

Microwave

CSC202
Cameron Goldberg

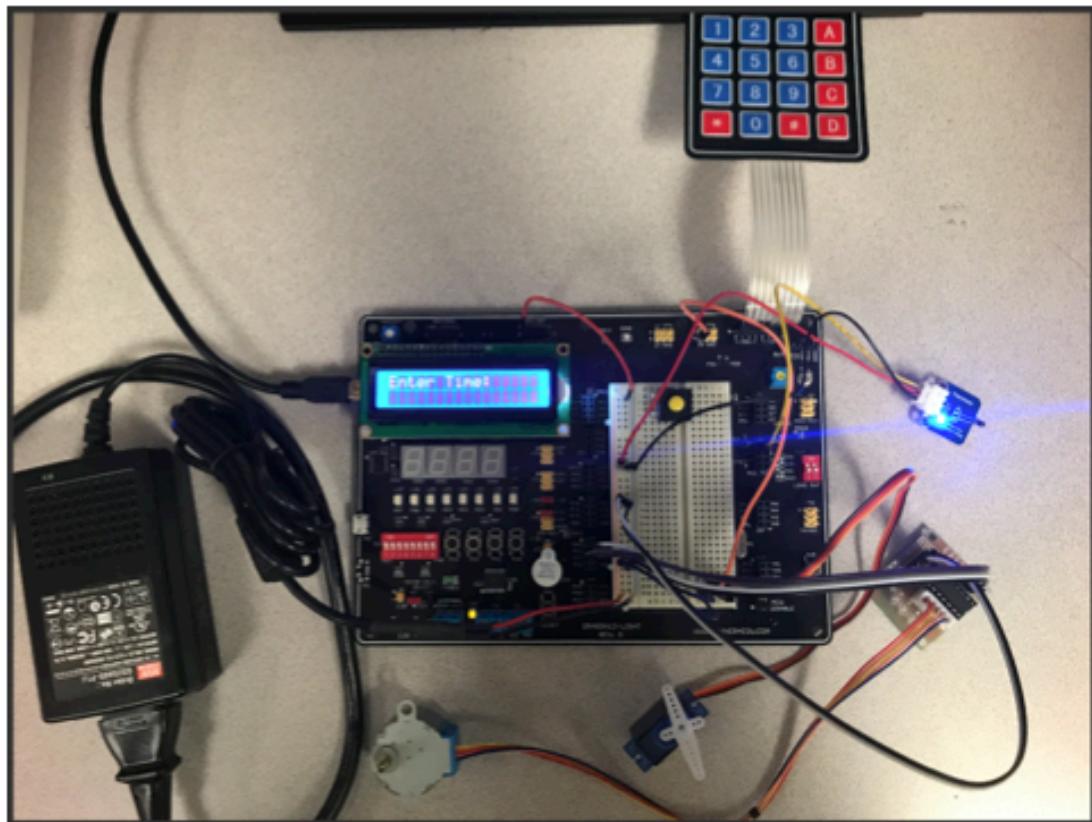


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Project Purpose

The purpose of this project is to write a program that simulates a microwave. Using the terminal and LCD, the program prompts the user to enter a time. This time is entered on a keypad, and, once entered, the program will let the user know the selection on the LCD. If the entry is outside the range of allowable entries, the user will be warned from the terminal and LCD that the entry was invalid. Once a valid entry is made, a servo motor is spun to lock the microwave door, the terminal displays that the door is locked, and the countdown begins. At the start of the countdown, the terminal displays a message that the food is cooking. During this process, the stepper motor will rotate and the count will be displayed on the LCD. The program will also read temperature using a thermistor and display this under the time. Once the countdown is complete, the program will stop spinning the stepper motor and display a message on the terminal, and it will show "Enjoy" on the LCD. At this moment, an LED will flash and the buzzer will beep. At any moment during the countdown, switch 5 can be held down to abort the cooking. When this happens, the countdown stops, and the terminal and LCD will display that the count was aborted. This will also not allow the enjoy message to take place. Once either the count is finished or aborted, the servo motor will rotate in the opposite direction to unlock the door, and there will be a message about this on the terminal. This process will repeat until the board is reset or the power is removed.

The Following External Components Are Required

- Keypad

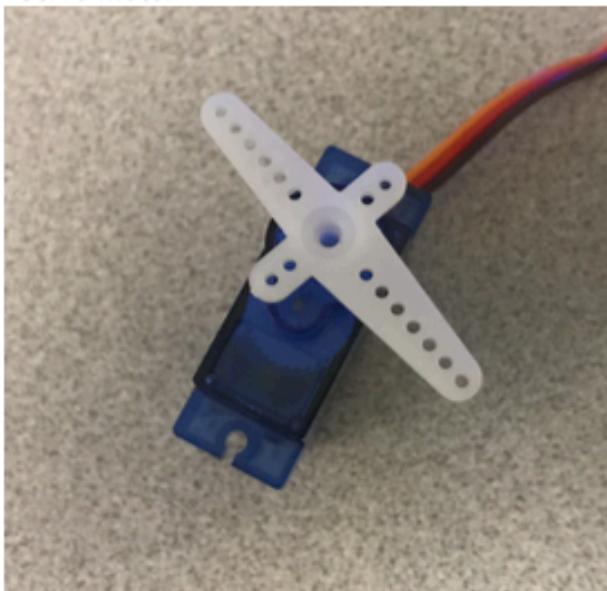


- Power Supply



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- Servo Motor

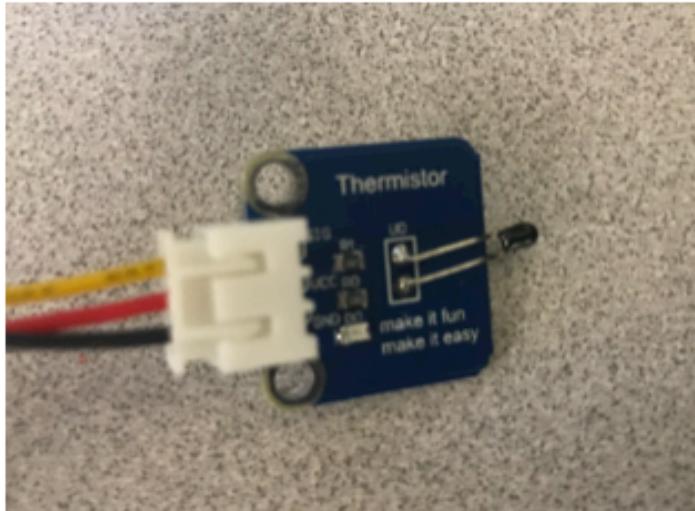


- Stepper Motor



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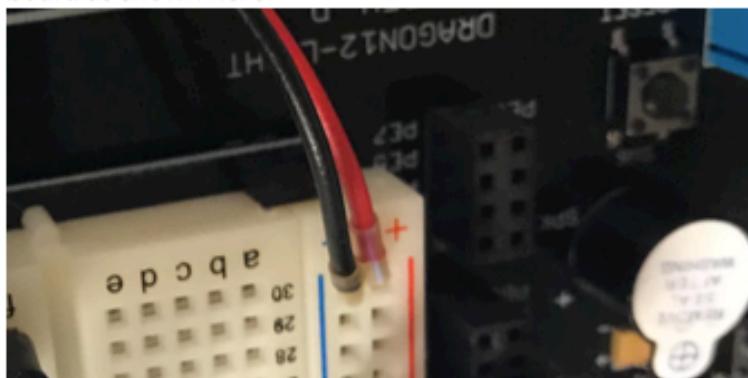
- Thermistor



Microwave Operation

Once the board is properly programmed and connected to your computer via USB, please follow these instructions:

- Connect the power and ground from the power supply to the power and ground on the breadboard as shown here

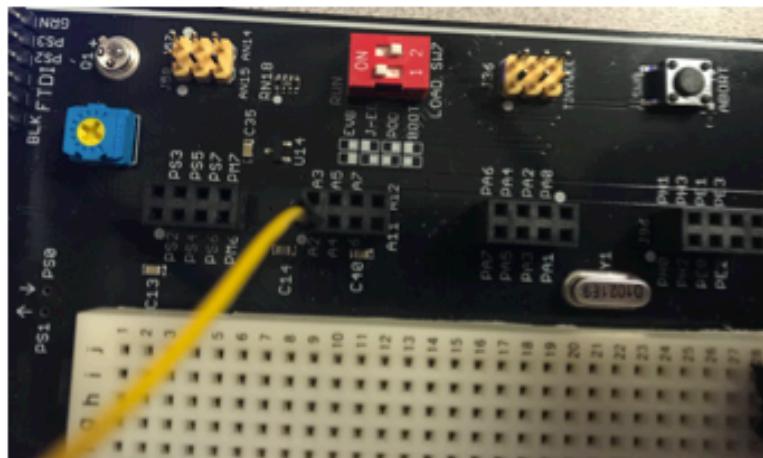


- Jump the ground from the board, located right above the LCD, to the breadboard to establish a common ground



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- To hook up the thermistor, plug the power and ground wires into the bread board, and place the signal wire in A2



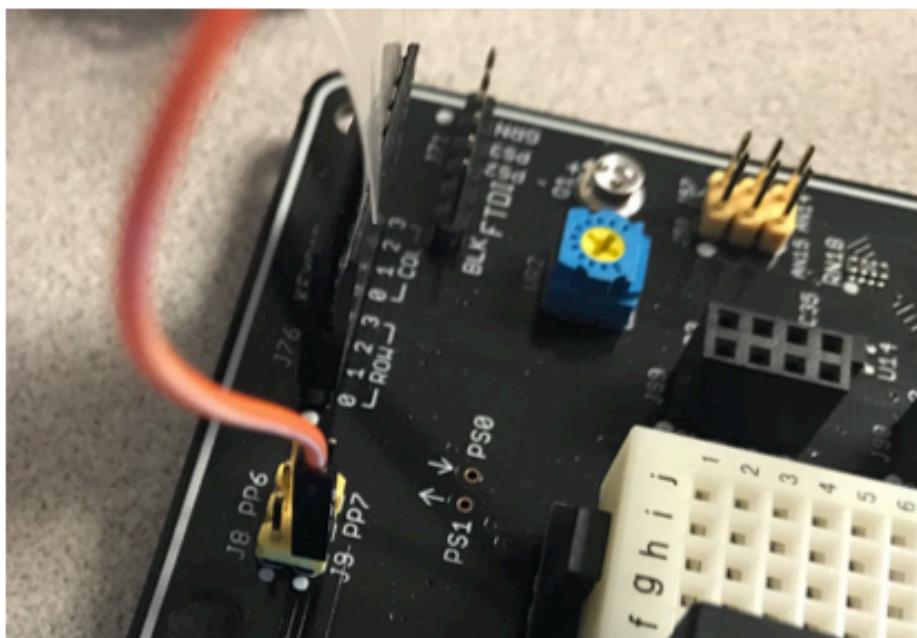
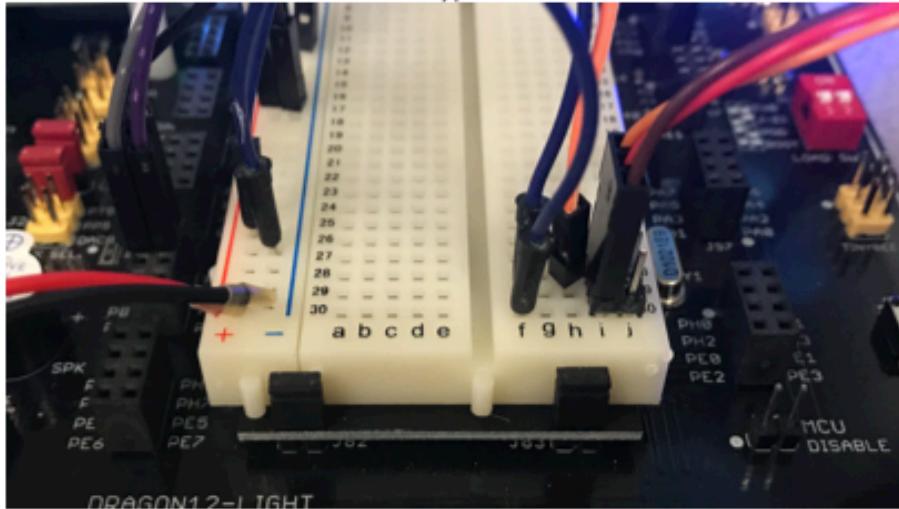
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- The power and ground of the stepper motor will be placed on the bread board, and 1N1, 1N2, 1N3, 1N4 will placed into PB0, PB1, PB2, and PB3, respectively



