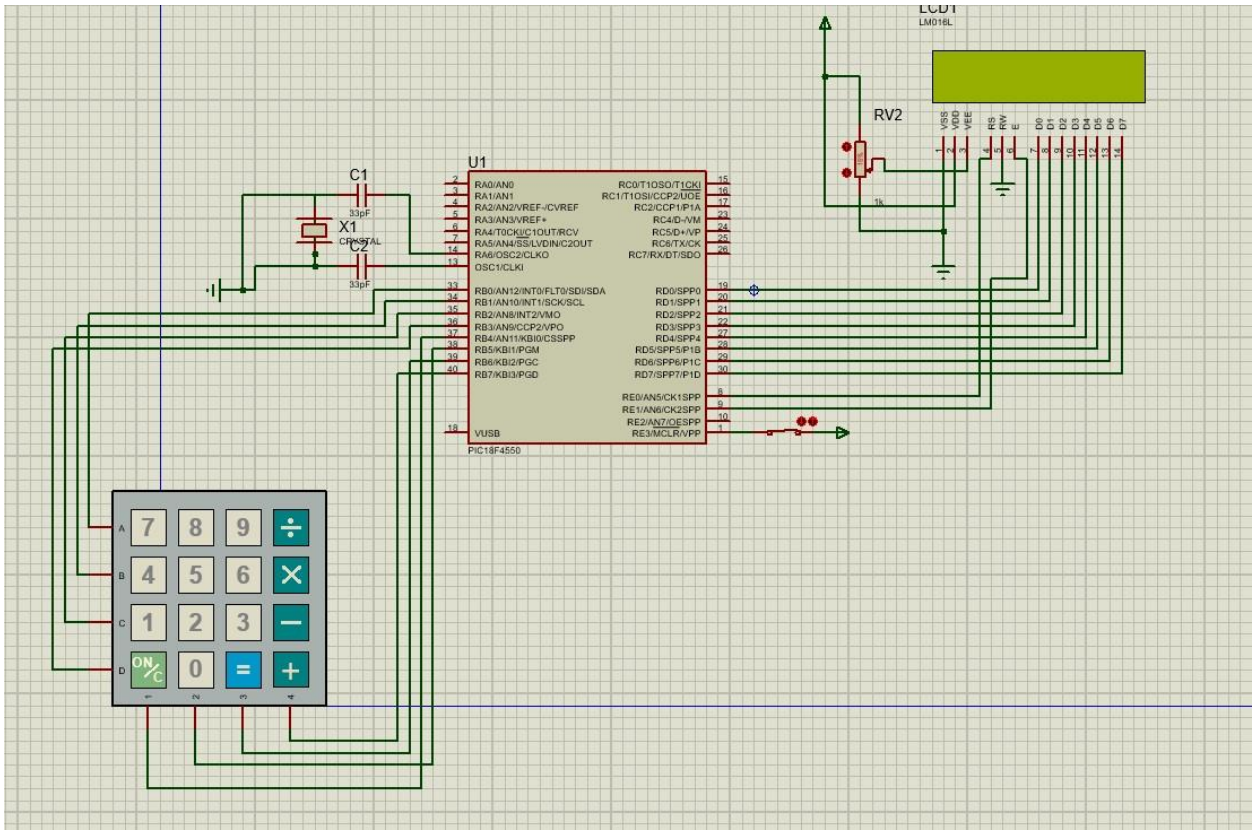
KEYPAD

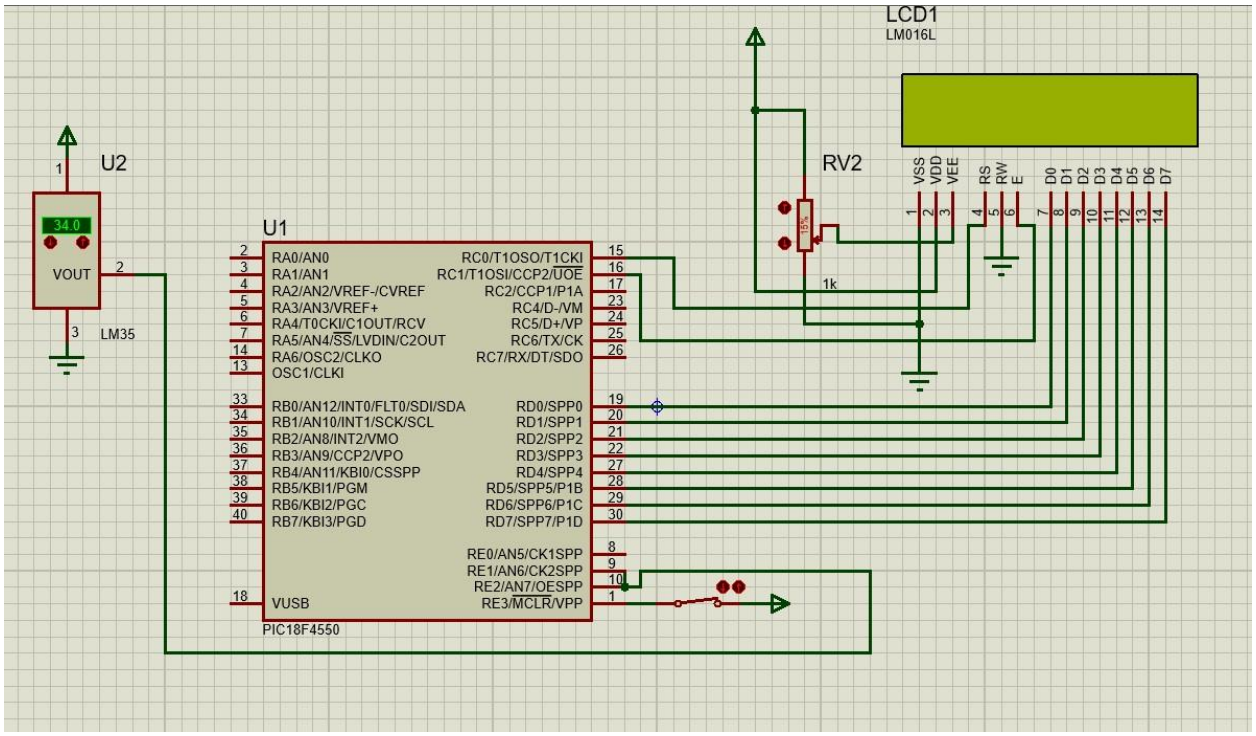



```
#include <pic18f4550.h>
#define LCD_EN LATEbits.LE1
#define LCD_RS LATEbits.LE0
#define LCDPORT LATD

const unsigned char KeyLookupTbl[] = {'7', '8', '9', '/',
    '4', '5', '6', '*',
    '1', '2', '3', '-',
    ' ', '0', '=', '+'};

void lcd_delay(unsigned int time) {
    unsigned int i, j;

    for (i = 0; i < time; i++) {
        for (j = 0; j < 50; j++);
    }
}
```

```
void SendInstruction(unsigned char command) {
   LCD_RS = 0;
   LCDPORT = command;
   LCD_EN = 1;
   lcd_delay(10);
   LCD_EN = 0;
   lcd_delay(10);
}

void SendData(unsigned char lcddata) {
   LCD_RS = 1;
   LCDPORT = lcddata;
   LCD_EN = 1;
   lcd_delay(10);
   LCD_EN = 0;
   lcd_delay(10);
}

void InitLCD(void) {
   ADCON1 = 0x0F;
   TRISD = 0x00;
   TRISEbits.RE0 = 0;
   TRISEbits.RE1 = 0;

   SendInstruction(0x38); //8 bit mode, 2 line,5x7 dots
   SendInstruction(0x06); // entry mode
   SendInstruction(0x0C); //Display ON cursor OFF
   SendInstruction(0x01); //Clear display
   SendInstruction(0x80); //set address to 0
}

unsigned char ReadKey(void) {
   unsigned char row, val, i, j, key = 0;

   while (1) // Loop till a key is pressed
   {
      TRISB = 0xF0;
