Project Report on

RFID Based Attendance System

Using Arduino Uno

By

Bishal Tamang(19IT101011)

In the partial fulfilment of requirements for the award of degree in

Bachelor of Science in Information Technology

(2019 To 2022)

Under the Guidance of

Mr. Tamilselvan T

Assistant Professor

School of Information Technology

SRM University Sikkim

SCHOOL OF INFORMATION TECHNOLOGY

SRM UNIVERSITY SIKKIM

TADONG, GANGTOK, SIKKIM - 737102

CERTIFICATE OF ACCEPTANCE

This is to certify that **Mr. Bishal Tamang** bearing Registration No. 19IT101011 of School of Information Technology, SRM University Sikkim has worked on the project entitled **"RFID based Attendance System using Arduino Uno"** under the supervision of **Mr. Tamilselvan T,** Assistant Professor, School of IT, SRM University Sikkim. The project was carried out from February 2022 to May 2022.

The project is hereby accepted by the School of Information Technology, SRM University Sikkim, in partial fulfilment of the requirements for the award of Degree in Bachelor of Science in Information Technology.

Dr. Om Prakash Sharma
HOD(IT)
School of Information Technology
SRM University Sikkim
India

PROJECT COMPLETION CERTIFICATE

This is to certify that **Mr. Bishal Tamang** bearing Registration No. 19IT101011 of School of Information Technology, SRM University Sikkim has worked under my supervision and guidance from February 2022 to May 2022 and has successfully completed the project entitled "**RFID based Attendance system using Arduino Uno**" in partial fulfillment of the requirements for the award of Degree in Bachelor of Science in Information Technology.

Mr. Tamilselvan T. 17/05/2022

Assistant Professor

School of Information Technology

DECLARATION

I hereby declare that the work recorded in this project report entitled **"RFID based Attendance System Using Arduino UNO,"** in partial fulfillment for the requirements for the award of Degree in Bachelor of Science in Information Technology from SRM University Sikkim, is a faithful and bonafide work carried out under the supervision and guidance of **Mr. Tamilselvan T**, from February 2022 to May 2022.

The assistance and help received during the investigation have been duly acknowledged.

Bishal Tamang.

Name: Bishal Tamang

Registration No: 19IT101011

BONAFIDE CERTIFICATE

This is to certify that this project report entitled **"RFID Based Attendance System Using Arduino UNO"** is the bonafied work of **Mr. Bishal Tamang** bearing Registration No. 19MIT101011 respectively who carried out this project under my supervision.

Dr. Om Prakash Sharma
Associate Professor
HOD-School of IT

Mr. Tamilselvan T.
Assistant Professor
School of IT
Project Guide

17/08/2022

Mr. Sundar Rajan S.
Associate Dean

Faculty of IT & Management

INTERNAL EXAMINER

EXTERNAL EXAMINER

ACKNOWLEDGEMENT

I would like to acknowledge the following as being idealistic channels in the completion of this project. I would like to extend my sincere thanks to all of them.

I take this opportunity to thank SRM University, Sikkim who provided the necessary facilities, guidance and gave me the chance to do this project.

I would like to thank our Head of Department, **Dr. Om Prakash Sharma** who gave me an opportunity to do this project on the topic **"RFID BASED ATTENDANCE SYSTEM USING ARDUINO UNO",** which helped me to learn many new things.

I take this opportunity to thank my Project Coordinator, **Mr. Nawang Lama**, Assistant Professor for his valuable guidance, support, and constant supervision in completion of this project.

I would also like to express my sincere gratitude towards my project guide,

Mr. Tamilselvan T, whose guidance, and care made the project successful.

I would like to express my special gratitude and thanks to all the faculties of School of Information Technology, SRM University for giving me such attention and time.

My thanks and appreciation also go to my colleagues who helped me in developing the project.

Thanking You,

Bishal Tamang (19IT101011)

ABSTRACT

In many schools and colleges, teachers record the students' attendance in an attendance register manually. Later this data is entered into a computer and the aggregate percentage of students' attendance is calculated. This method results in duplication of work and increases manpower requirements. Recently, students' attendance has been considered as one of the crucial elements or issues that reflects the academic achievements and the performance contributed to any university compared to the traditional methods that impose time-consuming and inefficiency.

Internet of Things (IoT) is one of the key mediums to solve the said issue. Diverse automatic identification technologies have been more in vogue such as Radio Frequency Identification (RFID). RFID is a wireless technology which uses to a purpose of identifying and tracking an object via radio waves to transfer data from an electronic tag, called RFID tag or label to send data to RFID reader. This IOT based project is for reducing manpower and implementing automation and furthermore being beneficial for the school, colleges, or any workplace.

TABLE OF CONTENTS

List of Figures

List of Tables

Chapter 1
INTRODUCTION

Information Technology (IT) has played a significant role in developing several aspects in academic sectors and domains such as student monitoring and management systems.

Attendance or daily register of understudies has turned into a vital assessment perspective in the current instructive framework in both universities and schools. The conventional attendance monitoring framework has a few impediments with the trend and the technology gap. For instance, passing the everyday attendance sheet to a huge number of students in a class is extremely risky and it hampers the consideration of the students in the class. It is waste of time as well as a student can deliberately enlist counterfeit attendance record in the day-by-day attendance sheet. On the off chance, if the teacher loses these documents, all the significant attendance records are lost without doubt.

Therefore, it is a critical subject to tracking and manages student's attendance in school, college, and university environment. Since it can be helped to urge students to attend on time, amend the efficiency of the learning, increase learning grade, and finally boosting and improving the education level. So, there is a need to manage the student attendance records automatically by using information technology management system in a faculty to assist the maintaining attendance. Biometrics techniques are used to verify identification through their characteristics like face recognition, signatures, fingerprint, voice recognition, irises, barcode, Bluetooth, Near-Field Communication (NFC), RFID and so on.

RFID innovation has a tremendous task to carry out in the completion of the vision of associating objects around us to the internet. These items extend from huge structures, modern plants, planes, vehicles, machineries, any sort of merchandise, and explicit pieces of a bigger framework to people, animals and plants and even explicit body portions of them. The idea driving this is called Internet of Things (IoT).

1.1 RFID Technology: RFID is standard for Radio Frequency Identification which is the very latest concept of Internet of Things (IoT) and it is very similar technology of barcode system but with some higher advanced concept. It works by using transferring and receiving signal using Antenna and Integrated Circuit. It has two parts namely, RFID Tag and RFID Reader.

1.2 RFID Tag: A RFID Tag is an electronic tag that exchanges information with a RFID reader through radio waves. Almost every RFID Tags have two parts namely, Antenna and Integrated Circuit (IC). Antenna used for receives radio frequency waves and IC used for processing and store data**.**

1.3 RFID Reader: RFID reader is a device which used to gather information from RFID tag which used to track individual. RFID uses radio waves to transfer the data from tag to reader

1.4 IOT (Internet of Things): The Internet of things (IoT) describes physical objects (or groups of such objects) with sensors, processing ability, software and other technologies that connect and exchange data with other devices and systems over the Internet or other communications networks. Internet of things has been considered a misnomer because devices do not need to be connected to the public internet, they only need to be connected to a network and be individually addressable.

1.5 Arduino: Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards can read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

Chapter 2
LITERATURE REVIEW

In this project, I did a literature review and took some paper for the reference as follows:

2.1 Attendance and Information System using RFID and Web-Based Application for Academic Sector.

By: Hasanein D. Rjeib. Nabeel Salih Ali, Ali Al Farawn, Basheer Al-Sadawi., Haider Alsharqi.
Journal & Published: Article in International Journal of Advanced Computer Science and Applications & January 2018

Findings: A student attendance and information system are designed and implemented to manage student's data and provide capabilities for tracking student attendance, grading student marks, giving information about timetable, lecture time, room number, and other student-related information. Also, the proposed system provides easiness for the staff where there is no need for extra paper works and additional lockers for saving data.

Research Gap: Much complicated being web-based application. Only students' data is involved, can be used for other staffs and faculties.

2.2 A RFID based (IoT) automatic attendance system: A survey analysis.

By: RKAR. Kariapper1, MS. Suhail Razeeth.
Journal & Published: Southeastern University of Sri Lanka, Oluvil & April 2019.

Findings: Radio Frequency Identification (RFID) is a very advanced technology for automatic attendance system, and it provide very higher accuracy and speed than a traditional paper-based system. And it says that RFID is a best replacement of traditional method without any doubt.

