Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

NEW ARTS COMMERCE AND SCIENCE COLLEGE, AHMEDNAGAR (AUTONOMOUS)

Project Report On

"Wireless Notice Board"

-: Submitted By:-

Miss:- Walhekar Rutuja Jalindar

Msc II. (Electronic Science)

A.Y. 2022-23

Under the Guidance of

Prof :- P. M.Gaikwad

Department of Electronic Science

Certificate

This is certify that **, Miss. Rutuja Jalindar Walhekar** has successfully submitted the project report entitled **"Wireless Notice Board"** towards the fulfillment of the project in Msc.II. Electronic Science, at Department of Electronic Science, New Arts, Commerce and Science College, Ahmednagar (Autonomous), Savitribai Phule Pune University, Pune during the academic year 2022-23.

Project Guide **Internal** **External** **H.O.D**

Acknowledgement

This acknowledgement is intended to thank all those who guided and supported me in carrying out my project. When expressed in words, feelings of gratitude are partially conveyed.

At first, I would like to express my heartiest gratitude & thanks to **HOD Prof. D. K. Sonawane & other respected teachers** for their kind help and guidance throughout my course.

I want to special thanks to **prof :-P. M. Gaikwad** for suggesting me my projectand providing me valuable guidance and support through whole of work. I also want specially thanks to **all my friends** for guiding and helping me

(Walhekar Rutuja Jalindar)

Date :-

Place :-Ahmednagar.

Contents

List of Figure

CHAPTER 1

Introduction to Developed System

1.1 Aim & Objectives:

Aim: To develop Wireless Notice Board Using Arduino and Bluetooth ModuleHC-05

Objectives:

1) To understand the working of Bluetooth Module HC-05.
2) To interface Bluetooth Module with Arduino Uno.
3) To develop wireless notice board.

1.2 Introduction:

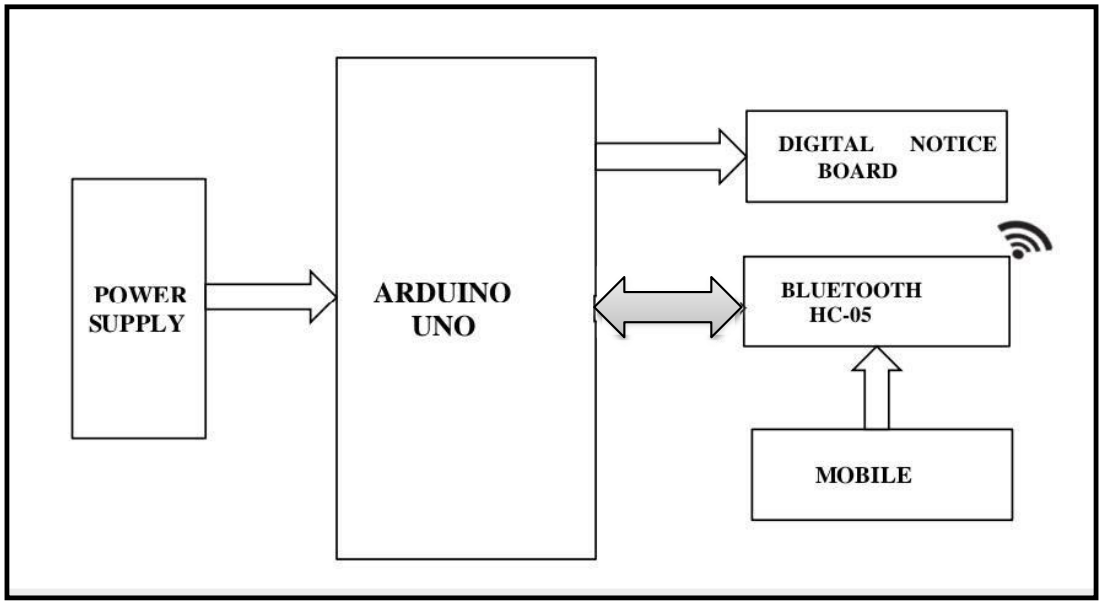
A wireless notice board is a modern-day electronic device that is used for displaying various kinds of information, such as news, events, advertisements, and announcements. It is a wireless system that enables users to remotely update the content displayed on the notice board from a computer or mobile device. Wireless notice boards typically consist of a display screen, a microcontroller, a wireless module, and a power supply. The display screen can be an LCD or LED panel of various sizes, and the microcontroller is responsible for controlling the display and receiving commands from the wireless module. The wireless module can be a Wi-Fi or Bluetooth module, which enablesthe device to connect to the internet or a local network.

Wireless notice boards are commonly used in public places like schools, colleges, hospitals, airports, railway stations, and bus stops. They are also used in corporate environments for displaying announcements and schedules in offices and conference rooms. With the help of wireless notice boards, organizations can easily update and manage their display content from a central location, saving time and resources. Wireless notice boards offer numerous benefits over traditional notice boards, such as cost savings, increased efficiency, and improved communication.

Installing and maintaining a wireless notice board is relatively easy, and it can be done by anyone with basic technical knowledge. Most manufacturers provide detailed instructions and documentation to guide users through the installation and maintenance processes. Wireless notice boards typically come with software that enables users to remotelyupdate the content displayed on the notice board. The software may be web-based or installedon a computer or mobile device. It allows users to create and schedule messages, set display parameters, and monitor the status of the notice board.

Overall, wireless notice boards are a convenient and effective way to communicate with a large audience, and their popularity is increasing as technology continues to advance. Notice boards are a versatile and effective communication tool that can help organizations improve their communication and engagement with their target audience.

