

GSM(global system for mobile communication)

A Mini Project Report

submitted in partial fulfilment of the requirements

for the award of the degree of

Bachelor of Technology

in

COMPUTER ENGINEERING

By

Sr. No.	Name	PRN No.
1.	Baliram Sugriv Kendre	1930331245061
2.	Rushikesh Ramdas Thakare	1930331245069
3.	Aditya Shivkumar Navgare	1930331245066
4.	Nilprasad Shanteshwar Birajdar	1930331245067

Under the guidance of

Prof. Rahul Rathod



DEPARTMENT OF COMPUTER ENGINEERING

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY

Lonere-402103, Tal-Mangaon, Dist-Raigad(MS) INDIA

2021-2022

Acknowledgement

There is always a sense of gratitude which people express towards others For their help and super- vision in achieving the goals. This formal piece of acknowledgement is an attempt to express the feeling of gratitude towards people who helped us in successfully completing our mini project.

We would like to ex-press our sincere gratitude to Head Of Department **Dr. L. D. Netak** for providing the opportunity to carry out the mini project. We would like to express our deep gratitude to **Prof.Rahul Rathod**, for his constant co- operation and encouragement. They were always there withtheir guidance and valuable suggestions throughout this project.

We would also like to thank all our friends and well wishers for support during the demanding period of this work.

Rushikesh Ramdas Thakare 1930331245069

Baliram Sugriv Kendre 1930331245061

Aditya Shivkumar Navgare 1930331245066

Nilprasad Shanteshwar Birajdar 1930331245067

Abstract

GSM, the Global System for Mobile communications, is a digital cellular communications system which has rapidly gained acceptance and market share worldwide, although it was initially developed in a European context. In addition to digital transmission, GSM incorporates many advanced services and features, including ISDN compatibility and worldwide roaming in other GSM networks. The advanced services and architecture of GSM have made it a model for future third-generation cellular systems, such as UMTS. GSM network is the most worldwide mobile communication network nowadays. Based on the SIEMENS MC35 GSM module, general techniques of communication with GSM network are depicted, including the initialization of terminal equipment, sending and reading short messages (SMS), sending SMS to group users, and the management on phonebook of SIM card, furthermore, a flexible solution on real-time reading SMS is proposed. Finally, application cases are given for GSM module. Global system for mobile communication (GSM) microwave has been proposed to affect central nervous system, especially a developing brain. In the study, we investigated the effects of 1800 MHz GSM microwave on dendritic filopodia, dendritic arborization and spine maturation of developing neurons in culture.

Certificate

This to certify that the dissertation entitled “GSM(Global system for mobile communication)” Submitted by 1.Baliram Sugriv Kendre 2.Rushikesh Ramdas Thakare3.Aditya Shivkumar Navgare 4.Nilprasad Shanteshwar Birajdaris record of work carried out by them under the guidance in the partial fulfilment of the requirement for the award of Degree of B.Tech in Computer Engineering course of Dr. Babasaheb Ambedkar Technological University ,Lonere(Dist.Raigad) in the academic year 2021-22.

(Asst. Prof. Rahul Rathod)

Guide

Department of Computer Engineering

(Dr. L.D.Netak)

Head Of Department

Department of Computer Engineering

Place:Dr.Babasaheb Ambedkar Technological University,Lonere.

Date:

INDEX

1. INTRODUCTION	6
1.1. OVERVIEW	6
1.2. AIM OF THE PROJECT	7
2. PROJECT DEVELOPMENT	
2.1. COMPONENTS REQUIREMENT	
2.1.1. ARDUINO UNO	8
2.1.2. GSM SIM900A	9
2.1.3. JUMPER WIRES	10
2.2. SOFTWARE REQUIREMENT	
2.2.1. ARDUINO IDE	11
3. PROJECT DESIGN	12
3.1. FLOW CHART	12
3.2. CIRCUIT DIAGRAM	13
3.3. APPLICATION	14
3.4. ADVANTAGES	15
3.5. DISADVANTAGES	16
3.6. CODE	17,18
4. RESULT	19
4.1. WORKING	19,20
5. CONCLUSION	21
6. REFERENCE	22

1. INTRODUCTION

1.1 OVERVIEW

SIM900A Modem is built with Dual Band GSM based SIM900A modem from SIMCOM. It works on frequencies 900MHz. SIM900A can search these two bands automatically. The frequency bands can also be set by AT Commands. The baud rate is configurable from 1200-115200 through AT command. SIM900A is an ultra compact and wireless module. The Modem is coming interface, which allows you connect PC as well as microcontroller with RS232 Chip(MAX232).

