

TITLE OF THE PROJECT

Submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering /
Technology degree in **BIOTECHNOLOGY**

By

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DEPARTMENT OF BIOTECHNOLOGY
SCHOOL OF BIO AND CHEMICAL

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A" by NAAC

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APRIL - 2022



SATHYABAMA

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DEPARTMENT OF BIOTECHNOLOGY **BONAFIDE CERTIFICATE**

This is to certify that this Project Report is the bonafide work of Devi Priya. V (39230011), Dhatchayani. K (39230013), Jesse Miracline Bincy . D (39230019) who carried out the project entitled "Attendance monitoring system with covid prevention measures" under my/our supervision from

Internal Guide
(Name in Capital letters with signature)

External Guide (If Applicable)
(Name in Capital letters with signature)

Head of the Department
(Name in Capital letters with Seal &
Signature)

Submitted for Viva voce Examination held on _____

Internal Examiner
(Name in Capital letters with Signature)

External Examiner
(Name in Capital letters with signature)

DECLARATION

I Devi Priya. V hereby declare that the Project Report entitled “Attendance monitoring system with covid prevention measures” done by me under the guidance of Dr. Gracy Jenifer (Internal) and Dr. Deepak (External) at is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering / Technology degree in Biotechnology

DATE:

PLACE:

SIGNATURE OF THE CANDIDATE

DECLARATION

I Dhatchayani. K hereby declare that the Project Report entitled
“Attendance monitoring system with covid prevention measures” done by
me under the guidance of Dr. Gracy Jenifer (Internal) and Dr. Deepak
(External) at is submitted in partial fulfillment of the requirements for the
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DECLARATION

I Jesse Miracline Bincy. D hereby declare that the Project Report entitled "Attendance monitoring system with covid prevention measures" done by me under the guidance of Dr. Gracy Jenifer (Internal) and Dr. Deepak (External) at is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering / Technology degree in **Biotechnology**

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ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to Board of Management of SATHYABAMA for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

We convey my thanks to Dr. -----, Dean, School of Bio and Chemical Engineering and Dr. Ramesh Kumar, Head of the Department, Dept. of Biotechnology for providing us necessary support and details at the right time during the progressive reviews.

We would like to express my sincere and deep sense of gratitude to my Project Guide Dr. Gracy Jenifer for her valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work.

We wish to express my thanks to all Teaching and Non-teaching staff members of the Department of Biotechnology who were helpful in many ways for the completion of the project.

ABSTRACT:

In today's era regardless of the field of study or preference for defining data (quantitative, qualitative), accurate data collection is essential for maintaining the integrity of research. Selection of appropriate method and the device used for data acquisition reduces chances of errors occurring. In this proposed method attendance management system of colleges. This paper presents a design and framework for taking attendance in colleges. As its targeted users are educational institutes where there is a requirement of affordable, user friendly, portable and secure automated system. Hence this prototype provides an amalgamated solution for replacing existing conventional attendance system with embedded attendance system.

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CHAPTER 1

INTRODUCTION

Attendance monitoring system with covid prevention measures With the growing society, traditional healthcare systems reach their capacity in providing sufficient and high-quality services. The world is facing the aging population and the inherent need for assisted-living environments for senior citizens. There is also a commitment by national healthcare organizations to increase support for personalized, integrated care to prevent and manage chronic conditions. Many applications related to In-Home Health Monitoring have been introduced over the last few decades, thanks to the advances in mobile and Internet of Things technologies and services. Such advances include improvements in optimized network architecture, indoor networks coverage, increased device reliability and performance, ultra-low device cost, low device power consumption, and improved device and network security and privacy. Current studies of in-home health monitoring systems presented many benefits including improved safety, quality of life and reduction in hospitalization and cost. However, many challenges of such a paradigm shift still exist, that need to be addressed to support scale-up and wide uptake of such systems, including technology acceptance and adoption by patients, healthcare providers and policymakers. The aim of this paper is three folds.

CHAPTER 2

LITERATURE SURVEY :

S.N O	TITLE	AUTHOR NAME	YEAR OF PUBLISHED	DESCRIPTION
1	Simulation Environment for Optimal Resource Planning During COVID-19 Crisis	Nenad Petrović	2021	In this paper, a simulation environment leveraging the synergy of deep learning-based predictions and linear optimization for efficient resource planning is presented.
2	Analysis and Predictions of Spread, Recovery, and Death Caused by COVID-19 in India	Rajani Kumari, Sandeep Kumar*, Ramesh Chandra Paonia, Vijander Singh, Linesh Raja, Vaibhav Bhatnagar, and Pankaj Agarwal	2021	This paper presents a detailed study of recently developed forecasting models and predicts the number of confirmed, recovered, and death cases in India caused by COVID-19
3	Artificial	Bouraoui	2021	In this paper,

	Intelligence Facing COVID-19 Pandemic for Decision Support in Algeria	Seyfallah, Tarak BENKEDJOUH		we presents a new mathematical formula for COVID-19 spread virus based on polynomial regression
4	Bringing University to homes in times of COVID-19 through technologies; Use case of the University of Cuenca	Victor Saquicela, Ronald Gualan	2021	In this paper which imposed a compulsory transition from a face-to-face modality to a virtual modality, through university management with the use of different technological platforms. Index Terms— Virtual

				education, telework, technology, adaptation, adoption, COVID-19.
5	COVID-19: Disease Pattern Study based on Semantic- Web Approach using Description Logic	Ria Rawal, kartik , Goe ,Charu Gupta	2021	In this paper, the disease pattern with respect to pandemic COVID-19 is studied.

CHAPTER 3

AIM:

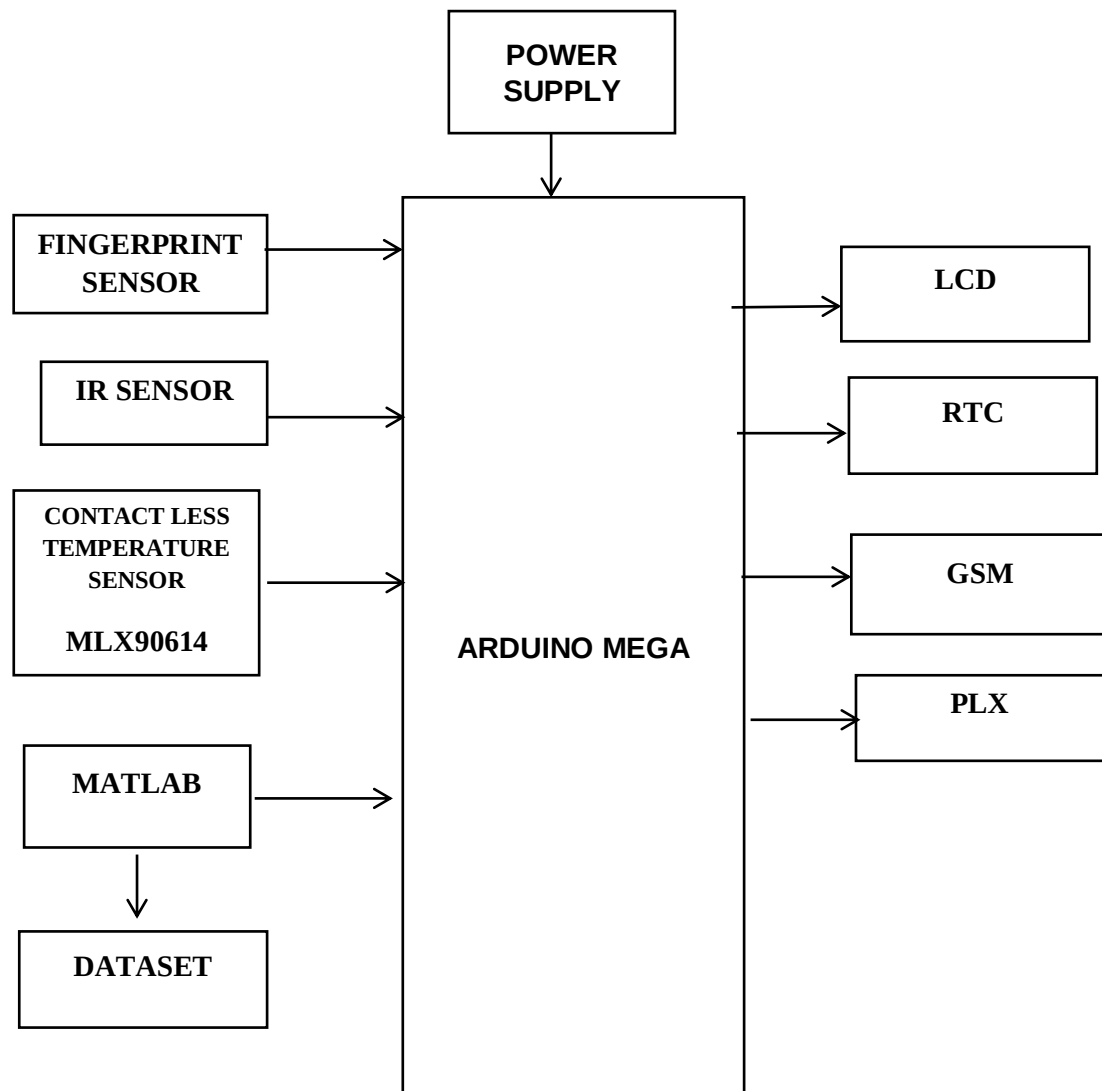
To develop a automated embedded system for taking attendance and student's data collection.

SCOPE OF THE PROJECT

The technological developments is Attendance monitoring system with covid prevention healthcare system Education and public health agencies, in collaboration, may use the example evaluation questions, indicators, and data sources below to develop a monitoring and evaluation protocol and determine a scope feasible for their situation. These are not exhaustive lists of questions, indicators, or data sources, and they may be adapted to align with community priorities and needs.

