DEPARTMENT OF ELECTRONIC SCIENCE

K.T.H.M College,Nashik

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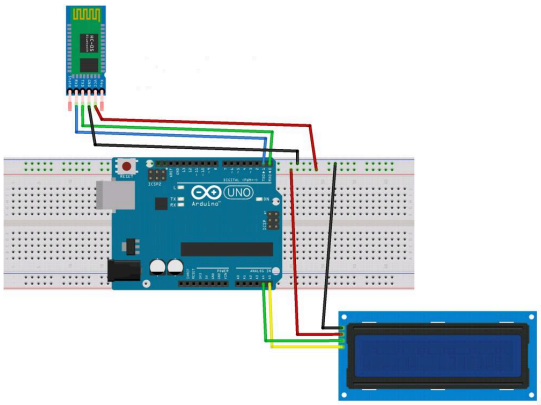
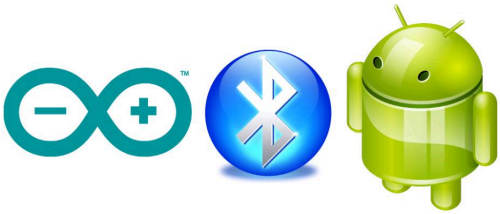
Wireless Digital Notice Board Display Based On Arduino and Bluetooth Technology





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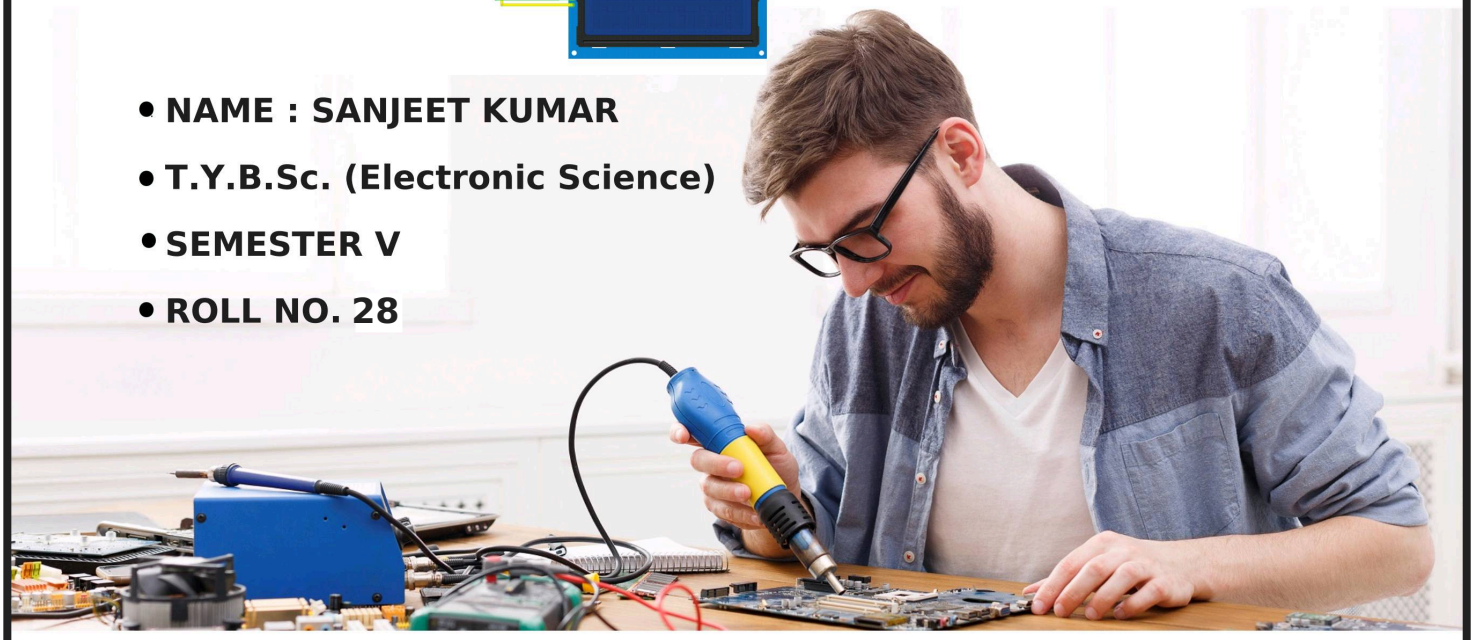

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This is to certify that **SANJEET KUMAR** of T.Y.B.Sc., **Roll No. 28** has completed project satisfactory as partial fulfilment of curriculum during academic year 2021-22.

