

Project Report

on

“Smart Student recognition System.”



In the partial fulfilment of the requirement of project report for Semester IV of Second Year of B-Tech in Computer science and Engineering Department proposed by Kolhapur Institute of Technology , Kolhapur.

Submitted By

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ENGINEERING, KOLHAPUR.**

CERTIFICATE

This is to certify that,

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Students of Second year Computer science and Engineering, Kolhapur
Institute of Technology Kolhapur have satisfactory completed the project
work entitled

“Smart Student recognition System.”

Towards the partial filament of B-Tech in Computer science and
Engineering, in Academics2022-2023 .This report represents the benefited
work done by students

Place:

Date: \ \ 2022

Guide	H.O.D.	Principal
(Dr. Ajit Patil)	(Prof. S. A. Nadgeri)	(Dr. D.M. Garage)
Internal Examiner	Head of Department	External Examiner

ABSTRACT

The main aim and motivation of this project is through this system we can try to stop the any dangerous incidents in school or collages as possible as. we have chosen project topic as smart student recognition system

In this report, first is brief introduction about our project. It includes the actual concept information and it's working.

In that includes Existing system problems, Requirement Specification, Hardware Requirements, Software Requirements and control flow diagram of our system.

At the end of the report, there is a reference for the project.

Because of this Project, we have got valuable knowledge of IOT Technology as well know about how it can be implemented in real time application.

INTRODUCTION

As we know many kidnapping cases are coming to our faces,also in collages there need of taking care of security measures.so we are trying to build this system.

- ❖ In this system we can check data of all student before entering class by using them
- ❖ RFID(Radio Frequency identification) tag by using RFID Module, if anyone student's not get authenticate then inform to their class teacher to take further action.
- ❖ In colleges and school big crowd arises so there is more possibility that some unknown persons get inside so by this system all data can be stored automatically.

In addition, by using this system we can get appropriate attendance of every student there is no any possibility of doing any wrong thing like proxy.

EXISTING SYSTEM PROBLEMS :

- ❖ During installation of that hardware may be some issue occur, like selecting proper device configuration.
- ❖ Sometimes display will not work properly.
- ❖ It is time consuming.
- ❖ Maintenance of database.
- ❖ When all places especially colleges and school there is many crowd so maintaining so student entry and taking care about time is a big task.

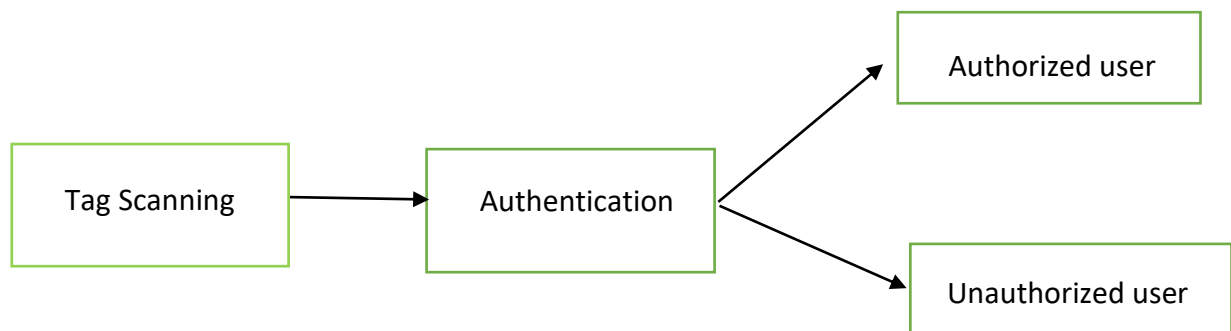
REQUIREMENT SPECIFICATION:

This System has following modules:

- 1.Authentication
- 2.Arduino
3. Radio Frequency identification(RFID) module
- 4.LCD display
- 5.Database
6. Attendance Management
- 7.LED
- 8.Buzzer

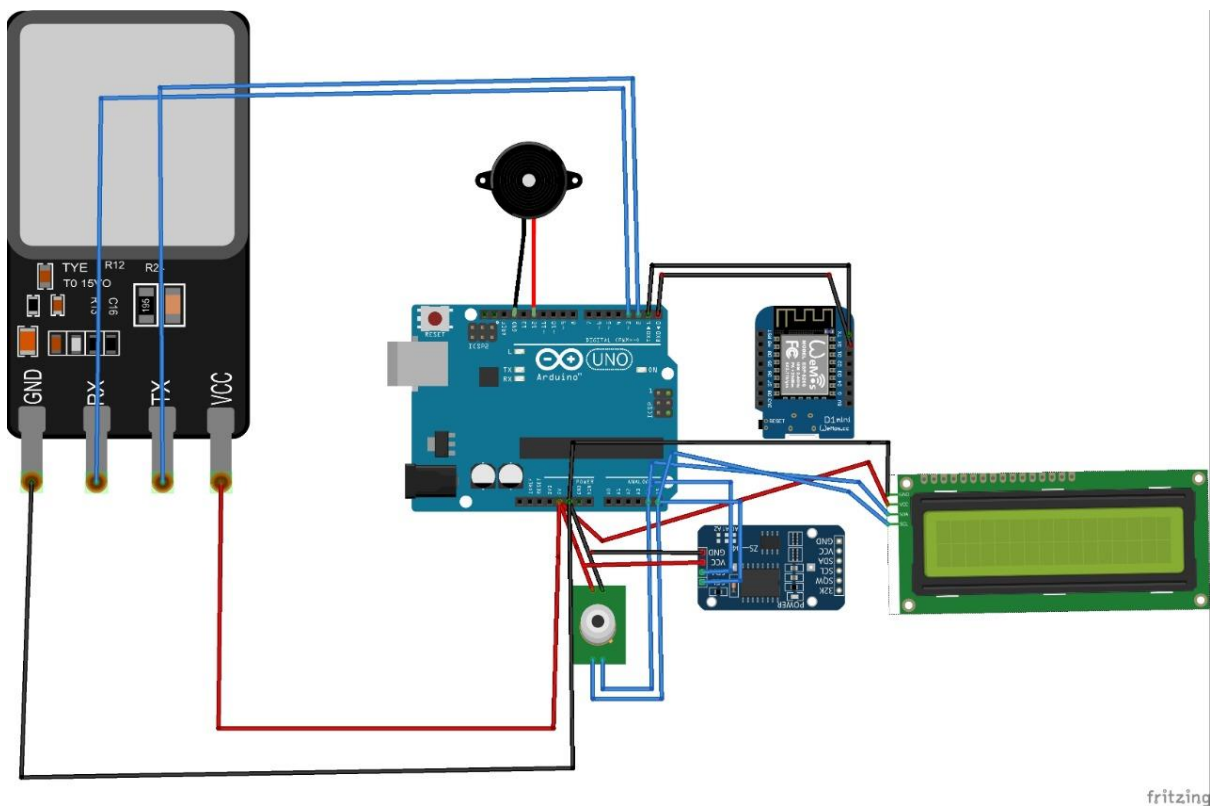
❖ Authentication :