CHAPTER 4

BLOCK DIAGRAM: **TRANSMITTER**

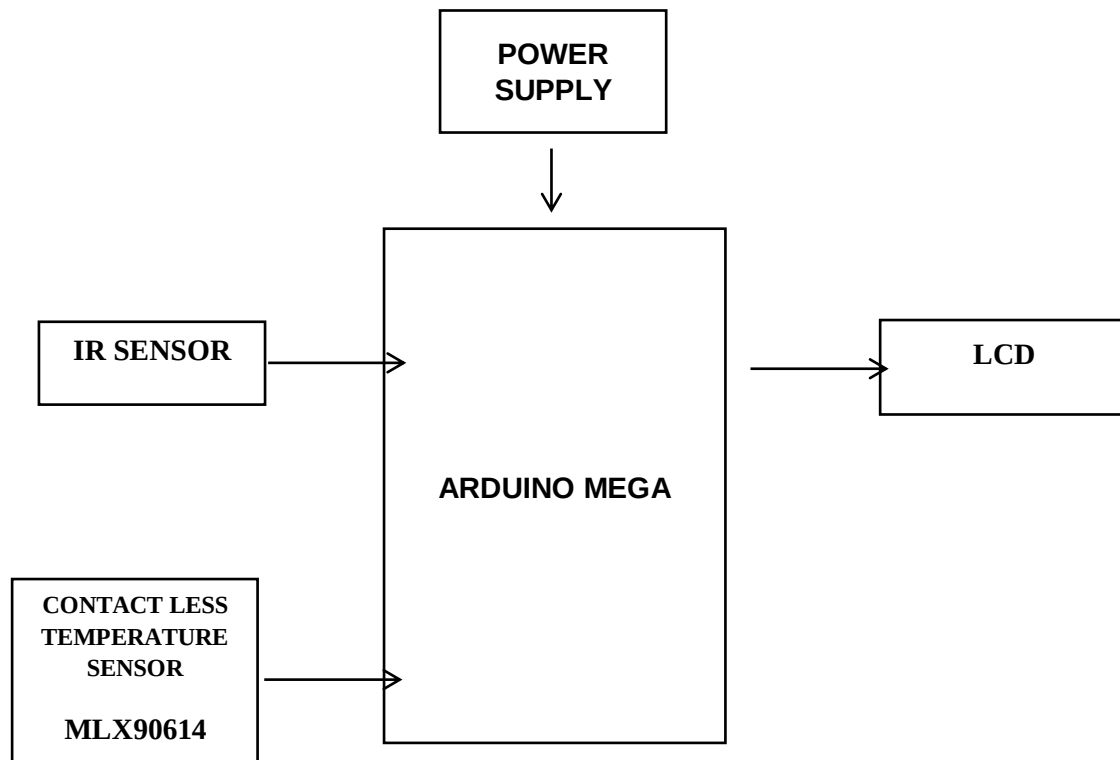
**MODULE NAME:**

- ❖ DETECTION
- ❖ AUTHENTICATION
- ❖ UPDATE

MODULE DESCRIPTION:**DETECTION**

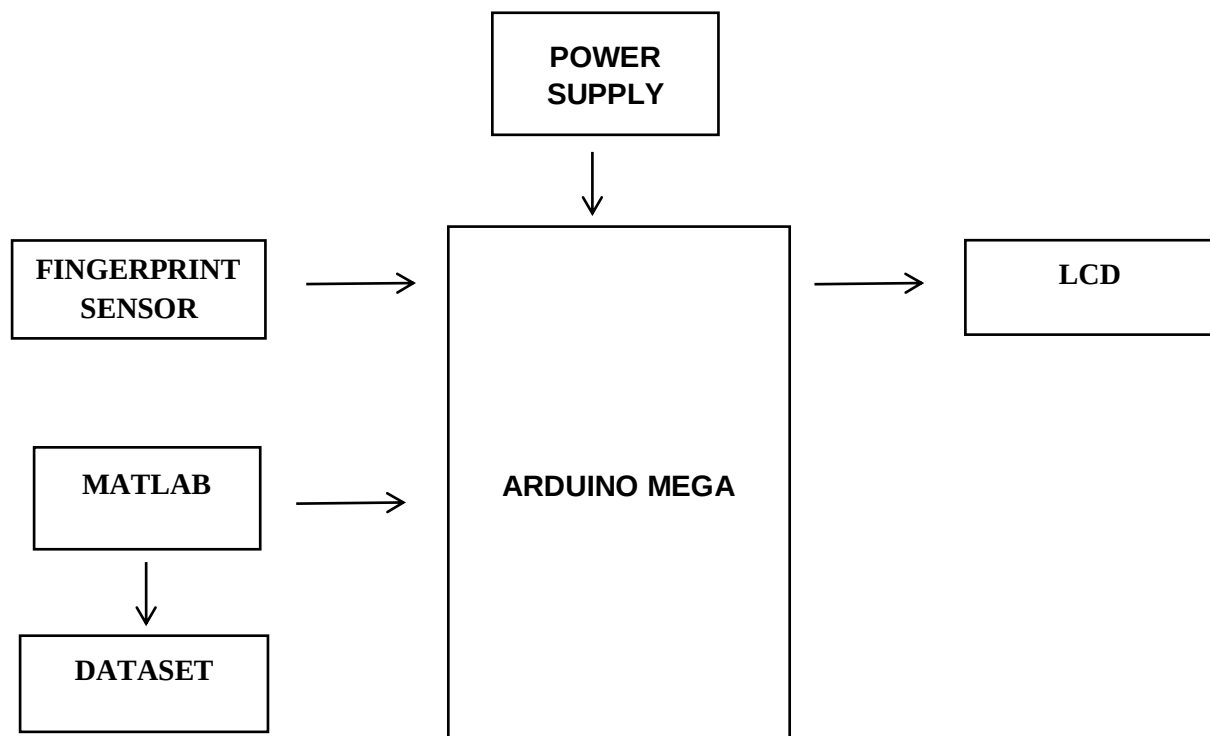
In this project our main motive is attendance monitoring system for students with covid 19 measures. Using IR sensor student will be detect

and using contactless temperature sensor to detect the students body temperature. The LCD will be update the all information.



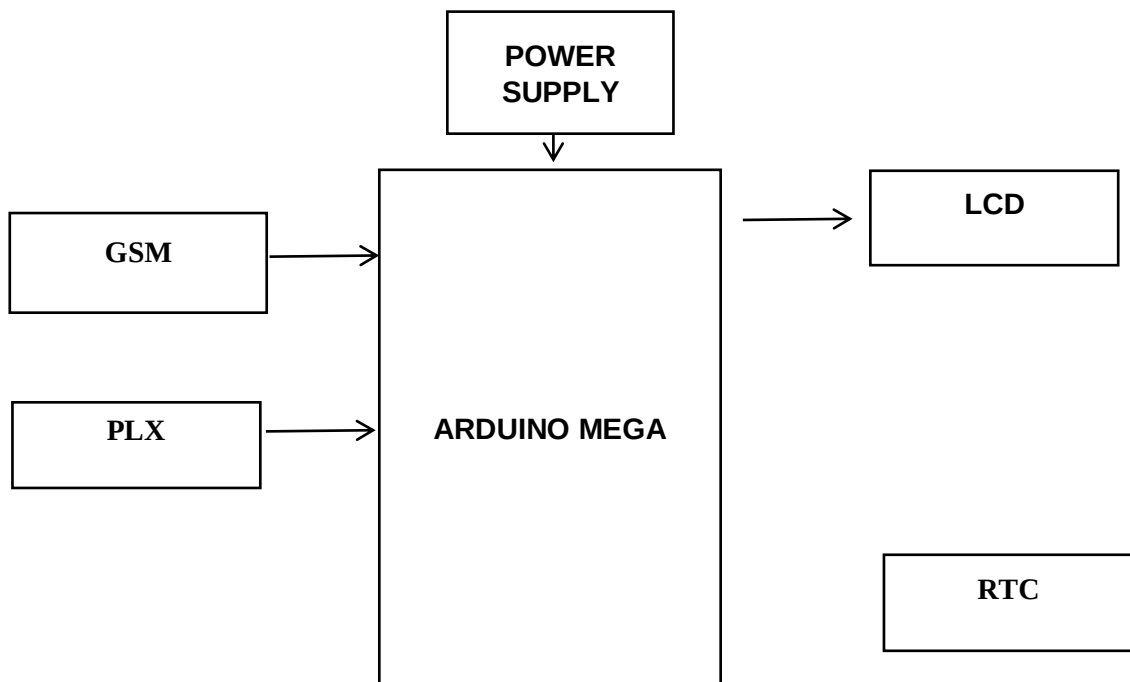
❖ AUTHENTICATION

Our projects main motive is to authentication for students. We are using the authentication for fingerprint and face match. We are using MATLAB for face matching and fingerprint sensor used for fingerprint authentication. LCD will be update the student information.



❖ UPDATE

All the information will be update the excel sheet. RTC used for time to time update in the excel sheet. Keypad will be used for student count.



CHAPTER 4

HARDWARE AND SOFTWARE DESCRIPTION

ARDUINO MEGA:

The MEGA 2560 is designed for more complex projects. With 54 digital I/O pins, 16 analog inputs and a larger space for your sketch it is the recommended board for 3D printers and robotics projects. This gives your projects plenty of room and opportunities.

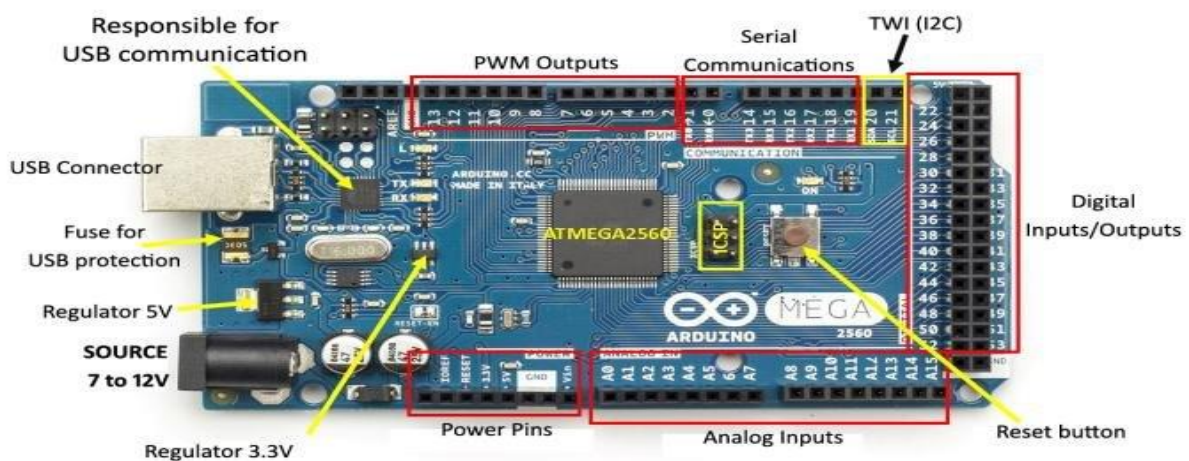


The **Arduino Mega 2560** is a microcontroller board based on the [ATmega2560](#). It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. The Mega 2560 board is compatible with most shields designed for the Uno and the former boards Duemilanove or Diecimila.

TECHNICAL SPECIFICATIONS:

Microcontroller	ATmega2560
Operating Voltage	5V
Input Voltage	7-12V

(recommended)	
Input Voltage (limit)	6-20V
Digital I/O Pins	54 (of which 15 provide PWM output)
Analog Input Pins	16
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	256 KB of which 8 KB used by boot loader
SRAM	8 KB
EEPROM	4 KB
Clock Speed	16 MHz
LED_BUILTIN	13
Length	101.52 mm
Width	53.3 mm
Weight	37 g



HARDWARE:

Arduino is open-source hardware. The hardware reference designs are distributed under a Creative Commons Attribution Share-Alike 2.5 license and are

available on the Arduino website. Layout and production files for some versions of the hardware are also available.

