MICROCONTROLLER AND ITS APPLICATIONS
ECE 3003 (L11L12)

RFID BASED CAR PARKING SYSTEM

GROUP MEMBERS

MOGULLA ARAVIND REDDY

19BEC0092

PUJARI YASWANTH KALYAN

19BEC0215

GUJJULA YASHWANTH REDDY

19BEC0349

PRAJJWAL DUTTA

19BEC0454

GADAM SETTY VAISHNAVI REKHA

19BEC0486

RFID BASED CAR PARKING SYSTEM

REVIEW-3 GROUP-3

LAB SLOT-L11+L12

Date- 30-11-2021

SUBMITTED TO-

NAME OF THE FACULTY	– PROF.DHANBAL RENGASWAMY
EMP ID	– 11091
CABIN NO	–TTANX–204–H
DESIGNATION	– ASSISTANT PROFESSOR SR GARDE–1
SCHOOL	– SCHOOL OF ELECTRONICS ENGINEERING
EMAIL ID	– rdhanbal@vit.ac.in

ROLES IN THE PROJECT

SL.NO	REG.NO	NAME	ROLES
1.	19BEC0092	MOGULLA ARAVIND REDDY	DOCUMENTATION
2.	19BEC0215	PUJARI YASWANTH KALYAN	DATACOLLECTION, DOCUMENTATION
3.	19BEC0349	GUJJULA YASHWANTH REDDY	CODING,REFERENCES
4.	19BEC0454	PRAJJWAL DUTTA	CIRCUIT DESIGN,CODING
5.	19BEC0486	GADAM SETTY VAISHNAVI REKHA	CIRCUIT DESIGN,CODING

OBJECTIVE

This Project proposes an idea on the development of car parking system with its improved successful parking. It is an innovative payment system that provides the ultimate solution for drivers, municipalities and private parking lot owners. Simple and cost effective to implement, this project acts as a standalone system or alongside traditional parking payment systems to eliminate fraud and reduce cash handling.

COMPONENTS REQUIRED

01 Proteus Circuit simulation software

02 Keil software
IC-NXP-p89v51RD2

INTRODUCTION

Due to the surge in urbanization, the usage of the automobiles has increased which in turn, has led to traffic and parking difficulties. The most widespread solution to this problem, is to increase manpower to handle such traffic. Even it is increased, the probability of traffic less parking is not completely controlled. As per recent survey more than 30% of traffic congestion are due to the search for vacant parking space.

Hence there comes the need for the usage of automated car parking system. There are many methods used in the automated parking like ZigBee, wireless sensor network, microcontroller. All these methods have some merits and demerits.

Various technologies have been introduced with the aim of facilitating the user in daily life. This may indirectly improve the productivity and efficiency in solving several matters. Radio Frequency Identification (RFID) is a wireless communication technology that able to uniquely identify tagged objects or people.

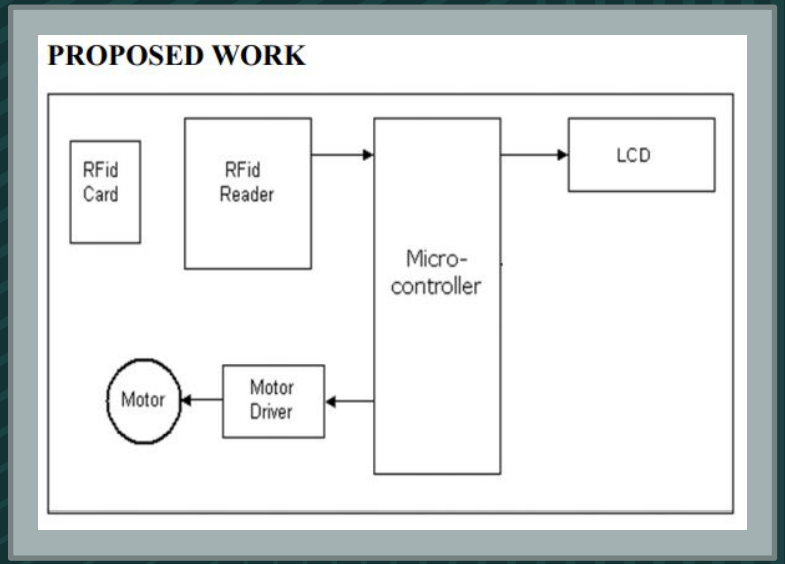
RFID systems have been widely used in many application, such as inventory control, product tracking through manufacturing and assembly, parking lot access and control, container or pallet tracking, Identification (ID) badges and access control, equipment or personnel tracking in hospitals and others .

RFID use the electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. RFID technology is applied in the Intelligent Transportation Systems (ITS) to monitor the traffic flow and control system for parking.

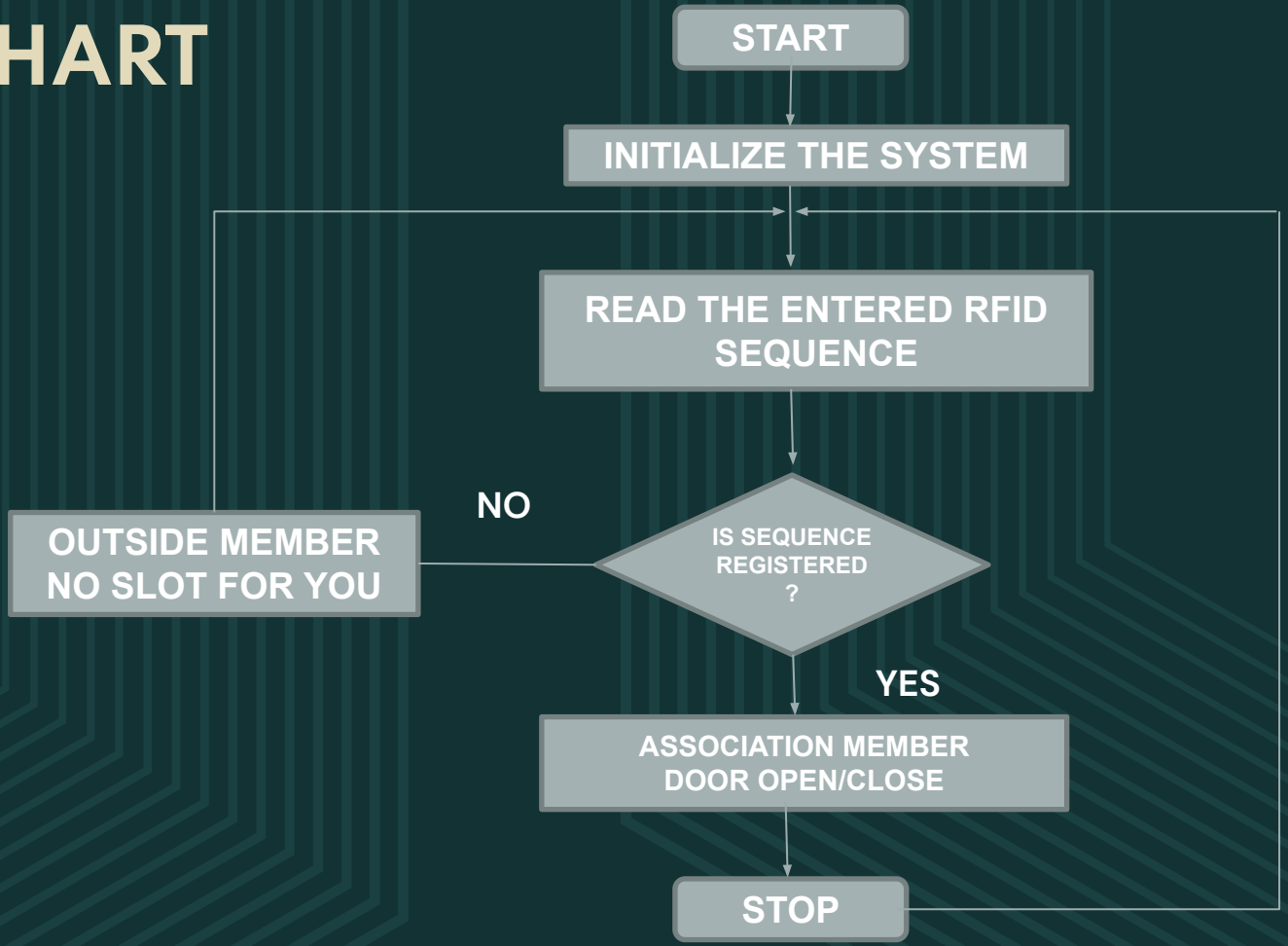
METHODOLOGY

The circuit shows that RFID reader scan the RFID tag ID and the information is sent to the microcontroller. After the ID is read, Microcontroller checks whether the tag ID matches or not. If the ID is matched, LCD displays the string “Association Member” on the LCD display and the motor movement indicates the opening and closing of doors.