For authentication process , in our project case we are using RFID tag as ID card and RFID module . we are using RC522 RFID module , it is designed to create a 13.56 mHz electromagnetic field that is used to communicate with RFID tag . Everyone have it's own tag which has it's own value which help in authentication .



❖ Arduino :

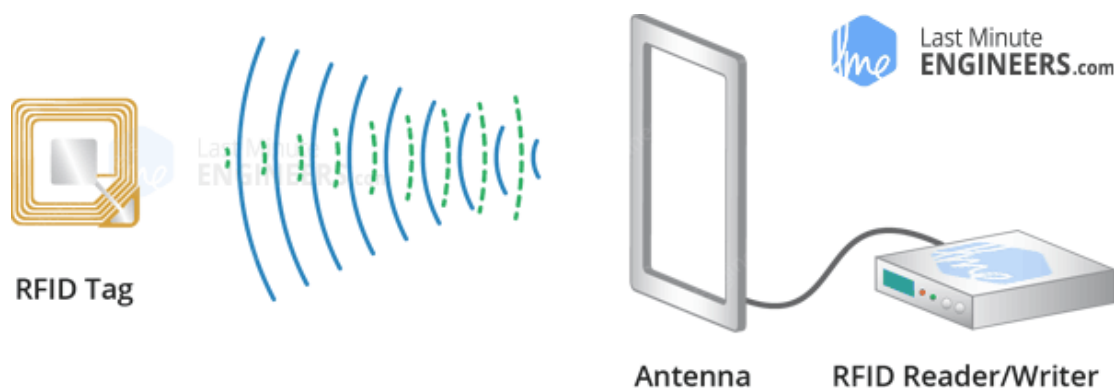
Arduino uno is a low cost , flexible and easy to use programmable open- source microcontroller board that is integrated into variety of electronic projects. Arduino is core module of our system in which all devices and code is integrated.It is contain microcontroller which is responsible for storing a code.



❖ Radio Frequency identification(RFID) module :

RFID system consists of two main components, a transponder/tag attached to an object to be identified, and a Transceiver also known as interrogator/Reader.

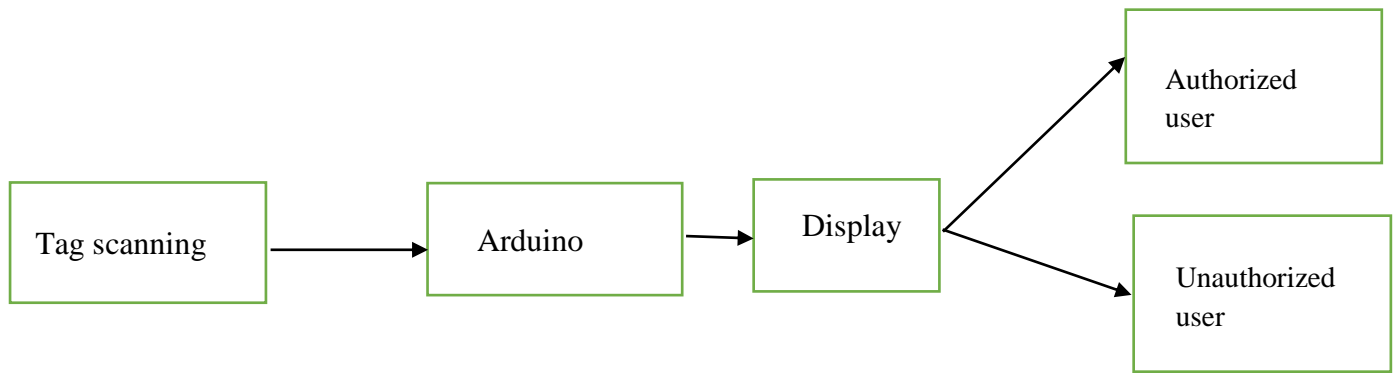
A Reader consists of a Radio Frequency module and an antenna which generates high frequency electromagnetic field. On the other hand, the tag is usually a passive device, meaning it doesn't contain a battery. Instead it contains a microchip that stores and processes information, and an antenna to receive and transmit a signal.



❖ LCD display :

This is I2C interface 16x2 LCD display module, a high-quality 2 line 16 character LCD module with on-board contrast control adjustment, backlight and I2C communication interface.

