**i/\*Write a program in Embedded C for 8051 microcontroller to find the sum**

**of two one -byte numbers stored at 2000H & 2001H and store the sum at 2002H.\*/**

#include<reg52.h>

xdata unsigned char a \_at\_ 0x2000;

xdata unsigned char b \_at\_ 0x2001;

xdata unsigned char sum \_at\_ 0x2002;

void main(){

sum = a+b;

here: goto here;

}

**/\* Q2. Write a program in Embedded C for 8051 microcontroller to find the sum**

**of two one -byte numbers stored at 2000H & 2001H and store the sum at 2002H & 2003H\*/**

#include<reg52.h>

xdata unsigned char a \_at\_ 0x2000;

xdata unsigned char b \_at\_ 0x2001;

xdata unsigned int sum \_at\_ 0x2003;

void main(){

sum = a+b;

}

**/\* Q3. Write a program in Embedded C for 8051 microcontroller to find the**

**16 bit sum, 8 bit difference, 16 bit product and quotient & remainder**

**(one byte size) of two one -byte numbers storedat 2000H & 2001H.**

**All answers should be stored from memory location 2002H onwards\*/**

#include<reg52.h>

xdata unsigned char a \_at\_ 0x2000;

xdata unsigned char b \_at\_ 0x2001;

xdata unsigned int sum \_at\_ 0x2002; //16 bit sum

xdata unsigned char diff \_at\_ 0x2004; //8 bit diff

xdata unsigned int prod \_at\_ 0x2005; //16 prod

xdata unsigned char quot \_at\_ 0x2007; //8bit quotient

xdata unsigned int rem \_at\_ 0x2008; // 8 bit remender

void main()

{

sum=a+b ;

diff=a-b;

prod=a\*b;

quot=a/b;

rem=a%b;

}

**/\*Q4. Write a program in Embedded C for 8051 microcontroller to copy 10 bytes of**

**data starting from memory location 2000H to memory location starting from 2010H.\*/**

#include<reg52.h>

xdata unsigned char a \_at\_ 0x2000;

xdata unsigned char b \_at\_ 0x2010;

xdata unsigned char i \_at\_ 0x1000;

void main(){

unsigned char\* ptr = &a;

unsigned char\* ptr1 = &b;

for(i = 0;i<10;i++,ptr++,ptr1++){

\*ptr1 = \*ptr;

}

here: goto here;

}

**/\* Q5. Write a program in Embedded C for 8051 microcontroller to copy 10 bytes of**

**data starting from memory location 2000H to memory location starting from 2010H in reverse.\*/**

#include<reg52.h>

xdata unsigned char a \_at\_ 0x2000;//2000 to 2009

xdata unsigned char b \_at\_ 0x2010;//2010 200f 200e 200d 200c 200b 200a 200

void main( )

{

unsigned char i;

unsigned char \*ptr1=&a,\*ptr2=&b;

for (i=9;i>=0; i--, ptr1++)

{

\*(ptr2+i)=\*ptr1;

}

here: goto here;

}

**/\* Q6. Write a program in Embedded C for 8051 microcontroller to generate a square wave of 10KHz on port pin P1.2. Assume crystal of 12MHz.**

a) Using Timer 0 in Mode 1

b) Using Timer 0 in Mode 2\*/

#include<reg52.h>

sbit p = P1^2;

void main(){

TR0 = 0;

TF0 = 0;

p = 0;

TMOD = 0x02;

TH0 = 0xCE;

TL0 = 0xCE;

TR0 = 1;

here: while(TF0==0);

TF0 = 0;

p = ~p;

goto here;

}

**/\* Q7. Write a program in Embedded C for 8051 microcontroller to find the 16 bit sum**

**of 10 bytes of data starting from memory location 3000H to 3009H and store the 16 bit sum at 3010H & 3011H.\*/**

#include<reg52.h>

xdata unsigned char a \_at\_ 0x3000;

xdata unsigned int sum \_at\_ 0x3010;

void main(){

unsigned char i =0;

unsigned char\* ptr = &a;

sum = 0;

for(i=0;i<10;i++,ptr++){

sum += \*ptr;

}

here: goto here;

}

**/\* Q8. Write a program in Embedded C for 8051 microcontroller to generate**

**a square wave of 6KHz on port pin P1.2. Assume crystal of 12MHz. \*/**

#include<reg52.h>

sbit P12=P1^2;

void main()

{

P12=0;

TMOD=0x02;

TH0=TL0=0xAC;

TR0=1;

TF0=0;

here:while(TF0==0);