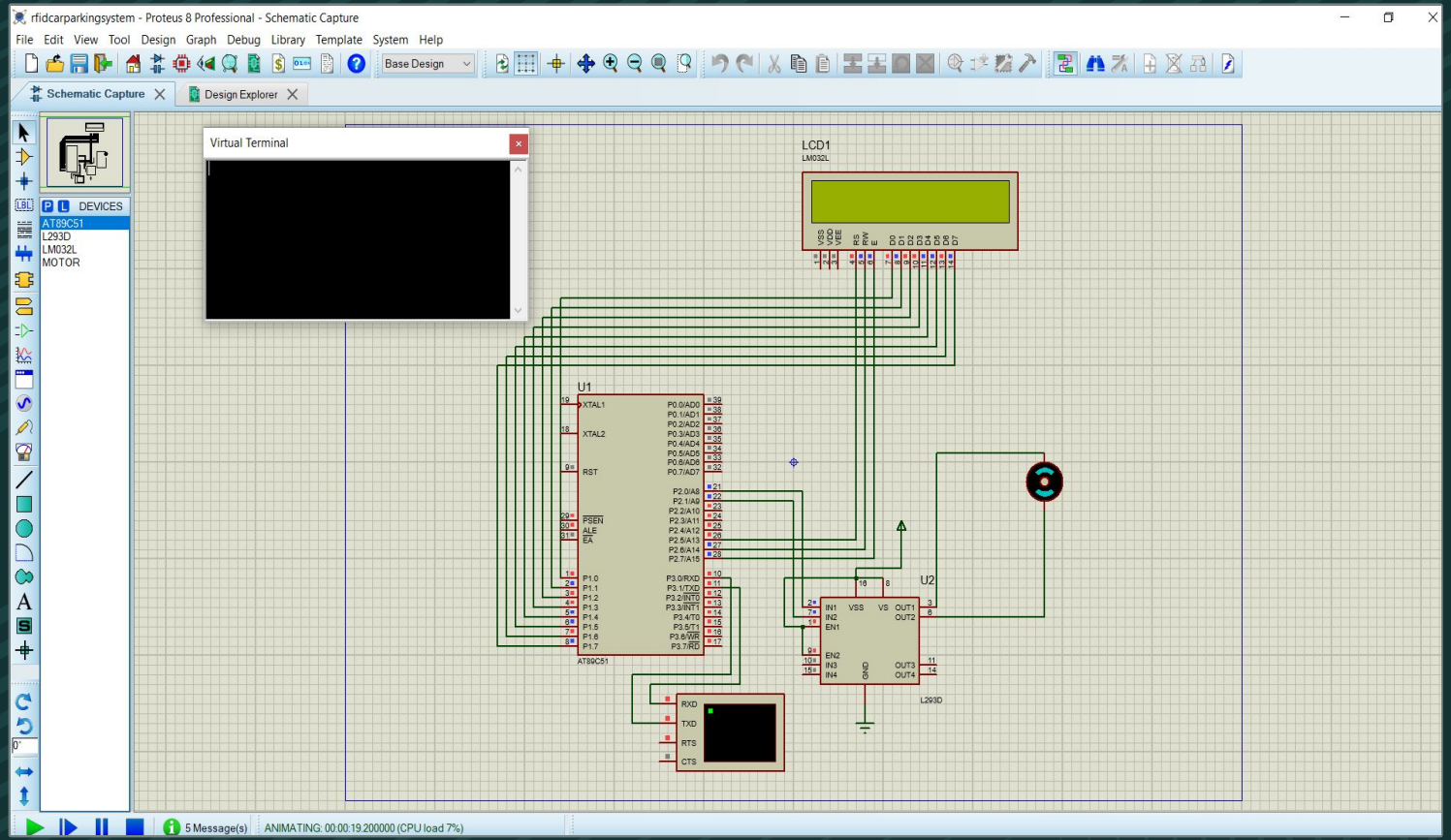
The motors are operated based on the H bridge circuit. They maintain a constant voltage across the circuit and prevent the circuit from damage. The clockwise rotation indicates the opening of the door whereas the anticlockwise rotation indicates the closing of door.



FLOW CHART


START
INITIALIZE THE SYSTEM
READ THE ENTERED RFID SEQUENCE
IS SEQUENCE REGISTERED ?
NO
OUTSIDE MEMBER NO SLOT FOR YOU
YES
ASSOCIATION MEMBER DOOR OPEN/CLOSE
STOP

CIRCUIT IN PROTEUS SOFTWARE



C:\Users\HP\Documents\MCLAB_19BEC0486\rfid based car parking system.uvproj - µVision

File Edit View Project Flash Debug Peripherals Tools SVCS Window Help

Target 1

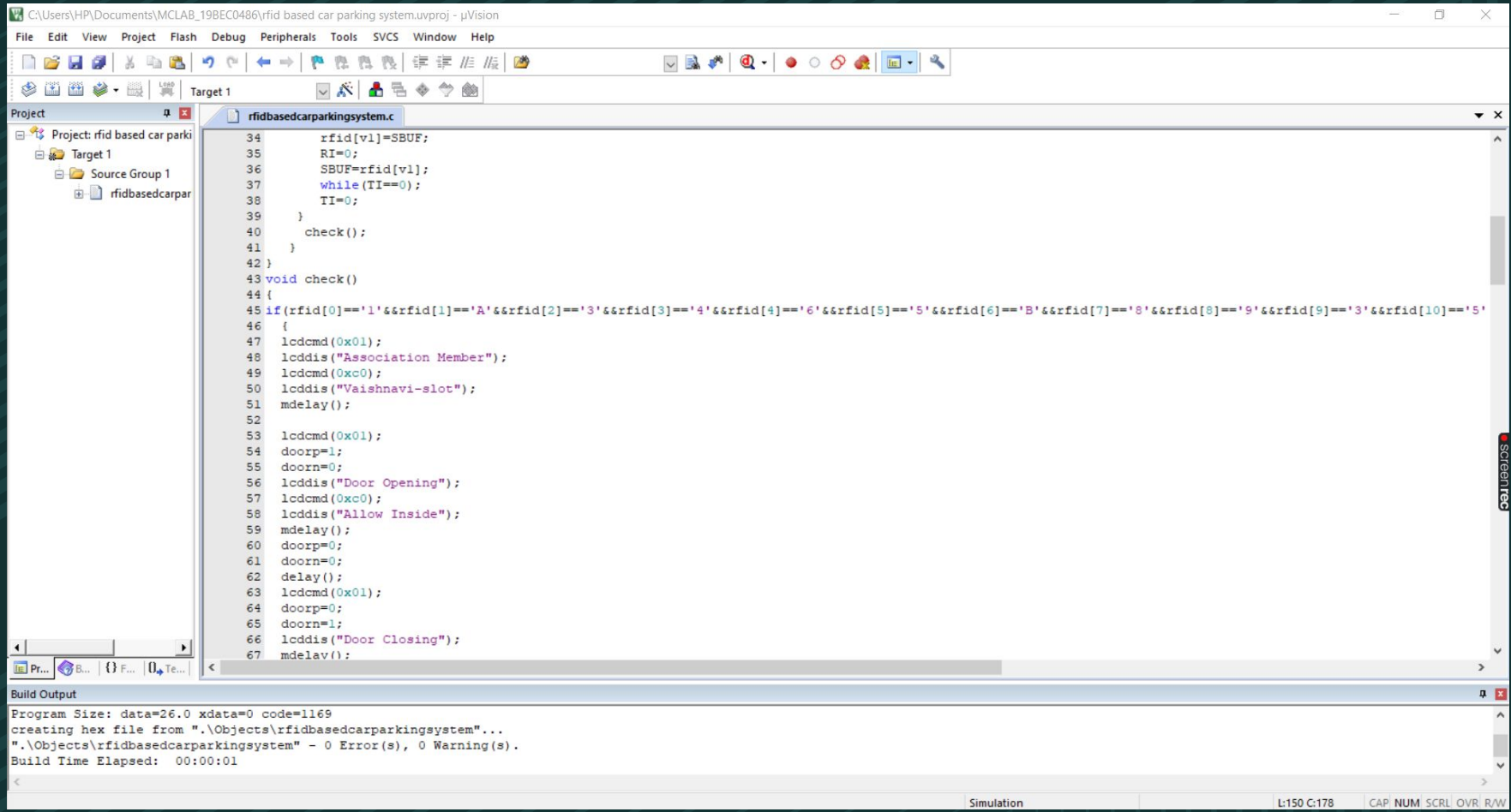
Project

Project: rfid based car parki
Target 1
Source Group 1
rfidbasedcarpar

rfidbasedcarparkingsystem.c

```
#include<reg51.h>
sbit doorp=P2^0;
sbit doorn=P2^1;
sbit rs=P2^5;
sbit rw=P2^6;
sbit en=P2^7;
void lcddat(unsigned char);
void lcdcmd(unsigned char);
void lcddis(unsigned char *);
void lcd_init();
void serial_init();
void check();
void delay();
void mdelay();
unsigned char rfid[12],v1;
void main ()
{
doorp=doorn=0;
serial_init();
lcd_init();
lcddis("RFID BASED CAR");
lcdcmd(0xc0) ; //forcing cursor to second line
lcddis("PARKING SYSTEM");
mdelay();

lcdcmd(0x01);
while(1)
{
    lcdcmd(0x01);
    lcddis("Swipe Your Card");
    for(v1=0;v1<12;v1++)
    {
       while(RI==0);
       rfid[v1]=SBUF;
```


C:\Users\HP\Documents\MCLAB_19BEC0486\rfid based car parking system.uvproj - µVision
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
Target 1
Project
Project: rfid based car parki
Target 1
Source Group 1
rfidbasedcarpar
rfidbasedcarparkingsystem.c
34 rfid[v1]=SBUF;
35 RI=0;
36 SBUF=rfid[v1];
37 while(TI==0);
38 TI=0;
39 }
40 check();
41 }
42 }
43 void check()
44 {
45 if(rfid[0]=='1'&&rfid[1]=='A'&&rfid[2]=='3'&&rfid[3]=='4'&&rfid[4]=='6'&&rfid[5]=='5'&&rfid[6]=='B'&&rfid[7]=='8'&&rfid[8]=='9'&&rfid[9]=='3'&&rfid[10]=='5'
46 {
47 lcdcmd(0x01);
48 lcddis("Association Member");
49 lcdcmd(0xc0);
50 lcddis("Vaishnavi-slot");
51 mdelay();
52
53 lcdcmd(0x01);
54 doorp=1;
55 doorn=0;
56 lcddis("Door Opening");
57 lcdcmd(0xc0);
58 lcddis("Allow Inside");
59 mdelay();
60 doorp=0;
61 doorn=0;
62 delay();
63 lcdcmd(0x01);
64 doorp=0;
65 doorn=1;
66 lcddis("Door Closing");
67 mdelay();
Build Output
Program Size: data=26.0 xdata=0 code=1169
creating hex file from ".\Objects\rfidbasedcarparkingsystem"...
".\Objects\rfidbasedcarparkingsystem" - 0 Error(s), 0 Warning(s).
Build Time Elapsed: 00:00:01
Simulation
L:150 C:178
CAP NUM SCRL OVR R/W