1.3 Block Diagram:



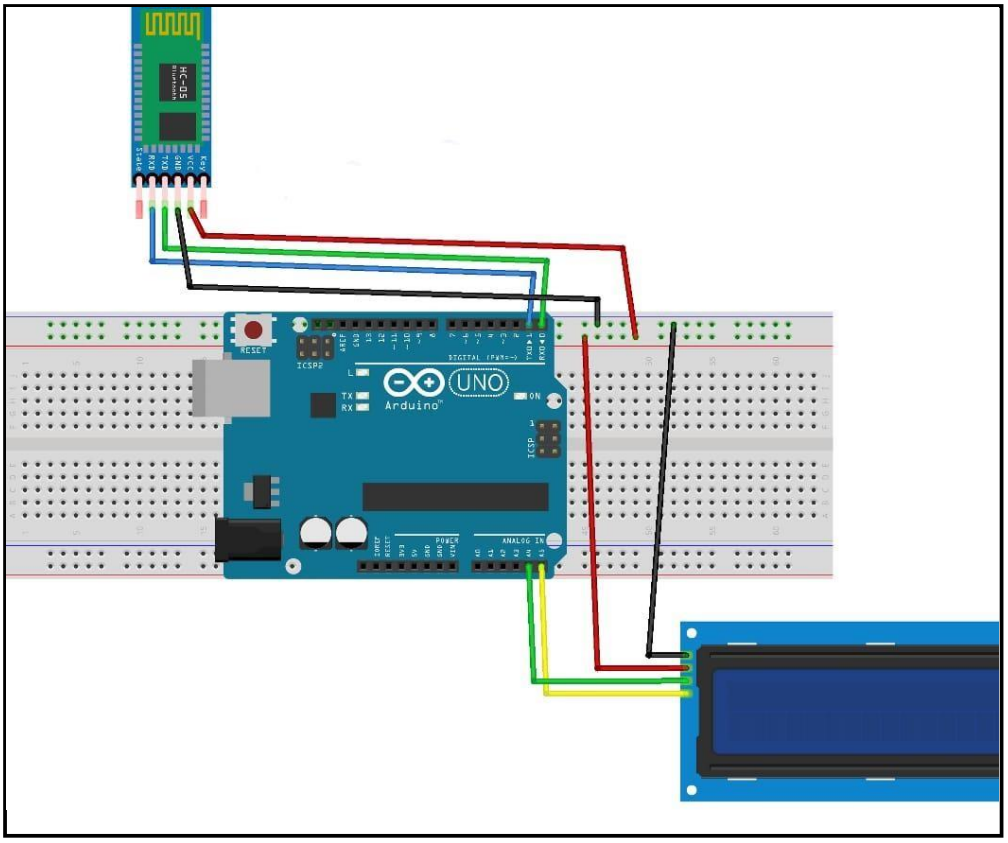
1. Microcontroller: The microcontroller is the brain of the wireless notice board. It controls all the functions of the notice board, including displaying the information on the screen, receiving and processing wireless signals, and managing powerconsumption.
2. Bluetooth Module: The wireless module is responsible for establishing a wireless connection between the notice board and a remote device, such as a computer or mobile phone. It can use various wireless protocols, such as Wi-Fi, Bluetooth, or Zigbee.
3. Display Screen: The display screen is the most visible component of the notice board. It can be an LCD or LED panel of various sizes, depending on the application and requirements. The microcontroller controls the display screen and updates the information displayed on it.

4. Power Supply: The power supply provides the necessary voltage and current to runthe wireless notice board. It can be either an AC or DC power source, and it may also include battery backup systems.

5. User Interface: The user interface allows users to interact with the wireless notice board. It may include buttons, touchscreens, or keypads, depending on the application and requirements.

Overall, the block diagram of a wireless notice board shows how the different components of the device work together to enable wireless communication and displayinformation on the screen. The microcontroller is the central component that controls the functions of the notice board, and the wireless module provides the connectivity to remote devices. The display screen is the most visible component, and the power supply, user interface, memory, and sensors complete the system.

1.4 Circuit Diagram:



1.5 Application:

1. Bus stands.
2. Railway stations.
3. Airports.
4. Shopping malls.
5. Parks.

CHAPTER 2

Development of System Hardware

2.1 Arduino Uno

Here are some of the key features of the Arduino Uno board:

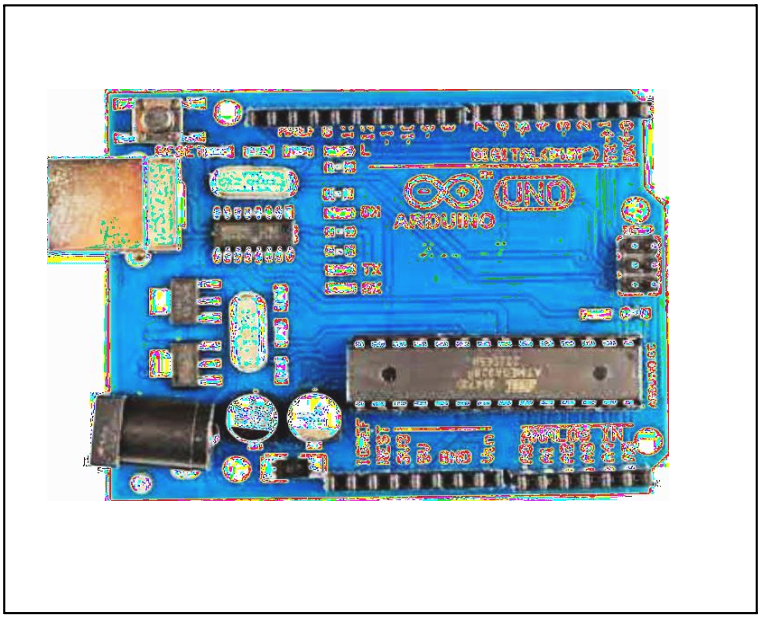


Figure 1 - Arduino Uno

- Microcontroller: The Arduino Uno board is based on the Atmel ATmega328P microcontroller, which is a low-power, high-performance chip that can run at up to 16MHz.
- Digital and Analog Inputs/Outputs: The board has 14 digital input/output pins that can be used for interfacing with digital sensors, motors, and other devices. It also has 6 analog input pins that can read analog signals from sensors, potentiometers, and other analog devices.
- USB Interface: The board has a built-in USB interface that allows it to connect to a computer for programming and communication. It also provides power to the board, eliminating the need for an external power

supply.