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 ect. through simple AT commands. This is a complete GSM module in a SMT type and made with a very powerful single-chip, allowing you to benefit from small dimensions. SIM 900A GSM Modem with serial and TTL outputs.

1.2 AIM OF THE PROJECT

The GSM module also enables user to query the status of device and current data at anytime. The microcontroller firmware is programmed to identify keywords “@AD SCHK” for status query and returns status SMS to the sender as shown in figure 7. On the other hand, Host can change the configuration parameter via SMS with keywords “@AD SCFG”. The microcontroller will extract the configuration data and update the EEPROM respectively. This new configuration will be retained until the next configuration SMS. Upon successful update, the GSM module will return the configuration SMS to Host as.

Finally, the GSM module is tested to send alert SMS whenever the radiation measured exceed the threshold value. This feature is beneficial for prompt or early emergency alert in radiation monitoring and safety. The GSM module should respond by transmitting alert SMS immediately, regardless of the data time interval. In this case, the GSM module is tested with a check source and the corresponding alert SMS is shown in figure 8.

2.PROJECT DEVELOPMENT

2.1 COMPONENTS REQUIREMENT

2.1.1 ARDUINO UNO



Figure 1 Arduino Uno

Arduino UNO is a microcontroller board based on the **ATmega328P**. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, 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 a AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

The Arduino UNO is a standard board of Arduino. Here UNO means 'one' in Italian. It was named as UNO to label the first release of Arduino Software. It was also the first USB board released by Arduino. It is considered as the powerful board used in various projects. Arduino.cc developed the Arduino UNO board.

Arduino UNO is based on an ATmega328P [microcontroller](#). It is easy to use compared to other boards, such as the Arduino Mega board, etc. The board consists of digital and analog Input/Output pins (I/O), shields, and other circuits.

The Arduino UNO includes 6 analog pin inputs, 14 digital pins, a [USB](#) connector, a power jack, and an ICSP (In-Circuit Serial Programming) header. It is programmed based on IDE, which stands for Integrated Development Environment. It can run on both online and offline platforms.

2.1.2 GSM SIM900A



Figure 2 GSM Model SIM900A

SIM900A Modem is built with Dual Band GSM based SIM900A modem from SIMCOM. It works on frequencies 900MHz. SIM900A can search these two bands automatically. The frequency bands can also be set by AT Commands. The baud rate is configurable from 1200-115200 through AT command. SIM900A is an ultra compact and wireless module. The Modem is coming interface, which allows you connect PC as well as microcontroller with RS232 Chip(MAX232). 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 ect. through simple AT commands. This is a complete GSM module in a SMT type and made with a very powerful single-chip, allowing you to benefit from small dimensions. SIM 900A GSM Modem with serial and TTL outputs.

2.1.3 Jumper Wires

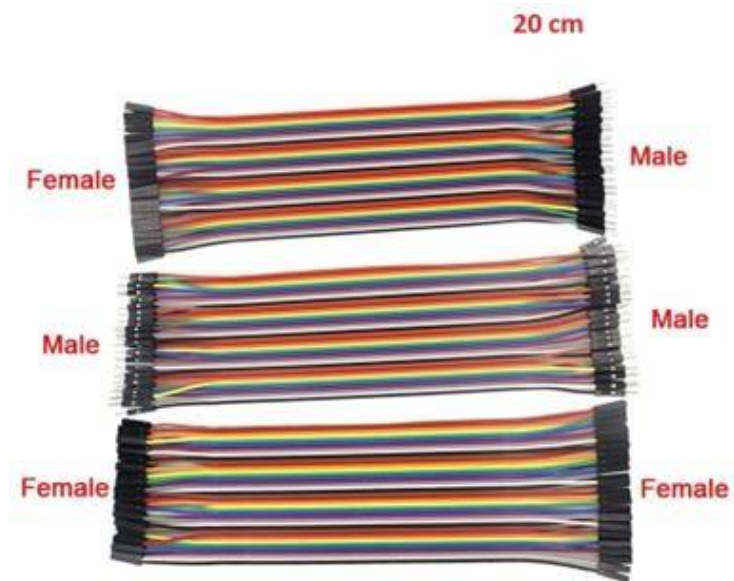


Figure 3 Jumper Wires

A jumper wire is an electric wire that connects remote electric circuits used for printed circuit boards. By attaching a jumper wire on the circuit, it can be short-circuited and short-cut (jump) to the electric circuit.