C:\Users\HP\Documents\MCLAB_19BEC0486\rfid based car parking system.uvproj - µVision

File Edit View Project Flash Debug Peripherals Tools SVCS Window Help

Target 1

Project

Project: rfid based car parki
Target 1
Source Group 1
rfidbasedcarpar

rfidbasedcarparkingsystem.c

```
67   mdelay();
68   doorp=0;
69   doorn=0;
70   }
71
72  else if(rfid[0]=='3'&&rfid[1]=='2'&&rfid[2]=='4'&&rfid[3]=='5'&&rfid[4]=='F'&&rfid[5]=='R'&&rfid[6]=='6'&&rfid[7]=='7'&&rfid[8]=='8'&&rfid[9]=='6'&&rfid[10
73   {
74   lcdcmd(0x01);
75   lcddis("Association Member");
76   lcdcmd(0xc0);
77   lcddis("Prajjwal-slot");
78   mdelay();
79
80   lcdcmd(0x01);
81   doorp=1;
82   doorn=0;
83   lcddis("Door Opening");
84   lcdcmd(0xc0);
85   lcddis("Allow Inside");
86   mdelay();
87   doorp=0;
88   doorn=0;
89   delay();
90   lcdcmd(0x01);
91   doorp=0;
92   doorn=1;
93   lcddis("Door Closing");
94   mdelay();
95   doorp=0;
96   doorn=0;
97   }
98   else if(rfid[0]=='2'&&rfid[1]=='3'&&rfid[2]=='4'&&rfid[3]=='R'&&rfid[4]=='F'&&rfid[5]=='6'&&rfid[6]=='4'&&rfid[7]=='7'&&rfid[8]=='1'&&rfid[9]=='2'&&rfid[1
99   {
100  lcdcmd(0x01);
```

Build Output

```
Program Size: data=26.0 xdata=0 code=1169
creating hex file from ".\Objects\rfidbasedcarparkingsystem"...
".\Objects\rfidbasedcarparkingsystem" - 0 Error(s), 0 Warning(s).
Build Time Elapsed:  00:00:01
```

C:\Users\HP\Documents\MCLAB_19BEC0486\rfid based car parking system.uvproj - µVision

File Edit View Project Flash Debug Peripherals Tools SVCS Window Help

Target 1

Project

Project: rfid based car parki
Target 1
Source Group 1
rfidbasedcarpar

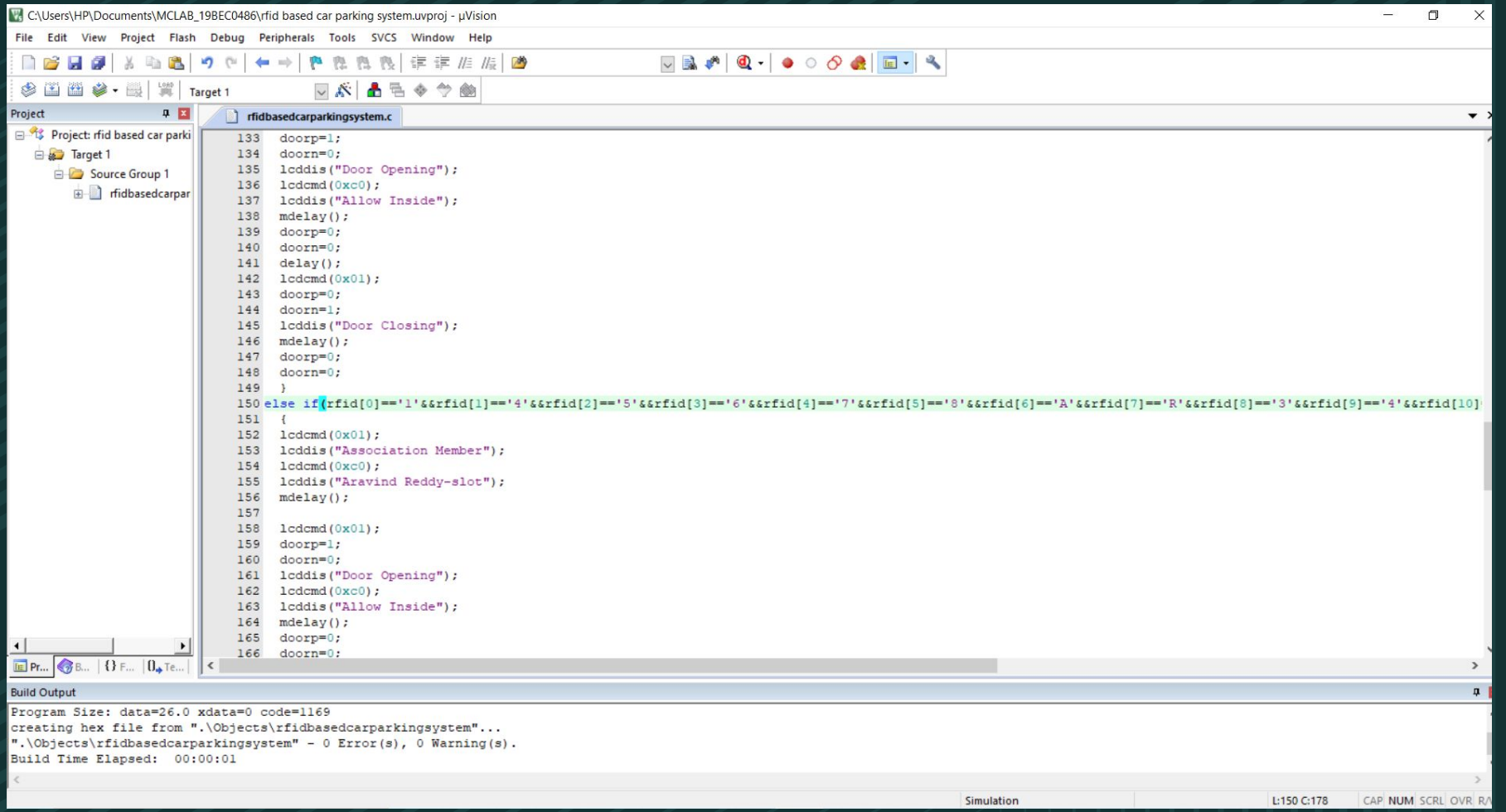
rfidbasedcarparkingsystem.c

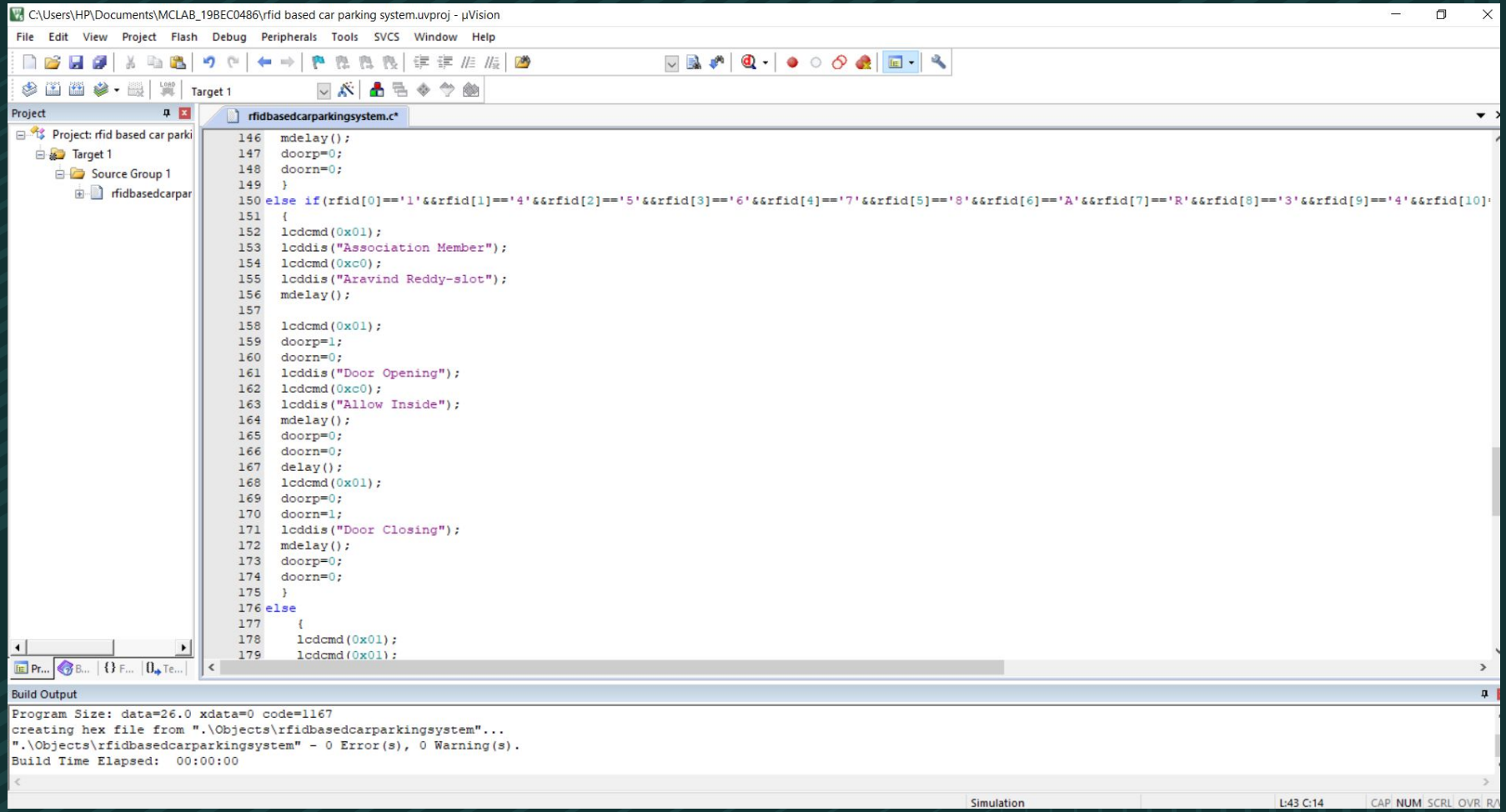
```
100   lcdcmd(0x01);
101   lcddis("Association Member");
102   lcdcmd(0xc0);
103   lcddis("Yashwanth Reddy-slot");
104   mdelay();
105
106   lcdcmd(0x01);
107   doorp=1;
108   doorn=0;
109   lcddis("Door Opening");
110   lcdcmd(0xc0);
111   lcddis("Allow Inside");
112   mdelay();
113   doorp=0;
114   doorn=0;
115   delay();
116   lcdcmd(0x01);
117   doorp=0;
118   doorn=1;
119   lcddis("Door Closing");
120   mdelay();
121   doorp=0;
122   doorn=0;
123   }
124 else if(rfid[0]=='3'&&rfid[1]=='9'&&rfid[2]=='F'&&rfid[3]=='2'&&rfid[4]=='6'&&rfid[5]=='1'&&rfid[6]=='8'&&rfid[7]=='7'&&rfid[8]=='D'&&rfid[9]=='4'&&rfid[10]
125   {
126   lcdcmd(0x01);
127   lcddis("Association Member");
128   lcdcmd(0xc0);
129   lcddis("Yashwanth Kalyan-slot");
130   mdelay();
131
132   lcdcmd(0x01);
133   doorp=1;
```