- Power Supply: The Arduino Uno can be powered using a USB cable, a 9V battery, or an external power supply. It has a voltage regulator that can handle input voltages from 7 to 20V.

Integrated Development Environment (IDE): The Arduino Uno comes with an easy-to-use software environment that allows users to write, compile, upload code to the board. The IDE is open-source and runs on Windows, MacOS X, and Linux.

- Shields: The Arduino Uno can be expanded using shields, which are plug-in boards that provide additional functionality, such as Ethernet connectivity, motor control, and LCD displays.

The Arduino Uno board is a versatile and powerful tool that can be used for awide range of projects, from simple LED blinking to complex robotics and automation systems. Its ease of use, affordability, and open-source nature have made it a popular choice among hobbyists, students, and professionals alike.

2.2 Basic Features of Arduino Uno

- Microcontroller: The Arduino Uno board is based on the Atmel ATmega328P microcontroller.
- Digital Input/Output Pins: The board has 14 digital input/output (I/O) pins .
- Analog Input Pins: The board has 6 analog input pins.
- PWM Pins: The board has 6 Pulse Width Modulation (PWM) pins.
- USB Interface: The board has a built-in USB interface that allows it to connect to a computer for programming and communication.
- Integrated Development Environment (IDE): The Arduino Uno comes with an easy-to-use software environment that allows users to write, compile, and upload codeto the board.

2.3 Arduino Uno specifications

1. Microcontroller: ATmega328P
2. Operating Voltage: 5V
3. Input Voltage (recommended): 7-12V
4. Input Voltage (limits): 6-20V
5. Digital I/O Pins: 14 (of which 6 provide PWM output)
6. Analog Input Pins: 6
7. DC Current per I/O Pin: 20 mA
8. DC Current for 3.3V Pin: 50 mA
9. Flash Memory: 32 KB (ATmega328P) of which 0.5 KB used by bootloader
10. SRAM: 2 KB (ATmega328P)
11. EEPROM: 1 KB (ATmega328P)
12. Clock Speed: 16 MHz
13. USB Interface: ATmega16U2
14. Length: 68.6 mm

2.4 Bluetooth Module (HC-05)

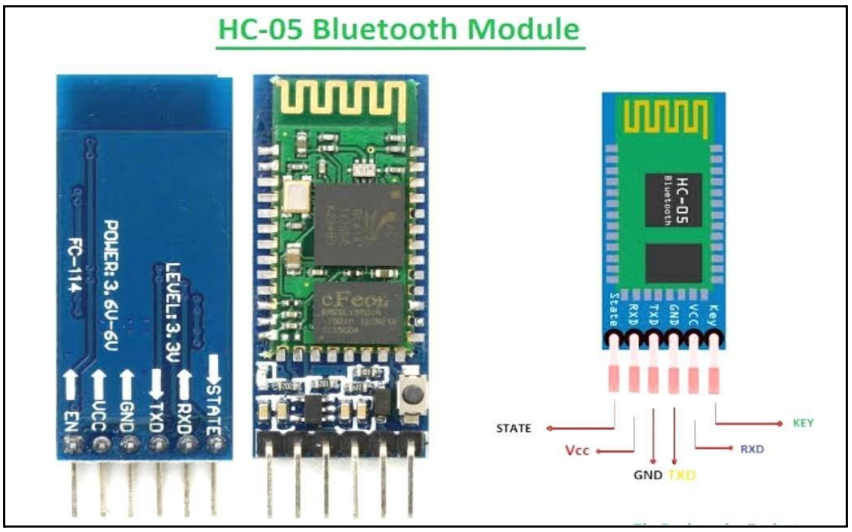


Figure 2 – Bluetooth Module

The HC-05 is a popular Bluetooth module that can be used to add wireless communication capabilities to microcontroller-based projects. Here is some additional information about the HC-05 module:

1. Bluetooth version: The HC-05 uses Bluetooth version 2.0+EDR (Enhanced Data Rate), which provides faster data transfer rates and improved power consumption compared to earlier Bluetooth versions.
2. Operating Frequency: The module operates on the 2.4GHz ISM (Industrial, Scientific and Medical) band.
3. Communication distance: The communication range is typically up to 10 meters, depending on the environment and the antenna used.
4. Power supply: The module can be powered by a voltage range of 3.6V to 6V DC, but it includes an onboard voltage regulator that allows it to be powered from a 5V source.
5. Serial communication: The HC-05 communicates with a microcontroller (or other device) over a serial interface, using TTL level signals at a default baud rate of 9600 bps. It supports a range of data formats, including 8 data bits, no parity, and 1 stop bit.

6. Supported profiles: The HC-05 supports the Serial Port Profile (SPP) and the Human Interface Device (HID) profile, among others.
7. Configuration: The module can be configured using AT commands, allowing you to set various parameters such as the device name, pairing code, and communication parameters.
8. Compatibility: The HC-05 is compatible with a wide range of microcontrollers, including the popular Arduino platform, and can also be used with a variety of other devices that support Bluetooth.

The HC-05 is a versatile and reliable Bluetooth module that can be used in a wide range of applications, from simple wireless data transfer to complex control systems. Its low cost, ease of use, and wide compatibility make it a popular choice for hobbyists and professionals alike.

2.5 Bluetooth Module application

i. Wireless communication.

ii. Simple Serial interface.

iii. Easy to use.

iv. Long-range communication.

v. Small size.

vi. Low power consumption.

vii. Support Multiple profiles.

