IoT Based Hospital Room Monitoring System

by

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This Project report is presented in partial fulfillment of the requirements for the Award of Degree of Master of Computer Science and Engineering

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APPROVAL

This Project titled "**Hospital Room Monitoring System**" submitted by Imran khan, ID No: 193-25-839 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of M.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been nd held on 22 December 2020.

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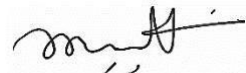**Dr. Mohammad Shorif Uddin**   **External Examiner**

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DECLARATION

I hereby declare that, this project has been done by myself under the supervision of Md.Tarek Habib, Assistant Professor, Department of Computer Science and Engineering, Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.
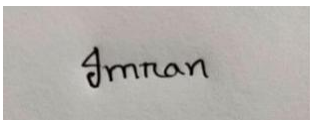
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To our beloved family, we want to give them our deepest love and gratitude for being very supportive and also for their inspiration and encouragement during my study in this University.

Dedicated to

My Parents

ABSTRACT

Late advances in Information and Communication Technology (ICT), particularly those identified with the Internet of Things (IoT), are encouraging brilliant areas. Among numerous administrations that a keen area can offer, far off wellbeing checking is a normal utilization of IoT worldview. It offers the capacity to constantly screen and gather wellbeing related information from an individual, and communicate the information to a far off element (for instance, a medical care specialist organization) for additional preparing and information extraction. An IoT-based far off wellbeing checking framework can be advantageous in country zones having a place with the keen locale where individuals have restricted admittance to standard medical care administrations. A similar framework can be advantageous in metropolitan regions where emergency clinics can be packed and where it might require some investment to benefit medical services. Nonetheless, this framework may create a lot of information. To understand a proficient IoT-based far off wellbeing checking framework, it is basic to examine the organization correspondence needs of such a framework; specifically the transfer speed prerequisites and the volume of produced information. The theory reads a business item for far off wellbeing observing in Skellefteå, Sweden. In light of the outcomes got by means of the business item, the theory distinguished the key organization related prerequisites of a normal far off wellbeing checking framework regarding ongoing occasion update, transfer speed necessities and information age. Besides, the theory has proposed a design called IReHMo - an IoT-based far off wellbeing checking engineering. This design permits clients to join a few kinds of IoT gadgets to expand the detecting capacities of the framework. Utilizing IReHMo, a few IoT correspondence conventions, for example, HTTP, MQTT and CoAP has been assessed and looked at against one another. Results indicated that CoAP is the most proficient convention to communicate little size medical care information to the far off workers. The mix of IReHMo and CoAP fundamentally decreased the necessary transfer speed just as the volume of created information (up to 56 percent) contrasted with the.

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Chapter 1

INTRODUCTION

This part depicted the settings that the removed prosperity noticing structure fits in. They fuse the sharp city perspective and its huge zones similarly advances of today-day ICT developments.The part nuances the investigation challenge that maker defied, similarly as the hypothesis objections and responsibility.

1.1 Introduction

In absolute people is creating at fast development. As shown by Census Bureau, the all out people was at 7.243 billion people (beginning at 16 May 2015).

Curiously, the resource are not boundless, there is a certain absence of indisputably the main normal resources generally, for instance, freshwater, non-environmentally friendly power source, combustible gas, significant metal. Besides, what fuels things is the unbalanced course of the general population, honestly, in overabundance of half of the absolute people accumulates in metropolitan networks and metropolitan regions. The qualification in people thickness is thousand-cover.

In actuality, there are different issues related with metropolitan regions those, for instance, profound pollution and stop up.

Generally speaking, the articulation "Insightful city" and covers development region [3&4&5]. Despite the way that there is certainly not a singular definition, This type of upgrade city is generally about usage of collected data als correspondence progressions to renovation execution and flourishing of the populance, to cut down reserve use of the all citys or district, and to team up even huge satisfactorily and successfully to the inhabitants.

Routinely, the upgrade city zone can disconnected in to a couple sub-domains yet not the limited to sharp economies, clever public, keen organization, splendid movability, splendid atmosphere and astute living

[6]. In each space, there are a couple of properties that portray it in more nuances. Of course, it is one of the most promising developments in Collected sources and Announcement Knowledge for the latest numerous years. In this view of convergence of the IoT perspective falsehoods adding moreover

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perceiving, identifying, preparing and correspondence capacities to real contraptions that in advance not proposed thus.

Thusly, the improvement grants devices to talk with each other, similarly as various organizations and structures, in this route getting new information and getting new functionalities. The essential hardware development engaging impacts of Internet of Things are Radio-repeat recognizing confirmation (RFID), Near field communication(NFC) and Sensor Networks; the item enabling specialists of IoT are middleware and search/scrutinizing [6]. What IoT genuinely does is to change data into information, data ultimately smarts. Consequently, individuals can build a sweeping point of view on the contend of interest in like manner. Expected view in the field of viability, it helps with get-together particular normal limits effectively, and finally changes them into estimations, data and exercises. There is an impressive summary of existing this type, and the once-over is up 'til now working on it is as of now present in energy the chiefs, environmental organization, clinical consideration, transport and traffic the board, collaborations, and stock organization. All uses of its amassed into the four essential use regions: carrying and collaborations, clinical administrations, splendid atmosphere (home, office, plant) and individual and social [7].

Considering this application a development stage and upgrade city as a raised equal society improvement perspective, they join in various zones, for example, common checking, splendid transportation, home computerization and adroit home, resource the chiefs, security and clinical administrations. Among them, clinical consideration becomes as the point of convergence of Publics, Technology and Economy triangle as painted in figure 1. Also, clinical administrations is a critical scale in wise living, one of the six fundamental spaces of the splendid city structure.
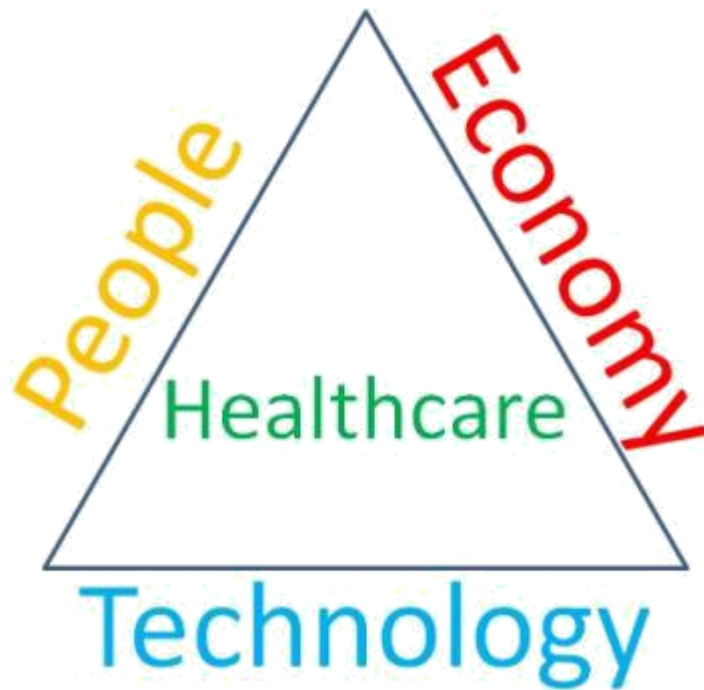
Figure 1.1.1: The relation among people, technology, economy and healthcare

Utilizing the most recent developments and innovation, the medical care framework upgrades the prosperity of a specific individual just as the populace while simultaneously decreases the weight on the state government assistance framework. The explanation is that preventive medical services as a rule distinguishes sickness and inconsistencies a whole lot earlier than the time the issue really happens, and it can forestall wounds and abrupt mishaps. The establishment cost of an IoT framework is a lot more modest contrasted and the later costs from medication and hospitalization. The accompanying propelling situation portrayed the upsides of a cutting edge far off medical services checking framework.

1.2 Problem statement

The correspondence network needs to continually adapt to the outstanding increment of gadgets and client interest. Then again, the organization limit is limited by mechanical cutoff points and monetary costs. As a rule, the limit of the correspondence network falls behind the interest from individuals and their gadgets. In the current organization foundation, the blockage is high in metropolitan territories while the limit is restricted in rustic regions. These stances enormous difficulties for the wide arrangement of eHealth administrations.

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Interestingly, as more individuals know about preventive medical services, the quantity of wellbeing checking applications and IoT gadgets will develop essentially. These gadgets will deliver "Enormous information" that should be communicated, prepared and broke down continuously. Sending

huge amounts of medical care information progressively will present new difficulties and necessities on the correspondence network framework, including transmission capacity and deferral. Moreover, medical care information comprises of various sorts, for example, basic information from the internal heat level. Another gathering of clinical consideration data relies upon its common sense, whether or not the data should be gotten rapidly for end purposes or little deferments are satisfactory. Examination challenges tended to in this proposal is to proficiently send medical services information inside the restriction of the current organization foundation, both in metropolitan and country zones.