Research Gap: Eventually from this study I got to know that each system we has its own advantages and disadvantages. Some characteristics are good for some system, and some

are not. To overcome this, a hybrid model is necessary, and which merely provide higher efficient system without any disadvantage.

2.3 A New Model of The Student Attendance Monitoring System Using RFID Technology

By: Mutammimul Ula, Angga Pratama, Yuli Asbar, Wahyu Fuadi, Riyadhul Fajri, Richki Hardi.

Journal & Published: Journal of Physics: Conference Series CSINTESA 2019

Findings: With the student attendance system using RFID technology, the management of the inputted data, and the archive of reports that often occur file loss no longer occurs because it has been stored in a database. With the student attendance system using RFID technology.

Research Gap: Beneficial for other staffs also, high maintenance and cost implementation.

2.4 Fully Automated Classroom Attendance System.

By: Eid Al Hajri, Farrukh Hafeez, Ameer Azhar N V.

Journal & Published: International Journal of Interactive Mobile Technologies, & August 2019

Findings: The implemented system offers number of befits over traditional system includes freedom of delivering lecture with full focus without notifying student timing. As it is fully automated, the chance of error in the attendance entry is NIL. Fully Automated Classroom Attendance System metric identification make system invincible.

Research Gap: Biometric identification can be installed; RFID reader range can be increased by replacing high range RFID reader.

2.5 Student Attendance System Using RFID.

By: R. Nivetha, M. Kavipriya, R. Pavithra, C. Jeyanthi, V. Santhana Lakshmi.

Journal & Published: International Journal of Research in Engineering, Science and Management volume 3, Issue-10 & October-2020.

Findings: Attempt has been made to mark the attendance of the students using RFID technology. It monitors the student's attendance thereby the time is saved for teacher. The adaptability of RFID for the student course attendance system in implementing functional and automatic system by simply swiping or moving their ID cards.

Research Gap: Use of Biometrics can improve some aspects, storing data in cloud could be more useful and easier for backing up data, and even data to be send to parents about present and absent of the students.

2.6 PROBLEM STATEMENT

Problem Definition

Passing the everyday attendance sheet to a huge number of students in a class is risky as students can miss their attendance call and it can hamper students' attendance percentage. It is waste of time as well as a student can give a false attendance and cheat on the record in the day-by-day attendance sheet. If the teacher loses these documents, all the significant attendance records are lost without doubt.

2.7 OBJECTIVE

- To provide very higher accuracy and speed than a traditional paper-based system.
- To provide security and easy tracking of data.
- Implement fully automatic process.

Chapter 3
METHODOLOGY

The research methodology used is as follows:

3.1 BLOCK DIAGRAM

A block diagram is used to represent a control system in diagram form. In other words, the practical representation of a control system is its block diagram. Each element of the control system is represented with a block and the block is the symbolic representation of the transfer function of that element.

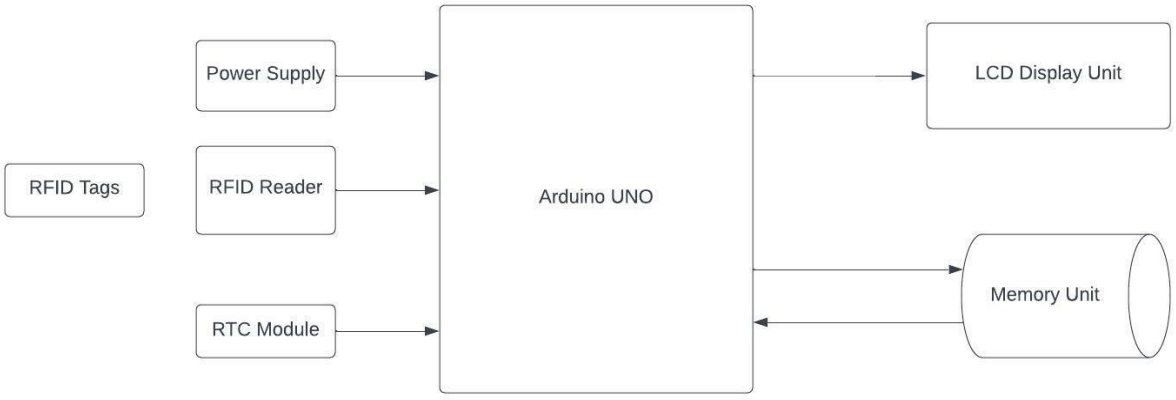


Figure 3.1: Block Diagram of the whole system

This is the block diagram of the project RFID based Attendance System using Arduino, RTC. Here Arduino UNO acts as a central processor for controlling all other components as input/output unit.

The function of each block in the block diagram above is as follows:

- RFID Reader: the input block consists of an RFID reader, the tag data card that the reader detects will be sent to the microcontroller.
- Block microcontroller, data processor and central controller of the system.
- Once it is verified by the microcontroller, data is stored in the memory unit.

3.2 FLOW CHART

A flowchart is a picture of the separate steps of a process in sequential order. It is a generic tool that can be adapted for a wide variety of purposes, and can be used to describe various processes, such as a manufacturing process, an administrative or service process, or a project plan.

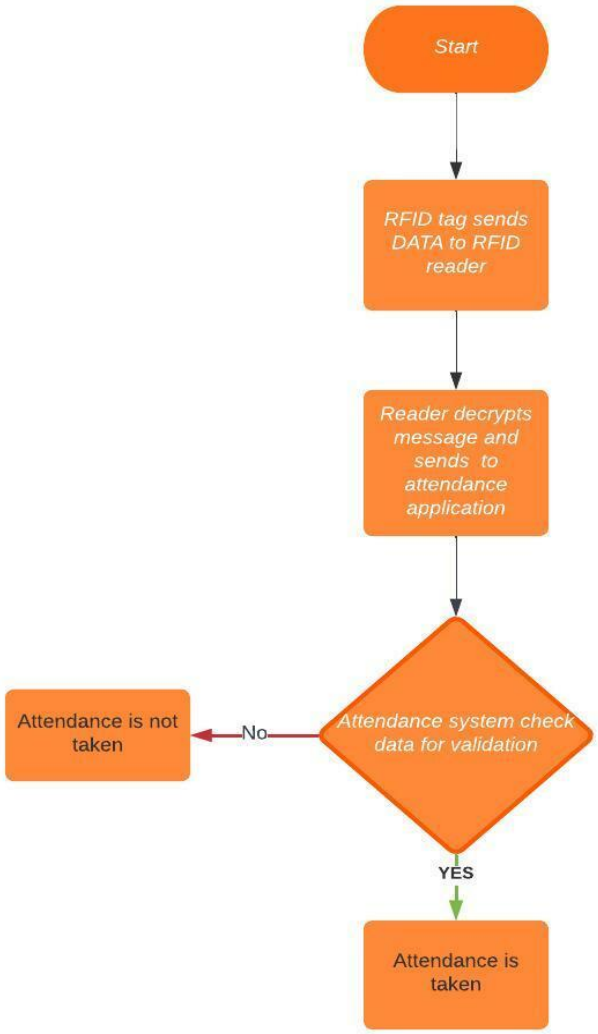


Figure 3.2: Flowchart of the system

Each student is issued an RFID card as their id card and their attendance is marked when they touch their card to RFID reader.

3.3 DATA FLOW DIAGRAM

A data-flow diagram is a way of representing a flow of data through a process or a system (usually an information system). The DFD also provides information about the outputs and inputs of each entity and the process itself. A data-flow diagram has no control flow — there are no decision rules and no loops.

