**Summary**

The purpose of this project was to modify an existing program whose function was to illuminate red LED 1 based on the state of switch 1 on the SImon board. Specifically if switch 1 was depressed LED 1 should illuminate. We were tasked with extending this code to work for all 9 LEDs on the Simon board.

In examining the existing code, we determined that accomplishing this would be possible by storing the state of the pins connected the switches into a temporary register, in this case, the carry bit. We then copied the contents of the carry bit to the pin connected to the corresponding LED, one at a time in different statements. First, however, we had to set the the utilized ports (P0M1, P1M1, & P2M1) to a value of 00H, so that each pin was initialized for both reading and writing.

Setting the value of the Switch Pin to the LED pin, allows both to have the same value, 0 if the switch is engaged and and 1 if the switch is off. We discovered that the LED is active low during testing by storing values of 1 and 0 directly into the correct pin for red LED 1 and observing the status of the LED. The LED did not illuminate when 1 was stored, but did illuminate on a value of 0. This led us to determine the switch must also use active low logic as well as there was no inversion of the carry bit in the original program.

The purpose of the loop is to continually update the state of the LEDs depending on what switches are being pressed during a given iteration, allowing the light to remain lit only as long as the switch was engaged. We needed to make the loop continuous because we needed the program to run continuously allowing for the activating of switches and illuminating of LEDs as long as the board was running.

To extend the program functionality we first mapped the relevant pins on the I/O ports to the corresponding switches and LEDs using the diagram included with the project materials. Further, we mapped the memory locations for the required pins to a new set of constants to aid in programming the LED functionality while providing better human readability.

**Work Effort**

Work effort was divided up equally among the group. All work as completed during team meetings in which all members were present and contributed.

-Jacques was responsible for possession of the SIMON board, managing the KEIL environment during meetings, and running flashmagic to the board as well as contributed ideas while coding and writing. Jacques was responsible for reserving meeting rooms for the project gatherings.

-Katherine and Evan contributed by providing intellectual ideas and collaboration during the coding and report writing processes.

-Evan was responsible for creating a communication medium between the team.

-Katherine was responsible for creating documents for interpersonal collaboration.

**Screenshots**