2.6 I2C Module

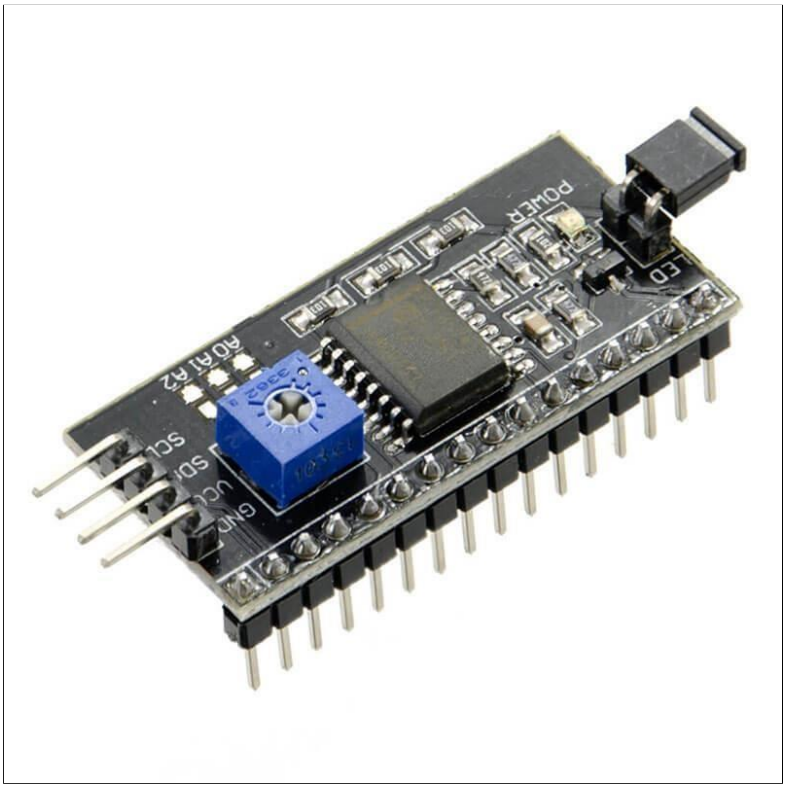


Fig.3- I2C Module

I2C, which stands for Inter-Integrated Circuit, is a popular serial communication protocol used for connecting multiple devices together on the same bus. It was developed by Philips (now NXP Semiconductors) in the 1980s as a simple and efficient means of communication between integrated circuits.

The I2C bus consists of two signal lines: a serial data line (SDA) and a serial clock line (SCL). These lines are shared among all the devices connected to the bus. Each device on the 12C bus has a unique address, allowing the master device (typically a microcontroller) to communicate with specific slave devices.

I2C operates in a master-slave architecture, where the master device initiates and controls the communication with the slave devices. The master generates the clock signal on the SCL line, while the data is transferred bidirectionally over the SDA line.

2.7 LCD Display

Figure 4 – LCD Display

An LCD (Liquid Crystal Display) is a common type of display used in electronics projects to display text and simple graphics. Here are some key features and information about LCD displays:

1. Display technology: LCD displays use a liquid crystal material sandwiched between two glass plates to display images. The display is made up of a grid of pixels that can be turned on or off to create characters and graphics.

2. Character display: Most LCD displays used in electronics projects are character displays, which can display a limited number of characters (typically 16x2 or 20x4). Each character is made up of a 5x8 or 5x11 pixel matrix.

3. Communication interface: LCD displays are typically controlled using a parallel interface or a serial interface (such as I2C or SPI). The interface allows the microcontroller to send data and commands to the LCD display to control what is displayed on the screen.

4. Backlighting: Most LCD displays have a built-in backlight, which can be turned on or off to make the display easier to read in low light conditions.
5. Power consumption: LCD displays typically consume very little power, making them suitable for battery-powered applications.
6. Libraries: There are many software libraries available for controlling LCD displays with various microcontrollers. These libraries simplify the programming process and provide an easy-to-use interface for controlling what is displayed on the screen.
7. Custom characters: Some LCD displays allow you to define custom characters, whichcan be useful for displaying symbols or icons that are not included in the built-in character set.
8. Cost: LCD displays are relatively low-cost and widely available, making them a popular choice for electronics projects.

Overall, LCD displays are a versatile and easy-to-use display technology that can be used in a wide range of electronics projects. They are compatible with many microcontrollers and programming languages, and can display a variety of characters and graphics.

2.8 Mobile Application Used

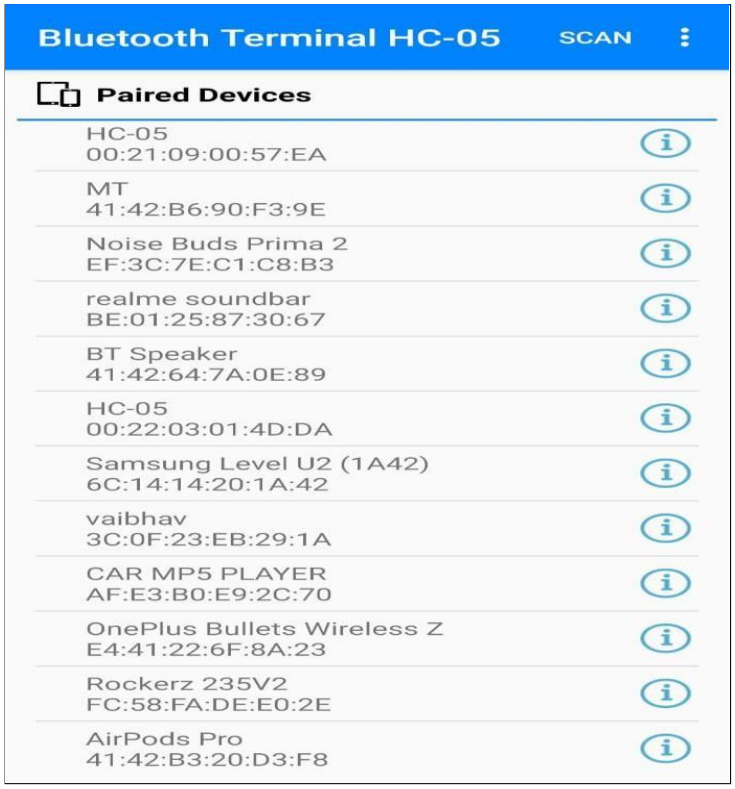


Figure 5 – Bluetooth Module HC-05

There are many mobile applications available that can be usedwith the HC-05 Bluetooth module. Here are a few examples:

1. BlueTerm: This is a simple terminal application that allows you to send and receive data wirelessly over Bluetooth. You can use it to send commands to your microcontroller or other device, and receive data back from it.