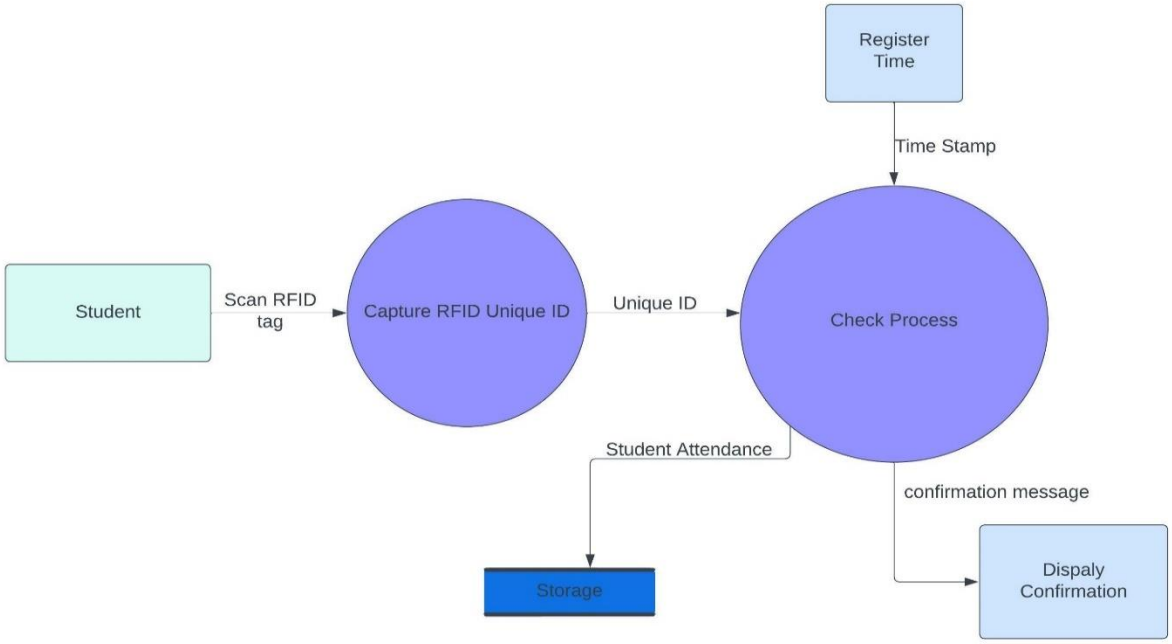


Figure 3.3: Dataflow Diagram of the system

3.4 PIN DIAGRAM

A pin out is a reference to the pins or contacts that connect an electrical device or connector. It describes the functions of transmitted signals and the circuit input/output (I/O) requirements. Each individual pin in a chip, connector or singular wire is defined in text, a table or a diagram.

Pin Out

A pin out is a reference to the pins or contacts that connect an electrical device or connector. It describes the functions of transmitted signals and the circuit input/output (I/O) requirements. Each individual pin in a chip, connector or singular wire is defined in text, a table or a diagram

PIN Out of different modules:

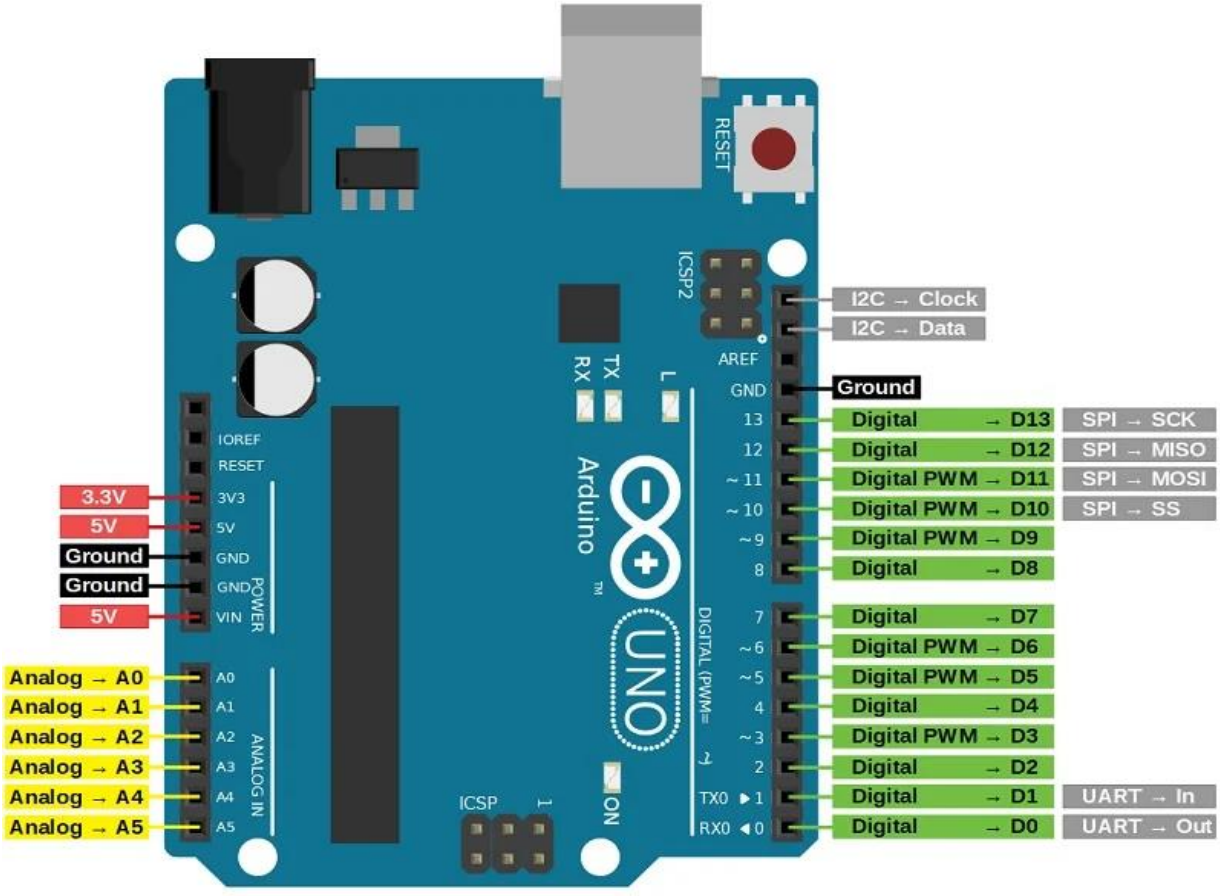


Figure 3.4: Pin Out of Arduino Uno Board

Arduino Uno:

Arduino Uno is based on the ATmega328P by Atmel. The Arduino Uno pin out consists of 14 digital pins, 6 analog inputs, a power jack, USB connection and ICSP header

Arduino Uno pin out – Power Supply

There are three ways to power the Arduino Uno:

Barrel Jack: The Barrel Jack or DC Power Jack can be used to power the Arduino board. The barrel jack is usually connected to a wall adapter. The board can be powered by 5-20 volts, but the manufacturer recommends to keep it between 7-12 volts. Above 12 volts, the regulators might overheat, and below 7 volts, might not suffice.

VIN Pin: This pin is used to power the Arduino Uno board using an external power source. The voltage should be within the range mentioned above.

USB cable: when connected to the computer, provides 5 volts at 500mA.

5v and 3v3: They provide regulated 5 and 3.3v to power external components according to manufacturer specifications.

GND: In the Arduino Uno pin out, you can find 5 GND pins, which are all interconnected. The GND pins are used to close the electrical circuit and provide a common logic reference level throughout your circuit. Always make sure that all GNDs (of the Arduino, peripherals and components) are connected to one another and have a common ground.

RESET: Resets the Arduino.

IOREF: This pin is the input/output reference. It provides the voltage reference with which the microcontroller operates.

Arduino Uno Pin out - Analog IN

The Arduino Uno has 6 analog pins, which utilize ADC (Analog to Digital converter). These pins serve as analogy inputs but can also function as digital inputs or digital outputs.

Arduino Uno Pinout - Digital Pins

Pins 0-13 of the Arduino Uno serve as digital input/output pins.

Pin 13 of the Arduino Uno is connected to the built-in LED.

In the Arduino Uno - pins 3, 5,6,9,10,11 have PWM capability.

Digital: Digital is a way of representing voltage in 1 bit: either 0 or 1. Digital pins on the Arduino are pins designed to be configured as inputs or outputs according to the needs of the user. Digital pins are either on or off. When ON they are in a HIGH voltage state of 5V and when OFF they are in a LOW voltage state of 0V. On the Arduino, when the digital pins are configured as output, they are set to 0 or 5 volts.

When the digital pins are configured as input, the voltage is supplied from an external device. This voltage can vary between 0-5 volts which is converted into digital representation (0 or 1).

When connecting a component to a digital pin, make sure that the logic levels match. If the voltage is in between the thresholds, the returning value will be undefined.

PWM: In general, Pulse Width Modulation (PWM) is a modulation technique used to encode a message into a pulsing signal. A PWM is comprised of two key components: frequency and duty cycle. The PWM frequency dictates how long it takes to complete a single cycle (period) and how quickly the signal fluctuates from high to low. The duty cycle determines how long a signal stays high out of the total period. Duty cycle is represented in percentage.

