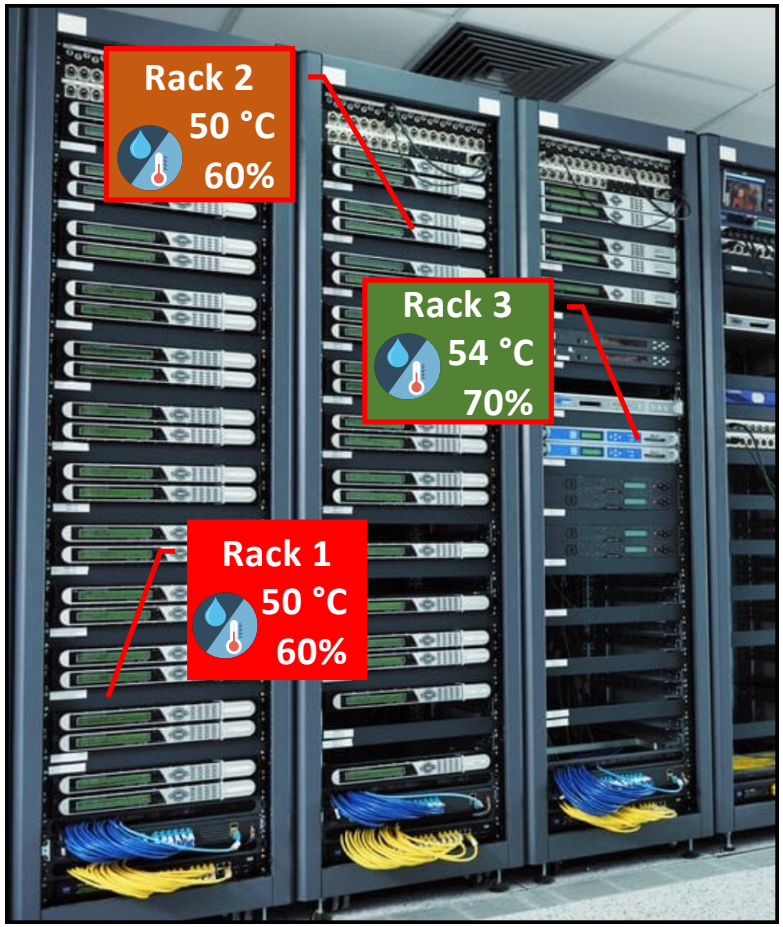


https://www.upsite.com/blog/sealing-rack-need/

MODULE 2d

Centralized Temperature & Humidity Monitoring System for Server Racks

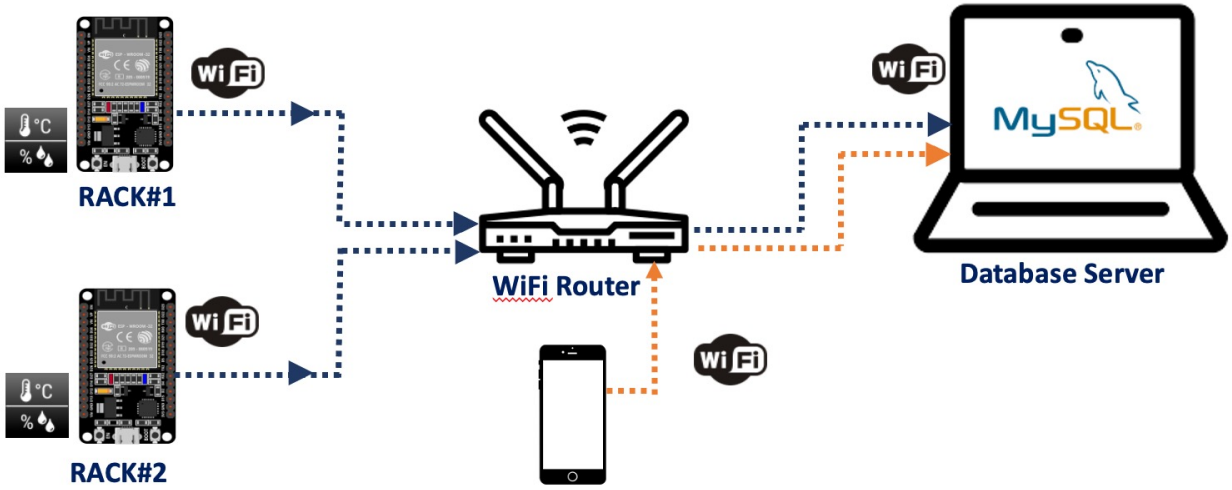
safyzan salim
019 622 0575

Project Overview

This tutorial will teach how to save data from ESP32s (or any ethernet microcontrollers) into MySQL.

Scenario:

You are required to monitor 2 server racks in a data center; i.e., ***Rack#1*** & ***Rack#2*** by using 2 ESP32s and 2 DHT11 sensors. Both readings need to be saved into a single table. The temperature & humidity of both rooms can be monitored thru webpage.



ZXZXZ

Components

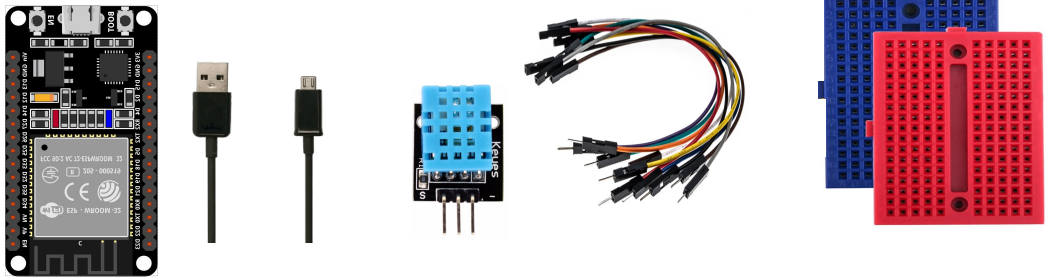
Hardware:

→ 1 x ESP-32 Wifi+Bluetooth 2-In-1 Development Board for Arduino (30 pin) + Cable.

→ 1 x Temperature & Humidity Sensor, DHT11.

→ Jumpers (male to female).

→ 2 x Mini Breadboard.



Software:

→ XAMPP ver 8.0.1(PHP 8.0.1) for Windows / OS X.

XAMPP

What is XAMPP?

XAMPP is the most popular PHP development environment

XAMPP is a completely free, easy to install Apache distribution containing MariaDB, PHP, and Perl. The XAMPP open source package has been set up to be incredibly easy to install and to use.

Solution

→ **Step 1: Propose block diagram & flowcharts**

A story board of the whole project which will give clear picture what you need to do.

→ **Step 2: Install Apache Web Server**

i. Install XAMPP (once), start web server service

ii. Start XAMPP service

iii. Test XAMPP page & PHPMyAdmin page

→ **Step 3: Creating MySQL Database**

i. Create database + test

ii. Create a PHP file for medium of transferring information from ESP32 to MySQL + Test

**Test with dummy data / manually inject data to database

→ **Step 4: Preparing PHP script to insert data to MySQL database**

i. Configure ***.php*** scripts.

ii. PHP script to display database.

iii. HTTP GET & HTTP POST.

Solution

→ **Step 5: Upload sketch to ESP32**

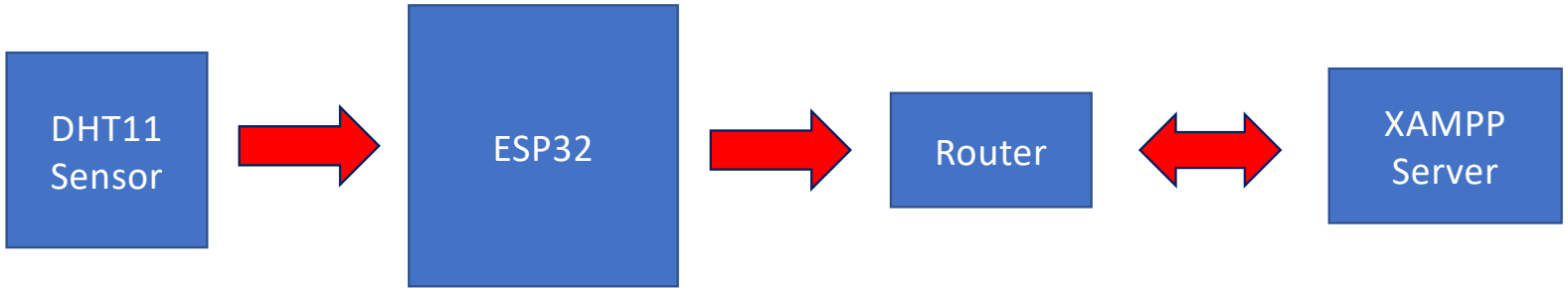
i. Connect DHT11 to ESP32.

ii. Configure ***sketch-vii_esp32-dht11-http-post.ino***.

Solution: Step 1

PROPOSED BLOCK DIAGRAM & FLOWCHART

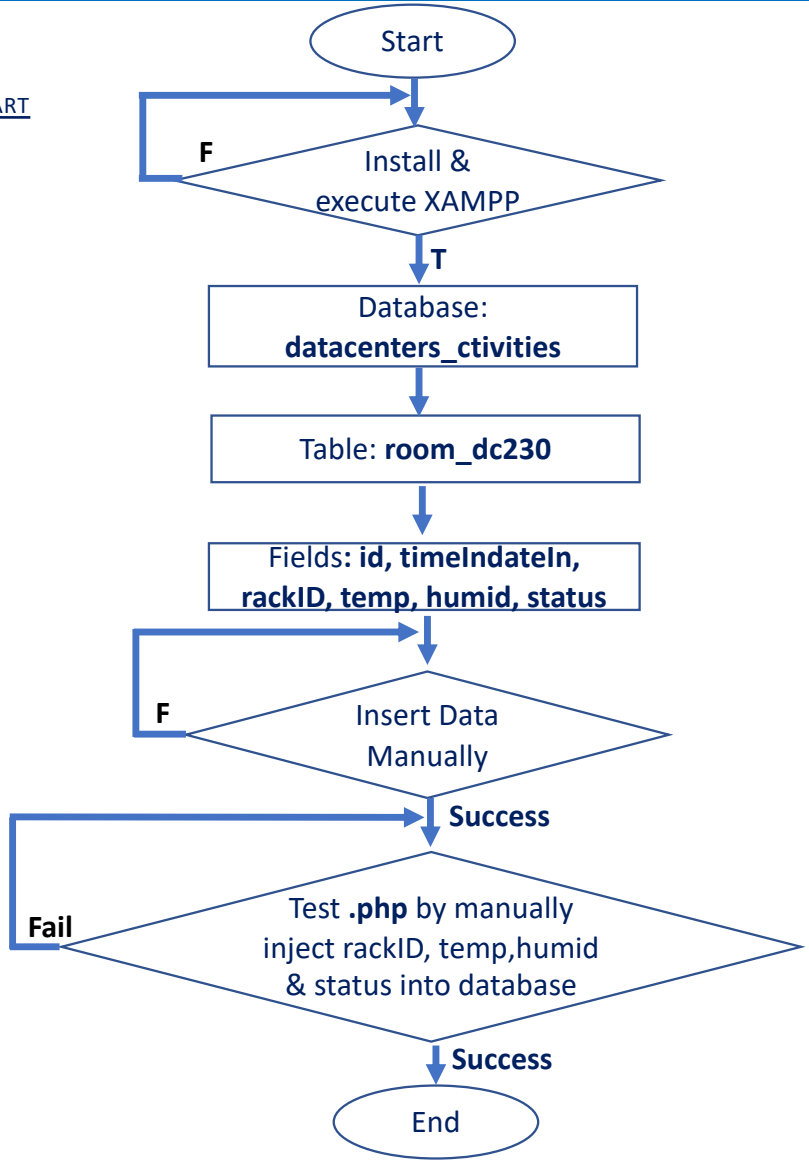
Project Block Diagram

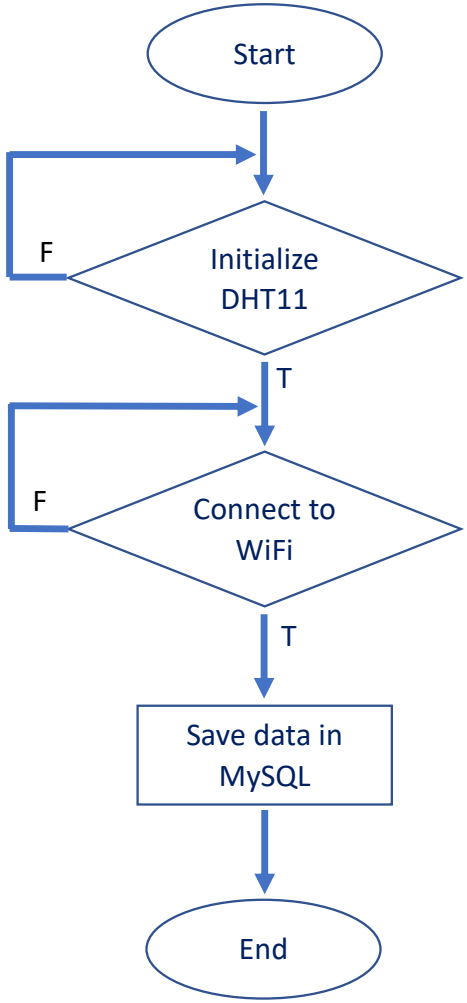


Solution: Step 1

PROPOSED BLOCK DIAGRAM & FLOWCHART

Flowchart





Solution: Step 2 INSTALL, START & TEST XAMPP SERVICES

→ Download and install latest version of XAMPP from https://www.apachefriends.org/download.html

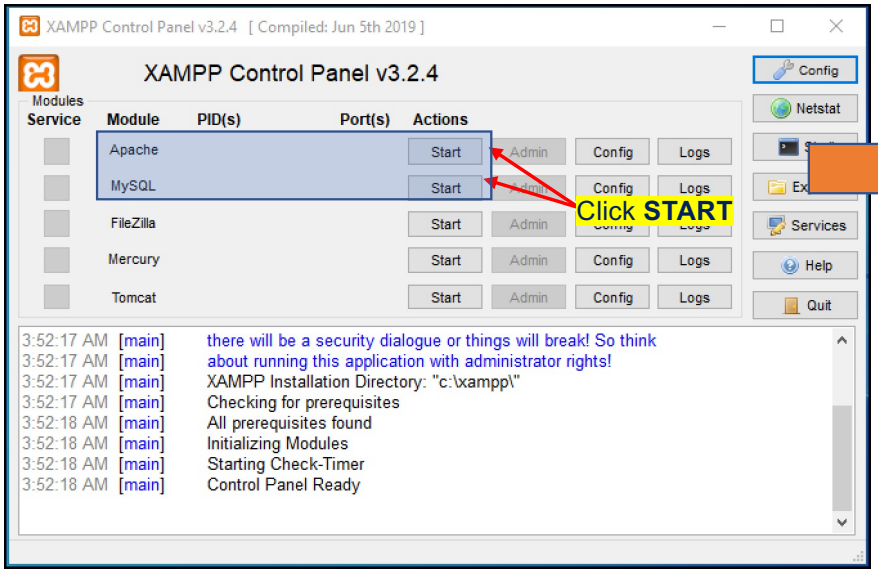
→ This link shows full tutorial on installing XAMPP on windows https://blog.templatetoaster.com/install-xampp-on-windows/

