Lab 7

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 Solved Example:

WAP to simulate 4-digit BCD up counter on the multiplexed seven segment display.

#include<LPC17xx.h> #include<stdio.h>

unsigned int seg_select[4] = {0<<23, 1<<23, 2<<23, 3<<23}; unsigned int dig1=0x00, dig2=0x00, dig3=0x00, dig4=0x00; unsigned int seg_count=0x00, temp1=0x00;

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

void delay(void); void display(void); int main(void)

{

SystemInit(); SystemCoreClockUpdate();

LPC_PINCON->PINSEL0 &= 0xFF0000FF; //P0.4 to P0.11 GPIO data lines LPC_PINCON->PINSEL3 &= 0xFFC03FFF; //P1.23 to P1.26 GPIO enable lines LPC_GPIO0->FIODIR |= 0x00000FF0; //P0.4 to P0.11 output

LPC_GPIO1->FIODIR |= 0x07800000; //P1.23 to P1.26 output

while(1)

{

delay(); display(); seg_count +=1;

if(seg_count == 0x04)

{

seg_count = 0x00; dig1 +=1;

if(dig1 == 0x0A)

{

dig1 = 0;

dig2 +=1; if(dig2 == 0x0A)

{

```c
dig2 = 0; dig3+=1;

if(dig3 == 0x0A)

{

dig3 = 0;

dig4 += 1; if(dig4 == 0x0A)

{

dig4 = 0;

} //end of dig4

} //end of dig3

} //end of dig2

} //end of dig1

} //end of seg_count

} //end of while(1)

}//end of main

void display(void) //To Display on 7-segments

{

LPC_GPIO1->FIOPIN = seg_select[seg_count]; if(seg_count == 0x00) // For Segment U8

{

temp1 = dig1;

}

else if(seg_count == 0x01) // For Segment U9

{

temp1 = dig2;

}

else if(seg_count == 0x02) // For Segment U10

{

temp1 = dig3;

}

else if(seg_count == 0x03) // For Segment U11
```

```
{
temp1 = dig4;
}
LPC_GPIO0->FIOPIN = array_dec[temp1]<<4; // Taking Data Lines for 7-Seg for(i=0;i<500;i++);
}
void delay(void)
{ unsigned int i; for(i=0;i<100000;i++);
}
```
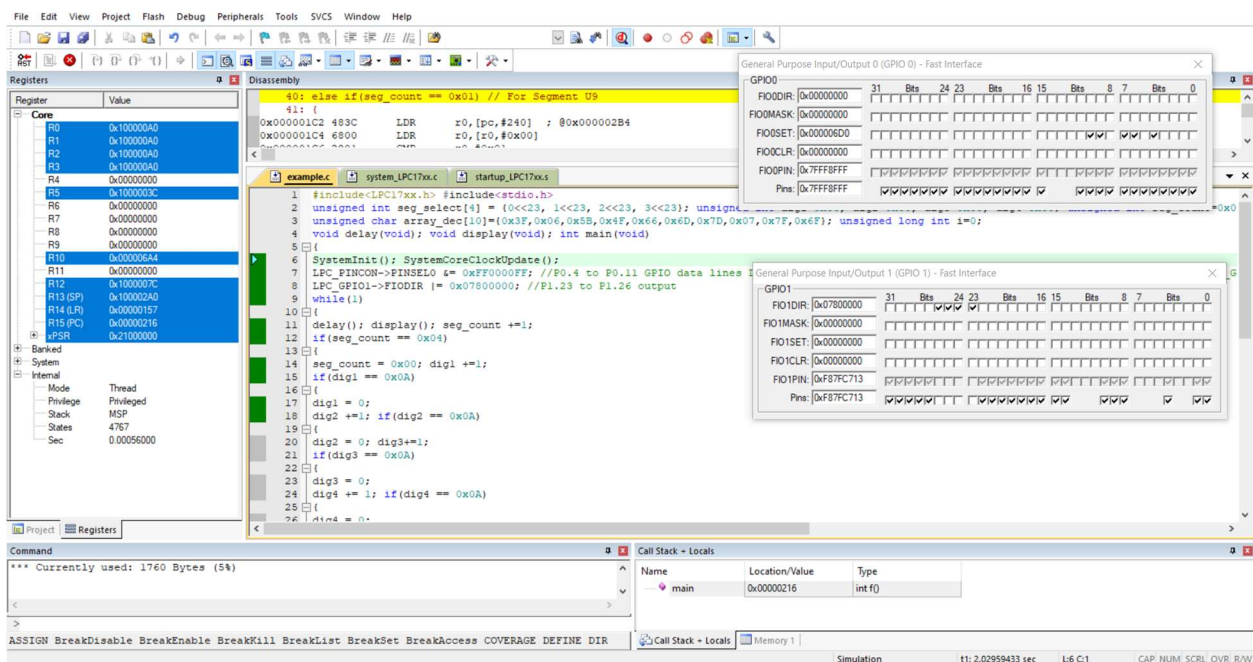