2. Bluetooth Serial Controller: This app provides a more advanced interface for controlling and monitoring Bluetooth-enabled devices. It supports a wide range of Bluetooth modules, including the HC-05, and allows you to send and receive data in avariety of formats.

3. Arduino Bluetooth Controller: This app is designed specifically for use with Arduino microcontrollers and the HC-05 module. It allows you to create a custom controlpanel for your project using a graphical user interface. You can use it to control motors, LEDs, and other components, and receive sensor data wirelessly.

4. Serial Bluetooth Terminal: This app provides a simple terminal interface for sending and receiving data over Bluetooth. It supports a wide range of Bluetooth modules, including the HC-05, and allows you to customize the interface with different themes and color schemes.

5. BlueTerm: This is a simple terminal application that allows you to send and receive data wirelessly over Bluetooth. You can use it to send commands to your microcontroller or other device, and receive data back from it.

6. Bluetooth Serial Controller: This app provides a more advanced interface for controlling and monitoring Bluetooth-enabled devices. It supports a wide range of Bluetooth modules, including the HC-05, and allows you to send and receive data in avariety of formats.

7. Arduino Bluetooth Controller: This app is designed specifically for use with Arduino microcontrollers and the HC-05 module. It allows you to create a custom controlpanel for your project using a graphical user interface. You can use it to control motors, LEDs, and other components, and receive sensor data wirelessly.

8. Serial Bluetooth Terminal: This app provides a simple terminal interface for sending and receiving data over Bluetooth. It supports a wide range of Bluetooth modules, including the HC-05, and allows you to customize the interface with different themes and color schemes.

9. Bluetooth Electronics Control: This app is designed for controlling electronics projects wirelessly using Bluetooth. It supports a variety of modules, including the HC-05, and provides a graphical user interface for controlling motors, LEDs, andcomponents.

When selecting a mobile application to use with the HC-05, it is important to choose one that is compatible with your mobile device's operating system, and provides the functionality you need for your project. Additionally, it is important to make sure that the appcommunicates with the HC-05 using the correct data format and implements appropriate security measures to protect your data.

CHAPTER 3

Development of System Software

3.1 INTRODUCTION

1. Double Click on “Arduino” icon.

2. The Arduino IDE will be opened with previously open project.

3. For new project go to File -> New.

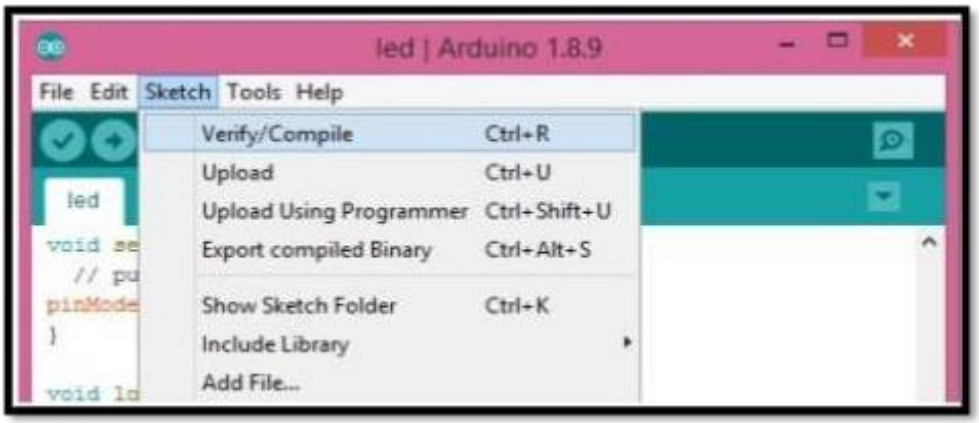
4. New Project is open.

5. It contains two main sections. setup() & loop().

6. After writing your program save it, go to File -> Save.

7. Select the folder where you want to save your file (if don’t want to save in defaultArduino folder), then give the appropriate name to the file and click on “save”.

8. Then to compile the written program, select Sketch -> Verify / Compile option. Orclick on “Verify” button.



9.After compilation is done, output window display message "Done Compiling" (if there are no errors in a program). Also display information about how much program & data memory is used by the program.

10. Double Click on "Arduino" icon.

11. The Arduino IDE will be opened with previously open project.

12. For new project go to File -> New.

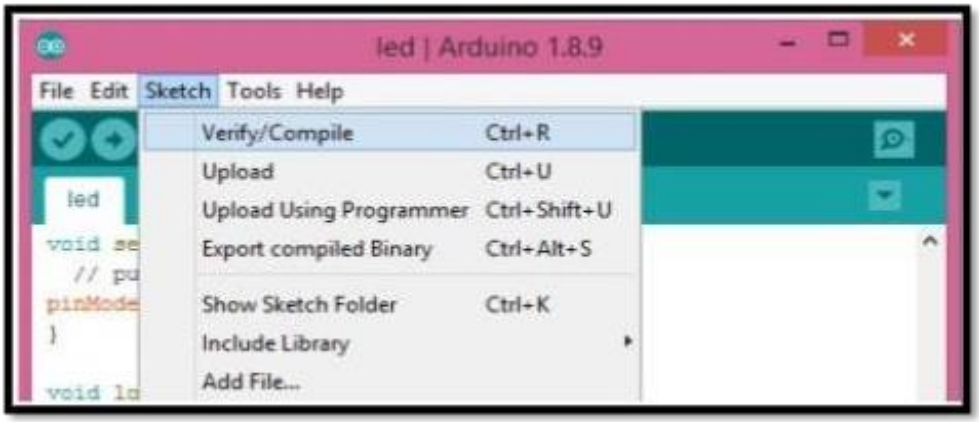
13. New Project is open.