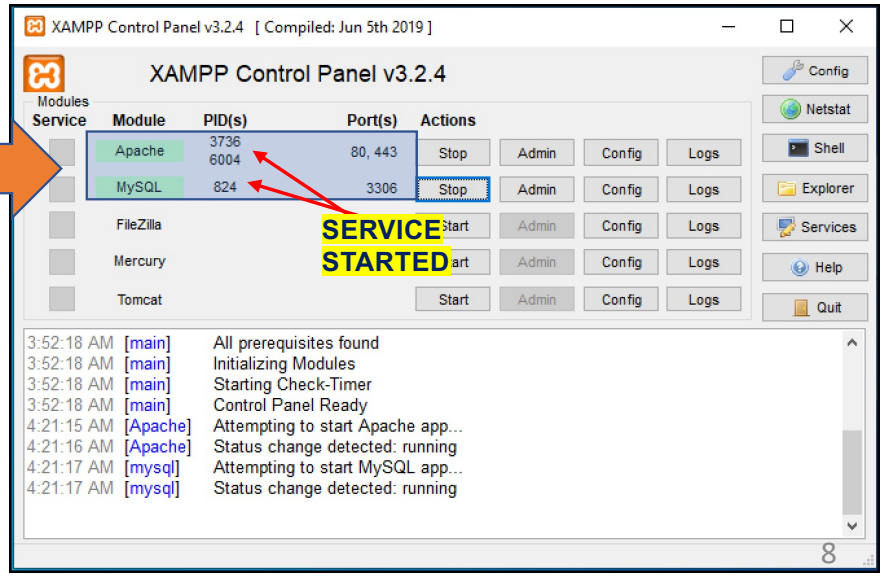
→ Once installed, launch XAMMP Control Panel (7.3.26)

For Windows (v7.3.26):

- to run, go to ***c://xampp/contol-control.exe*** → Start ***MySQL Database & Apache Web Service***

- open your browser and type http://localhost/



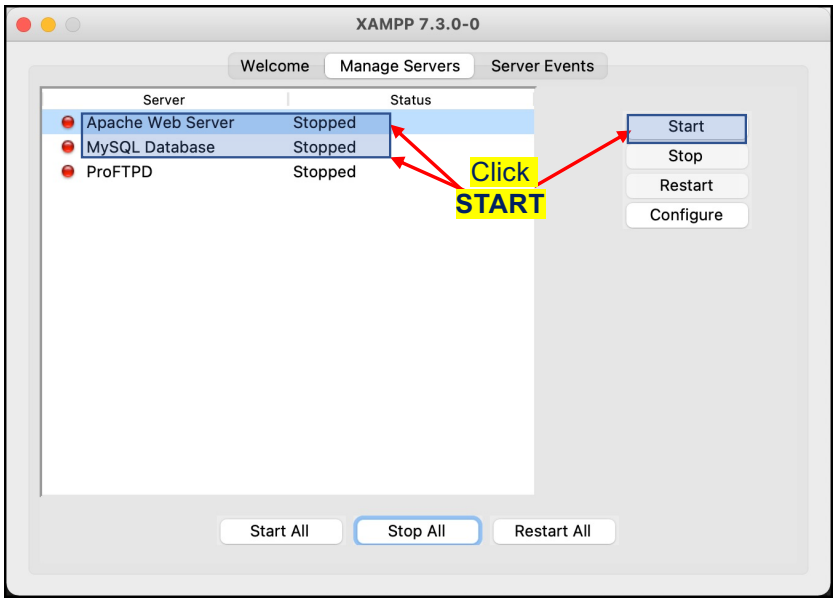


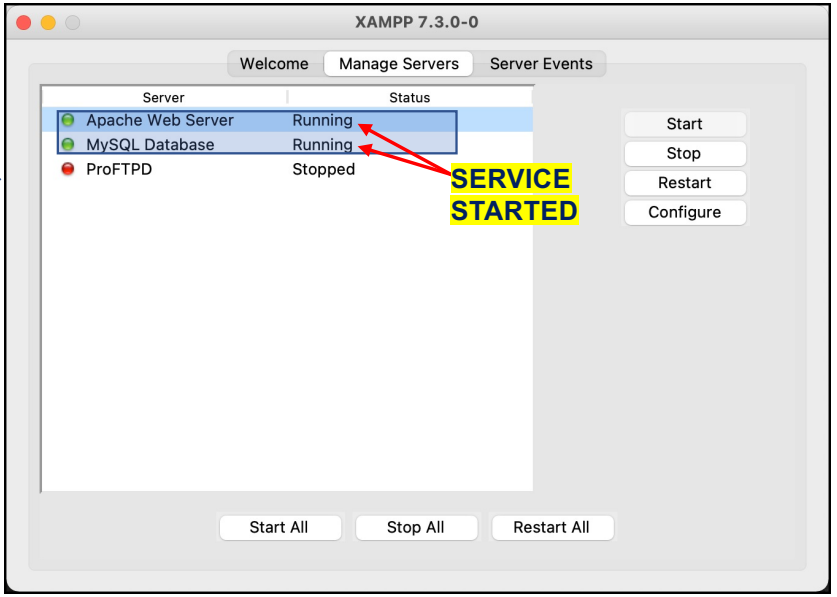
Solution: Step 2 INSTALL, START & TEST XAMPP SERVICES

For OS X (v7.3.0):

- go to **Applications>XAMPP>manager-osx** → Start ***MySQL Database & Apache Web Service***

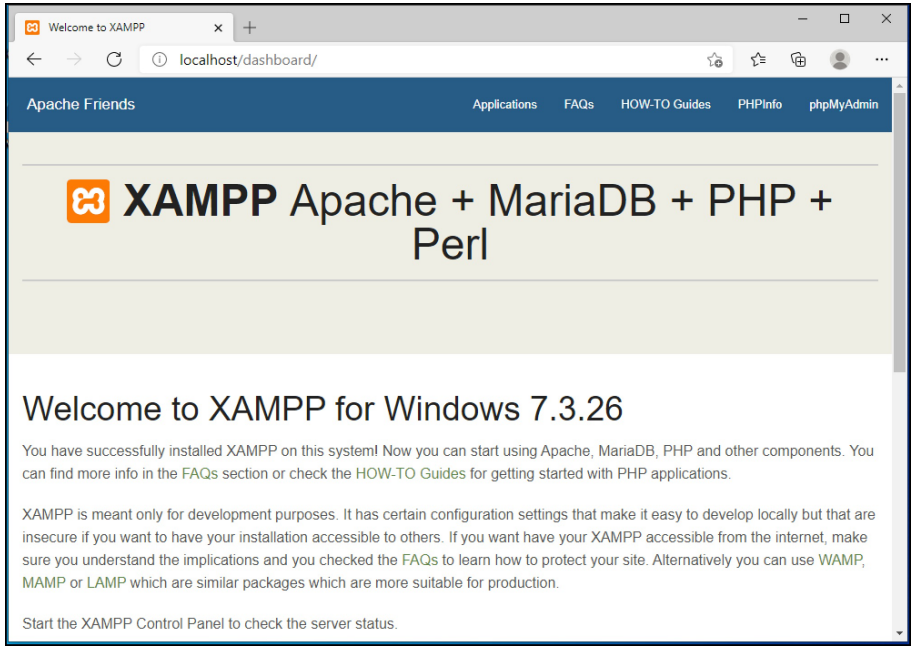
- open your browser and type http://localhost/



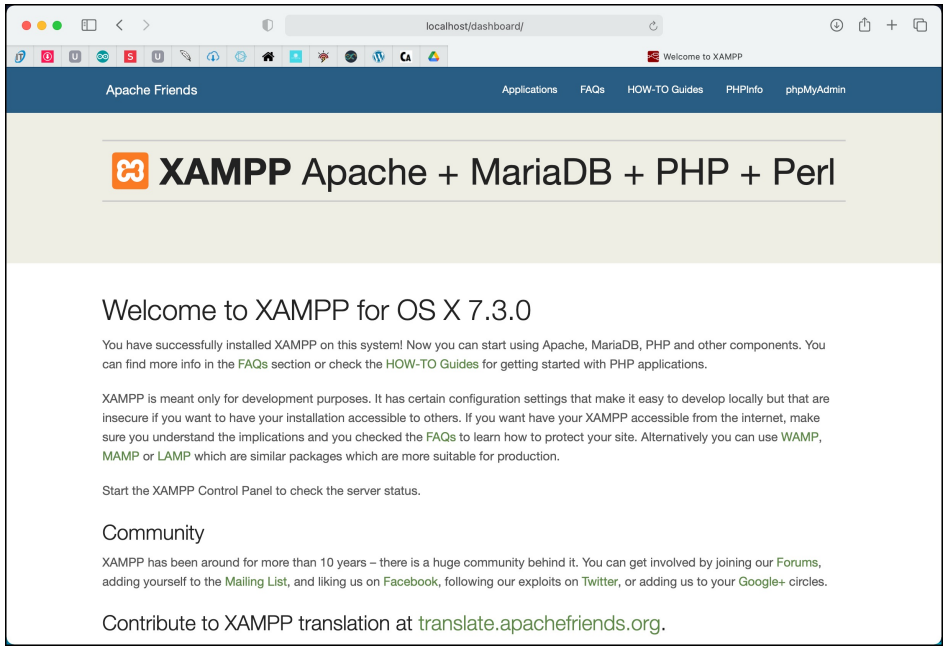


Solution: Step 2 INSTALL, START & TEST XAMPP SERVICES

→ XAMPP landing page can be found at http://localhost/



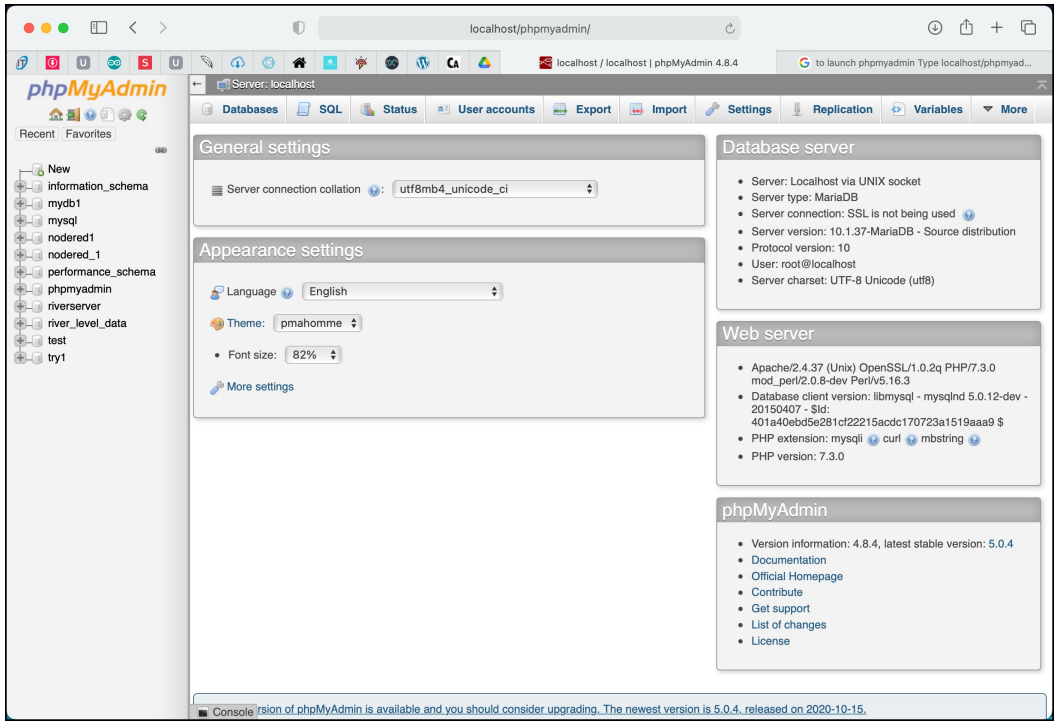
Windows system



OS X system

Solution: Step 2 INSTALL, START & TEST XAMPP SERVICES

- → To use MySQL database, point your browser to http://localhost/phpmyadmin
- → You can also click phpMyAdmin link at XAMPP dashboard.
- → PHPMyAdmin is a third party tool to manage data inside the database.



Solution: Step 3 CREATING MySQL DATABASE

→ Set up database with the following properties:

Database Name: **datacenter_activities**

Table Name: **room_dc230**

Columns: **6**

- The number of characters used should be equal to or less than 64.
- The name should comprise of letters, numbers and underscore.
- The DB name should not start with a number.
- It should be relevant to the topic for which it is being created.

https://www.javatpoint.com/creating-mysql-database-with-xampp

NAME	TYPE	LENGTH	ADDITIONAL SETTING
id	INT	11	Index: **PRIMARY** AI: **YES**
logDateTime	DATETIME	-	Default: **CURRENT_TIMESTAMP**
rackID	VARCHAR	255	-
tempValue	VARCHAR	255	-
humidValue	VARCHAR	255	-
rackStatus	VARCHAR	255	-

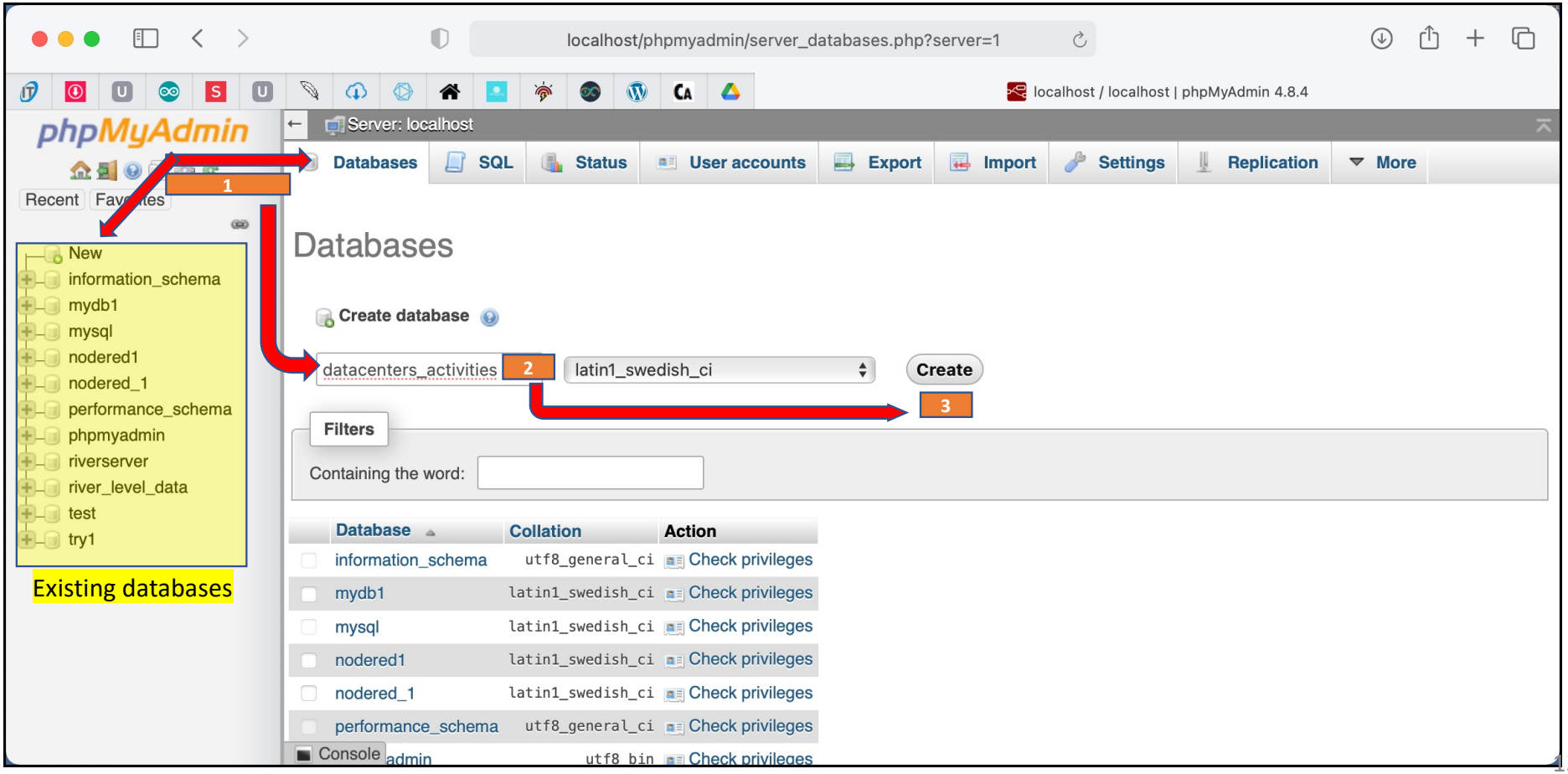
AI = Auto Increment
- = empty
#use appropriate name for variables (dbname, tablename…) that reflect with the task/activity