Communication Protocols: Serial (TTL) - Digital pins 0 and 1 are the serial pins of the Arduino Uno. They are used by the on-board USB module.

Serial Communication: Serial communication is used to exchange data between the Arduino board and another serial device such as computers, displays, sensors and more. Each Arduino board has at least one serial port. Serial communication occurs on digital pins 0 (RX) and 1 (TX) as well as via USB. Arduino supports serial communication through digital pins with the Software Serial Library as well. This allows the user to connect multiple serial-enabled devices and leave the main serial port available for the USB.

Software serial and hardware serial - Most microcontrollers have hardware designed to communicate with other serial devices. Software serial ports use a pin-change interrupt

system to communicate. There is a built-in library for Software Serial communication. Software serial is used by the processor to simulate extra serial ports. The only drawback with software serial is that it requires more processing and cannot support the same high speeds as hardware serial.

SPI - SS/SCK/MISO/MOSI pins are the dedicated pins for SPI communication. They can be found on digital pins 10-13 of the Arduino Uno and on the ICSP headers.

SPI: Serial Peripheral Interface (SPI) is a serial data protocol used by microcontrollers to communicate with one or more external devices in a bus like connection. The SPI can also be used to connect 2 microcontrollers. On the SPI bus, there is always one device that is denoted as a Master device and all the rest as Slaves. In most cases, the microcontroller is the Master device. The SS (Slave Select) pin determines which device the Master is currently communicating with.

SPI enabled devices always have the following pins:

MISO (Master In Slave Out) - A line for sending data to the Master device.

MOSI (Master Out Slave In) - The Master line for sending data to peripheral devices.

SCK (Serial Clock) - A clock signal generated by the Master device to synchronize data transmission.

I2C - SCL/SDA pins are the dedicated pins for I2C communication. On the Arduino Uno they are found on Analog pins A4 and A5.

I2C: is a communication protocol commonly referred to as the "I2C bus". The I2C protocol was designed to enable communication between components on a single circuit board. With I2C there are 2 wires referred to as SCL and SDA.

SCL is the clock line which is designed to synchronize data transfers.

SDA is the line used to transmit data. Each device on the I2C bus has a unique address, up to 255 devices can be connected on the same bus.

Aref - Reference voltage for the analog inputs.

Interrupt - INT0 and INT1. Arduino Uno has two external interrupt pins.

External Interrupt - An external interrupt is a system interrupt that occurs when outside interference is present. Interference can come from the user or other hardware devices in the network. Common uses for these interrupts in Arduino are reading the frequency a square wave generated by encoders or waking up the processor upon an external event.

Arduino has two forms of interrupt:

External, Pin Change: There are two external interrupt pins on the ATmega168/328 called INT0 and INT1. Both INT0 and INT1 are mapped to pins 2 and 3. In contrast, Pin Change interrupts can be activated on any of the pins.

Arduino Uno Pin out - ICSP Header

ICSP stands for In-Circuit Serial Programming. The name originated from In-System Programming headers (ISP). Manufacturers like Atmel who work with Arduino have developed their own in-circuit serial programming headers. These pins enable the user to program the Arduino boards' firmware. There are six ICSP pins available on the Arduino board that can be hooked to a programmer device via a programming cable.

RFID-RC522:

The RC522 is a 13.56MHz RFID module that is based on the MFRC522 controller from NXP semiconductors. The module can support I2C, SPI and UART and normally is shipped with a RFID card and key fob. It is commonly used in attendance systems and other person/object identification applications.

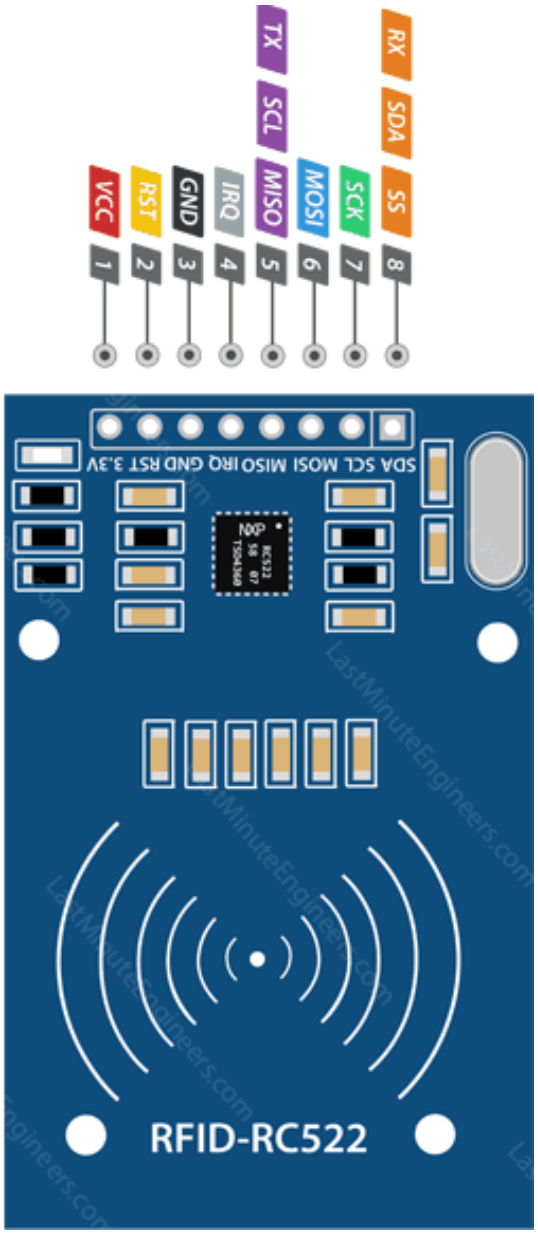


Figure 3.5: Pin Out of RFID-RC522

RC522 Pin Configuration:

Pin Number	Pin Name	Description
1	Vcc	Used to Power the module, typically 3.3V is used
2	RST	Reset pin – used to reset or power down the module
3	Ground	Connected to Ground of system
4	IRQ	Interrupt pin – used to wake up the module when a device comes into range
5	MISO/SCL/TX	MISO pin when used for SPI communication, acts as SCL for I2c and TX for UART.
6	MOSI	Master out slave in pin for SPI communication
7	SCK	Serial Clock pin – used to provide clock source
8	SS/SDA/Rx	Acts as Serial input (SS) for SPI communication, SDA for IIC and Rx during UART

Table 3.5: RFID-RC522 Pin Configuration

Micro SD Card Adapter Module:

SD cards or Micro SD cards are widely used in various applications, such as data logging, data visualization, and many more. Micro SD Card Adapter modules make it easier for us to access these SD cards with ease. The Micro SD Card Adapter module is an easy-to-use module with an SPI interface and an on-board 3.3V voltage regulator to provide proper supply to the SD card.

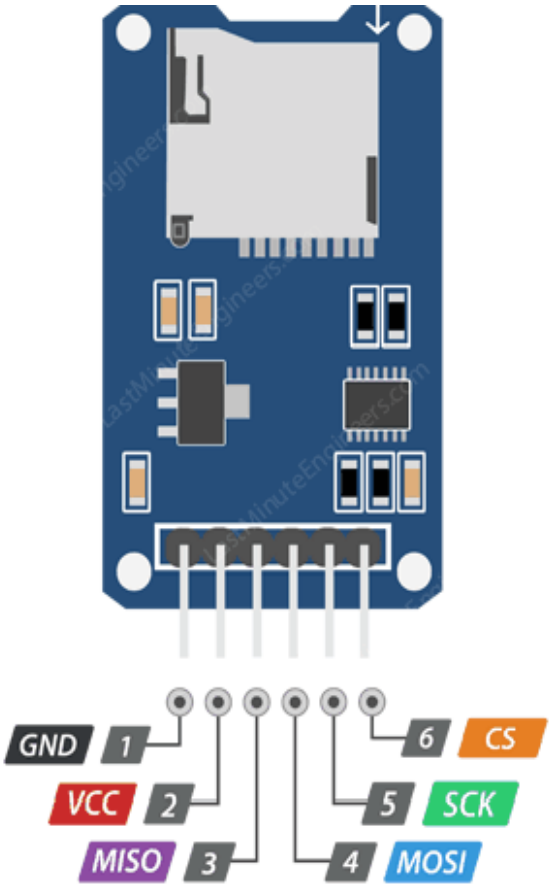


Figure 3.6: Pin Out of SD Card Module

Pin Configuration of Micro SD Card Adapter Module:

The module contains 6 pins for power and communicating with the controller. The table below describes the pin type and role of each pin on the module.