1.3 Objective

The proposal plans to comprehend the correspondence necessities of a distant wellbeing observing framework, explicitly the transmission capacity and the volume of created information. In light of this agreement, the proposition means to propose an engineering that proficiently gather medical care information, pre-measure the information and send it to the workers for additional handling. Additionally, IoT correspondence conventions should be assessed and thought about. At last the most appropriate organization correspondence convention should be fused in the design.

1.4 Scopes of Project

This suggestion considered the correspondence related pieces of Internet of Things devices and structures concerning eHealth for Smart areas, unequivocally to fathom the bandwidth need and volume of data made. Considering the introduction of a current business trial5, the proposition inspected and perceived its characteristics and weaknesses with respect to getting sorted out points. As an after stage, the suggestion proposed a designing that kept an eye on the drawback of existing structures while keeping up their characteristics.. The top designing, a couple of correspondence shows was passed on and taken a gander at, achieving the proposition of the CopAP is a huge powerful request show in the field of applications.

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1.5 Project Outline

This Project is organized as follows:

Chapter 1: Introductions, Problem of the statement, Objective,and Scope, Project outline.

Chapter 2: Reviews the literature Introduction, Robotic hand control system, Literature Survey, project summary.

Chapter3: Analysis of the system component introduction, Features of i. Arduino Uno, Servo Motor MG996R, HC O6 Bluetooth Module, 7805 Voltage Regulator IC, Device overview, Memory.

Chapter 4: Describes the hardware development part of Introduction, Pin diagram, program, Arduino , Bluetooth Module , Servo Motor, Circuit diagram, Application interface, Serial interface etc.

Chapter 5: Presents the result and its discussions such as Simulation result & Hardware result.

Chapter 6: Concludes with some recommendations are Limitations of work, Future scopes

Chapter 2

LITERATUR EREVIEWS

2.1 Introduction

A controller vehicle is characterized as any cell phone that is constrained by an implies that doesn't confine its movement with a birthplace outer to the gadget. This is frequently a radio control gadget, the link among control and vehicle, or an infrared or Bluetooth regulator. A controller vehicle (Also known as RCV) is constantly constrained by a human and makes no sure move self-rulingly. It is crucial that a vehicle ought to be fit for continuing precisely to an objective region; moving inside that territory to satisfy its main goal and returning similarly precisely and securely to base.

2.2 Wireless control system

Bluetooth distant advancement is a short-range radio development, which is made for Personal Area Network (PAN). Bluetooth is a standard made by a social occasion of equipment producers that grants

quite an electronic stuff, from PCs and telephones to consoles and headphones, to make its own relationship, without wires, joins, or any quick action from a customer. It is an extraordinarily designated sort network operable over a little locale, for instance, a room. Bluetooth far off development makes it possible to impart signs over short detachments between telephones, PCs, and various devices and likewise smooth out correspondence and synchronization between contraptions. It is an overall standard that wipes out wires and connections between both fixed and phones and empowers both data and voice correspondence. Bluetooth offers the opportunity of improvised associations and passes on authoritative synchronicity between the whole of your own contraptions. Bluetooth is an incredible standard where devices can thusly find each other, develop affiliations, and find what they can achieve for each other on an uncommonly delegated premise.

Bluetooth is planned to be a standard that works at two levels:

1)   Bluetooth gives us understanding at the genuine level - Bluetooth is a radio-repeat standard.

2)   It also gives plan at the accompanying level up, where things need to surrender to when pieces are sent, the quantity of will be sent at a time, and how the social occasions in a conversation can be sure that the message got is identical to the message sent.

It is considered from the outset by Ericsson, preceding being gotten by a lot of various associations, Bluetooth is a standard for a little, unobtrusive radio chip to be associated with PCs, printers, phones, etc A Bluetooth chip is proposed to displace joins by taking the information commonly passed on by the connection and conveying it at an outstanding repeat to a beneficiary chip, which will by then give the information got to the PC, phone whatever.

2.3 Summary

The device includes three key components: the microcontroller circuit or Arduino, the The robot chasis and the Bluetooth. We used Arduino, the HC Bluetooth Module and the use of the programming library tools on this project.

Chapter 3

ANALYSIS OF THE SYSTEM COMPONENT

3.1 Introduction

This chapter, we have discussed component that must needed to make this Voice Control Arm robot.

3.2 Components

The Voice Control Arm robot has the following main components are:

1. NodeMCU (ESP8266)

2. BMP280 Barometric Pressure and Temperature Sensors

3. DHT11 Temperature and Humidity Sensors

4. DS18B20 Temperature Sensors

5. LM317 Voltage Regulator

6. Female Header

7. Vero board

8. DC Power Supply

3.2.1 NodeMCU (ESP8266)

In our task, we utilize numerous gadgets like ESP 8266 NodeMCU module v3. It is also name of a microcontroller organized by Espressif Systems. The module itself is an autonomous WiFi sorting out course of action offering as an expansion from existing more modest scope regulator to Wi-Fi and is in like manner fit for running free applications. This module goes with an innate USB connectors and higher game plan stick outs..
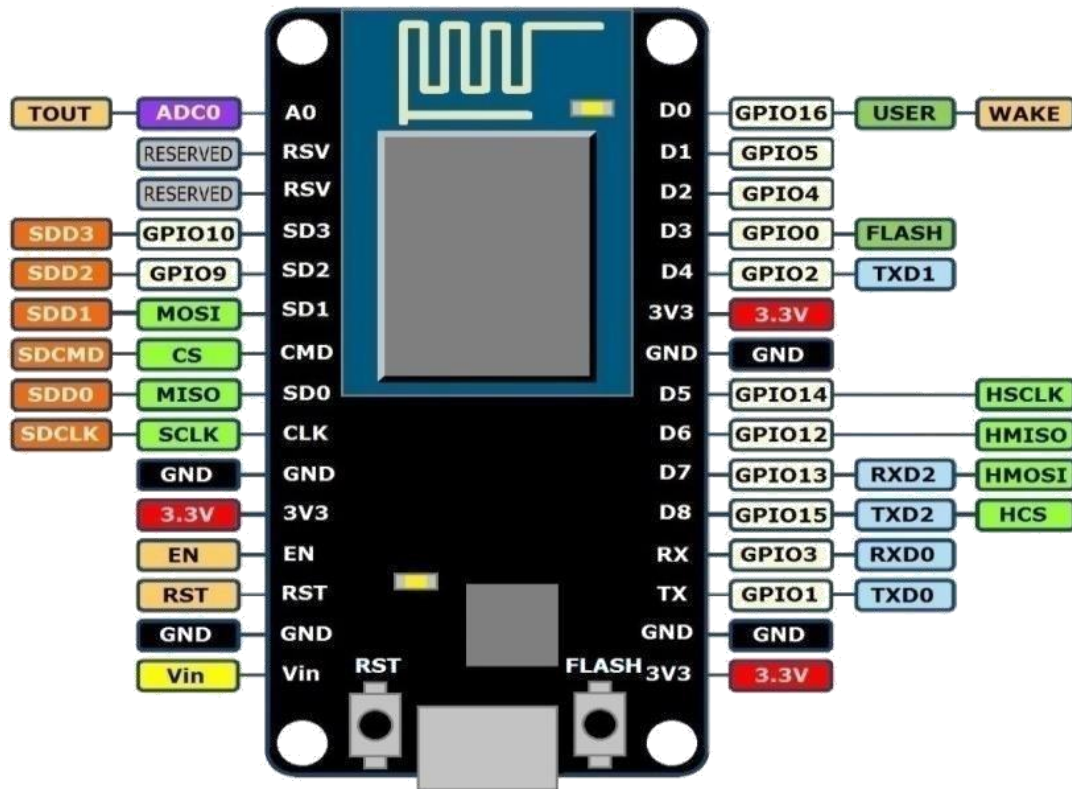
Figure 0.1: ESP8266 Node MCU

Specification:

• Voltages: 3.3 V.

• Wi-Fi Direct (P2P), soft-AP.

• Current consumptions: 10uA~170mA.

• Flash memory attachable: 16MB max (512K normal).

• Integrated TCP/IP protocol stack.

• Processors: Ten silica 106

3.2.2 BMP280 Barometric

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This is shown that the main point of the element is the bleeding edge modernized temperature, moistness and weight sensor . It's a substitution to sensors .

BME/BMP280

BME280 Chip
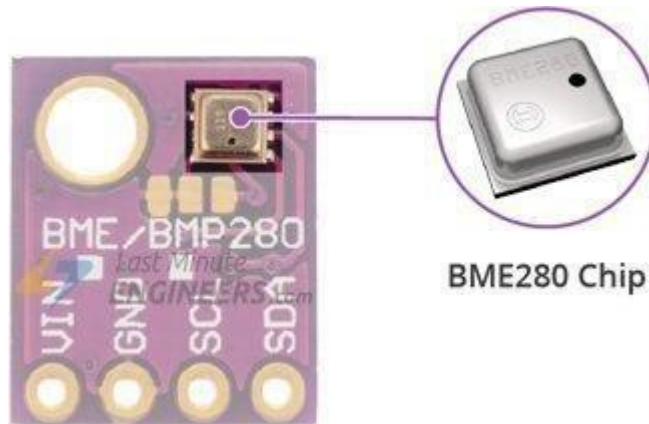
This exactitude can ration relative moisture from 0 to 100% with ±3% accuracy, barometric load from 300Pa to 1100 hPa with ±1 hPa inside and out precision, and temperature from - 40°C to 85°C with ±1.0°C exactness.

