```
  /*
 * Project name:
    Car park System Control
*/

// LCD module connections
sbit LCD_RS at RB2_bit;
sbit LCD_EN at RB3_bit;
sbit LCD_D4 at RB4_bit;
sbit LCD_D5 at RB5_bit;
sbit LCD_D6 at RB6_bit;
sbit LCD_D7 at RB7_bit;
sbit LCD_RS_Direction at TRISB2_bit;
sbit LCD_EN_Direction at TRISB3_bit;
sbit LCD_D4_Direction at TRISB4_bit;
sbit LCD_D5_Direction at TRISB5_bit;
sbit LCD_D6_Direction at TRISB6_bit;
sbit LCD_D7_Direction at TRISB7_bit;
// End LCD module connections

// LCD TEXTS DEFINATIONS
char txt1[] = "Here is";
char txt2[] = "your ticket";
char txt4[] = "your payment";
char txt5[] = " Stop ";
char txt6[] = "you can go";
char txt9[] = "Welcome";
char msg1[] = "Barrier Opening";
char msg2[] = "Barrier Closing";
char msg5[] = "Car Enters";
char msg4[] = "Car Exits";
char helpin[] = "help in mode";
char helpout[] ="help out mode";

char car[10];        // string variable to display cars count

//SENSORS DEFINATION
#define S2 PORTD.B0
#define S4 PORTD.B1
#define S3 PORTD.B2
#define S1 PORTD.B3
//Variable Definations
unsigned int entry_flag;                             // a flag to allow the car ennters and to check the payment
unsigned int exit_flag;                              // exit flag to ensure the prrocess of enter flag
unsigned int Count_flag;                             // a flag to count the car annd ensure the completion of previous operations
unsigned int color;                                  // global variable to check tthe traffic condition
unsigned int arr1[4];                                // stepper motor sequence arrrays
unsigned int i;                                      // intialize variable for thee variation of array sequence
unsigned int count;                                  // integer count value to reppresent the number of cars enter and ext the car park
unsigned oldstate_ticket;                            // a flag for Button Ticket
unsigned oldstate_paid;                              // a flag for Button Paid
unsigned oldstate_help;                              // a flag for Button Help in// out
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void Open_Barrier(){
int arr1[4]={9,10,6,5};                               //array for opening Barrrier
r
int i = 0;                                            //counter for running throug
gh array values

         while(Button(&PORTD,7,1,0)){                 // While The barrier is Down
n
           PORTA= arr1[i];                            //set stepper output
           i++;
           delay_ms(20);                              // the speed of barrier move
ement
           if (i > 3) i = 0;                          // Reset The counter
    }
   PORTA=0x00;                                        //Turn off Barrier Drive
   }
void lcd_reset(){Lcd_Cmd(_LCD_CLEAR);                 // lcd clear
 Lcd_Cmd(_LCD_CURSOR_OFF);}

void Close_Barrier(){
int arr1[4]={5,6,10,9};                               //array for closing Barrier
int i = 0;                                            //counter for running throug
gh array values
    while(Button(&PORTD,5,1,0)){                      //while the barrier is UP
           PORTA= arr1[i];                            //set stepper Motor Barrier
 output
           i++;                                       //increment counter by 1
           delay_ms(20);                              // speed of barrier movement
t
          if (i > 3) i = 0;                           // reset the counter
    }
    PORTA=0x00;                                       //Turn off stepper drive
    }
 void light_traffic(){                                // Traffic Light Function
if(S3==1||S2==1){                                     // Whether S3 or S2 =1
PORTC= 0xA0;                                          // Traffic Light is Red
color=0;}                                             // Variable of Red Traffic L
Light
else{ PORTC= 0x50;                                    // Traffic Light is Green
color=1; }                                            // Variable of Greeen Traffi
ic Light
  }
void Entry_procedure(){                               // Entrance Procedure
lcd_reset();                                          // Lcd Clear
delay_ms(500);                                        // Delay For Smooth operatio
on
lcd_out(1,1,txt1);                                    // Display " Here is "
lcd_out(2,2,txt2);                                    // Display " Your Ticket"
delay_ms(500);                                        // Delay For Smooth operatio
on
 lcd_reset();                                         // Lcd Clear
 light_traffic();                                     // Call Traffic light functi
ion to check traffic condtion
 if(color>0)
  {lcd_out(1,1,txt6);                                 // If the traffic light is g
