

Lab-1

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Aim:

- 1) Write a C program to blink LED with a frequency of 1 Hz.
- 2) Write a C program to control an LED that lights up in different colors.

Approach:

- 1) Global macro counter for counting in the FOR loop, We will adjust the counter value until we think the delay has reached 1 sec.
- 2) Now we used two counters, one for light color and the other for the delay

```
//LAB1-Q1
#if 1
int current=0;
int i=0;
while(1)
{

if(current%3==0)
{GPIO_PORTF_DATA_R = 0x02;}
if(current%3==1)
{GPIO_PORTF_DATA_R = 0x04;}
if(current%3==2)
{GPIO_PORTF_DATA_R = 0x08;}
for(i=0; i<COUNTER; i++)
continue;
GPIO_PORTF_DATA_R = 0x00;
for(i=0; i<COUNTER; i++)
continue;
current++;
}
#endif
```

Observation:

With the brute calculation of the counter in the for loop, we were not able to achieve a frequency of 1hz so we tried counting cycles from the assembly code of the for loop.

Assembly of the for loop:

```
46 for(i=0; i<COUNTER; i++)  
$C$L4:  
000002ec: 9801 ldr r0, [r13, #4]  
000002ee: 1C40 adds r0, r0, #1  
000002f0: 9001 str r0, [r13, #4]  
000002f2: 4914 ldr r1, [pc, #0x50]  
000002f4: 9801 ldr r0, [r13, #4]  
000002f6: 4281 cmp r1, r0  
000002f8: DCF8 bgt $C$L5
```

\$C\$L6

In the FOR loop disassembly, we found that all have immediate addressing and have 1 cycle per instruction. In summary, we assumed the FOR loop has 7 cycles.

- Clock = 16Mhz, that gives Counter = 700000

Conclusion:

We achieved near 1hz blinking with counter set to 700000

Images:



