Farmingdale State College

Department of Electrical Engineering Technology

**EET-251 Microprocessors Spring 2019 Prof. Cernuto**

**Lab #7 1 HZ Binary Counter using Subroutine for Delay**

**Modify Lab#6 to design a program to generate an 8-bit binary counter at 1 Hz count rate. You must use a subroutine to implement the 1 second delay. Call the subroutine to produce the 1 second delay, but all other program coding must be in the main routine that calls this delay subroutine. Use the Stopwatch in MPLAB X you check and verify the 1second delay. Each time you increment the counter, output the 8-bit counter to PORTB. This will enable you to visually observe the counting when you implement the design on Proteus 8. You are required to draw a flowchart for your design solutions before you start your lab.**

***Part A:***

**Design the program to create an 8-bit binary counter. Demonstrate the operation of the lab to your instructor using MPLAB X debug and Watch window.**

***Part B:***

**Implement the Design on Proteus 8 and demonstrate to the Instructor. First demonstrate with the 8-LEDs. Next, Replace the 8-Leds with two 7-segment BCD displays.**

**Lab Report & Demonstration:**

1. **Hand in the flowcharts for your designs, part A**
2. **Calculate and write down the expected delay in your Subroutine delay loop to achieve the 1 second delay and hand this in. Show all your work.**
3. **If applicable calculate and write down all expected results of the program prior to demonstration as requested above.**
4. **Demonstrate to Instructor that program has no build errors and operates correctly using the MPLAB X Debugger single step mode and Watch Window**
5. **Copy of .asm program to hand in**
6. **Implement the design on Proteus 8 and demonstrate to Instructor.**
7. **Hand in a printout of the Schematic from Proteus 8.**