      LATB = 0xFF;
      for (i = 0x01; i < 0x10; i = i << 1) {
         LATB = ~i; //Make output pin of PORTD low, one
column at a time
         lcd_delay(2);
         row = PORTB >> 4; //Scan rows
```

```
        for (j = 0x01; j < 0x10; j = j << 1) {
            if ((row & j) == 0) //Check which row scanned is low
            {
                val = KeyLookupTbl[key]; //If a key is pressed, find and return the corresponding
character
                return val;
            } else
                key++; //If key not pressed, increament key counter value
        }
    }

  }
}

void main() {
  unsigned char Key, str[16];
  unsigned char *string1 = "Key Pressed = ";

  TRISB = 0xF0; //rows as inputs and columns as output
  LATB = 0xFF;

  InitLCD();
  SendInstruction(0x80); //set 1st line
  while (*string1)
    SendData(*string1++);


  while (1) //Forever loop
  {
    Key = ReadKey(); //Check the key pressed
    SendInstruction(0xC0); //set 2nd line
    SendData(Key);
    lcd_delay(100);
  }
}
```

TEMPERATURE SENSOR

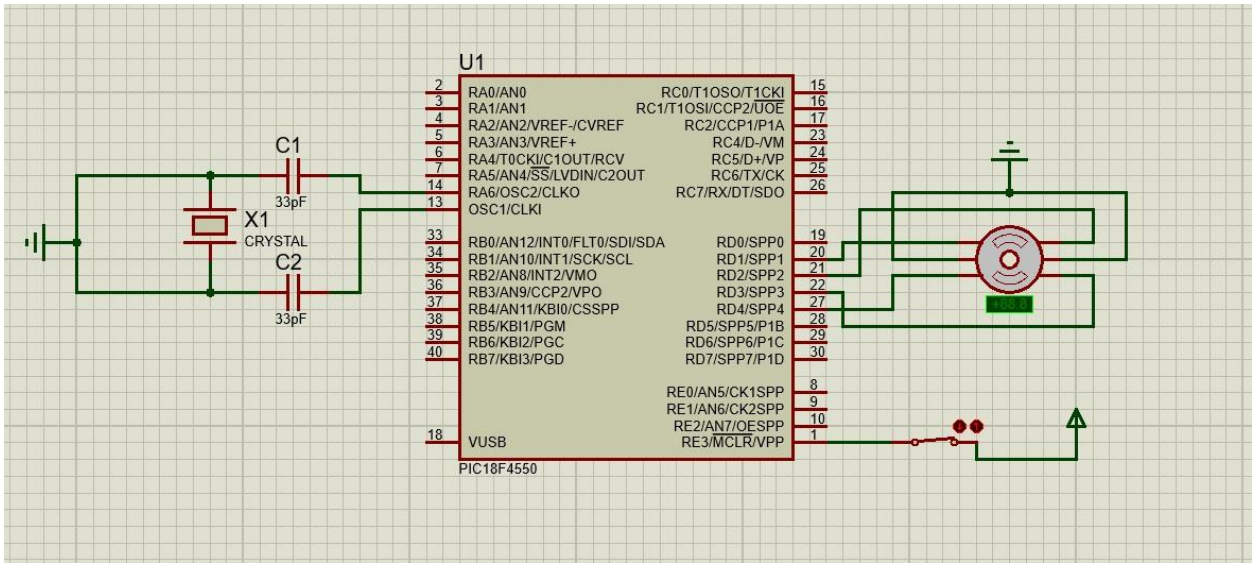



```
#include <pic18f4550.h>
#include <stdio.h>
#define LCD_EN LATCbits.LC1
#define LCD_RS LATCbits.LC0
#define LCDPORT LATD

unsigned char str[16];

