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CpE – 187 FA2022

Laboratory 04: Simple I/O Debugging

SIMULATION: https://youtu.be/DcbUf4LQ5Hk

HARDWARE: https://youtu.be/n2F2CLzZgac

In this laboratory, the student was introduced to work on debugging process. The student supposed to follow the desired LED Output and correct the program. With the given program, the student first debug without changing the code which shows below.

Table 1. Comparison of measured versus desired response

Switch Input	Desired LED Output	Actual LED Output
Both are pressed	Blue	Blue
Just SW1	Red	Green
Just SW2	Green	Red
Neither is pressed	Off	Blue

After investigation, the student was able to identify the incorrect LEDs and edit to desired LED output. Here is the snippet of the edited part of the program.

```
// 3. Subroutines Section
// MAIN: Mandatory for a C Program to be executable
int main(void){
  TExaS_Init(SW_PIN_PF40,LED_PIN_PF321);
  // TExaS_Init initializes the real board grader for lab 4
  PortF_Init();        // Call initialization of port PF4, PF3, PF2, PF1, PF0
  EnableInterrupts();  // The grader uses interrupts
  while(1){
    SW1 = GPIO_PORTF_DATA_R&0x10;     // read PF4 into SW1
    SW2 = GPIO_PORTF_DATA_R&0x01;     // read PF0 into SW2
    if(SW1&&SW2){                     // both pressed
      GPIO_PORTF_DATA_R = 0x00;       // LED is blue
    } else if(SW1&&(!SW2)){           // just SW1 pressed
        GPIO_PORTF_DATA_R = 0x08;     // LED is red
    } else if((!SW1)&&SW2){           // just SW2 pressed
        GPIO_PORTF_DATA_R = 0x02;     // LED is green
    }else{                            // neither switch
        GPIO_PORTF_DATA_R = 0x04;     // LED is off
    }
  }
}
```

Figure 1. snippet of the changed part of the program

QUESTION:

Download and open the data sheet for the TM4C123 microcontroller

1. Look at the Tiva TM4C123GH6PM Microcontroller High Level Block Diagram to see how much SRAM and Flash ROM are available. (10 Points)

   32kb SRAM, 256kb Flash ROM

2. Lookup in the relevant chapter to see how many GPIO (General Purpose Input/Output) pins are supported. (10 Points)

   43 GPIO