Q1.
Write a C program to display the number "1234" serially in the seven segment display.
```
#include <LPC17xx.h>
#include <stdio.h>
#define FIRST_SEG 0xF87FFFFF
#define SECOND_SEG 0xF8FFFFFF
#define THIRD_SEG 0xF97FFFFF
#define FOURTH_SEG 0xF9FFFFFF
#define DISABLE_ALL 0xFA7FFFFF
unsigned int dig1=0x00,dig2=0x00,dig3=0x00,dig4=0x00;
unsigned int twenty_count=0x00,dig_count=0x00,temp1=0x00;
unsigned char dec[10]={0x3F,0x06,0x5B,0x4F,0x66,0x6D,0x7D,0x07,0x7F,0x6F};
unsigned char tm0_flag=0x00,one_s_f=0x00;
unsigned long int temp2=0x00000000,i=0;
```

```c
unsigned int temp3=0x00;
void delay(void);
void display(void);
int main(void)
{
LPC_PINCON->PINSEL0&=0XFF0000FF;
LPC_PINCON->PINSEL3&=0XFFC03FFF;
LPC_GPIO0->FIODIR|=0X00000FF0;
LPC_GPIO1->FIODIR|=0X07800000;
LPC_GPIO2->FIODIR =0x0;
while(1)
{
delay();
dig_count+=1;
if(dig_count==0x05)
{
dig_count=0x00;
one_s_f=0xFF;
}
if(one_s_f == 0xFF)
{
one_s_f = 0x00;
dig1 += 1;
if(dig1 == 0x0A)
{
dig1 = 0;
dig2 += 1;
if(dig2 == 0x0A)
{
dig2 = 0;
dig3 += 1;
if(dig3 == 0x0A)
{
dig3 = 0;
dig4 += 1;
if(dig4 == 0x0A)
{
dig4 = 0;
}
}
}
}
}
display();
}
}
void display(void)
{
if(dig_count == 0x01)
```

```c
{
temp1 = dig1;
LPC_GPIO1->FIOPIN = FIRST_SEG;
}
else if(dig_count == 0x02)
{
temp1 = dig2;
LPC_GPIO1->FIOPIN = SECOND_SEG;
}
else if(dig_count == 0x03)
{
temp1=dig3;
LPC_GPIO1->FIOPIN=THIRD_SEG;
}
else if(dig_count==0x04)
{
temp1=dig4;
LPC_GPIO1->FIOPIN=FOURTH_SEG;
}
temp1 &= 0x0f;
temp2 = dec[temp1];
temp2 = temp2<<4;
LPC_GPIO0->FIOPIN = temp2;
for(i=0;i<500;i++);
LPC_GPIO0->FIOCLR = 0xff0;
LPC_GPIO1->FIOPIN = DISABLE_ALL;
}
void delay(void)
{
unsigned int i;
for(i=0;i<1000;i++);