void lcd_delay(unsigned int time)
{
 unsigned int i , j ;

   for(i = 0; i < time; i++)
   {
         for(j=0;j<100;j++);
   }
}
```

```
void SendInstruction(unsigned char command)
{
    LCD_RS = 0;                 // RS low : Instruction
    LCDPORT = command;
    LCD_EN = 1;                 // EN High
    lcd_delay(10);
    LCD_EN = 0;                 // EN Low; command sampled at EN falling edge
    lcd_delay(10);
}

void SendData(unsigned char lcddata)
{
    LCD_RS = 1;                 // RS HIGH : DATA
    LCDPORT = lcddata;
    LCD_EN = 1;                 // EN High
    lcd_delay(10);
    LCD_EN = 0;                 // EN Low; data sampled at EN falling edge
    lcd_delay(10);
}

void InitLCD(void)
{
   ADCON1 = 0x0F;
   TRISD = 0x00; //set data port as output
   TRISCbits.RC0 = 0; //RS pin
   TRISCbits.RC1 = 0; // EN pin

   SendInstruction(0x38);      //8 bit mode, 2 line,5x7 dots
   SendInstruction(0x06);       //entry mode
   SendInstruction(0x0C);       //Display ON cursor OFF
   SendInstruction(0x01);      //Clear display
   SendInstruction(0x80);      //set address to 0
}

void LCD_display(unsigned int row, unsigned int pos, unsigned char *ch)
{
   if(row==1)
      SendInstruction(0x80 | (pos-1));
   else