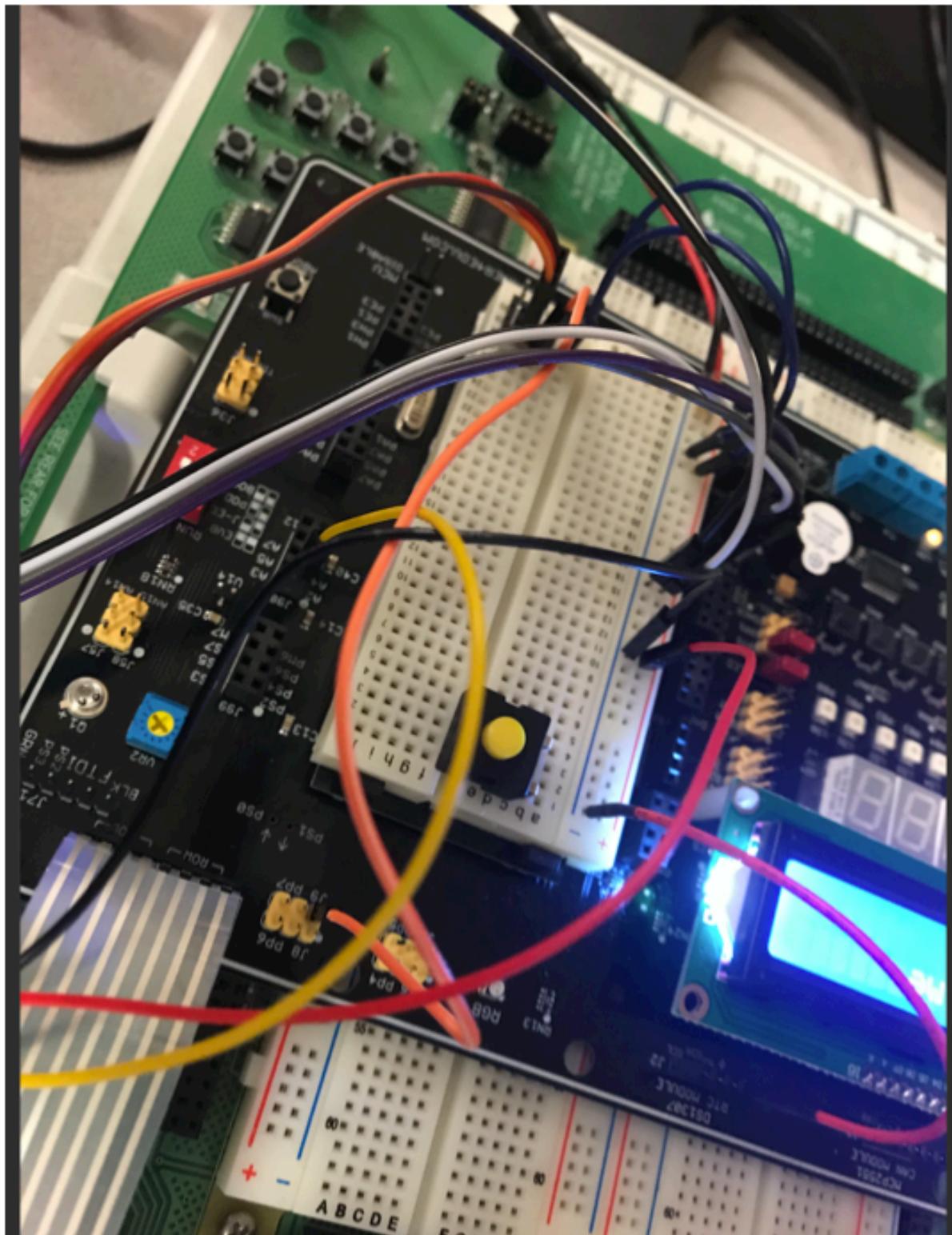
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- Connect the servo connector to the breadboard and jump the power(red) and ground(brown) wires to the power and ground on the breadboard. The signal(orange) wire will be jumped to J9. It is also shown here that the keypad is connected to J76.



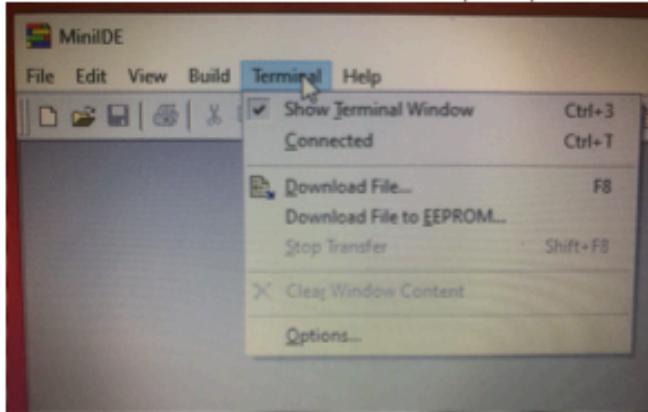
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- Here is a larger picture to show all the wiring

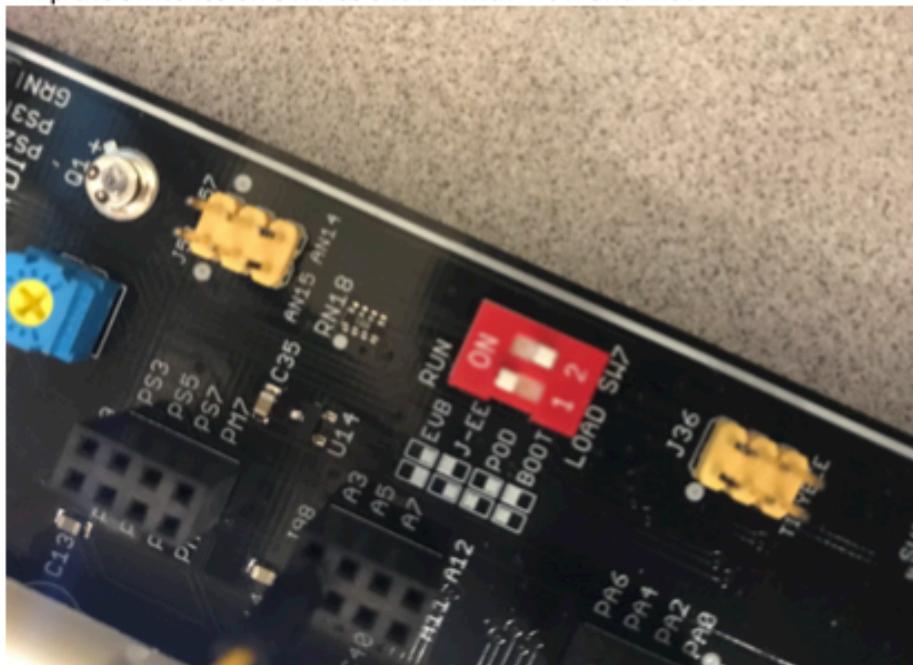


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- Plug the power supply in
- Open up MinilDE and make sure BOTH "Show Terminal Window" and "Connected" are checked. This will allow the terminal prompts from the board to be displayed.

