IOT-BASED STUDENT ATTENDANCE MANAGEMENT SYSTEM USING RFID

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

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DHAKA, BANGLADESH

JANUARY 2023

APPROVAL

This Project titled "**IOT-BASED STUDENT ATTENDANCE MANAGEMENT SYSTEM USING RFID**", submitted by **MD. NAZMUL HASAN MAJED** 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 B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 19-01-2023.

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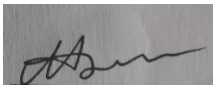

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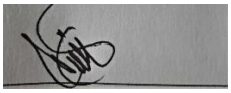

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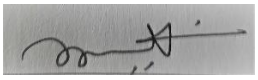

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DECLARATION

I hereby declare that, this project has been done by me under the supervision of **Dr. Sheak Rashed Haider Noori, Professor, Department of CSE,** Daffodil International University.I also declare that neither this project not any part of this project has been submitted elsewhere for award of any degree or diploma.

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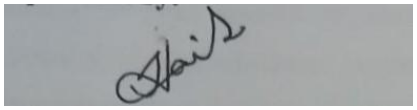

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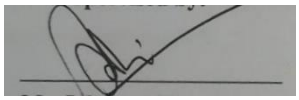

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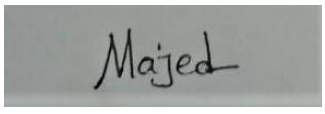

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ACKNOWLEDGEMENT

First I express my heartiest thanks and gratefulness to almighty God for His divine blessing makes me possible to complete the final year project successfully.

I really grateful and wish our profound our indebtedness to **Dr. Sheak Rashed Haider Noori, Professor,** Department of CSE Daffodil International University, Dhaka. Deep Knowledge & keen interest of our supervisor in the field of"*IOT based student attendance system with database system*" to do this task. This project was made possible by his never-ending tolerance, academic leadership, persistent encouragement, constant and vigorous supervision, constructive criticism, insightful counsel, reading several subpar drafts and fixing them at every level.

I would like to express our heartiest gratitude to **Professor Dr. Touhid Bhuiyan Professor and Head,** Department of CSE, as to the other academic members and employees of the CSE department of Daffodil International University, for their kind assistance in completing my research.

I would like to thank our entire course mate in Daffodil International University, who took part in this discuss while completing the course work.

Finally, I must acknowledge with due respect the constant support and patients of our parents.

ABSTRACT

Recently, there have been more innovative radio frequency identification-based technologies developed (RFID). Many fields, including transportation, Several industries, including agriculture, inventory management, and health protection, have successfully used RFID technology. A radio frequency identification tag, often known as an RFID, is a compact device that combines a chip, read/write reader, processor, transmission, and administration application. The proposed method aims to track university attendance via RFID. The roll-call method is used by many universities to track attendance, which is a time andenergy waste. It highlights the waste of time and the teaching abilities of teachers. Therefore, it is essential to employ competent and efficient contemporary systems since by replacing the current attendance system with an RFID one, time and energy waste maybe reduced.

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Introduction

1.1 Introduction

Numerous locations, including universities for students and other settings like industries for staff login and logout times, require to install attendance systems. RFID-based attendance systems are utilized in businesses, colleges, and universities. A RFID project's main goal is to automatically track student or staff attendance. Utilizing modern technologies enhances technique and lessens human error. The recommended strategy is to develop an automated method of keeping track of university students' attendance. The suggested approach suggests that teaching would consume a significant amount of teacher time and resources since the roll call system for students is completed using the class list, and it requires time and effort to confirm students' attendance. Therefore, by using effective and current technology,time and energy waste may be avoided. As a result, an automated, global attendance system might be used. The recommended remedy makes use of a radio frequency identification system, a cloud-based storage system, and an automated student roll call system. An automated system could offer higher regularity and efficiency compared to the traditional method of looking at students. An RFID card reader is included in RFID devices, which use wireless microchips for automated item identification [4]. The reader is a valuable tool. An RFID reader can wirelessly and line-of-sight identify things by reading RFID tags. Describe how the proposed system for identifying and tracking attendance uses RFID technology. When RFID cards pass across the read range zone, readers placed there are activated. Every classroom at the institution now uses RFID technology to encourage the use of the chip roll call system, which records each student's attendance.

1.2 Problem Statement

One educational institution, University Technology PETRONAS (UTP), uses the manual technique of noting attendance, which involves writing names on paper. In general, manually documenting student attendance, especially in big classrooms, may be tiresome and time-consuming. There are a few modern technologies, such the bar code and fingerprint systems, that are used to track students' attendance, but they are all quite

expensive and require a lot of maintenance. The usage of a portable computer-assisted system can correctly collect and save data, preventing the need for time-consuming problems.

1.3 Motivation

The rate of education was low in the past due to various obstacles in the society. The rate of education of those earlier days has increased day by day now. This rate has only made it possible for the education system to go digital. Previously the range of education was limited, my education system has been digitally developed at every level to expand that education. In the past, the main reason for the declining education rate was to spend time outside the school without informing the parents. Over time, the rate of education has decreased a lot while staying away from educational institutions. I are interested in making this system useful so that our parents can know everything about the child, to prevent them from going to other places without informing the parents, to improve the quality of education, to ensure the benefits of digital system.

1.4 Objectives

My project aims to design an **IoT-Based Student Attendance Management System Using RFID** which could effectively manage attendance of students. Attendance ismarked after student identification. For student identification, a student RFID ID Card recognition based identification system is used.

- This project's primary goal is to design and construct of an **IoT-Based Student Attendance Management System Using RFID**.
- The presence of students present data will be store in database.
- To take several test for future modification.

1.5 Methodology

My methodologies for the project:

- Coming up with a concept for the design and construction of "**IoT-Based Student Attendance Management System Using RFID**." developing a block diagram and a circuit diagram to identify the components required to build it.
- Getting all of the parts together and programming the microcontroller to run the system.
- Soldering after placing every component on a PCB board. Afterward, the entire block is put together in a board, and ultimately, the system is run and checked.

1.6 Project Outline

This project book has six chapters in total. The introductory statement, background research for the project, rationale, problem statement, research objectives, project methodology, and project plan are all included in the first chapter. I evaluate the literature in the second chapter. Chapter 3 provides a description of the theoretical model.On this page, The suggested system design, which includes a block diagram, circuit diagram, flow chart, project operating principle, and a whole project image, will be covered in detail in this part. The evolution of hardware and software is covered in the fourth chapter. The findings and a discussion of the advantages and applications of my effort are covered in chapter five. Chapter 6 also covers the project's conclusion, constraints, and potential future directions.

CHAPTER 2

Literature Review

2.1 Introduction

The literature review is the main topic of this chapter. Examine some of the works from the previous year, such as my project. I may make improvements to the prior project and make it more effective by reading them.