Build Output

```
Program Size: data=26.0 xdata=0 code=1169
creating hex file from ".\Objects\rfidbasedcarparkingsystem"...
".\Objects\rfidbasedcarparkingsystem" - 0 Error(s), 0 Warning(s).
Build Time Elapsed:  00:00:01
```

Simulation L:150 C:178 CAP NUM SCRL OVR R/


C:\Users\HP\Documents\MCLAB_19BEC0486\rfid based car parking system.uvproj - µVision
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
Target 1
Project
Project: rfid based car parki
Target 1
Source Group 1
rfidbasedcarpar
rfidbasedcarparkingsystem.c
doorp=1;
doorn=0;
lcddis("Door Opening");
lcdcmd(0xc0);
lcddis("Allow Inside");
mdelay();
doorp=0;
doorn=0;
delay();
lcdcmd(0x01);
doorp=0;
doorn=1;
lcddis("Door Closing");
mdelay();
doorp=0;
doorn=0;
}
else if(rfid[0]=='1'&&rfid[1]=='4'&&rfid[2]=='5'&&rfid[3]=='6'&&rfid[4]=='7'&&rfid[5]=='8'&&rfid[6]=='A'&&rfid[7]=='R'&&rfid[8]=='3'&&rfid[9]=='4'&&rfid[10]
{
lcdcmd(0x01);
lcddis("Association Member");
lcdcmd(0xc0);
lcddis("Aravind Reddy-slot");
mdelay();
lcdcmd(0x01);
doorp=1;
doorn=0;
lcddis("Door Opening");
lcdcmd(0xc0);
lcddis("Allow Inside");
mdelay();
doorp=0;
doorn=0;
Build Output
Program Size: data=26.0 xdata=0 code=1169
creating hex file from ".\Objects\rfidbasedcarparkingsystem"...
".\Objects\rfidbasedcarparkingsystem" - 0 Error(s), 0 Warning(s).
Build Time Elapsed: 00:00:01
Simulation
L:150 C:178
CAP NUM SCRL OVR R/W


C:\Users\HP\Documents\MCLAB_19BEC0486\rfid based car parking system.uvproj - µVision
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help
Target 1
Project
Project: rfid based car parki
Target 1
Source Group 1
rfidbasedcarpar
rfidbasedcarparkingsystem.c*
146 mdelay();
147 doorp=0;
148 doorn=0;
149 }
150 else if(rfid[0]=='1'&&rfid[1]=='4'&&rfid[2]=='5'&&rfid[3]=='6'&&rfid[4]=='7'&&rfid[5]=='8'&&rfid[6]=='A'&&rfid[7]=='R'&&rfid[8]=='3'&&rfid[9]=='4'&&rfid[10]
151 {
152 lcdcmd(0x01);
153 lcddis("Association Member");
154 lcdcmd(0xc0);
155 lcddis("Aravind Reddy-slot");
156 mdelay();
157
158 lcdcmd(0x01);
159 doorp=1;
160 doorn=0;
161 lcddis("Door Opening");
162 lcdcmd(0xc0);
163 lcddis("Allow Inside");
164 mdelay();
165 doorp=0;
166 doorn=0;
167 delay();
168 lcdcmd(0x01);
169 doorp=0;
170 doorn=1;
171 lcddis("Door Closing");
172 mdelay();
173 doorp=0;
174 doorn=0;
175 }
176 else
177 {
178 lcdcmd(0x01);
179 lcdcmd(0x01);
Build Output
Program Size: data=26.0 xdata=0 code=1167
creating hex file from ".\Objects\rfidbasedcarparkingsystem"...
".\Objects\rfidbasedcarparkingsystem" - 0 Error(s), 0 Warning(s).
Build Time Elapsed: 00:00:00
Simulation
L:43 C:14
CAP NUM SCRL OVR R/W

C:\Users\HP\Documents\MCLAB_19BEC0486\rfid based car parking system.uvproj - µVision

File Edit View Project Flash Debug Peripherals Tools SVCS Window Help

Target 1

Project

Project: rfid based car parki
Target 1
Source Group 1
rfidbasedcarpar

rfidbasedcarparkingsystem.c

```
199 en=1;
200 }
201 void lcddat(unsigned char val)
202 {
203 P1=val;
204 rs=1;
205 rw=0;
206 en=1;
207 delay();
208 en=0;
209 }
210 void delay()
211 {
212 unsigned int v5;
213 for(v5=0;v5<6000;v5++);
214 }
215 void lcddis(unsigned char *s)
216 {
217 unsigned char w;
218 for(w=0;s[w]!='\0';w++)
219 {
220 lcddat(s[w]);
221 }
222 }
223 void serial_init()
224 {
225 SCON=0X50;
226 TMOD=0X20;
227 TH1=-3;
228 TR1=1;
229 }
230 void mdelay()
231 {
232 unsigned int v6,v7;
```

Build Output

```
Program Size: data=26.0 xdata=0 code=1169
creating hex file from ".\Objects\rfidbasedcarparkingsystem"...
".\Objects\rfidbasedcarparkingsystem" - 0 Error(s), 0 Warning(s).
Build Time Elapsed:  00:00:01
```

Simulation L:150 C:178 CAP NUM SCRL OVR R/

C:\Users\HP\Documents\MCLAB_19BEC0486\rfid based car parking system.uvproj - µVision

File Edit View Project Flash Debug Peripherals Tools SVCS Window Help

Target 1

Project

Project: rfid based car parki
Target 1
Source Group 1
rfidbasedcarpar

rfidbasedcarparkingsystem.c*

```
207 rw=0;
208 en=1;
209 delay();
210 en=0;
211 }
212 void delay()
213 {
214 unsigned int v5;
215 for(v5=0;v5<6000;v5++);
216 }
217 void lcddis(unsigned char *s)
218 {
219 unsigned char w;
220 for(w=0;s[w]!='\0';w++)
221 {
222 lcddat(s[w]);
223 }
224 }
225 void serial_init()
226 {
227 SCON=0X50;
228 TMOD=0X20;
229 TH1=-3;     //baudrate 9600
230 TR1=1;
231 }
232 void mdelay()
233 {
234 unsigned int v6,v7;
235 for (v6=0;v6<2;v6++);
236 {
237 for (v7=0;v7<60000;v7++);
238 }
239 }
```

