Experiment 2: General Purpose Input Output

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Veni. Vidi. Vici.

-Julius Caesar

1 Introduction

This lab aims to help students to gain more experience in the MSP430 Education Board, MSP430G2553 microcontroller and its assembly language. Students are recommended both to read the supplementary material **"Supplementary Chapter 6 General Purpose IO"** on Ninova. Also, if preferred, they could bring their own computers to the laboratory on which Texas Instruments Code Composer Studio IDE is installed.

2 Part 1

In this part you will assign a register to count, how many times a specific
switch debouncing

The general purpose input and output (GPIO) using the ports of MSP430G2553 (i.e. Port 1 and 2) can be performed by configuring and reading/setting the corresponding registers of the selected port. The following two instructions read P1.2 and conditionally branch depending on the state of the button.

Overall, in the first part of the experiment, you are required to write a simple code that:

- Waits for the user to press P2.4.
- Turns LED P1.4 on.
- Waits on an infinite loop.

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1    ; Infinite loop example
2    loop    jmp loop
```

3 Part 2

Write an assembly program that switches back and forth between the LED P2.2 & LED P2.3 using BUTTON P1.5. If the LED P2.2 is on when the BUTTON P1.5 is pressed, it turns off LED P2.2 & turns on LED P2.3. If the LED P2.3 is on when the BUTTON P1.5 is pressed, it turns off LED P2.3 & turns on LED P2.2. Also, if you hold the BUTTON, the state of the LEDs should not keep changing (Hint: What is switch bouncing?). Lastly, you should set the initial state of LEDs as P2.2 at on & P2.3 at off state.

4 Part 3

Write an assembly program that counts how many times the push button P2.1 is pressed. In this manner, you should first "define a variable in memory rather than using an accumulator". to store how many times the button is pressed. You are asked to use a 4-bit variable which resets at #16d. Your program should display the value of the variable on Port 1. Note that the value should not continue to increase if you keep the push button pressed. (You should check how to declare a variable can be declared and initialized in the data section. Please check MSP430 Introduction document.)