Appendix B :

This is the simulation source code for “Design of An Embedded Automobile Engine Locking and controlling System By Using GSM Technology” version 1.0 .

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Source code:

```
#include <LGSM.h> // inculding GSM libaray

#include <LEEPROM.h> // including EEPORM library

#include <LiquidCrystal.h> // including LCD library

LiquidCrystal lcd(12, 13, 5, 4, 3, 2); // LCD pin connection ( connecting pin 12 to Enale, pin 13 to RS, pin (5,4,3,2) for data)

char phonenum[20] = "+249123182274"; // user phone number

int relay1= 7; // connecting realy1 to pin 7 for enabling and disabling the system

int relay2= 8; // coonecting realy2 to pin 8 for starting the igintion system

int engine= 9; // coonecting the car engine to pin 9


void setup() {
```

```
  for(int i = 0; i < 14; i++) {
    pinMode(i, OUTPUT);
    digitalWrite(i, LOW);}
Serial.begin(9600);
for(int i = 0; i < 14; i++) Serial.println(digitalRead(i));
  lcd.begin(16, 2);
  lcd.print("welcome"); // printing welcome on the LCD
while(!LSMS.ready()) // waiting for the gsm to be ready for working
delay(1000);
Serial.println("SIM ready for work!");
}
void loop()
{
  int a = 0; // defining varabiles will be used in code later
int value;
char buf[20];
int v;
char orignal[500];
char data[500];
int len=0;
// the next part will cover network failure scenario,in case it happened the system will go back to manual using
if( LSMS.ready()== false) {
  digitalWrite(relay2,LOW);
      digitalWrite(relay1,HIGH);
    digitalWrite(engine,LOW);
```

```
   lcd.clear();
   lcd.print("Network Error");
   lcd.setCursor(0,1);
   lcd.print("Manual using");
}
// the next part to enable the user to enter the password and save it to the eeprom memory in case of first system installation
  value = EEPROM.read(a);
if (value==0){
 LSMS.beginSMS(phonenum);
  LSMS.print("this is first installation please send your password to this number");
  if(LSMS.endSMS()){
    Serial.println("SMS is sent");
  }else{
    Serial.println("SMS is not sent");
  }

if(LSMS.available()) // Check if there is new SMS
{
Serial.println("There is new message.");
LSMS.remoteNumber(buf, 20); // display Number part
Serial.print("Number:");
Serial.println(buf);
Serial.print("new password:"); // display Content part
while(true)
```

```
{
v = LSMS.read();
if(v < 0)
break;
EEPROM.write(len++,char(v));
Serial.print((char)v);
}
}
LSMS.flush(); // delete message
}
delay(1000);
for (int i = 0; i < 4; i++)
orignal[i] = EEPROM.read(i);// if not first installation,, read the password from the eeprom

if(LSMS.available()) // Check if there is new SMS
{
Serial.println("There is new message.");
 delay(2000);
 lcd.clear();
lcd.print("new message");
LSMS.remoteNumber(buf, 20); // display the sender phone Number
Serial.print("Number:");
Serial.println(buf);
Serial.print("Content:"); // display the message Content
while(true)
```

```
{
v = LSMS.read();
if(v < 0)
break;
data[len++]=(char)v; // storing the message into array for comparison prupose later
Serial.print((char)v);
}
Serial.println();
// the next part will cover phone number and content compairson for deciding what will be the system respone
// first compare the phone number with the owner number
 if(buf[0]== phonenum[0] && buf[1]== phonenum[1] && buf[2]== phonenum[2] && buf[3]== phonenum[3] && buf[4]== phonenum[4] && buf[5]== phonenum[5] && buf[6]== phonenum[6] && buf[7]== phonenum[7] && buf[8]== phonenum[8] && buf[9]== phonenum[9] && buf[10]== phonenum[10] && buf[11]== phonenum[11] && buf[12]== phonenum[12] ){
