1st expt : Simple programs on Memory data transfer

Internal to internal memory data transfer

ORG 00h

MOV R0,#30h

MOV R1,#50h

MOV R2,#0Ah

BACK:

 MOV A,@R0

 MOV @R1,A

 INC R0

 INC R1

DJNZ R2,BACK

END

Internal to external memory data transfer

ORG 00h

MOV R0,#30h

MOV R1,#0Ah

MOV DPTR,#0100h

BACK:

 MOV A,@R0

 MOVX @DPTR,A

 INC R0

 INC DPTR

DJNZ R1,BACK

END

External to internal memory data transfer

```
ORG 00h
MOV R0,#30h
MOV R1,#0Ah
MOV DPTR,#0100h
BACK:
MOVX A,@DPTR
MOV @R0,A
INC R0
INC DPTR
DJNZ R1,BACK
END
```

External to external memory data transfer

```
org 00h
mov DPTR,#0100h
mov R0, #00h
mov R1,#05h
mov R2,#0Ah
AGAIN:movx A,@DPTR
 push DPL
 push DPH
 mov DPL,R0
 mov DPH,R1
 movx @DPTR,A
 pop DPH
 pop DPL
 inc DPTR
 inc R0
 DJNZ R2,AGAIN
 End
```

2nd expt: LED interfacing with 8051 Microcontroller.

1)LED Flashing

```
#include<AT89X51.h>
 void Delay(void);
void main (void)
{
 while(1)
 {
 P2 = 0x55;
 Delay();
 P2 = 0xAA;
 Delay();
 }
}
void Delay(void)
{
 int j;
 int i;
 for(i=0;i<10;i++)
 {
 for(j=0;j<10000;j++)
 {
 }
 }
}
```

2) BCD Counter

```c
#include<reg51.h>

void Delay(void);
void main (void)
{
unsigned char count=0x00, x,
d1,d2,d3;
 while(1)
 {
x=count/10;
d1= count%10;
d2= x%10;
d3= x/10;
 P2 = d1;
P3= d2;
P1 = d3;
 Delay();
Delay();
 count=count+1;
 }
}
void Delay(void)
{
 int j;
 int i;
 for(i=0;i<10;i++)
 {
 for(j=0;j<10000;j++)
 {
 }
 }
}
```

3) Hex Counter

```c
#include<reg51.h>
 void Delay(void);
void main (void)
{
 unsigned char count=0x00;
  while(1)
 {
 P2 = count; // LED ON
 Delay();
 count= count+1;
 }
}
void Delay(void)
{
int j;
 int i;
 for(i=0;i<10;i++)
 {
 for(j=0;j<10000;j++)
 {
 }
 }

 }
```

Expt 3rd : Write a program in Embedded C to rotate Stepper Motor in Clock and Anti-clock Wise Directions.

1) Full drive Mode

#include<reg51.h>

void T1M1Delay(void) //To create a delay of 200 ms using T1 Timer and M1 Mode

 {

Unsigned int x;

for (x=0; x<20; x++)

{

TMOD=0x10;

TH1=0xDB;

TL1=0xFF;

TR1=1;

While (TF1==0);

TR1=0;

TF1=0;

}

}

void main()

{

 while(1) // To repeat infinitely

 {

P1=0x0C; //P1 = 0000 1000 First Step

T1M1Delay();

P1=0x06; //P1 = 0000 0100 Second Step

T1M1Delay();

P1=0x03; //P1 = 0000 0010 Third Step

T1M1Delay();

P1=0x09; //P1 = 0000 0001 Fourth Step

T1M1Delay();

 }

}

2) Half Drive mode

```c
#include<reg51.h>

void T1M1Delay(void) //To create a delay of 200 ms using T1 Timer and M1 Mode
{
unsigned int x;
for (x=0; x<20; x++)
{
TMOD=0x10;
TH1=0xDB;
TL1=0xFF;
TR1=1;
While (TF1==0);
TR1=0;
TF1=0;
}
}
void main()
{
 while (1)
 {
 P1 = 0x08; //P1 = 0000 1000 First Step
 T1M1Delay();
 P1 = 0x0C; //P1 = 0000 1100 Second Step
 T1M1Delay();
 P1 = 0x04; //P1 = 0000 0100 Third Step
 T1M1Delay();
 P1 = 0x06; //P1 = 0000 0110 Fourth Step
 T1M1Delay();
 P1 = 0x02; //P1 = 0000 0010 Fifth Step
 T1M1Delay();
 P1 = 0x03; //P1 = 0000 0011 Sixth Step
```

```c
T1M1Delay();

P1 = 0x01; //P1 = 0000 0001 Seventh Step

T1M1Delay();

P1= 0x09; //P1 = 0000 1001 Eight Step

T1M1Delay();

}

}
```