2.1 SOFTWARE REQUIREMENT

2.2.1. ARDUINO IDE

Arduino Integrated Development Environment (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 hardware to upload programs and communicate with them.

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.

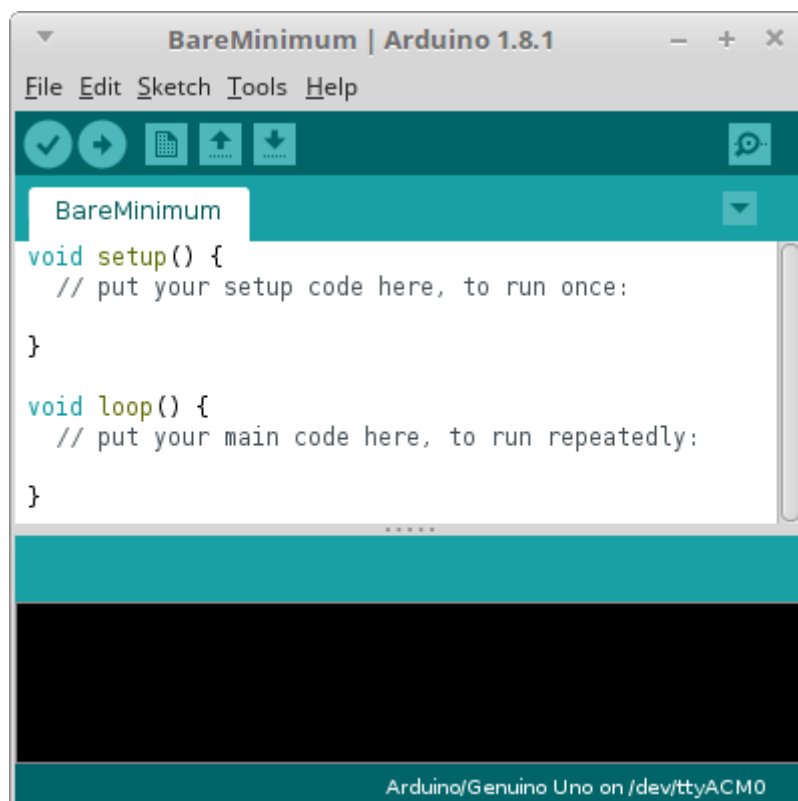
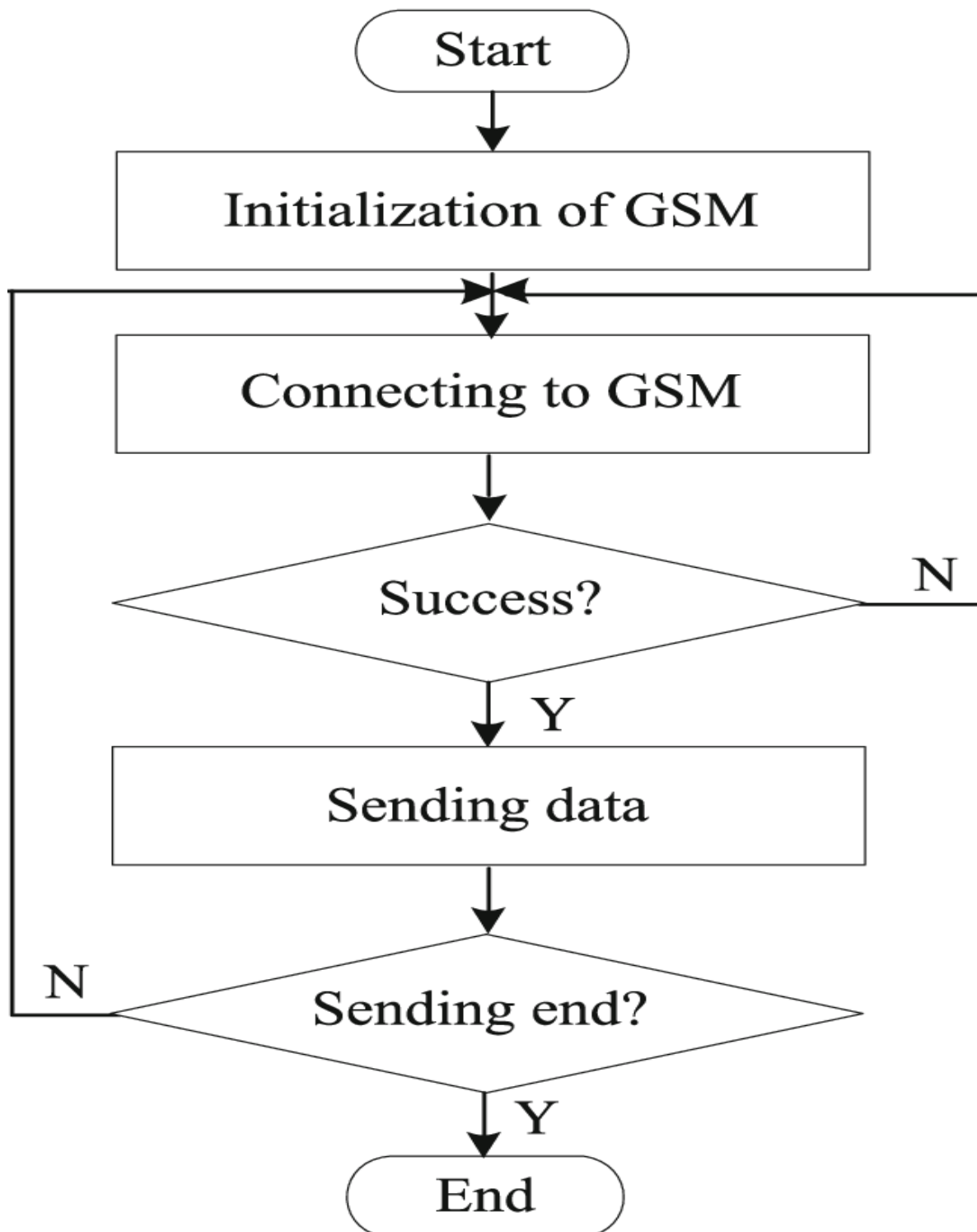