 // then compare the the message content
 if( data[0] == orignal[0] && data[1]== orignal[1] && data[2]== orignal[2] && data[3]== orignal[3] && data[4]=='*' && data[5]=='e' && data[6]=='#'){
  digitalWrite(relay1,HIGH); // enable the system
  digitalWrite(relay2,LOW);
    digitalWrite(engine,LOW);
 lcd.clear();
 lcd.print("new message");
  lcd.setCursor(0,1);
```

```
  delay(2000);
  lcd.print("Eanbling system"); // displaying the system response in LCD
  LSMS.beginSMS(phonenum); // sending feedack to the user about the current system status
  LSMS.print(" system enabled");
  if(LSMS.endSMS()){
    Serial.println("SMS is sent");
  }else{
    Serial.println("SMS is not sent");
  }
  }
else if(data[0]== orignal[0] && data[1]== orignal[1] && data[2]== orignal[2] && data[3]== orignal[3] && data[4]=='*' && data[5]=='d' && data[6]=='#'){

  digitalWrite(relay2,LOW); // disabling the system
      digitalWrite(relay1,LOW);
   digitalWrite(engine,LOW);
    lcd.clear();
 lcd.print("new message");
  lcd.setCursor(0,1);
  delay(2000);
  lcd.print("Disanbling system");  // displaying the system response in LCD
   LSMS.beginSMS(phonenum);
  LSMS.print(" system disabled");
  if(LSMS.endSMS()){
```

```
  Serial.println("SMS is sent");
 }else{
  Serial.println("SMS is not sent");
 }


 }
  else if(data[0]== orignal[0] && data[1]== orignal[1] && data[2]== orignal[2] && data[3]== orignal[3] && data[4]=='*' && data[5]=='s' && data[6]=='#'){


     digitalWrite(relay1,HIGH); // starting the igintion system
      delay(2000);
      digitalWrite(relay2,HIGH);
      delay(5000);
      digitalWrite(relay2,LOW);
  digitalWrite(engine,HIGH);
      lcd.clear();
 lcd.print("new message");
 lcd.setCursor(0,1);
 delay(2000);
 lcd.print("starting engine");  // displaying the system response in LCD
  LSMS.beginSMS(phonenum); // sending feedack to the user about the current system status
 LSMS.print(" emgine started");
 if(LSMS.endSMS()){
  Serial.println("SMS is sent");
```

```
  }else{
    Serial.println("SMS is not sent");
  }
  }
  else if( data[0] =='c' && data[1]=='h' && data[2]=='a' && data[3]=='n' && data[4]=='g' && data[5]=='e' ){
  // this part to cover password changing secnario and write the new password to the eeprom
  for (int x = 12; x < 16; x++){
  int m=0;
EEPROM.write(m, data[x]);
m++;
  }
   lcd.clear();
 lcd.print("new message");
  lcd.setCursor(0,1);
  delay(2000);
  lcd.print("password changed");  // displaying the system response in LCD
  LSMS.beginSMS(phonenum); // sending feedack to the user about password changing
  LSMS.print("password changed");
  if(LSMS.endSMS()){
    Serial.println("SMS is sent");
  }else{
    Serial.println("SMS is not sent");
  }
```

```
  }


  }
  else {
    //if the owner sends wrong password this part will inform him
     LSMS.beginSMS(phonenum);
  LSMS.print("ERROR wrong password");// // sending feedack to the user about the wrong password
  if(LSMS.endSMS()){
    Serial.println("SMS is sent");
  }else{
    Serial.println("SMS is not sent");
  }
   lcd.clear();
 lcd.print("new message");
  lcd.setCursor(0,1);
  delay(2000);
  lcd.print("Wrong password");  // dispalying the response in LCD


  }
 else {
lcd.clear();
lcd.print("no respone");
}
LSMS.flush(); // delete message
}
```

```
delay(1000);


}
```