      SendInstruction(0xC0 | (pos-1));

   while(*ch)
      SendData(*ch++);
}
```

```
void ADCInit(void)
{
   TRISEbits.RE1 = 1;               //ADC channel 6 input
   TRISEbits.RE2 = 1;               //ADC channel 7 input

   ADCON1 = 0b00000111;             //Ref voltages Vdd & Vss; AN0 - AN7 channels Analog
   ADCON2 = 0b10101110;             //Right justified; Acquisition time 4T; Conversion clock
Fosc/64
}

unsigned short Read_ADC(unsigned char Ch)
{
   ADCON0 = 0b00000001 | (Ch<<2);      //ADC on; Select channel;
   GODONE = 1;              //Start Conversion

   while(GO_DONE == 1 );    //Wait till A/D conversion is complete
   return ADRES;                    //Return ADC result
}

int main(void)
{
   unsigned int temp;
   InitLCD();
   ADCInit();
   LCD_display(1,1,"Temperature: ");
   while(1)
   {
      temp = Read_ADC(7);
      temp = ((temp * 500) / 1023);
      sprintf(str,"%d'C  ",temp);
      LCD_display(2,1,str);
      lcd_delay(5000);
   }
   return 0;
}
```

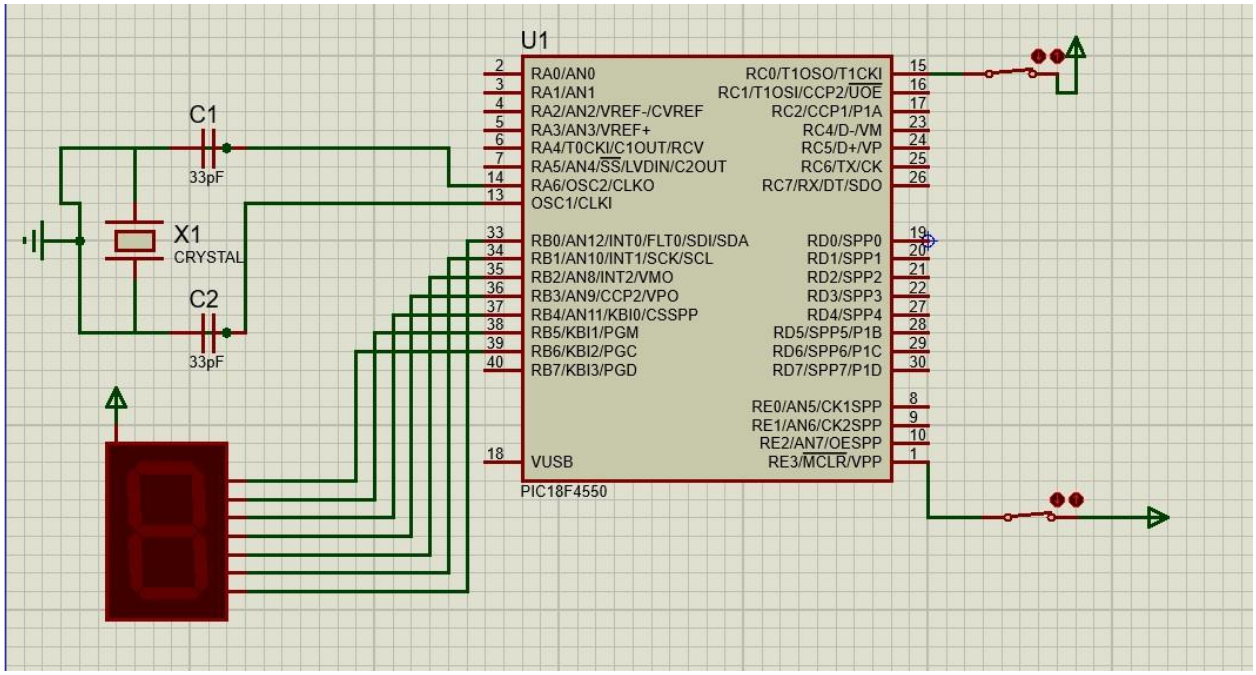
STEPPER MOTOR




```
#include<pic18f4550.h>
#define in1 PORTDbits.RD1
#define in2 PORTDbits.RD2
#define in3 PORTDbits.RD3
#define in4 PORTDbits.RD4

void delay(unsigned int time) {
   unsigned int i, j;
   for (i = 0; i < time; i++) {