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INDEX

Tittle of Project

Wireless Digital Notice Board Display Based on Arduino and Bluetooth Technology

ABSTRACT

This document deals with an innovative rather an interesting manner of intimating the message to the people using a wireless electronic display board which is synchronized using the Bluetooth technology. This will help us in passing any message almost immediately without any delay just by sending a SMS which is better and more reliable than the old traditional way of passing the message on notice board. This proposed technology can be used in colleges many public places, malls or big buildings to enhance the security system and also make awareness of the emergency situations and avoid many dangers. Using Bluetooth module display the message onto the display board. The Electronic notice board is wireless and no need of wires for displaying the information on the LCD Display. It is very easy to operate and consumes less power. The circuit of the wireless notice board is portable.

AIM AND OBJECTIVE OF THE PROJECT

Presently almost all electronic notice boards are designed using wired system.One of the drawbacks of the design is the system is inflexible in term of placement.The common notice board cannot be placed anywhere because of the messy wire.The aim of this project is to develop a digital notice board that will be used at the faculty in order to display latest information through Bluetooth module. The message can be send through android application.

INTRODUCTION

Wireless technology has a tremendous progress over the past few years. The ever-increasing use of wireless networks serves as an indicator of the progress in the area of wireless networks. As a means of communication, notice board are widely trendy with its applications ranging from schools, colleges, hospitals to major organizations. Notice boards effectively tackle the global problem of deforestation by conveying messages at large without the use of paper. The design of SMS driven automatic display Board which can replace the currently used programmable electronic display and conventional notice board. It is proposed to design receive cum display toolkit which can be programmed and later be used from an authorized mobile phone. It consists of ardunio board, controller AT mega 328P, Bluetooth ,mobile phone and LCD display board.LCD display board is used for testing the proposed model. The interfacing of a ardunio board with mobile phone is quite easy with help of the terminal pin, read/write pin .Hence we employ Atmel ATmega328p microcontroller. The complexity of coding of our proposed system is less as compared with PC, but once programmed the microcontroller works at its best. The design procedure involves identifying the different components and assembling all of them and it makes proper communication. Then coding process has to be done, which has to take care of the difference between two successive communications.

LITERATURE SURVEY

[1] Ramya R, Bavithra N, Priyanka M, “Wireless Enotice board using Bluetooth technology” This paper explains E-notice board with the help of Bluetooth technology.This document deals with an innovative rather an interesting manner of intimating the message to the people using a wireless electronic display board whichis synchronized using the Bluetooth technology. This will help us in passing any message almost immediately without any delay just by sending a SMS which is better and more reliable than the old traditional way of passing the message on noticeboard. This proposed technology can be used in colleges many public places, malls or big buildings toenhance the security system and also make awarenessof the emergency situations and avoid many dangers.

