Midterm Exam

EE 470 - Introduction to the Internet of Things- Fall 2022

NAME Het Patel DATE: 11/08/2022

Link to this document:
https://docs.google.com/document/d/1rrmKDXBxPwJomA1TnY3spwJHaJmTnTK_xZfI-02S3qU/edit?usp=sharing

Please start early!!! Complete the serverside first!
The server may be down on Sunday night!
This midterm has a combined 200 points!

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1. Submission (80 points)

1. **What is the purpose of this project? What is the point? Here are some examples to help you to start your description (you need to describe the purpose of your project very clearly in more than one line):**

   The purpose of this project is to determine the duration of the light in the closed room. Oftentimes we have seen automatic switches which turn on and off in a certain amount of time. This project goes a little more in depth to measure the amount of light turned on in the room.

2. **What would your project be used for? Who would use your system? Who is it for?**

   This project can certainly be a great model of an IoT system which measures the amount of time light is on. The great thing is, it is accessible from anywhere in the world. This can be used in any house or offices where people are more concerned with power usage of their property. Definitely by doing simple math you can find out the amount of power used by that specific light during the month and many more following ideas you can implement with this device.

3. **Clearly, explain what type of DURATION you are measuring and how.**

   This project measures the duration between when the light turns ON and when it turns back OFF. The unit of this duration is made conventional as in seconds.

4. **Provide a list of hardware materials (devices) you used in your project. You need to include the device name, quantity, and manufacturer or part number.**

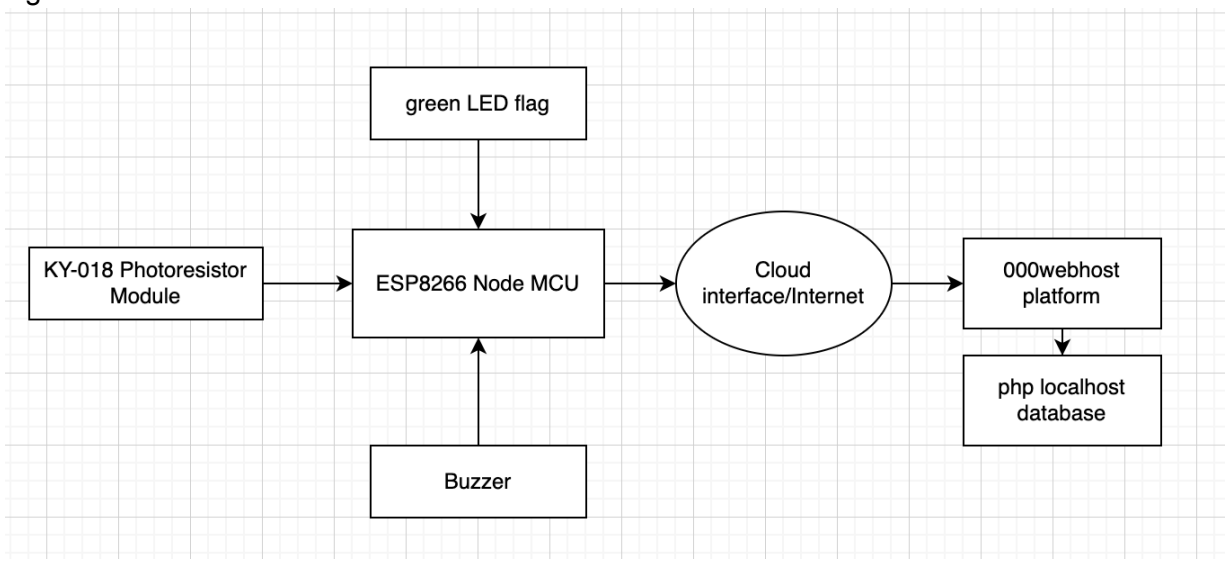
List of parts: 1. 1x ESP8266 Node MCU 2. 1x KY-018 Photoresistor 3. 1x Buzzer 4. 1x 220 ohm Resistor 5. 10x Jumper wires for connection 6. 1x A power cable for MCU
Description: Above is the list of components that have been used in this project.