TF0=0;

P12=~P12;

goto here;

}

**/\* Q9. Design a circuit to show the interface of two LEDs (L1 & L2) and one Key (K1)**

**to P1.0, P1.1 & P1.2 port lines of 8051. Write a program in Embedded C for 8051 microcontroller**

**such that the LED1 remains ON and LED2 remains OFF as long as K1 is not pressed and LED1**

**remains OFF and LED2 remains ON as long as K1 is pressed \*/**

#include<reg52.h>

sbit L1=P1^0;

sbit L2=P1^1;

sbit Key=P1^2;

void main(){

L1=L2=0;

Key = 1;

while(1){

if(Key==0){

L1=1;

L2=0;

}

if(Key==1){

L1=0;

L2=1;

}

}

}

**/\* Q10. a. Write a program in Embedded C for 8051 microcontroller to generate a**

**square wave of 10KHz on port pin P1.2 using Timer 0 in Mode 1 and using interrupt.**

**Assume crystal of 12MHz. \*/**

#include<reg52.h>

sbit p12=P1^2;

void main(){

p12=0;

IE=0x82; //EA=1, ET0=1 all others 0

TMOD=0x01;

TL0=0xCE;

TH0=0xFF;

TR0=1;

here:goto here;

}

void isr\_timer0() interrupt 1{

TF0=0;

TR0 = 0;

p12=~p12;

TL0=0xCE;

TH0=0xFF;

TR0 = 1;

}

**/\* Q11. Write a program in Embedded C for 8051 microcontroller to generate a**

**square wave of 10KHz on port pin P1.2 using Timer 0 in Mode 2 and using interrupt.**

**Assume crystal of 12MHz. \*/**

#include<reg52.h>

sbit p12=P1^2;

void main(){

p12=0;

IE=0x82; //EA=1, ET0=1 all others 0

TMOD=0x02;

TL0=0xCE;

TH0=0xCE;

TR0=1;

here:goto here;

}

void isr\_timer0() interrupt 1{

TF0=0;

p12=~p12;

}

**/\* Q12. Write a program in Embedded C for 8051 microcontroller to transmit the number 0x5A on serial port at baud**

**rate of 1200 baud in an infinite loop. Assume crystal of 11.0592MHz.\*/**

#include<reg52.h>

void main(){

TMOD=0x20;

TH1=TL1=0xE8;

SCON=0x40;

TR1=1;

here:SBUF=0x5A;

while(TI==0);

TI=0;

goto here;

}

**/\* Q13. Write a program in Embedded C for 8051 microcontroller to transmit the number**

**0x5A on serial port at baud rate of 1200 baud in an infinite loop using interrupt.**

**Assume crystal of 11.0592MHz. \*/**

#include<reg52.h>

void main(){

IE=0x90; //EA=1, ET0=1 all others 0

TMOD=0x20;

TH1=TL1=0xE8;

SCON=0x40;

TR1=1;

SBUF=0x5A;

here: goto here;

}

void isr\_serial() interrupt 4{

SBUF=0x5A;

TI=0;

}

**/\* Q14. Write a program in Embedded C for 8051 microcontroller to transmit 10 numbers starting from location 2000h**

**on serial port at baud rate of 9600 baud. Assume crystal of 11.0592MHz \*/**

#include<reg52.h>

xdata unsigned char num \_at\_ 0x2000;

void main()

{

unsigned char\* ptr =&num;

unsigned char i=0;

TMOD=0x20;

TH1=TL1=0xFD;

SCON=0x40;

TR1=1;

for(i=0;i<10;i++, ptr++)

{

SBUF = \*ptr;

while(TI==0);

TI=0;

}

here: goto here;

}

**/\* Q15. Write a program in Embedded C for 8051 microcontroller to transmit 10 numbers starting**

**from location 2000h on serial port at baud rate of 9600 baud using interrupt.**

**Assume crystal of 11.0592MHz.\*/**

#include<reg52.h>

xdata unsigned char num \_at\_ 0x2000;

xdata unsigned char i \_at\_ 0x4000;

unsigned char \*ptr=&num;

void main()

{

TMOD = 0x20;

TH1=TL1=0xFD;

SCON=0x40;

TR1=1;

IE=0x90;

SBUF=\*ptr;

here: goto here;

}

void serial\_isr() interrupt 4

{

TI = 0;

if(i==10){

return;

}

i++;

ptr++;

SBUF=\*ptr;

}

**/\* Q16. Interface a 7 segment common cathode LED display to Port 1 on 8051.**

**Write a program in Embedded C for 8051 microcontroller to display the numbers from 0 to 9 in an infinite loop on the LED**

**display with delay of 500msec inbetween each count. Assume crystal of 11.0592MHz. \*/**

#include<reg52.h>

unsigned char dispcode[10] ={0xC0,0xF9,0xA4,0xB0,0x99,0x92,0x82,0xF8,0x80,0x90};

void delay()

{

int c = 0;

TMOD=0x02;

TH0=TL0=0x92;

TR0=1;

here: while(TF0==0);

TF0=0;

c++;

if(c>10\*500){

TR0=0;

return;

}

goto here;

}

void main()

{

unsigned char i =0;

while(1)

{

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

{

P1=dispcode[i];

delay();

}

}

}

**/\* Q17. Interface a common cathode 7 segment display with Port 1 and a key at Port 2.1.**

**Write code in embedded C such that the count on the display is incremented every time the key is pressed.**

**Further, once the count reaches 9 then it rolls over to 0. Assume crystal of 12MHz\*/**

#include<reg52.h>

sbit key = P2^1;

unsigned char display[10] = {0x3F,0x06,0x5B,0x4F,0x66,0x6D,0x7D,0x07,0x7F,0x6F};

unsigned char i = 0;

void main(){

unsigned char \*ptr;

key = 1;

while(1){

ptr = &display[0];

for(i=0;i<10;i++,ptr++){

P1=\*ptr;

while(key==1);

while(key==0);

}

}

}

**/\* Q18. Write a program in Embedded C for 8051 microcontroller to**

**receive 05 numbers on serial port at baud rate of 9600 baud using interrupt**

**and store the same starting from location 2000h Assume crystal of 11.0592MHz. \*/**

**#include<reg52.h>**

**xdata unsigned char a \_at\_ 0x2000;**

**unsigned char i = 0;**

**unsigned char\* ptr = &a;**

**void main(){**

**TMOD = 0x20;**

**TH1=TL1 = 0xFD;**

**SCON = 0x50;**

**IE = 0x90;**

**TR1 = 1;**

**here: goto here;**

**}**

**void isr\_in() interrupt 4{**

**RI = 0;**

**if(i==5){**

**return;**

**}**

**i++;**

**\*ptr = SBUF;**

**ptr++;**

**}**

**19./\*Interface a common cathode 7 segment display with Port 1 and a key at INTO pin. Write code in embedded C such that the count**

**on the display is incremented every time the key is pressed. Further, once the count reaches 9 then it rolls over to 0. Use**

**interrupt Assume crystal of 12MHz\*/**

**#include<reg52.h>**

**xdata unsigned char dispcode[10] ={0xC0,0xF9,0xA4,0xB0,0x99,0x92,0x82,0xF8,0x80,0x90};**

**xdata unsigned char i \_at\_ 0x2008;**

**unsigned char \*ptr;**

**sbit k1 = P3^2;**

**void main(){**

**i=0;k1=1;**

**ptr=&dispcode[0];**

**P1 = \*ptr;**

**IE = 0x81;**

**//IT0=0;**

**here: goto here;**

**}**

**void isr() interrupt 0{**

**i++;**

**if(i==10)**

**{**

**i=0;**

**ptr = &dispcode[i];**

**P1=\*ptr;**

**}**

**else{**

**ptr++;**

**P1 = \*ptr;**

**}**

**}**

**/\*Q4. Write a program in Embedded C for 8051 microcontroller to copy 10 bytes of**

**data starting from memory location 2000H to memory location starting from 2010H.\*/**

#include<reg52.h>

xdata unsigned char a \_at\_ 0x2000;

xdata unsigned char b \_at\_ 0x2010;

xdata unsigned char i \_at\_ 0x1000;

void main(){

unsigned char\* ptr = &a;

unsigned char\* ptr1 = &b;

for(i = 0;i<10;i++,ptr++,ptr1++){

\*ptr1 = \*ptr;

}

here: goto here;

}

/\* Q5. Write a program in Embedded C for 8051 microcontroller to copy 10 bytes of

data starting from memory location 2000H to memory location starting from 2010H in reverse.\*/

#include<reg52.h>

xdata unsigned char a \_at\_ 0x2000;//2000 to 2009

xdata unsigned char b \_at\_ 0x2010;//2010 200f 200e 200d 200c 200b 200a 200

void main( )

{

unsigned char i;

unsigned char \*ptr1=&a,\*ptr2=&b;

for (i=9;i>=0; i--, ptr1++)