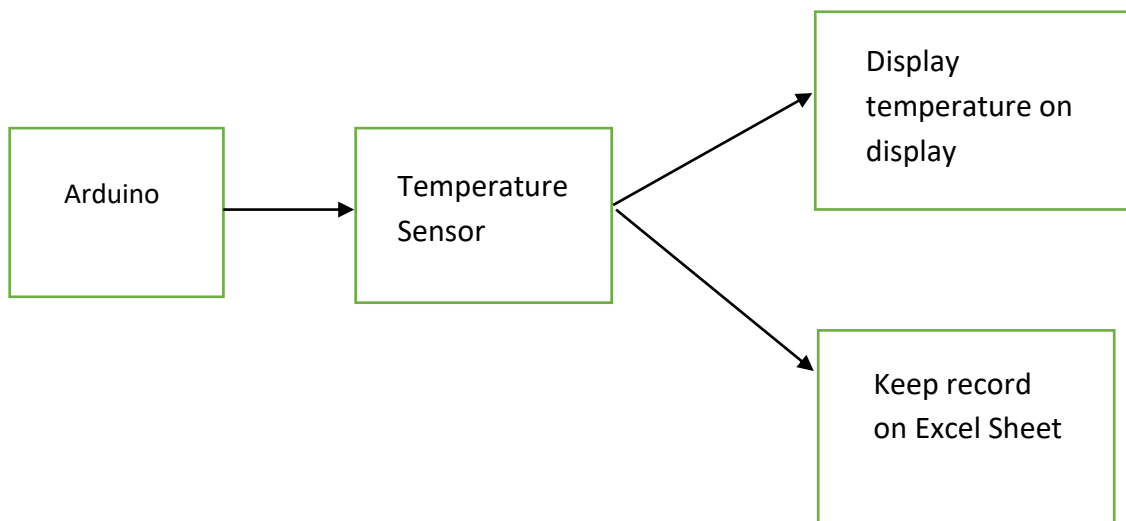
In our project we use display for displaying **authorized**
,unauthorized name roll_no.



❖ Temperature Sensor :

Temperature Sensor is capable of measuring the temperature of a particular object or surface without getting into contact with it.

In our project we measure temperature of student by temperature sensor without contact so it's safe in this COVID -19 pandemic .

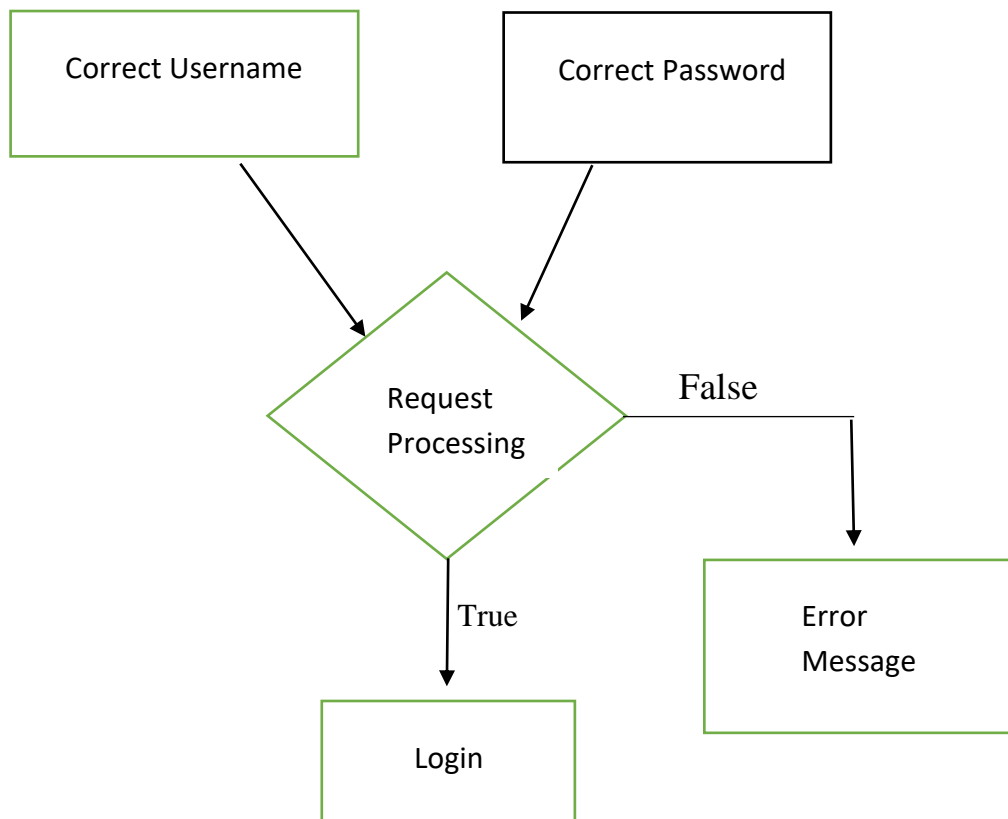


❖ Database :

Database is used to store the data . In our project we use database to store authorized user (Student) name , High temperature student list and for Attendance management.

❖ Admin : Login :

By using admin module we get login with correct username and password into system. We use for blynk app for this .



❖ Attendance Management :

In our project we produce accurate attendance because before entering classroom every student pass through our system by it's RFID tag . It would be managed regular student attendance accurately and automatically . The data through Arduino directly send this data to app which contains user authentication and their temperature which recorded in our app database and maintain attendance.

HARDWARE REQUIREMENTS:

1.Arduino uno :



Arduino UNO is a low-cost, flexible, and easy-to-use programmable open-source microcontroller board that can be integrated into a variety of electronic projects. This board can be interfaced with other Arduino boards, Arduino shields, Raspberry Pi boards and can control relays, LEDs, servos, and motors as an output.