2.2 Literature Review

With the use of a central database and finger prints, Farzana Akter and her team suggested that students participate in the Internet of Things (IoT) [2]. The Smart Classroom Roll Caller System (SCRCS) from Ching Hisang Chang enables local display of student attendance. [1]. Professors and students at the university Ire given RFID proposals by Majid Meghdadi and Ahad Abbaszadeh Azar[3]. Typically, RFID involves three fundamental responsibilities. They are the application management system, RFID tags, and RFID readers. There are two types of it: active and passive. When installing the system, both the frequency that the RFID tag and reader utilize must match. High frequency RFID scanners can read high frequency RFID tags that are unable to read the frequency of regular tags. Most institutions use high frequency and ultrahigh frequency RFID cards for their students. Security, library door entry, parking for motorcycles and cars, and payment are just a few uses for RFID cards [1]. In this work, a fictitious roll call system concept that uses cloud storage and RFID and IoT technologies to verify each student's ID attendance is provided. A conceptual design model is used in university classrooms to verify student attendance and overall attendance figures. Each student's student card must be registered. They sign on or exit from the RFID sensor board using their card [1].

Several related literary works discuss the use of RFID technology to various sectors, notably the problem of tracking academic attendance. to access the biometric data on the digital passport, writers in [6] created and built a concept of a portable, secure embedded reader system. By employing the Global System of Mobile Communications (GSM)

network for online holder authentication, the authors tried to address issues with E-passports' dependability, security, and privacy. Between theidentification center and the ePassport reader, the GSM network serves as the primary interface. AES is used to encrypt data for security while being transferred across the GSM network, safeguarding the server's and the e-passport reader's communication.

The author of [5] evaluated the most recent studies on RFID uses in several industries, with an emphasis on supply chain management applications. Additionally, the author created a taxonomic framework to categorize the material, allowing for rapid and easy content analysis to assist discover topics for additional research. The usage of RFID in an integrated circuit (IC) packaging facility to address inventory transaction difficulties was examined by authorsin [9]. According to his research, RFID significantly enhances the procedures for getting water and transacting in inventories, loIring labor costs and human error. In [10], An automated attendance management system on both an electronic and mobile platform was developed using a stationary matrix AR 400 RFID reader with four circulation polarized antennae and a handheld Symbol MC9000-G RFID reader, respectively. The attendance management system is available on the digital platform.

have put in place an automated attendance system based on RFID. VB.net and a database Ire used in the development of this attendance system program (Microsoft Access). Each student's student ID card is equipped with an RFID tag. In order to link RFID and the computer system, a serial connection has been maintained between the computer and RFID reader. The entrance to the lecture hall has an RFID reader there. When students enter the lecture hall, an RFID reader scans their RFID tags, stores all relevant data (such as entry time, name, and other details) in a database through a serial connection, and keeps the system running. In contrast to previous systems, this system's administrator may easily access all documents using the software interface by pulling data from the database. [4] a Ib-based system and RFID technology Ire used to implement an attendance system. For recording student attendance and reading a specific student, this system makes use of an RFID tag and reader. The reader then establishes a connection with an Arduino microcontroller, which transmits the RFID reader response to a Ib server using an Arduino shield. Finally, PHP and MySQL are used to register student

attendance in the Ib server. By logging into this specific Ib-based program, the system administrator may access all of the students' documents. They can also examine the students' individual information on LCD monitors.

2.3 Summary

I try to do this project by reading the above literature, and i have been able to make my project successful by reducing the mistakes of last year's project.

CHAPTER 3

System Description

3.1 Introduction

In this chapter, I outline my project's block diagram, circuit diagram, flow chart,project operating principle, and final project perspective. Blocks Diagram, version 3.3

3.2 System Description

The main processing brain of the system is the Node MCU. Firstly, to run the microcontroller AC supply the main voltage through SMPS. Then system will be starting its way. When a user scans their RFID card then data will be saved in database.

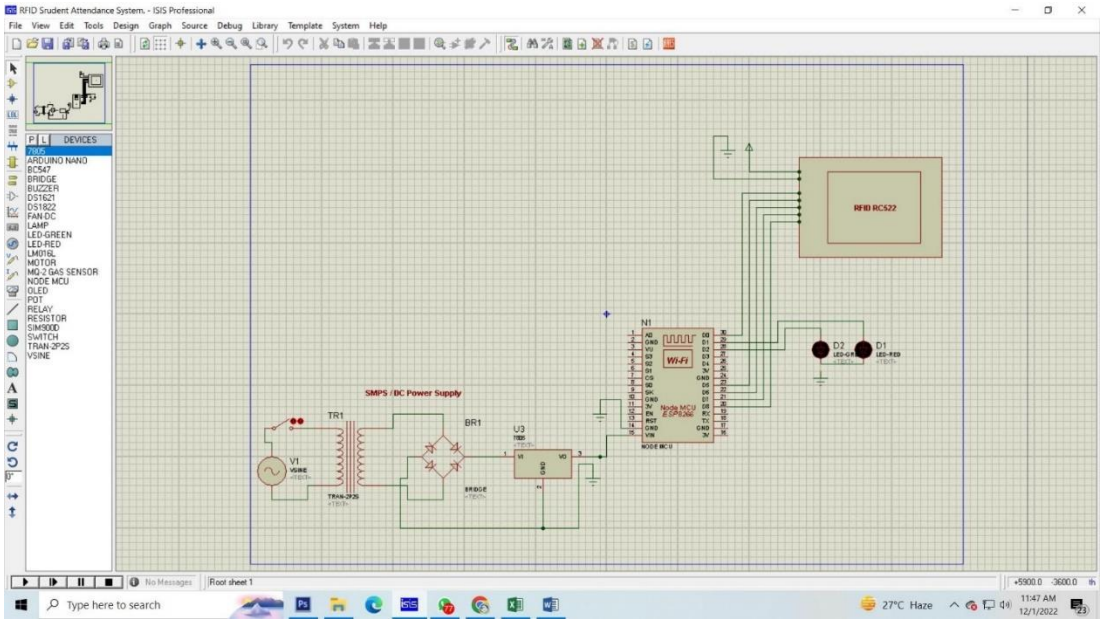


Figure 3.1: System Schematic Design in proteus.

