</div>";
$conn->close();

?>
```

ARDUINO MARIADB MYSQL PHP

PYTHON RASPBERRY PI

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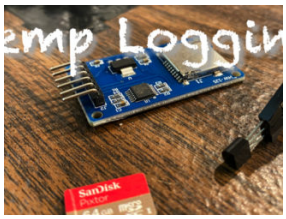
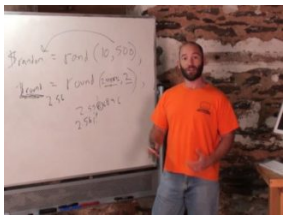
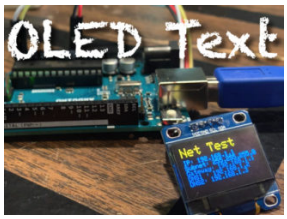


Arduino Modules – Log Temperature to SD Card Data Logging Module (HW-125)



Basic Math and Numbers in PHP Programming



Arduino – Print Text to OLED Screen

1 COMMENT

Misbah Hameed says:
JANUARY 5, 2021 AT 10:51 AM

Thank you

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