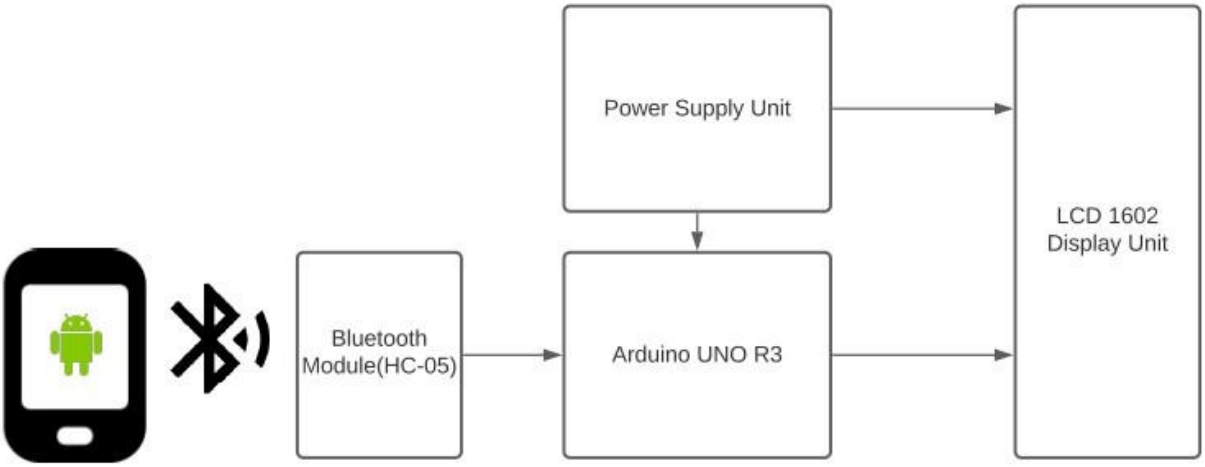
[2] Dharmendra Kumar Sharma, Vineet Tiwari,“Small and medium range wireless electronic notice board using Bluetooth and ZigBee” this paper introduces Notice Board using Bluetooth and ZigBee Technology.When information exchange occurs between people via a network, then authentication and security of data have more priority. This paper introduces a low cost,hand held, wireless electronic notice board by using Atmel’s ATmega32 microcontroller and different wireless technologies (Bluetooth and ZigBee) and their performance analysis based on the parameters uch as range, BER (bit error rate), RSSI (Received signal strength indicator), signal attenuation and power consumption. The notice board receives seria ldata from wireless module receiver and displays it on the graphical liquid crystal display. We have realized a common communication receiver hardware for notice board having compatibility with both wirelessmodules i.e., Bluetooth and ZigBee. We used KS0108based 128x64 graphical LCD as display element.

[3] M. Abila Mary, B. Pavithra, R. Sangeetha,Prof.T.C. Subbu Lakshmi, “GSM based wireless notice board using Arduino” In this paper built a Notice board using GSM technology.The GSM based notice board is aimed at the colleges and universities for displaying day-to-day information continuously or at regular intervals during the working hours. Being GSM-based system, it offers flexibility to display flash news or announcements faster than the programmable system.• To develop a GSM based notce board whose contents can be updated through an SMS which realized through an embedded system with microcontroller.• To design a project simple, easy to install, user friendly system, which may receive and display notice in a very specific manner.• SMS based notice board in corporating the widely u sed GSM to facilitate the communication of displaying message on notice board via user’s mobile phone.• SIM 800 GSM modem with a SIM card is interfaced to the ports of the Arduino with the helpo f AT commands.

[4] Pallavi M. Banait, Nikita P. Bakale, Mayuri S. Dhakulkar, Bhushan S. Rakhonde, “Cost effective Android based wireless notice board” IJETER International Journal of Emerging Technologies in Engineering Research. In the day-to-day life, smart phone is gaining a wide range of importance in its usage and is portable. Thus, an android smart phone can be for the purpose. An android application is installed in the user’s smartphone which permits the transmission. At receiver end, a low-cost microcontroller board (Arduino Uno)is programmed to receive and display messages in anyof the above communication mode. Using the developed system, two different applications for displaying messages on a remote digital notice boardand wireless person calling has been implemented.The developed system will therefore aim in wirelessly sharing the information with intended users and also helps in saving the time and the cost for paper and printing hardware.

Literature survey is mainly carried out in order to analyze the background of the current project which helps to find out flaws in the existing system and guides on which unsolved problems we can work out.

BLOCK DIAGRAM



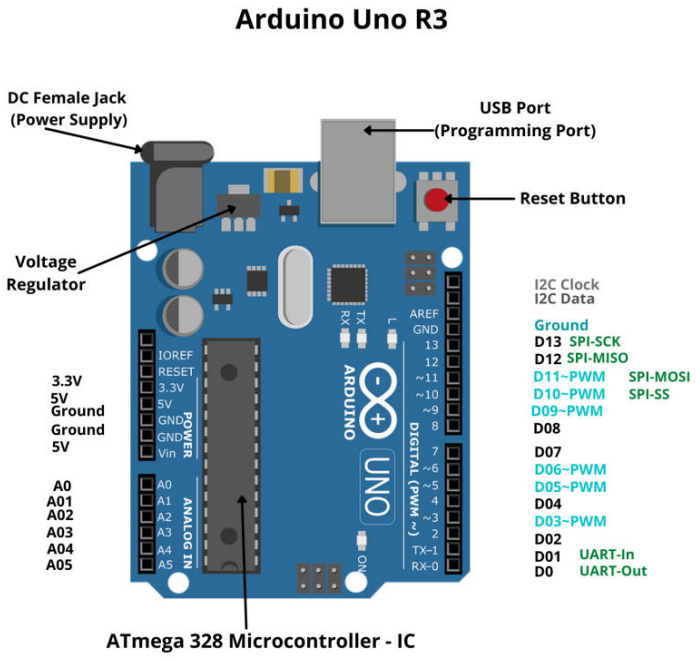
Block Diagram of the messaging display system

