This document details the solution for homework 5. This program is intended for the ATMEGA AVR Dragonfly and Butterfly. The program starts with three scrolling messages. These are "WELCOME", which transitions directly to "LOCKPICKING GAME PRESS CENTER TO START". The user then presses the center and waits for the message to finish scrolling. Then the message "PRESS RIGHT-LEFT TO SELECT LOCK PRESS CENTER TO START" scroll past. There are a couple things to mention here. First of all, with both of the two lattermost messages, the center button does not immediately transition into the next function. If I had a bit more time, I would implement it without using interrupts, checking the state of the center button each time the for loop occurs and breaking from the for loop and while loop when a center button press is registered. However, as it stands, the user must wait until the message has completed scrolling in order to proceed to the next stage.

After the third scrolling message, the program then transitions into a menu where the user can choose which lock they want. The locks one, two, and three have the values 7, 11, and 15, respectively. Each value corresponds to 8 degrees of motion. This number was found by figuring out how many pulses it took to complete 180 degrees of motion. This number was fortunately the same for both clockwise and counterclockwise motion. Each of the aforementioned locks was in a doubly circular linked list, with each lock having an identifying character and its angle value. The user shall cycle through the linked list until they find their desired lock by using the left and right switches, and then choose their desired lock by using the center button. Every time a button or switch is pressed, the given input is displayed on the LCD. When the user presses the center button, this menu exits and moves onto the next stage.

I would have much preferred to be able to write a program that rotates degree by degree, but that unfortunately is not possible given the servo. As it stands, while the user holds down the up or down keys, the servo will rotate clockwise or counterclockwise, respectively until it hits 0 or 180 degrees, also respectively. This angle is displayed on the LCD and the rotation signal goes through PINB1. The servo used was the SG90 360 degree micro servo.

The program will compare the current angle with the goal angle from the user's lock choice. When the lock angles match, a light will start to blink. It does take about a half second to toggle after matching, so have patience. This LED blinks on PINB0.