if(twenty_count==1000)
{
one_s_f=0xff;twenty_count=0x00;
}
else
{
twenty_count += 1;
}
}
```
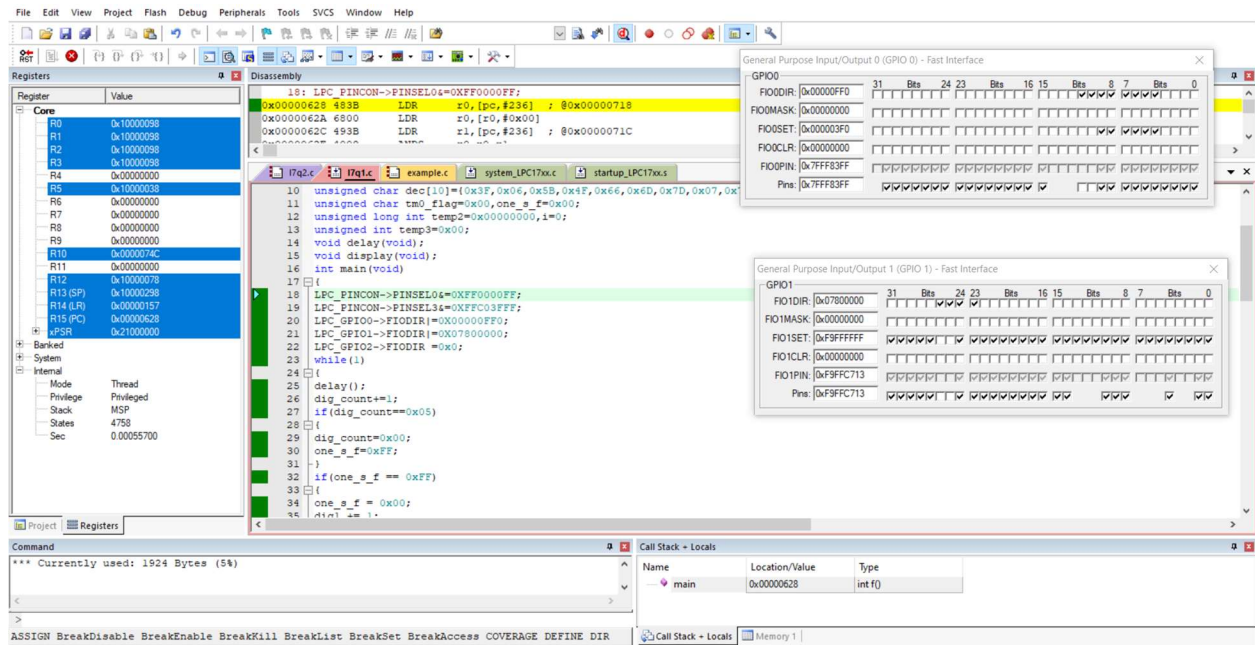
Q2. Write a C program to simulate a 4 digit BCD down counter.

```c
#include<LPC17XX.h>

#define FIRSTSEG 0<<23;

#define SECONDSEG 1<<23;

#define THIRDSEG 2<<23;

#define FOURTHSEG 3<<23;

unsigned int dig_1 = 0x00;

unsigned int dig_2 = 0x00;

unsigned int dig_3 = 0x00;

unsigned int dig_4 = 0x00;

unsigned long i;

unsigned int twenty_count=0x00, dig_count = 0, temp1 = 0x00, one_sec_flag = 0x00;

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

unsigned long int temp2 = 0x0;

void display(void)

{

if(dig_count == 0x01)
```

```c
{
temp1 = dig_1;

LPC_GPIO1->FIOPIN = FIRSTSEG;

}

if(dig_count == 0x02)

{

temp1 = dig_2;

LPC_GPIO1->FIOPIN = SECONDSEG;

}

if(dig_count == 0x03)

{

temp1 = dig_3;

LPC_GPIO1->FIOPIN = THIRDSEG;

}

if(dig_count == 0x04)

{

temp1 = dig_4;

LPC_GPIO1->FIOPIN = FOURTHSEG;

}

temp1 &= 0x0F;

temp2 = array_dec[temp1];

temp2<<=4;

LPC_GPIO0->FIOPIN = temp2;

for(i=0; i<50000; i++);

LPC_GPIO0->FIOCLR = 0x00000FF0;

}

void delay()

{ for(i=0; i<10000; i++); }

int main()
```

```c
{
LPC_GPIO0->FIODIR |=0xFF<<4;

LPC_GPIO1->FIODIR |=15<<23;

while(1)

{
delay();

dig_count +=1;

if(dig_count == 0x05)

{
delay();

dig_count = 0x01;

one_sec_flag = 0xFF;

}
if(one_sec_flag==0xFF)

{
one_sec_flag = 0x00;

dig_1-=1;

if(dig_1==0xFFFFFFFF)

{
dig_1=9;

dig_2-=1;

if(dig_2==0xFFFFFFFF)

{
dig_2=9;

dig_3-=1;

if(dig_3==0xFFFFFFFF)

{
dig_3 = 9;

dig_4 -= 1;
```

```c
if(dig_4==0xFFFFFFFF)

{

dig_4 = 9;

}

}

}

}

}

display();

}

}
```