The weight assessments are so precise (low height clatter of 0.25m), you can even use it as an altimeter with ±1 meter precision.

Temperature: -40°C to 85°C (±1.0°C accuracy)

3.2.2.1   Power   Requirements

Humidity: 0 to 100% RH (±3% accuracy)

This   module   accompanies an on-
board   of   the   Pressure: 300hPa to 1100hPa (±1hPa accuraccy)   controller, so you can
utilize   it   with   this   given   rationale
microcontroller   also   Altitude: 0 to 30,000ft (±1 meter accuracy)   like   chip   without
stress.

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The BME280 eats up under assessments and idle. This low grant the battery driven instance, during only 5μA during power usage execution in contraptions, for handsets, GPS modules or watches.

3.2.2.2 I2C Interfaces

The modules incorporates an essential two-wire edge it can be successfully done with any device that is the selected.

The defaulting address of the module it can be changed to successfully with the weld hurdler other than chip.

3.2.2.3 Method to be Address   Change I2C

- Located the than chip. As with the left side   dilemma jumper other usual this pad is related on the module.

- The relationship   between the center and left side of the pad to isolate those using a severe edge.

3.2.2.4 BME280 Sensor   Pinout

This module has only 4 pins that interface it to the remainder of the world. The affiliations are according to the accompanying:

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3.2.3 DHT11 & Humidity
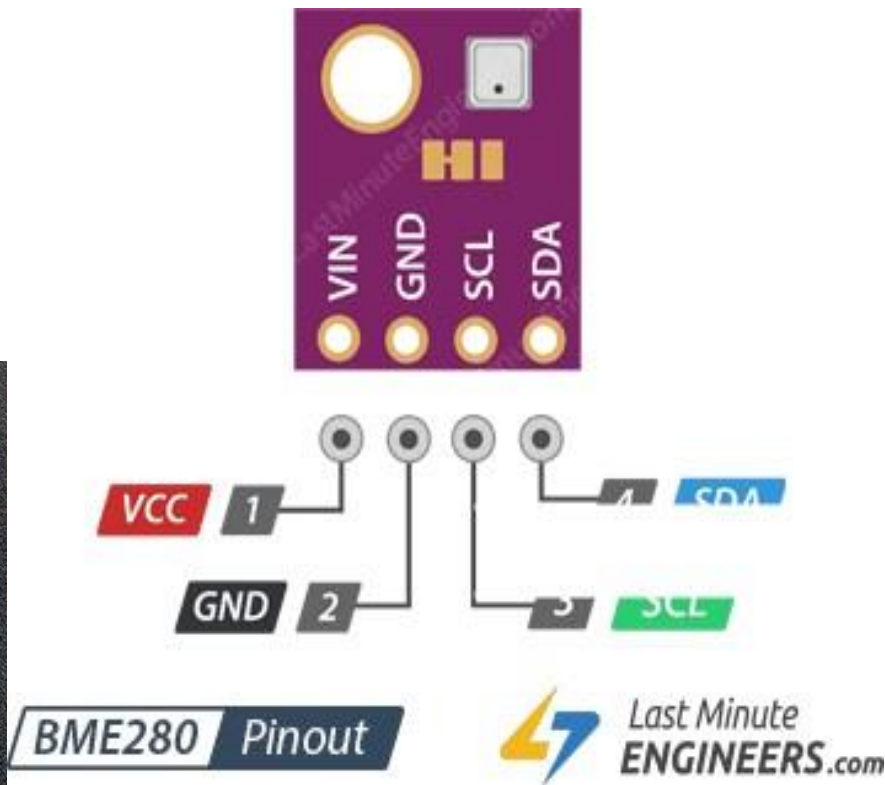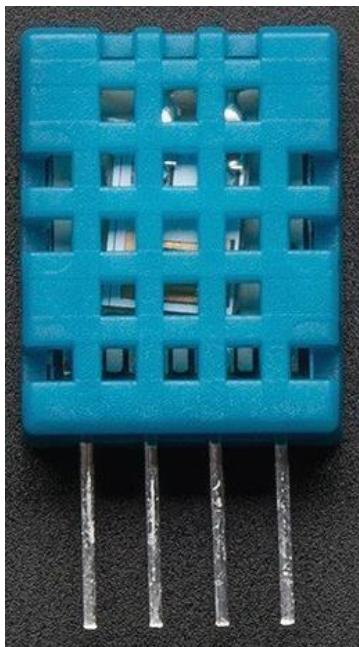
Temperature Sensor

The DHT11 is a fundamental, ultra negligible exertion progressed temperature and tenacity sensor. It uses a capacitive dampness sensor and a thermistor to evaluate the incorporating air, and lets out an automated sign on the data pin (no basic information pins required). It's truly simple to use, yet requires wary wanting to get data. The primary veritable disservice of this sensor is you can simply get new data from it once at ordinary spans, so while using our library, sensor readings can be up to 2 seconds old.

3.2.3.1 DHT11 Pin :

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Pin Name	Descriptions
Vcc	Power supply of 3.5v to 5.5v
Data	Outputs the both Temperature and Humidity through the serial Data
Grounds	Connected to ground of the circuit

Table no 1: DHT11 Pin configuration

3.2.3.2 DHT11 Features :

• Operating Voltage: 3.5V to 5.5V

• Operating current: 0.3mA (measuring) 60uA (standby)

• Output: Serial data

• Temperature Range: 0°C to 50°C

• Humidity Range: 20% to 90%

• Resolution: Temperature and Humidity both are 16-bit

• Accuracy: ±1°C and ±1%

3.2.3.3 Brief about L298N Module

For assessings tenacity they use the moistness recognizing part it has two cathodes with sogginess field substrate between them.It is the clamminess changes, the conductivity of the substrate changes or the conflict between these terminals changes. This change in conflict is assessed and arranged by the IC which sets it up to be examined by a controller.

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Humidity Sensing Component

NTC Temeperature Sensor Thermistor
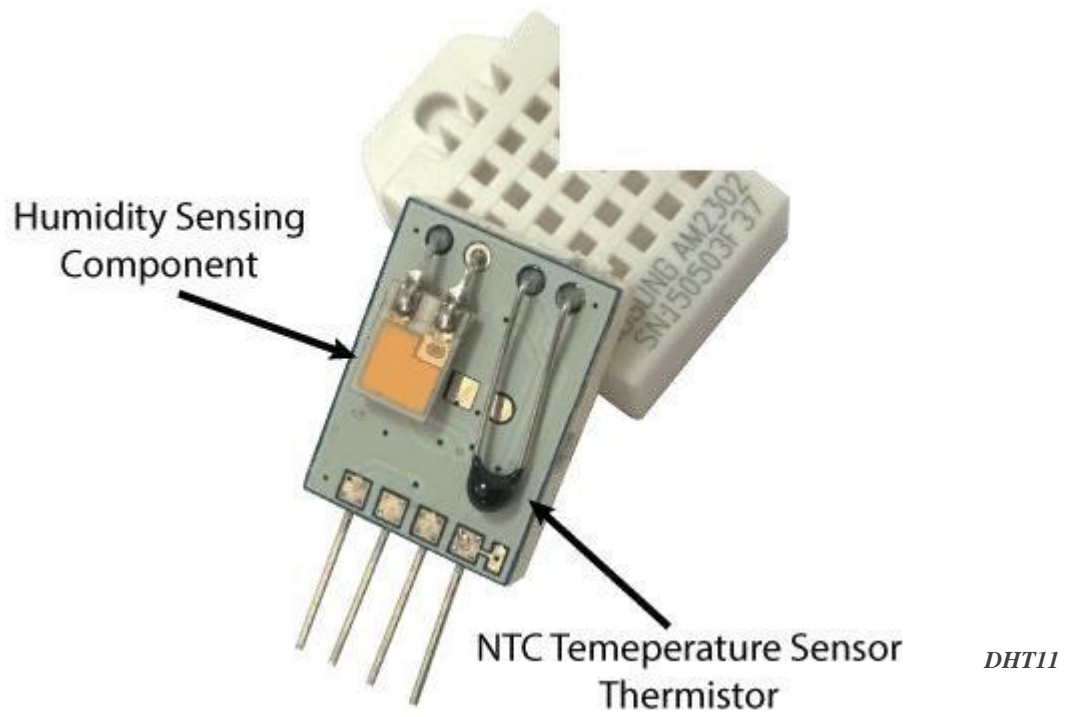
Figure 3.2.3.3.1: construction

DHT11

This is really a variable resistor that changes its resistance with change of the temperature. These sensors are made by sintering of semiconductive materials, for instance, stoneware creation or polymers to outfit greater changes in the resistance with essentially little changes in temperature. The articulation "NTC" means "Negative Temperature Coefficient", which suggests that the hindrance lessens with augmentation of the temperature.