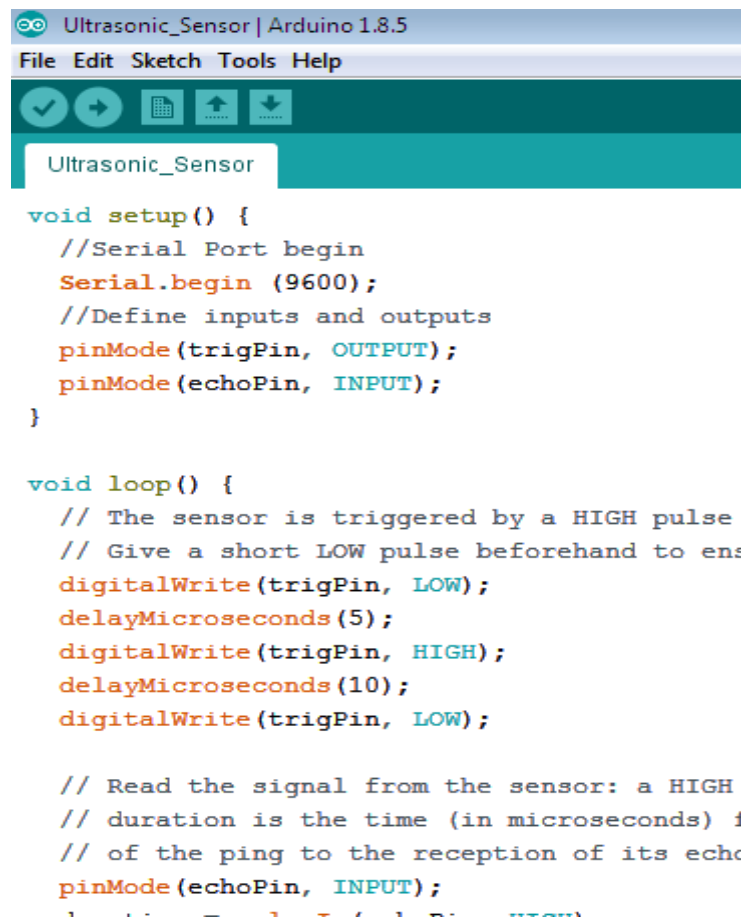
Although the hardware and software designs are freely available under copyleft licenses, the developers have requested the name Arduino to be exclusive to the official product and not be used for derived works without permission. The official policy document on use of the Arduino name emphasizes that the project is open to incorporating work by others into the official product. Several Arduino-compatible products commercially released have avoided the project name by using various names ending in -duino. An early Arduino board with an RS-232 serial interface (upper left) and an Atmel ATmega8 microcontroller chip (black, lower right); the 14 digital I/O pins are at the top, the 6 analog input pins at the lower right, and the power connector at the lower left.

PROGRAMMING:

The Mega 2560 board can be programmed with the Arduino Software (IDE). For details, see the reference and tutorials.

The ATmega2560 on the Mega 2560 comes preprogrammed with a boot loader that allows you to upload new code to it without the use of an external hardware programmer. It communicates using the original STK500 protocol (reference, C header files).

You can also bypass the boot loader and program the microcontroller through the ICSP (In-Circuit Serial Programming) header using Arduino ISP or similar; see these instructions for details.

A screenshot of the Arduino IDE interface. The title bar reads "Ultrasonic_Sensor | Arduino 1.8.5". The menu bar includes "File", "Edit", "Sketch", "Tools", and "Help". Below the menu bar is a toolbar with icons for checking, running, saving, and uploading. The main text area shows the code for the "Ultrasonic_Sensor" sketch. The code defines a setup function for serial communication and pin modes, and a loop function that triggers the ultrasonic sensor and reads the echo signal.

```
void setup() {  
  //Serial Port begin  
  Serial.begin (9600);  
  //Define inputs and outputs  
  pinMode(trigPin, OUTPUT);  
  pinMode(echoPin, INPUT);  
}  
  
void loop() {  
  // The sensor is triggered by a HIGH pulse  
  // Give a short LOW pulse beforehand to ensure a clean HIGH pulse  
  digitalWrite(trigPin, LOW);  
  delayMicroseconds(5);  
  digitalWrite(trigPin, HIGH);  
  delayMicroseconds(10);  
  digitalWrite(trigPin, LOW);  
  
  // Read the signal from the sensor: a HIGH pulse  
  // duration is the time (in microseconds) from the sending of the ping  
  // of the ping to the reception of its echo  
  pinMode(echoPin, INPUT);  
  long duration = pulseIn(echoPin, HIGH);  
}
```

The ATmega16U2 (or 8U2 in the rev1 and rev2 boards) firmware source code is available in the [Arduino repository](#). The ATmega16U2/8U2 is loaded with a DFU boot loader, which can be activated by:

- **On Rev1 boards:** connecting the solder jumper on the back of the board (near the map of Italy) and then resetting the 8U2.
- **On Rev2 or later boards:** there is a resistor that pulling the 8U2/16U2 HWB line to ground, making it easier to put into DFU mode. You can then use [Atmel's FLIP software](#) (Windows) or the [DFU programmer](#) (Mac OS X and Linux) to load a new firmware. Or you can use the ISP header with an external programmer (overwriting the DFU boot loader). See [this user-contributed tutorial](#) for more information.

WARNINGS:

The Mega 2560 has a resettable poly fuse that protects your computer's USB ports from shorts and overcurrent. Although most computers provide their own internal protection, the fuse provides an extra layer of protection. If more than 500 mA is applied to the USB port, the fuse will automatically break the connection until the short or overload is removed.

POWER:

The Mega 2560 can be powered via the USB connection or with an external power supply. The power source is selected automatically.

External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm center-positive plug into the board's power jack. Leads from a battery can be inserted in the GND and Vin pin headers of the POWER connector.

The board can operate on an external supply of 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may become unstable. If using more than 12V, the voltage regulator may overheat and damage the board. The recommended range is 7 to 12 volts.

The power pins are as follows:

- **Vin.** The input voltage to the board when it's using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage

through this pin, or, if supplying voltage via the power jack, access it through this pin.

- **5V.** This pin outputs a regulated 5V from the regulator on the board. The board can be supplied with power either from the DC power jack (7 - 12V), the USB connector (5V), or the VIN pin of the board (7-12V). Supplying voltage via the 5V or 3.3V pins bypasses the regulator, and can damage your board. We don't advise it.
- **3V3.** A 3.3 volt supply generated by the on-board regulator. Maximum current draw is 50 mA.
- **GND.** Ground pins.
- **IOREF.** This pin on the board provides the voltage reference with which the microcontroller operates. A properly configured shield can read the IOREF pin voltage and select the appropriate power source or enable voltage translators on the outputs for working with the 5V or 3.3V.

MEMORY:

The ATmega2560 has 256 KB of flash memory for storing code (of which 8 KB is used for the bootloader), 8 KB of SRAM and 4 KB of EEPROM (which can be read and written with the [EEPROM library](#)).

INPUT AND OUTPUT:

Below is the pin mapping for the Atmega2560. The chip used in Arduino 2560.

There are pin mappings to [Atmega8](#) and [Atmega 168/328](#) as well.

Arduino Mega 2560 PIN diagram

and from the board. The RX and TX LEDs on the board will flash when data is being transmitted via the ATmega8U2/ATmega16U2 chip and USB connection to the computer (but not for serial communication on pins 0 and 1).

A SoftwareSerial library allows for serial communication on any of the Mega 2560's digital pins.

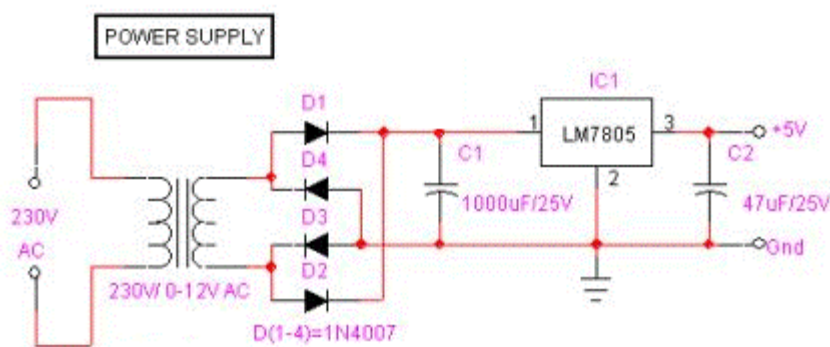
The Mega 2560 also supports TWI and SPI communication. The Arduino Software (IDE) includes a Wire library to simplify use of the TWI bus; see the documentation for details. For SPI communication, use the SPI library.

APPLICATIONS:

- Arduboy, a handheld game console based on Arduino.
- Arduinome, a MIDI controller device that mimics the Monome.
- Ardupilot, drone software and hardware.
- ArduSat, a cubesat based on Arduino.
- C-STEM Studio, a platform for hands-on integrated learning of computing, science, technology, engineering, and mathematics (C-STEM) with robotics.
- Data loggers for scientific research.
- OBduino, a trip computer that uses the on-board diagnostics interface found in most modern cars.
- **Power Supply:**
 - This section describes how to generate +5V DC power supply

The power supply section is the important one. It should deliver constant output regulated power supply for successful working of the project. A 0-

12V/1 mA transformer is used for this purpose. The primary of this transformer is connected in to main supply through on/off switch& fuse for protecting from overload and short circuit protection. The secondary is connected to the diodes to convert 12V AC to 12V DC voltage. And filtered by the capacitors ,Which is further regulated to +5v, by using IC 7805.



FINGER PRINT SENSOR

R305 Fingerprint Module consists of optical fingerprint sensor, high-speed DSP processor, high-performance fingerprint alignment algorithm, high-capacity FLASH chips and other hardware and software composition, stable performance, simple structure, with fingerprint entry, image processing, fingerprint matching, search and template storage and other functions.



R305 is a finger print sensor module with TTL UART interface. The user

can store the finger print data in the module and can configure it in 1:1 or 1: N mode for identifying the person. The FP module can directly interface with 3v Microcontroller. A level converter (like MAX232) is required for interfacing with PC.

The R305 fingerprint module has two interface TTL UART and USB2.0, USB2.0 interface can be connected to the computer; RS232 interface is a TTL level, the default baud rate is 57600 , can be changed, refer to a communication protocol ; can And microcontroller, such as ARM, DSP and other serial devices with a connection, 3.3V 5V microcontroller can be connected directly. Needs to connect the computer level conversion, level conversion note , embodiments such as a MAX232 circuit.

Operation Principle

Fingerprint processing includes two parts: fingerprint enrollment and fingerprint matching (the matching can be 1:1 or 1:N). When enrolling, user needs to enter the finger two times. The system will process the two time finger images, generate a template of the finger based on processing results and store the template. When matching, user enters the finger through optical sensor and system will generate a template of the finger and compare it with templates of the finger library. For 1:1 matching, system will compare the live finger with specific template designated in the Module; for 1:N matching, or searching, system will search the whole finger library for the matching finger. In both circumstances, system will return the matching result, success or failure.

