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19CSE303 Embedded Systems
Lab Worksheet - 9
Timer Counter

Exercise Problems

1. Write a ARM embedded C program configure Timer 0 create a delay of 1secs between an LED on and off. Assume LED's are connected in all the PINS of GPIO0 and clock frequency is 3MHz.

Hint1: Use the formula in Lecture Section-9 Slide 36 to calculate the Match register value.

Hint2: Use Logic analyzer to visualize the time delay

```
#include <LPC214X.h>

void delay(){
T0MR0 = 3000000;    //Load Calculated Count for desirted delay
T0MCR = 0x00000004;  //Stop on MR0
T0TCR = 1;              // Enable Timer 0
while(T0TC != T0MR0);   //wait untill TC reaches the desired
delay
T0TC=0;                 // Reset Timer
}
main(){
IODIR0 = 0xFFFFFFFF;  //Configure POrt 0 as output port
while(1){
IOSET0 = 0xFFFFFFFF;  // Make all poins of port 0 High
delay();
IOCLR0 = 0xFFFFFFFF;   // Make all poins of port 0 Low
delay();
}
}
```

2. Write a ARM embedded C program count the external events occurred using Counter module.

```
#include <LPC21xx.H>                          /* LPC21xx
definitions */

#define T0CTCR          (*((volatile unsigned long *)
0xE0004070))
#define T1CTCR          (*((volatile unsigned long *)
0xE0008070))

int count;
int main(void)
{

    PINSEL0 = 0x00200020;  //Setting for Capture in port P0.2
and P0.10
    T0TCR = 0x00000001;    //Enable Timercounter register for
counting
    T1TCR = 0x00000001;    //Enable Timercounter register for
counting
    T0CTCR = 0x00000001;   // enabling counter for counting on
rising edge od signal in CAP0 Timer0 pin
    T1CTCR = 0x00000001;   // enabling counter for counting on
rising edge od signal in CAP0 Timer1 pin
    while(1)
        count = T0TC;
}
```

Assignment Problem

1. Alter the program in Ex.1 to create a blinking LED pattern with ON time as 5 secs and off time as 2 secs.