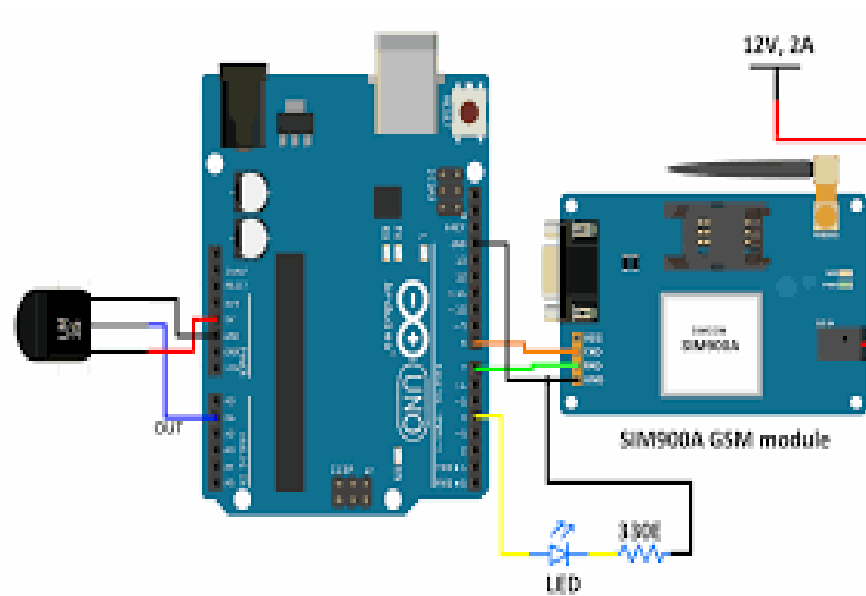
Figure 6: Arduino IDE

2.PROJECT DESIGN

2.1FLOW CHART:



2.2CIRCUIT DIAGRAM:



2.3 Applications

- 1.The global system for mobile communications (**GSM**) is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile devices such as mobile phones and tablets. Learn more in: [Safe and Secure Home Automation Through IoT Applications: A Sensor and IC-Based Implementation for Digital Transformation](#)
- 2.The Global System for Mobile Communications (**GSM**) is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile devices such as mobile phones and tablets. Learn more in: [IoT Applications in Smart Home Security: Addressing Safety and Security Threats](#)
- 3.The module is the best application to design a graphic for Voice call and SMS application.
- 4.Some IoT applications, mostly in an emergency have the module.
- 5.The location tracing system also uses SIM900A.
- 6.SIM900A can use for mobile communication.

2.4ADVANTAGES:

- 1.More suitable network with robust features.
- 2.No roaming charges on International calls.
- 3.Worldwide connectivity and extensive coverage.
- 4.SAIC and DAIC techniques used in GSM provide very high transmission quality.
- 5.The phone works based on the SIM card so that it is easy to change the different varieties of phones by users.
- 6.GSM signals don't have any deterioration.
- 7.Easy to integrate GSM with other wireless technology such as CDMA and LTE.
- 8.It has the ability to use repeaters.