5. What is the URL link to your webpage: Must be similar to https://faridfarahmand.000webhostapp.com/**IoTmidTerm/sensorDisplay.xxx** -

Link to your page: https://eceiotpro.000webhostapp.com/IoTmidTerm/sensorDisplay.php

6. Submit a high-level diagram of your design. This will be similar to Figure 1, above. Add your details. No grade will be given for sloppy work! You can use draw.io.

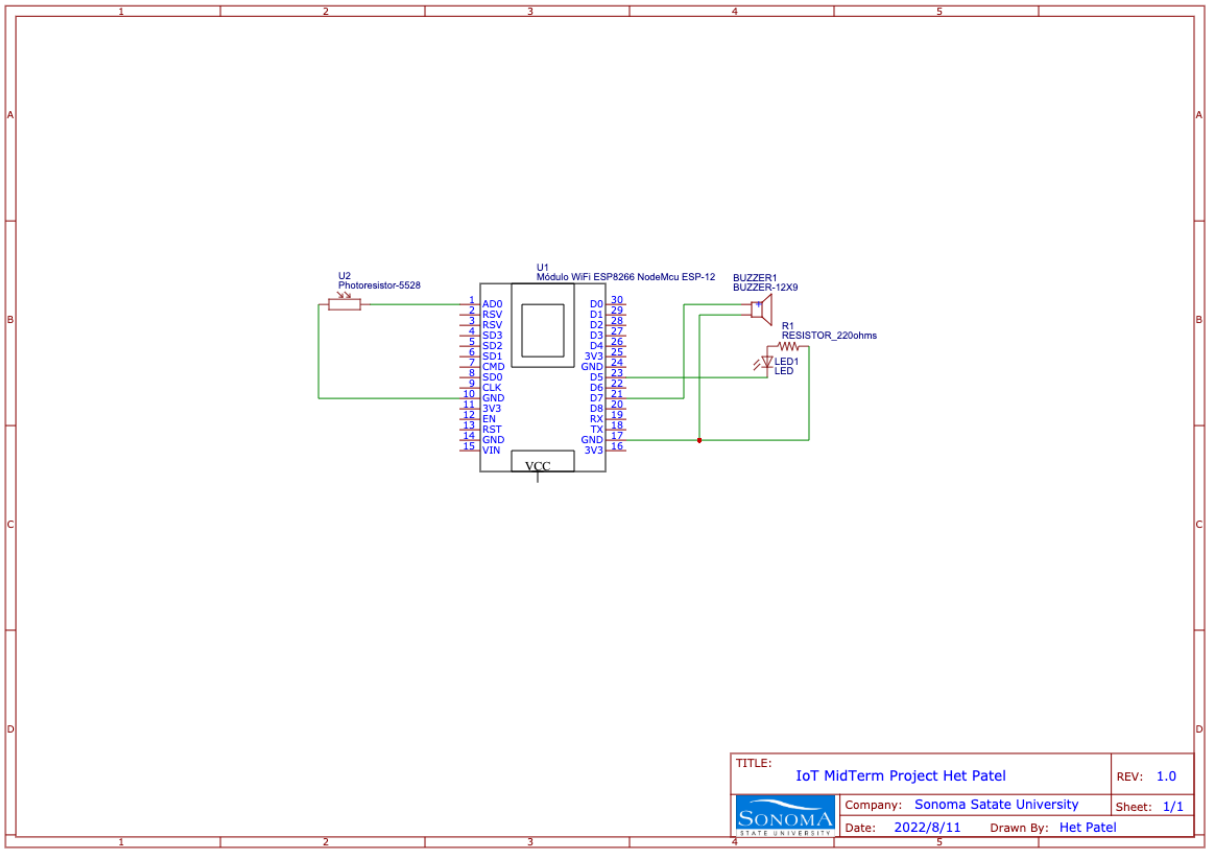
Figure



Description: The mentioned snapshot shows the high level diagram of the project. It shows each of the components included in the project.