Expt 4th : Write a program for interfacing button, LED, relay & buzzer

```
#include<p18F4520.h>

#pragma config OSC=HS

#pragma config PWRT=OFF

#pragma config WDT=OFF

#pragma config DEBUG=OFF

#pragma config LVP=OFF

#define SW1 PORTDbits.RD0

#define SW2 PORTDbits.RD1

#define relay PORTDbits.RD3

#define D0 PORTDbits.RD4

#define D1 PORTDbits.RD5

#define D2 PORTDbits.RD6

#define D3 PORTDbits.RD7

void left();

void right();

void delay(unsigned int);

void main()

{

TRISD=0x03;

PORTDbits.RD3=0;

while(1)

{

if(SW1==0&&SW2==1)

{

relay=0;

left();

}

if(SW1==1&&SW2==0)

{

relay=1;
```

```
right();

}

}

}

void left()

{

relay=0;

while(SW2==1)

{

D0=0;D1=0;D2=0;D3=1;

delay(10);

D0=0;D1=0;D2=1;D3=0;

delay(10);

D0=0;D1=1;D2=0;D3=0;
```

```
delay(10);

D0=1;D1=0;D2=0;D3=0;

delay(10);

}

}

void right()

{

relay=1;

while(SW1==1)

{

D0=1;D1=0;D2=0;D3=0;

delay(10);

D0=0;D1=1;D2=0;D3=0;

delay(10);

D0=0;D1=0;D2=1;D3=0;

delay(10);
```

```c
D0=0;D1=0;D2=0;D3=1;

delay(10);

}

}

void delay(unsigned int itime)

{

int i,j;

for(i=0;i<itime;i++)

for(j=0;j<1275;j++);

}
```

Expt 5th : Interfacing of LCD to PIC for Display displaying different messages

```c
#include <P18f4520.h>

#pragma config OSC=HS

#pragma config PWRT=OFF

#pragma config WDT=OFF

#pragma config DEBUG=OFF, LVP=OFF

unsigned char text1[] = {" SKNCOE"};

unsigned char text2[] = {" PUNE"};

void delay(unsigned int value);

void lcdcmd(unsigned char value);

void lcddata(unsigned char value);

void lcdinit(void);

void lcddisplay(int row,unsigned char *str);

#define ldata PORTD

#define rs PORTCbits.RC3

#define rw PORTCbits.RC4

#define en PORTCbits.RC5

void main()

{

TRISD = 0x00;

TRISC=0x00;

ADCON1=0x0F;

lcdinit();

lcddisplay(1,text1);

lcddisplay(2,text2);

while(1);

}

void lcddisplay(int row,unsigned char *str)

{
```

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```c
int k;
```

```c
if (row==1)

lcdcmd(0x80);

else lcdcmd(0xC0);

for(k=0;k<16;k++)

{

if(str[k] !=0)

lcddata(str[k]);

else break;

}

while((k<16)){

lcddata(' ');

k++;

}

 }

void delay(unsigned int value)

{

int i,j;

for(i=0;i<=value;i++)

for(j=0;j<=50;j++);

}

void lcdcmd (unsigned char value)

{

ldata=value;

rs=0;

rw=0;

en=1;

delay(1);

en=0;
```

```c
}

void lcddata (unsigned char value)
```

```c
{
ldata=value;
rs=1;
rw=0;
en=1;
delay(1);
en=0;
}
void lcdinit(void)
{
lcdcmd(0x38);
delay(1);
lcdcmd(0x0E);
delay(1);
lcdcmd(0x01);
delay(1);
lcdcmd(0x06);
delay(1);
}
```

Expt 6th : Interfacing of 4X4 keypad and displaying key pressed on LCD

```c
#include <P18f4520.h>

#include"lcd.h"

#pragma config OSC=HS

#pragma config PWRT=OFF

#pragma config WDT=OFF

#pragma config DEBUG=OFF, LVP=OFF

void delay (unsigned int itime);

#define R1 PORTBbits.RB0

#define R2 PORTBbits.RB1

#define R3 PORTBbits.RB2

#define R4 PORTBbits.RB3

#define C1 PORTBbits.RB4

#define C2 PORTBbits.RB5

#define C3 PORTBbits.RB6

#define C4 PORTBbits.RB7

unsigned char text1[]={"LOGSUN SYSTEMS"};

unsigned char text2[]={"KEY PRESSED:"};

 void main(void)

 {

TRISD = 0x00;

 TRISC = 0x00;

ADCON1=0x0f;

TRISBbits.TRISB0=1;

TRISBbits.TRISB1=1;

TRISBbits.TRISB2=1;

TRISBbits.TRISB3=1;

TRISBbits.TRISB4=0;

TRISBbits.TRISB5=0;

TRISBbits.TRISB6=0;

TRISBbits.TRISB7=0;
```

```c
lcdinit();

lcddisplay(1,text1);

lcddisplay(2,text2);

 while(1)