COMPONENT SPECIFICATION

*ARDUINO BOARD

Arduino board is the heart of our system. Entire functioning of system depends on this board. TheArduino Uno is a ATmega328p microcontroller board. This board has 14 digital input/output pins (6 as a PWMoutputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and areset button.

An Arduino (/ɑːrˈdwiːnoʊ/) Board is an open-source hardware and software Microcontroller. Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various sensors, breadboard, expansion boards etc… The microcontrollers can be programmed using the C and C++ programming languages, using the software Arduino IDE or MBlock



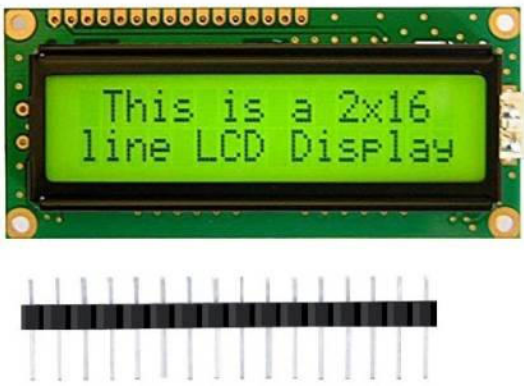
COMPONENT SPECIFICATION

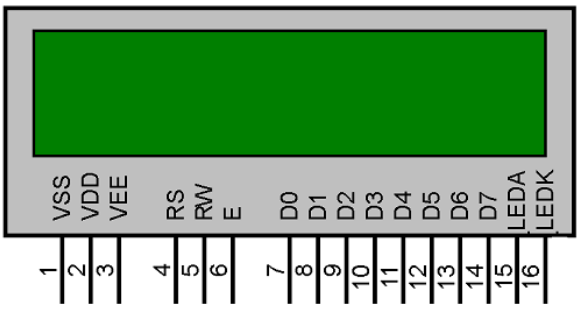
*POWER SUPPLY

This project utilizes a controlled 5V, 500Ma power supply,7805 three terminal voltage controllers is utilized for voltage regulation. Bridge type full wave rectifier is utilized to rectify the ac output of secondary of2 30/12V step down transformer.

*LCD DISPLAY

We utilize screen as display. LCD is utilized in a project to visualize the output of application. Liquidcrystal displays (LCDs) have supplies which combine the properties of both liquids and crystals. With the liquidcrystal material sand witched in between them, an LCD consists of two glass panels. The inner surface of the glass plates are covered with transparent electrodes that identify the character, symbols or patterns to be displayed and the polymeric layers are present in between the electrodes and the liquid crystal, which makes the liquid crystal molecules for maintaining a defined direction angle.

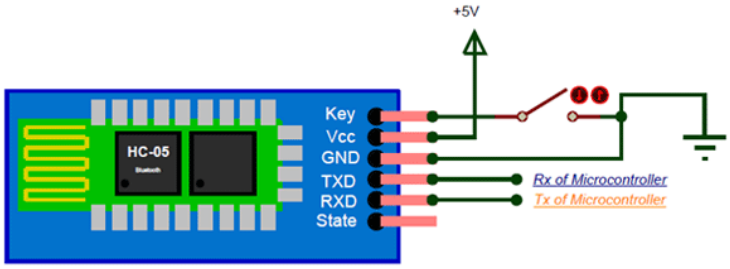




COMPONENT SPECIFICATION

* BLUETOOTH MODULE(HC-05)

The HC-05 is a very cool module which can add two-way (full-duplex) wireless functionality. one canuse this module to communicate between two microcontrollers like Arduino or communicate with any devicewith Bluetooth functionality like a Phone or Laptop. There are many android applications that are already available which makes this process a lot easier. The module communicates with the help of USART at 9600baud rate hence it is easy to interface with any microcontroller that supports USART. We can also configure the default values of the module by using the command mode.