2.5DISADVANTAGES:

- 1.Bandwidth lag because of multiple users shares the same bandwidth so the transmission can encounter interface.
- 2.It can interfere with certain electronics, such as hearing aids that are due to pulse transmission technology. As a result, many locations, such as hospitals, airports and petrol pumps require cell phones to be turned off.
- 3.To increase coverage repeaters are required to be installed.
- 4.It provided limited data rate capability so for high data rate advanced version of GSM devices are used.
- 5.Many of GSM technology is patented by Qualcomm thus license needs to be obtained from them.
- 6.Manufacturers are not releasing IS-95 devices due to the lack of a big market so IS-95 is normally installed in the small tower.
- 7.GSM has fixed maximum call sites range up to 35 km that is very limited.
- 8.There is no end-to-end encryption of user data.
- 9.Several incompatibilities within the GSM standards.
- 10.Electromagnetic radiation is more with the use of GSM.

2.6CODE

```
#include <SoftwareSerial.h>
SoftwareSerial mySerial(2, 3); // tx, rx
char msg;
char call;
void setup()
{
  mySerial.begin(9600); // Setting the baud rate of GSM Module
  Serial.begin(9600); // Setting the baud rate of Serial Monitor (Arduino)
  Serial.println("GSM SIM900A BEGIN");
  Serial.println("Enter character for control option:");
  Serial.println("h : to disconnect a call");
  Serial.println("i : to receive a call");
  Serial.println("s : to send message");
  Serial.println("r : ReceiveMessage");
  Serial.println("c : to make a call");
  Serial.println("e : to redial");
  Serial.println();
  delay(100);
}
void loop()
{