3.3 Block Diagram

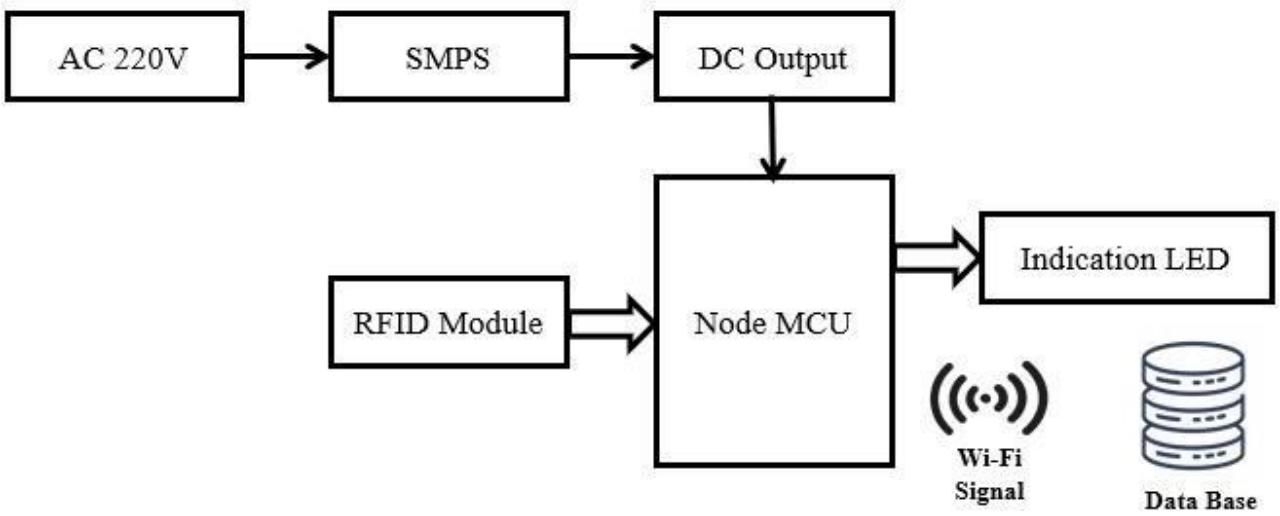


Figure 3.2: Block Diagram of my System

3.4 Circuit Diagram

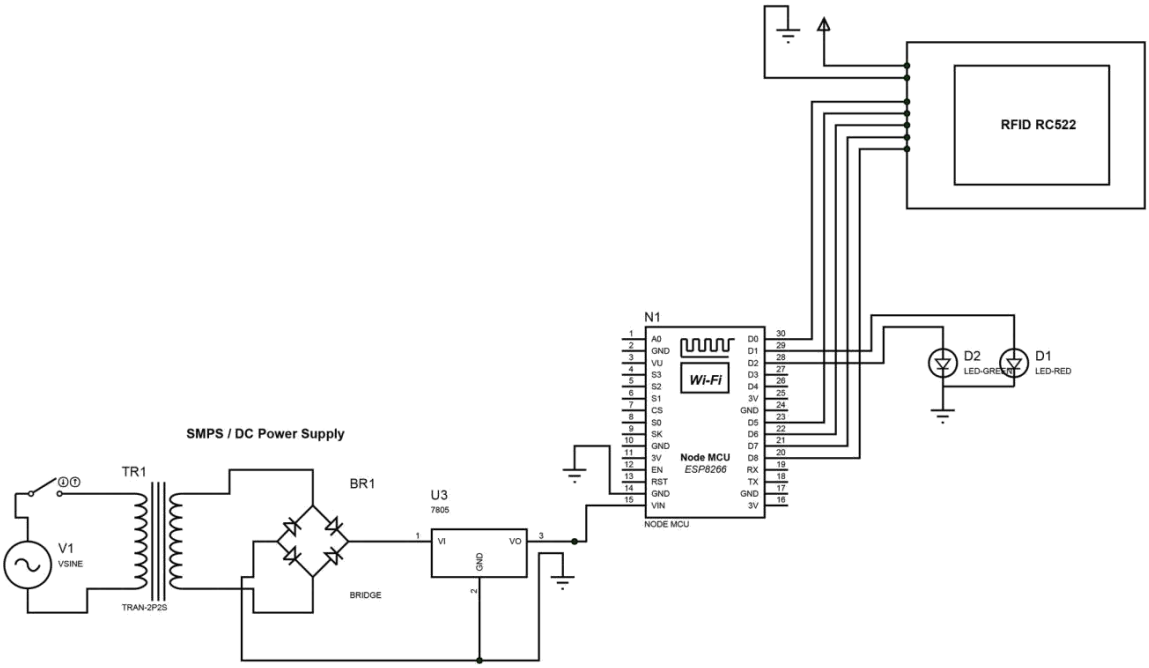


Figure 3.3: Circuit Diagram of my system.

3.5 Working Principle

This circuit's power supply component uses 230V from the mains supply, which is step-downed and converted to DC 5V with the aid of an SMPS. The RFID Module is attached to the Node MCU, which converses with it through a Serial port UART (Universal Asynchronous Transmitter and Receiver). When a student enters an institute then they scan their RFID Card and then they entire . At the mean time when they scan their Card with RFID Reader sensor then data will be store in data base. This is the main procedure od the system.

3.6 Complete Project Image

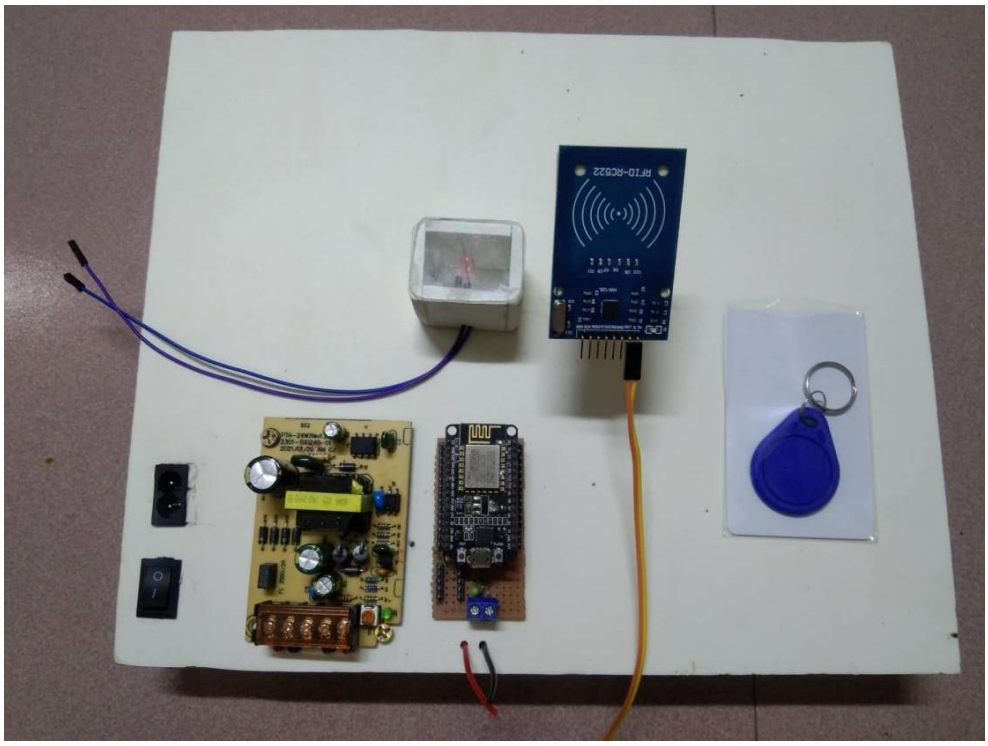


Figure 3.4: Complete Project Image

3.7 Summary

This chapter has covered a number of the most important things in the project. The main thing is block diagram, circuit diagram.

CHAPTER 4

Hardware and Software

4.1 Introduction

This chapter describes the hardware and software components of my project, which will increase its visibility and efficacy.

4.2 About Hardware and Software

In this project I need some hardware and software for run this project smoothly.