Pin Type	Pin Description
GND	Ground
VCC	Voltage Input
MISO	Master In Slave Out (SPI)
MOSI	Master Out Slave In (SPI)
SCK	Serial Clock (SPI)
CS	Chip Select (SPI)

Table 3.6: SD Card Module Pin Configuration

RTC Module:

RTC means Real Time Clock. RTC modules are simply TIME and DATE remembering systems which have battery setup which in the absence of external power keeps the module running. This keeps the TIME and DATE up to date. So we can have accurate TIME and DATE from RTC module whenever we want.

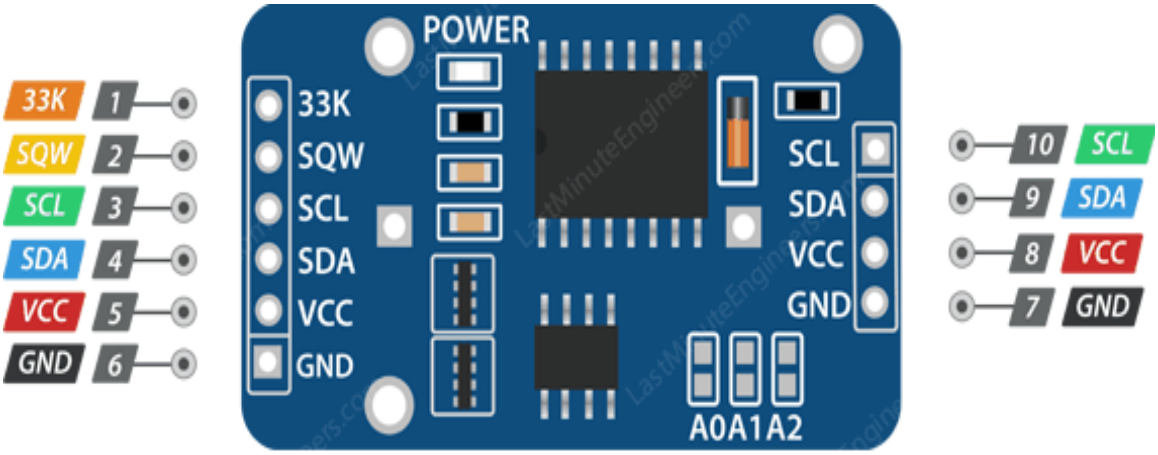


Figure 3.7: Pin Out of DS3231 RTC Module

DS3231 RTC Pin Configuration:

DS3231 is a six-terminal device, out of them two pins are not compulsory to use. So we have mainly four pins. These four pins are given out on other side of module sharing the same name.

Pin Name	Description
VCC	Connected to positive of power source.
GND	Connected to ground.
SDA	Serial Data pin (I2C interface)
SCL	Serial Clock pin (I2C interface)
SQW	Square Wave output pin
32K	32K oscillator output

Table 3.7: DS3231 RTC Pin Configuration

16x2 LCD Module:

16x2 LCD modules are very commonly used in most embedded projects, the reason being its cheap price, availability, programmer friendly and available educational resources.

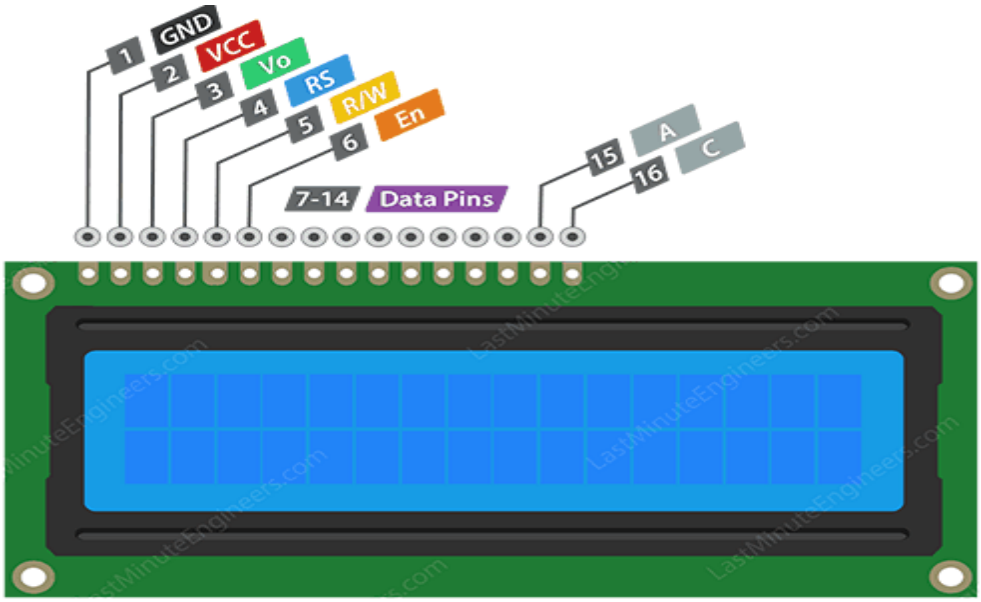


Figure 3.8: Pin Out of 16x2 LCD Display Module

16x2 LCD Pinout Configuration:

Pin No:	Pin Name:	Description
1	Vss (Ground)	Ground pin connected to system ground
2	Vdd (+5 Volt)	Powers the LCD with +5V (4.7V – 5.3V)
3	VE (Contrast V)	Decides the contrast level of display. Grounded to get maximum contrast.
4	Register Select	Connected to Microcontroller to shift between command/data register
5	Read/Write	Used to read or write data. Normally grounded to write data to LCD
6	Enable	Connected to Microcontroller Pin and toggled between 1 and 0 for data acknowledgement
7	Data Pin 0	Data pins 0 to 7 forms a 8-bit data line. They can be connected to Microcontroller to send 8-bit data. These LCD's can also operate on 4-bit mode in such case Data pin 4,5,6 and 7 will be left free.
8	Data Pin 1	
9	Data Pin 2	
10	Data Pin 3	
11	Data Pin 4	
12	Data Pin 5	
13	Data Pin 6	
14	Data Pin 7	
15	LED Positive	Backlight LED pin positive terminal
16	LED Negative	Backlight LED pin negative terminal

Table 3.8: 16x2 LCD Pin Configuration

Pin Connections of the system:

RFID	UNO
SDA	PIN 10
SCK	PIN 13
MOSI	PIN 12
MISO	PIN 11
IRQ	
GND	GND
RST	
3.3V	3.3V

Table 3.9: Pin Connection of RFID & Uno

SD MODULE	UNO
CS	PIN 5
SCK	PIN 13
MOSI	PIN 12
MISO	PIN 11
VCC	5v
GND	GND

Table 3.10: Pin Connection of SD Module and Uno

RTC	UNO
32K	
SQW	
SCL	A5
SDA	A4
VCC	5v
GND	GND

Table 3.11: Pin Connection of RTC & Uno

Chapter 4

SYSTEM OVERVIEW

4.1 COMPONENTS AND SUPPLIES

- Arduino Uno Board
- RFID MFRC522 Module
- SD card module
- RTC module
- RFID Card/Tag
- LCD display
- Breadboard
- Jumper wires
- Potentiometer & Resistor

4.2 Arduino Uno board

Arduino UNO Microcontroller stores the attendance of the student in the microcontroller memory. Main goal of RFID based attendance system is to record the attendance of the student. In this project, Arduino UNO microcontroller is used which is based on 8-bit ATmega328P Microcontroller. It is the main component of project.