      for (j = 0; j < 100; j++);
   }
}

void main(void) {
   TRISD = 0;
   while(1) {

      in2 = in3 = in4 = 0;
      in1 = 1;

      delay(500);

      in1 = in3 = in4 = 0;
```

```
        in2 = 1;

        delay(500);

        in1 = in2 = in4 = 0;
        in3 = 1;

        delay(500);

        in1 = in2 = in3 = 0;

        in4 = 1;
        delay(500);

    }
}
```

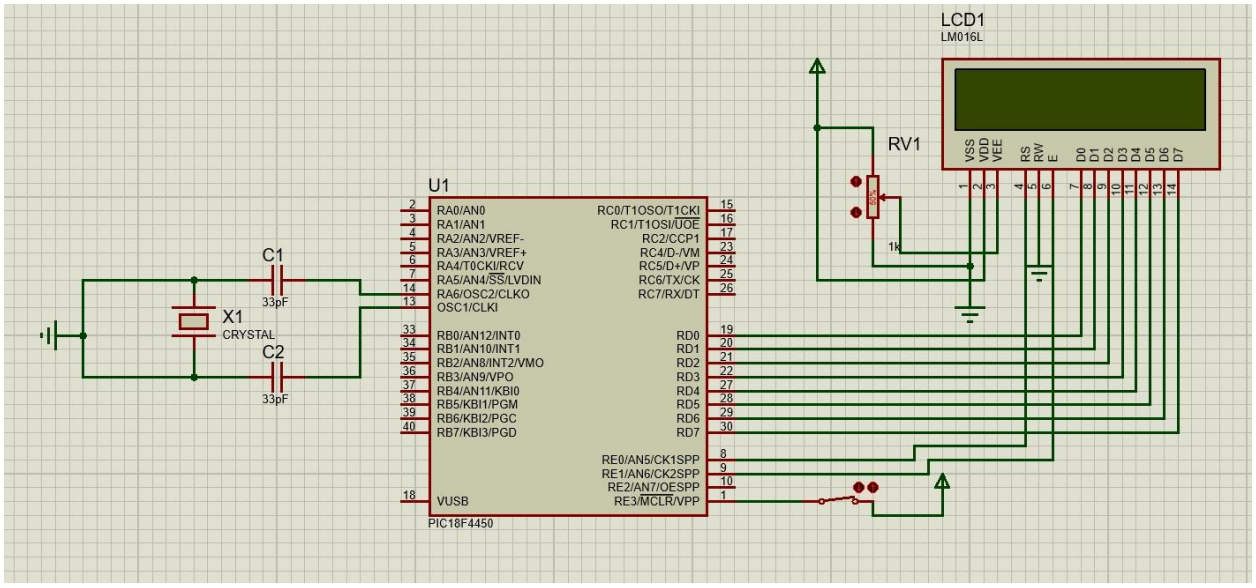
SEVEN SEGMENT DISPLAY




```
#include<pic18f4550.h>
#define seg_port LATB

void Delay_ms(unsigned int n) {
    unsigned int i, j;
    for (i = 0; i < n; i++) {
        for (j = 0; j < 165; j++);
    }
}

void main(void) {

    TRISC = 1;
    TRISB = 0;

    while (1) {

        seg_port=0xC0;          // Display '0'
        Delay_ms(500);

                    seg_port=0xF9;          // Display '1'
                    Delay_ms(500);
```

```
            seg_port=0xA4;        // Display '2'
            Delay_ms(500);

            seg_port=0xB0;        // Display '3'
            Delay_ms(500);

            seg_port=0x99;        // Display '4'
            Delay_ms(500);

            seg_port=0x92;        // Display '5'
            Delay_ms(500);

            seg_port=0x82;        // Display '6'
            Delay_ms(500);