Specifications

- Microcontroller : ATmega328p
- Operating Voltage : 5v
- Length : 68.6mm
- Width : 53.4mm
- Weight : 25g
- Price : 1200/-

2.LCD Display 16*2 :



16x2 LCD display is an alphanumeric display. It is based on the HD44780 display controller, and ready to interface with most microcontrollers.

It works on 5V and has a Green Backlight which can be switched on and off as desired. The contrast of the screen can also be controlled by varying the voltage at the contrast control pin(Pin 3).

Specifications

- 16 Characters x 2 Lines
- 5 x 7 Dots with Cursor
- Built in Controller
- +5v Power Supply (Also Available for +3V)
- 1/16 Duty Circle
- Price:236/-

3. RFID 522:



This RC522 RFID Card Reader Module 13.56MHz is a low-cost MFRC522 based RFID Reader Module is easy to use and can be used in a wide range of applications.

The MFRC522 is a highly integrated reader/writer IC for contactless communication at 13.56 MHz

Specifications

- Integrated MF RC522
- 13.56MHz contactless communication card chip.
- The low-voltage, low-cost, small size of the non-contact card chip to read and write.
- Working current : 13 – 26mA / DC 3.3V
- Standby current : 10 – 13mA / DC 3.3V
- Sleep current : <80uA
- Peak current : <30mA
- Working frequency : 13.56MHz
- Card reading distance : 0~60mm (Mifare1 card)
- **Price:119/-**

4.SMPS 12 Power Supply:



12V 5A SMPS - 60W - DC Metal Power Supply - Good Quality - Non-Water Proof

Specifications:

- Input Voltage: AC 100 - 264V 50 / 60Hz
- Output Voltage: 12V DC, 5A, and 60W
- Output voltage: Adjustment Range: $\pm 20\%$
- Protections: Overload / Over Voltage / Short Circuit
- Auto-Recovery After Protection
- Universal AC input / Full range
- 100% Full Load Burn-in Test
- Cooling by Free Air Convection
- High Quality and High Performance
- LED power supply with a metal body for hidden installation for LED lighting.
- Design with Built-in EMI Filter, improve signal precision.
- Certifications: CE & RoHS
- **Price: 375/-**

5.Nodemcu:



Specification of Node-MCU IoT Module: -

- It is based on ESP8266, integrates GPIO, PWM, IIC, 1-Wire and ADC all in board.
- Power your development in the fastest way comminating with NodeMCU Firmware!
- USB-TTL included, plug play
- 10 GPIO, every GPIO can be PWM, I2C, 1-wire
- **Price:218/-**

Features of Node-MCU IoT Module: -

- Open source IoT Platform
- Easily Programmable
- Low cost & Simple to Implement
- WI-FI enabled

6. Buckconverter :



LM2596 DC-DC Buck Converter Adjustable Step-Down Power Supply Module

Specifications

- Input Voltage - 3.2V - 40V DC
- Output Voltage - 1.25V - 35V DC
- Size - 43mm x 20mm x 15mm
- Output Current - 2A, Max 3A (Additional Heat Sink is required) • **Price-49/-**

7.buzzer :

A buzzer or beeper is an audio signaling device which may be mechanical, electromagnetic or piezoelectric. Typical uses of buzzer and beeper include alarm devices, timers and confirmation of user input such as mouse click or keystroke.