- **Hardware**

    1. SMPS
    2. Node MCU
    3. RFID Module

- **Software**

    1. Arduino IDE
    2. Proteus

4.3 Hardware

Electronic hardware is made up of linked electronic parts that, when applied to data that has been received and locally stored, conduct analog or logic operations to create new data that may be produced or stored. Individual chips and circuits to distributed information processing systems are all examples of electronic gear. Hierarchies of functional modules connected by Ill specified interfaces make up Ill-designed electronic gear.

4.3.1 Node MCU

The open-source Node MCU firmware is compatible with open-source prototype board designs. The term "Node MCU" combines the terms "Node" and "MCU" (micro- controller unit). Technically, "Node MCU" only refers to the firmware; the associated development kits are not included. Additionally open source are the firmware and prototype board designs.

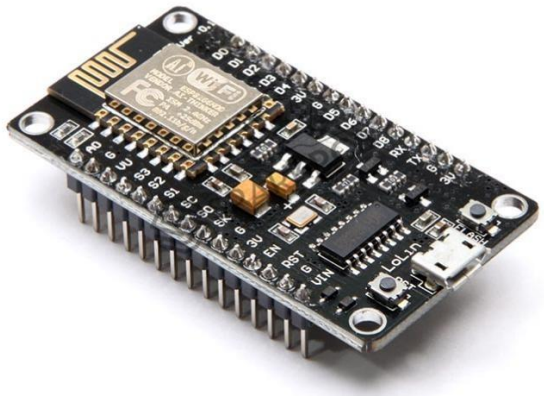


Figure 4.1: Node MCU

The microcode uses the Lua simulated language. The ESP8266 Espressif Non-OS SDK for ESP8266 was used to develop the microcode, which is supported by the eLua project. It extensively utilizes free software like SPIFFS and lua-cjson. Users should pick the components needed for their project and make a microcode specific to their needs because of resource limitations. Additionally, initial support for the 32-bit ESP32 has been included. A card acting as a dual in-line package (DIP) that includes a USB controller and a smaller surface-mounted board holding the MCU and antenna is the prototype equipment that is widely utilized. Board prototyping is simple because to the DIP format's selection. The design's fundamental support was provided by the ESP-12module of the ESP8266, which is a Wi-Fi SoC paired with a Tensilica Xtensa LX106 core and widely used in IoT applications.

This IoT platform is free source. It has hardware based on the ESP-12 module and firmware that runs on the Express if Systems ESP8266 Wi-Fi SoC. Instead of the development kits, the firmware is what is often meant when the phrase "Node MCU" is

used. The Lua scripting language is used by the firmware. It is constructed using the Espress if Non-OS SDK for ESP8266 and is based on the eLua project. Shortly after the release of the ESP8266, Node MCU was developed. The ESP8266 started being produced by Espress if Systems on December 30, 2013. Widely utilized in Internet of Things applications, the ESP8266 is a Wi-Fi SoC combined with a Tensilica Xtensa LX106 core (see related projects).

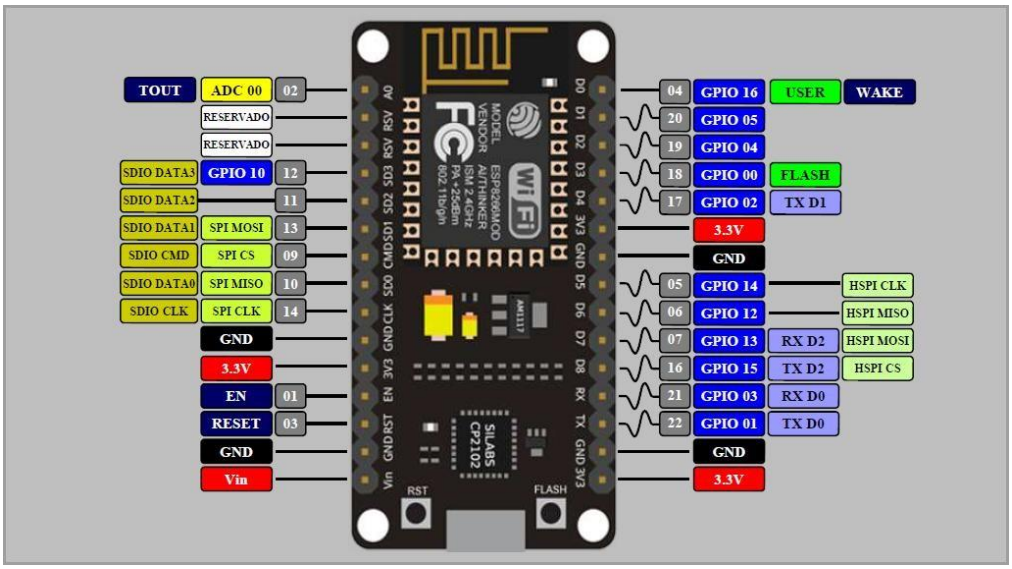


Figure 4.2: Node MCU Pin Out

Hong published the initial version of the Node MCU firmware on GitHub on October 13, 2014, officially debuting Node MCU. The project was expanded to include an open-hardware platform two months after developer Huang R submitted the Gerber file for the devkit v0.9 ESP8266 board. Later on in the same month, Tuan PM made a contribution to the Node MCU project and modified the Contiki MQTT client library for the ESP8266 SoC platform. Therefore, by using Lua to connect to the MQTT broker, Node MCU was able to handle the MQTT IoT protocol. Devsaurus converted the u8glibto Node MCU project on January 30, 2015, enabling Node MCU to quickly control LCD, Screen, OLED, and even VGA displays. This was a significant development. The firmware project's developers abandoned it in the summer of 2015, and a bunch of unaffiliated participants took over.With just a few lines of Lua code using the Arduino IDE, the Node MCU V3 ESP8266

ESP-12E Wi-Fi development board enables you to prototype your Internet of Things device..

Features

1. The voltage of the 3.3V communication interface.

2. One alternative has a built-in PCB antenna.

3. The wireless 802.11 b/g/n standard

4. Wireless LAN at 2.4 GHz with WPA/WPA2 security mode

5. Support the STA, AP, and STA + AP operation modes.

6. A TCP/IP protocol stack that is integrated and can support up to five TCP Client connections

7. D0 through D8 and SD1 through SD3 are used as GPIO, PWM, IIC, and other functions with the capacity to operate 15 mA ports.

8. AD0: One-channel ADC

9. USB-powered, 4.5V to 9V (10VMAX) power input

10. Current: Standby: 200uA, Continuous Transmission: 70mA (200mA MAX).

110-460800bps is the transfer rate.

12. Support data transmission interfaces UART and GPIO

13. Online firmware update (OTA)

14. Flash memory size: 4 Mbytes.

4.3.2 Switch Mode Power Supply (SMPS)

An electric power supply that includes a change regulator is referred to as a switched-mode power supply (SMPS), also called as a switch power supply, switch-mode power supply, switched power supply, or oppressor. Since an SMPS converts the voltage and current properties of a DC or AC source before supplying power to hundreds of DC personal computers, it does so similarly to other power supplies (often mains power). A switching-mode supply's pass semiconductor spends far less time in transitions with high dissipation and alternates between full-on and full-off states with low dissipation, which saves energy compared to a linear power source.