Solution: Step 3 CREATING MySQL DATABASE

5

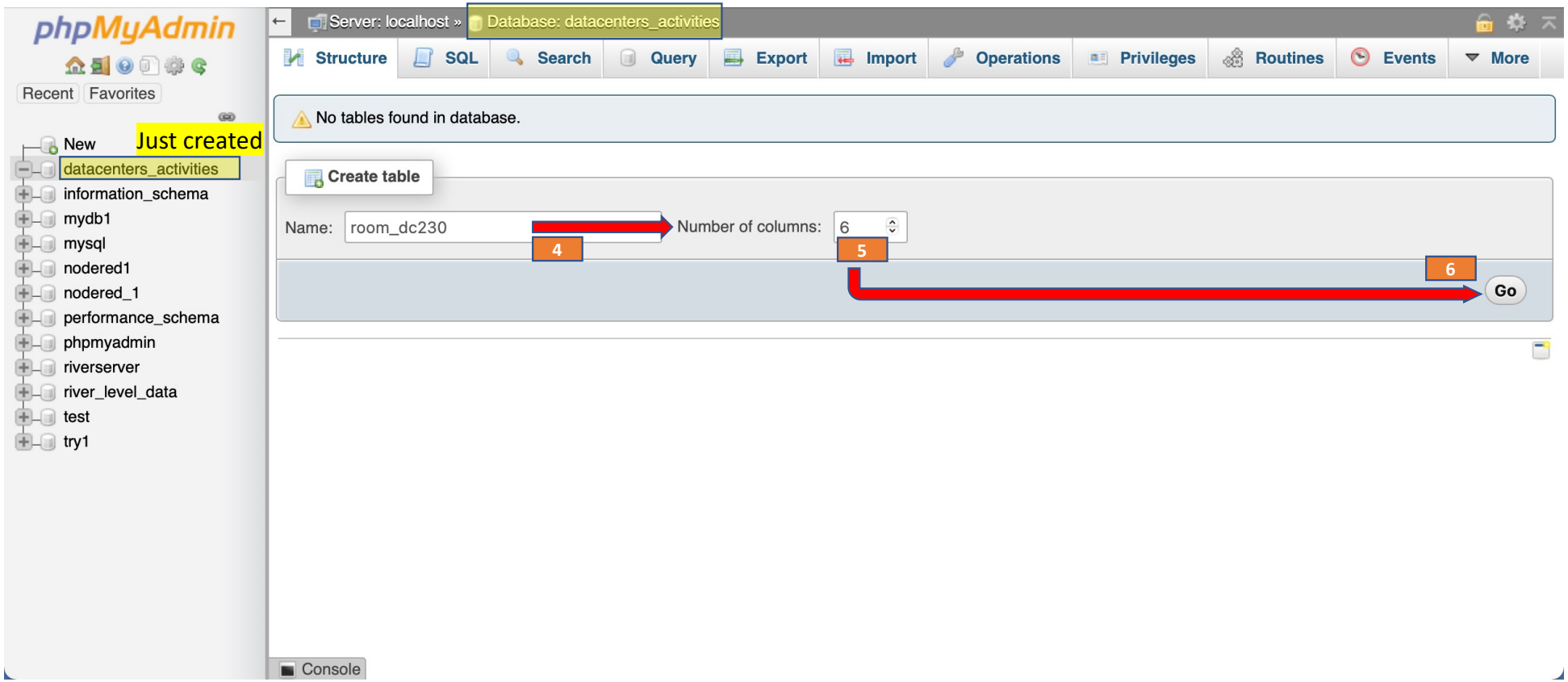
6

→ Database Name: **datacenter_activities**



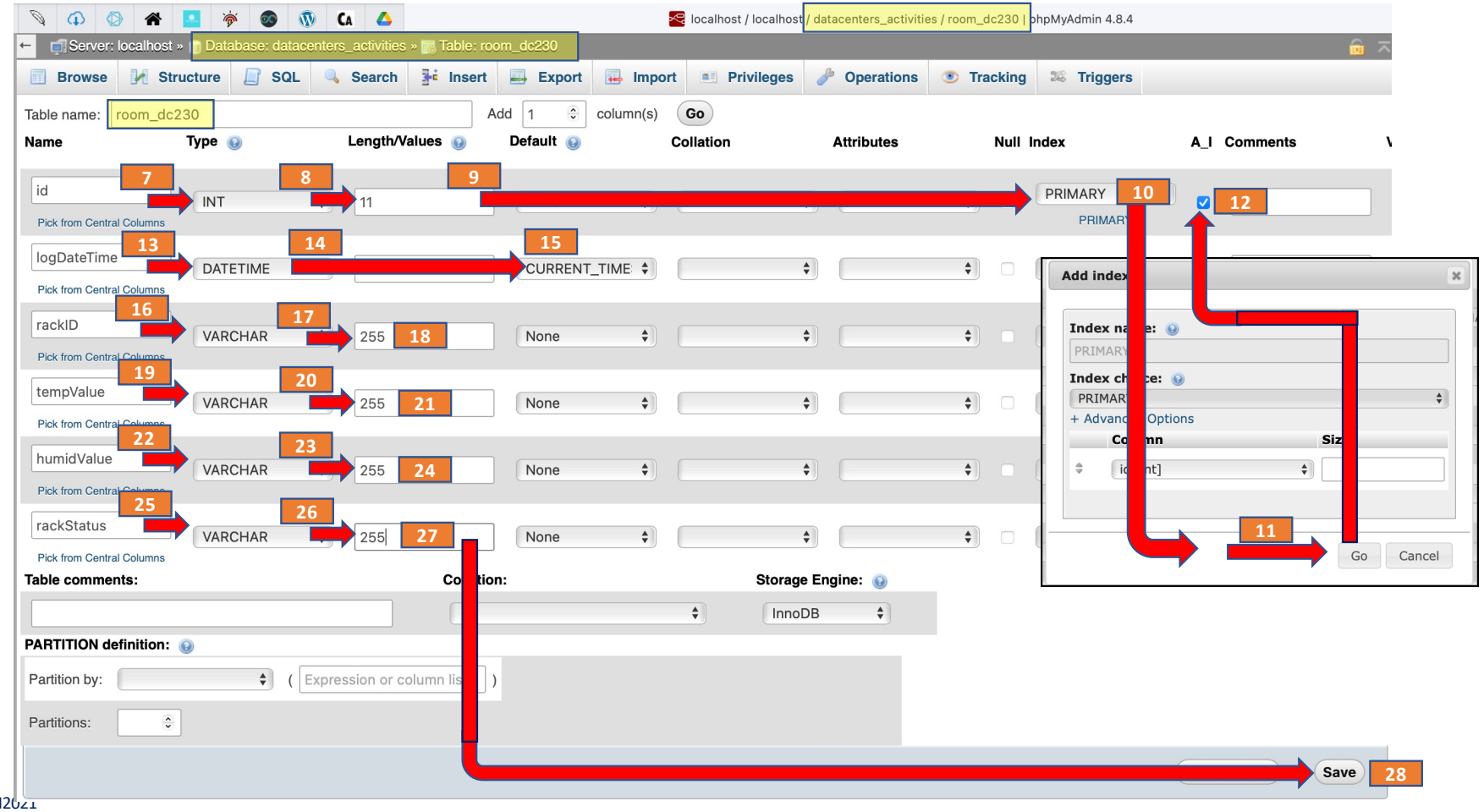
Solution: Step 3 CREATING MySQL DATABASE

→ Table Name: **room_ds230** Number of columns: **6**



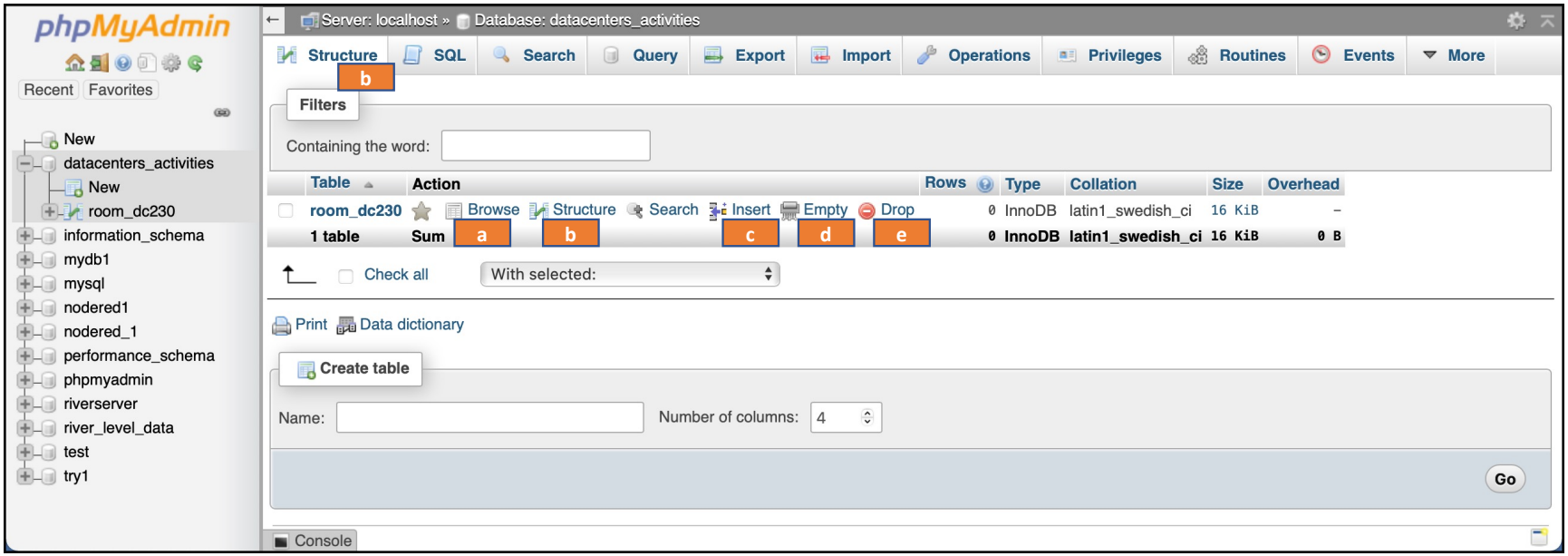
Solution: Step 3 CREATING MySQL DATABASE

→ Table Name: **room_ds230** Number of columns: **6**



Solution: Step 3 CREATING MySQL DATABASE

→ What you should know on PHPMyAdmin panel (at least).



a Browse → to view / edit / delete data stored in room_dc230, increment counter will proceed to next number.

b Structure → to view / edit / delete / add table structure.

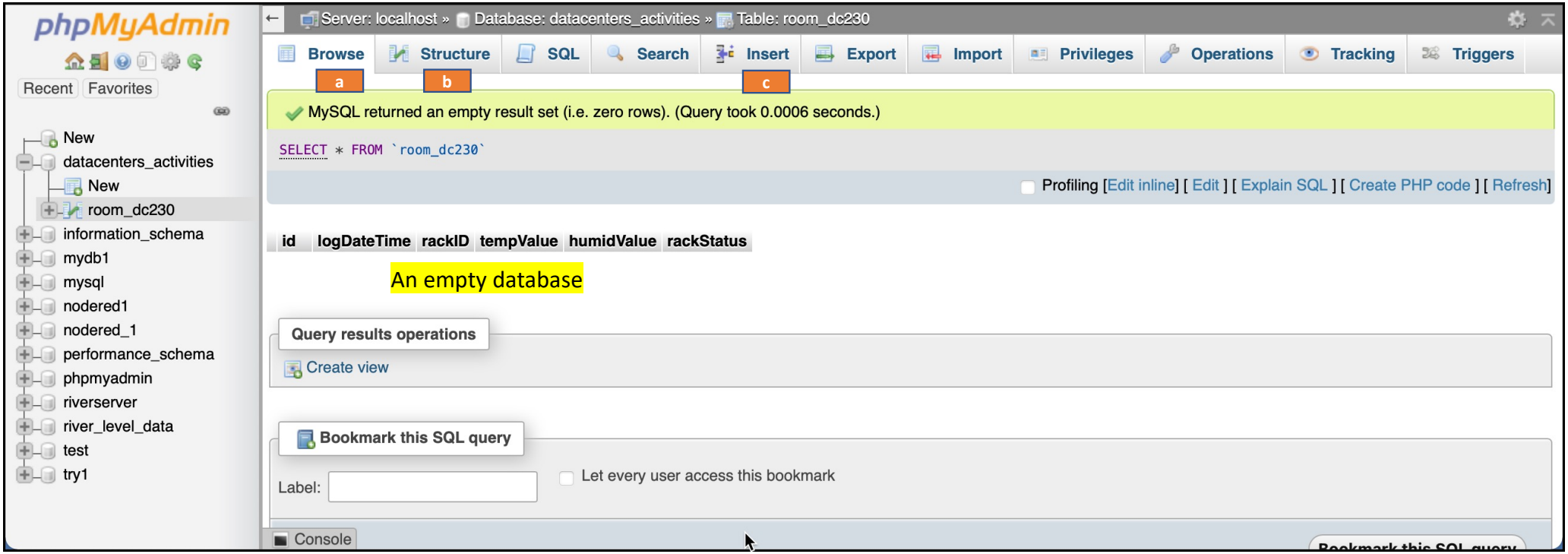
c Insert → to manually insert data into room_dc230.

d **Empty → to empty room_dc230 database, any increment counter will start from 1.**

e **Drop → will delete room_dc230 table.**

Solution: Step 3 CREATING MySQL DATABASE

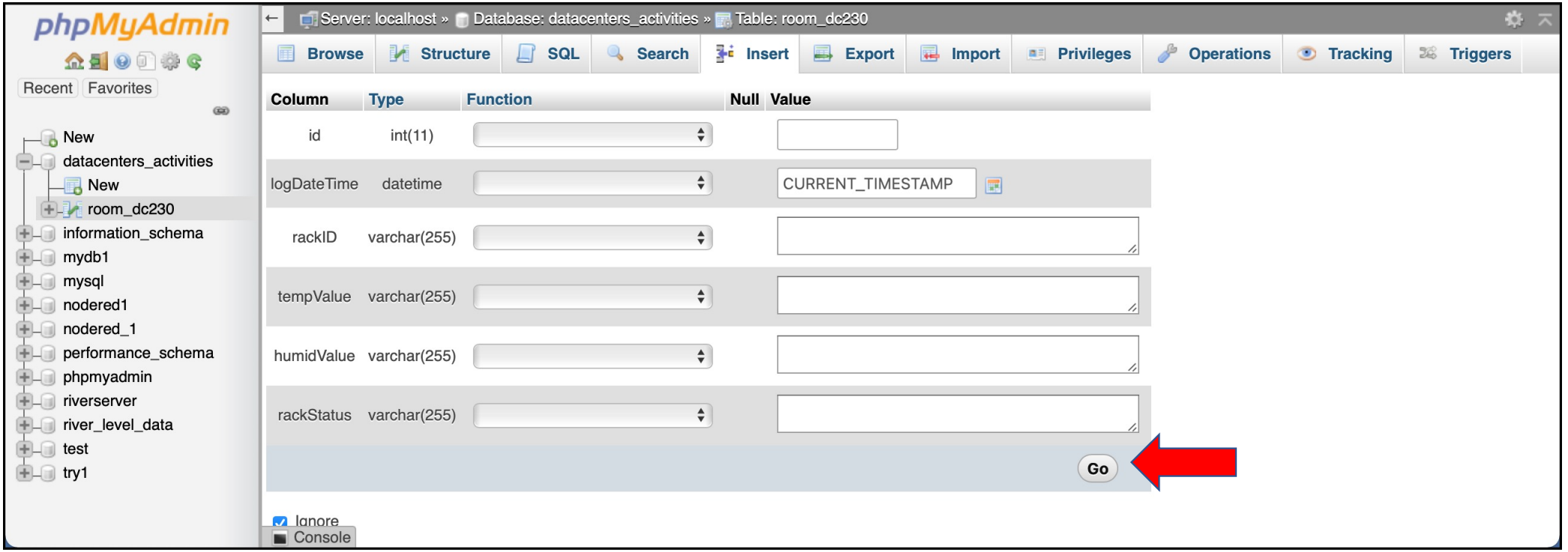
→ Click a ***Browse*** to view room_dc230 database. It is empty since no data in it.