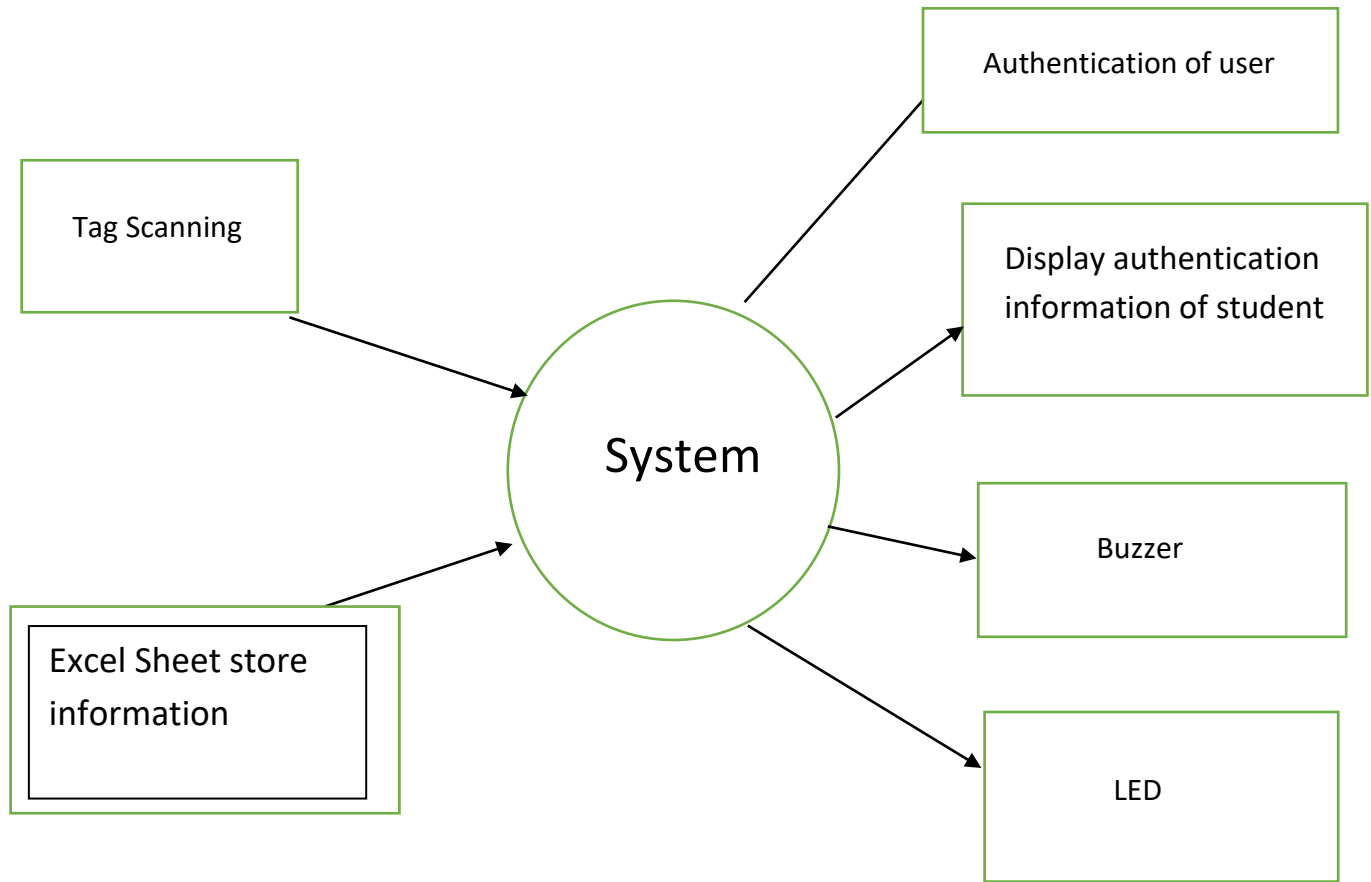
Specifications

- Color is black
- The frequency rang is 3,300Hz
- The sound pressure level is 85 dBA or 10 cm.
- **Price : 40/-**

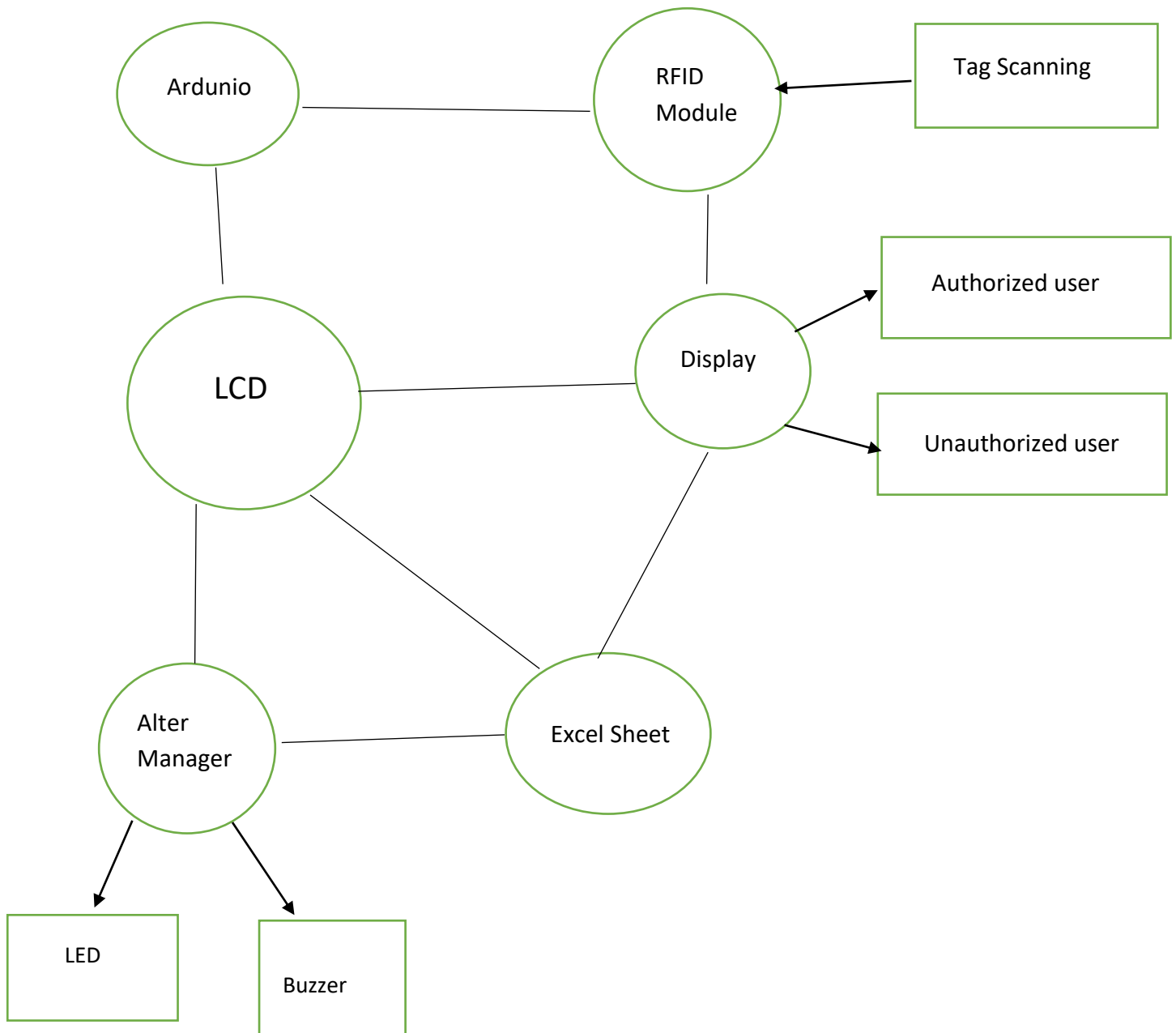
SOFTWARE REQUIREMENTS:

1. **Operating System** : Microsoft Windows 7 / 8 / 10 / 11.
2. **Programming Language** : Arduino Programming
3. **IDE** : Arduino Software .