{

\*(ptr2+i)=\*ptr1;

}

here: goto here;

}

/\* Q6. Write a program in Embedded C for 8051 microcontroller to generate a square wave of 10KHz on port pin P1.2. Assume crystal of 12MHz.

a) Using Timer 0 in Mode 1

b) Using Timer 0 in Mode 2\*/

#include<reg52.h>

sbit p = P1^2;

void main(){

TR0 = 0;

TF0 = 0;

p = 0;

TMOD = 0x02;

TH0 = 0xCE;

TL0 = 0xCE;

TR0 = 1;

here: while(TF0==0);

TF0 = 0;

p = ~p;

goto here;

}

/\* Q7. Write a program in Embedded C for 8051 microcontroller to find the 16 bit sum

of 10 bytes of data starting from memory location 3000H to 3009H and store the 16 bit sum at 3010H & 3011H.\*/

#include<reg52.h>

xdata unsigned char a \_at\_ 0x3000;

xdata unsigned int sum \_at\_ 0x3010;

void main(){

unsigned char i =0;

unsigned char\* ptr = &a;

sum = 0;

for(i=0;i<10;i++,ptr++){

sum += \*ptr;

}

here: goto here;

}

/\* Q8. Write a program in Embedded C for 8051 microcontroller to generate

a square wave of 6KHz on port pin P1.2. Assume crystal of 12MHz. \*/

#include<reg52.h>

sbit P12=P1^2;

void main()

{

P12=0;

TMOD=0x02;

TH0=TL0=0xAC;

TR0=1;

TF0=0;

here:while(TF0==0);

TF0=0;

P12=~P12;

goto here;

}

/\* Q9. Design a circuit to show the interface of two LEDs (L1 & L2) and one Key (K1)

to P1.0, P1.1 & P1.2 port lines of 8051. Write a program in Embedded C for 8051 microcontroller

such that the LED1 remains ON and LED2 remains OFF as long as K1 is not pressed and LED1

remains OFF and LED2 remains ON as long as K1 is pressed \*/

#include<reg52.h>

sbit L1=P1^0;

sbit L2=P1^1;

sbit Key=P1^2;

void main(){

L1=L2=0;

Key = 1;

while(1){

if(Key==0){

L1=1;

L2=0;

}

if(Key==1){

L1=0;

L2=1;

}

}

}

/\* Q10. a. Write a program in Embedded C for 8051 microcontroller to generate a

square wave of 10KHz on port pin P1.2 using Timer 0 in Mode 1 and using interrupt.

Assume crystal of 12MHz. \*/

#include<reg52.h>

sbit p12=P1^2;

void main(){

p12=0;

IE=0x82; //EA=1, ET0=1 all others 0

TMOD=0x01;

TL0=0xCE;

TH0=0xFF;

TR0=1;

here:goto here;

}

void isr\_timer0() interrupt 1{

TF0=0;

TR0 = 0;

p12=~p12;

TL0=0xCE;

TH0=0xFF;

TR0 = 1;

}

/\* Q11. Write a program in Embedded C for 8051 microcontroller to generate a

square wave of 10KHz on port pin P1.2 using Timer 0 in Mode 2 and using interrupt.

Assume crystal of 12MHz. \*/

#include<reg52.h>

sbit p12=P1^2;

void main(){

p12=0;

IE=0x82; //EA=1, ET0=1 all others 0

TMOD=0x02;

TL0=0xCE;

TH0=0xCE;

TR0=1;

here:goto here;

}

void isr\_timer0() interrupt 1{

TF0=0;

p12=~p12;

}

/\* Q12. Write a program in Embedded C for 8051 microcontroller to transmit the number 0x5A on serial port at baud

rate of 1200 baud in an infinite loop. Assume crystal of 11.0592MHz.\*/

#include<reg52.h>

void main(){

TMOD=0x20;

TH1=TL1=0xE8;

SCON=0x40;

TR1=1;

here:SBUF=0x5A;

while(TI==0);

TI=0;

goto here;

}

/\* Q13. Write a program in Embedded C for 8051 microcontroller to transmit the number

0x5A on serial port at baud rate of 1200 baud in an infinite loop using interrupt.