Solution: Step 3 CREATING MySQL DATABASE

→ In order to insert data manually into room_dc230, select c ***Insert***.

→ For this time, leave ***ALL*** text box empty. Then click ***Go*** to save into room_dc230 database.

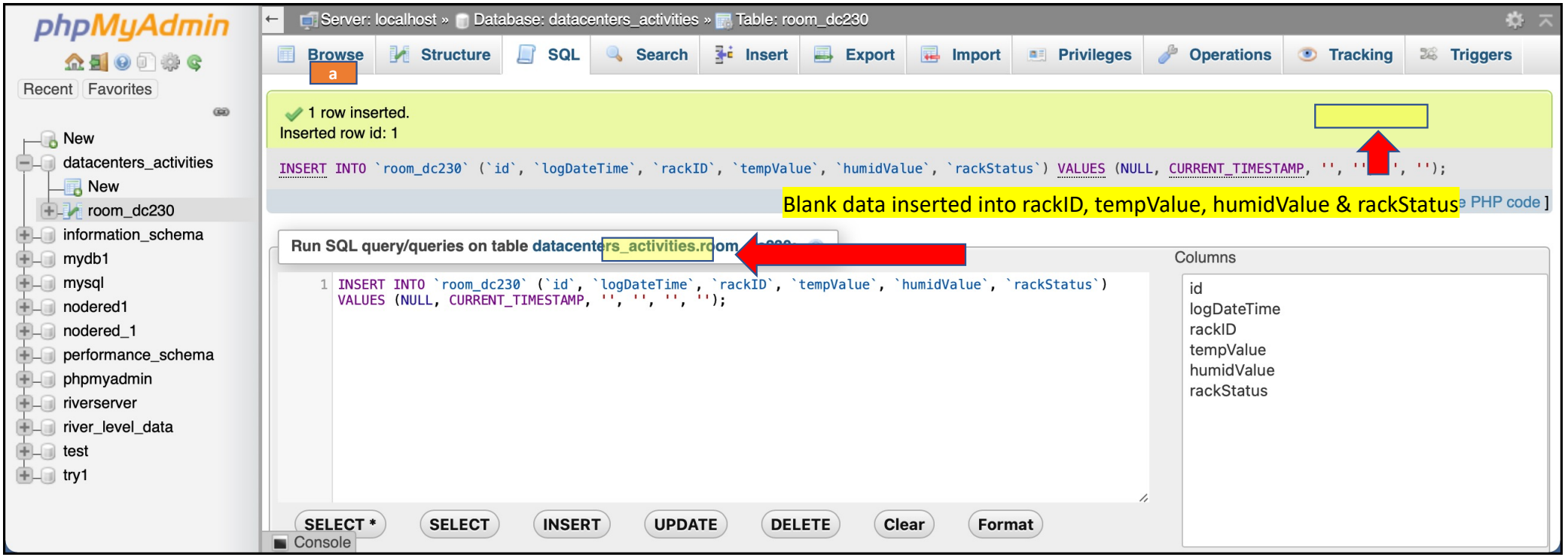


Solution: Step 3 CREATING MySQL DATABASE

→ Observe the red arrow. What do you think?

→ a Click ***Browse*** link to view the input.

```
INSERT INTO `room_dc230` (`id`, `logDateTime`, `rackID`, `tempValue`, `humidValue`, `rackStatus`) VALUES (NULL, CURRENT_TIMESTAMP, '', '', '', '');
```

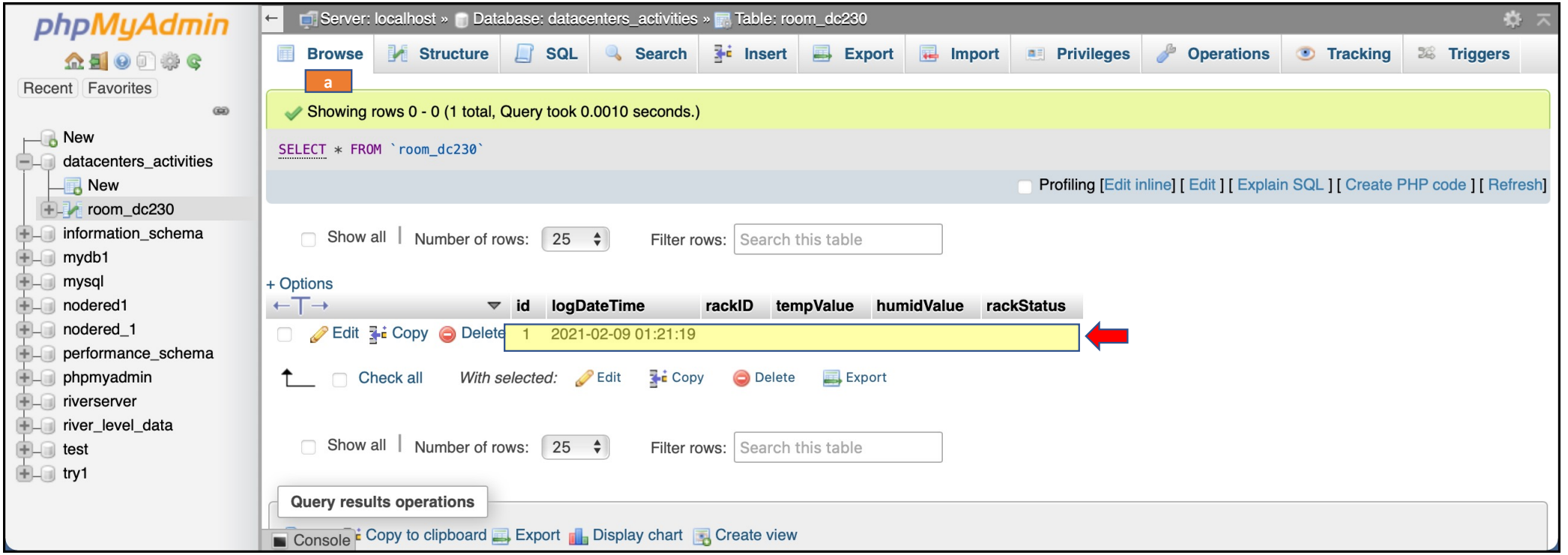


Solution: Step 3 CREATING MySQL DATABASE

→ Congrats! You managed to add your first data into room_dc230 database.

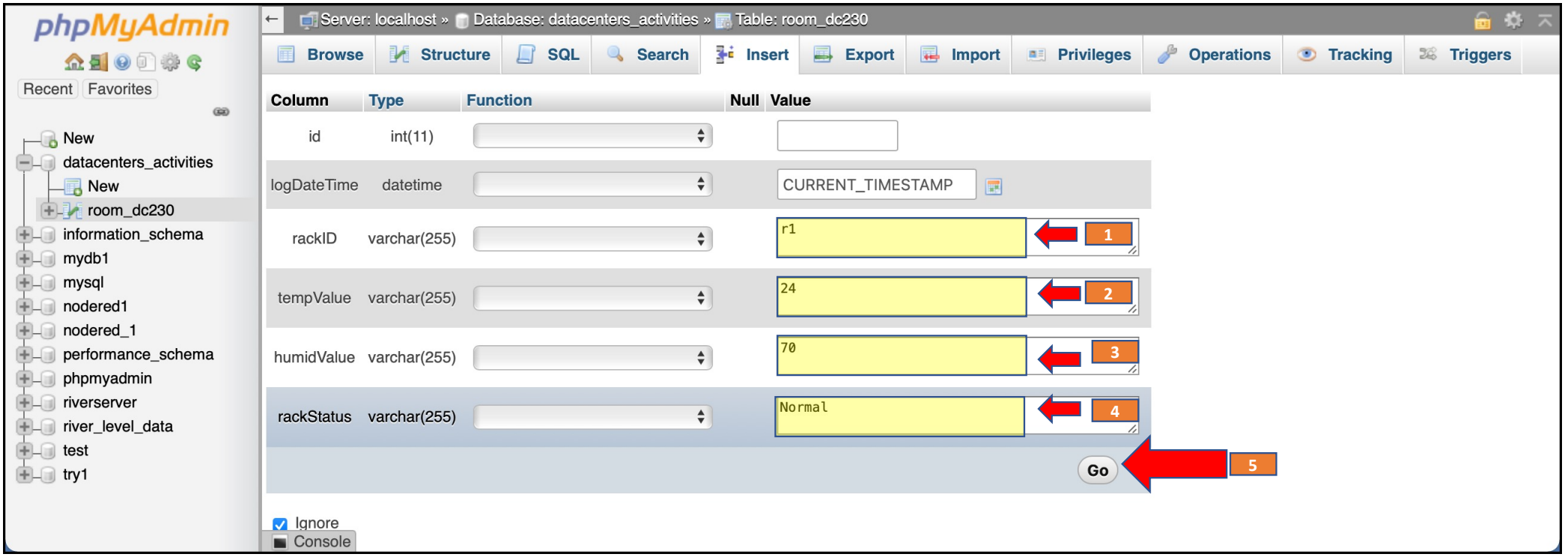
→ Click ***Edit*** link if you wish to edit the data.

→ ***Delete*** will not reset the ***id*** into **zero**. Next data entered will get the following running number.



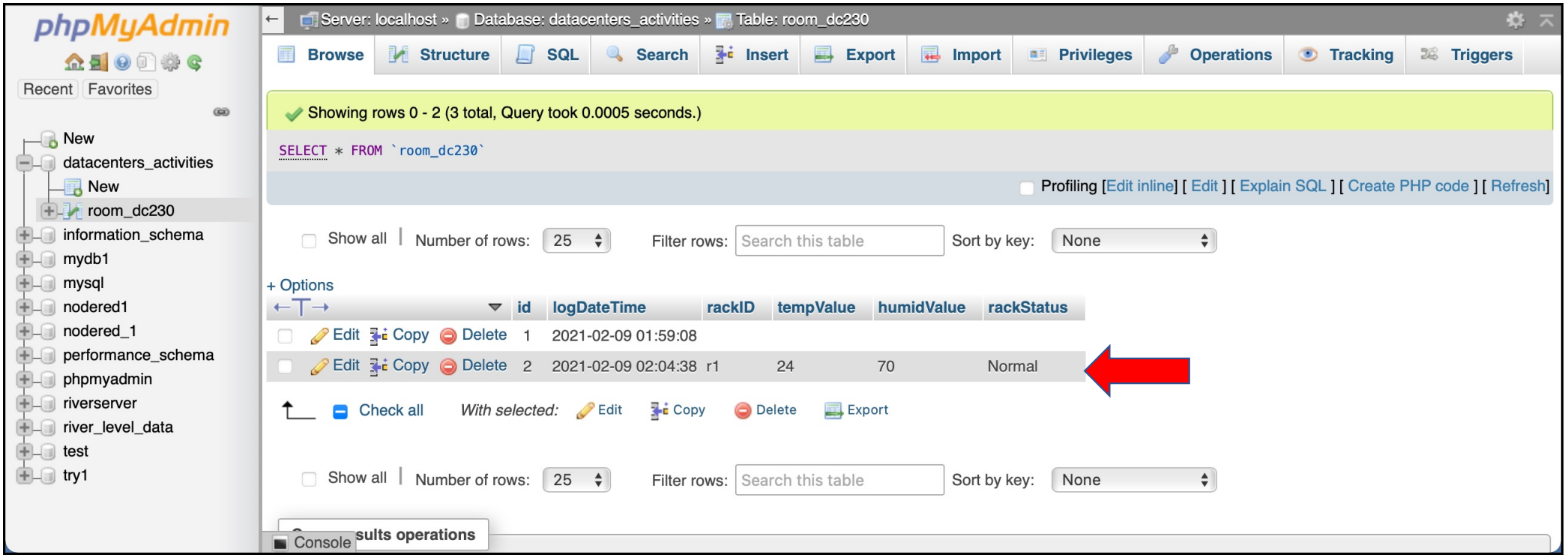
Solution: Step 3 CREATING MySQL DATABASE

→ Go to ***Insert*** link and add the information as show by red arrow & press ***Go*** to save the data.



Solution: Step 3 CREATING MySQL DATABASE

→ Red arrow shows the new data that have been entered.



Solution: Step 4 PHP SCRIPTS & HTDOCS & CODE EXPLAINATION & RUN TEST

→ Two PHP files are needed; esptodb.php & webview.php.

ESP32 + DHT11

...