  if (Serial.available() > 0)
  switch(Serial.read())
  {
    case 's':
      SendMessage();
      break;
    case 'r':
      ReceiveMessage();
      break;
    case 'c':
      MakeCall();
      break;
    case 'h':
      HangupCall();
      break;
    case 'e':
      RedialCall();
      break;
    case 'i':
      ReceiveCall();
      break;
  }
  if (mySerial.available() > 0)
  Serial.write(mySerial.read());
}
void SendMessage()
{

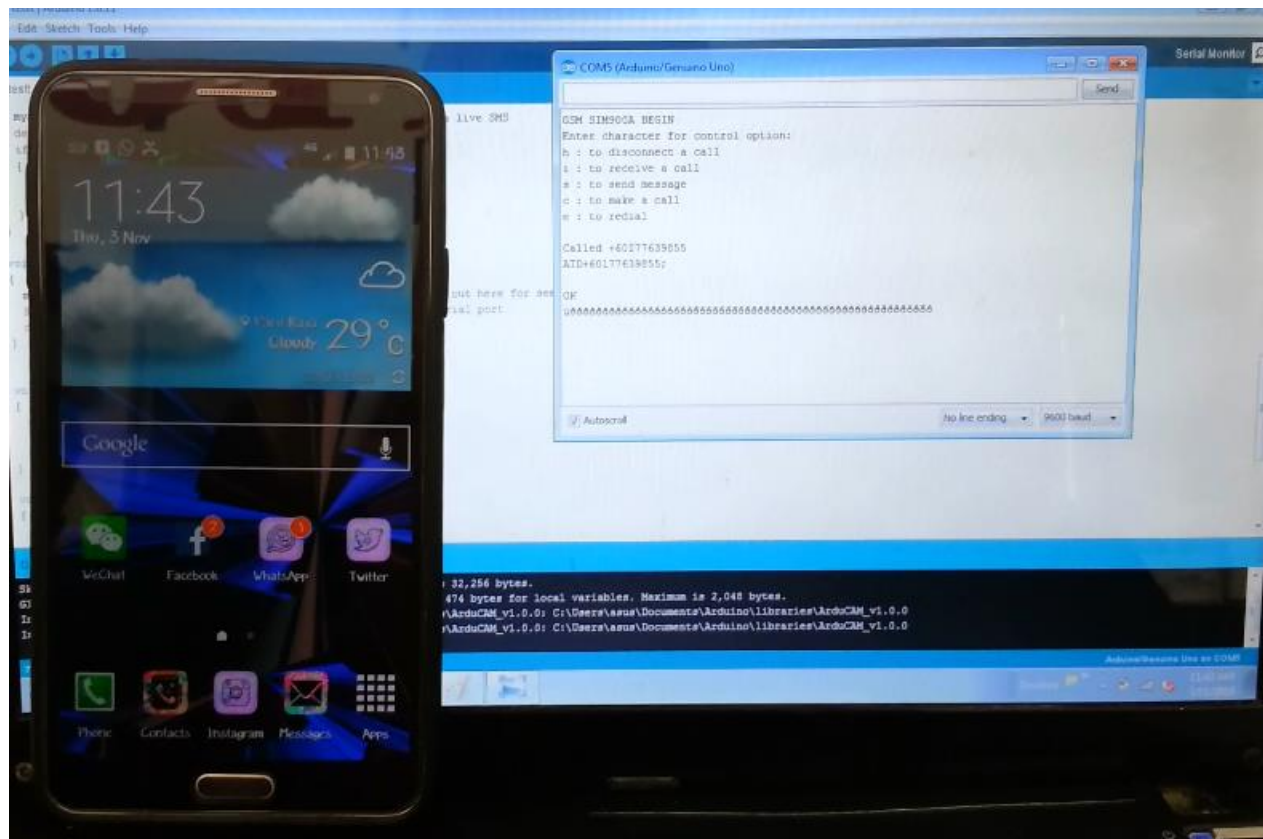
```

```

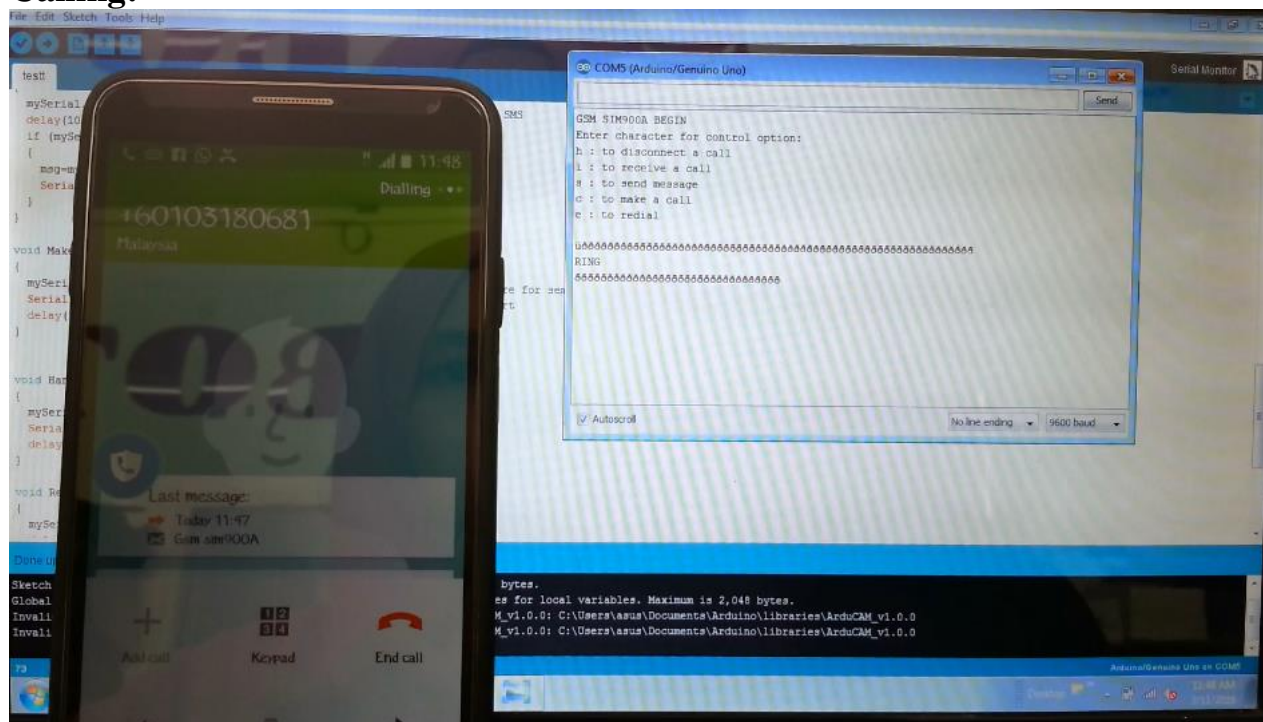
Serial.println("Sending Message");
mySerial.println("AT+CMGF=1"); //Sets the GSM Module in Text Mode
delay(1000); // Delay of 1000 milli seconds or 1 second
mySerial.println("AT+CMGS=\"+917875796141\"\\r"); // Replace x with mobile number +91
delay(1000);
mySerial.println("sim900a sms");// The SMS text you want to send
delay(100);
mySerial.println((char)26);// ASCII code of CTRL+Z
delay(1000);
}
void ReceiveMessage()
{
Serial.println("Received Message");
mySerial.println("AT+CNMI=2,2,0,0,0"); // AT Command to recieve a live SMS
delay(1000);
if (mySerial.available()>0)
{
msg=mySerial.read();
Serial.print(msg);
}
}
void MakeCall()
{
mySerial.println("ATD+917875796141;"); // ATDxxxxxxxxxx; -- watch out here for semicolon
at the end!!
Serial.println("Calling "); // print response over serial port
delay(5000);
}
void HangupCall()
{
mySerial.println("ATH");
Serial.println("Hangup Call");
delay(1000);
}
void ReceiveCall()
{
mySerial.println("ATA");
Serial.println("Received Call");
delay(1000);
{
call=mySerial.read();
Serial.print(call);
}
}
void RedialCall()
{
mySerial.println("ATDL");
Serial.println("Redialing");
delay(1000);
}
}