*HC-05 Technical Specifications

Serial Bluetooth module for Arduino and other microcontrollers

Operating Voltage: 4V to 6V (Typically +5V)

Operating Current: 30mA

Range: <100m

Works with Serial communication (USART) and TTL compatible

Follows IEEE 802.15.1 standardized protocol Uses Frequency-Hopping Spread spectrum (FHSS)

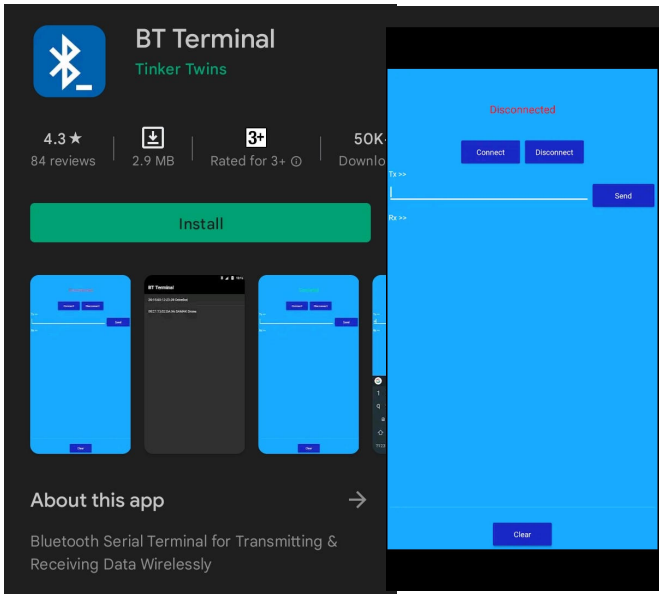
Can be easily interfaced with Laptop or Mobile phones with Bluetooth

* ANDROID APPLICATION

BT Terminal is a teriminal app with UART serial commnication protocol that transmit and recives data wirelessly through bluetooth connections. The app can be Bluetooth Molused for Robotics Communication,Configuring Bluetooth Modules (using AT Commands), Home Automation,etc.

*FEATURES

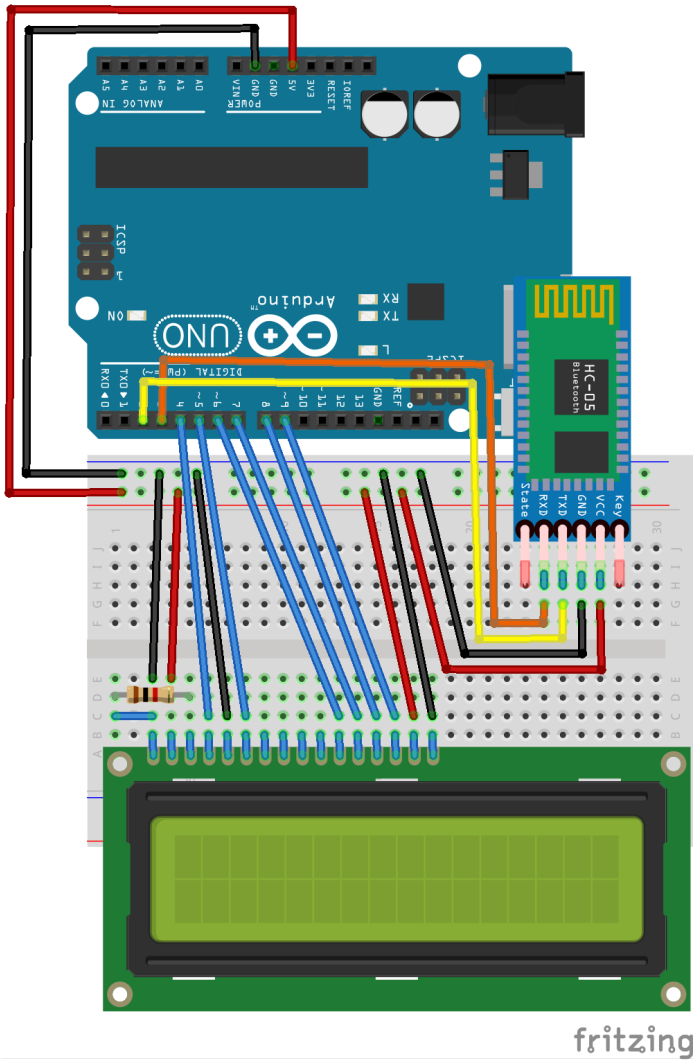
1. Tested on HC-05 Bluetooth Module.
2. The app features both, transmitting and receiving data.
3. "Connect" and "Disconnect" buttons to quickly switch between connections without closing the app.
4. "Clear" button to clear all the received data, at once.
5. Single-page user interface for convenient usage.
6. Completely FREE! No Ads!