0 level DFD :



1 LEVEL DFD :



SYSTEM CONNECTIONS :

Arduino UNO Components :

The Arduino UNO board contains the following components and specifications:

ATmega328: This is the brain of the board in which the program is stored.

Ground Pin: there are several ground pins incorporated on the board.

PWM: the board contains 6 PWM pins. PWM stands for Pulse Width Modulation, using this process we can control the speed of the servo motor, DC motor, and brightness of the LED.

Digital I/O Pins: there are 14 digital (0-13) I/O pins available on the board that can be connected with external electronic components.

Analogue Pins: there are 6 analogue pins integrated on the board. These pins can read the analogue sensor and can convert it into a digital signal.

AREF: It is an Analog Reference Pin used to set an external reference voltage.



Reset Button: This button will reset the code loaded into the board. This button is useful when the board hangs up, pressing this button will take the entire board into an initial state.

USB Interface: This interface is used to connect the board with the computer and to upload the Arduino sketches (Arduino Program is called a Sketch)

DC Power Jack: This is used to power up the board with a power supply.

Power LED: This is a power LED that lights up when the board is connected with the power source.

Micro SD Card: The UNO board supports a micro SD card that allows the board to store more information.

3.3V: This pin is used to supply 3.3V power to your projects.

5V: This pin is used to supply 5V power to your projects.

VIN: It is the input voltage applied to the UNO board.

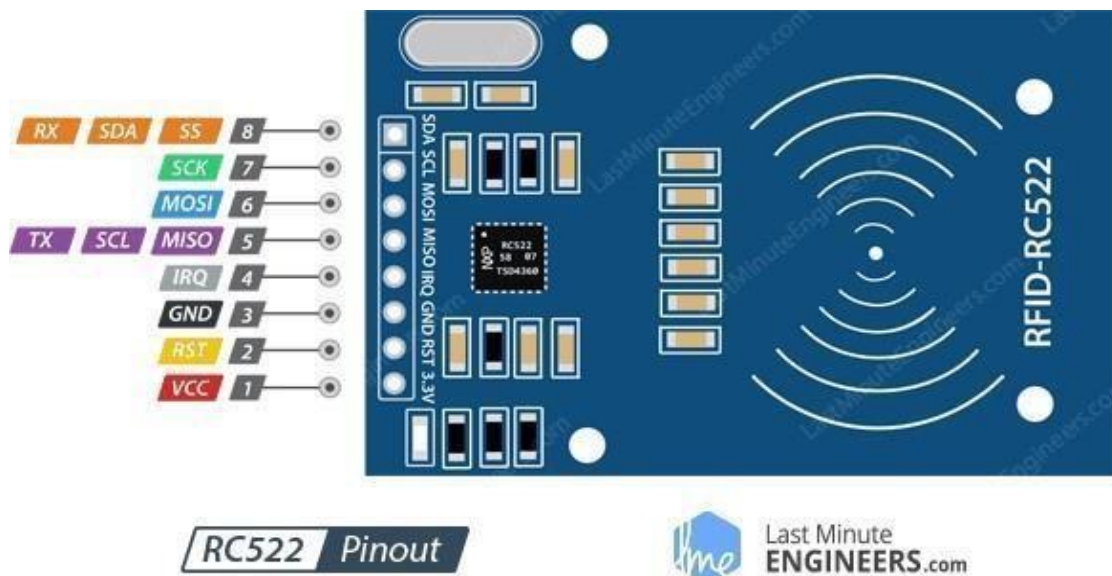
Voltage Regulator: The voltage regulator controls the voltage that goes into the board.

SPI: The SPI stands for Serial Peripheral Interface. Four Pins 10(SS), 11(MOSI), 12(MISO), 13(SCK) are used for this communication.

TX/RX: Pins TX and RX are used for serial communication. The TX is a transmit pin used to transmit the serial data while RX is a receive pin used to receive serial data.

❖ *RC522 RFID Module Pinout :*

The RC522 module has total 8 pins that interface it to the outside world. The connections are as follows:



VCC supplies power for the module. This can be anywhere from 2.5 to 3.3 volts. You can connect it to 3.3V output from your Arduino. Remember connecting it to 5V pin will likely destroy your module!

RST is an input for Reset and power-down. When this pin goes low, hard power down is enabled. This turns off all internal current sinks including the

oscillator and the input pins are disconnected from the outside world. On the rising edge, the module is reset.

GND is the Ground Pin and needs to be connected to GND pin on the Arduino. IRQ is an interrupt pin that can alert the microcontroller when RFID tag comes into its vicinity.