Figure DHT11 sensor

3.2.3.4
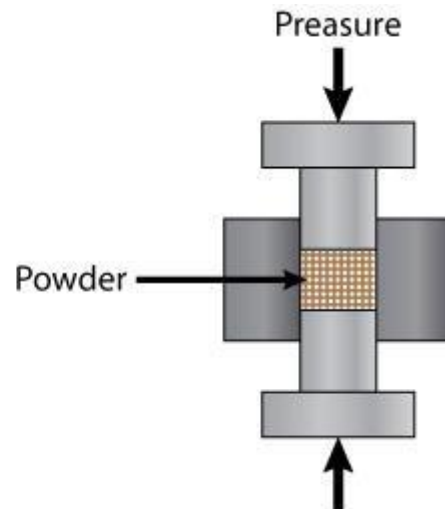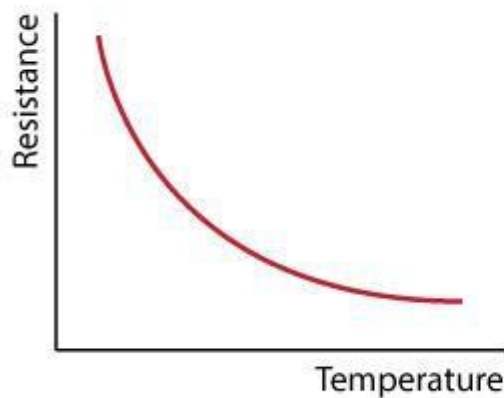
3.2.3.3.2: temperature construction

Applications of DHT11 Module

- Measure of the heat and moisture

- Local Weather station

- Automatical of weather of the switch

- Situation monitorizations

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3.3 DS18B20 Temperature Sensor

Figure 3.3.1: DS18B20   Temperature
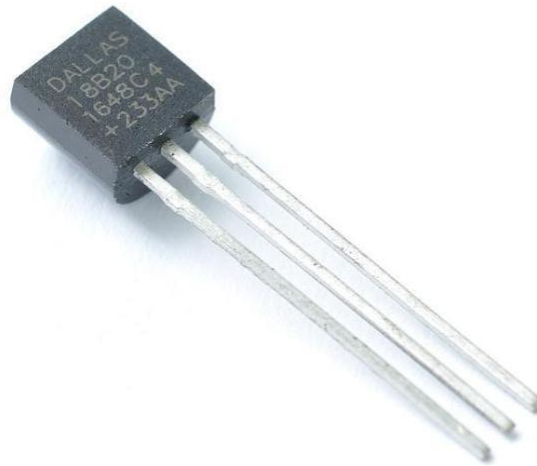
The DS18B20 progressed 12-cycle Celsius has a ready limit with programmable upper and The DS18B20 passes on by definition requires only a ground) for correspondence thermometer gives 9-digit to temperature assessments and nonvolatile customer lower trigger core interests. over a 1-Wire transport that solitary data line (and with a central chip. Additionally, the DS18B20 can get power clearly from the data line ("parasite power"), getting rid of the necessity for an external power effortlessly.

Each DS18B20 has an uncommon 64-digit successive code, which licenses diverse DS18B20s to deal with a comparable 1-Wire transport. As needs be, it is anything but difficult to use one chip to control .

3.3.1.1   Specification

- Unique 1-Wire® Interface Requires Only One Port Pin for Communication

- Reduce Component Count with Integrated Temperature Sensor and EEPROM

- Measures Temperatures from - 55°C to +125°C (- 67°F to +257°F)

- ±0.5°C Accuracy from - 10°C to +85°C

- Programmable Resolution from 9 Bits to 12 Bits

- No External Components Required

- Parasitic Power Mode Requires Only 2 Pins for Operation (DQ and GND)

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3.3.1.2   Applications

- Thermostatic Controls

- Industrial Systems

- Consumer Products

- Thermometers

- Thermally Sensitive Systems

3.3.2   LM317 Voltage Regulator
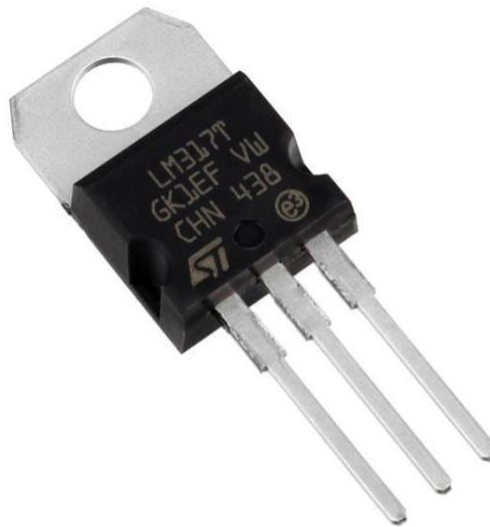
Figure 3.3.2.1: Voltage Regulator

The voltage regulatioins is an adaptable 3−terminal positive voltage regulator fit for giving in bounty of 1.5 An over a yield voltage extent of 1.2 V to 37 V. This voltage regulator is particularly easy to use and requires only two external resistors to set the yield voltage. Further, it uses internal current limiting, warm conclusion and safe zone pay, making it essentially blow−out affirmation.

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The voltage regulations serves a wide combination of usages including neighborhood, on card rule. This contraption can moreover be used to make a programmable yield regulator, or by interfacing a fixed resistor between the change and yield, the voltage regulatios can be used as a precision current regulator.

3.3.2.1   Features

- Yield Current in Excess of 1.5 A

- Output Adjustable between 1.2 V and 37 V

- Internal Thermal Overload Protection

- Internal Short Circuit Current Limiting Constant with Temperature

- Output Transistor Safe−Area Compensation

- Floating Operation for High Voltage Applications

- Eliminates Stocking many Fixed Voltages

- Available in Surface Mount D2PAK−3, and Standard 3−Lead Transistor Package.

3.3.3   Female Headers

Figure 3.3.3.1: Female   *Headers*
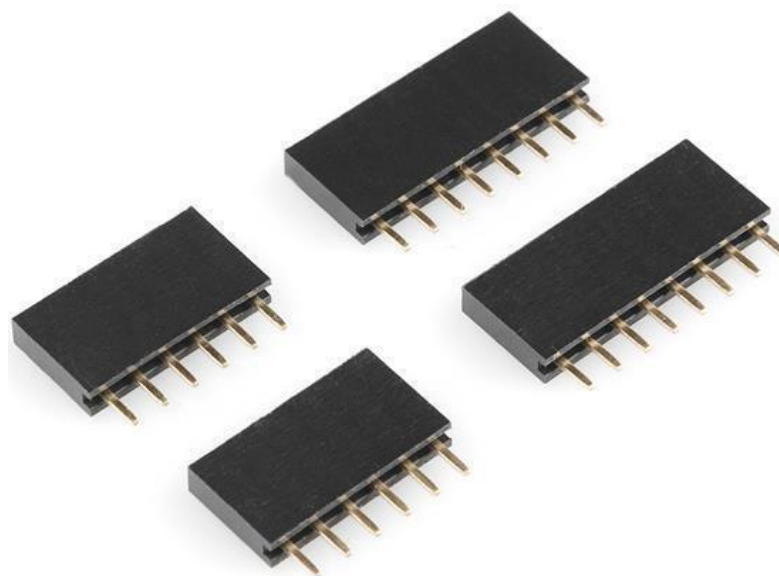
This headers are   every now and
again associated   with strip interface
connectors,   pin   headers
consistently   similarly fill in as

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receivers for hurdlers. The maximum broadly perceived hurdler scattering is 2.54 millimeters anyway 2.0 millimeters will be now and again used in more humble things.

This header connectors are thusly "male" connectors and are by and large used inside equipment, rather than being used as a connector apparently of the device.

Consistently pin headers are through-opening (THT) devices, anyway surface-mount development (SMT)

versions of one and two section pin headers in like manner exist. In the last case the weld sides of the pins are basically wound on a 90 degree point to be bound to a quandary plane. On single section pin headers the pins are bowed trading aside this is the other, on twofold line pin headers this is essentially but outwards. In the occasion that pin headers are optional, the THT variety is as often as possible picked for straightforwardness of manual social event.It can be either conventional or determined. The last structure is consistently used to relate two sheets organized.

3.3.3.1 Shrouded or Box header

this is with a plastic guide box nearby them are identified as box headers (BH) or covered headers and are routinely used in blend in with assurance expulsion connectors (IDC) for ribbon joins. An indent (key) in the guide box consistently thwarts putting the connector the wrong path around.

3.3.3.2 Polarizer key

A couple of systems entrance or important the its heading relationship with roughly that blocks and squares s the openings in the plugs. One switch of some unsatisfactory heading hits that check and hinders a mixed up affiliation. The correct pin header has in any event one pin in the header disposed of or slice to show a key for right course.

3.3.3.3 Pin numbering

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For multiple-line headers, the pin number is more many-sided, considering the way that meaningful the region of its 1st doesn't normally confirm how the abundance pin is numbered. Typically for titles attached to strip connects, it is numbered so they go straightly over the connection. Because of the method in which the connector joins to the connection, its suggests in a two-section title, bits in a solitary line have odd numbers and bits in the other line have even numbers.