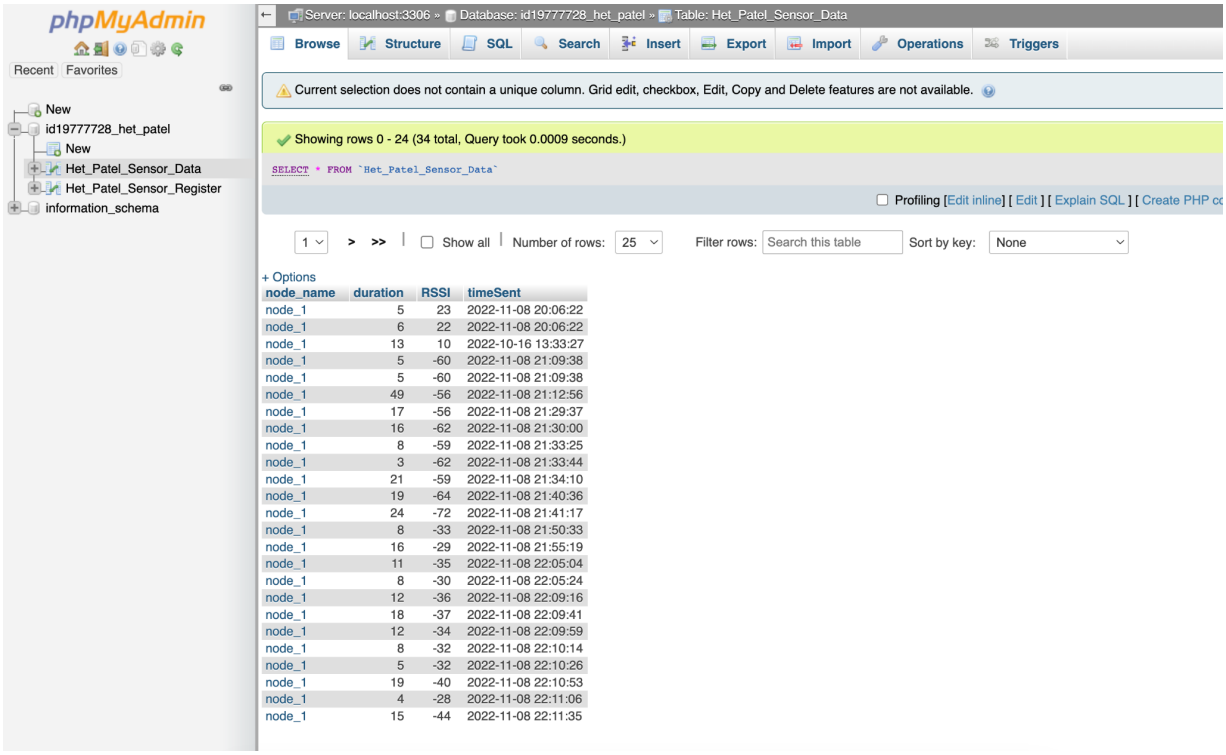
7. Submit your full circuit diagram - You must use a circuit diagram such as EasyEDA (https://easyeda.com/). Your circuit must be very clear!