Microcontroller does the following functions:

1. Displaying on LCD.

2. Input is read from RFID reader.

3. The data or RFID card ID is compared with the data stored in microcontroller memory.

4. If the tag does not match, the buzzer or the led gives signal.

5. If the tag is available in the memory, in time of the student is stored.

6. The data is sent to the memory unit and the attendance of the student is marked

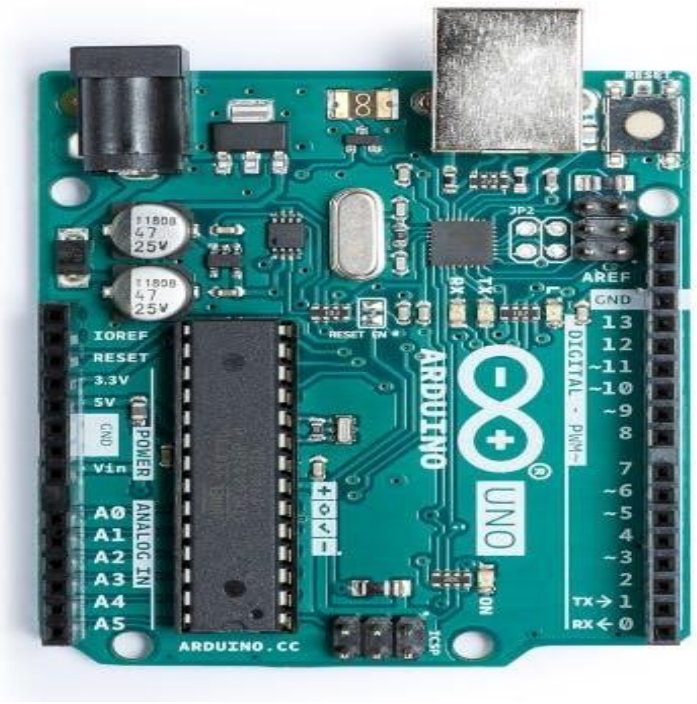


Figure 4.2: Arduino UNO Board

4.3 RFID Reader MFRC522 Module

Full form of RFID is Radio Frequency Identification. RFID tags and RFID reader use wireless communication between them. In this kind of communication RFID Reader does not need any line of sight with the tags. The reader can find the RFID tag even if there is an obstacle between them. RFID Reader is shown in figure

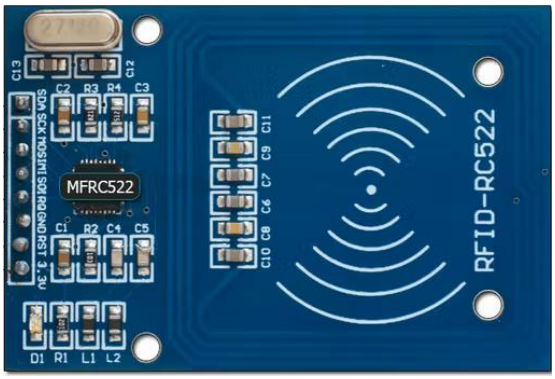


Figure 4.3: RFID MFRC522 Module

4.4 SD Card Module

It is used to transfer data to and from SD card. Used to fulfil the data logging part. Uses SPI communication to transfer data between the microcontroller and SD card.

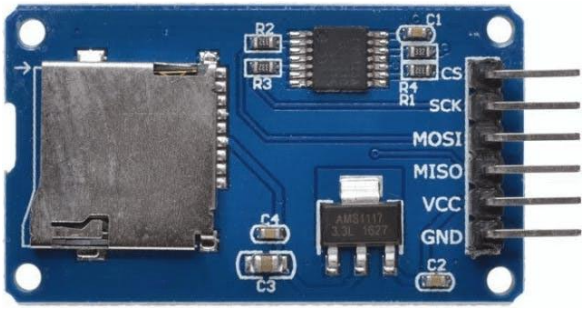


Figure 4.4: SD card module

4.5 RTC Module

RTC stands for Real Time Clock. This is power by a battery. Therefore, even when the whole device is switched off, we can still get the accurate time from the RTC.

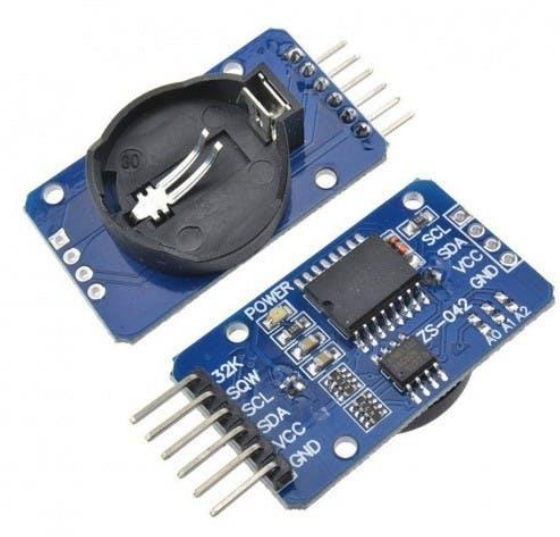


Figure 4.5: RTC Module

4.6 RFID Card & Tag

There are two main kinds of RFID cards, Passive and Active. Passive RFID tags are used in this system.

We can use normal RFID cards which are of the size of credit card. These cards are like credit or debit

cards which are white in color that can be used as ID card also.

Figure 4.6: RFID Tag & Card

4.7 LCD Display

Liquid crystal display is also used to display the Name, Time in and Time out of the authorized students and to display error message for unauthorized access

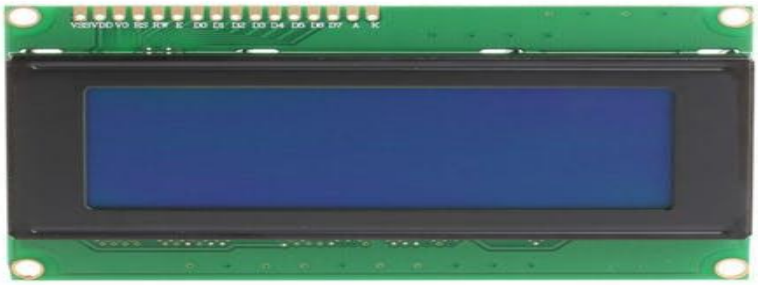


Figure 4.7: LCD Display

4.8 Breadboard

A breadboard is a rectangular plastic board with a bunch of tiny holes in it. Most electronic components in electronic circuits can be interconnected by inserting their leads or terminals into the holes and then making connections through wires where appropriate. The breadboard has strips of metal underneath the board and connects the holes on the top of the board.

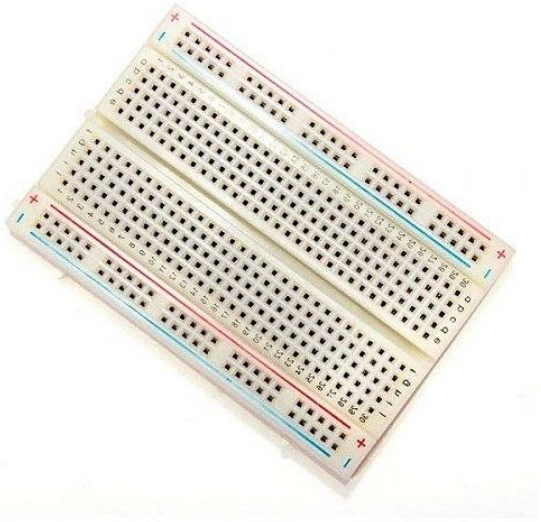


Figure 4.8: Breadboard

4.9 Jumper Wire

Jumper wires are used to connect two points in a circuit. All Electronics stocks jumper wire in a variety of lengths and assortments. Frequently used with breadboards and other prototyping tools to make it easy to change a circuit as needed. Male jumpers are designed to plug securely into the holes in a breadboard. Female jumpers are useful for connecting male header posts and pin terminals on components. Jumpers are available in female-female, male-male and male-female configurations.

Figure 4.9: Jumper Wires

4.10 Potentiometer & Resistor

A potentiometer is a three-terminal resistor with a sliding or rotating contact that forms an adjustable voltage divider. If only two terminals are used, one end and the wiper, it acts as a variable resistor or rheostat.

The resistor is a passive electrical component that creates resistance in the flow of electric current. In almost all electrical networks and electronic circuits they can be found.

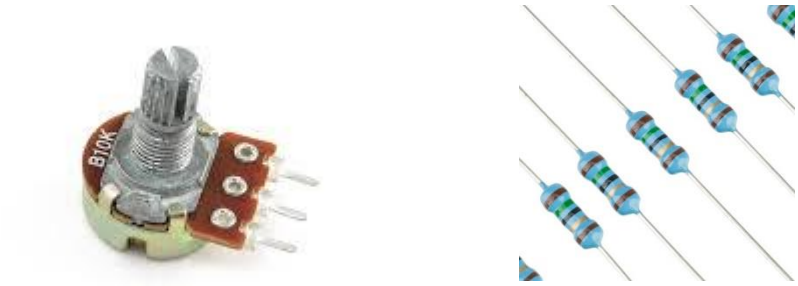


Figure 4.10: Potentiometer & Resistor

4.11 SOFTWARE IMPLEMETATION

4.11.1 Arduino IDE

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software. This software can be used with any Arduino board. The Arduino development environment contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions, and a series of menus. It has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving and exporting and displays errors. The console displays text output by the Arduino environment including complete error messages and other information.