green, Display " You Can Go "
  entry_flag=1;}                                      // a Flag to enter the Car P
Park
```

```
  else
  {lcd_out(2,2,txt5);}                                // Display " Stop " if the t
traffic light is red
  while(entry_flag==1)                                // Wait For the Car To Reach
h Sensor 3
     {if(S3==1)                                       // If Sensor 3 detects Car,
 it wil exceute the next data
    {lcd_out(1,1,msg1);                               // display " Barrier Opening
g "
    Open_Barrier();                                   // Call Barrier openg Functi
ion
    lcd_reset();                                      // LCD clear
    break;} }                                         // Exit the loop
    if(entry_flag==1)                                 // IF the previous Process i
is completed
    {exit_flag=1;                                     // evaluate exit flag = 1
    entry_flag=0;}                                    // Reset the entry Flag
  while(exit_flag==1)                                 // Wait For the Car To Reach
h Sensor 2
    {lcd_out(1,1,txt6);                               // Display " You Can Go "
    if(S2==1)                                         // If staement to check whet
ther the car reaches Sensor 2 or not
    {lcd_reset();                                     // Clear LCD
    lcd_out(1,1,msg2);                                // Display " Barrier is clos
sing
    Close_Barrier();                                  // Call Barrier Clost Functi
ion
    lcd_reset();                                      // LCD Clear
     break;}}
    if(exit_flag==1)                                  // IF the previous Process i
is completed
    Count_flag=1;                                     //  evaluate count flag = 1
    exit_flag=0;                                      // reset the exit flag
  while(Count_flag==1)                                // Wait For the Car to reach
hes Sensor 2
    {if(S1==1)                                        // If staement to check whet
ther the car reaches Sensor 1 or not
    {lcd_out(1,1,msg5);                               // Diplay " Car Enters"
     Count_flag=0;                                    // Reset Flag
     break; }
     }
  }
void count_up(){                                       // Count Up Function
 count=EEPROM_READ(0X02);                              // Read count from Memory
 count++;                                              // Increment The count by 1
1
EEPROM_WRITE(0X02,count);                              // Write new count data int
to the memory
IntToStr(count,car);                                   // Convert int count into C
Char Car
ltrim(car);
lcd_out(2,2,car);                                      // diplay the current car n
number that entered the Car Park
delay_ms(500);                                         // to allow the display exi
ist for 0.5 sec
lcd_reset();                                           // Clear  LCD
}
void Count_down1(){                                    // Count Down Function
count=EEPROM_READ(0X02);                               // Read count from Memory
```

```
count--;                                               // Decrement The count by 1
1
EEPROM_WRITE(0X02,count);                              // Write new count data int
to the memory
IntToStr(count,car);                                   // Convert int count into C
Char Car
ltrim(car);
lcd_out(2,2,car);                                      // diplay the current car n
number that entered the Car Park
delay_ms(500);                                         // to allow the display exi
ist for 0.5 sec
lcd_reset();                                           // Clear  LCD
}
void Exit_procedure(){                                 // Exit Procedure
 lcd_reset();                                          // Clear  LCD
 delay_ms(500);                                        // Delay for Smooth operati
ion
lcd_out(1,1,txt1);                                     // Display " Here is "
lcd_out(2,2,txt4);                                     // Display " Your Payment "
"
 delay_ms(1000);                                       // Delay for smooth operati
ion
 lcd_reset();                                          // Clear  LCD
 light_traffic();                                      // Call Traffic Light Funct
tion
 delay_ms(1000);
 if(color>0)
  {lcd_out(1,1,txt6);                                  // If the traffic light is
 green, Display " You Can Go "
  entry_flag=1;}                                       // a Flag to enter the Car
 Park
  else
  {lcd_out(2,2,txt5);}                                 // Display " Stop " if the
 traffic light is red
  while(entry_flag==1)                                 // Wait for the Car to Reac
ches Sensor 2