Hardware connection

Via serial interface, the Module may communicate with MCU of 3.3V or 5V power: TXD (pin 3 of P1) connects with RXD (receiving pin of MCU), RXD (pin 4 of P1) connects with TXD (transferring pin of MCU). Should the upper computer (PC) be in RS-232 mode, please add level converting circuit, like MAX232, between the Module and PC.

USB Communication

Pin number	Name	Type	Function description
7	5V	In	Power Input
8	D+	Out	USB data output.
9	D-	In	USB data input.
10	GND	-	Signal ground.

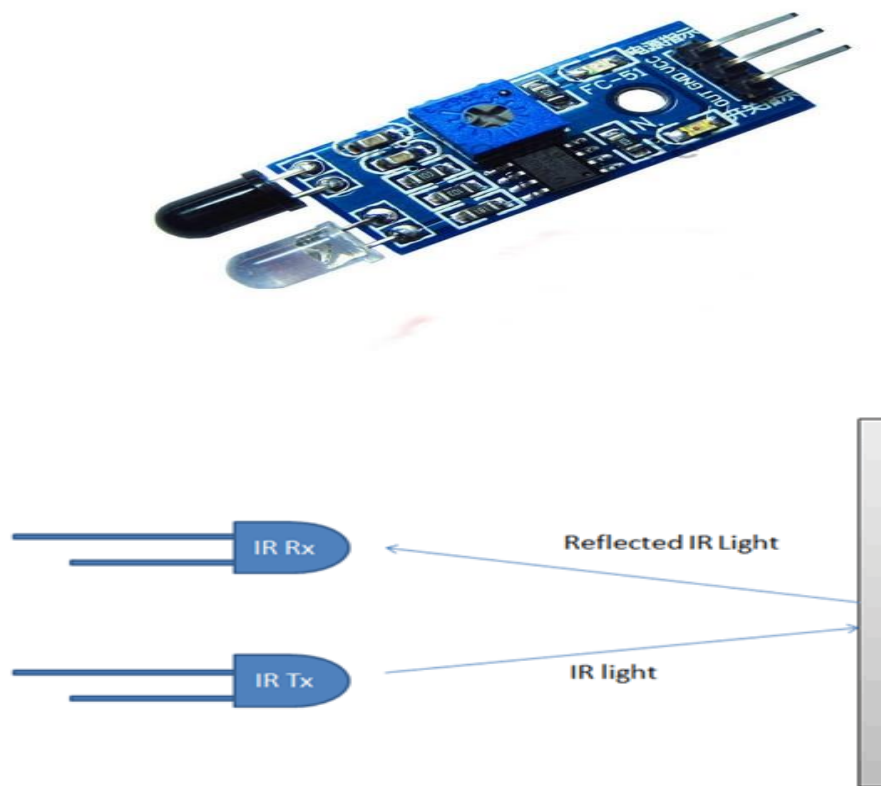
Serial Communication

The mode is semi duplex asynchronism serial communication. And the default baud rate is 57600bps. User may set the baud rate in 9600~115200bps. Transferring frame format is 10 bit: the low-level starting bit, 8-bit data with the LSB first, and an ending bit. There is no check bit.

Applications:

- Secure logins via keyboard modules
- User identification at kiosks
- Biometric door locks
- Credit card security
- Weapon activation
- Theft protection
- **IR SENSOR**
- An [infrared sensor](#) is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation, rather than emitting it that is called as a [passive IR sensor](#). Usually

in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes, that can be detected by an infrared sensor. The emitter is simply an IR LED ([Light Emitting Diode](#)) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, The resistances and these output voltages, change in proportion to the magnitude of the IR light received.



IR Transmitter circuit information

This IR transmitter sends 38 kHz (frequency can be adjusted using R2). IR carriers at around 38 kHz carrier frequencies are widely used in TV remote controlling and ICs for receiving these signals are quite easily available. Ir transmitter constructed by using IC555 timers and mode of operation under astable mutivibrator

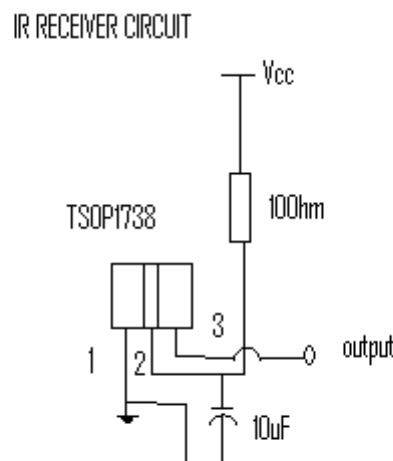
Formula frequency

$$T = 0.69(R_a + 2R_b) C$$

Schematics IR Transmitter

IR RECEIVER

This is a very small IR receiver based on the TSOP1738 receiver. This receiver has all the filtering and 38 kHz demodulation built into the unit. Simply point an IR remote at the receiver, a stream of 1s and 0s out of the data from ir transmitter and TSOP capable of receiver only 38khz frequency because in surrounding so many devices transmitting ir signal at different frequency so we constructed receiver to receive at 38khz frequency only and output of ir receiver given to microcontroller port three at P3.2.



CONTACTLESS TEMPERATURE SENSOR

This document is intended to provide an introduction to utilizing thermopile sensors for contactless temperature measurement. Thermopiles are mainly used for contactless temperature measurement in a wide range of applications. Their primary function is to transfer the heat radiation emitted from objects into a voltage output. Major applications include appliances such as microwave ovens, clothes dryers, and automated cooking, medical devices such as ear and fore head thermometers, automotive

applications such as car climate control, seat occupancy, blind spot alert, and black ice warning, consumer products such as printers, copiers, mobile phones and many industry applications such as paper and plastics manufacturing

MATLAB

MATLAB (**MAT**rix **LAB**oratory) is a numerical computing environment and fourth-generation programming language. Developed by Math Works, MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages, including C, C++, Java, and Fortran.

FEATURES OF MATLAB

- High-level language for technical computing.
- Development environment for managing code, files, and data.
- Interactive tools for iterative exploration, design, and problem solving.
- Mathematical functions for linear algebra, statistics, Fourier analysis, filtering, optimization, and numerical integration.
- 2-D and 3-D graphics functions for visualizing data.
- Tools for building custom graphical user interfaces.
- Functions for integrating MATLAB based algorithms with external applications and languages, such as C, C++, Fortran, Java™, COM, and Microsoft Excel.

DEVELOPING ALGORITHMS AND APPLICATIONS

- MATLAB provides a high-level language and development tools that let you quickly develop and analyze your algorithms and applications.
- The MATLAB language supports the vector and matrix

operations that are fundamental to engineering and scientific problems. It enables fast development and execution. With the MATLAB language, you can program and develop algorithms faster than with traditional languages because you do not need to perform low-level administrative tasks, such as declaring variables, specifying data types, and allocating memory. In many cases, MATLAB eliminates the need for 'for' loops. As a result, one line of MATLAB code can often replace several lines of C or C++ code.

- At the same time, MATLAB provides all the features of a traditional programming language, including arithmetic operators, flow control, data structures, data types, object-oriented programming (OOP), and debugging features.
- MATLAB lets you execute commands or groups of commands one at a time, without compiling and linking, enabling you to quickly iterate to the optimal solution. For fast execution of heavy matrix and vector computations, MATLAB uses processor-optimized libraries. For general-purpose scalar computations, MATLAB generates machine-code instructions using its JIT (Just-In-Time) compilation technology.

DATA ANALYSIS

MATLAB provides interactive tools and command-line functions for data analysis operations, including:

- Interpolating and decimating
- Extracting sections of data, scaling, and averaging
- Thresholding and smoothing
- Correlation, Fourier analysis, and filtering
- 1-D peak, valley, and zero finding

- Basic statistics and curve fitting
- Matrix analysis

DATA ACCESS

MATLAB is an efficient platform for accessing data from files, other applications, databases, and external devices. You can read data from popular file formats, such as Microsoft Excel; ASCII text or binary files; image, sound, and video files; and scientific files, such as HDF and HDF5.

Low-level binary file I/O functions

VISUALIZING DATA

All the graphics features that are required to visualize engineering and scientific data are available in MATLAB. These include 2-D and 3-D plotting functions, 3-D volume visualization functions, tools for interactively creating plots, and the ability to export results to all popular graphics formats. You can customize plots by adding multiple axes; changing line colors and markers; adding annotation, Latex equations, and legends; and drawing shapes.

let you work with data files in any format. Additional functions let you read data from Web pages and XML.

3-D PLOTTING AND VOLUME VISUALIZATION

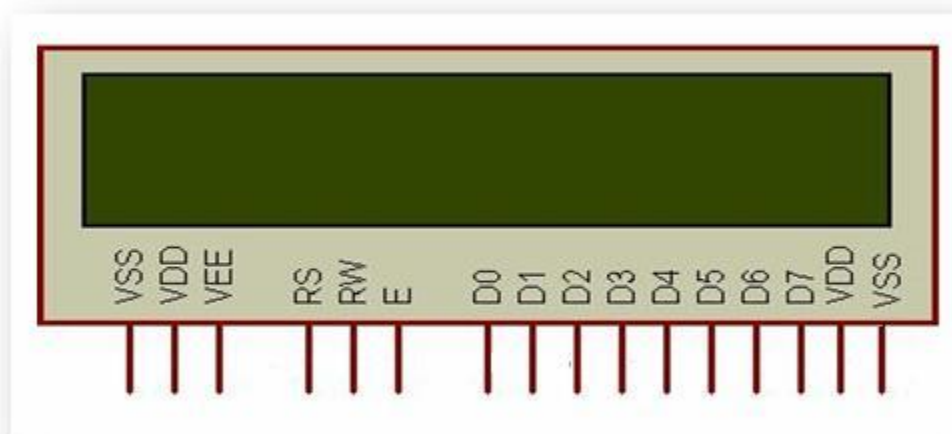
MATLAB provides functions for visualizing 2-D matrices, 3-D scalar, and 3-D vector data. You can use these functions to visualize and understand large, often complex, multidimensional data. Specifying plot characteristics, such as camera viewing angle, perspective, lighting effect, light source locations, and transparency.

3-D plotting functions include:

- Surface, contour, and mesh.
- Image plots.
- Cone, slice, stream, and isosurface.

LCD (Liquid Crystal Display)

- LCD screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over [seven segments](#) and other multi segment [LEDs](#). The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even [custom characters](#) (unlike in seven segments), [animations](#) and so on.
- A **16x2 LCD** means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.
- The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD. Click to learn more about internal structure of a [LCD](#).



PinDescription

The most commonly used LCDs found in the market today are 1 Line, 2 Line or 4 Line LCDs which have only 1 controller and support at most of 80 characters, whereas LCDs supporting more than 80 characters make use of 2 HD44780 controllers.

Most LCDs with 1 controller has 14 Pins and LCDs with 2 controller has 16 Pins (two pins are extra in both for back-light LED connections).