Figure



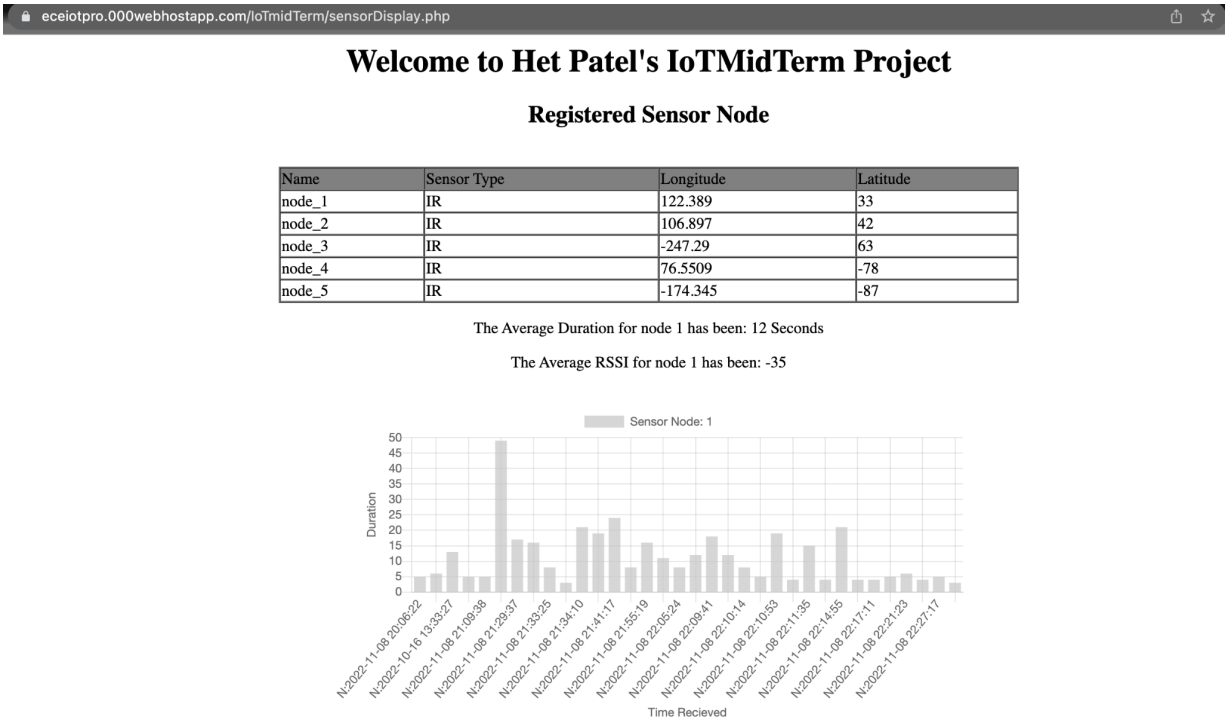
Description: The schematic of the module.

8. Show a snapshot of your database. Also, show the graph associated with the data in the database. These two must be consistent.



node_name	duration	RSSI	timeSent
node_1	5	23	2022-11-08 20:06:22
node_1	6	22	2022-11-08 20:06:22
node_1	13	10	2022-10-16 13:33:27
node_1	5	-60	2022-11-08 21:09:38
node_1	5	-60	2022-11-08 21:09:38
node_1	49	-56	2022-11-08 21:12:56
node_1	17	-56	2022-11-08 21:29:37
node_1	16	-62	2022-11-08 21:30:00
node_1	8	-59	2022-11-08 21:33:25
node_1	3	-62	2022-11-08 21:33:44
node_1	21	-59	2022-11-08 21:34:10
node_1	19	-64	2022-11-08 21:40:36
node_1	24	-72	2022-11-08 21:41:17
node_1	8	-33	2022-11-08 21:50:33
node_1	16	-29	2022-11-08 21:55:19
node_1	11	-35	2022-11-08 22:05:04
node_1	8	-30	2022-11-08 22:05:24
node_1	12	-36	2022-11-08 22:09:16
node_1	18	-37	2022-11-08 22:09:41
node_1	12	-34	2022-11-08 22:09:59
node_1	8	-32	2022-11-08 22:10:14
node_1	5	-32	2022-11-08 22:10:26
node_1	19	-40	2022-11-08 22:10:53
node_1	4	-28	2022-11-08 22:11:06
node_1	15	-44	2022-11-08 22:11:35