     {if(S2==1)                                        // If statement to check wh
hether the car reaches S2 or not
    {lcd_out(1,1,msg1);                                // Display " Barrier Openin
ng "
    Open_Barrier();                                    // Call Barrier Opening Fun
nction
    lcd_reset();                                       // Clear LCD
    break;} }                                          // Exits the loop
    if(entry_flag==1)                                  // IF statement to check th
he completetion of previous operation
    {exit_flag=1;                                      // Evaluate Exit Flag =1
    entry_flag=0;}                                     // Reset Entry Flag
  while(exit_flag==1)                                  // Wait for the Car to Reac
ches Sensor 3
    {lcd_out(1,1,txt6);                                // Diplay " You can Go " on
nce the Barrier is UP
    if(S3==1)                                          // If statement to check wh
hether the car reaches S3 or not
    {lcd_reset();                                      // Clear LCD
    lcd_out(1,1,msg2);                                 // Display " Barrier Closin
ng "
    Close_Barrier();                                   // Call Barrier Closing Fun
nction
    lcd_reset();                                       // Clear LCD
```

```
     break;}}                                          // Exits the loop
    if(exit_flag==1)                                   // IF statement to check th
he completetion of previous operation
    Count_flag=1;                                      // Evaluate Count Flag =1
    exit_flag=0;                                       // Reset EXIT Flag
  while(Count_flag==1)                                 // Wait for the Car to Reac
ches Sensor 4
    {if(S4==1)                                         // If statement to check wh
hether the car reaches S4 or not
    {lcd_out(1,1,msg4);                                // Display " CAR Exits "
     Count_flag=0;                                     // Reset Count Flag
     break; }
      }
     }
void help(){
   lcd_reset();
   lcd_Out(1,1,helpin);                                // Display " Help Mode Acti
ivated "
    while(1){                                          // Infinite loop
     if (S1==1)                                        // Check if Car Reaches S1
 or not
    {count_up();                                       // Call Count up Function
     break;}                                           // Exits The loop
     if (S4==1)                                        // Check if Car Reaches S4
 or not
     {Count_down1();                                   // Call Count Down Function
n
      break;}                                          // Exits The loop
     }
   }

void main(){

  ANSEL  = 0;                                          // Configure AN pins as dig
gital I/O
  ANSELH = 0;
  C1ON_bit = 0;                                        // Disable comparators
  C2ON_bit = 0;
//-------------------------------------------------------------------

   TRISA=0;                                            // Configure All PORT A PIN
N AS OUTPUT
   TRISC=0X0F;                                         // Configure First 4 bits a
as Input and Last 4 Bits As Output of PORTC
   TRISD=0XAF;                                         // Configure all PORT D pin
ns as INPUT


------------------------------------------------------------------
  PORTA=0X00;                                          // ASSESS ALL INPUT VALUES
 OF A=0
  PORTC.B4=0;                                          // ASSESS STOP IN  = 1
  PORTC.B5=0;                                          // ASSESS GO   IN  = 1
  PORTC.B6=0;                                          // ASSESS STOP OUT = 1
  PORTC.B7=0;                                          // ASSESS GO   OUT = 1


//-------------------------------------------------------------------


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```c


Lcd_Init();
Lcd_Cmd(_LCD_CLEAR);
Lcd_Cmd(_LCD_CURSOR_OFF);

while(1){
 lcd_out(1,1,txt9);                                    // DISPLAY " WELCOME"
 { if(button(&PORTC,0,1,1))                            // Button Ticket Function
{ oldstate_ticket=1; }
if(oldstate_ticket&&button(&PORTC,0,1,0))
{ oldstate_ticket=0;
  Entry_procedure();                                   // CALL ENTRANCE PROCEDURE FUNCTION
  count_up(); }  }                                     // CALL COUNT UP FUNCTION
if(button(&PORTC,1,1,1))                               // Button PAID Function
{ oldstate_paid=1; }
if(oldstate_paid&&button(&PORTC,1,1,0)){
oldstate_paid=0;
 Exit_procedure();                                     // CALL EXIT PROCEDURE FUNCCTION
 Count_down1(); }                                      // CALL COUNT DOWN
    }
}
```