            seg_port=0xF8;        // Display '7'
            Delay_ms(500);

            seg_port=0x80;        // Display '8'
            Delay_ms(500);

            seg_port=0x90;        // Display '9'
            Delay_ms(500);

    }
}
```

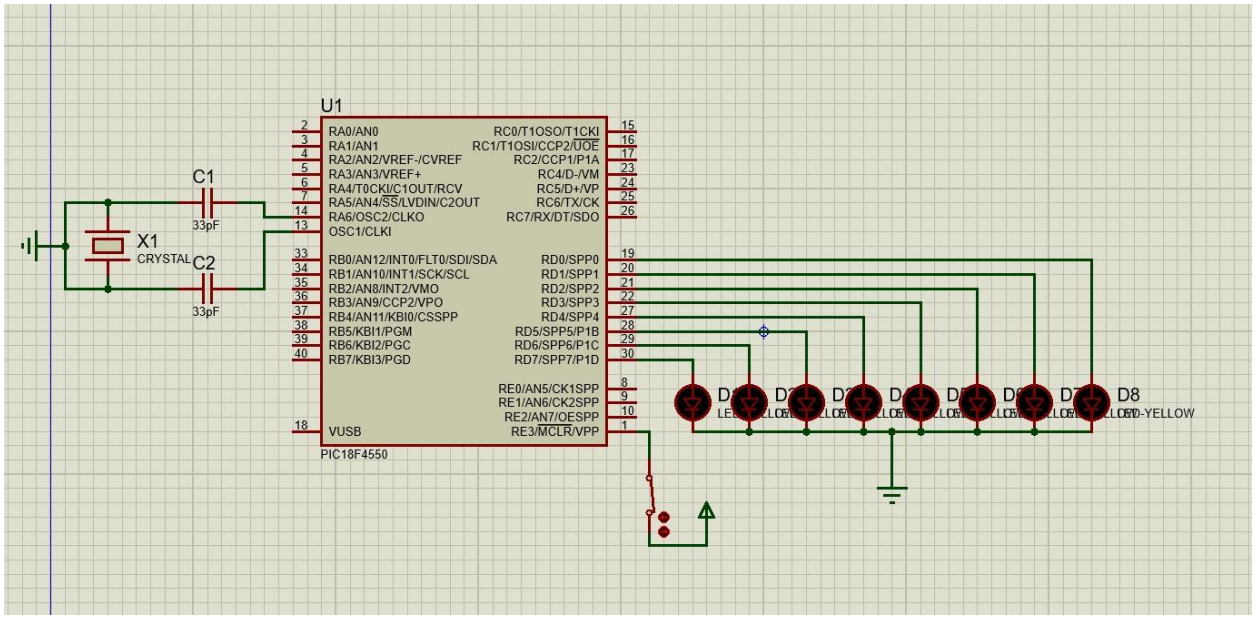
LCD




```
#include <pic18f4550.h>
#define LCD_EN LATEbits.LE1
#define LCD_RS LATEbits.LE0
#define LCDPORT LATD

void lcd_delay(unsigned int time) {
    unsigned int i, j;
    for (i = 0; i < time; i++) {
        for (j = 0; j < 100; j++);
    }
}

void SendInstruction(unsigned char command) {
    LCD_RS = 0; // RS low : Instruction
    LCDPORT = command;
    LCD_EN = 1; // EN High
    lcd_delay(10);
    LCD_EN = 0; // EN Low; command sampled at EN falling edge
    lcd_delay(10);
}

void SendData(unsigned char lcddata) {
    LCD_RS = 1; // RS HIGH : DATA
    LCDPORT = lcddata;
    LCD_EN = 1; // EN High
    lcd_delay(10);
```

```
    LCD_EN = 0; // EN Low; data sampled at EN falling edge
    lcd_delay(10);
}

void InitLCD(void) {
    ADCON1 = 0x0F;
    TRISB = 0x00; //set data port as output
    TRISAbits.RA0 = 0; //RS pin
    TRISAbits.RA1 = 0; // EN pin
    SendInstruction(0x38); //8 bit mode, 2 line,5x7 dots
    SendInstruction(0x06); // entry mode