ESP32 + DHT11

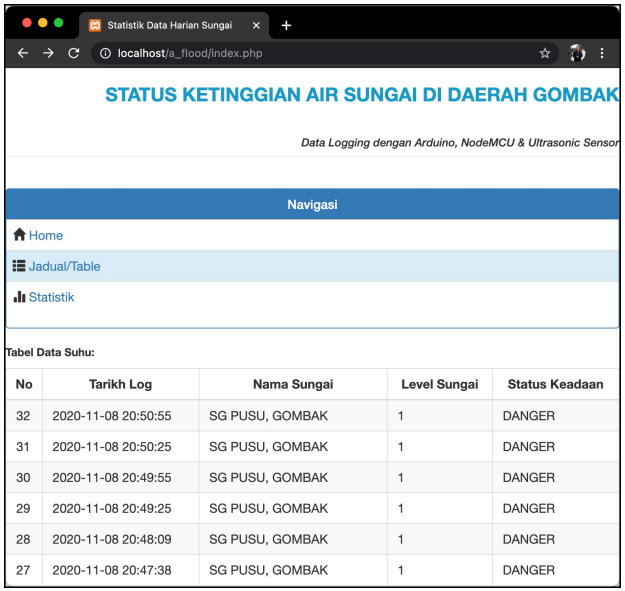
HTTP POST

Send every **xx** seconds

http://localhost/a-my/esptodb.php

Insert racks' information into database table

http://localhost/a-my/webview.php



Publish information upon web request

Update every **xx** seconds

Database: ***datacenters_activities***
Table: ***room_dc230***

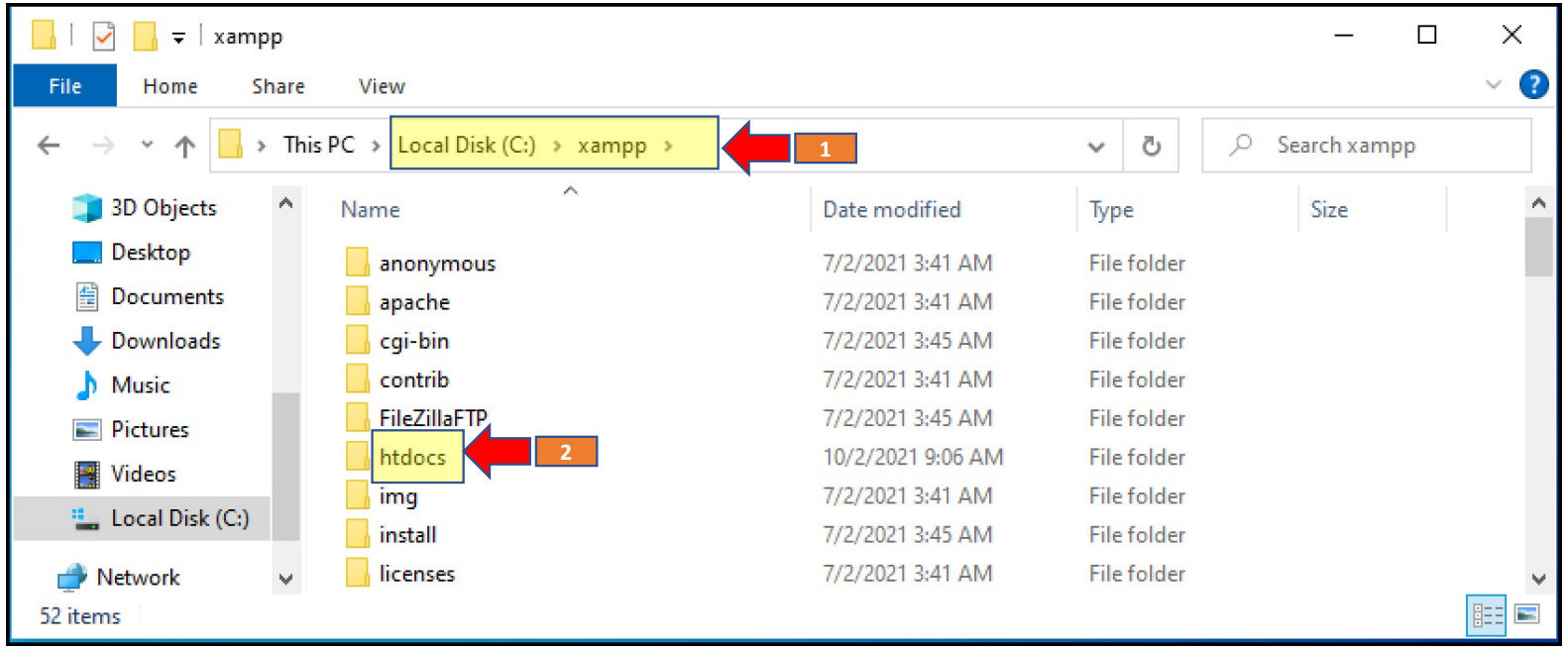
*****esptodb.php*** is the medium of ESP32 to save information from racks into database

***** *webview.php*** is to display datacenters activities on web page.

Solution: Step 4 PHP SCRIPTS & HTDOCS & CODE EXPLAINATION & RUN TEST

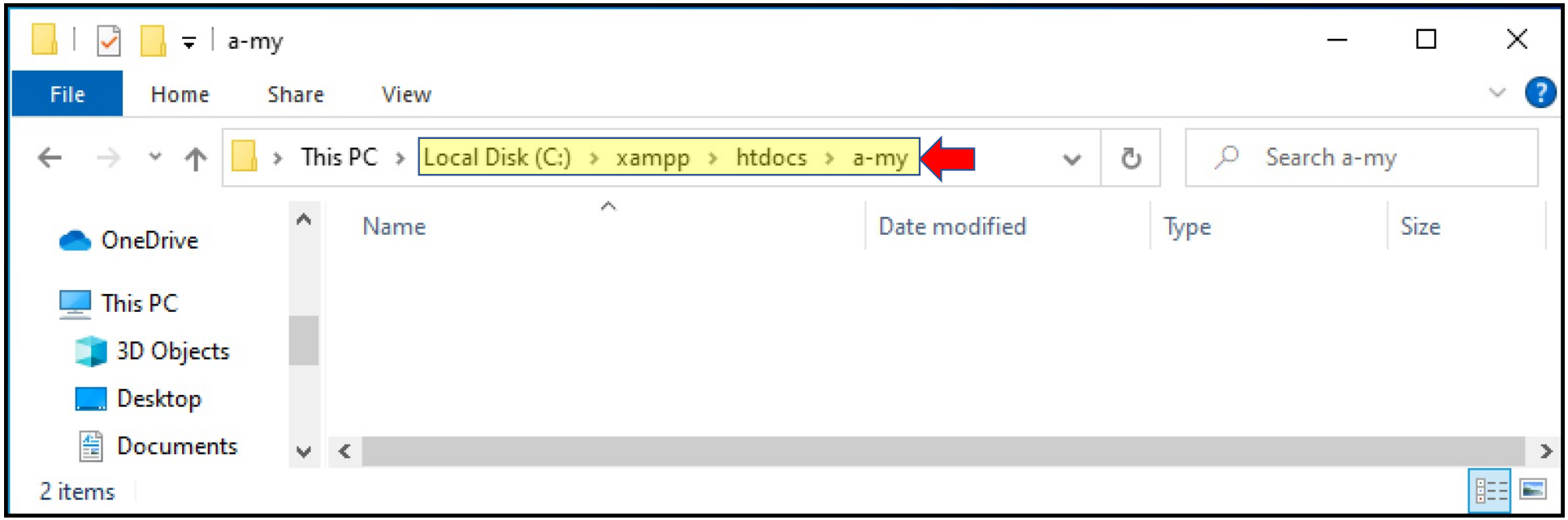
→ In order to publish any website either PHP or HTML, you need to save the files in a ***specific folder***, named ***htdocs***. It can be found in XAMPP folder.

→ It is advised that each project has its own folder. This may avoid you to override files that carries same filename.



Solution: Step 4 PHP SCRIPTS & HTDOCS & CODE EXPLAINATION & RUN TEST

→ Navigate to ***htdocs*** & create new folder named ***a-my***.

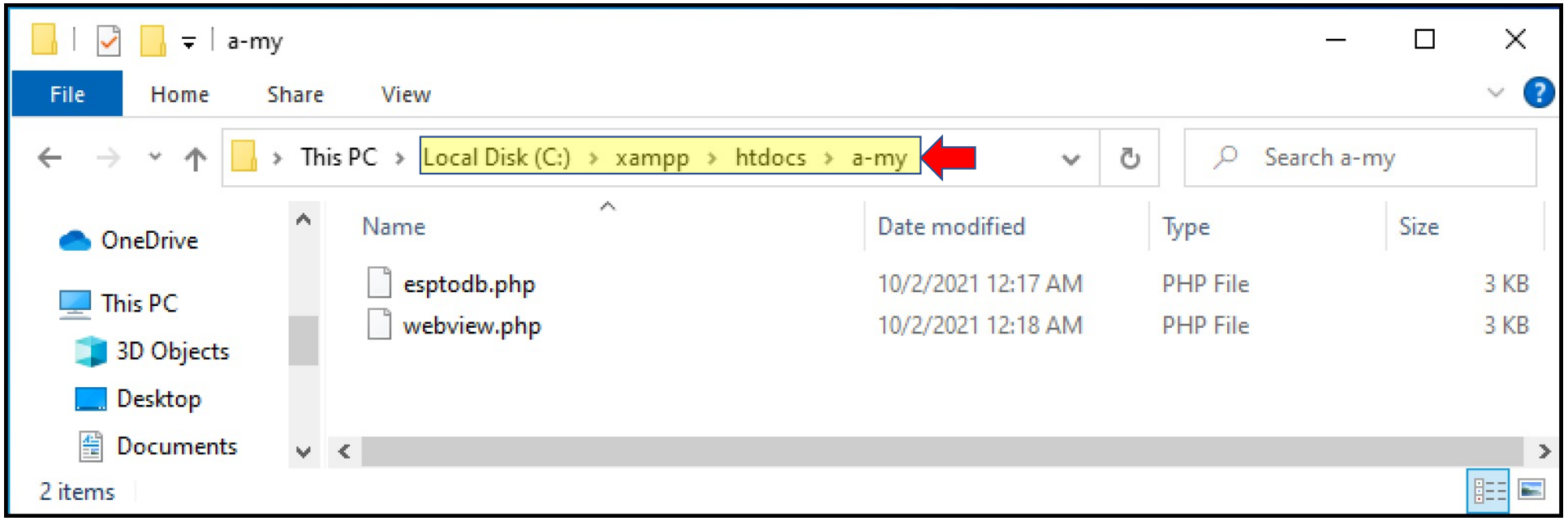


Solution: Step 4 PHP SCRIPTS & HTDOCS & CODE EXPLAINATION & RUN TEST

→ Download "***esptodb.php***" & "***webview.php***" from ***http://bit.ly/3p2pmNd***.

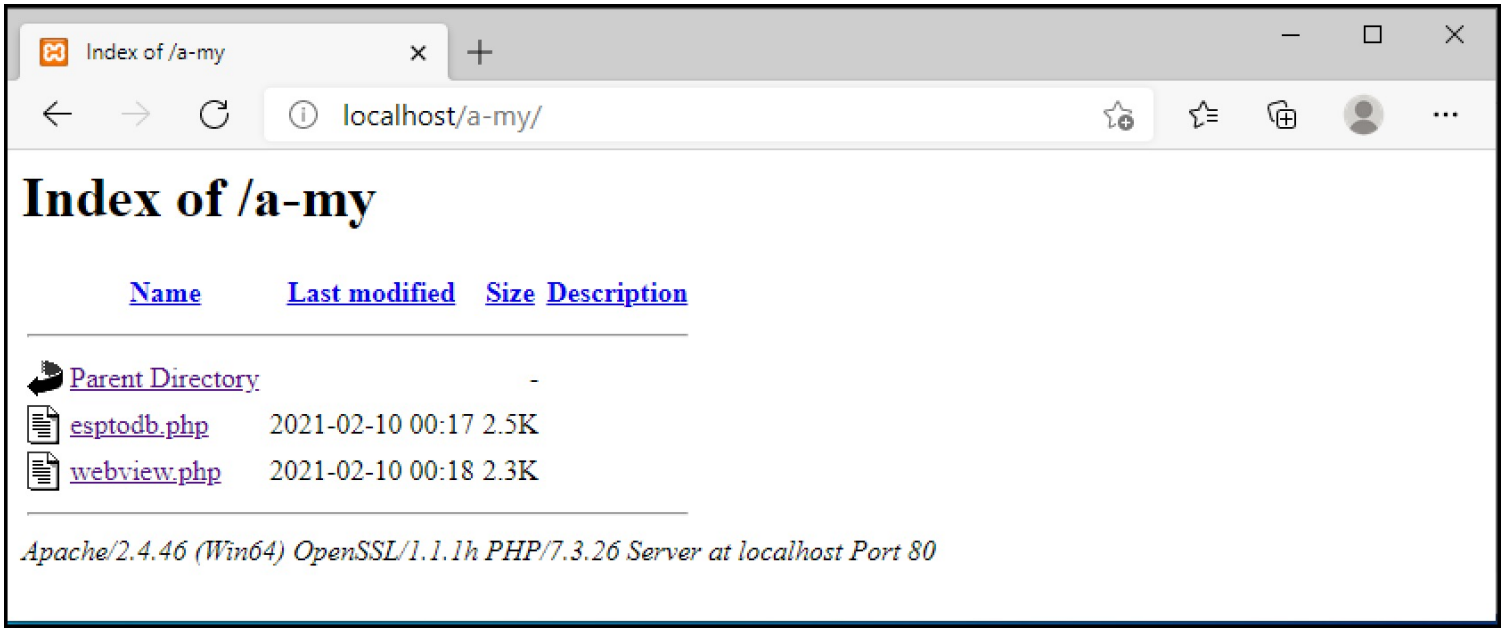
→ Extract & paste the files into ***a-my*** folder.

→ ESP32 will use "***esptodb.php***" as a medium to save information into MySQL while client will use "***webview.php***" to view the information thru web browsers.



Solution: Step 4 PHP SCRIPTS & HTDOCS & CODE EXPLAINATION & RUN TEST

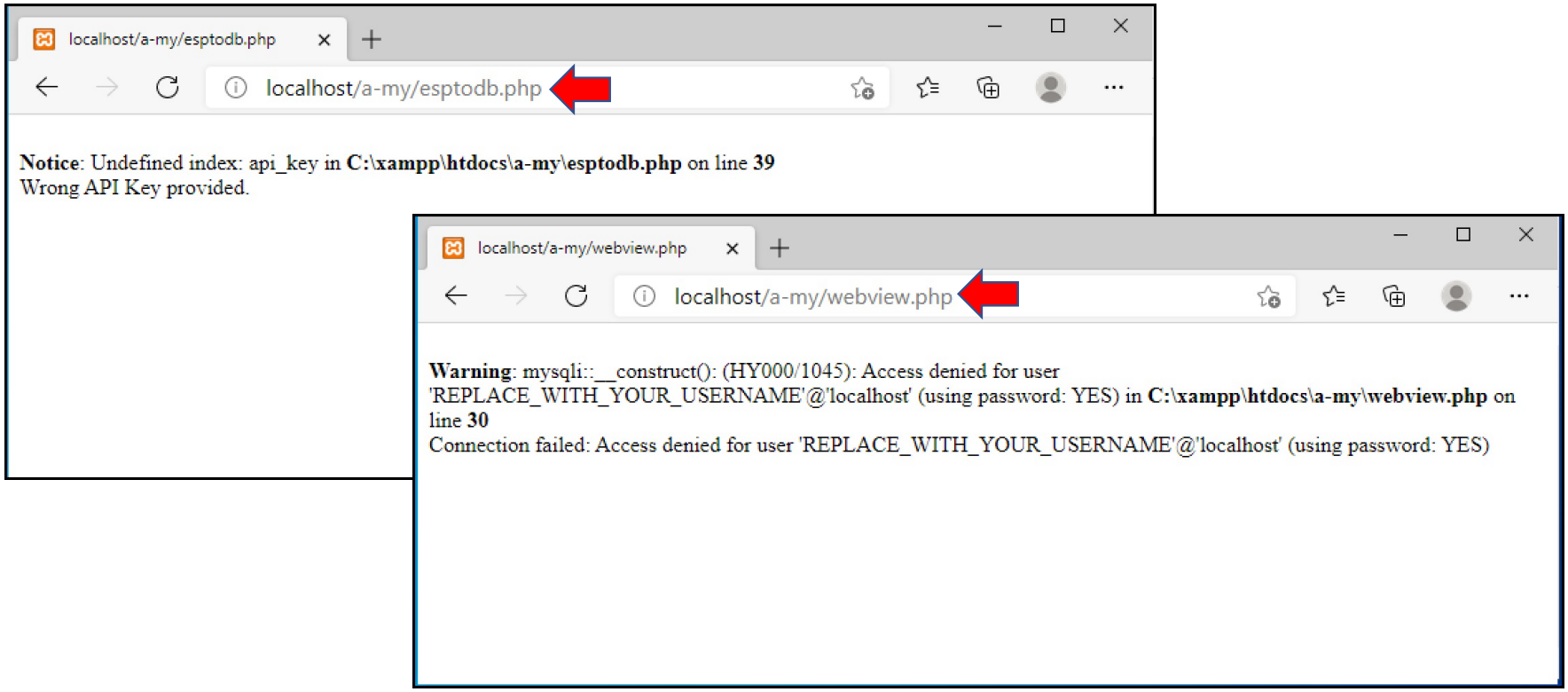
→ Open up your web browser & type **localhost/a-my/** in the address bar. You should get the similar output. If you failed to see this, go to your XAMPP C-Panel & check whether the server services has been deployed or not.