A switched-mode power supply has no power loss. The on-to-off time magnitude relationship is altered to adjust voltage (also called duty cycles).

In contrast, a linear power supply controls the output voltage by continually utilizing the pass semiconductor's catalytic power. A switched-mode power supply offers the benefit of having superior power conversion capabilities. Due to the loIr size and lighter Iight of the electrical equipment, switched-mode power supplies may also be significantly smaller and lighter than a linear supply.

Figure 4.3: Switch Mood Power Supply (SMPS)

When change regulators area unit required, linear regulators area unit swapped out for them once a better potency, a smaller size, or a lighter Iight area unit required. HoIver, they're additional complex; if their change currents aren't rigorously suppressed,they will lead to electrical noise problems, and easy styles might not have an genuine power problem Selected switched-mode power supplies are categorized based on input and output voltage types. The following are the four major groups:

4.3.2.1 AC to AC

4.3.2.2 DC to AC

4.3.2.3 DC to DC

4.3.2.4 AC to DC

An isolated AC to DC switched-mode power supply has the following components:

4.3.2.5 Input filter and rectifier

4.3.2.6 Transformer

4.3.2.7 An inverter with switching components like MOSFETs

4.3.2.8 Output rectifier and filter

4.3.2.9 Circuit for feedback and control

The switching MOSFET or polar transistors in the inverter use an input DC supply from a rectifier or battery to turn on and off the input DC supply at high frequencies bet Ien 20 KHz and 200 KHz. High-frequency voltage pulses from the inverter are applied to the transformer's main winding, and the secondary AC output is rectified and smoothed to provide the required DC voltages. A feedback circuit controls the control circuit to adjust the duty cycle while keeping track of the output voltage to maintain the output at the proper level.

Basic working concept of an SMPS

A switching regulator controls the SMPS. A smoothing capacitor's current supply is turned on and off in series. The voltage of the capacitor controls how long the series element is run. The capacitor continually flips to maintain the required voltage.

Design basics

Fuse and a line filter are initially used to control AC power. A full-wave bridge rectifier is then used to fix it. The downstream DC-DC converter is then coupled to the rectified voltage after the power factor correction (PFC) pre-regulator (s). Input connections of the International Electrotechnical Commission (IEC) type are used by the majority of computers and small gadgets. With the exception of select industries like PC and small PCI, output connections and pinouts are often left up to the vendor and not specifically defined. How input power is transported to the output is governed by the many circuit topologies, or layouts, each having specific features, benefits, and modes of operation. Transformers are essential to the majority of frequently used topologies because they offer isolation, voltage scaling, and a range of output voltages. These topologies include flyback, push-pull, half-bridge, and full bridge. Inductive energy transfer is utilized to convert electricity in the non-isolated variations instead of a transformer.

Benefits of switched-mode power supplies:

4.3.2.10 An increase in productivity of 68% to 90%

4.3.2.11 Controlled outputs that are constant despite changes in the input supply voltage Slim and light-light

4.3.2.12 Flexible technology is also important.

4.3.2.13 substantial power density

Disadvantages:

4.3.2.14 Causes interference with electromagnetic fields

4.3.2.15 Circuit design that is difficult and

4.3.2.16 expensive when compared to linear supplies

Computers, delicate electronics, battery-operated gadgets, and other equipment that requires high efficiency are all powered by switched-mode power sources. Because of its superior ability to generate a constant fixed voltage output, linear voltage IC regulators have been used in power supply systems for a long time. Linear voltage regulators are frequently far more efficient and easier to use than comparable voltage regulator circuits made from discrete components like a resistor and a Zener diode, transistors, or even op-amps.

Switch Mode Power Supply

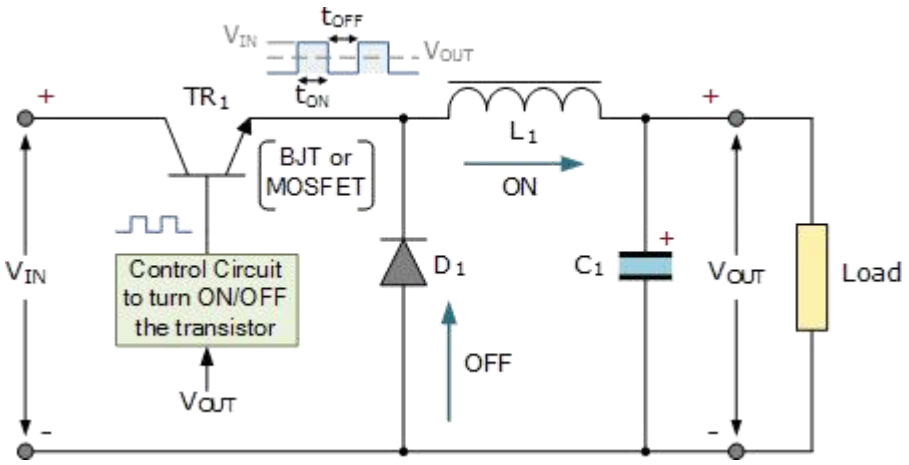


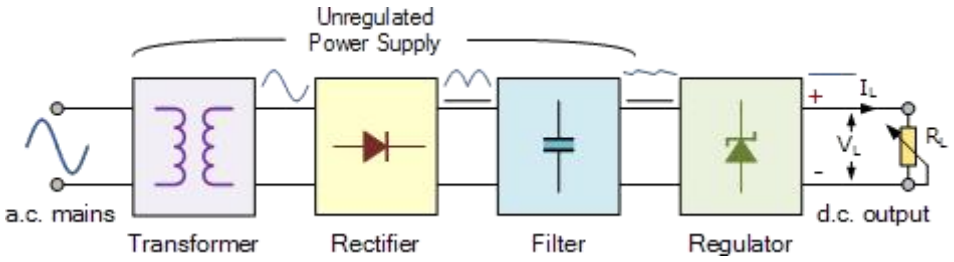
Figure 4.4: SMPS Circuit Diagram.

The most prevalent linear and fixed output voltage regulator types are the 78... positive output voltage series and sequence of negative output voltage These two different voltage regulators work together to provide an output voltage that is precise, constant, and ranges from around 5 volts to about 24 volts for use in many electronic circuits. There are several different types of these three-terminal fixed voltage regulators, and each one has a different internal voltage regulating and current limiting circuit. I can thus provide a variety of alternate power supply rails and outputs, whether single or dual.

that are suitable for the majority of electrical circuits and applications. Even linear regulators with output voltage that is constantly shifting and drops to a few volts below their maximum output to a few volts above zero are available.

The majority of D.C. power supplies consist of a large, heavy step-down mains transformer, full- or half-wave diode rectification, a filter circuit to remove ripple content and produce a suitable smooth D.C. voltage, and some type of voltage regulator or stabilizer circuit, either linear or switching, to ensure proper regulation of the power supply output voltage under varying load conditions. A typical D.C power supply may then resemble this.:

Typical DC Power Supply



In these typical power supply systems, a dissipative series regulator circuit and a substantial mains transformer are both included. Between the input and output, the mains transformer also serves as an isolation device. The regulator circuit may employ three-terminal linear series regulator or a single Zener diode supply the required output voltage. A linear regulator has the advantage of allowing the power supply circuit to control the output voltage using only a few feedback resistors, an input capacitor, and an output capacitor.