Commands and Instruction set

Only the instruction register (IR) and the data register (DR) of the LCD can be controlled by the MCU. Before starting the internal operation of the LCD, control information is temporarily stored into these registers to allow interfacing with various MCUs, which operate at different speeds, or various peripheral control devices. The internal operation of the LCD is determined by signals sent from the MCU. These signals, which include register selection signal (RS), read/write signal (R/W), and the data bus (DB0 to DB7), make up the LCD instructions (Table 3). There are four categories of instructions that:

- Designate LCD functions, such as display format, data length, etc.
- Set internal RAM addresses
- Perform data transfer with internal RAM
- Perform miscellaneous functions

LCD LIQUID CRYSTAL DISPLAYS:

- The LCD standard requires 3 control lines and 8 I/O lines for the data bus.
- • **8 data pins D7:D0**
- Bi-directional data/command pins.

Alphanumeric characters are sent in ASCII format.

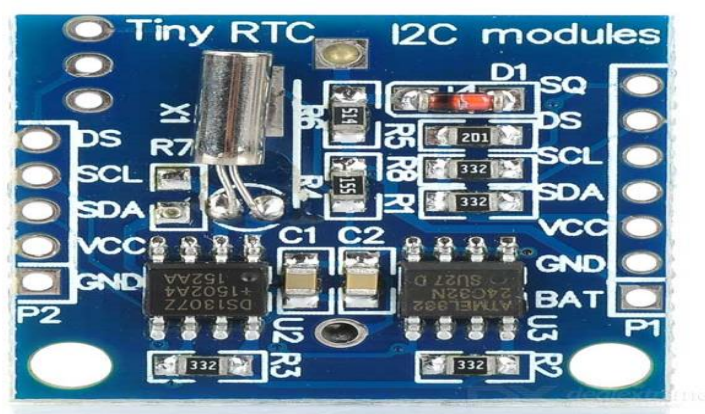
- • **RS: Register Select**

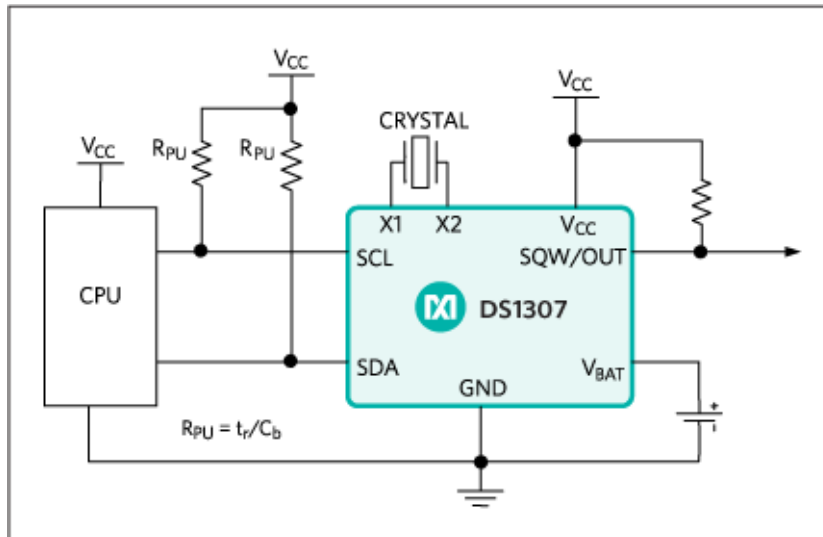
- RS = 0 -> Command Register is selected
RS = 1 -> Data Register is selected
- **R/W: Read or Write**
- 0 -> Write, 1 -> Read
- **E: Enable (Latch data)**
- The 8 data lines are connected to PORT 1 of 8051 microcontroller. The three control lines (RS, RW and EN) are connected to PORT 3.5,3.6 and 3.7 respectively.

RTC

- **Description**

The DS1307 serial real-time clock (RTC) is a low-power, full binary-coded decimal (BCD) clock/calendar plus 56 bytes of NV SRAM. Address and data are transferred serially through an I²C, bidirectional bus. The clock/calendar provides seconds, minutes, hours, day, date, month, and year information. The end of the month date is automatically adjusted for months with fewer than 31 days, including corrections for leap year. The clock operates in either the 24-hour or 12-hour format with AM/PM indicator. The DS1307 has a built-in power-sense circuit that detects power failures and automatically switches to the backup supply. Timekeeping operation continues while the part operates from the backup supply.





GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM)

DEFINITION:

Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz. It is estimated that many countries outside of Europe will join the GSM partnership.

THE GSM NETWORK:

GSM provides recommendations, not requirements. The GSM specifications define the functions and interface requirements in detail but do not address the hardware. The reason for this is to limit the designers as little as possible but still to make it possible for the operators to buy equipment from different suppliers. The GSM network is divided into three major systems: the switching system (SS), the base station system (BSS), and the operation and support system (OSS). The basic

GSM network elements are shown in below.

THE OPERATION AND SUPPORT SYSTEM:

The operations and maintenance center (OMC) is connected to all equipment in the switching system and to the BSC. The implementation of OMC is called the operation and support system (OSS). The OSS is the functional entity from which the network operator monitors and controls the system. The purpose of OSS is to offer the customer cost-effective support for centralized, regional, and local operational and maintenance activities that are required for a GSM network. An important function of OSS is to provide a network overview and support the maintenance activities of different operation and maintenance organizations.

GSM SPECIFICATIONS:

Before looking at the GSM specifications, it is important to understand the following basic terms:

- **bandwidth**—the range of a channel's limits; the broader the bandwidth, the faster data can be sent
- **bits per second (bps)**—a single on-off pulse of data; eight bits are equivalent to one byte
- **frequency**—the number of cycles per unit of time; frequency is measured in hertz (Hz)
- **kilo (k)**—kilo is the designation for 1,000; the abbreviation kbps represents 1,000 bits per second
- **megahertz (MHz)**—1,000,000 hertz (cycles per second)
- **milliseconds (ms)**—one-thousandth of a second
- **watt (W)**—a measure of power of a transmitter.
- Specifications for different personal communication services (PCS) systems vary among the different PCS networks. Listed below is a

description of the specifications and characteristics for GSM.

- **frequency band**—The frequency range specified for GSM is 1,850 to 1,990 MHz (mobile station to base station).
- **duplex distance**—The duplex distance is 80 MHz. Duplex distance is the distance between the uplink and downlink frequencies. A channel has two frequencies, 80 MHz apart.
- **channel separation**—The separation between adjacent carrier frequencies. In GSM, this is 200 kHz.
- **modulation**—Modulation is the process of sending a signal by changing the characteristics of a carrier frequency. This is done in GSM via Gaussian minimum shift keying (GMSK).
- **transmission rate**—GSM is a digital system with an over-the-air bit rate of 270 kbps.
- **access method**—GSM utilizes the time division multiple access (TDMA) concept. TDMA is a technique in which several different calls may share the same carrier. Each call is assigned a particular time slot.
- **speech coder**—GSM uses linear predictive coding (LPC). The purpose of LPC is to reduce the bit rate. The LPC provides parameters for a filter that mimics the vocal tract. The signal passes through this filter, leaving behind a residual signal. Speech is encoded at 13 kbps.

SIM 900 GSM/GPRS MODULE:

GSM/GPRS Modem-RS232 is built with Dual Band GSM/GPRS engine- SIM900, works on frequencies 900/ 1800 MHz. The Modem is coming with RS232 interface, which allows you connect PC as well as microcontroller with RS232 Chip(MAX232). The baud rate is configurable from 9600-115200 through AT command. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with

internet via GPRS. It is suitable for SMS, Voice as well as DATA transfer application in M2M interface. The onboard Regulated Power supply allows you to connect wide range unregulated power supply . Using this modem, you can make audio calls, SMS, Read SMS, attend the incoming calls and internet through simple AT commands.



FEATURES:

- Dual-Band GSM/GPRS 900/ 1800 MHz.
- RS232 interface for direct communication with computer or MCU kit.
- Configurable baud rate.
- Power controlled using 29302WU IC.
- ESD Compliance.
- Enable with MIC and Speaker socket.
- With slid in SIM card tray.
- With Stub antenna and SMA connector.

Input Voltage: 12V DC.

WORKING:

Unlike mobile phones, a GSM modem doesn't have a keypad

and display to interact with. It just accepts certain commands through a serial interface and acknowledges for those. These commands are called as AT commands. There are a list of AT commands to instruct the modem to perform its functions. Every command starts with "AT". That's why they are called as AT commands. AT stands for attention. In our simple project, the program waits for the mobile number to be entered through the keyboard. When a ten digit mobile number is provided, the program instructs the modem to send the text message using a sequence of AT commands .

PLX

PLX-DAQ is a **Parallax microcontroller data acquisition add-on tool for Microsoft Excel**. Any of our microcontrollers connected to any sensor and the serial port of a PC can now send data directly into Excel. ... Plot or graph data as it arrives in real-time using Microsoft Excel.

SOFTWARE REQUIREMENTS:

EMBEDDED C

Embedded C is most popular programming language in software field for developing electronic gadgets. Each processor used in electronic system is associated with embedded software.

Embedded C programming plays a key role in performing specific function by the processor. In day-to-day life we used many electronic devices such as mobile phone, washing machine, digital camera, etc. These all device working is based on microcontroller that are programmed by embedded C.

In embedded system programming C code is preferred over other

language. Due to the following reasons:

- Easy to understand
- High Reliability
- Portability
- Scalability

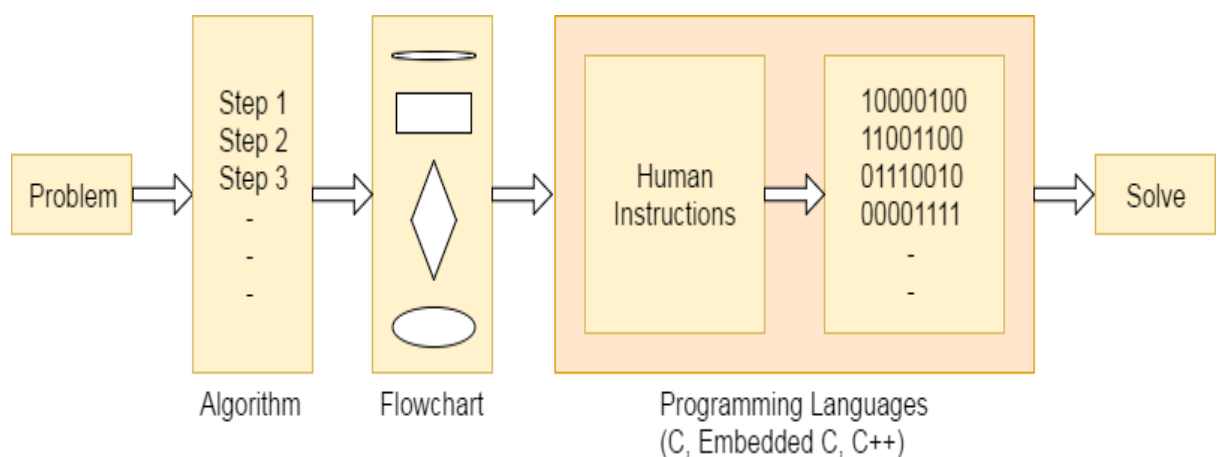
EMBEDDED SYSTEM PROGRAMMING:

Basic Declaration

Function is a collection of statements that is used for performing a specific task and a collection of one or more functions is called a programming language. Every language is consisting of basic elements and grammatical rules. The C language programming is designed for function with variables, character set, data types, keywords, expression and so on are used for writing a C program.

