

ECE 414 LAB ASSIGNMENT 1

Introduction to the PIC 32 / Tool Familiarization

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AIM OF THE LAB

The aim of the lab is to familiarize with Kicad, MPLAB and the PIC32 microcontroller.

INTRODUCTION

This lab is divided into 3 main parts: installation, familiarization and implementation. During the installation part, we installed the Atom and its teletype package, Kicad and MPLab on our personal computers. Atom possesses the teletype package that allows to modify code remotely between coworkers.

In the familiarization part, we overviewed different options that can be done with the different installed softwares. A C code was given to us, it allows us to make 3 bits counting using LEDs. Our task was to implement that. After that, we added a fourth LED in the circuit and realized a four bit counting by updating the previous code.

CHANGE SHAMT VALUE

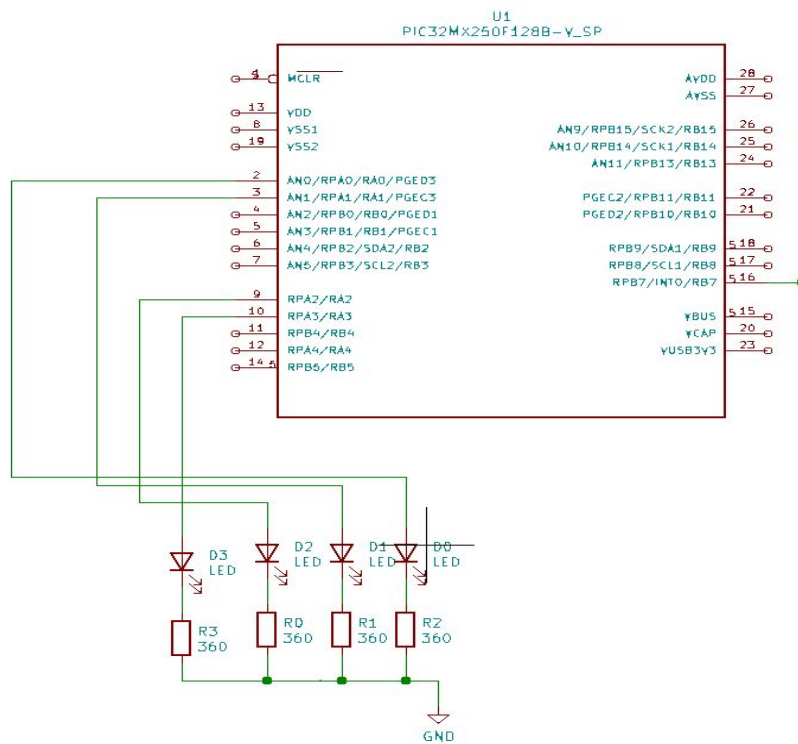
As part of the Lab assignment, we were asked to observe what happens when the SHAM value is changed to 21 and 19.

- When 21 was used, the counting speed decreased
- When 19 was used, the counting speed increased

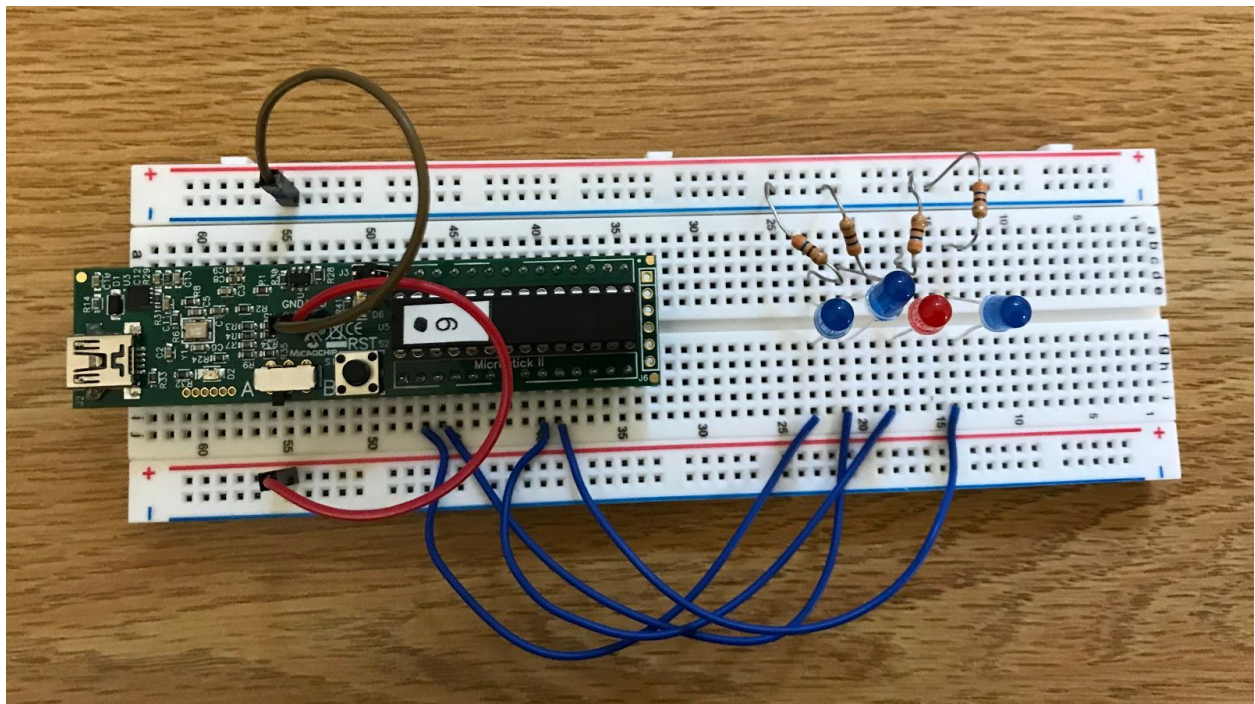
Interpretation: This value controls the delay of the counting.

ADDING THE FOURTH LED

The new schematic with the fourth LED is shown below:



Schematic diagram with the fourth LED



Implementation over the breadboard

The implementation code of the program is as follows

```

/*=====
* main.c
* My first PIC32 program.
*
* Author: John Nestor
*=====*/
/* Clock configuration */
#pragma config FOSC = FRCPLL, POSCMOD = OFF
#pragma config FPLLIDIV = DIV_2, FPLLMUL = MUL_20
#pragma config FBDIV = DIV_1, PLLDIV = DIV_2
#pragma config FWDIV = OFF, JTAGEN = OFF, FSOSCEN = OFF
#include <xc.h>
#include <inttypes.h>
#define SHAMT 21
void main()
{
    uint32_t count;
    /* Set up all PORTA pins as digital outputs. */
    ANSELA = 0;
    TRISA = 0;
    /* Simple counter. */
    count = 0;
    while (1) {
        // output bottom 4 bits shifted to show progress
        LATA = (count >> SHAMT) & 0xF;
        count++;
    }
}

```

Comment : We basically change the `LATA = (count >> SHAMT) & 0x7;` into `LATA = (count >> SHAMT) & 0xF;` to realize a 4 bit counting

CONCLUSION

In this lab, we learned about how to use the PIC 32 microcontroller and how to program using MPLAB. We also learned how Kicad can be helpful to analyze the conceptual part of circuit before implementing.