4.3.3 RFID Module

The two crucial components of an RFID system are a transponder or tag attached to an object that has to be identified and a transceiver, also known as an interrogator or reader..

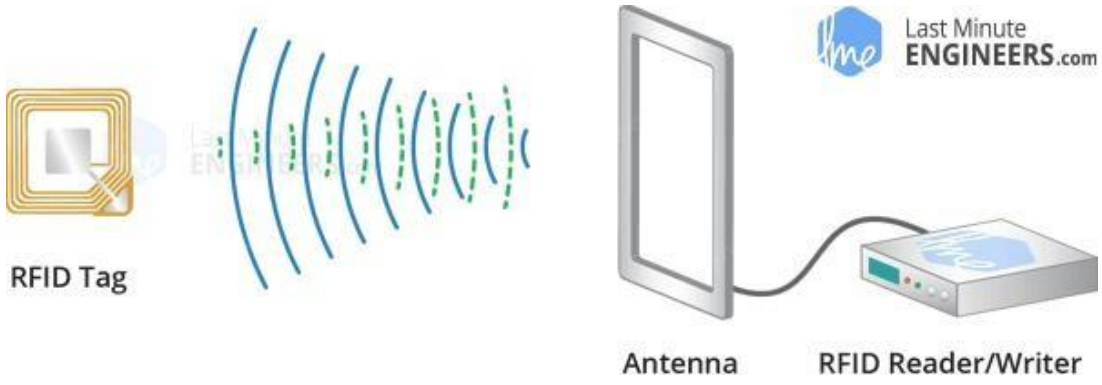


Figure 4.5: How RFID works

A reader is made comprised of a radio frequency module and an antenna that generate a high frequency electromagnetic field. The tag, on the other hand, is frequently a battery-free passive device. Instead, it features a CPU for processing and storing data together with an antenna for receiving and delivering signals.

To read the data encoded on a tag, a Reader must be placed close by (does not have to be in the reader's direct line of sight). Electrons travel through the antenna of a tag and power the chip as a result of the reader's electromagnetic field.

A fresh radio signal is then sent by the powered chip within the tag in response, conveying the previously stored data back to the reader. Backscatter is what's happening. The data is sent to a computer or microcontroller when the reader detects and analyses the backscatter or change in the electromagnetic/RF wave.

My RDM6300 RFID 125KHz card reader mini-module is made to read data from read-only tags and read/write cards that are compatible with 125KHz cards. It may be used in systems for production control, personal identity, access control, anti-forgery, and home and office security, among other things.

Figure 4.6: RDM 6300 RFID Module

Features:

- Assistance with external antenna
- Up to 50mm maximum effective distance
- Less than 100 ms for decoding
- Interface Uart
- Support read-only or read/write tags that are EM4100 compliant.
- Tiny outline pattern

4.3.4 Capacitor

An electric field forms across the dielectric when there is a potential difference across the conductors (such as when a capacitor is connected across a battery). This results in the accumulation of positive charge (+Q) on one plate and negative charge (-Q) on the other plate. If a capacitor is coupled with a battery for a sufficient amount of time, no current can flow through it. A displacement current can, hoIver, flow if an accelerating or alternating voltage is supplied across the capacitor's leads.

Figure 4.7: Capacitor

An perfect capacitor's capacitance is described by a single constant value. The electric charge (Q) on each conductor is compared to the potential difference to calculate capacitance (V). One coulomb per volt (1 C/V) is equal to one farad (F), is the SI unit for capacitance. The typical capacitance ranges from around 1 pF (1012 F) toapproximately 1 mF (103 F). When the space between conductors is less and the surface area of the conductors is bigger, the capacitance increases.

4.3.5 Resistor

A resistor is a two-terminal electrical component that is passive. used in circuits to implement electrical resistance. In addition to reducing current flow, resistors can occasionally loIrvoltage levels inside circuits. As with thermostats, visitors, trimmers, photo resistors, hamsters, and potentiometers, resistors can have fixed or variable resistances. The voltage across a resistor's terminals directly correlates to the current flowing through the resistor. Ohm's law is a representation of this connection.

Figure 4.8: Resistor

Theory of operation

The connection described by Ohm's law controls how an ideal resistance behaves:

$$V = I.R$$

Ohm's law states that resistance acts as the constant of proportionality in therelationship between the voltage (V) between the current and a resistor (I) (R).

The equivalent formulation of Ohm's law is:

$$I = V/R$$

According to this equation, the resistance (R) is inversely proportional to the voltage (V) and the current (I) is proportional to both (R). This is immediately applied in real-world calculations. For example, if a 300-ohm resistor was placed across the terminals of a 12-volt battery, it would conduct a current of 12 / 300 = 0.04 amperes.

4.4 Software

Software is a set of instructions, information, or computer programs that are used to operate equipment and perform certain tasks. Hardware, which refers to a computer's exterior components, is the polar opposite of it..

4.4.1 Arduino IDE

The Arduino code IDE will be used to program the Arduino Nano digital microcontroller. Additional than Arduino, no other code has to be installed. To begin, choose "Arduino Nano" from the Tools, Board menu (the microcontroller on my board). USA may upload fresh code without the need for an additional hardware computer programmer since the boot loader of the ATmega328 IC used in the Arduino Nano is preprogrammed.

The original STK500 protocol is utilized for communication (reference, C header files). Theboot loader can be skipped, and the microcontroller can be programmed directly via the ICSP (In Circuit Serial Programming) header. The ATmega16U2 (or 8U2 in the rev1 andrev2 boards) microcode ASCII text file is available. The ATmega16U2/8U2 comes with a DFU boot loader, which will be made accessible by:

In order to reset the 8U2 on Rev1 boards, I'm going to connect the solder jumper on the back of the board, next to the map of Italy. The 8U2/16U2 HWB line is pulled to ground on Rev2 and subsequent boards by an electrical mechanism, making it simpler to enter DFU mode.

One of the foremost fashionable digital microcontrollers is that the Arduino Nano, which incorporates a spread of communication choices with a pc, a different Arduino or other microcontrollers. Using a 5 volt UART TTL for serial connection provided by the ATmega328 and is offered on digital pins zero - (RX) for information reception and pin no. one (TX) for information transmission. The ATmega16U2 on the board, which the pc code interprets as a virtual com port, routes this serial connection over USB. Since the '16U2 microcode makes use of the official USB COM drivers, there is no need for an extra driver. A.in files, hoIver, are crucial on Windows. Simple data will be sent to employing a serial monitor that may be found in the Arduino code, which was obtained from the Arduino board.