Assume crystal of 11.0592MHz. \*/

#include<reg52.h>

void main(){

IE=0x90; //EA=1, ET0=1 all others 0

TMOD=0x20;

TH1=TL1=0xE8;

SCON=0x40;

TR1=1;

SBUF=0x5A;

here: goto here;

}

void isr\_serial() interrupt 4{

SBUF=0x5A;

TI=0;

}

/\* Q14. Write a program in Embedded C for 8051 microcontroller to transmit 10 numbers starting from location 2000h

on serial port at baud rate of 9600 baud. Assume crystal of 11.0592MHz \*/

#include<reg52.h>

xdata unsigned char num \_at\_ 0x2000;

void main()

{

unsigned char\* ptr =&num;

unsigned char i=0;

TMOD=0x20;

TH1=TL1=0xFD;

SCON=0x40;

TR1=1;

for(i=0;i<10;i++, ptr++)

{

SBUF = \*ptr;

while(TI==0);

TI=0;

}

here: goto here;

}

/\* Q15. Write a program in Embedded C for 8051 microcontroller to transmit 10 numbers starting

from location 2000h on serial port at baud rate of 9600 baud using interrupt.

Assume crystal of 11.0592MHz.\*/

#include<reg52.h>

xdata unsigned char num \_at\_ 0x2000;

xdata unsigned char i \_at\_ 0x4000;

unsigned char \*ptr=&num;

void main()

{

TMOD = 0x20;

TH1=TL1=0xFD;

SCON=0x40;

TR1=1;

IE=0x90;

SBUF=\*ptr;

here: goto here;

}

void serial\_isr() interrupt 4

{

TI = 0;

if(i==10){

return;

}

i++;

ptr++;

SBUF=\*ptr;

}

/\* Q16. Interface a 7 segment common cathode LED display to Port 1 on 8051.

Write a program in Embedded C for 8051 microcontroller to display the numbers from 0 to 9 in an infinite loop on the LED

display with delay of 500msec inbetween each count. Assume crystal of 11.0592MHz. \*/

#include<reg52.h>

unsigned char dispcode[10] ={0xC0,0xF9,0xA4,0xB0,0x99,0x92,0x82,0xF8,0x80,0x90};

void delay()

{

int c = 0;

TMOD=0x02;

TH0=TL0=0x92;

TR0=1;

here: while(TF0==0);

TF0=0;

c++;

if(c>10\*500){

TR0=0;

return;

}

goto here;

}

void main()

{

unsigned char i =0;

while(1)

{

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

{

P1=dispcode[i];

delay();

}

}

}

/\* Q17. Interface a common cathode 7 segment display with Port 1 and a key at Port 2.1.

Write code in embedded C such that the count on the display is incremented every time the key is pressed.

Further, once the count reaches 9 then it rolls over to 0. Assume crystal of 12MHz\*/

#include<reg52.h>

sbit key = P2^1;

unsigned char display[10] = {0x3F,0x06,0x5B,0x4F,0x66,0x6D,0x7D,0x07,0x7F,0x6F};

unsigned char i = 0;

void main(){

unsigned char \*ptr;

key = 1;

while(1){

ptr = &display[0];

for(i=0;i<10;i++,ptr++){

P1=\*ptr;

while(key==1);

while(key==0);

}

}

}

/\* Q18. Write a program in Embedded C for 8051 microcontroller to

receive 05 numbers on serial port at baud rate of 9600 baud using interrupt

and store the same starting from location 2000h Assume crystal of 11.0592MHz. \*/

#include<reg52.h>

xdata unsigned char a \_at\_ 0x2000;

unsigned char i = 0;

unsigned char\* ptr = &a;

void main(){

TMOD = 0x20;

TH1=TL1 = 0xFD;

SCON = 0x50;

IE = 0x90;

TR1 = 1;

here: goto here;

}

void isr\_in() interrupt 4{

RI = 0;

if(i==5){

return;

}

i++;

\*ptr = SBUF;

ptr++;

}

19./\*Interface a common cathode 7 segment display with Port 1 and a key at INTO pin. Write code in embedded C such that the count

on the display is incremented every time the key is pressed. Further, once the count reaches 9 then it rolls over to 0. Use

interrupt Assume crystal of 12MHz\*/

#include<reg52.h>

xdata unsigned char dispcode[10] ={0xC0,0xF9,0xA4,0xB0,0x99,0x92,0x82,0xF8,0x80,0x90};

xdata unsigned char i \_at\_ 0x2008;

unsigned char \*ptr;

sbit k1 = P3^2;

void main(){

i=0;k1=1;

ptr=&dispcode[0];

P1 = \*ptr;

IE = 0x81;

//IT0=0;

here: goto here;

}

void isr() interrupt 0{

i++;

if(i==10)

{

i=0;

ptr = &dispcode[i];

P1=\*ptr;

}

else{

ptr++;

P1 = \*ptr;

}

}