```

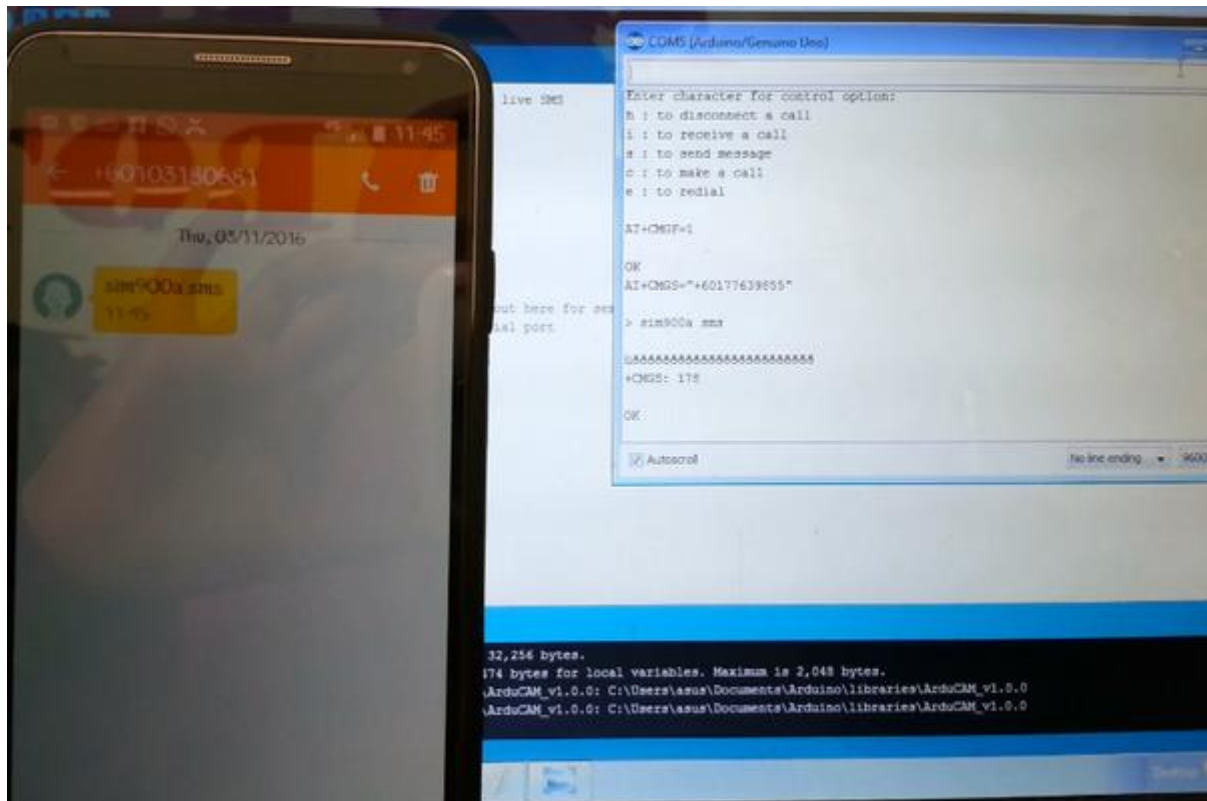
WORKING MODEL :