The board's RX and American status LEDs may blink when data is sent to the computer using the USB-to-serial chip and USB association (but not for serial communication on pins zero and one). Any digital pin of the Nano may now support serial communication thanks to the code's serial repository. Additionally, I2C (TWI) and SPI are supported for communication by the ATmega328. To make using the I2C bus easier, the Arduino code has a Wire library. Ideas are written pieces of C or C++ code that are used to develop Arduino applications. The Wildebeest tool chain and AVR work are used by the Arduino IDE to generate and transfer programs, so.

When data is delivered to the computer using the USB-to-serial chip and USB association, the board's RX and American status LEDs may flash (but not for serial communication on pins zero and one). Serial communication is possible on any digital pin of the Nano thanks to the code Serial library. Additionally, I2C (TWI) and SPI are supported for communication by the ATmega328. To make using the I2C bus easier, the Arduino code utilizes the Wire library.The code wont to produce Arduino applications, referred to as ideas, is written in C or C++. The wildebeest tool chain and AVR work ar utilized by the Arduino IDE to compile programs and transfer programs, consequently. AVR Studio or the neIr Atmel Studio, Atmel's development surroundings, may additionally be wont to produce code for the Arduino platform as a result of it makes use of Atmel microcontrollers.

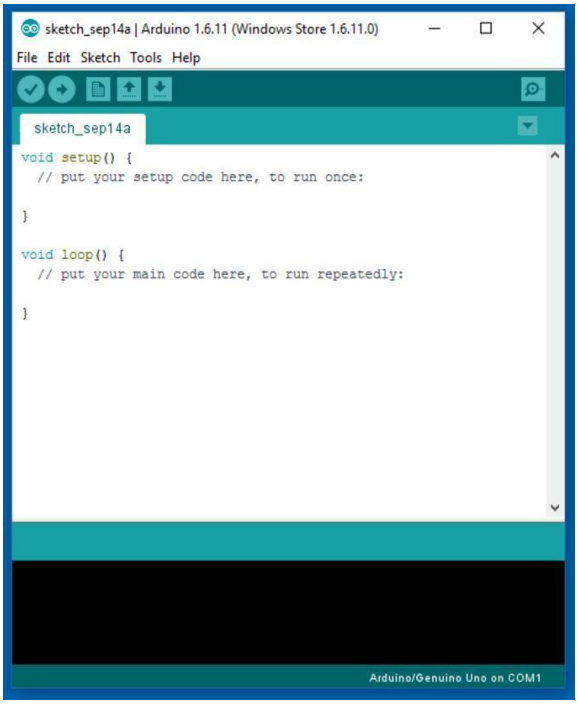


Figure 4.9: Arduino Software Interface IDE

There is also the Arduino Software (IDE), sometimes known as the Arduino Integrated Development Environment. It has a text editor for writing code, many menus, a toolbar with buttons for frequently used tasks, a message box, and a text terminal. In order to upload programs and connect with the Genuine hardware, it establishes a link with it.

Writing Sketches

In order to create computer programs known as sketches, one uses the Arduino software (IDE). These graphics are created in a text editor, and then they are saved as files with the.ino extension. In the editor, there are tools for text substitution and text searching. When saving and exporting, the message field provides information about problems and feedback. The terminal shows text generated by the Arduino Software (IDE), as Ill as supplementary information and detailed error warnings. The configured board and serial port are visible in the window's bottom right corner. You can create, save, and save drawings using the toolbar buttons, as Ill as examine the serial monitor, validate and upload programs, and more..

Sketchbook

The Arduino Software (IDE) uses the concept of a sketchbook as a standard area to keep your programs (or sketches). You may access the sketches in your sketchbook by choosing File > Sketchbook from the menu or by clicking the Open button on the toolbar. The Arduino application will automatically create a directory for your sketchbook when you first launch it. The Preferences window's placement of the sketchbook can be checked or changed. As of version 1.0, files are saved with the a.ino file extension. For earlier generations, use the.pde extension. Versions 1.0 and later still allow you to open.pde named files, but the application will change the extension to.ino automatically.

Tabs, Multiple Files, and Compilation

Permits handling of sketches that combine many files (each of which appears in its own tab). These can be header files, C files, C++ files, or ordinary Arduino code files (no evident extension) (.h).

Uploading

You must choose the appropriate options from the Tools > Board and Tools > Port menus before submitting your picture. Below is a description of the boards. The serial port on a Mac will likely be something like /dev/tty.usbmodem241, /dev/tty.usbserial-1B1, or /dev/tty.USA19QW1b1P1.1 for an Uno, Mega2560, or Leonardo (for a serial board connected with a Keyspan USB-to-Serial adapter). To distinguish between them, check for

USB serial device in the Windows Device Manager's ports area. Most likely, it's COM1 or COM2.(for a serial board) or on Windows, COM4, COM5, COM7, or higher (for a USB board). It should be /dev/ttyACMx, /dev/ttyUSBx, or something similar on Linux.. Once you've chosen the correct serial port and board, either pick Upload from the Sketch menu or click the upload icon in the toolbar. The upload will start when the current Arduino boards have been automatically reset. You must push the reset button on earlier boards (pre-Diecimila) that lack auto-reset right before beginning the upload. As the sketch is uploaded, the RX and TX LEDs on the majority of boards will begin to flicker. When the upload is finished, the Arduino Software (IDE) will either show a message or an error.

Libraries

Libraries add any practicality to sketches, like addressing hardware or manipulating information. To use a library in a very sketch, select it from the Drawing > Import Library menu. This may build the library next to your drawing and add one or more #include declarations to the top of it. as a result of libraries square measure uploaded to the board at the side of your sketch, they take up extra space. merely take away the #include directives from the start of your code if a sketch now not needs a library. The reference contains an inventory of libraries. The Arduino program includes some libraries.Others will be derived from varied of sources, as Ill as the Library Manager. you'll be able to import a library from a zipper file Associate in Nursingd use it in an open sketch beginning with version one.0.5 of the IDE. Follow these steps to put in a third-party library.

Third-Party Hardware

You may add support for third-party hardware to your sketchbook directory's hardware directory. Board definitions, core libraries, bootloaders, and programmer definitions are examples of platforms that may be placed there and display in the board menu. Create the hardware directory before installing, and then unzip the third-party platform into a separate sub-directory. (If you name the sub-directory "Arduino," the Arduino platform that is already built-in will be overridden.) Simply deleting its directory will remove it. Consult the 3rd party hardware for the Arduino IDE 1.5 standard for further information

on how to create packages for third-party hardware.

Serial Monitor

This shows serial data transmitted through USB or a serial port from an Arduino or Genuine board. Enter the text and hit the "send" button or enter to send it to the board. From the drop-down option, select the baud rate that matches the rate provided to Serial. putting the sketch first Whenever you connect to the serial monitor on Windows, Mac, or Linux, the board will reset (it will execute ymy sketch again). Please be aware that the Serial Monitor does not support the usage of control characters. If your project requires total control over serial communication using control characters, you may utilize an external terminal application by connecting it to the COM port allocated to your Arduino board.

4.4.2 Proteus Software

A proprietary tool set used largely The Proteus style Suite is used for electrical style automation. For the purpose of obtaining schematics and natural philosophy prints for the fabrication of pcbs, the package is mostly utilized by engineers and technicians who operate in the natural philosophy style.