Solution: Step 4 PHP SCRIPTS & HTDOCS & CODE EXPLAINATION & RUN TEST

→ Click at the file one at a time. There are errors/warnings since the files were not properly configure.

→ You need a text editor to edit both files & we are going to use Sublime Text as the editor for PHP scripts. You may download it the following link: https://www.sublimetext.com/3



Solution: Step 4 PHP SCRIPTS & HTDOCS & CODE EXPLAINATION & RUN TEST

→ Open ***webview.php*** with ***sublimetext*** or any preferable text editor. The credentials are to establish connection to the database.

→ By default, ***$servername*** is "***localhost***" & ***$username*** is "***root***".

```
15   $servername = "localhost";
16
17   // REPLACE with your Database name
18   $dbname = "REPLACE_WITH_YOUR_DATABASE_NAME";
19
20   // REPLACE with table name
21   $tablename = "REPLACE_WITH_YOUR_TABLE_NAME";
22
23   // REPLACE with Database user
24   $username = "REPLACE_WITH_YOUR_USERNAME";
25
26   // REPLACE with Database user password
27   $password = "REPLACE_WITH_YOUR_PASSWORD";
```

→ Set up database with the following properties:

Database Name: **datacenter_activities**

Table Name: **room_dc230**

```
15   $servername = "localhost";
16
17   // REPLACE with your Database name
18   $dbname = "datacenters_activities";
19
20   // REPLACE with table name
21   $tablename = "room_dc230";
22
23   // REPLACE with Database user
24   $username = "root";
25
26   // REPLACE with Database user password
27   $password = "";
```

Solution: Step 4 PHP SCRIPTS & HTDOCS & CODE EXPLAINATION & RUN TEST

→ Before getting access to MySQL database, the client must establish a connection to the server as shown in **Line#30**. If any of the credentials incorrect, the client don't have the permission to access the server. The script stops & will display error message at the browser. (MySQLi = MySQL improved)

→ **Line#36** indicates selection of 5 columns from ***room_dc230*** table with descending order of ***id***. The syntax is put into a variable called **$sql**.

```
29  // Create connection
30  $conn = new mysqli($servername, $username, $password, $dbname);
31  // Check connection
32  if ($conn->connect_error) {
33      die("Connection failed: " . $conn->connect_error);
34  }
35
36  $sql = "SELECT logDateTime, rackID, tempValue, humidValue, rackStatus FROM $tablename ORDER BY id DESC";
```

Solution: Step 4 PHP SCRIPTS & HTDOCS & CODE EXPLAINATION & RUN TEST

→ A mix of PHP and HTML syntax in creating table.

```
38  echo '<table cellspacing="5" cellpadding="5">
39        <tr>
40          <td>Rack ID</td>
41          <td>Timestamp</td>
42          <td>Temparature (C)</td>
43          <td>Humidity (%)</td>
44          <td>Rack Status</td>
45        </tr>';
```

→ **Line#47 – Line#69** is hosting asking, fetch data from database & display them in table manner.

→"***query( )***" is a function that fetch data that was assigned in ***$sql*** variable. The results were put into a variable called $results.

→ each data from "***$results***" will be split into an array form according to its respected field.

```
47  if ($result = $conn->query($sql)) {
48      while ($row = $result->fetch_assoc()) {
49          $row_id = $row["rackID"];
50          $row_log = $row["logDateTime"];
51          $row_temp = $row["tempValue"];
52          $row_humid = $row["humidValue"];
53          $row_stats = $row["rackStatus"];
```

Solution: Step 4 PHP SCRIPTS & HTDOCS & CODE EXPLAINATION & RUN TEST

→ Script to display the information fetched from database in table form. Each row represent 1 set data / reading. New row carries another set of reading/data.

```
60          echo '<tr>
61                  <td>' . $row_id . '</td>
62                  <td>' . $row_log . '</td>
63                  <td>' . $row_temp . '</td>
64                  <td>' . $row_humid . '</td>
65                  <td>' . $row_stats . '</td>
66                </tr>';
67      }
```

→ The fetched data in ***$result*** are emptied, thus the variable carries no information.

→ "***close( )***" is a function that closes previously open database connection.

→ End of HTML script.

```
68      $result->free();
69  }
70
71  $conn->close();
72  ?>
73  </table>
74  </body>
75  </html>
```

Solution: Step 4 PHP SCRIPTS & HTDOCS & CODE EXPLAINATION & RUN TEST

→ Open ***esptodb.php*** with ***sublimetext*** or any preferable text editor. Fill up with your database credentials.

→ If ***webview.php*** is meant for client to view the temperature & humidity of the racks, ***esptodb.php*** is a script for EPS32 saving the racks data into the database.

→ ***$api_key_value*** is a kind of password to except information send from the **ESP32**. **ESP32** must send same key & the information will only be entertained when the key is matched. Otherwise, the information will be rejected.

```
28   // Keep this API Key value to be compatible with the ESP32 code provided in the project page.
29   // If you change this value, the ESP32 sketch needs to match
30   $api_key_value = "tPmAT5Ab3j7F9";
```

→ ***Line#33*** will empty the content of the handlers. The task of the handlers are to keep for information temporarily when received from the ESP32 thru HTTP POST or HTTP GET request.

```
32   // empty the variables
33   $api_key= $rackID = $tempVal = $humidVal = $rackStat = "";
```

Solution: Step 4 PHP SCRIPTS & HTDOCS & CODE EXPLAINATION & RUN TEST

→ There are 2 types of Hyper Text Transfer Protocol (HTTP) request methods: ***POST*** & ***GET***.

→ What is HTTP? HTTP works as request-response protocol between a client & a server.

→ ***HTTP GET*** is used to request data from a specified resource. It is often used to get values form APIs.

- eg., ***http://localhost/a-my/esptodb.php?key=tPmAT5Ab3jF9&temp=10***
- Name = **Key** & value = **tPmAT5Ab3jF9** + name = **temp** & value = **10** are send together in URL
- With HTPP GET, data is **visible** to everyone

→ ***HTTP POST*** is used to send information to a server to create/update a resource.

- eg., publish sensor readings to a server
- The data sent to the server with POST is stored in the request body of the HTTP request
- ***String serverPath = serverName "?temperature=24.37"; // sample in sketch***
- With HTTP POST, data is ***not visible*** in the URL request. However, if it's not encrypted, it's still visible in the request body.

https://randomnerdtutorials.com/esp8266-nodemcu-http-get-post-arduino/

Solution: Step 4 PHP SCRIPTS & HTDOCS & CODE EXPLAINATION & RUN TEST

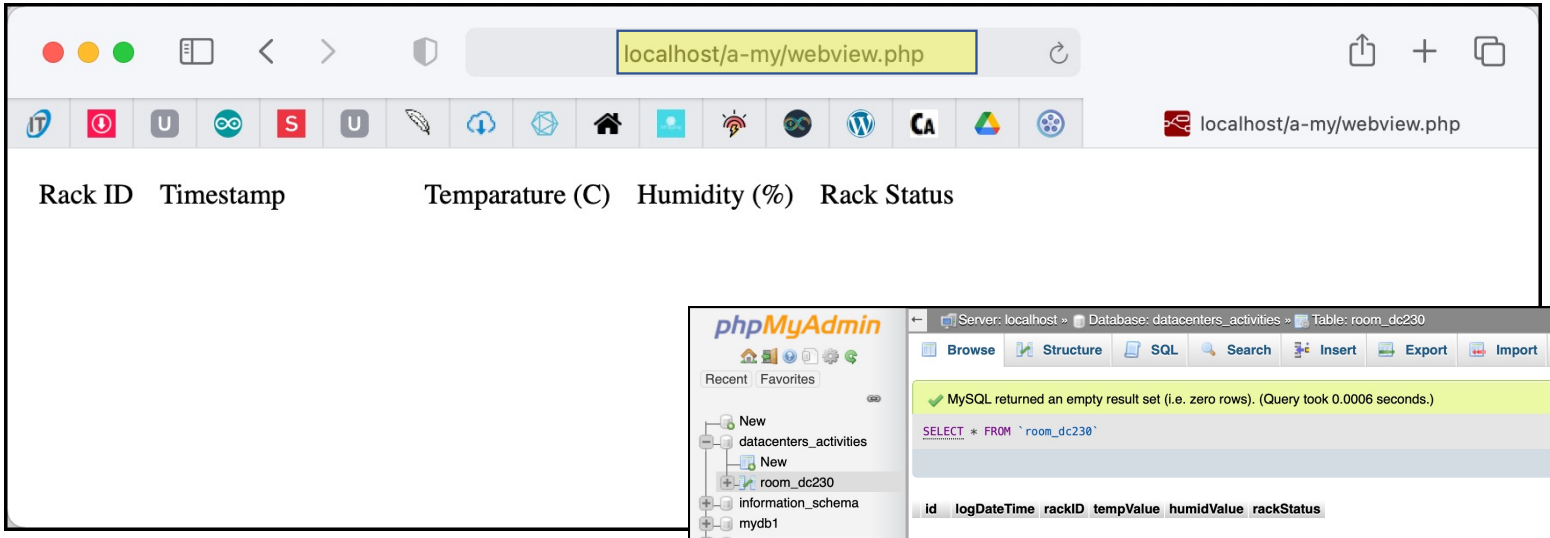
http://localhost/a-my/esptodbase.php?api_key=tPmAT5Ab3j7F9&rID=v112&temp=22&humid=40&currentStat=NORMAL

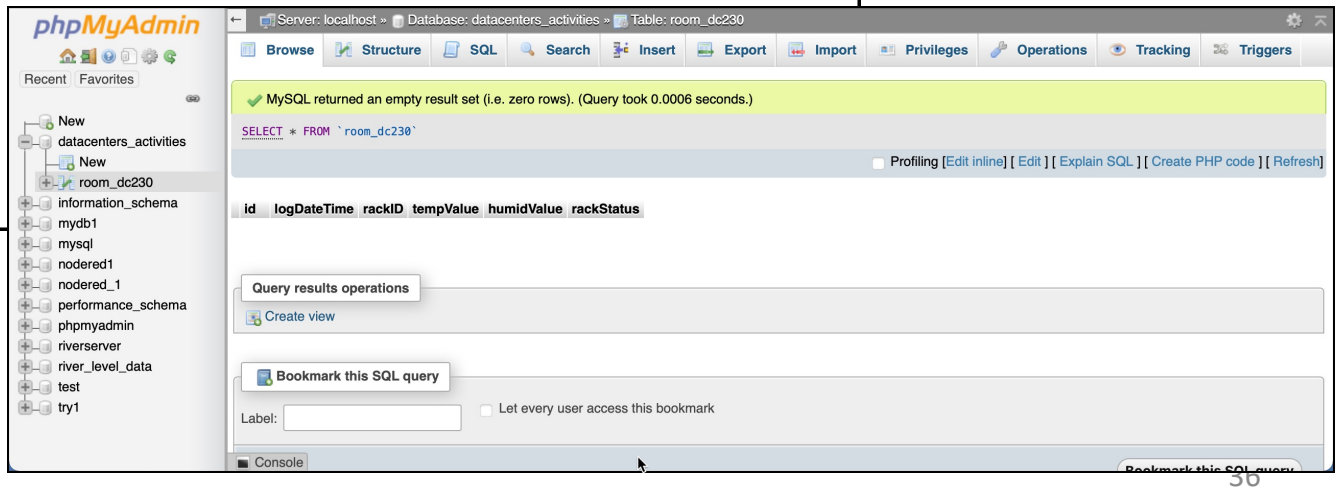
```php
// use POST for production
if ($_SERVER["REQUEST_METHOD"] == "GET") {              //GET or POST
    //echo "test";
    $api_key = test_input($_GET["api_key"]);            //$_GET or $_POST
    if($api_key == $api_key_value) {
        $rackID   = test_input($_GET["rID"]);           //$_GET or $_POST
        $tempVal  = test_input($_GET["temp"]);          //$_GET or $_POST
        $humidVal = test_input($_GET["humid"]);         //$_GET or $_POST
        $rackStat = test_input($_GET["currentStat"]);   //$_GET or $_POST

        // Create connection
        $conn = new mysqli($servername, $username, $password, $dbname);
        // Check connection
        if ($conn->connect_error) {
            die("Connection failed: " . $conn->connect_error);
        }

        $sql = "INSERT INTO $tablename (rackID, tempValue, humidValue, rackStatus)
        VALUES ('" . $rackID . "', '" . $tempVal . "', '" . $humidVal . "', '" . $rackStat . "')";

        if ($conn->query($sql) === TRUE) {
            echo "New record created successfully";
        }
        else {
            echo "Error: " . $sql . "<br>" . $conn->error;
        }

        $conn->close();
    }
    else {
        echo "Wrong API Key provided.";
    }

}
else {
    echo "No data posted with HTTP POST.";
}

function test_input($data) {
    $data = trim($data); //remove whitespace
    $data = stripslashes($data); //removes backslashes
    $data = htmlspecialchars($data); //to converts special characters
    //& (ampersand), " (double quote), ' (single quote), < (less than), > (greater than))
    //to HTML entities ( i.e. & (ampersand) becomes &amp, ' (single quote) becomes &#039,
    //< (less than) becomes &lt; (greater than) becomes &gt; ).
    return $data;
}
```

Solution: Step 4 PHP SCRIPTS & HTDOCS & CODE EXPLAINATION & RUN TEST

→ It is now the time to test both PHP scripts. Make sure that the database credentials have set accordingly.

→ No information print out since the database is still empty.