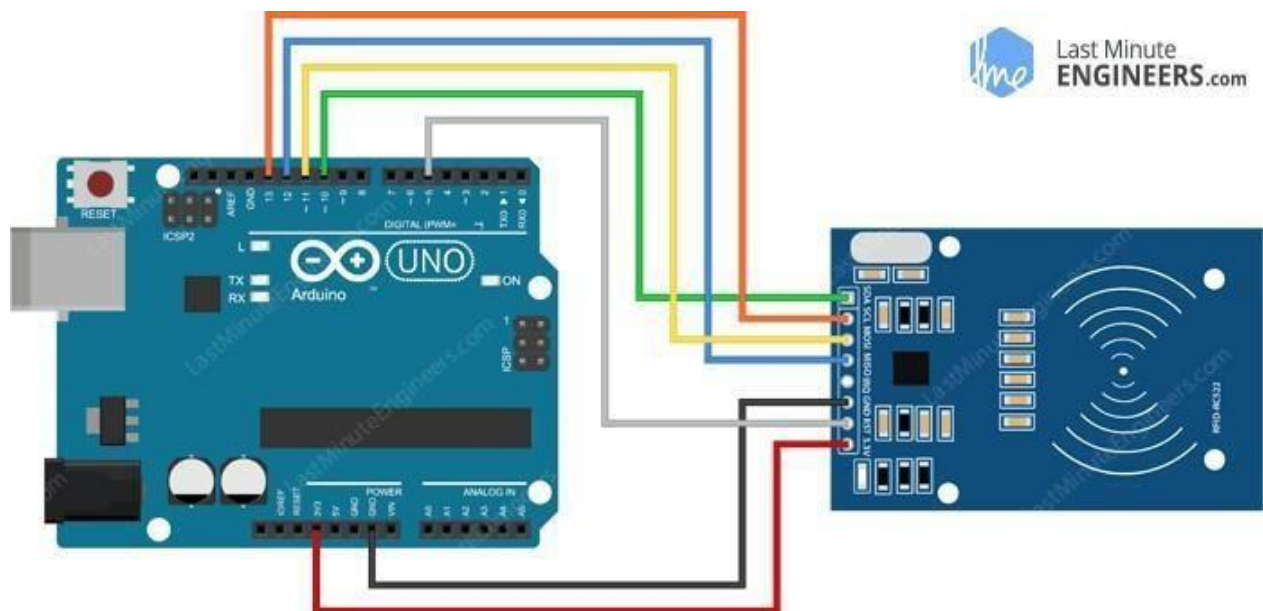
MISO / SCL / Tx pin acts as Master-In-Slave-Out when SPI interface is enabled, acts as serial clock when I2C interface is enabled and acts as serial data output when UART interface is enabled.

MOSI (Master Out Slave In) is SPI input to the RC522 module.

SCK (Serial Clock) accepts clock pulses provided by the SPI bus Master i.e. Arduino.

SS / SDA / Rx pin acts as Signal input when SPI interface is enabled, acts as serial data when I2C interface is enabled and acts as serial data input when UART interface is enabled. This pin is usually marked by encasing the pin in a square so it can be used as a reference for identifying the other pins.

❖ Wiring – Connecting RC522 RFID module to Arduino UNO



To start with, connect VCC pin on the module to 3.3V on the Arduino and GND pin to ground. The pin RST can be connected to any digital pin on the Arduino. In our case, it's connected to digital pin#5. The IRQ pin is left unconnected as the Arduino library we are going to use doesn't support it.

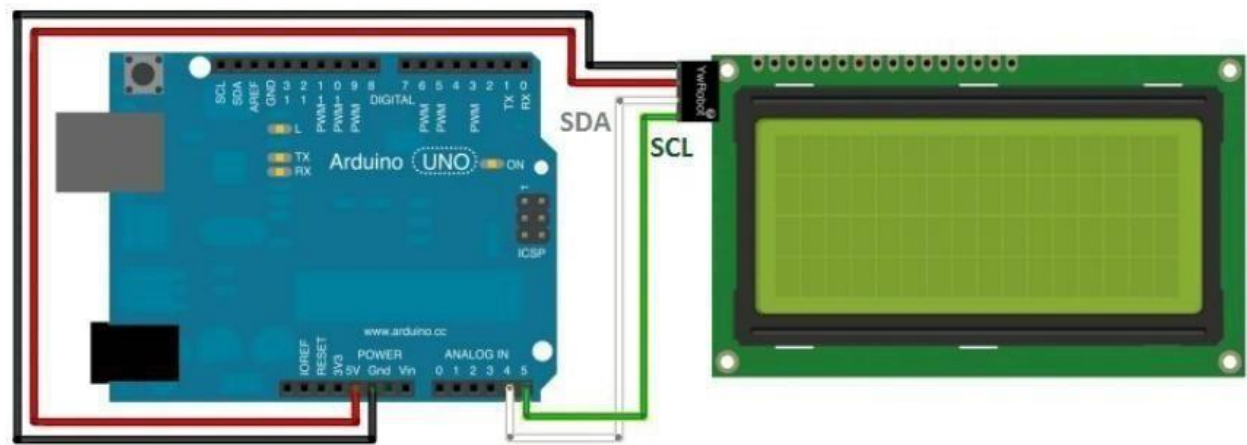
Now we are remaining with the pins that are used for SPI communication. As RC522 module require a lot of data transfer, they will give the best performance when connected up to the hardware SPI pins on a microcontroller. The hardware SPI pins are much faster than „bit-banging“ the interface code using another set of pins.

❖ Connecting I2C LCD Display module to Arduino UNO.

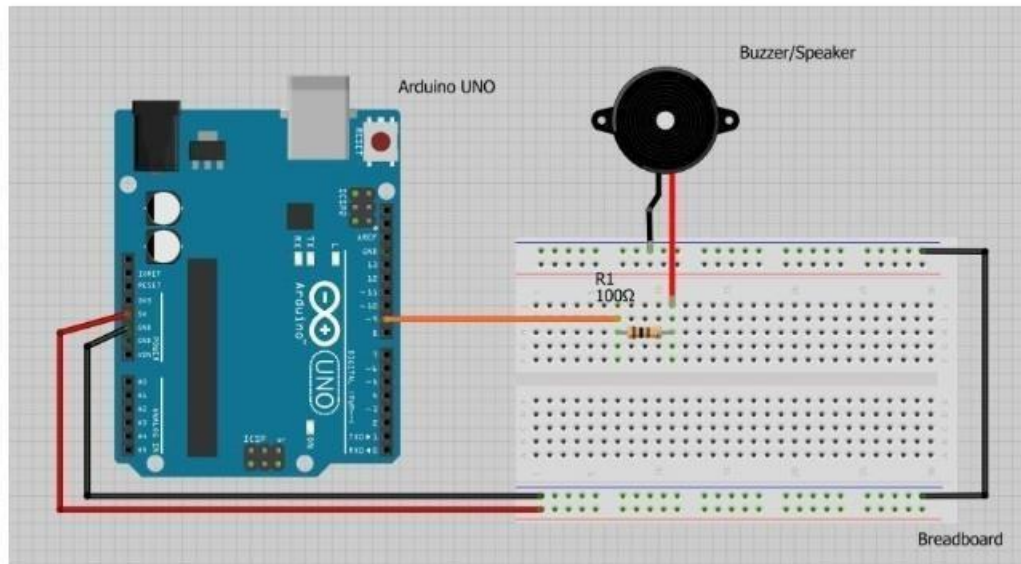
At first you need to solder the I2C-to-LCD piggy-back board to the 16-pins LCD module. Ensure that the I2C-to-LCD piggy-back board pins are straight and fit in the LCD module, then solder in the first pin while keeping the I2C-toLCD piggyback board in the same plane with the LCD module. Once you have finished the soldering work, get four jumper wires and connect the LCD module to your Arduino as per the instruction given below.