14. It contains two main sections. setup() & loop().

15. After writing your program save it, go to File -> Save.

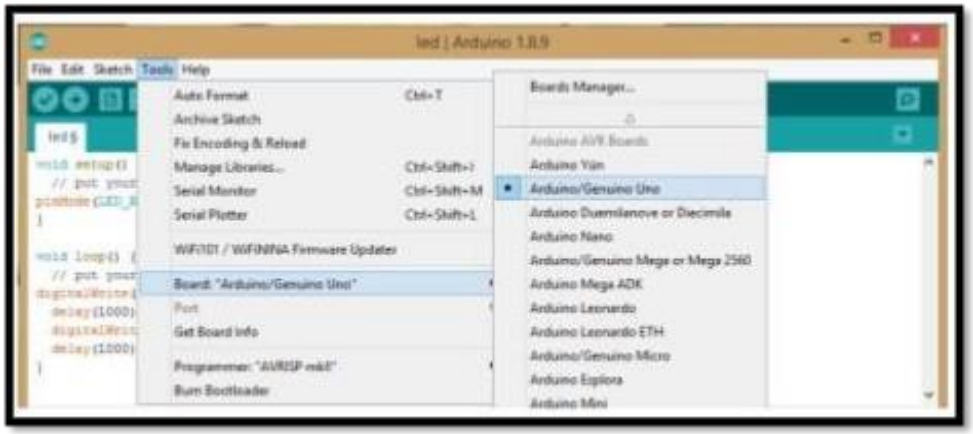
16. Select the folder where you want to save your file (if don't want to save in defaultArduino folder), then give the appropriate name to the file and click on "save".

17. Then to compile the written program, select Sketch -> Verify / Compile option. Orclick on "Verify" button.



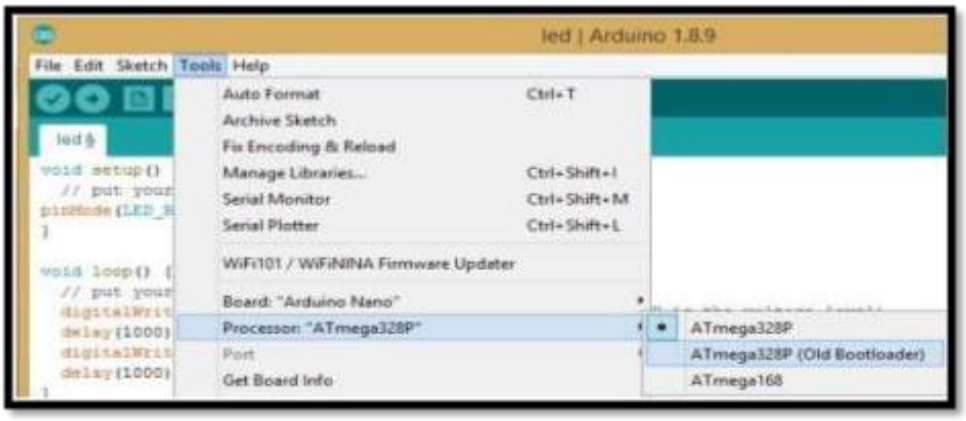
18. After compilation is done, output window display message “Done Compiling” (if there are no errors in a program). Also display information about how much program & data memory is used by the program.

19.Then select the desired Arduino board, go to Tools -> Board: -> Arduino / Genuine Uno (if Uno issued) or select Arduino Nano (if



Nano is used).

20.For Arduino Nano, there is option for selection of Processor. This has threechoices user can select one as per the processor & Bootloader used in the available Nano board.

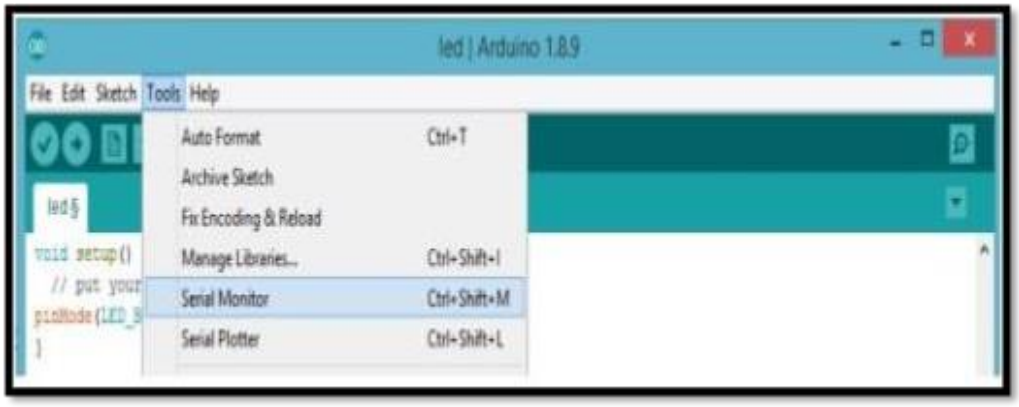


21. After selecting the board, select the COM port where selected board is connected. Go to the Tools -> Port.

22. Once board & COM port is selected, upload the program on to the connected board. Go to Sketch - > Upload. (Arduino has on board programmer, hence no need of external programmer.)

23. Perform necessary connections to the Arduino and observed the output. In order toexecute program again from start press Reset button on the Arduino board.

24. If you want to use serial monitor, go to Tools -> Serial Monitor. (Serial monitor displays the data coming from serial port of the



Arduino).