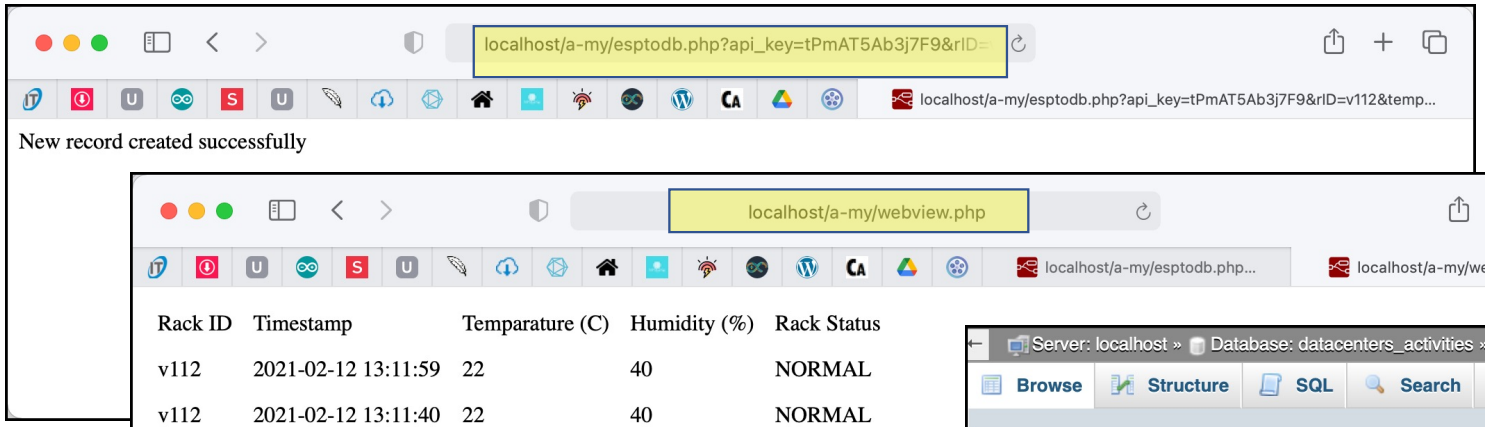


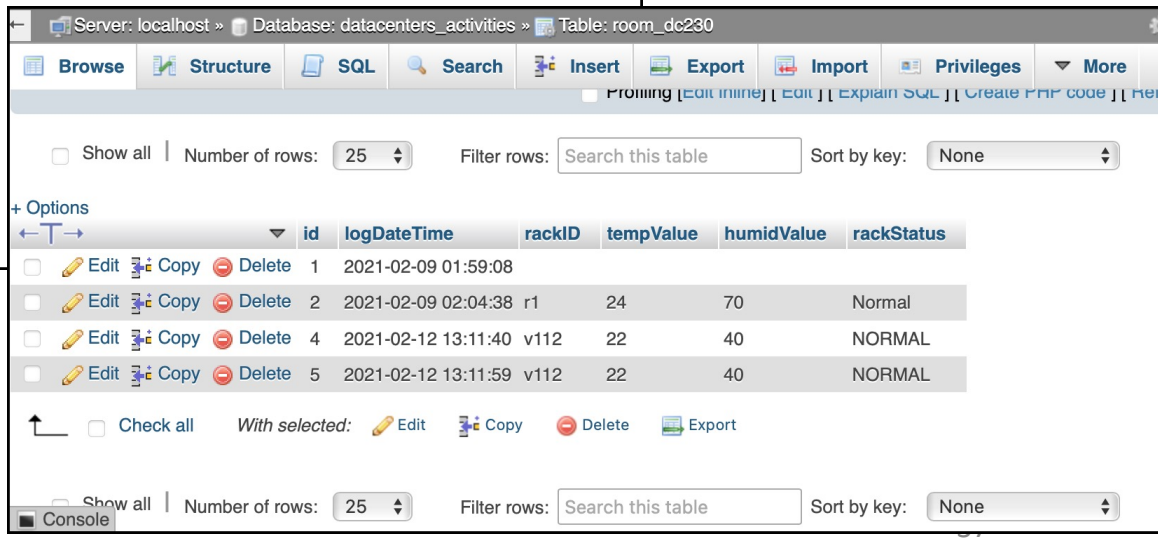


Solution: Step 4 PHP SCRIPTS & HTDOCS & CODE EXPLAINATION & RUN TEST

→ Open a browser, then copy & paste the following link & press enter.

http://localhost/a-my/esptodb.php?api_key=tPmAT5Ab3j7F9&rID=v112&temp=22&humid=40&currentStat=NORMAL





→ Try this:

1- http://localhost/a-my/

2- http://localhost/a-my/esptodb.php?api_key=tpMAT5Ab3j7F9&rID=v111&temp=22.4&humid=40%&currentStat=999

Solution: Step 5 ESP32 POST INFORMATION TO DBASE: SKETCH WALKTHROUGH

→ Open ***sketch-vii_esp32-dht11-http-post.ino*** from ***http://bit.ly/3p2pmNd*** downloaded in Step 4. Do not upload the sketch since you need to make some changes.

→ This will inform the compiler to compile the correct library no matter if what board you are currently uploading into. In this case, either ESP32 or NodeMCU & ESP8266.

```
13 #ifdef ESP32
14   // this will compile for ESP32 board
15   #include <WiFi.h>
16   #include <HTTPClient.h>
17 #else
18   // this will compile for ESP8266, NodeMCU boards
19   #include <ESP8266WiFi.h>
20   #include <ESP8266HTTPClient.h>
21   #include <WiFiClient.h>
22 #endif
```

Solution: Step 5 ESP32 POST INFORMATION TO DBASE: SKETCH WALKTHROUGH

→ Set the followings to the WiFi network connection.

```
// Replace with your network credentials
const char* ssid     = "REPLACE_WITH_YOUR_SSID";
const char* password = "REPLACE_WITH_YOUR_PASSWORD";
```

→ Change the "***192.168.1.102***" with your server's IP address. How to find IP address of your system ☺?

→ The file path "***/a-my/esptodb.php***" reflects the "***drive/xampp/htdocs/***" & set in STEP xx.

```
// REPLACE with your Domain name and URL path or server's IP address with path
const char* serverName = "http://192.168.1.102/a-my/esptodb.php";
```

→ Both ESP32 has the same API key with esptodb.php to avoid fake request. If not match, the information will not save into database. The API key is manually generated by the developer/user.

```
// Keep this API Key value to be compatible with the PHP code provided in the project page.
// If you change the apiKeyValue value, the PHP file "/esptodb.php" also needs to have the same key
String apiKeyValue = "tPmAT5Ab3j7F9";
```

→ Set the sensorID accordingly – e.g. rackID. This ID must be different from one another & must be documented, easier to detect & locate.

```
String sensorID = "a1";
```

Solution: Step 5 ESP32 POST INFORMATION TO DBASE: SKETCH WALKTHROUGH

→ The board will connect to the WiFi router. If any of the SSID or Password is incorrect, the board will not to join the network. Open Serial Monitor to view the process. IP address will be published if the board connected to the router.

```
40 void setup() {
41   Serial.begin(115200);
42
43   WiFi.begin(ssid, password);
44   Serial.println("Connecting");
45   while(WiFi.status() != WL_CONNECTED) {
46     delay(500);
47     Serial.print(".");
48   }
49   Serial.println("");
50   Serial.print("Connected to WiFi network with IP Address: ");
51   Serial.println(WiFi.localIP());
52 }
```

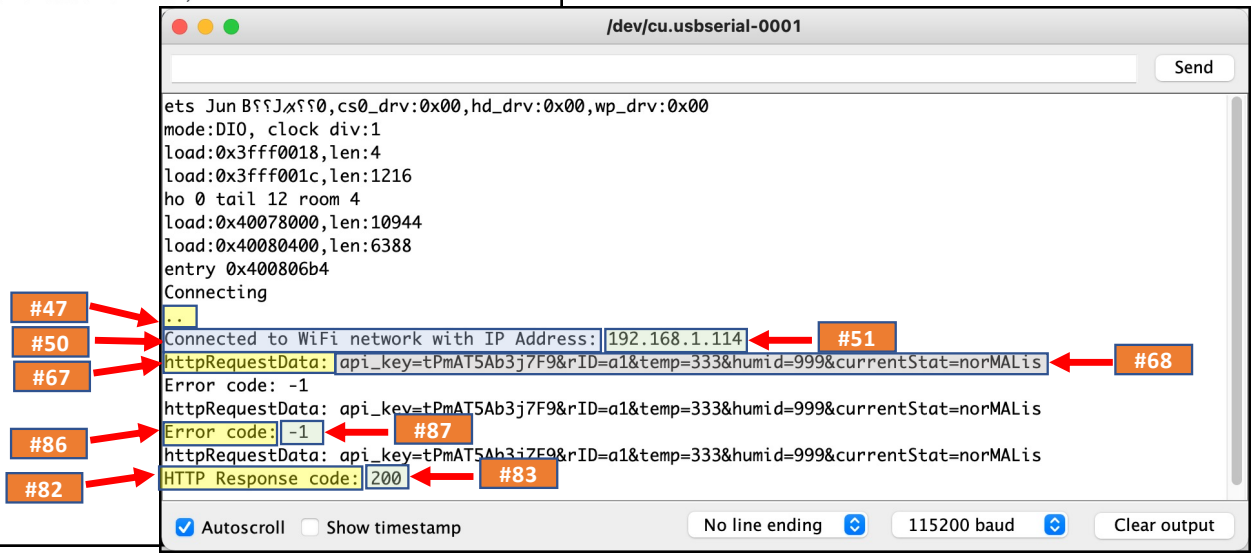
→ Fail to connect to router.

```
Connecting
..................................................................................................
```

Solution: Step 5 ESP32 POST INFORMATION TO DBASE: SKETCH WALKTHROUGH

```
54 void loop() {
55   //Check WiFi connection status
56   if(WiFi.status()== WL_CONNECTED){
57     HTTPClient http;
58
59     // Your Domain name with URL path or IP address with path
60     http.begin(serverName);
61
62     // Specify content-type header
63     http.addHeader("Content-Type", "application/x-www-form-urlencoded");
64
65     // Prepare your HTTP POST request data
66     String httpRequestData = "api_key=" + apiKeyValue + "&rID=" + sensorID + "&temp=" + 333  + "&humid=" + 999 + "&currentStat=" + "norMALis";
67     Serial.print("httpRequestData: ");
68     Serial.println(httpRequestData);
69
70     // You can comment the httpRequestData variable above
71     // then, use the httpRequestData variable below (for testing purposes without the DHT11 sensor) -->Similar with Line#66
72     //String httpRequestData = "api_key=tPmAT5Ab3j7F9&rID=abc&temp=123&humid=24.75&currentStat=norMALis";
73
74     // Send HTTP POST request
75     int httpResponseCode = http.POST(httpRequestData);
76
77     // If you need an HTTP request with a content type: text/plain
78     //http.addHeader("Content-Type", "text/plain");
79     //int httpResponseCode = http.POST("Hello, World!");
80
81     if (httpResponseCode>0) {
82       Serial.print("HTTP Response code: ");
83       Serial.println(httpResponseCode);
84     }
85     else {
86       Serial.print("Error code: ");
87       Serial.println(httpResponseCode);
88     }
89     // Free resources
90     http.end();
91   }
92   else {
93     Serial.println("WiFi Disconnected");
94   }
95   //Send an HTTP POST request every 30 seconds
96   delay(30000);
97 }
```

#66: Test send data to esptodb.php (IP add at #29)
#81: Success to communicate with server
#85: Unable to communicate with server --> not in the same network
#96: Update every 30 seconds

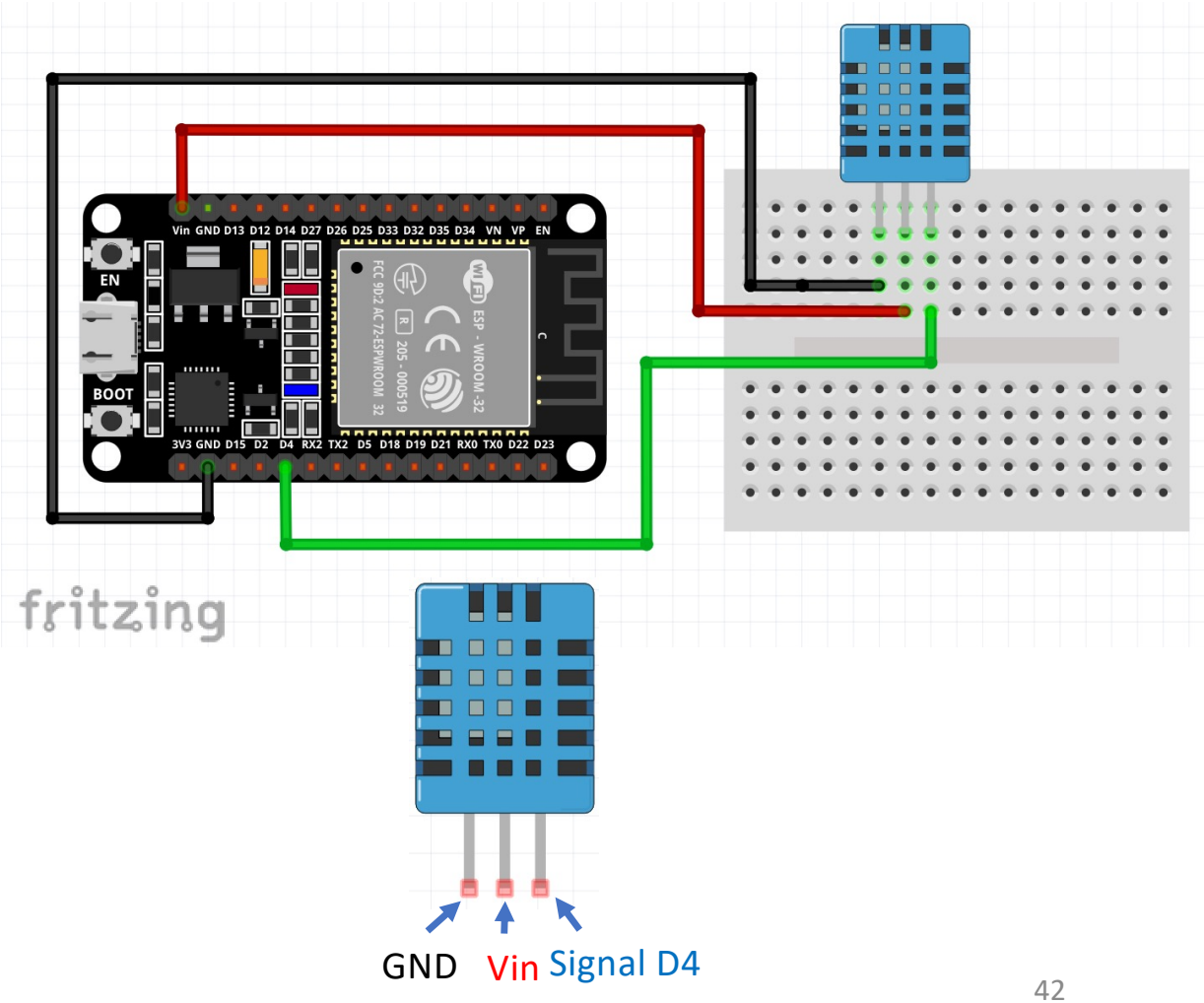


Solution: Step 6 SCHEMATIC DIAGRAM

→ After success tested the skech, its time to combine the DHT part with ESP32.

→ Before we go any further, construct the circuit as in the figure.

→ Check a few times, the connections that have been made before plugging ESP32 to USB port. This might prevent short circuit to DHT11. Watch out on sensors' pin. Same type, doesn't mean same pin configurations.