3.3.4 Vero Board
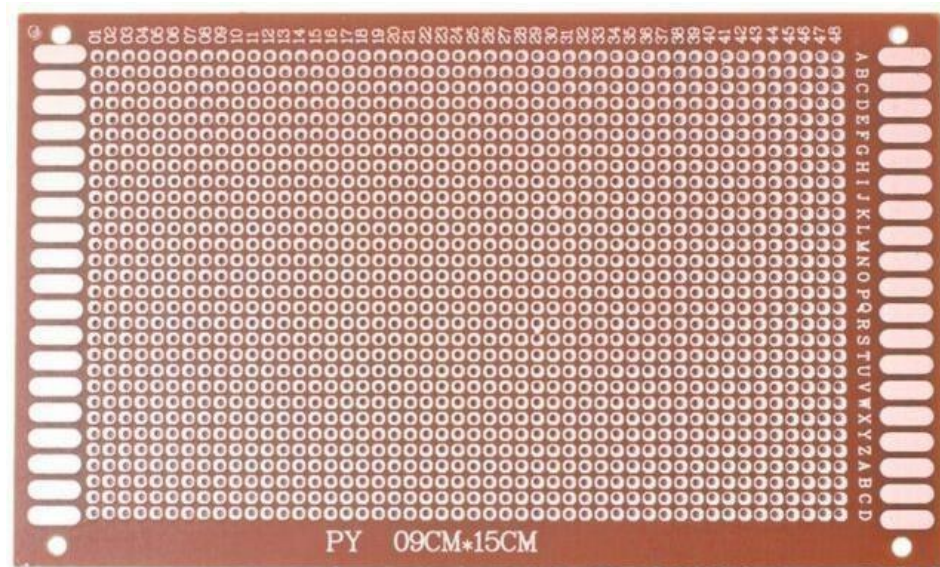
Figure 3.3.4.1:   *Verro board*

This is a brand a type of board, a pre-outlined track board material of copper bands on an ensuring sustained paper board which was begun.It was announced as an all-around helpful measurable for use in creating automated circuits - differentiating as of reason arranged printed circuit sheets in a combination of devices routes could fabricated by a stock equipping panel.

In mid 1959, the VPE Electronics Department was outlined while regulating boss are this part selected two past.

The standard plan for maximum of the that time had rations located in a typical model with the path outlined by like as conductive pathways. A captivating other choices, proposed by Fitzpatrick in the wake of visiting the RECMF Exhibition to serve VPE, envisioned a standard circuit board passing on straight-line conductors on which the parts could be fittingly dispersed and connected with the conductors to convey the essential circuit. .

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3.3.4.1 Production

Bought in sheets of 1.6 mm (0.06 in) copper-clad SRBP printed circuit material were cut to give 122 mm x 456 mm (4.8 in x 18 in) size stacks up with the individual burdens up then being machined to outline the outcome according to the principal Veroboard specification. A different handling shaper gadget, was made - wiping out piece of the strengthened.

For a second movement an uncommon gadget with cemented punch bits 1.35 mm (0.052 in) in estimation mounted on a solid base square was created to reiterate jab a framework of openings, on 0.2 in (5.1 mm) isolatting, through the copper strips and the base board.

Several dimensional, measureable value, and tooling issues were capable before finished sheets of palatable quality could be conveyed in sum. These machining issues were capable on account of the non-convenience of head printed path board handling and infiltrating methods or workplaces for substance preparing (cutting) the strips.

3.3.5 DC Power Supply

Figure 3.3.5.1: DC Power Supply

This type of power supply power supply, switched-supply, SMPS, or force supply that fuses a change over electrical other force supplies, a DC or AC source (exchanging the mode mode power supply, force switcher) is an electronic changing controller to force proficiently. Like SMPS moves power from a (regularly mains capacity) to DC loads, for example, a PC, while changing over voltage and current qualities. Dissimilar to a direct force supply, the pass semiconductor of an exchanging mode supply persistently switches between low-scattering, all out and full-off states, and invests almost no time in the high dispersal changes, which limits

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squandered energy. A speculative ideal exchanged mode power supply scatters no force. Voltage guideline is accomplished by shifting the proportion of on-to-off time (otherwise called obligation cycles). Interestingly, a direct force source panels the vintage energy by constantly trickle power in the pass by the wire. This more influential transformation efficiency is a significant preferred position of an exchanged mode.

Chapter 4
HARDWARE DEVELOPMENT

4.1 Introduction

This section portrays the strategies actualized in an IoT Based Hospital Room Monitoring System making calculations. The principle subjects examined in this section are the manner by which this venture streaming programming. The depiction equipment association data.

4.2 Diagram
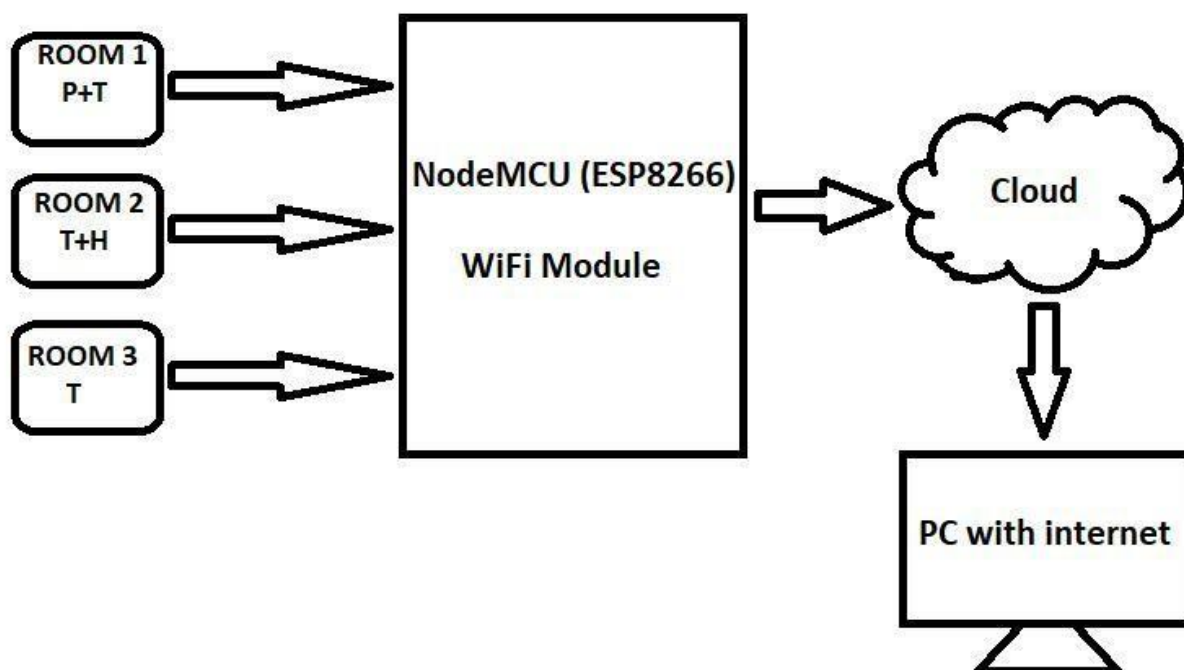
Figure 4.2.0.1: IoT Based Hospital Room Monitoring System

This block shows how the system works with the WiFi module. Here we've used NodeMCU as the main controller as well as wifi module. It has a wifi module and microcontroller on the same chip. The sensors are connected to the NodeMCU's I/O pins to collect data. The data then analyzed and calculated by the controller. The calculated data then sent to a local server using HTTP packet. In that HTTP packet all data are stored. To see those data, we have to connect to the server via a web browser. It can be either on PC/Laptop or in mobile browser. After connecting to the server we will see all the data that the WiFi module collected from the sensors. This is the simple block of our project.