Build Output

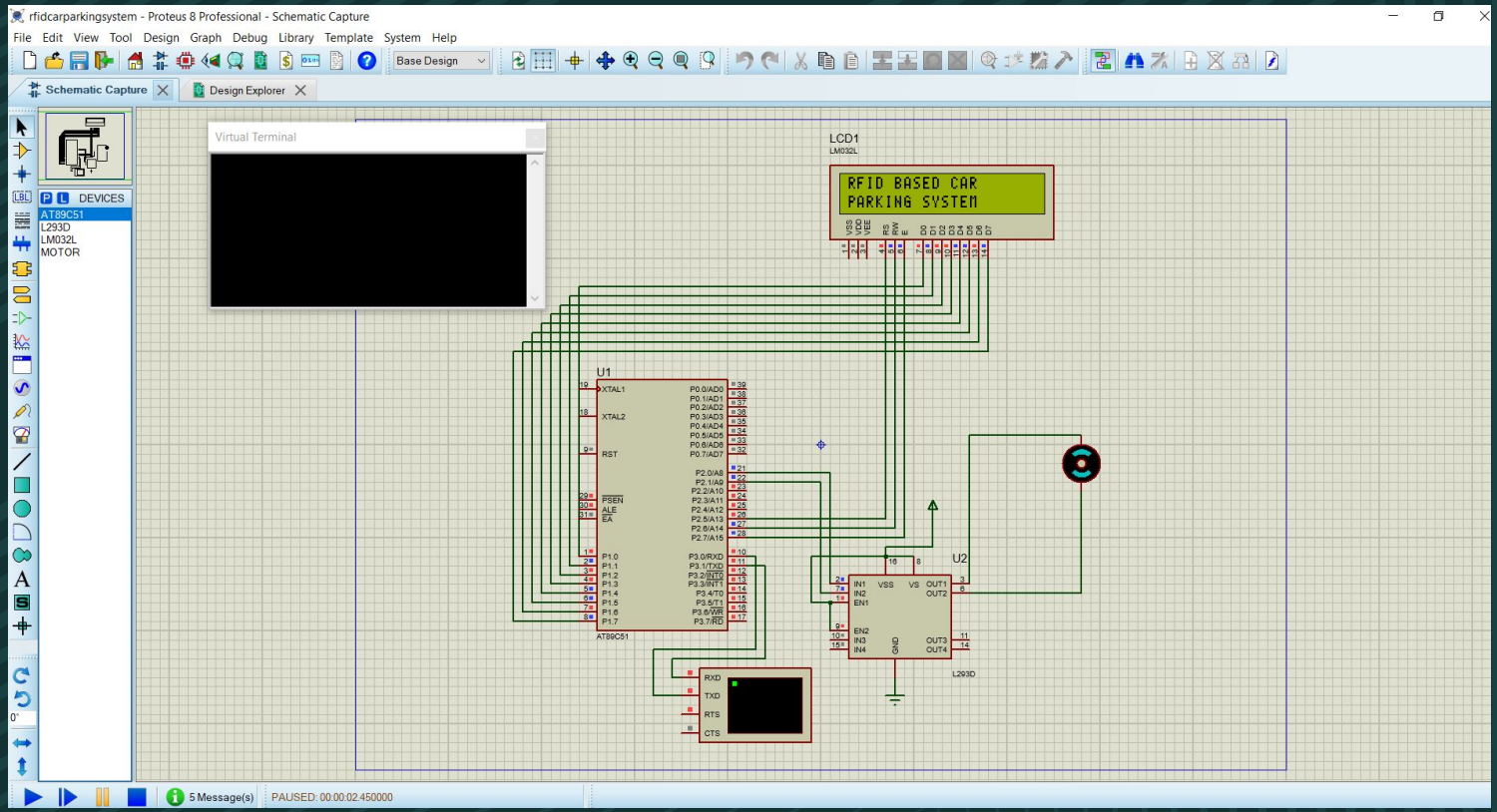
```
Program Size: data=26.0 xdata=0 code=1167
creating hex file from ".\Objects\rfidbasedcarparkingsystem"...
".\Objects\rfidbasedcarparkingsystem" - 0 Error(s), 0 Warning(s).
Build Time Elapsed:  00:00:00
```

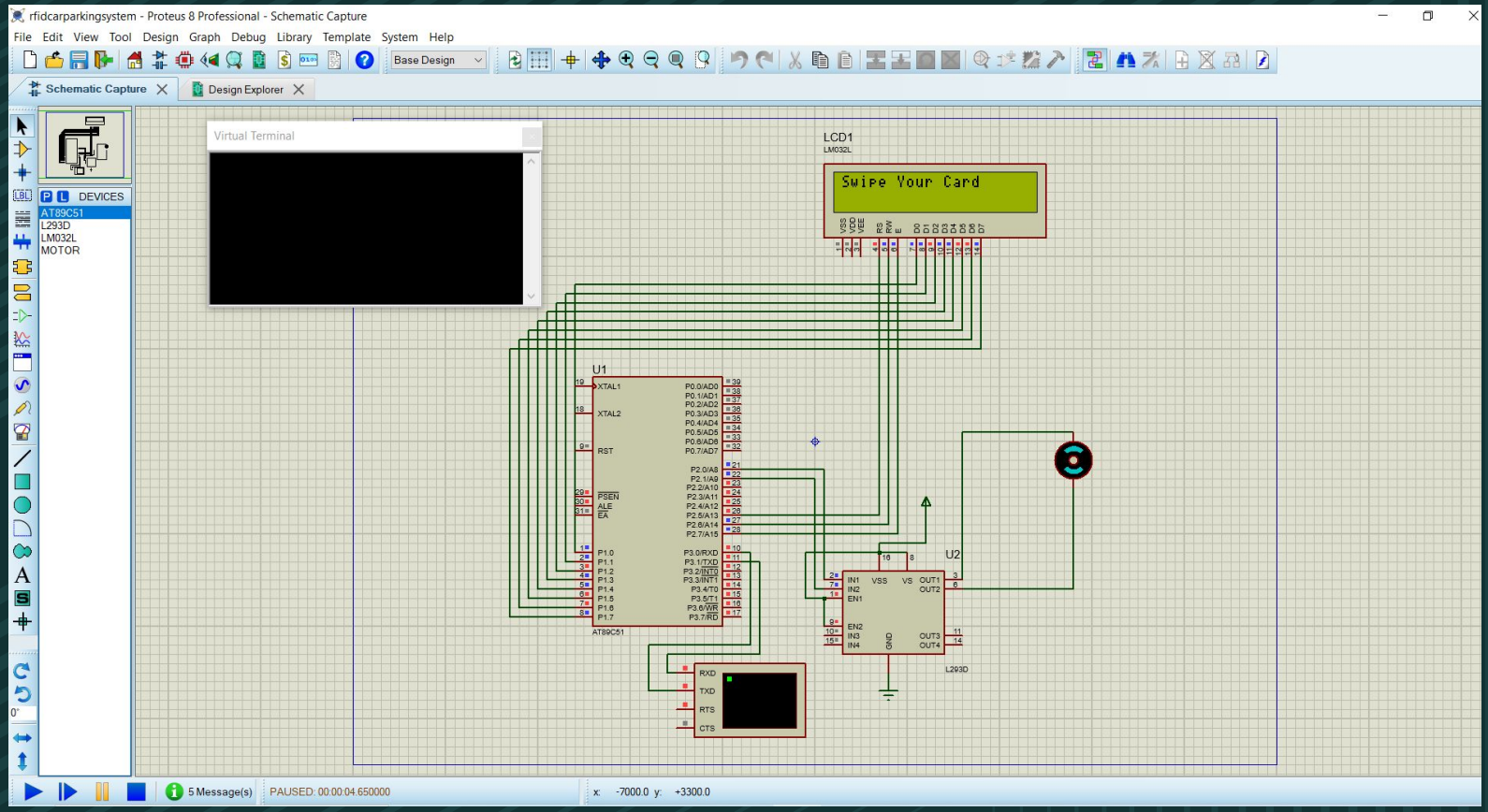
Simulation L:43 C:14 CAP NUM SCRL OVR R/A