4.11.2 Working of the system

Student Attendance system is used to mark the attendance of students by recording the in time and out time of the students. It is included in colleges, school for students to get their attendance. RFID cards come in the size of credit card which is in white color. A student will be given RFID card and RFID reader will be placed on the door or the entry gate of school or college. Whenever students want to enter in the school/college, he/she must show the RFID card to the reader, student has to take the RFID card near to the RFID reader. RFID Reader will mark the attendance by fetching the RFID card number and swiped in time.

Chapter 5

OUTCOME/RESULT

The attendance of the students is stored in the memory unit i.e., SD Card. Attendance is stored in numerical format with different unique ID. Date & Time along with RFID unique ID is stored.

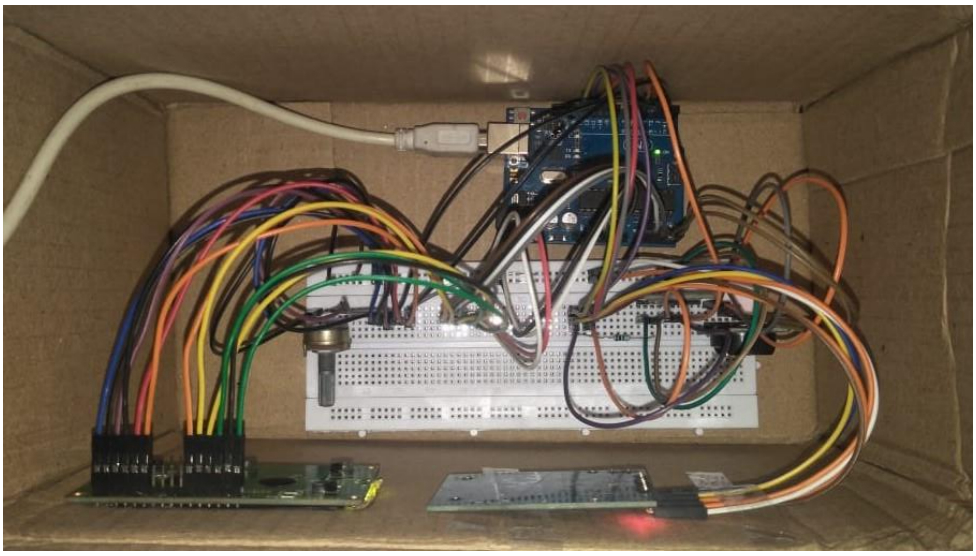


Figure 5.1: Result 1

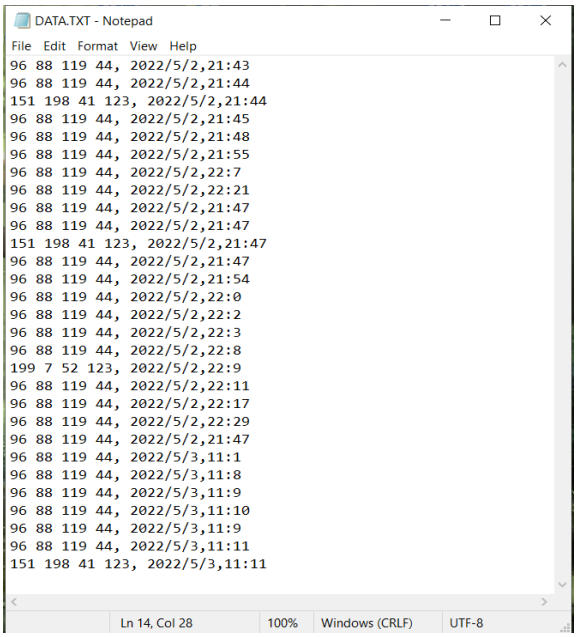


Figure 5.2: Result 2

GANTT CHART

TASK	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL
Planning					
Research					
Design					
Implementation					
Follow up / Documentation					

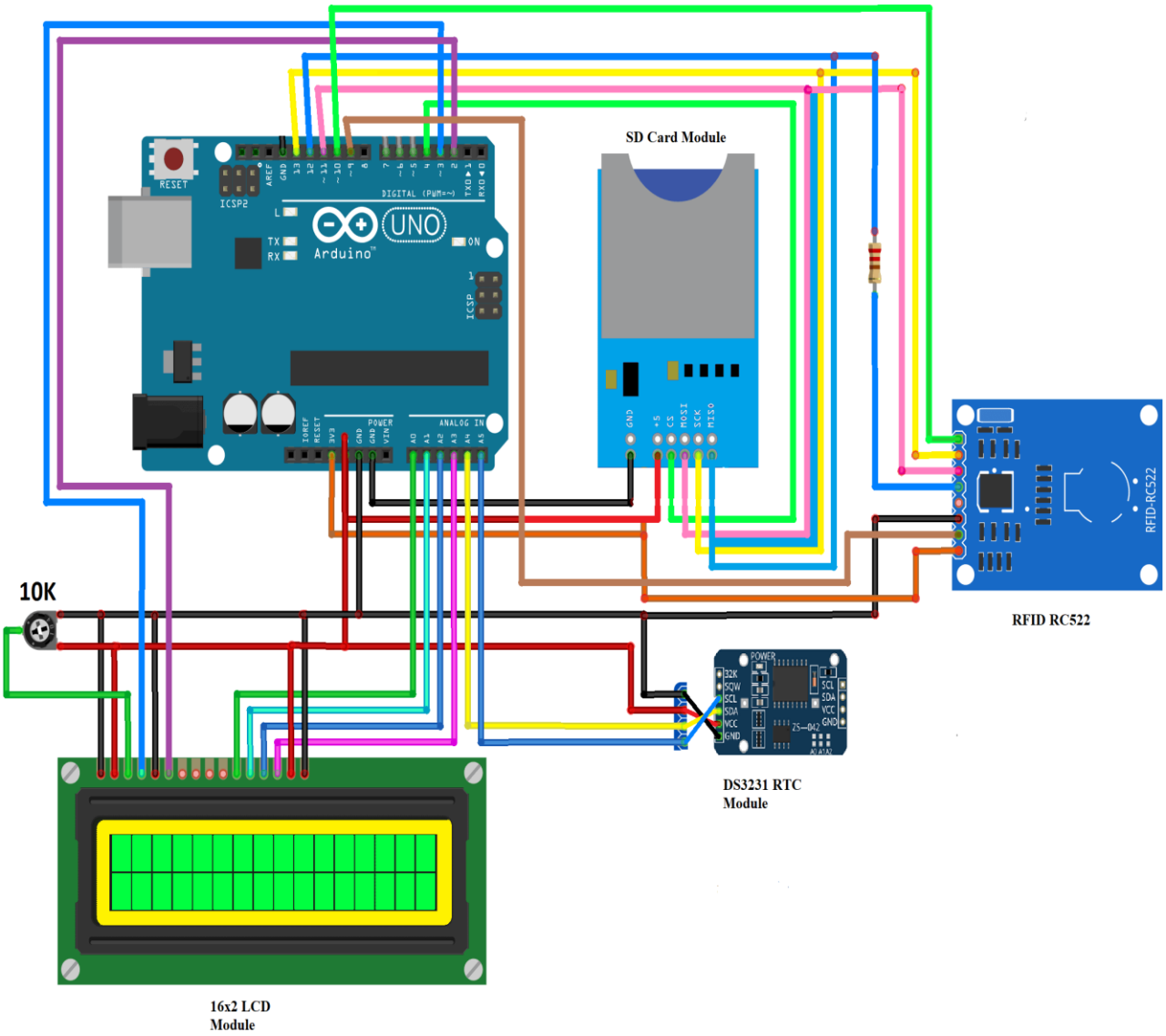
Chapter 6
CONCLUSION AND OVERVIEW

In this project attempt has been made to mark the attendance of the students using RFID technology. It has been up to mark, the use of RFID is a success, it is storing up data much faster than traditional method and with much higher accuracy. Just swiping the RFID tags attendance is being stored and time saving for the student and the teacher.