BASIC EMBEDDED C PROGRAMMING STEPS:

Let's see the block diagram representation of Embedded C Programming Steps:



The microcontroller programming is different for each type of operating system. Even though there are many operating systems that exist such as Windows, Linux, RTOS, etc. but RTOS has several advantages for embedded system development.

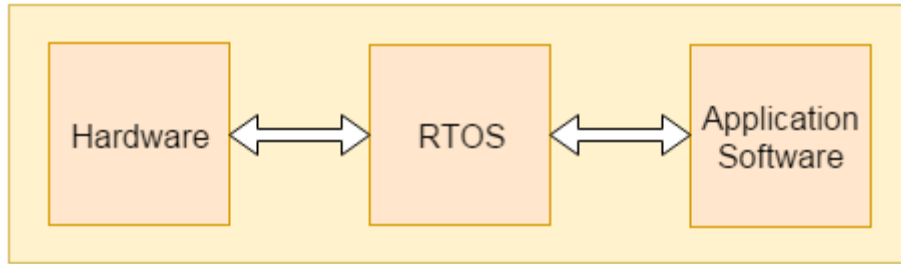
EMBEDDED SYSTEMS:

Embedded System is a system composed of hardware, application software and real time operating system. It can be a small independent system or a large combinational system.

Our Embedded System tutorial includes all topics of Embedded System such as characteristics, designing, processors, microcontrollers, tools, addressing modes, assembly language, interrupts, embedded C programming, LED blinking, serial communication, LCD programming, keyboard programming, project implementation etc.

An embedded system is a combination of three major components:

- **Hardware:** Hardware is a physically used component that is physically connected with an embedded system. It comprises of microcontroller based integrated circuit, power supply, LCD display etc.
- **Application software:** Application software allows the user to perform varieties of application to be run on an embedded system by changing the code installed in an embedded system.
- **Real Time Operating system (RTOS):** RTOS supervises the way an embedded system works. It acts as an interface between hardware and application software which supervises the application software and provides mechanism to let the processor run on the basis of scheduling for controlling the effect of latencies.



CHARACTERISTICS OF EMBEDDED SYSTEM:

- An embedded system is software embedded into computer hardware that makes a system dedicated to be used for variety of application.
- Embedded system generally used for do specific task that provide real-time output on the basis of various characteristics of an embedded system.
- Embedded system may contain a smaller part within a larger device that used for serving the more specific application to perform variety of task using hardware-software intermixing configuration.
- It provides high reliability and real-time computation ability.

Advantages:

- Same hardware can be used in variety of application.
- Lesser power requirement
- Lower operational cost of system
- Provide high performance and efficiency

Disadvantages:

- Developing a system required more time. Due to functional complexity.

- Skilled engineers required because one mistake may result in destroying of complete project.

Designing of an embedded system

BASIC STRUCTURE OF AN EMBEDDED SYSTEM:

- **Sensor:** Sensor used for sensing the change in environment condition and it generate the electric signal on the basis of change in environment condition. Therefore it is also called as transducers for providing electric input signal on the basis of change in environment condition.
- **A-D Converter:** An analog-to-digital converter is a device that converts analog electric input signal into its equivalent digital signal for further processing in an embedded system.
- **Processor & ASICs:** Processor used for processing the signal and data to execute desired set of instructions with high-speed of operation. Application specific integrated circuit (ASIC) is an integrated circuit designed to perform task specific operation inside an embedded system.
- **D-A Converter:** A digital-to-analog converter is a device that converts digital electric input signal into its equivalent analog signal for further processing in an embedded system.
- **Actuators:** Actuators is a comparator used for comparing the analog input signal level to desired output signal level for providing the error free output from the system.

EMBEDDED SYSTEM TOOLS AND PERIPHERALS:

Compiler:

Compiler is used for converting the source code from a high-level programming language to a low-level programming language. It converts the code written in high level programming language into assembly or machine code. The main reason for conversion is to develop an executable program.

Let's see the operations performed by compiler are:

- Code generation
- Code optimization
- Parsing
- Syntax direct translation
- Preprocessing

Cross-Compiler:

If a program compiled is run on a computer having different operating system and hardware configuration than the computer system on which a compiler compiled the program, that compiler is known as cross-compiler.

Decompiler:

A tool used for translating a program from a low-level language to high-level language is called a decompiler. It is used for conversion of assembly or machine code to high-level programming language.

Assembler:

Assembler is embedded system tool used for translating a computer instruction written in assembly language into a pattern of bits which is used by the computer processor for performing its basic operations. Assembler creates an object code by translating assembly language instruction into set of mnemonics for representing each low-level machine operation.

Emulators:

An emulator is a software program or a hardware kit which emulates the functions of one computer system into another computer system. Emulators have an ability to support closer connection to an authenticity of the digital object.

It can also be defined as the ability of a computer program in electronic device to emulate another program or device. It focusing on recreating the original computer environment and helps a user to work on any type of application or operating system.

CRITERIA FOR CHOOSING MICROCONTROLLER:

Choosing a microcontroller is essential process in designing of embedded system. While selecting a microcontroller, make sure that it meets the system need and it must be cost effective. We need to decide whether an 8-bit, 16-bit or 32-bit microcontroller is best suitable for the computing needs of a task.

In addition to above, the following points need to be kept in mind while selecting a microcontroller:-

- **Speed:** The operational speed of the microcontroller or the highest speed microcontroller can support.
- **Packaging:** Packaging is important for improving the assembling, space and prototyping of an end-product.
- **RAM and ROM:** On the basis of operation of embedded system and memory need for storage data and programs the type of microcontroller required for designing system is decided.
- **Count of I/O pins:** The number of input and output devices connected with the system plays an essential role in choosing the type of microcontroller.
- **Cost per unit:** It is important in terms of final cost of the product in which the microcontroller is to be used.

➤ **Power consumption:** Power consumption plays an important role for maintaining the efficiency of an embedded system

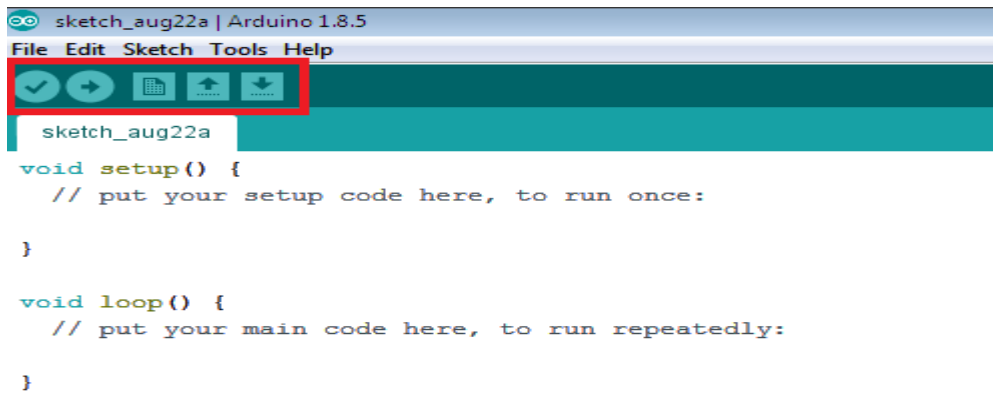
ARDUINO SOFTWARE IDE

The Arduino Integrated Development Environment - or Arduino Software (IDE) - 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 connects to the Arduino and Genuino hardware to upload programs and communicate with them.

WRITING SKETCHES:

Programs written using Arduino Software (IDE) are called **sketches**. These sketches are written in the text editor and are saved with the file extension **.ino**. The editor has features for cutting/pasting and for searching/replacing text. The message area gives feedback while saving and exporting and also displays errors. The console displays text output by the Arduino Software (IDE), including complete error messages and other information. The bottom right hand corner of the window displays the configured board and serial port. The toolbar buttons allow you to verify and upload programs, create, open, and save sketches, and open the serial monitor.

NB: Versions of the Arduino Software (IDE) prior to 1.0 saved sketches with the extension .pde. It is possible to open these files with version 1.0, you will be prompted to save the sketch with the .ino extension on save.



TOOLS:

➤ ***Auto Format***

This formats your code nicely: i.e. indents it so that opening and closing curly braces line up, and that the statements inside curly braces are indented more.

➤ ***Archive Sketch***

Archives a copy of the current sketch in .zip format. The archive is placed in the same directory as the sketch.

➤ ***Fix Encoding & Reload***

Fixes possible discrepancies between the editor char map encoding and other operating systems char maps.

➤ ***Serial Monitor***

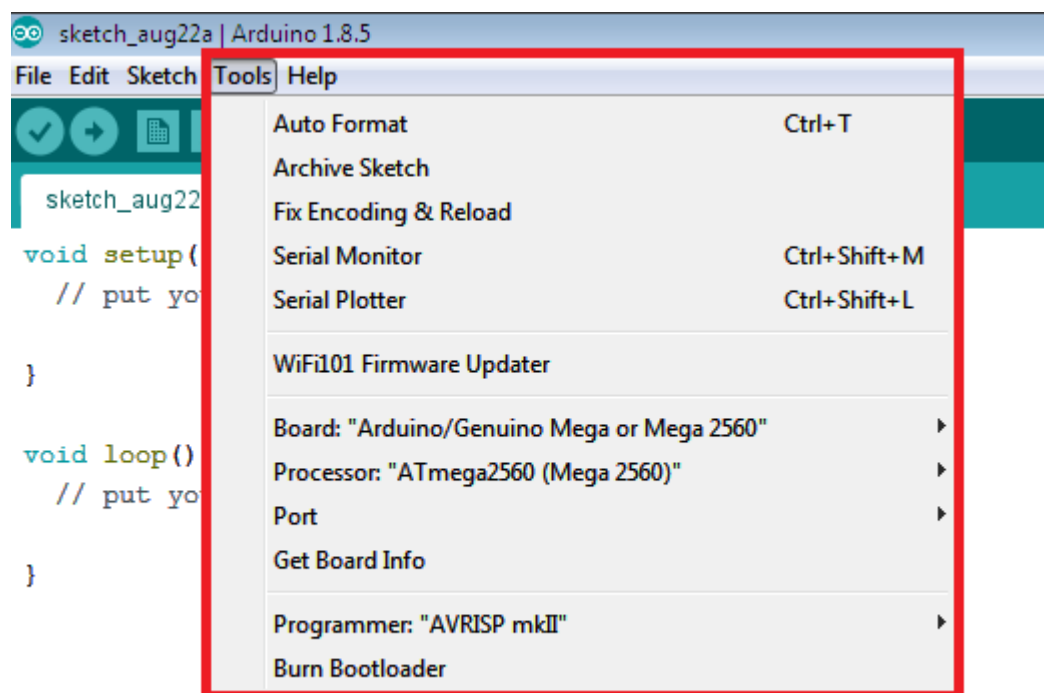
Opens the serial monitor window and initiates the exchange of data with any connected board on the currently selected Port. This usually resets the board, if the board supports Reset over serial port opening.