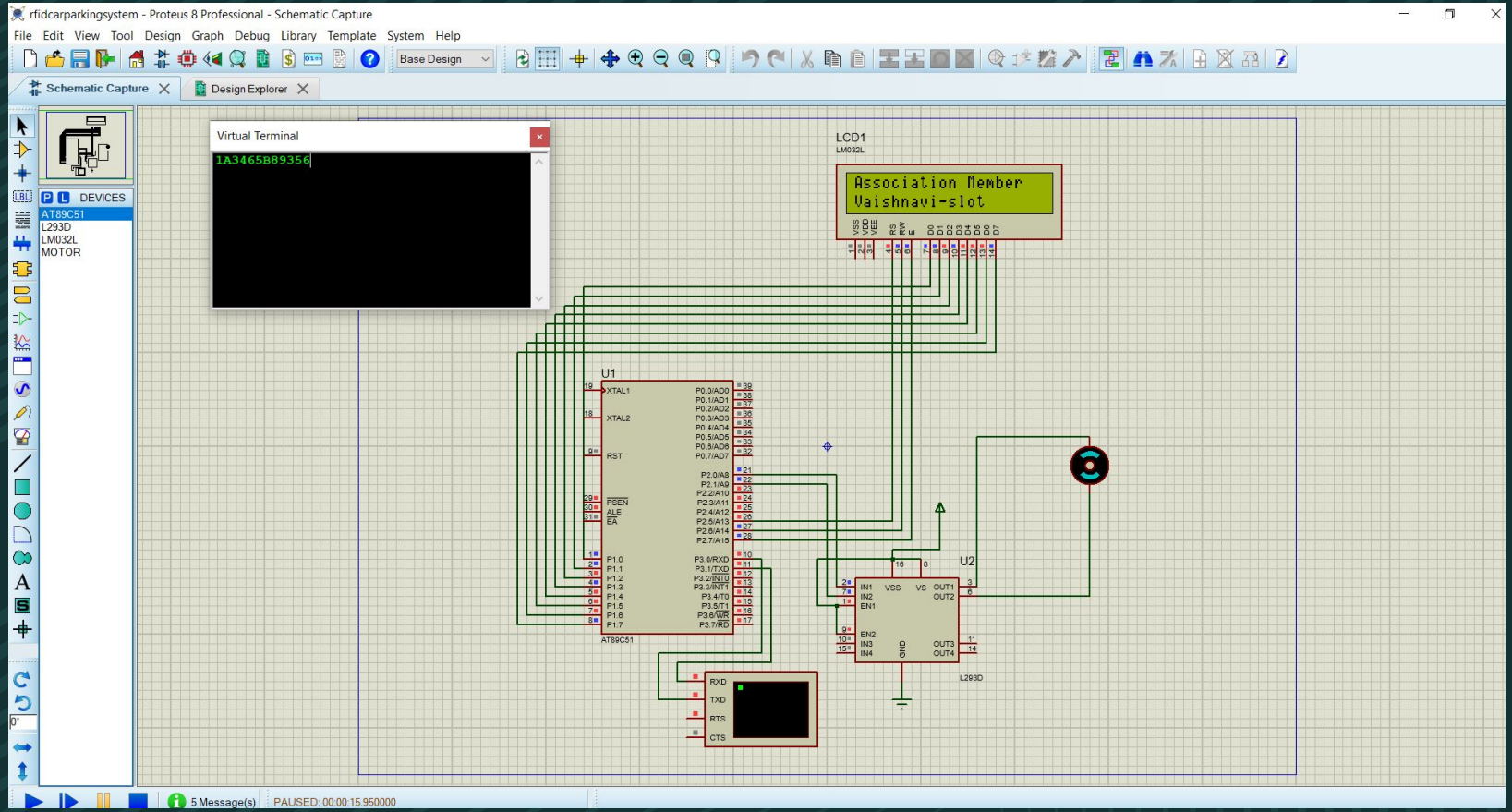
RFID INPUT SEQUENCE

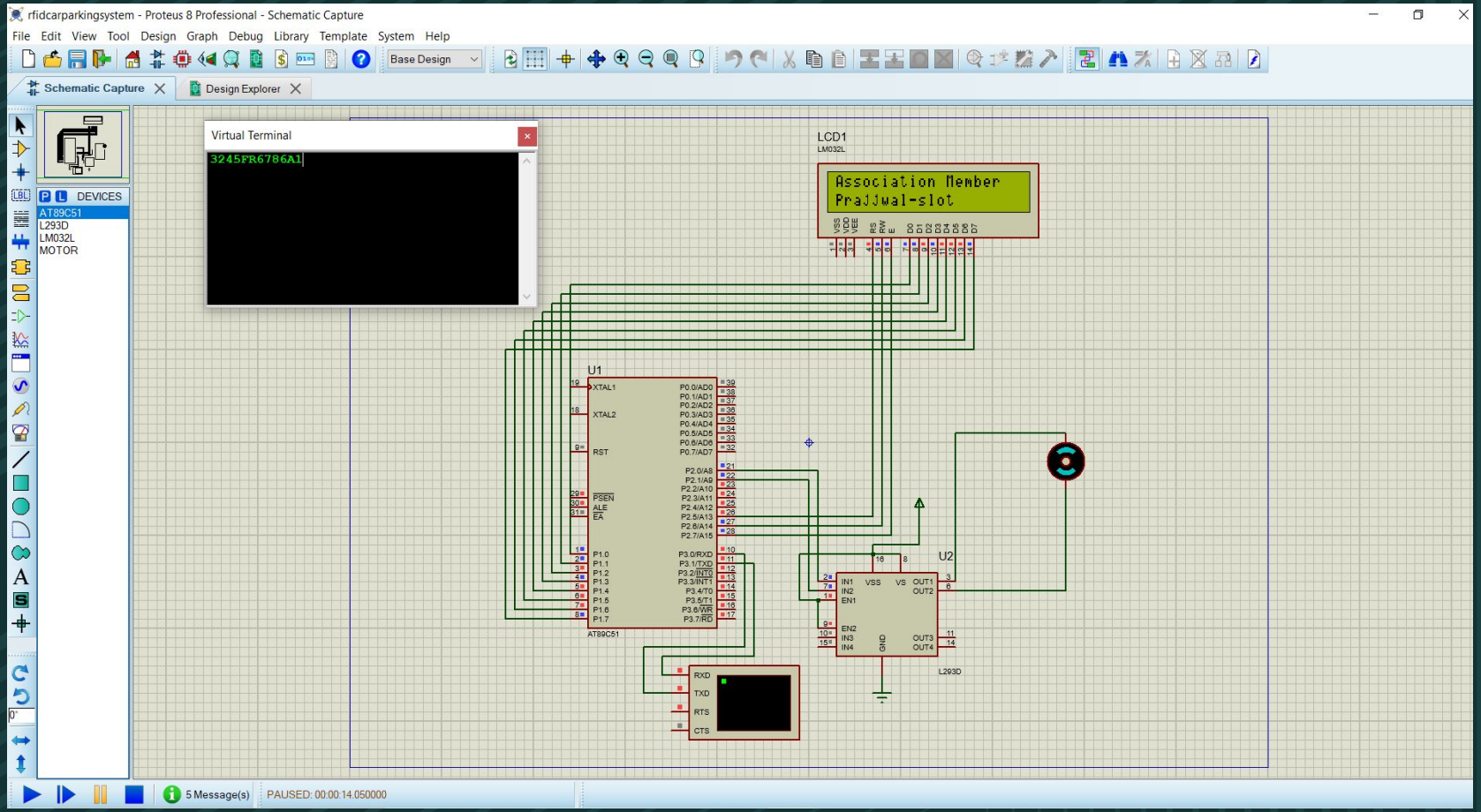
- 1A3465B89356–Vaishnavi Rekha
- 3245FR6786A1–Prajjwal Dutta
- 234RF6471297–Yashwanth Reddy
- 39F26187D468–Yashwanth Kalyan
- 145678AR34EC–Aravind Reddy