4.3 Circuit Diagram
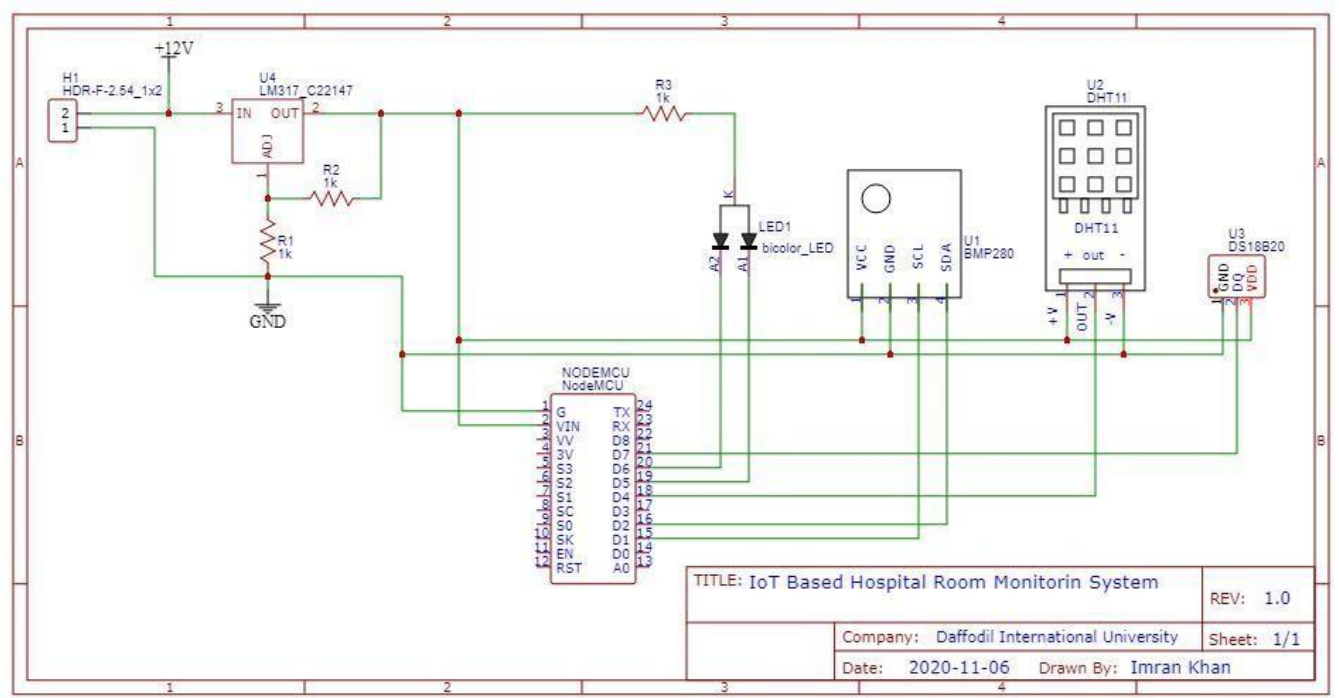
Figure 4.3.0..1: Schematic Diagram IoT Based Hospital Room Monitoring System

In this circuit diagram, the NodeMCU works as the main controller as well as the Wi-Fi controller of the project. All of the peripheral components are connected to the controller. We have connected three different

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sensors to collect data from three different rooms. In the room 1, we've installed the BMP280 Barometric pressure sensor. This sensor can measure air pressure of the room. It can also measure the ambient temperature of the room. The sensor works in I2C mode. It sends all data via two pins called SDA and SCL.The SDA connects to the D2 of the controller and SCL connects to the D1 of the controller. To collect humidity and temperature data from room 2, we've used DHT11 sensor. It can measure the humidity and temperature of a room. All data sends via only one bit of the sensor. The last sensor is a temperature sensor.

This sensor can measure body temperature of a patient. We've used this sensor in the room 3. The sensor pin is connected for this pin D7 of the controller. For wifi connectivity indications, we've used a bicolor led that is connected to the pins D5 and D6. When the system is trying to connect to the router/network, the red led blinks. It turns into green whenever it connected to the network.

4.4 Flowchart
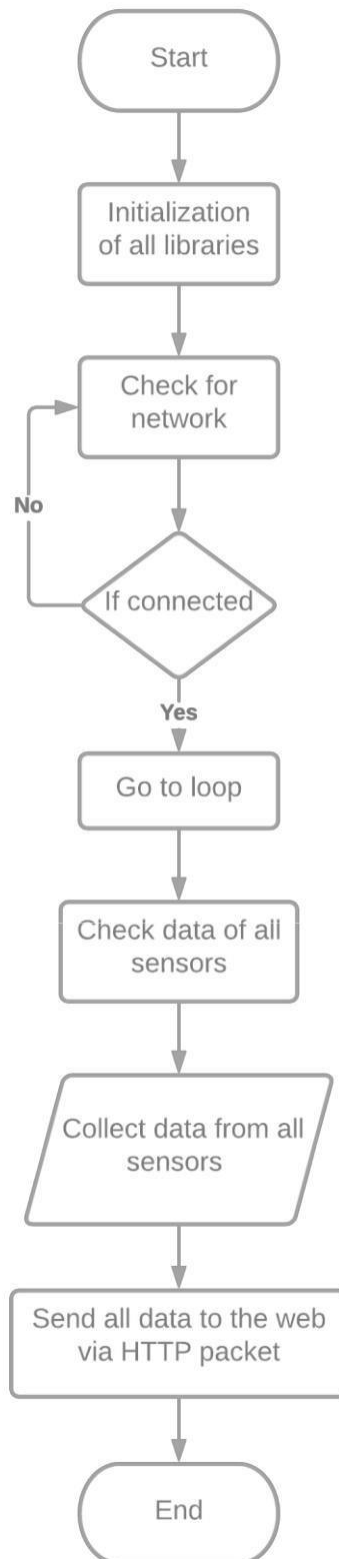
Figure 4.4.1: Flowchart diagram

Chapter 5

RESULTS AND DISCUSSIONS

5.1 Introduction

This chapter will given all the results and relevant discussions.