It is obvious that the use of biometrics could improve some aspects of using this kind of system. High security level can be increased, much wider range of RFID can be set to capture the data over from distance. This system can be further improved by storing the attendance in the cloud or in much bigger database, even data can be sent to the parents about the presence and absence of the student, cards can be misused by the student's, proxy attendance can be given, where fingerprint can be a essential as well as implementing NFC Near field communication and improve and be much more secure to use.

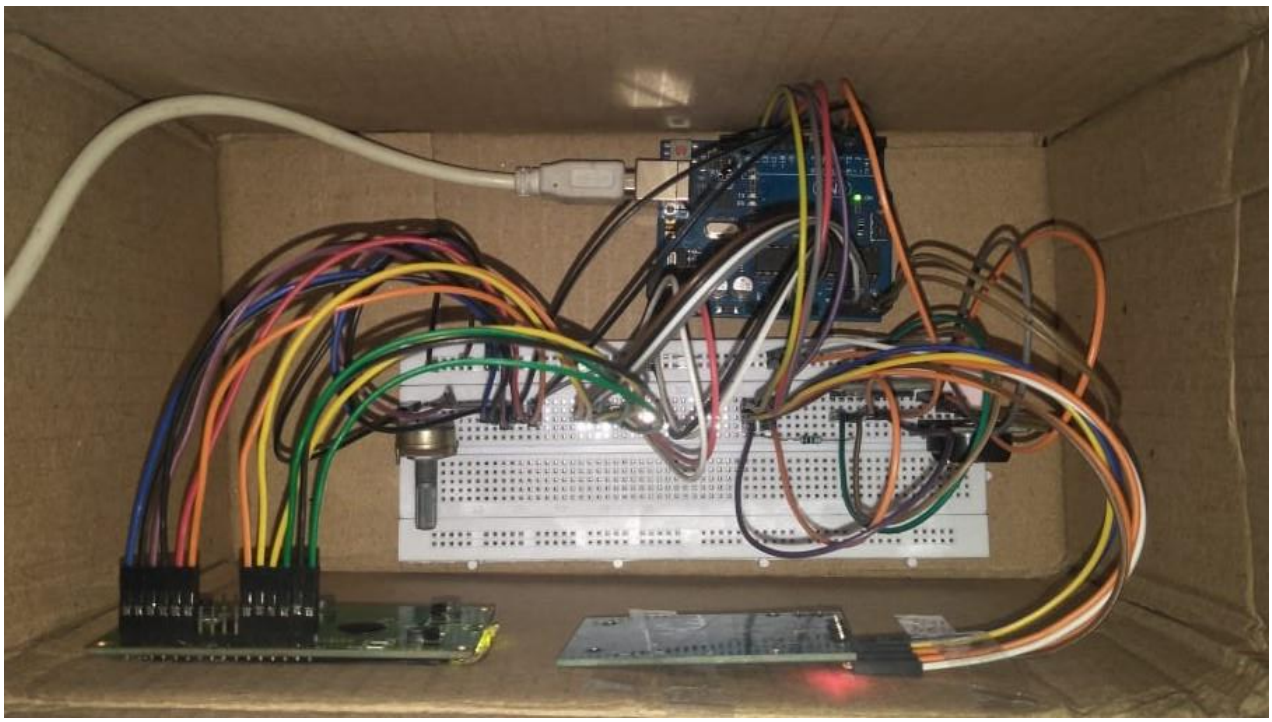
Appendix:

Connecting Diagram of the system:

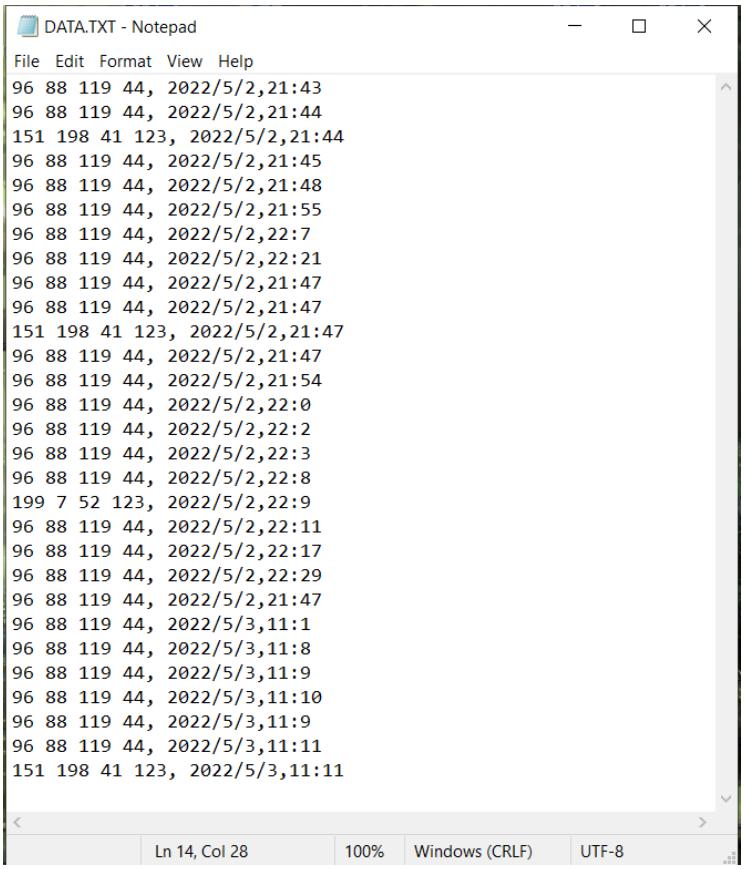


Working of the system

Student Attendance system is used to mark the attendance of students by recording the in time and out time of the students. It is included in colleges, school for students to get their attendance. RFID cards come in the size of credit card which is in white color. A student will be given RFID card and RFID reader will be placed on the door or the entry gate of school or college. Whenever students want to enter in the school/college, he/she must show the RFID card to the reader, student has to take the RFID card near to the RFID reader. RFID Reader will mark the attendance by fetching the RFID card number and swiped in time.



Output:


DATA.TXT - Notepad
File Edit Format View Help
96 88 119 44, 2022/5/2,21:43
96 88 119 44, 2022/5/2,21:44
151 198 41 123, 2022/5/2,21:44
96 88 119 44, 2022/5/2,21:45
96 88 119 44, 2022/5/2,21:48
96 88 119 44, 2022/5/2,21:55
96 88 119 44, 2022/5/2,22:7
96 88 119 44, 2022/5/2,22:21
96 88 119 44, 2022/5/2,21:47
96 88 119 44, 2022/5/2,21:47
151 198 41 123, 2022/5/2,21:47
96 88 119 44, 2022/5/2,21:47
96 88 119 44, 2022/5/2,21:54
96 88 119 44, 2022/5/2,22:0
96 88 119 44, 2022/5/2,22:2
96 88 119 44, 2022/5/2,22:3
96 88 119 44, 2022/5/2,22:8
199 7 52 123, 2022/5/2,22:9
96 88 119 44, 2022/5/2,22:11
96 88 119 44, 2022/5/2,22:17
96 88 119 44, 2022/5/2,22:29
96 88 119 44, 2022/5/2,21:47
96 88 119 44, 2022/5/3,11:1
96 88 119 44, 2022/5/3,11:8
96 88 119 44, 2022/5/3,11:9
96 88 119 44, 2022/5/3,11:10
96 88 119 44, 2022/5/3,11:9
96 88 119 44, 2022/5/3,11:11
151 198 41 123, 2022/5/3,11:11
Ln 14, Col 28
100%
Windows (CRLF)
UTF-8

REFERENCES:

[1] Ula, Mutammimul, et al. "A New Model of The Student Attendance Monitoring System Using RFID Technology." Journal of Physics: Conference Series. Vol. 1807. No. 1. IOP Publishing, 2021.

[2] Nivetha, R., et al. "Student Attendance System Using RFID." International Journal of Research in Engineering, Science and Management 3.10 (2020): 16-19.

[3] Al Hajri, Eid, Farrukh Hafeez, and Ameer Azhar NV. "Fully Automated Classroom Attendance System." Int. J. Interact. Mob. Technol. 13.8 (2019): 95-106.

[4] Kariapper, R. K. A. R., and Suhail Razeeth. "RFID Based (IoT) Automatic Attendance System: A Survey Analysis." Available at SSRN 3372734 (2019).

[5] Rjeib, Hasanein D., et al. "Attendance and information system using RFID and web-based application for academic sector." International Journal of Advanced Computer Science and Applications 9.1 (2018).