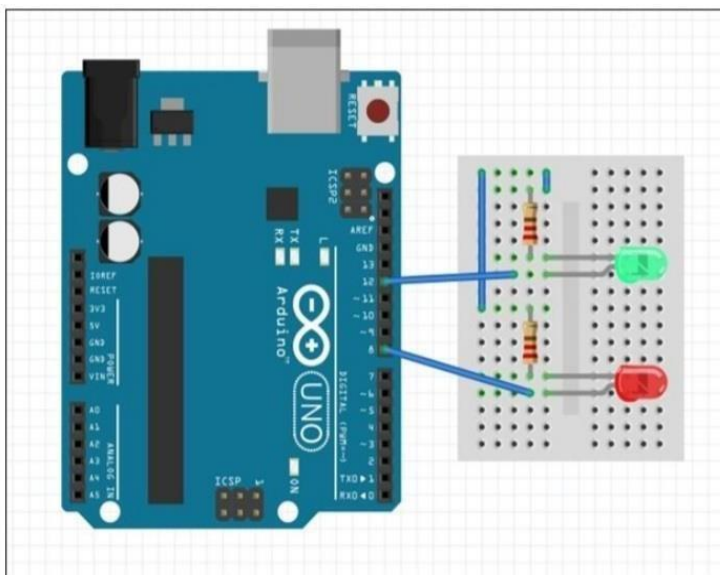
1. LCD display to Arduino wiring.



❖ Connection of Arduino with Buzzer :



❖ Connection of Arduino with LED :



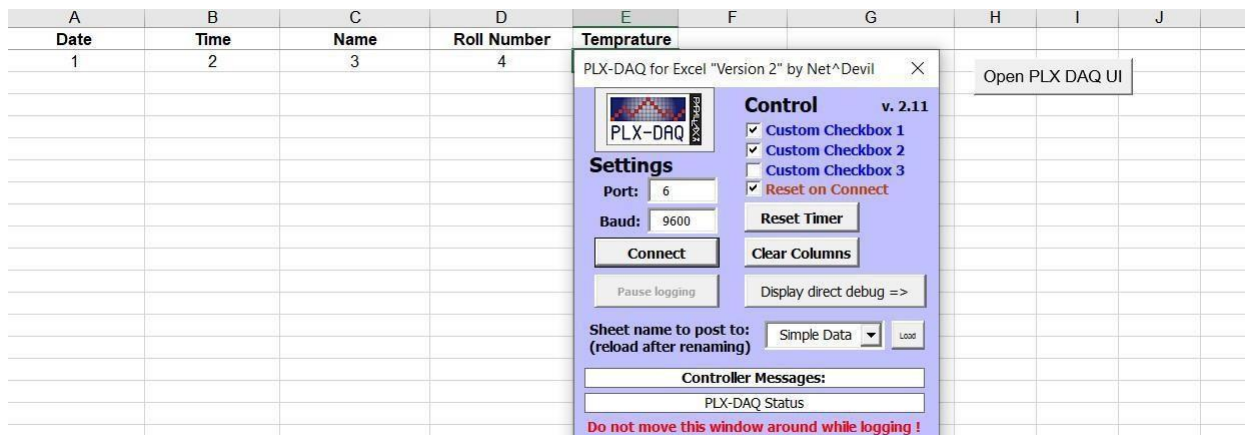
SENDING DATA ARDUINO TO EXCEL SHEET:

PLX-DAQ stands for Parallax Data Acquisition tool to update stream data. This software is currently developed in Nov 23,2020 PLX-DAQ has been useful in laboratories and classrooms around the world for real-time sensor data collection and subsequent analysis in Excel.

Some of the big features of PLX-DAQ include:

- Plot or graph data as it arrives in real-time using Microsoft Excel / Windows 10
- Record up to 26 columns of data
- Mark data with real-time (hh:mm:ss) or seconds since reset
- Read/Write any cell on a worksheet
- Read/Set any of 4 checkboxes on control the interface
- Example code for the BASIC Stamp 2, and Propeller 1 (Spin) available(BlocklyProp example coming soon)
- Baud rates up to 128K
- Supports COM 1 to 15

You just Download this PLX-DAQ sheet online From its Official website andimplement it in your system.



REFERENCES –

- <https://www.hackerearth.com/blog/developers/arduino-programming-for-beginners/>
- <https://www.arduino.cc/en/Main/arduinoBoardUno>>
- <https://components101.com/wireless/rc522-rfid-module>
- <https://esp8266-shop.com/esp8266-guide/esp8266-information/>
- <https://components101.com/displays/16x2-lcd-pinout-datasheet>

You Tube :

- <https://www.youtube.com/watch?v=PzJayPUPV6A&t=271s>