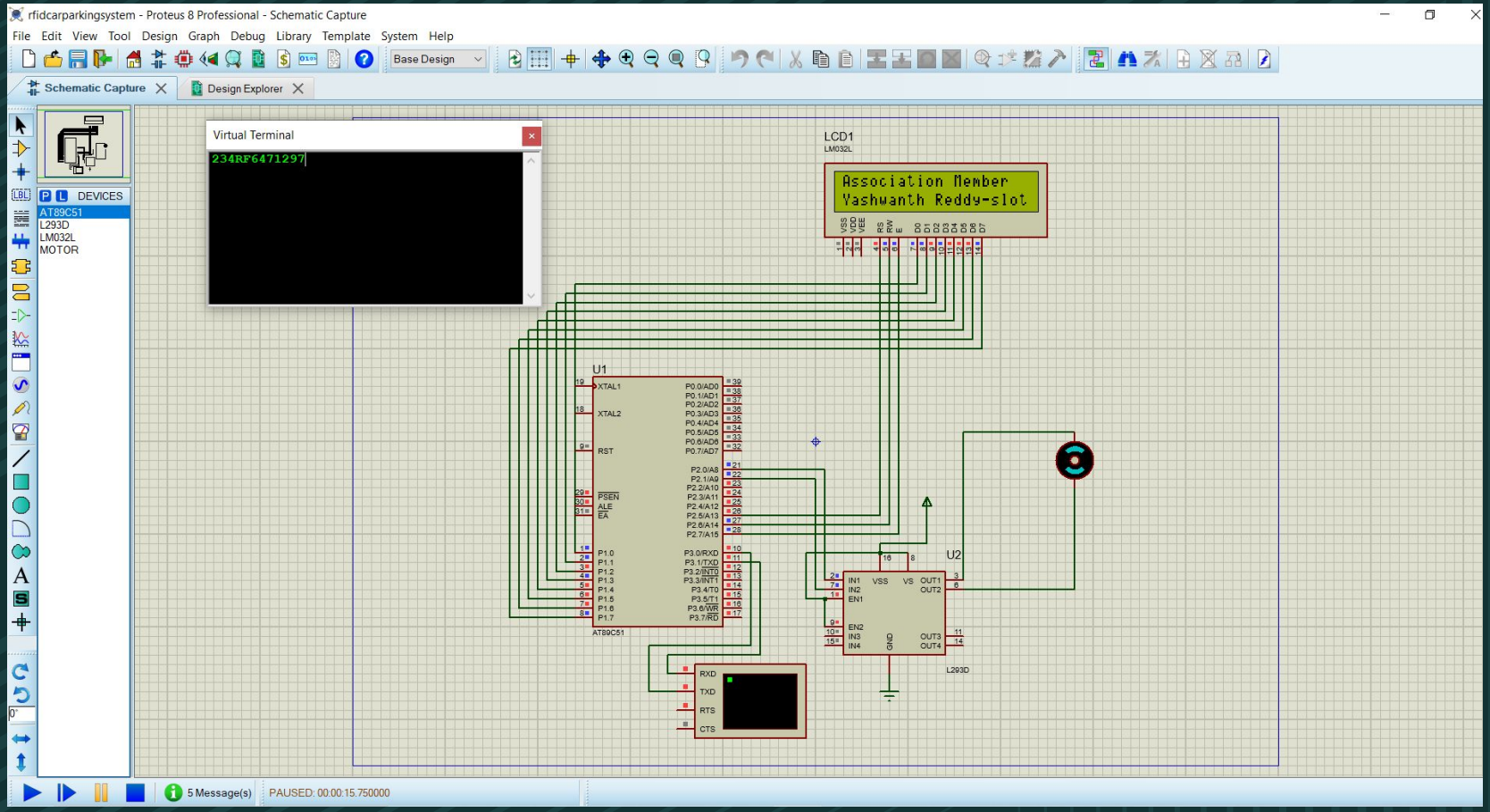
OUTPUT

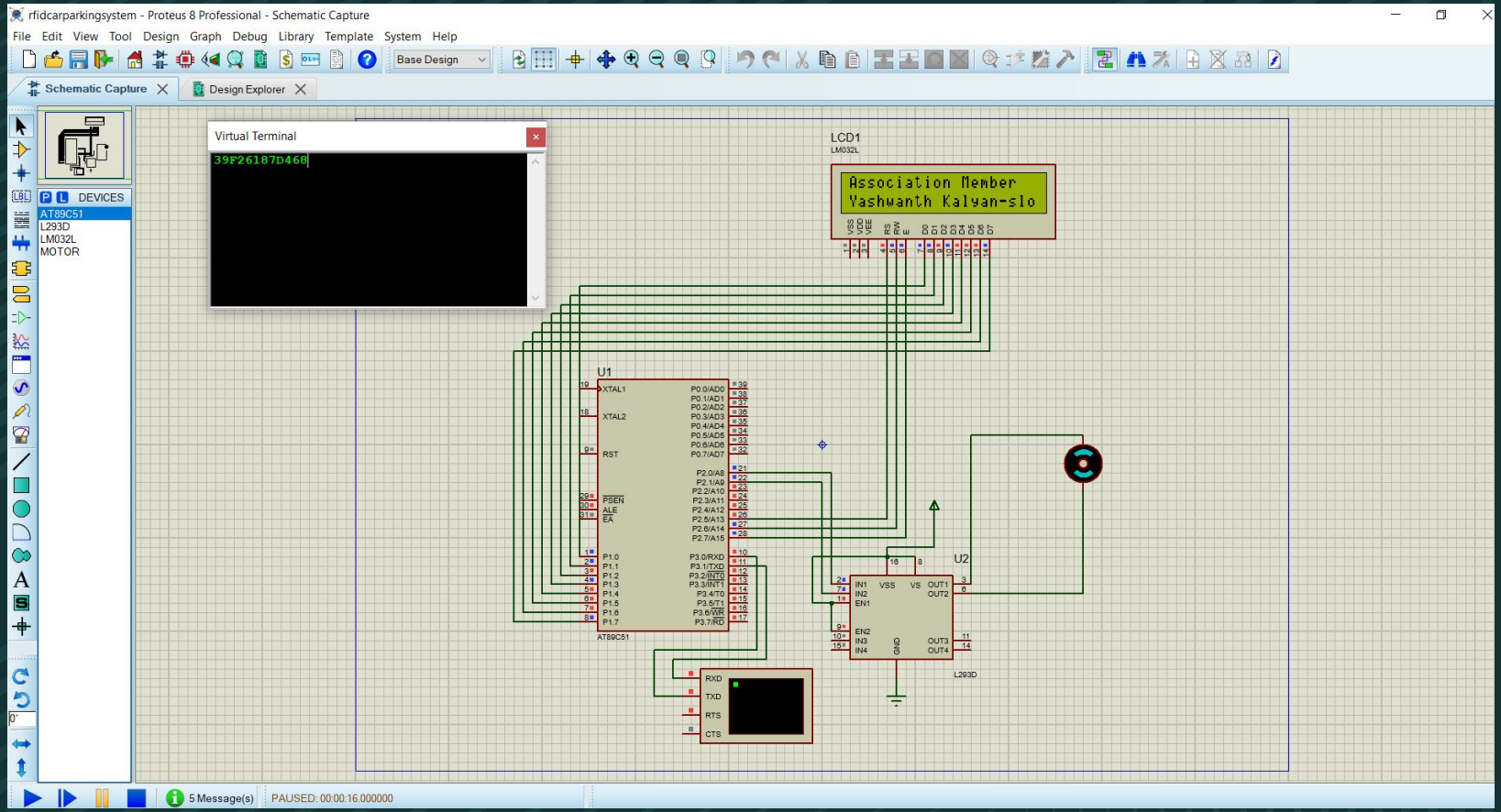

rfidcarparkingsystem - Proteus 8 Professional - Schematic Capture
File Edit View Tool Design Graph Debug Library Template System Help
Base Design
Schematic Capture
Design Explorer
Virtual Terminal
DEVICES
AT89C51
L293D
LM032L
MOTOR
LCD1
LM032L
RFID BASED CAR
PARKING SYSTEM
U1
AT89C51
U2
L293D
RXD
TXD
RTS
CTS
5 Message(s)
PAUSED: 00:00:02.450000

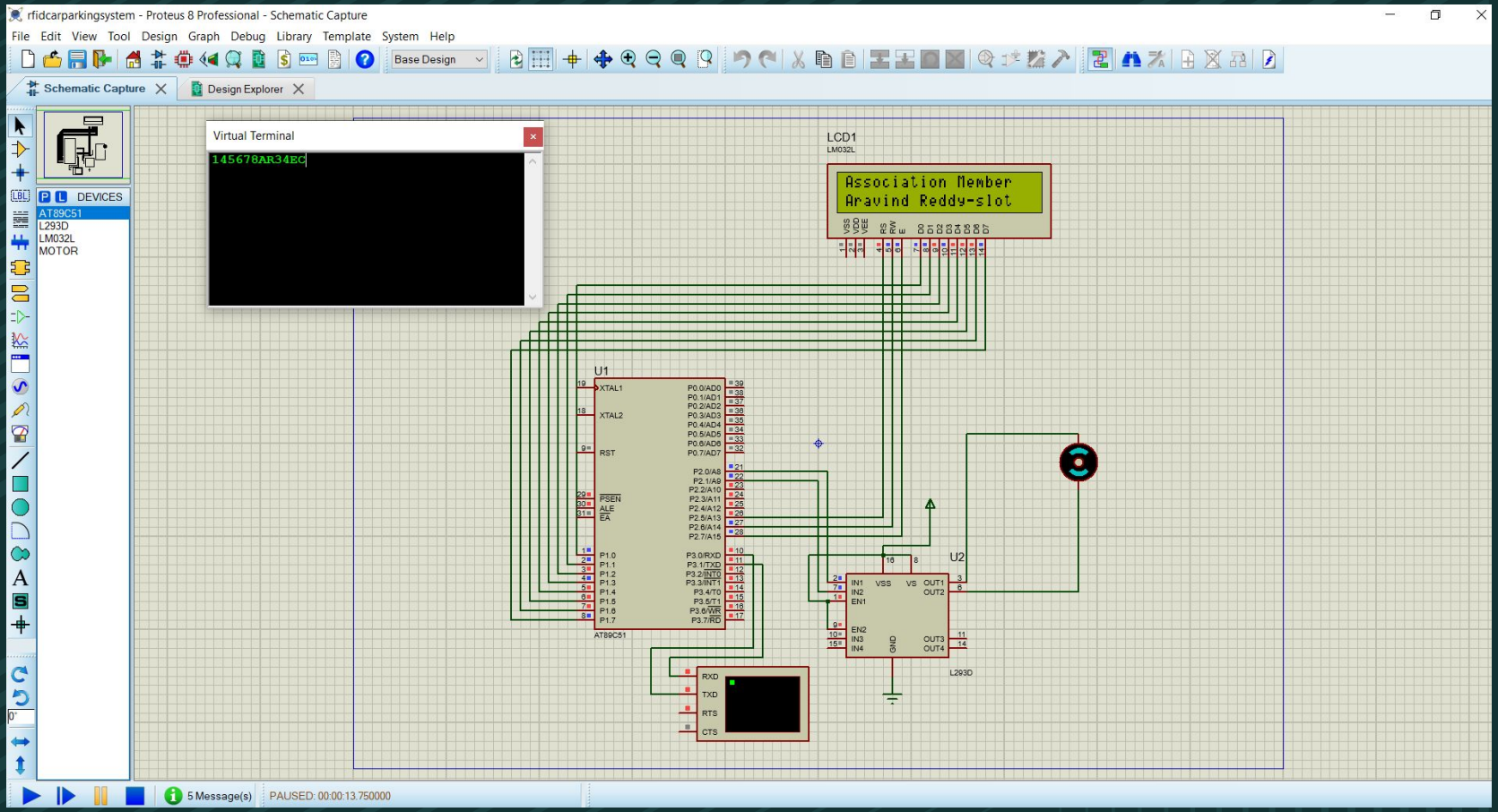

rfidcarparkingsystem - Proteus 8 Professional - Schematic Capture
File Edit View Tool Design Graph Debug Library Template System Help
Base Design
Schematic Capture
Design Explorer
Virtual Terminal
DEVICES
AT89C51
L293D
LM032L
MOTOR
LCD1
LM032L
Swipe Your Card
U1
AT89C51
U2
L293D
RXD
TXD
RTS
CTS
5 Message(s)
PAUSED: 00:00:04.650000
x: -7000.0 y: +3300.0


rfidcarparkingsystem - Proteus 8 Professional - Schematic Capture
File Edit View Tool Design Graph Debug Library Template System Help
Base Design
Schematic Capture
Design Explorer
Virtual Terminal
1A3465B89356
DEVICES
AT89C51
L293D
LM032L
MOTOR
LCD1
LM032L
Association Member
Vaishnavi-slot
U1
AT89C51
U2
L293D
RXD
TXD
RTS
CTS
5 Message(s)
PAUSED: 00:00:15.950000