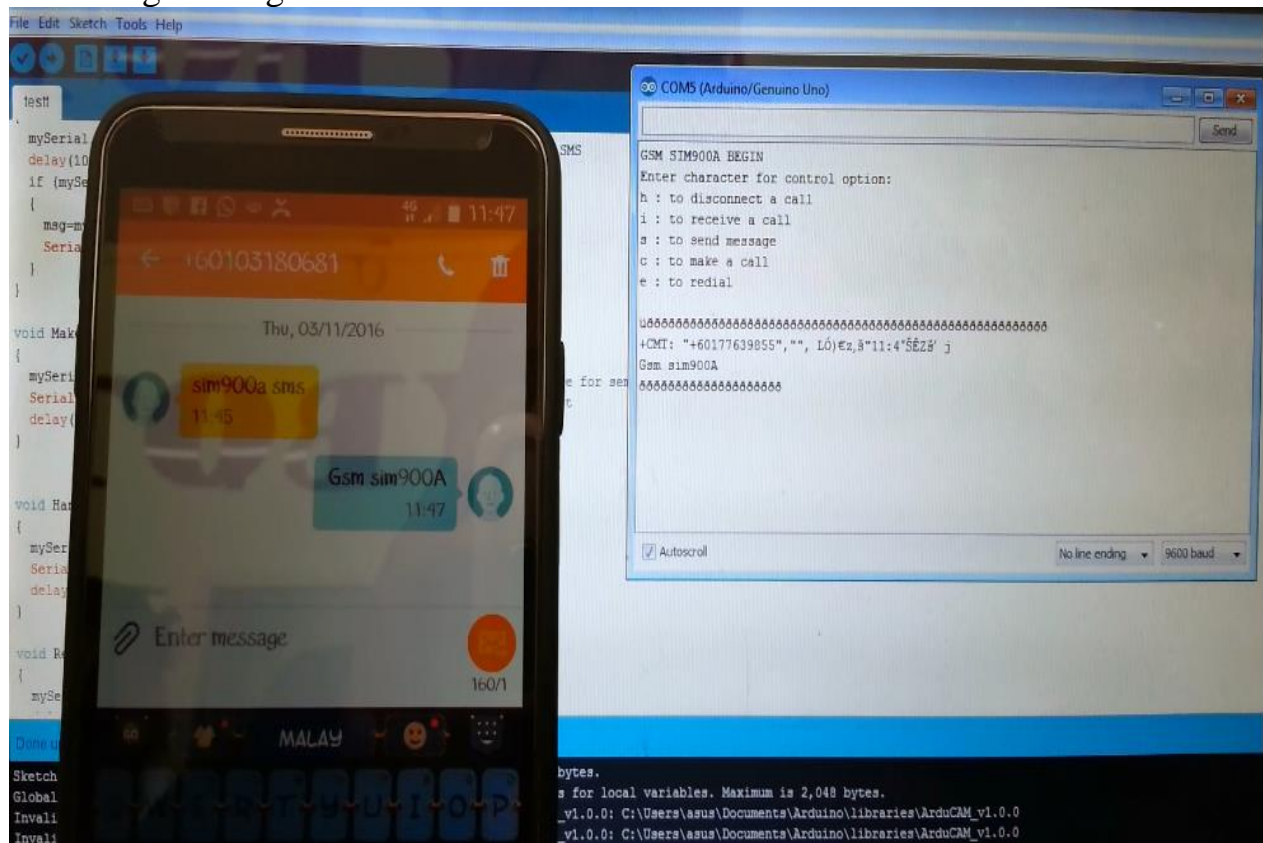
Calling:



Sending Message



Receiving Message



conclusion:

Year by year, the GSM system improves and its subscribers increases around the world. It divides into three main parts that are OSS, SS, and BSS. These parts include some important department that manages the system, stores information of users, and another tasks. GSM has ability to roam worldwide and has roaming agreements in place with foreign operators globally. So, users can easily use their same SIM in another cities or countries. GSM network facilitate easier access to cellular and satellite platforms across international lines. Using digital technology, it employs both speech and data channels in its system. In addition, GSM has network management subsystem that detects problems and solves them, maintains information up to date, and detects good and bad performance of a network.

References

<https://www.instructables.com/GSM-SIM900A-With-Arduino>

<https://rees52.com/diy-iduino/1452-how-to-make-a-call-using-the-arduino-gsm-sim900-sim900a-intefraing-with-arduino-uno-kt789>

<https://randomnerdtutorials.com/sim900-gsm-gprs-shield-arduino/>