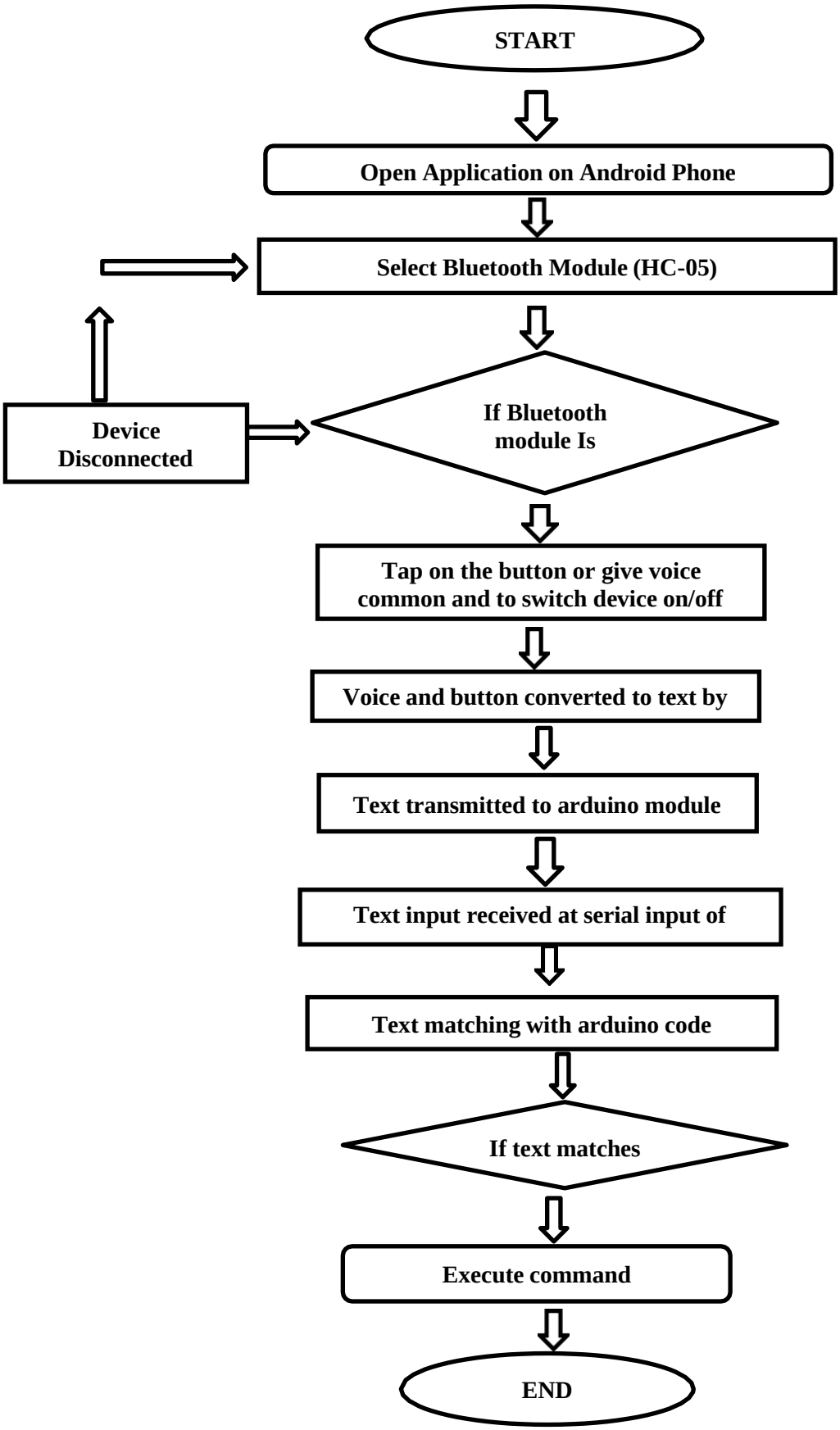
25. You can go through the in-build examples available in the Arduino IDE and trythem on actual Arduino board as per your interest.

3.2 Program

```
#include<SoftwareSerial.h>
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 16, 2);
String val;
void setup() {
  Serial.begin(9600);
  lcd.init();
  lcd.backlight();
  lcd.clear();
}
void loop() {

  if (Serial.available()>0)
  {
  val = Serial.readString();
  val.trim();
  Serial.println(val);
  Serial.println();
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Notice : ");
  lcd.setCursor(0, 1);
  lcd.print(val);
  }
 }
```

