Experiment 1: Basic Assembly Coding

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*N*o! My heart shall be a tower,
and I myself set at its highest rim:
where nothing else is, neither one last hurt,
nor the ineffable, where the world shall stop
Still one thing alone in immensity,
to darken first and then again grow light

Rainer Maria Rilke, The Solitary

1 Introduction and Preliminary

As can be guessed from the prologue, this experiment will be about turning the LEDs on and off with a pattern. It is strongly suggested to investigate the following material before the lab.

- MSP430 Education Board Manual
- MSP430 Architecture Chapter 4
- MSP430 Instruction Set

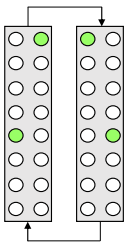
2 Part 1

Create a new CCS Project. Be sure that you selected **"MSP430G2553"** as the target and **Empty Assembly-only Project** as the project template. Write the given code inside main.asm. This code will be useful for the remaining parts of the experiment.

```
SetupP1     bis.b   #001h,&P1DIR ;P1.0 output
Mainloop    xor.b   #001h,&P1OUT ;Toggle P1.0
Wait        mov.w   #050000,R15 ;Delay to R15
            L1      dec.w R15 ; Decrement R15
            jnz L1 ; Delay over?
            jmp Mainloop ; Again
```

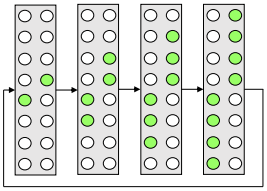
3 Part 2

Write the assembly code to turn the LEDs on and off according to following pattern.



4 Part 3

Write the assembly code to turn the LEDs on and off according to following pattern.



5 Part 4

Write the assembly code to turn the LEDs on and off according to following pattern. (**Hint:** You can obtain that pattern using 4 different parts of code. But, using a spesific instruction decreases it to 2.)