Tai Duc Nguyen - ECE 303 - 04/18/2020

Lab 2 Memo

Experimental Setup

This experiment features a game called Codebreaker. The participant's task is to guess a 4 digit number code in 5 tries. If the guess on a number is accurate, then the corresponding LED is turned off. Else, that LED will blink faster. In order to control the 4 LEDs, 4 (16 bit counter) interrupts and a vector, `is_start`, to turn the LEDs OFF are used.

The algorithm works as follow:

- A random 4 digits number is generated (stored into an array of 4 `uint8_t` elements)
- The vector `is_start` is initialized to all 0 (OFF state)
- If user enter a 4 digit number:
    - Check each user entered digit with the corresponding randomly generated digit.
    - If match, then `is_start[i]` is set to `0`
    - if not, then `is_start[i]` is set to `1`. And, the blink rate of LED `i` is doubled: `led_hertz[i] *= 2`
    - Update `OCRiA` for all LEDs.
    - If user entered all correct digits, then exit. Print the user has won.
    - If not, increment `attempts` by 1. Check if `attempts` is 5. If so, print game over and the randomly generated number.
    - Allow the user to continue the game or finish the game. If continuing, then reinitialize all vectors and prompt the user for guesses.

Constructed Circuit