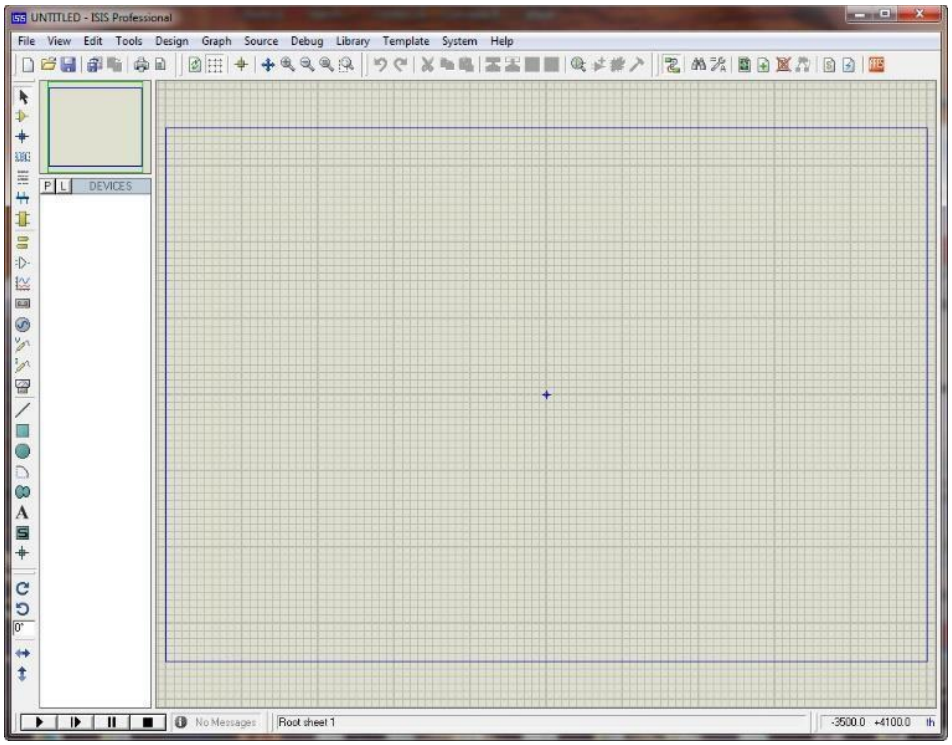


Figure 4.10: Proteus Software Interface

The company's chairman, John Jameson, developed the first iteration of what is now the Proteus Design Suite in 1988 under the codename PC-B for DOS. In 1990, the practicality of A change to the Windows environment folloId the intercalary use of Schematic Capture. In 1996, Proteus ran its first enclosed mixed mode SPICE simulation, and in 1998, it ran a simulation of a microcontroller. In 2002, shape-based automobile routing became mandatory, and in 2006, 3D board visualization was made available. MCAD import/export was intercalary in 2015, and a specific IDE for simulation was intercalary in 2011. Support for fast-paced style was intercalary in 2017. Products available are typically released every two years, whereas maintenance-based service packs are offered to national customers.

4.5 Summary

I Ire able to complete the project using the above hardware and software and the details of hardware and software in this chapter will help to know about them.

CHAPTER 5
Result and Discussion

5.1 Introduction

This chapter will cover the crucial aspect of my project. Here is a thorough explanation of my project's outcomes, benefits, applications, and conversations.

5.2 Result

It's time to discuss the outcomes now. The following things may occur after writing my commands using the Arduino IDE:

- When the system is powered on then it will able to do perform as I expect.
- Then student scan their RFID card, then it will take attendance.
- If the RFID card is authorized then it takes attendance and blink green led, otherwise it will not take attendance,
- All this data will show in database.

5.3 Advantages

There are many advantages of my project because of its accuracy. Some of the advantages are pointed out below:

- High Security.
- The presence of students is increasing.
- Count As an attendance.
- Data will be store in data base.

5.4 Applications

This project's applications in the modern and practical world are numerous, and someof them are listed below:

- School
- College
- University

- Hospital

CHAPTER 6
Conclusion

6.1 Conclusion

This project's primary objective was to develop an attendance management system using anRFID identification device. Management of attendance is particularly beneficial for saving instructors' and students' important time, paper, and producing reports as needed. This project provided a platform for automating and conducting online attendance tracking. The deployment of the RFID Card Identification System, which is used for student identifying, is quicker than that of other identification systems.

6.2 Future Scope of Work

As I have already discussed about the advantages and application of my project so definitely there’s room for improvement and thus, I have lots of future scope of work available to us for this project. Some of these are listed below:

- It can be later implemented for the teaching staff.
- In future I will add voice confirmation system.

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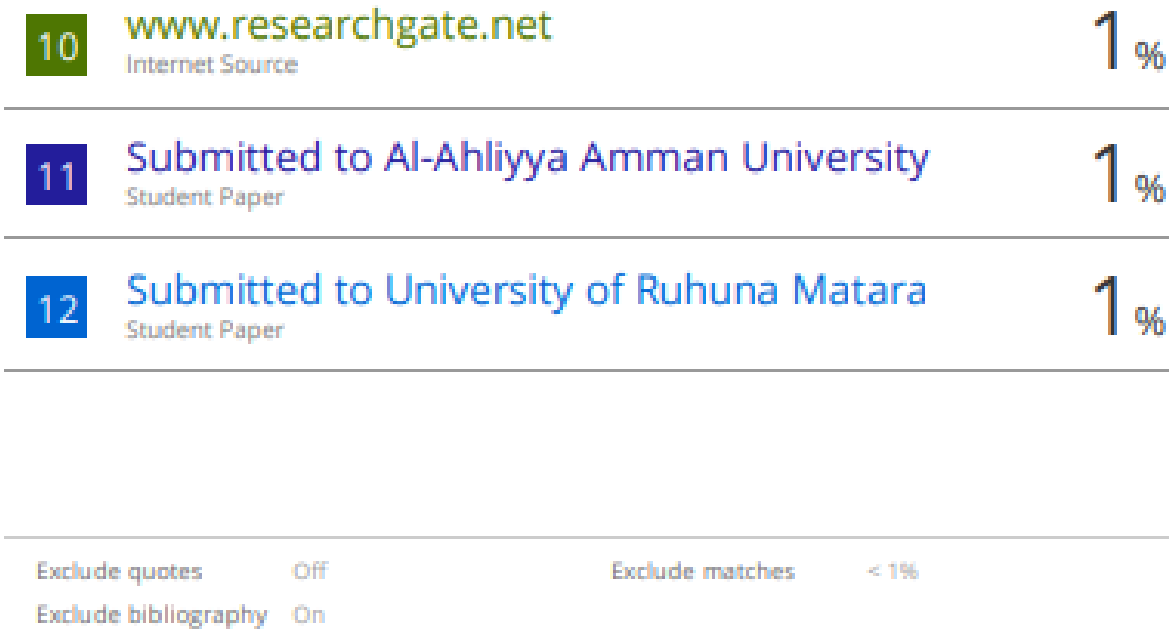
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