Board

Select the board that you're using. See below for [descriptions of the various boards](#).

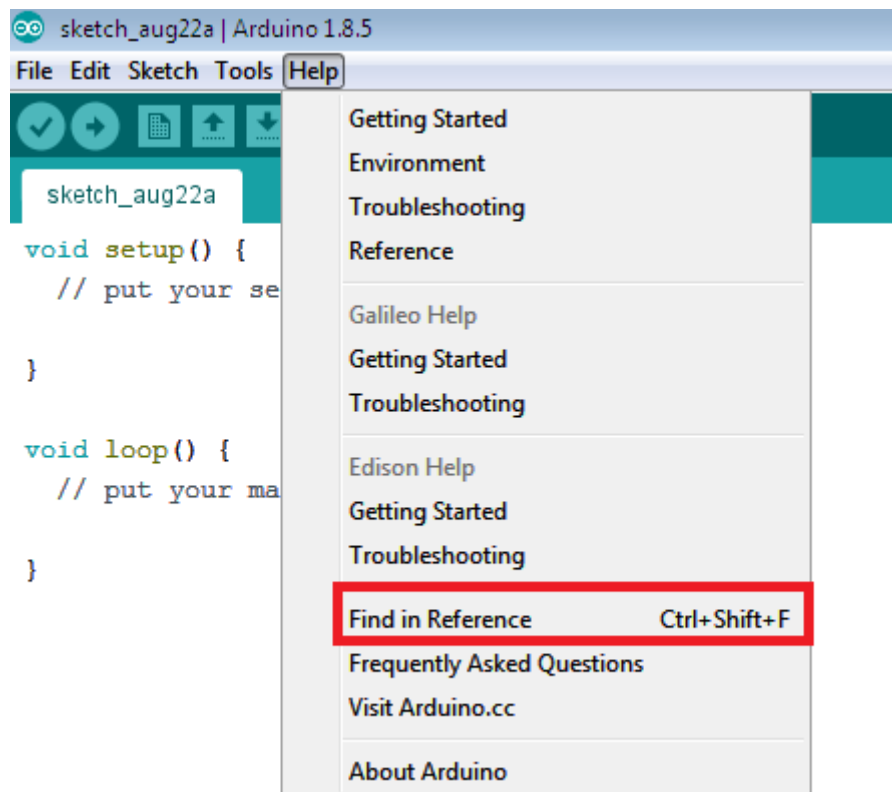
Port

This menu contains all the serial devices (real or virtual) on your machine. It should automatically refresh every time you open the top-level tools menu.

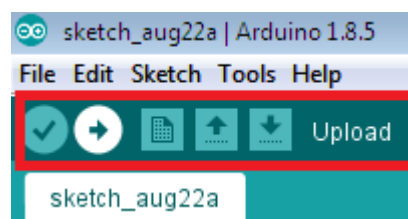


Help:

Here you find easy access to a number of documents that come with the Arduino Software (IDE). You have access to Getting Started, Reference, this guide to the IDE and other documents locally, without an internet connection. The documents are a local copy of the online ones and may link back to our online website.



UPLOADING:



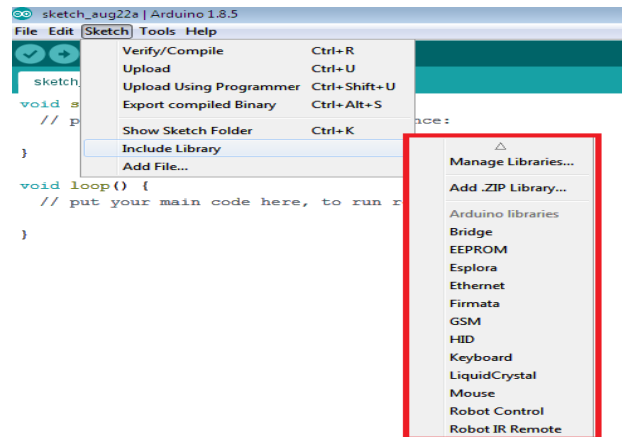
Before uploading your sketch, you need to select the correct items from the **Tools > Board** and **Tools > Port** menus. The boards are described below. On the Mac, the serial port is probably something like **/dev/tty.usbmodem241** (for an Uno or Mega2560 or Leonardo) or **/dev/tty.usbserial-1B1** (for a Duemilanove or earlier USB board), or **/dev/tty.USA19QW1b1P1.1** (for a serial board connected with a Keyspan USB-to-Serial adapter). On Windows, it's probably COM1 or COM2 (for a serial board) or COM4, COM5, COM7, or higher (for a USB board) - to find out, you look for USB serial device in the ports section of the Windows Device Manager. On Linux, it should be **/dev/ttyACMx** , **/dev/ttyUSBx** or similar. Once you've selected the correct

serial port and board, press the upload button in the toolbar or select the **Upload** item from the **Sketch** menu. Current Arduino boards will reset automatically and begin the upload. With older boards (pre-Diecimila) that lack auto-reset, you'll need to press the reset button on the board just before starting the upload. On most boards, you'll see the RX and TX LEDs blink as the sketch is uploaded. The Arduino Software (IDE) will display a message when the upload is complete, or show an error.

When you upload a sketch, you're using the Arduino **bootloader**, a small program that has been loaded on to the microcontroller on your board. It allows you to upload code without using any additional hardware. The bootloader is active for a few seconds when the board resets; then it starts whichever sketch was most recently uploaded to the microcontroller. The boot loader will blink the on-board (pin 13) LED when it starts (i.e. when the board resets).

LIBRARIES:

Libraries provide extra functionality for use in sketches, e.g. working with hardware or manipulating data. To use a library in a sketch, select it from the **Sketch** > **Import Library** menu. This will insert one or more **#include** statements at the top of the sketch and compile the library with your sketch. Because libraries are uploaded to the board with your sketch, they increase the amount of space it takes up. If a sketch no longer needs a library, simply delete its **#include** statements from the top of your code.



There is a [list of libraries](#) in the reference. Some libraries are included with the Arduino software. Others can be downloaded from a variety of sources or through the Library Manager. Starting with version 1.0.5 of the IDE, you do can import a library from a zip file and use it in an open sketch. See these [instructions for installing a third-party library](#).

CHAPTER 5

PERFORMANCE, DISCUSSION AND RESULT

IMPLEMENTATION

LIST OF MODULES

- ❖ DETECTION
- ❖ AUTHENTICATION
- ❖ UPDATE

PROPOSED METHOD

In proposed method the system is automated attendance in colleges, easy to maintaining the attendance system. Attendance Monitoring System means a computerized software along with special devices to capture attendance data such as arrival time, duration of absence from Section, leave at credit and ailment and monthly aggregate of hours of

duty and absence of employees.

PROPOSED SYSTEM ADVANTAGES

1. Easy to taking attendance
2. less man power

DETECTION

In this project our main motive is attendance monitoring system for students with covid 19 measures. Using IR sensor student will be detected and using contactless temperature sensor to detect the students body temperature. The LCD will update all information.

AUTHENTICATION

Our projects main motive is to authentication for students. We are using the authentication for fingerprint and face match. We are using MATLAB for face matching and fingerprint sensor used for fingerprint authentication. LCD will update the student information.

UPDATE

All the information will update the excel sheet. RTC used for time-to-time update in the excel sheet. Keypad will be used for student count.

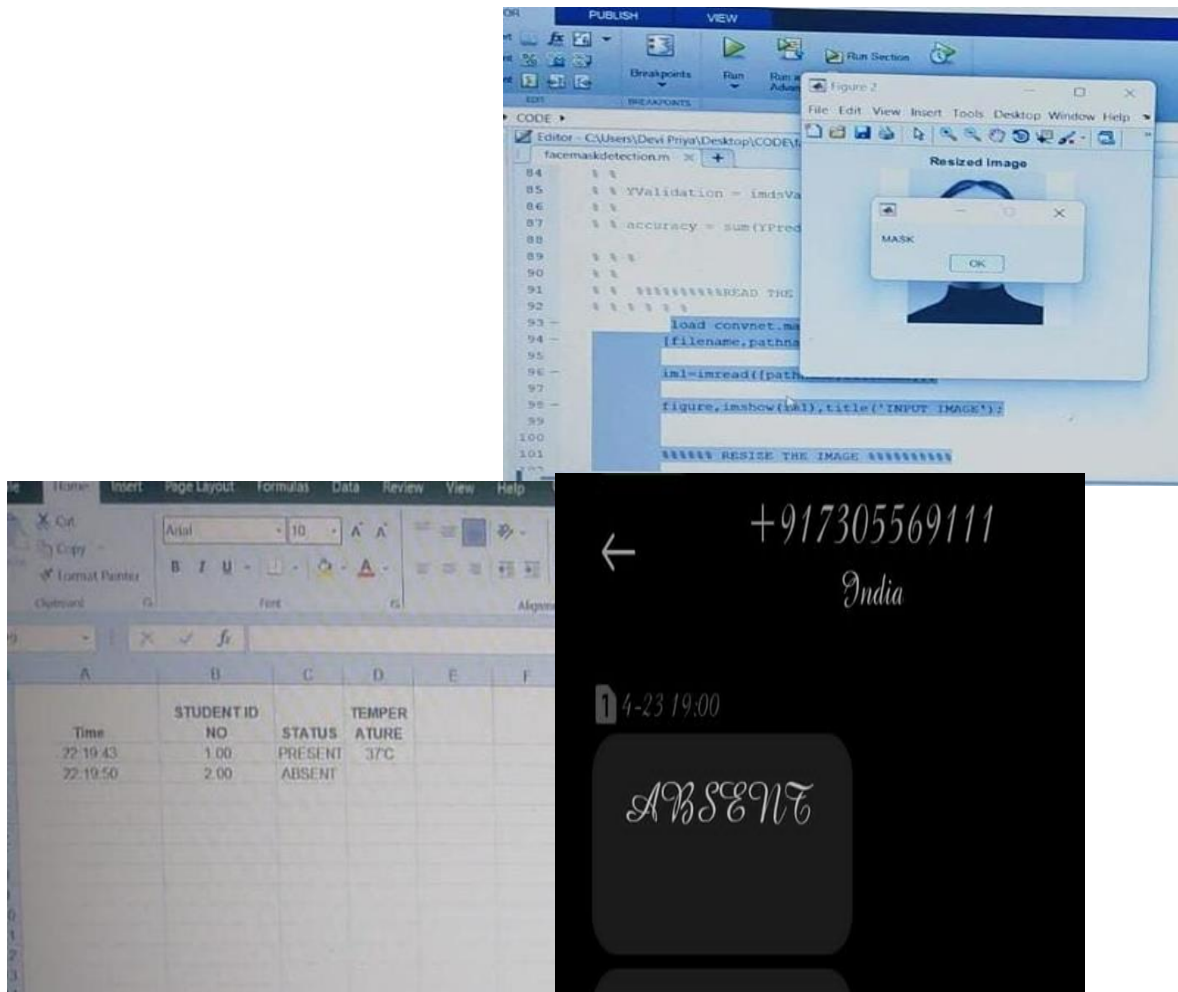
PROPOSED SYSTEM ADVANTAGES

1. Easy to taking attendance
2. less man power

RESULTS:

MATLAB

EXCEL Sheet



SMS

CHAPTER 6

1 SUMMARY AND CONCLUSION

As the evolution of society, diseases and technologies continues, new mHealth scenarios and applications will appear and become a reality, these identified open issues will be ongoing. The research communities need to continue reporting on the benefits, challenges and lessons learned of IoT in-home health monitoring systems deployment so that new system development can learn from. This paper presents the needs, the technology advances.