Solution: Step 7 THE WORKING SKETCH

→ Open ***sketch-vii_esp32-dht11-http-post.ino*** from ***http://bit.ly/3p2pmNd*** downloaded in Step 4. Do not upload the sketch since you need to make some changes.

```
13 #ifdef ESP32
14   // this will compile for ESP32 board
15   #include <WiFi.h>
16   #include <HTTPClient.h>
17 #else
18   // this will compile for ESP8266, NodeMCU boards
19   #include <ESP8266WiFi.h>
20   #include <ESP8266HTTPClient.h>
21   #include <WiFiClient.h>
22 #endif
23
24 #include <dht11.h>
25 dht11 DHT;
26 #define DHT11_PIN 4
27
28 // Replace with your network credentials
29 const char* ssid     = "air24";//REPLACE_WITH_YOUR_SSID";
30 const char* password = "polis12345";//REPLACE_WITH_YOUR_PASSWORD";
31
32 // REPLACE with your Domain name and URL path or server's IP address with path
33 const char* serverName = "http://192.168.1.102/a-my/esptodb.php";
34
35 // Keep this API Key value to be compatible with the PHP code provided in the project page.
36 // If you change the apiKeyValue value, the PHP file "/esptodb.php" also needs to have the same key
37 String apiKeyValue = "tPmAT5Ab3j7F9";
38
39 String sensorID = "a1";
40 //// latihan
41 ////String sensorLocation = "Office";
```

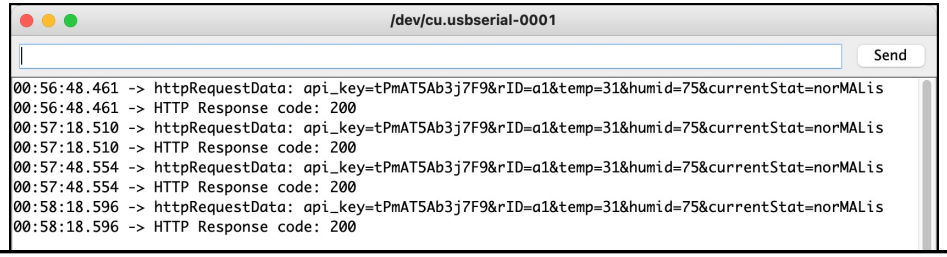
Solution: Step 7 THE WORKING SKETCH

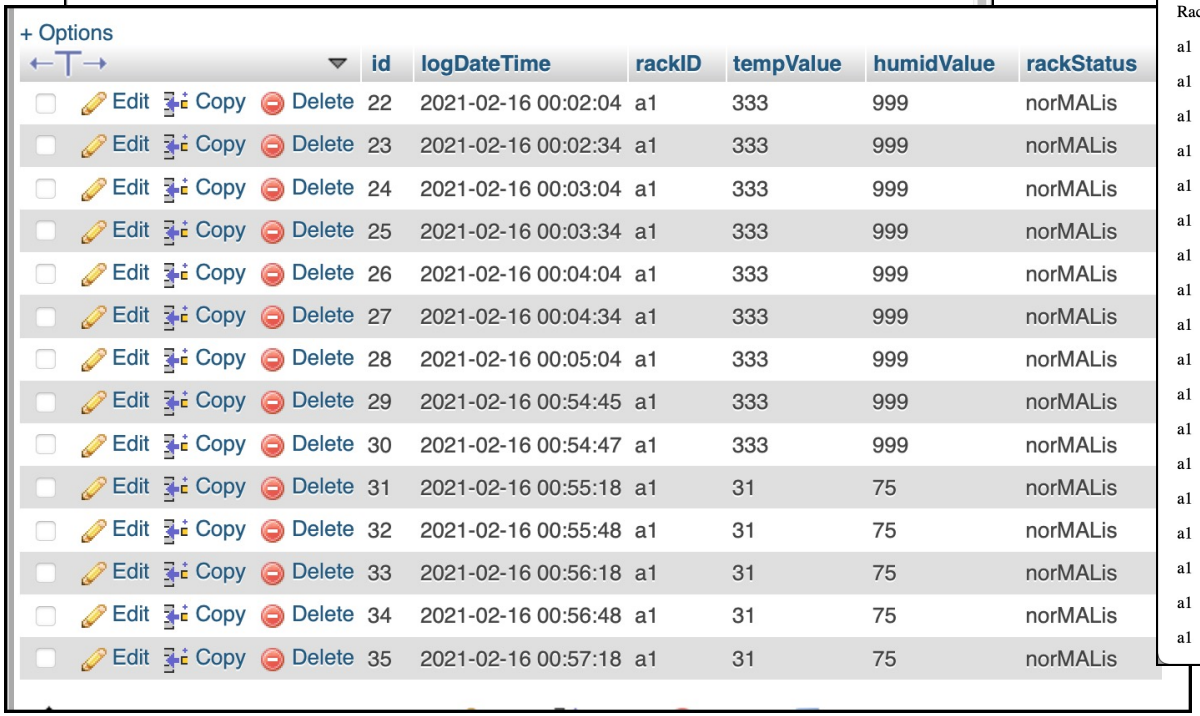
```
44 void setup() {
45   Serial.begin(115200);
46   WiFi.begin(ssid, password);
47   Serial.println("Connecting");
48   while(WiFi.status() != WL_CONNECTED) {
49     delay(500);
50     Serial.print(".");
51   }
52   Serial.println("");
53   Serial.print("Connected to WiFi network with IP Address: ");
54   Serial.println(WiFi.localIP());
55 }
```

Solution: Step 7 THE WORKING SKETCH

```
57 void loop() {
58   int chk = DHT.read(DHT11_PIN);    //Read humid & temp
59   //Check WiFi connection status
60   if(WiFi.status()== WL_CONNECTED){
61     HTTPClient http;
62
63     // Your Domain name with URL path or IP address with path
64     http.begin(serverName);
65
66     // Specify content-type header
67     http.addHeader("Content-Type", "application/x-www-form-urlencoded");
68
69     // Prepare your HTTP POST request data
70     String httpRequestData = "api_key=" + apiKeyValue + "&rID=" + sensorID
71                            + "&temp=" + DHT.temperature  + "&humid=" + DHT.humidity
72                            + "&currentStat=" + "norMALis";
73     Serial.print("httpRequestData: ");
74     Serial.println(httpRequestData);
75
76     // You can comment the httpRequestData variable above
77     // then, use the httpRequestData variable below (for testing purposes without the DHT11 sensor) -->Similar with Line#66
78     //String httpRequestData = "api_key=tPmAT5Ab3j7F9&rID=abc&temp=123&humid=24.75&currentStat=norMALis";
79
80     // Send HTTP POST request
81     int httpResponseCode = http.POST(httpRequestData);
82
83     // If you need an HTTP request with a content type: text/plain
84     //http.addHeader("Content-Type", "text/plain");
85     //int httpResponseCode = http.POST("Hello, World!");
86     if (httpResponseCode>0) {
87       Serial.print("HTTP Response code: ");
88       Serial.println(httpResponseCode);
89     }
90     else {
91       Serial.print("Error code: ");
92       Serial.println(httpResponseCode);
93     }
94     // Free resources
95     http.end();
96   }
97   else {
98     Serial.println("WiFi Disconnected");
99   }
100  //Send an HTTP POST request every 30 seconds
101  delay(30000);
102 }
```

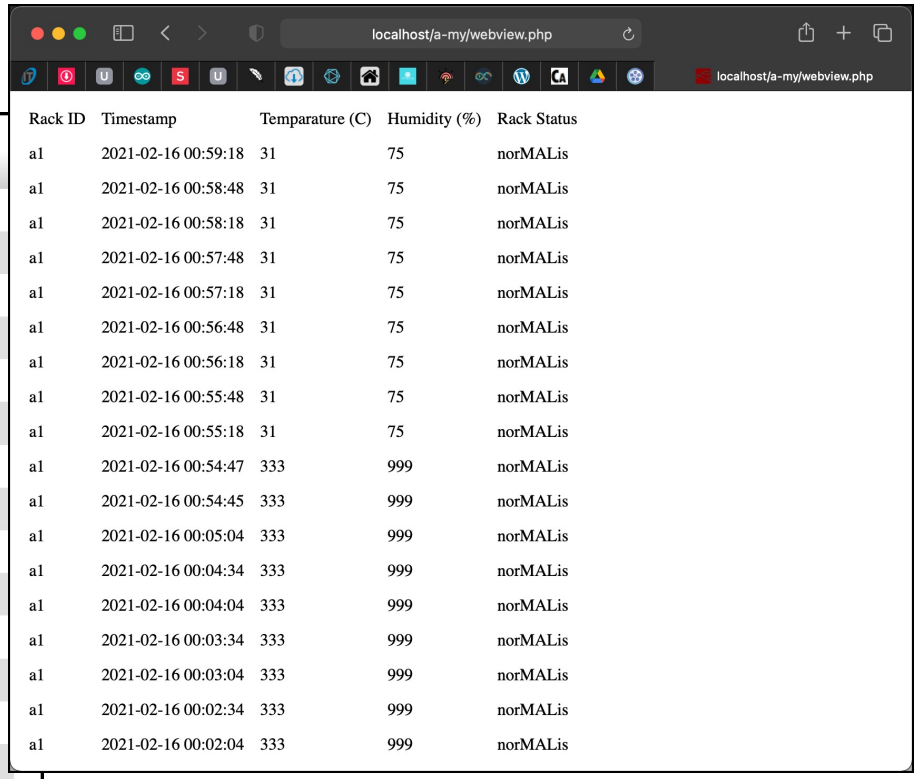
Solution: Step 7 THE WORKING SKETCH





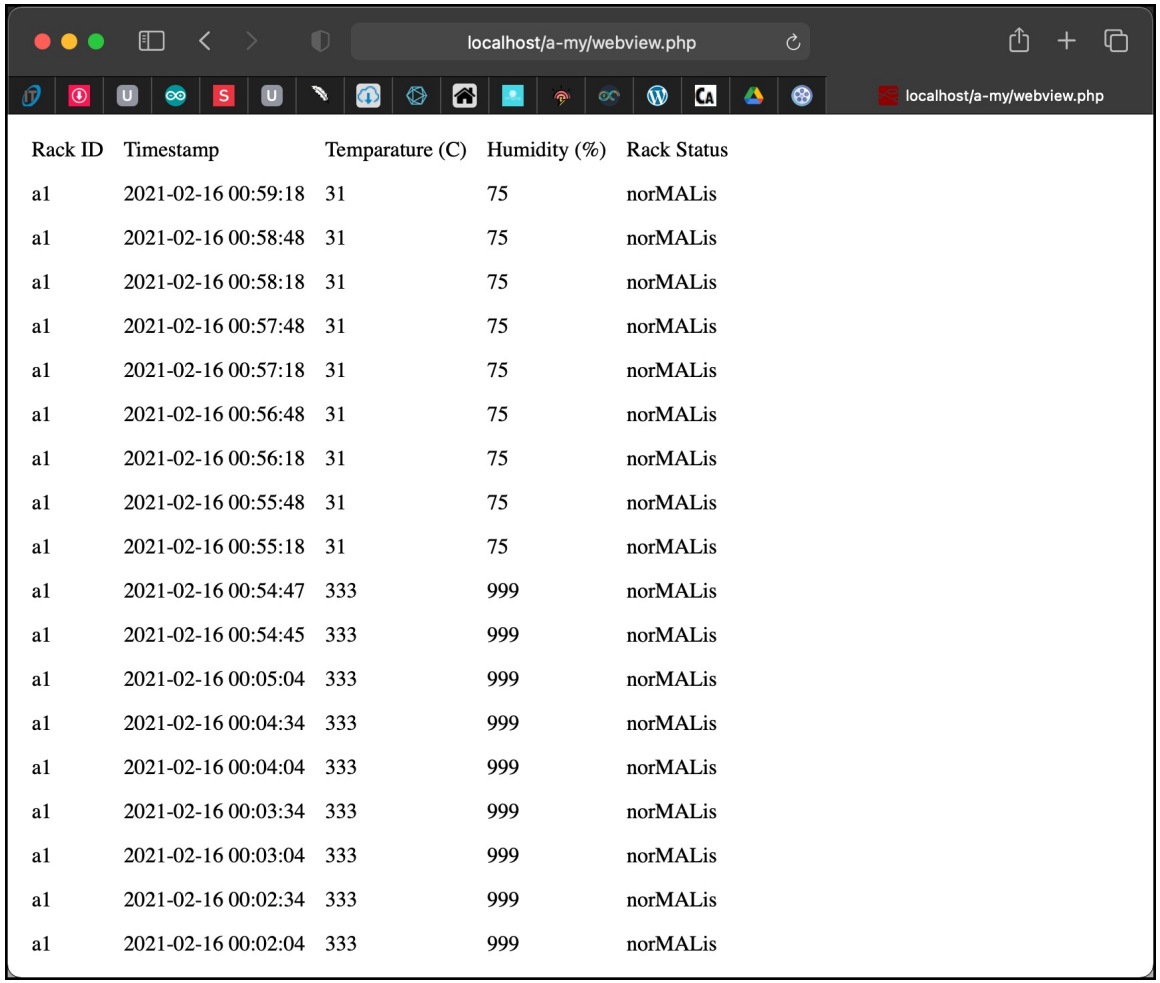
+ Options

	id	logDateTime	rackID	tempValue	humidValue	rackStatus
Edit Copy Delete	22	2021-02-16 00:02:04	a1	333	999	norMALis
Edit Copy Delete	23	2021-02-16 00:02:34	a1	333	999	norMALis
Edit Copy Delete	24	2021-02-16 00:03:04	a1	333	999	norMALis
Edit Copy Delete	25	2021-02-16 00:03:34	a1	333	999	norMALis
Edit Copy Delete	26	2021-02-16 00:04:04	a1	333	999	norMALis
Edit Copy Delete	27	2021-02-16 00:04:34	a1	333	999	norMALis
Edit Copy Delete	28	2021-02-16 00:05:04	a1	333	999	norMALis
Edit Copy Delete	29	2021-02-16 00:54:45	a1	333	999	norMALis
Edit Copy Delete	30	2021-02-16 00:54:47	a1	333	999	norMALis
Edit Copy Delete	31	2021-02-16 00:55:18	a1	31	75	norMALis
Edit Copy Delete	32	2021-02-16 00:55:48	a1	31	75	norMALis
Edit Copy Delete	33	2021-02-16 00:56:18	a1	31	75	norMALis
Edit Copy Delete	34	2021-02-16 00:56:48	a1	31	75	norMALis
Edit Copy Delete	35	2021-02-16 00:57:18	a1	31	75	norMALis



Rack ID	Timestamp	Temparature (C)	Humidity (%)	Rack Status
a1	2021-02-16 00:59:18	31	75	norMALis
a1	2021-02-16 00:58:48	31	75	norMALis
a1	2021-02-16 00:58:18	31	75	norMALis
a1	2021-02-16 00:57:48	31	75	norMALis
a1	2021-02-16 00:57:18	31	75	norMALis
a1	2021-02-16 00:56:48	31	75	norMALis
a1	2021-02-16 00:56:18	31	75	norMALis
a1	2021-02-16 00:55:48	31	75	norMALis
a1	2021-02-16 00:55:18	31	75	norMALis
a1	2021-02-16 00:54:47	333	999	norMALis
a1	2021-02-16 00:54:45	333	999	norMALis
a1	2021-02-16 00:05:04	333	999	norMALis
a1	2021-02-16 00:04:34	333	999	norMALis
a1	2021-02-16 00:04:04	333	999	norMALis
a1	2021-02-16 00:03:34	333	999	norMALis
a1	2021-02-16 00:03:04	333	999	norMALis
a1	2021-02-16 00:02:34	333	999	norMALis
a1	2021-02-16 00:02:04	333	999	norMALis

Solution: Step 7 THE WORKING SKETCH



Rack ID	Timestamp	Temparature (C)	Humidity (%)	Rack Status
a1	2021-02-16 00:59:18	31	75	norMALis
a1	2021-02-16 00:58:48	31	75	norMALis
a1	2021-02-16 00:58:18	31	75	norMALis
a1	2021-02-16 00:57:48	31	75	norMALis
a1	2021-02-16 00:57:18	31	75	norMALis
a1	2021-02-16 00:56:48	31	75	norMALis
a1	2021-02-16 00:56:18	31	75	norMALis
a1	2021-02-16 00:55:48	31	75	norMALis
a1	2021-02-16 00:55:18	31	75	norMALis
a1	2021-02-16 00:54:47	333	999	norMALis
a1	2021-02-16 00:54:45	333	999	norMALis
a1	2021-02-16 00:05:04	333	999	norMALis
a1	2021-02-16 00:04:34	333	999	norMALis
a1	2021-02-16 00:04:04	333	999	norMALis
a1	2021-02-16 00:03:34	333	999	norMALis
a1	2021-02-16 00:03:04	333	999	norMALis
a1	2021-02-16 00:02:34	333	999	norMALis
a1	2021-02-16 00:02:04	333	999	norMALis

QUESTIONS?

Questions?

EXERCISE

Modify this project by doing the followings:

a. Add LED statement in ESP32 sketch – if connected to WiFi, built in led (GPIO2) will switch on.
b. Write condition statements at PHP files:
   i. If temp >= 28˚C && <=39˚C status is **ALERT**
   ii. If temp >= 40˚C status is **DANGER**

   The status need to be saved in the database together with other information.

   HINT: you need to omit the status information from ESP32 sketch.