    SendInstruction(0x0C); //Display ON cursor OFF
    SendInstruction(0x01); //Clear display
    SendInstruction(0x80); //set address to 1st line

}

unsigned char *String1 = "JSPM RSCOE";
unsigned char *String2 = "SY ENTC";

void main(void) {
    ADCON1 = 0x0F;
    TRISD = 0x00; //set data port as output
    TRISEbits.RE0 = 0; //RS pin
    TRISEbits.RE1 = 0; // EN pin
    SendInstruction(0x38); //8 bit mode, 2 line,5x7 dots
    SendInstruction(0x06); // entry mode
    SendInstruction(0x0C); //Display ON cursor OFF
    SendInstruction(0x01); //Clear display
    SendInstruction(0x80); //set address to 1st line
    while (*String1) {
        SendData(*String1);
        String1++;
    }
    SendInstruction(0xC0); //set address to 2nd line
    while (*String2) {
        SendData(*String2);
        String2++;
    }
    while(1);
}
```

8 LED’S (RING COUNTER)



Code :

```
#include <pic18f4550.h>

void delay(unsigned int time) {
    unsigned int i, j;
    for (i = 0; i < time; i++) {
        for (j = 0; j < 165; j++);
    }
}

void main(void) {

    TRISD = 0;
    unsigned char i,j;
    i = 0x80;
    unsigned int n;
    for(n = 0; n<8; n++) {
        j = i>>n;
        PORTD = j;
        delay(200);

    }
}
```