BT Terminal Android Application

The above figure is available on Google Play Store. Here in our project it used to give an input to our noticeboard from mobile phone.

CIRCUIT DIAGRAM (WIRELESS NOTICE BOARD)



*WORKING

At first, LCD will display “DISPLAY: WELCOME TO NOTICE BOARD.” And after some delay,LCD will display the timetable continously. If an authorise user wants to display some notice on this notice oard then he/she will first pair his device to this module and after write a message in "BT Terminal" mobile application. Ater the message has been send by user, bluetooth module will receive it and it sends this message to aduino Board serially.As the ATMega 328P microcontroller receives this message, it will display the information 16x2 LCD display.If the message haven‟t received from BT Terminal, the bluetooth module will continously search for message to receive. And the message will remain displayed on the LCD display.

SOFTWARE DEVELOPMENT

System development method is a process through which a product will get com- pleted or a product gets rid from any problem. Software development process is described as a number of phases, procedures and steps that gives the complete soft- ware. It follows series of steps which is used for product progress. The development method followed in this project is waterfall model.

MODEL PHASE

The waterfall model is a sequential software development process, in whichprogress is seen as flowing steadily downwards (like a waterfall) through the phases of Requirement initiation, Analysis, Design, Implementation, Testing and maintenance.

Requirement Analysis: This phase is concerned about collection of requirement ofthe system. This process involves generating document and requirement review.

System Design: Keeping the requirements in mind the system specifications aretranslated in to a software representation. In this phase the designer emphasizes on:-algorithm, data structure, software

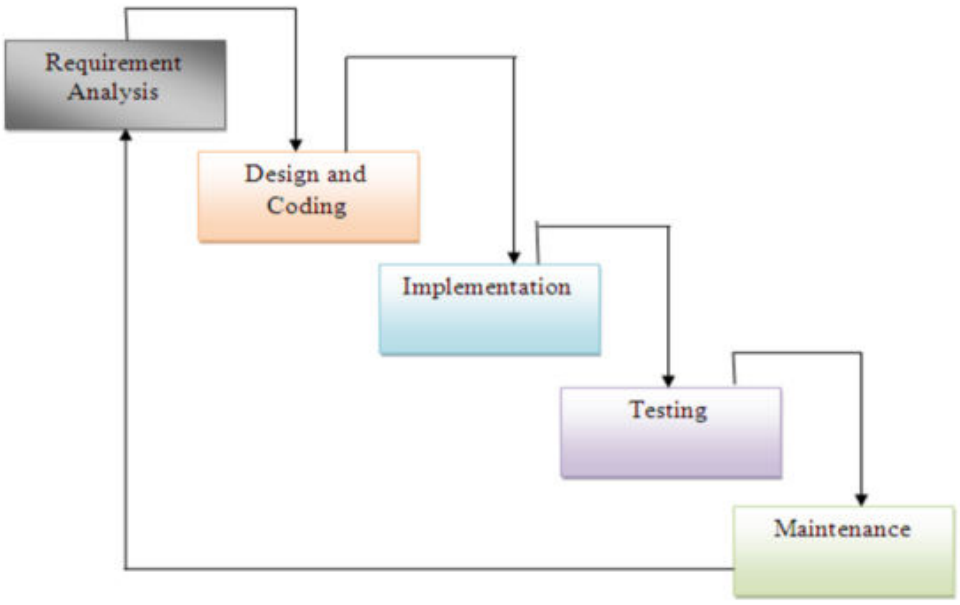
Coding: In this phase programmer starts his coding in order to give a full sketchof product. In other words system specifications are only converted in to machinereadable compute code. Implementation: The implementation phase involves the actual coding or programming of the software. The output of this phase is typically thelibrary, executables, user manuals and additional software documentation .