{

C1=0;C2=C3=C4=1;

if(R1 == 0){lcddat ('F');} // Display 0

if(R2 == 0){lcddat ('B');} // Display 4

if(R3 == 0){lcddat ('7');} // Display 8

if(R4 == 0){lcddat ('3');} // Display C
```

```c
C2=0;C1=C3=C4=1;

if(R1 == 0){lcddat ('E');} // Display 1

if(R2 == 0){lcddat ('A');} // Display 5

if(R3 == 0){lcddat ('6');} // Display 9

if(R4 == 0){lcddat ('2');} // Display D

C3=0;C1=C2=C4=1;

if(R1 == 0){lcddat ('D');} // Display 2

if(R2 == 0){lcddat ('9');} // Display 6

if(R3 == 0){lcddat ('5');} // Display A

if(R4 == 0){lcddat ('1');} // Display E

C4=0;C1=C2=C3=1;

if(R1 == 0){lcddat ('C');} // Display 3

if(R2 == 0){lcddat ('8');} // Display 7

if(R3 == 0){lcddat ('4');} // Display B

if(R4 == 0){lcddat ('0');} // Display F

}

}
```

Expt 7th : Interface analog voltage 0-5V to internal ADC and display value on LCD.

```c
#include<P18F4520.h>

#pragma config OSC=HS

#pragma config PWRT=OFF

#pragma config WDT=OFF

#pragma config DEBUG=OFF, LVP=OFF

void lcdcmd(unsigned char value);

void lcddata(unsigned char value);

void msdelay(unsigned int itime);

#define ldata PORTD

#define rs PORTBbits.RB3

#define rw PORTBbits.RB4

#define en PORTBbits.RB5

void main(void)

{

unsigned int i, d;

unsigned char val,

temp[3];

TRISD=0;

PORTD=0;

TRISB=0x00;

PORTB=0;

ADCON0 = 0X01;

ADCON1 = 0X0E;

ADCON2=0b10001010;

msdelay(15);

lcdcmd(0x38);

msdelay(15);

lcdcmd(0x0E);

msdelay(15);
```

```c
lcdcmd(0x01);

msdelay(15);

lcdcmd(0x06);

msdelay(15);

while(1)

{

lcdcmd(0x80);

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msdelay(20);

ADCON0bits.GO = 1;

while

(ADCON0bits.DONE ==1);

temp[0]= (ADRESH & 0x0f);

temp[1]= (ADRESL & 0xf0)>>4;

temp[2]= (ADRESL & 0x0f);

for(d=0; d<3; d++)

{

if (temp[d] < 10)

temp[d] = temp[d]+0x30;

else

temp[d] = temp[d]+0x37;

lcddata(temp[d]);

msdelay(15);

}

msdelay(10);

}

}

void lcdcmd (unsigned char value)

{

ldata=value;

rs=0;
```

```c
rw=0;

en=1;

msdelay(1);

en=0;

}

void lcddata (unsigned char value)

{

ldata=value;

rs=1;

rw=0;

en=1;

msdelay(1);

en=0;

}

void msdelay (unsigned int itime)

{

int i,j;

for(i=0;i<itime;i++)

for(j=0;j<1235;j++);

}
```

Expt 8th : Interfacing serial port with PC both side communication

```c
#include <p18f4520.h>

//Configuration bit setting//

#pragma config OSC = HS //Oscillator Selection

#pragma config WDT = OFF //Disable Watchdog timer

#pragma config LVP = OFF //Disable Low Voltage Programming

#pragma config PBADEN = OFF //Disable PORTB Analog inputs

void Transmit_String(unsigned char *string)

{

 unsigned char i=0;

for(i=0;string[i]!='\0';i++) //loop till end of the string

{

 while(PIR1bits.TXIF == 0);

 TXREG = string[i];

 }

}

unsigned char MSG1[] = {"UART COMMUNICATION \r\n"};

unsigned char MSG2[] = {"TRANSMITTING STRING \r\n"};

unsigned char MSG3[] = {"SEND 10 Characters \r\n"};

unsigned char MSG4[] = {"Received Data \r\n"};

void main(void)

{

 unsigned char j=0;

 unsigned char RX_DATA[20];

 unsigned char MSG5[] = {"Received Data \r\n"};

 TRISCbits.TRISC7 = 1; // RXD as Input

 TRISCbits.TRISC6 = 0; // TXD as Output

 RCSTA = 0x90;

 TXSTA = 0x24;

 BAUDCON = 0x00;

 SPBRG = 0x19;
```

```
SPBRGH = 0;

Transmit_String (MSG1);

Transmit_String (MSG2);

Transmit_String (MSG3);

for (j=0; j<10 ; j++)

{
```

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```
while(PIR1bits.RCIF == 0);

RX_DATA[j] = RCREG;

}

RX_DATA[10] = '\0';

Transmit_String (MSG4);

Transmit_String (RX_DATA);

while(1);

}
```