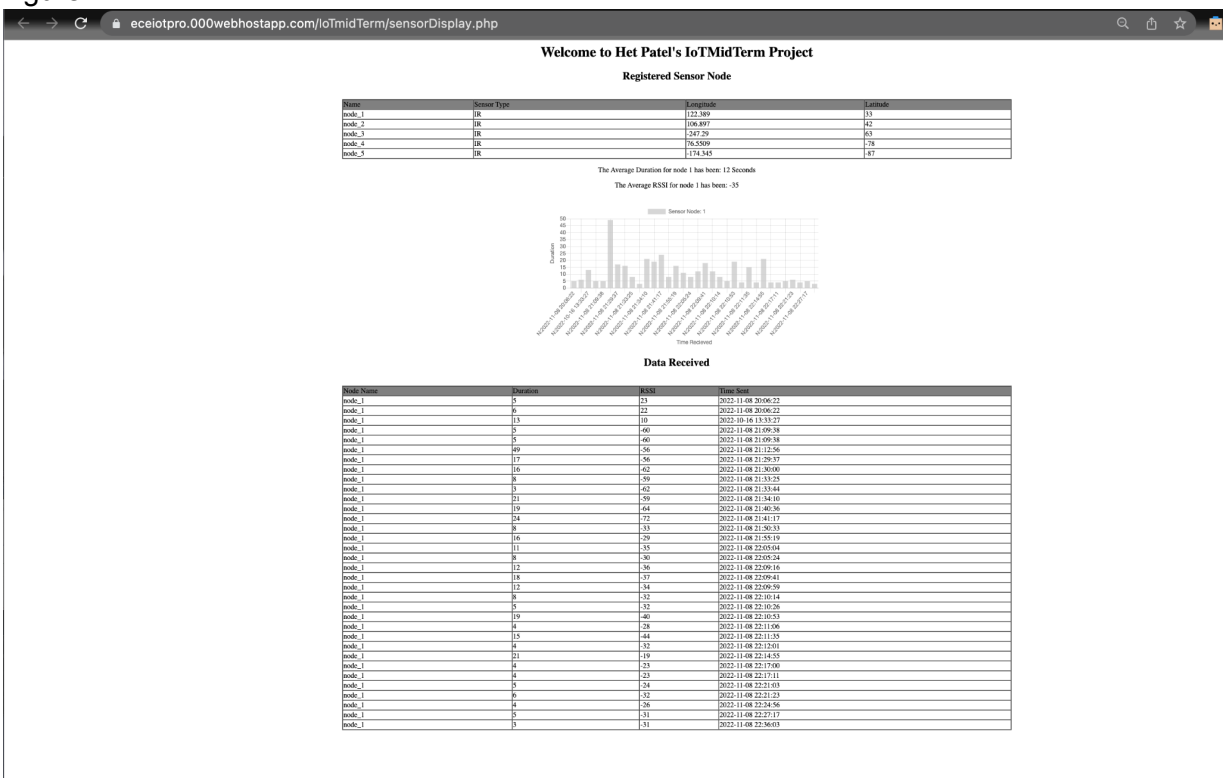
Figure of the database showing sensor data and time



Snapshot of the graph which shows the Duration vs Time which was fetched from “Het_Patel_Sensor_Data” table. (Please ignore the very high value since it was marked down during the testing purpose).

9. Attach a snapshot of your webpage (the `sensorDisplay` page)

Figure:



The above snapshot shows the actual page where all the values from both tables are mentioned along with the graphical data.