5.2 Final Result

Here's our final assembled project.
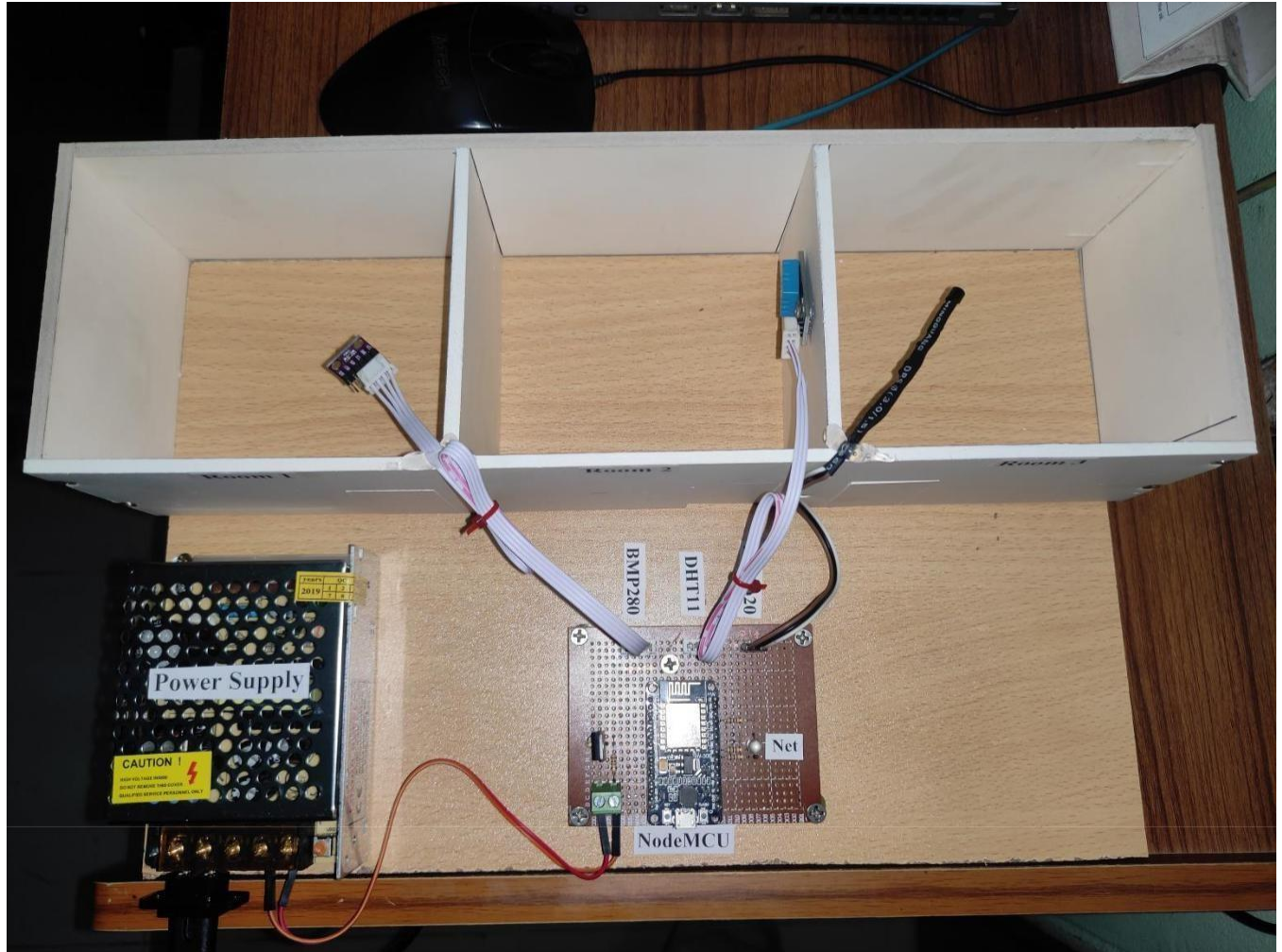
Figure 5.2.1: Project Image 1
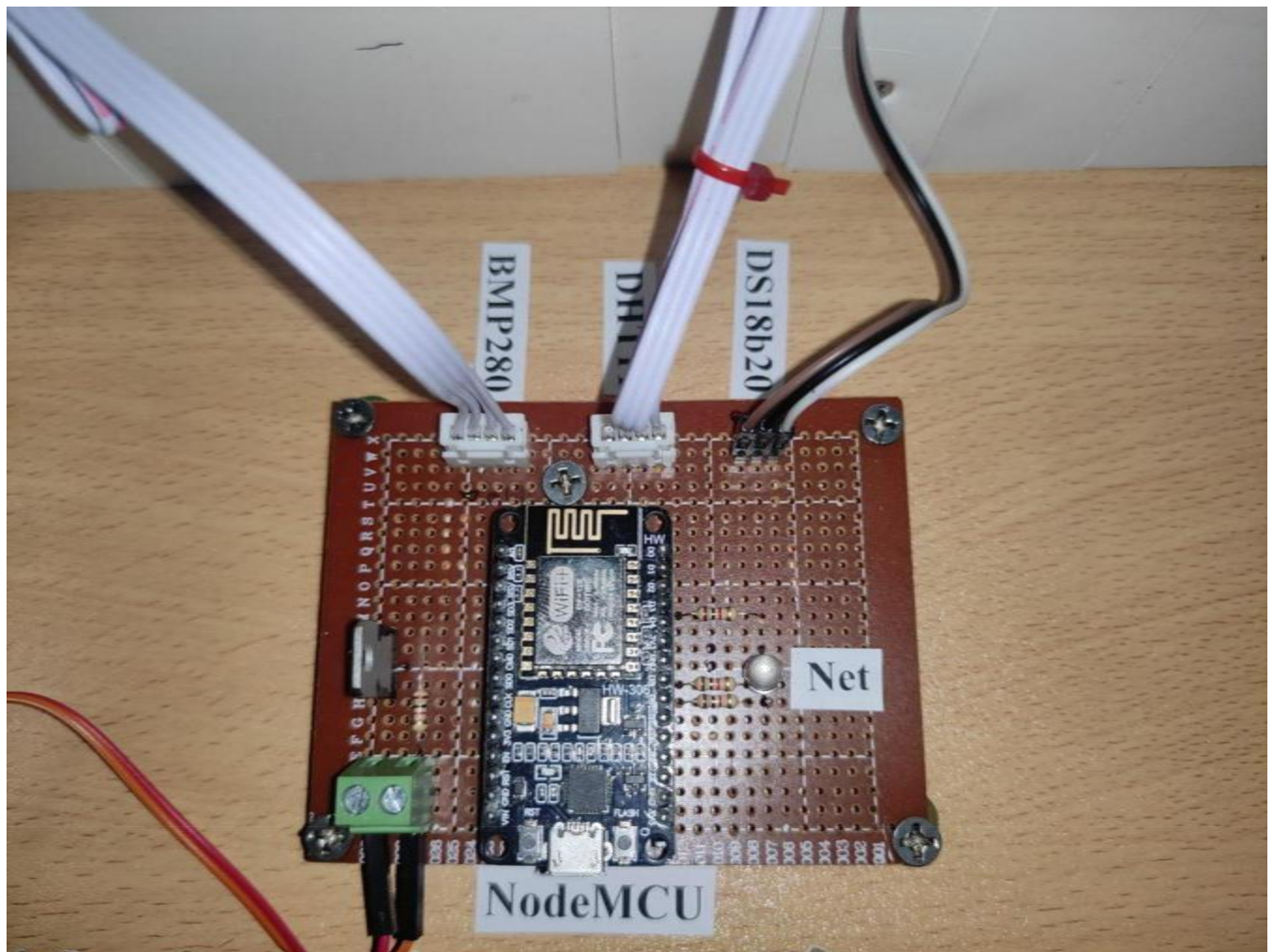
Figure 5.2.0.2: Project Image 2
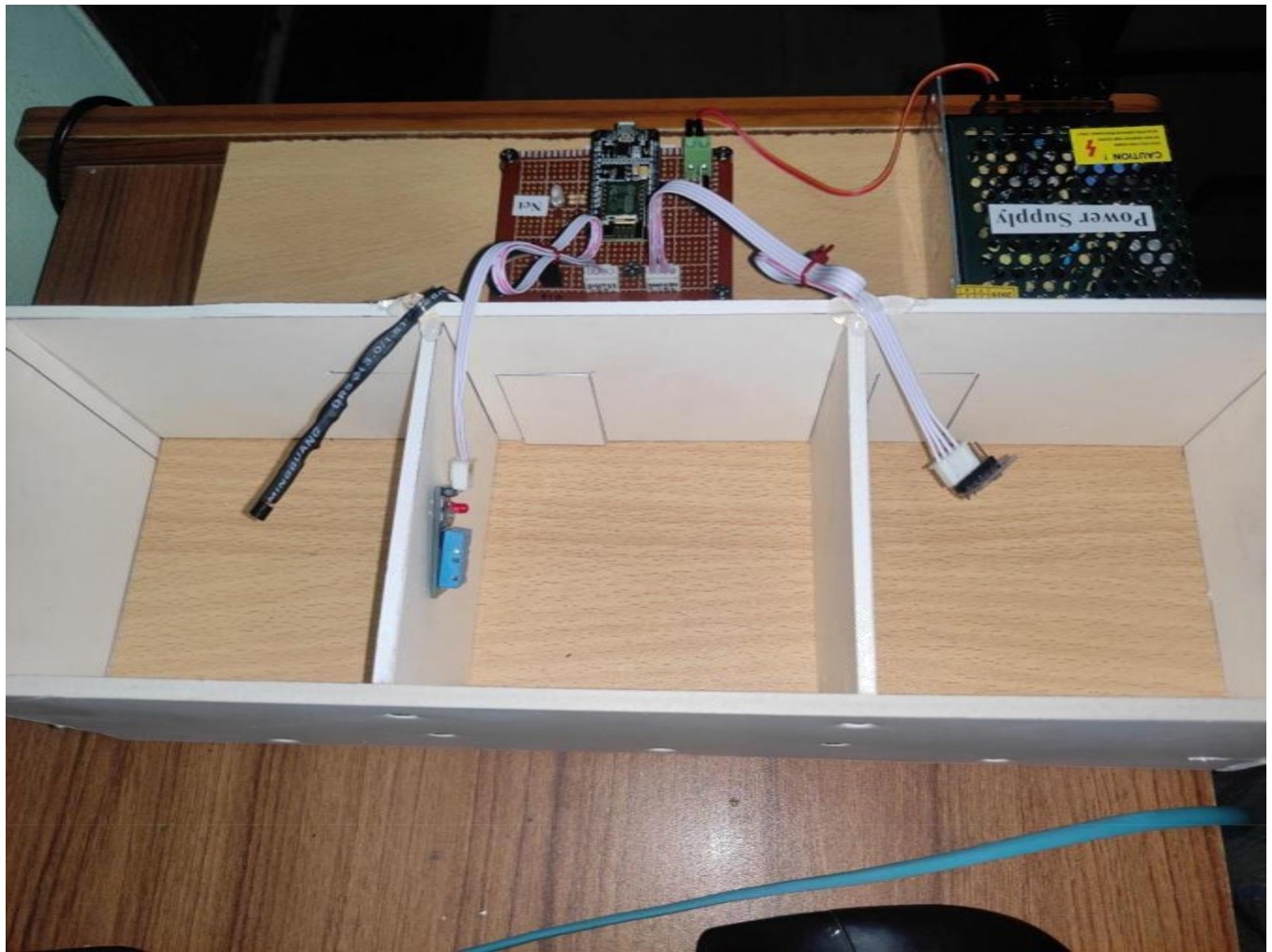
Figure 5.2.0..3: Project Image 3

5.3 Discussion

Our model vehicle is tried by us ordinarily. We have discovered a positive yield from it. Despite the fact that from the outset we are confronting issues of setting the baud rate for the microcontroller. Yet, presently both the mechanical and electrical parts are functioning admirably with one another. The scope of controlling the vehicle from any cell phone is less than 100 meters however it is very good. The working application which was made by us is easy to utilize so everybody is controlling the vehicle by it. Both the catch control and accelerometer capacity of the android application works consummately while controlling the vehicle.

5.4 Summary

In this chapter has discussed the result and discussion. With this project, we are successful to demonstrate with regarding the objectives of the project. At last, completing this chapter the project is ready to use. We've briefly discussed and shown the result of our experiment.

Chapter 6
CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

The postulation has distinguished a few prerequisites of a far off wellbeing observing framework. As an overall prerequisite, the framework should have the option to help and fuse a few kinds of medical services and home computerization sensors and gadgets. Besides, the framework should have the option to refresh happened occasions continuously. As far as organization necessities, the framework is relied upon to devour low data transmission, particularly transfer transmission. Besides, the volume of information created is relied upon to be little, with the goal that it won't pressure the current organization foundation just as initiate superfluous expenses to clients. At last, the framework should be open and adaptable to help a few IoT conventions.

6.2 Main Limitations and Constraints

- We confronted a few issues while setting the baud rate for the microcontroller. Issues emerge when we attempt to work with a higher baud rate (>115200) with the inside 16MHz clock of the microcontroller. Since as per Datasheet the mistake is excessively high (nearly 7%). Also, the inner clock gives a default blunder of +/ - 10%. The 16MHz clock speed and 9600 baud rate give a fundamentally low mistake (<0.2%). For adding the gem we needed to compose the circuit pieces of the microcontroller.