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INTERDISCIPLINARY PROJECT

ATTENDANCE MONITORING SYSTEM WITH COVID PREVENTION MEASURES

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ATTENDANCE MONITORING SYSTEM WITH COVID PREVENTION MEASURES

ABSTRACT

In today's era regardless of the field of study or preference for defining data (quantitative, qualitative), accurate data collection is essential for maintaining the integrity of research. Selection of appropriate method and the device used for data acquisition reduces chances of errors occurring. In this proposed method attendance management system of colleges. This paper presents a design and framework for taking attendance in colleges. As its targeted users are educational institutes where there is a requirement of affordable, user friendly, portable and secure automated system. Hence this prototype provides an amalgamated solution for replacing existing conventional attendance system with embedded attendance system.

AIM:

To develop a automated embedded system for taking attendance and student's data collection.

OBJECTIVE :

It is the collection of data of students while taking attendance like student's temperature, time ,whether they are wearing mask or not by using various sensor and also send SMS to their parents when they are absent.

HARDWARE REQUIREMENTS:

- ARDUINO MEGA
- IR SENSOR
- FINGERPRINT SENSOR
- MLX90614 TEMP.SENSOR
- LCD (16 X 2)
- RTC
- GSM
- POWER SUPPLY

SOFTWARE REQUIREMENTS :

- ARDUINO IDE
- EMBEDDED C

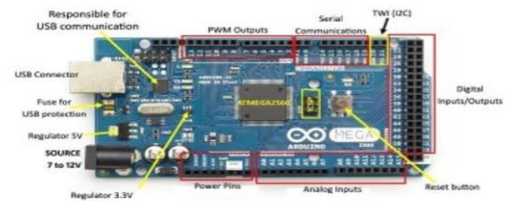
ARDUINO MEGA:

- The Arduino Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button .

- This board comes with USB cable port that is used to connect and transfer code from computer to the board.

- The board can operate on an external supply of 6 to 20 volts. The recommended range is 7 to 12 volts.

- Arduino Mega 2560 is compatible with WiFi shields hence allowing the wireless features for the applications in 3D printing and Robotics.



IR SENSOR

- An [infrared sensor](#) is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion.
- The emitter is simply an IR LED ([Light Emitting Diode](#)) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED.
- When the IR transmitter emits radiation, it reaches the object and some of the radiation reflects back to the IR receiver. Based on the intensity of the reception by the IR receiver, the output of the sensor defines.
- An Infrared technology implemented in night vision equipment
- IR sensors uses in radiation thermometers to measure the temperature depend upon the temperature and the material of the object.



FINGER PRINT SENSOR:

- Fingerprint scanners work by capturing the pattern of ridges and valleys on a finger. The information is then processed by the device's pattern analysis/matching software, which compares it to the list of registered fingerprints on file.
- R305 Fingerprint Module consists of optical fingerprint sensor, high-speed DSP processor, high-performance fingerprint alignment algorithm, high-capacity FLASH chips and other hardware and software composition, stable performance, simple structure, with fingerprint entry, image processing, fingerprint matching, search and template storage and other functions.
- R305 is a finger print sensor module with TTL UART interface. The user can store the finger print data in the module and can configure it in 1:1 or 1: N mode for identifying the person.
- The R305 fingerprint module has two interface TTL UART and USB2.0, USB2.0 interface can be connected to the computer.



CONTACTLESS TEMPERATURE SENSOR

- Thermopiles are mainly used for contactless temperature measurement in a wide range of applications. Their primary function is to transfer the heat radiation emitted from objects into a voltage output.
- Major applications include appliances such as microwave ovens, clothes dryers, and automated cooking, medical devices such as ear and forehead thermometers.
- Since the corona outbreak, it has become very difficult to identify those who are affected by the virus or not. To solve this issue, temperature devices are often used to measure body temperature. These devices have **non-contact IR temperaturesensors** which can **measure the body temperature** without any physical contact.



LCD (Liquid Crystal Display)

- A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits
- A **16x2 LCD** means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.
- The command register stores the command instructions given to the LCD. A command is an instruction given to LCD
- The data register stores the data to be displayed on the LCD.
- Most LCDs with 1 controller has 14 Pins and LCDs with 2 controller has 16 Pins (two pins are extra in both for back-light LED connections).
- LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters.

RTC

- Real-time clock (RTC) is a low-power, full binary-coded decimal (BCD) clock/calendar .
- The clock/calendar provides seconds, minutes, hours, day, date, month, and year information.
- The end of the month date is automatically adjusted for months with fewer than 31 days, including corrections for leap year. The clock operates in either the 24-hour or 12-hour format with AM/PM indicator.



GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM)

- Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication.
- Unlike mobile phones, a GSM modem doesn't have a keypad and display to interact with. It just accepts certain commands through a serial interface .
- In our simple project, the program waits for the mobile number to be entered through the keyboard. When a ten digit mobile number is provided, the program instructs the modem to send the text message.
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Power Supply :

- It should deliver constant output regulated power supply for successful working of the project
- A 0-12V/1 mA transformer is used for this purpose. The primary of this transformer is connected in to main supply through on/off switch& fuse for protecting from overload and short circuit protection.
- The secondary is connected to the diodes to convert 12V AC to 12V DC voltage. And filtered by the capacitors ,Which is further regulated to +5v, by using IC 7805.

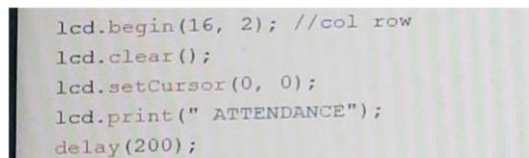
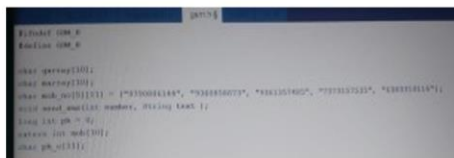
MATLAB

- MATLAB (an abbreviation of "Matrix Laboratory") is a proprietary multiparadigm programming language and numeric computing environment developed by MathWorks. MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages.
- The MATLAB language supports the vector and matrix operations that are fundamental to engineering and scientific problems. It enables fast development and execution.
- MATLAB is an efficient platform for accessing data from files, other applications, databases, and external devices. You can read data from popular file formats, such as Microsoft Excel; ASCII text or binary files; image, sound, and video files

Software requirement

ARDUINO IDE:

- The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board.
- Programs written using Arduino Software (IDE) are called **sketches**. These sketches are written in the text editor and are saved with the file extension .



EMBEDDED C

- Embedded C is most popular programming language in software field for developing electronic gadgets .
- In day-to-day life we used many electronic devices such as mobile phone, washing machine, digital camera, etc. These all device working is based on microcontroller that are programmed by embedded C.
- In embedded system programming C code is preferred over other language . Due to the following reasons:
 - Easy to understand
 - High Reliability
 - Portability
 - Scalability
- The extension in C language is known as embedded C programming language. As compared to above the embedded programming in C is also have some additional features like data types, keywords and header file etc is represented by `#include <microcontroller name.h>`.

ADVANTAGES :

- 1.Continuous monitoring.
- 2.Easy to maintain process
- 3.Fast response of the system.

CONCLUSION :

As the evolution of society, diseases and technologies continues, new mHealth scenarios and applications will appear and become a reality, these identified open issues will be ongoing. The research communities need to continue reporting on the benefits, challenges and lessons learned of IoT in home health monitoring systems deployment so that new system development can learn from. This paper presents the needs of technology advances.

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 **SPIRO PRIME TECH SERVICES** 

10th April, 2022

Internship Confirmation

This is to acknowledge that Ms. DEVI PRIYA V (Reg No:SP22M011), a Student of IIIrd year B.TECH (BIO TECHNOLOGY) from "SATHYARAMA INSTITUTE OF SCIENCE & TECHNOLOGY" will be going to act as an Internship trainee under the technology of "EMBEDDED" at our concern from 20.03.2022 to 23.04.2022.

Thanking you,

For SPIRO PRIME TECH SERVICES,


M. SAMPATH KUMAR
MANAGER



Corporate Office : # 78, 3rd Floor, Uthman Road, T.Nagar, Chennai - 600 017.
Mail: hr@spiroit.com Mobile: 9791 044 044 / www.spiroprojects.com.

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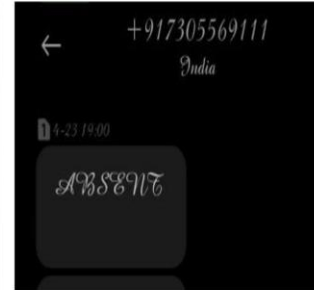
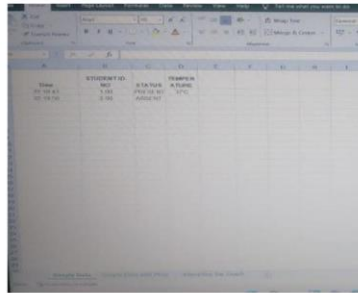
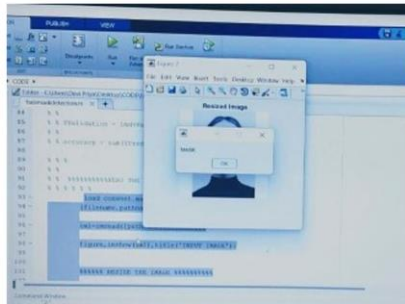


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PROCESS:

- Connect the adaptor to the power supply and connect the Arduino mega cable to the PC and PLX cable to the PC.
- Switch on Arduino mega and PC. First IR sensor detect the moving of any object.
- Then , by using the MATLAB program , we can check whether the person is wearing mask or not.
- Next , Contactless temperature sensor detect the person's body temperature . It will automatically update in Excel sheet via PL-Excel cable.
- Then , when the person touch fingerprint sensor, it will authenticate the student and will update on Excel sheet with time. RTC is use for time update.
- At last , GSM will send the SMS to the corresponding parents mobile number ,when the student is absent.

OUTPUT :



THANK YOU