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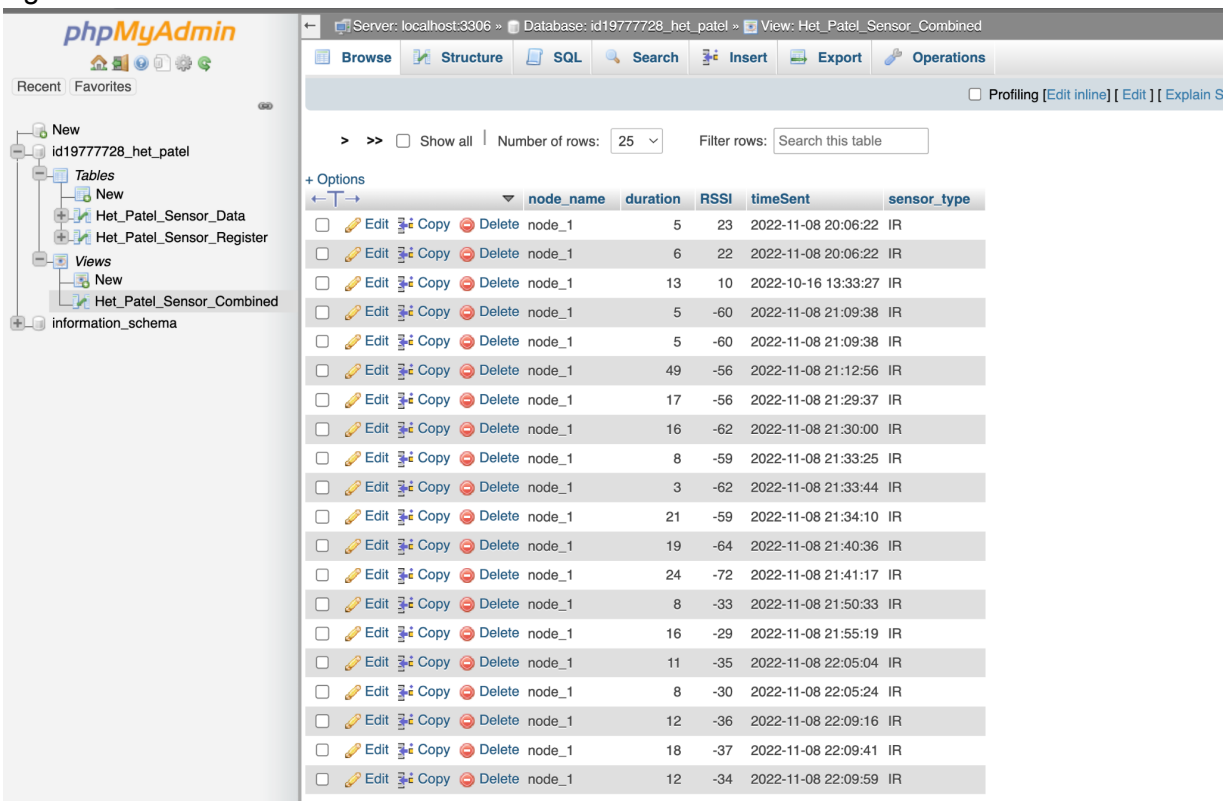
10. Show a VIEW of your database. The VIEW must include **all columns in the register and data tables**.

Figure



node_name	duration	RSSI	timeSent	sensor_type
node_1	5	23	2022-11-08 20:06:22	IR
node_1	6	22	2022-11-08 20:06:22	IR
node_1	13	10	2022-10-16 13:33:27	IR
node_1	5	-60	2022-11-08 21:09:38	IR
node_1	5	-60	2022-11-08 21:09:38	IR
node_1	49	-56	2022-11-08 21:12:56	IR
node_1	17	-56	2022-11-08 21:29:37	IR
node_1	16	-62	2022-11-08 21:30:00	IR
node_1	8	-59	2022-11-08 21:33:25	IR
node_1	3	-62	2022-11-08 21:33:44	IR
node_1	21	-59	2022-11-08 21:34:10	IR
node_1	19	-64	2022-11-08 21:40:36	IR
node_1	24	-72	2022-11-08 21:41:17	IR
node_1	8	-33	2022-11-08 21:50:33	IR
node_1	16	-29	2022-11-08 21:55:19	IR
node_1	11	-35	2022-11-08 22:05:04	IR
node_1	8	-30	2022-11-08 22:05:24	IR
node_1	12	-36	2022-11-08 22:09:16	IR
node_1	18	-37	2022-11-08 22:09:41	IR
node_1	12	-34	2022-11-08 22:09:59	IR

The snapshot of the VIEW combined table named as “Het_Patel_Sensor_Combined” shows the combined values of both tables only when the nodes are equal to each table.

3. Answer the following questions (20 points)

Please answer the following questions and submit them:

1. **How much RAM is your program using?**
   36.5% (used 29924 bytes from 81920 bytes)
2. **How much of FLASH space is your program using?**
   38.5% (used 401685 bytes from 1044464 bytes)
3. **At what level of RSSI your buzzer is enabled? What is the unit?**
   The buzzer is enabled when RSSI values was below -75 dBm
4. **What is the power consumption of your system? How did you measure it?**
   Explain. TBD with the testing equipment.