- Currently can be controlled in a local network (<100m).

- But while working in a more extended territory it's anything but a shrewd choice.

- Another impediment of Inter is it is a lot of intensity devouring and depletes the battery rapidly.

- While controlling the engine and the microcontroller from a similar source a few issues were looked because of the commotion. We utilized two distinct forces for engines and microcontroller for security.

6.3 Future Work

- Despite the fact that our task is finished in our sense however it very well may be improved from multiple points of view which we can't show for time or for different causes like the absence of assets and so forth Following the improvement of our undertaking might be thought of:

- Voice acknowledgment can be added to the vehicle with the end goal that it very well may be motioned by talking straightforwardly through the mouth.

- Speed control while utilizing an accelerometer can likewise be presented.

- High weight conveying properties can be given to this vehicle with the goal that a lot more mechanical or different capacities can be introduced in it.

- Friendly configuration can be given to it so it tends to speak to in a more business way.

- More capacities can be added to the android application.

- Distance of control can be expanded.

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APPENDIX
Code

```
#include <ESP8266WiFi.h>


#include <dht.h>

#include <Wire.h>

#include <SPI.h>

#include <Adafruit_BMP280.h>


#include <OneWire.h>

#include <DallasTemperature.h>


#define ONE_WIRE_BUS 13

OneWire oneWire(ONE_WIRE_BUS);

DallasTemperature sensors(&oneWire);
```

```
Adafruit_BMP280 bmp; // use I2C interface

Adafruit_Sensor *bmp_temp = bmp.getTemperatureSensor();
Adafruit_Sensor *bmp_pressure = bmp.getPressureSensor();


dht DHT;


#define DHT11_PIN 2


const char* ssid     = "TechTronics"; //

const char* password = "Tronix1892"; //


WiFiServer server(80);


void setup () {
  Serial.begin(115200);

  delay(100);

  Serial.print("Connecting to ");

  Serial.println(ssid);

  WiFi.begin(ssid, password);

  sensors.begin();

  pinMode(0, OUTPUT);

  pinMode(14, OUTPUT);

  pinMode(12, OUTPUT);
```

```
digitalWrite(0, HIGH);

digitalWrite(14, HIGH);

digitalWrite(12, HIGH);


while (WiFi.status() != WL_CONNECTED) {

  delay(400);

  Serial.print(".");

  digitalWrite(0, LOW);

  delay(100);

  digitalWrite(0, HIGH);

}


Serial.println("");

Serial.println("WiFi is connected");

server.begin();

Serial.println("Server started");

Serial.println(WiFi.localIP());

digitalWrite(14, LOW);


Serial.print("Probe BMP280: ");

if (!bmp.begin()) {
  Serial.println(F("Could not find a valid BMP280 sensor, check wiring!"));
  while (1) delay(10);
}
```

```
/* Default settings from datasheet. */ bmp.setSampling(Adafruit_BMP280::MODE_NORMAL,
      /* Operating Mode. */
            Adafruit_BMP280::SAMPLING_X2, /* Temp. oversampling */
            Adafruit_BMP280::SAMPLING_X16, /* Pressure oversampling */

            Adafruit_BMP280::FILTER_X16, /* Filtering. */
            Adafruit_BMP280::STANDBY_MS_500); /* Standby time. */


  bmp_temp->printSensorDetails();

  delay(1000);

}


void loop() {


  int chk = DHT.read11(DHT11_PIN);

  float h = DHT.humidity;

  float DHTt = DHT.temperature;

  float DHTtf = ((DHTt * 1.8) + 32);

  delay(100);


  sensors.requestTemperatures();

  float dsTemp = sensors.getTempCByIndex(0);

  float dsTempF = (sensors.getTempCByIndex(0) * 9.0) / 5.0 + 32.0;


  Serial.print ("Dallas Temp: ");
```

```
Serial.print (dsTemp);

Serial.print (" *C | ");


Serial.print (dsTempF);

Serial.println (" *F");
delay(100);


Serial.print ("DHT Temp: ");

Serial.print (DHTt);

Serial.print (" *C | ");


Serial.print (DHTtf);

Serial.println (" *F");


delay(100);


sensors_event_t temp_event, pressure_event;

bmp_temp->getEvent(&temp_event);

bmp_pressure->getEvent(&pressure_event);


float adafT = temp_event.temperature;

Serial.print(F("BMP280 Temperature: "));

Serial.print(adafT);

Serial.print(" *C | ");
```

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```
float adafTf = ((adafT * 1.8) + 32);

delay(100);


Serial.print (adafTf);

Serial.println (" F");

delay(100);


Serial.print("Humidity: ");

Serial.println(h);

delay(100);


float pascal = pressure_event.pressure; Serial.print(F("Pressure = "));
Serial.print(pascal);
Serial.println(" hPa");
delay(100);


Serial.println();

Serial.println();

Serial.println();

delay(500);


// Read temperature as Celsius (the default)

// float t = dht.readTemperature();

// Read temperature as Fahrenheit (isFahrenheit = true)
```

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```
// float f = dht.readTemperature(true);

WiFiClient client = server.available();

client.println("HTTP/1.1 200 OK");

client.println("Content-Type: text/html");

client.println("Connection: close"); // the connection will be closed after completion of the response

client.println("Refresh: 5"); // update the page after 5 sec

client.println();

client.println("<!DOCTYPE HTML>");

client.println("<html>");

client.println("<style>html { font-family: Cairo; display: block; margin: 0px auto; text-align:
center;color: #333333; background-color: #3cffb0;}");

client.println("body{margin-top: 50px;}");

client.println("h1 {margin: 50px auto 30px; font-size: 50px; text-align: center;}");

client.println(".side_adjust{display: inline-block;vertical-align: middle;position: relative;}");

client.println(".text1{font-weight: 180; padding-left: 15px; font-size: 50px; width: 170px; text-align:
left; color: #3498db;}");

client.println(".data1{font-weight: 180; padding-left: 80px; font-size: 50px;color: #3498db;}");

client.println(".text2{font-weight: 180; font-size: 50px; width: 170px; text-align: left; color: #ff6600;}");

client.println(".data2{font-weight: 180; padding-left: 150px; font-size: 50px;color: #ff6600;}");

client.println(".text3{font-weight: 180; padding-left: 15px; font-size: 50px; width: 170px; text-align:
left; color: #0066ff;}");
```

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```
client.println(".data3{font-weight: 180; padding-left: 80px; font-size: 50px;color: #0066ff;}");

client.println(".data{padding: 10px;}");

client.println("</style>");

client.println("</head>");

client.println("<body>");

client.println("<div id=\"webpage\">");

client.println("<h1>IoT Based Hospital Room Monitoring System</h1>");

client.println("<h2>Prepared by: Imran Khan</h2>");

client.println("<h2>Daffodil International University</h2>");

client.println("<hr>");

client.println("<hr>");

client.println("<hr>");

client.println("<h1>Room 1</h1>");

client.println("<hr>");

client.println("<hr>");


client.println("<div class=\"data\">");

client.println("<div class=\"side_adjust text2\">Temperature:</div>");
client.println("<div class=\"side_adjust data2\">"); client.print(adafT);

client.println("<div class=\"side_adjust text2\">
&deg;C   /</div>"); client.print(adafTf);

client.println("<div class=\"side_adjust text2\">
```

°F</div>"); client.println("</div>");

client.println("<div class=\"data\">");
client.println("<div class=\"side_adjust text3\">Pressure:</div>"); client.println("<div class=\"side_adjust data3\">");

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```
client.print(pascal);
client.println("<div class=\"side_adjust text3\">hPa</div>");

client.println("</div>");

client.println("<hr>");


client.println("<h1>Room 2</h1>");

client.println("<hr>");

client.println("<hr>");


client.println("<div class=\"data\">");

client.println("<div class=\"side_adjust
text2\">Temperature:</div>"); client.println("<div
class=\"side_adjust data2\">"); client.print(DHTt);

client.println("<div class=\"side_adjust text2\">
&deg;C   |</div>"); client.print(DHTtf);

client.println("<div class=\"side_adjust text2\">
&deg;F</div>"); client.println("</div>");


client.println("<div class=\"data\">");

client.println("<div class=\"side_adjust text1\">Humidity:</div>");
client.println("<div class=\"side_adjust data1\">"); client.print(h);

client.println("<div class=\"side_adjust text1\">%</div>");

client.println("</div>");
```

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```
client.println("<hr>");


client.println("<h1>Room 3</h1>");

client.println("<hr>");

client.println("<hr>");


client.println("<div class=\"data\">");
client.println("<div class=\"side_adjust text2\">Body
Temperature:</div>");

client.println("<div class=\"side_adjust
data2\">"); client.print(dsTemp);

client.println("<div class=\"side_adjust text2\">
&deg;C   |</div>"); client.print(dsTempF);

client.println("<div class=\"side_adjust text2\"> &deg;F</div>");

client.println("</div>");

client.println("<hr>");


client.println("</div>");

client.println("</body>");

client.println("</html>");

delay(4000);

}
```
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