Testing: In this phase all programs (models) are integrated and tested to ensure thatthe complete system meets the software requirements. The testing is concerned withverification and validation.

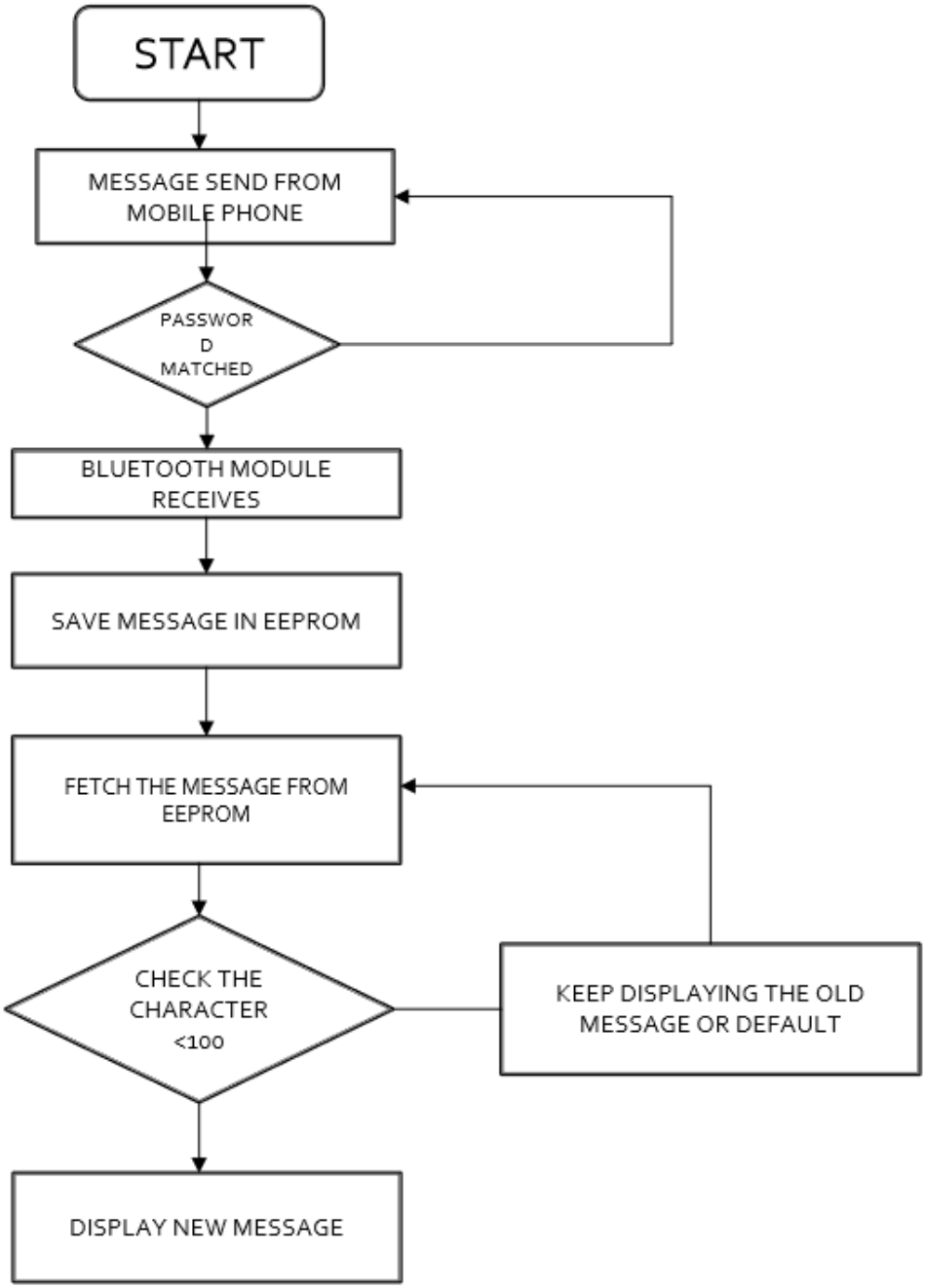
Maintenance: The maintenance phase is the longest phase in which the softwareis updated to fulfill the changing customer need, adapt to accommodate change inthe external environment, correct errors and oversights previously undetected in thetesting phase, enhance the efficiency of the software.