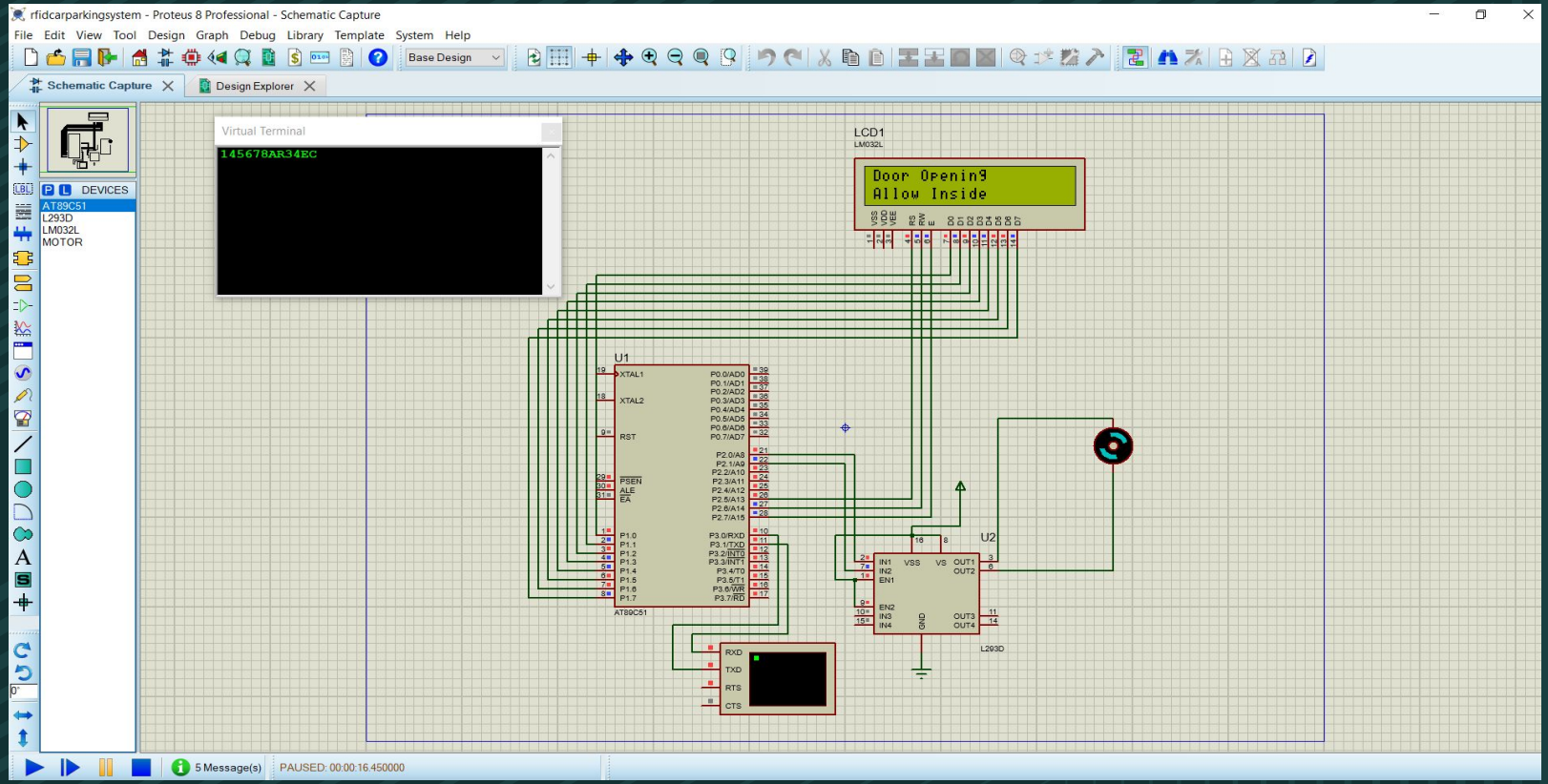

rfidcarparkingsystem - Proteus 8 Professional - Schematic Capture
File Edit View Tool Design Graph Debug Library Template System Help
Base Design
Schematic Capture
Design Explorer
Virtual Terminal
3245FR6786A1
DEVICES
AT89C51
L293D
LM032L
MOTOR
LCD1
LM032L
Association Member
Prajjwal-slot
U1
AT89C51
U2
L293D
RXD
TXD
RTS
CTS
5 Message(s)
PAUSED: 00:00:14.050000

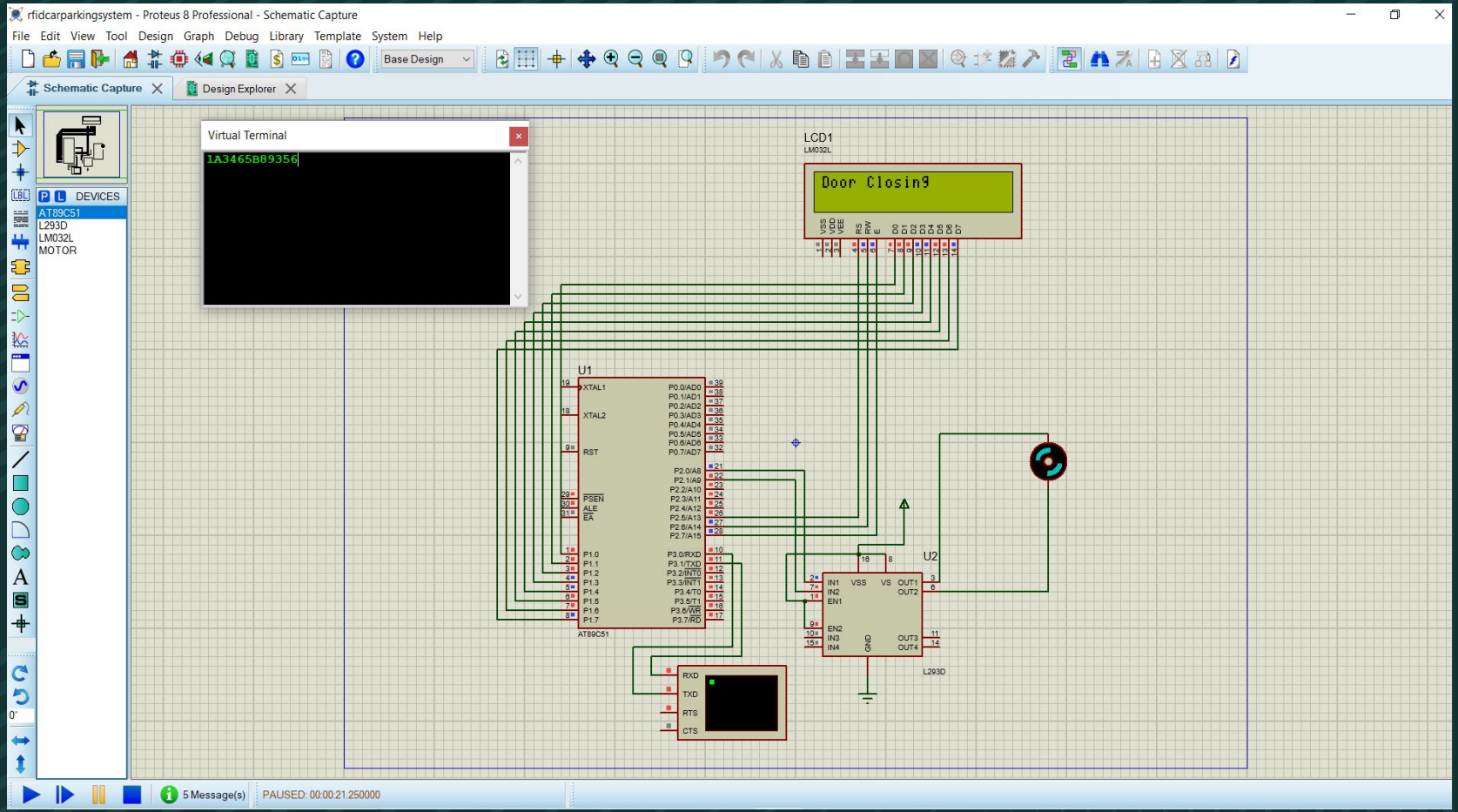

rfidcarparkingsystem - Proteus 8 Professional - Schematic Capture
File Edit View Tool Design Graph Debug Library Template System Help
Base Design
Schematic Capture
Design Explorer
Virtual Terminal
234RF6471297
DEVICES
AT89C51
L293D
LM032L
MOTOR
LCD1
LM032L
Association Member
Vashwanth Reddy-slot
U1
AT89C51
U2
L293D
RXD
TXD
RTS
CTS
5 Message(s)
PAUSED: 00:00:15.750000


rfidcarparkingsystem - Proteus 8 Professional - Schematic Capture
File Edit View Tool Design Graph Debug Library Template System Help
Base Design
Schematic Capture
Design Explorer
Virtual Terminal
39F26187D468
DEVICES
AT89C51
L293D
LM032L
MOTOR
LCD1
LM032L
Association Member
Yashwanth Kalyan-slo
U1
AT89C51
U2
L293D
RXD
TXD
RTS
CTS
5 Message(s)
PAUSED: 00:00:16.000000


rfidcarparkingsystem - Proteus 8 Professional - Schematic Capture
File Edit View Tool Design Graph Debug Library Template System Help
Base Design
Schematic Capture
Design Explorer
Virtual Terminal
145678AR34EC
DEVICES
AT89C51
L293D
LM032L
MOTOR
LCD1
LM032L
Association Member
Aravind Reddy-slot
U1
AT89C51
U2
L293D
RXD
TXD
RTS
CTS
5 Message(s)
PAUSED: 00:00:13.750000

OPENING AND CLOSING OF THE DOOR




rfidcarparkingsystem - Proteus 8 Professional - Schematic Capture
File Edit View Tool Design Graph Debug Library Template System Help
Base Design
Schematic Capture
Design Explorer
Virtual Terminal
1A3465B89356
DEVICES
AT89C51
L293D
LM032L
MOTOR
LCD1
LM032L
Door Closing
U1
AT89C51
U2
L293D
RXD
TXD
RTS
CTS
5 Message(s)
PAUSED: 00:00:21.250000

ADVANTAGES AND APPLICATIONS

- RFID based Car Parking System is implemented in this project and can be used to eliminate the hassle of manual operation of parking system.
- This system can help in reducing cost, increase in productivity and saves time.
- Accurate timing details are measured with the help of RTC Module.
- Prepaid and postpaid cards can be integrated with the system for easy payment options.
- Analyze traffic patterns to maximize facility utilization.
- Increase security within the parking facility.
- Manage staffing for peak traffic periods.
- Save time for parking.
- Improve customer service.

CONCLUSION

The project offers a new solution to the evolving technology such as: saving time and manual effort, problem of illegal parking, reduction of traffic jam and more safety parking high.

REFERENCE

[1] Rosario Salpietro , Luca Bedogni, Marco DiFelice, Luciano Bononi“Park Here! A Smart Parking System based on Smartphones’ Embedded Sensors and Short Range Communication Technologies” Department of Engineering and Computer Science, University of Bologna, 978-1-5090-0366-

[2] Mrs. D.J.Bonde, Rohit SuniKetan Suresh Gaikwadl Shende, “Automated Car Parking System Commanded By Android Application” International Conference on Computer Communication and Informatics (ICCCI -2014), Jan. 03 – 05, 2014, Coimbatore ,University of Pune MMIT – Lohgaon Pune, India

[3] Hongwei Wang and Wenbo He, “Reservation-based SPS” The first international workshop on cyber-physical networking systems, Dept .Computer, Electrical Eng, University of Nebraska-Lincoln, NE, USA, 978-1-4244-9920-5/11. IEEE, 2011

THANK YOU