3.3 Flowchart



CHAPTER 4

Result & Conclusion

4.1 Experimental Setup

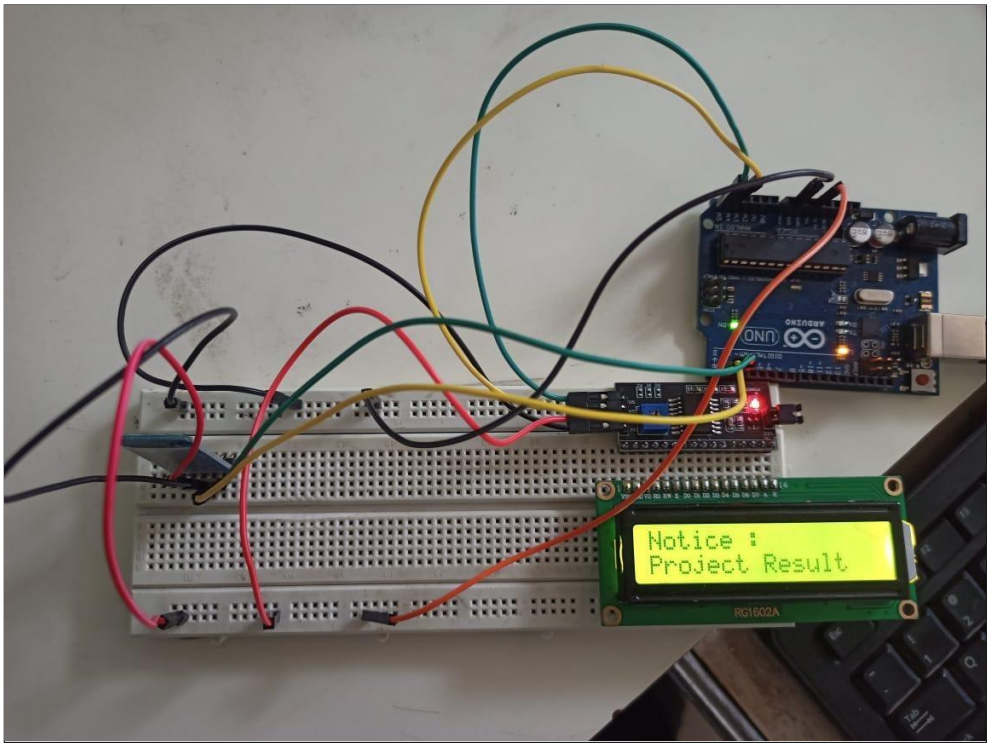


Figure 6: Experimental set up of project

The result of the proposed method is a simple display of the message on the LCD screen. The output helps us to analyze that the result which was intended to achieve is so successful. The output displayed on the screen is the message sent using HC-05 Bluetooth terminal. The sample message that will be displayed on the screen is seen where the message is on the interface.

Overall, the final result of a wireless notice board project is a functional and useful device that can display important information in a convenient and engaging way, while also providing a valuable learning experience for students or hobbyists interested in electronics and programming.

4.2 Result

The results of a wireless notice board project can vary depending on the specific goals and objectives of the project. However, some common results that can be expected from a wireless notice board project include:

Improved communication: A wireless notice board can help improve communication within an organization by allowing for real-time updates and the ability to reach a large audience quickly.

Time and cost savings: Using a wireless notice board can help organizations save time and money by eliminating the need to print and distribute paper notices.

Increased engagement: By using a wireless notice board, organizations can increase audience engagement and participation by displaying dynamic and engaging content such as images and videos.

Enhanced organization: A wireless notice board can help organizations stay organized by providing a central location for displaying important information and updates.

Flexibility and customization: Wireless notice boards can be customized to meet the specific needs and requirements of different organizations, making them a flexible and versatile communication tool.

Overall, a wireless notice board project can have a positive impact on communication, organization, and engagement within an organization, while also providing time and cost savings.

4.3 Conclusion

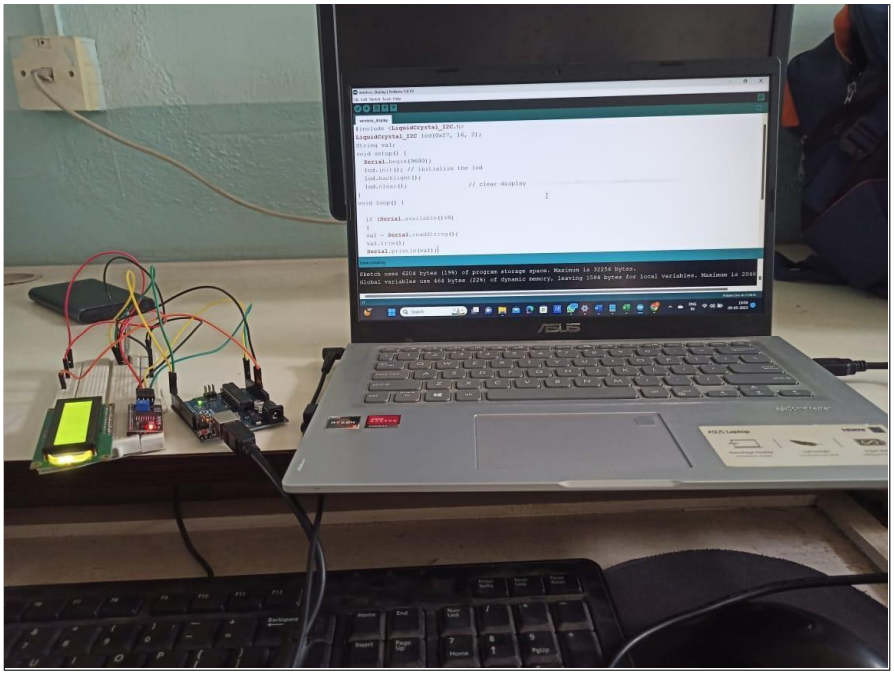


Figure 7- Output of Experiment

As the technology is advancing every day the display board systems are movingfrom Normal handwriting display to digital display. Further to Wireless display units. This project develops a wireless notice board system with Bluetooth connected to it, which displays the desired message of the user through an SMS in a most populated or crowded places. Here by introducing the concept of wireless technology in the Field of the communication. We can make our communication more efficient and faster, with greater efficiency. We can display the messages and with less errors and maintenance.

Chapter 5

References

[1] Ramya R, Bavithra N, Priyanka M “Wireless E-notice board using Bluetooth technology”,IJERT 2018.

[2] Dharmendra Kumar Sharma, Vineet Tiwari, Krishnan Kumar, et.al, “Small and MediumRange Wireless Electronics Notice Board using Bluetooth and Zig Bee”, IEEE INDICON 2015.

[3] M. Abila Mary, B. Pavithra, R. Sangeetha, Prof.T.C. Subbu Lakshmi “GSM basedwireless noticeboards using Arduino”, IJARTET 2019.

[4] Pooja Pawar, Suvarna Langade, Mohini Bandgar “IOT Based Digital Notice Board usingArduino ATMega328”, IRJET 2019.

[5] Pallavi M. Banait, Nikita P. Bakale, Mayuri S. Dhakulkar, Bhushan S. Rakhonde “Costeffective Android based wireless notice board”, IJETER 2018.

[6] Gaurav Bhardwaj, Gunjan Sahu, Rajan Kumar Mishra “IOT based smart notice board”,

[7] Youtube.

[8] Google.