***Reason for choosing Waterfall Model as developmentmethod**

1.Clear project objectives.
2.Stable project requirements.
3. Progress of system is measurable.
4.Strict sign-off requirements.
5.Helps you to be perfect.
6. Logic of software development is clearly understood.
7.Production of a formal specification.
8.Better resource allocation.
9.Improves quality.
The emphasis on requirements and design before writing a singleline of code ensures minimal wastage of time and effort and reduces the risk of schedule slippage.



Waterfall Model


START
MESSAGE SEND FROM MOBILE PHONE
PASSWOR D MATCHED
BLUETOOTH MODULE RECEIVES
SAVE MESSAGE IN EEPROM
FETCH THE MESSAGE FROM EEPROM
CHECK THE CHARACTER <100
KEEP DISPLAYING THE OLD MESSAGE OR DEFAULT
DISPLAY NEW MESSAGE

FLOW CHART

CODEING

```
#include <LiquidCrystal.h>
#include <SoftwareSerial.h>

LiquidCrystal lcd (4, 5, 6, 7, 8, 9);
SoftwareSerial mySerial (2, 3);   //(RX, TX);

String val = "No Data";
String oldval;
String newval = "No Data";
int i = 0;

void setup()
{
  // put your setup code here, to run once:
  lcd.begin(16,2);
  mySerial.begin(9600);
  Serial.begin(9600);
  lcd.setCursor(0, 0);
  lcd.print("Wireless Notice");
  lcd.setCursor(0, 1);
  lcd.print("    Board    ");
  delay(3000);
  lcd.clear();
  lcd.print("Welcome!");
}

void loop()
{
  val = mySerial.readString();
  val.trim();
  Serial.println(val);
  if(val != oldval)
  {
    newval = val;
  }
  lcd.clear();
  lcd.setCursor(i, 0);
  lcd.print(newval);
  i++;
  if(i >= 15)
  {
    i = 0;
  }
  val = oldval;
}
```

GitHub

https://github.com/sanjeetmeenia/Wireless-Notice-Board-BT

APPLICATION

* The proposed model is used in bus stations, railway stations, parks, etc. to display the messages wirelessly.

* This Project can also be used in colleges and organizations.

* The multi terminal is intended for simultaneous management of multiple accounts, such as WIFI and Bluetooth for which is mostly helpful for transmitting message to the display.

CONCLUSION

As the technology is advancing every day the display board systems are moving from Normal hand writing display to digit display. Further to Wireless display units. This paper develops aphoto type laboratory model wireless notice board system with BLUETOOTH MODULE connected to it, which displays the desired message of the user in a most populated or crowded places.This proposed system has many upcoming applications in educational institutions and organizations,crime prevention, traffic management, railways, advertisements etc.Been user friendly, long range and faster means of conveying information are major bolsters for this application. By using this proposed methodology we can enhance the security system and also make awareness of the emergency situations and avoid many danger.

FUTURE ENHANCEMENT

The display unit can range from LED scrolling displays to LCD monitors.The LED scrolling displays can be set up at public transport places such as bus stations,railway stations and airports. They can also be used in offices and similar organizations for sending notices. The LCD monitors can be setup on school and college campuses for sending out notices. Also, as an extension to the current message displaying template, multiple messages can be displayed at a time,by dividing the screen to the required number of parts.

A commercial model can he able to display more than one message at a time.In our project we are sending messages via WI-FI network and displaying on a LED by utilizing AT-WF commands. The same principle can be applied to control electricalappliances at a distant location.

Robots can be controlled in a similar fashion by sending the commands to the robots. These commands are read by using AT-WF commands and appropriate actionis taken. This canbe used for spy robots at distant locations, utilized by the military to monitor movement of enemy troops.

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