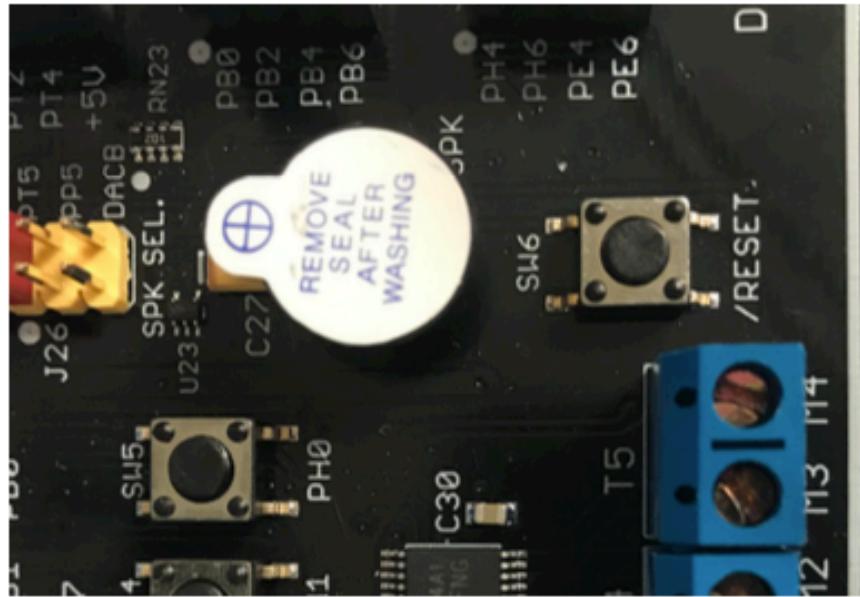


- Flip the switches on SW7 as shown with 1 ON and 2 OFF

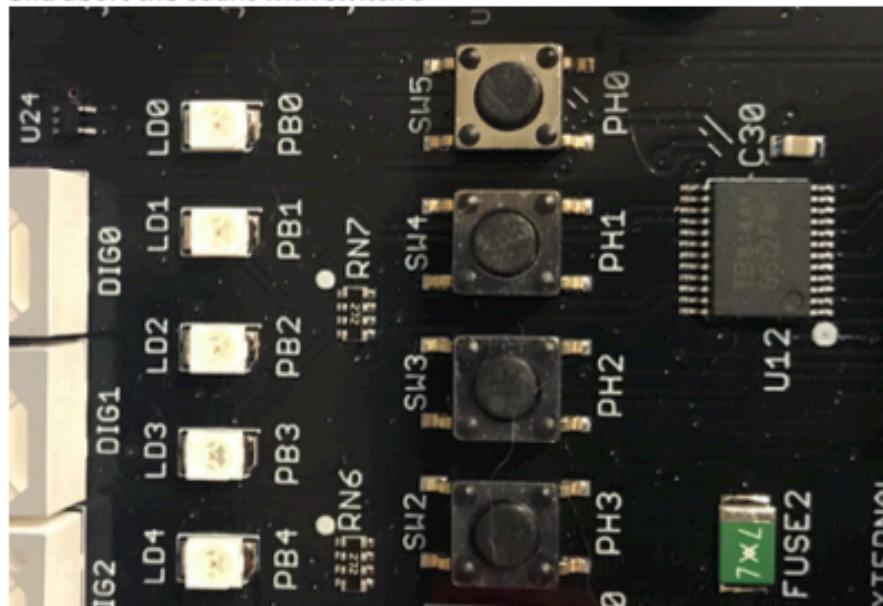


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- Push SW6 to reset the board. You will see the prompt to enter time on both the terminal and LCD

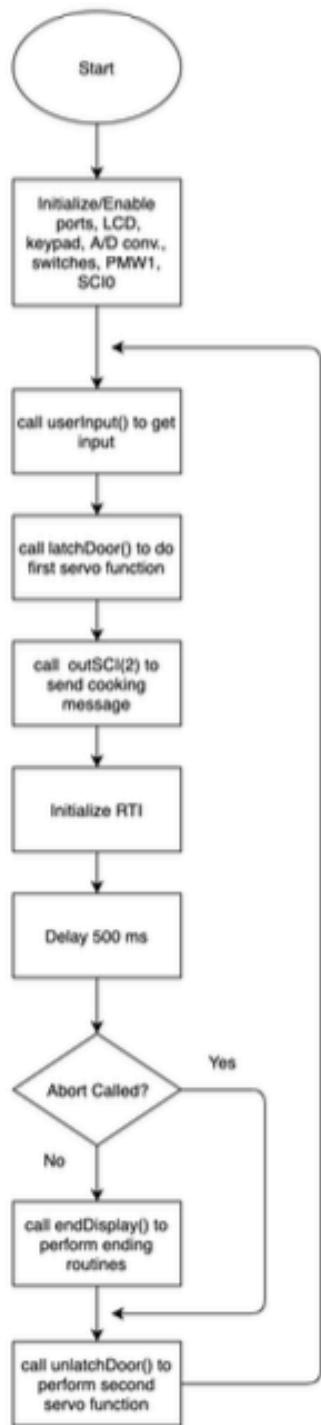


- Now follow the terminal and LCD prompts. Enter input on the keypad using digits 1 through 9 and abort the count with switch 5



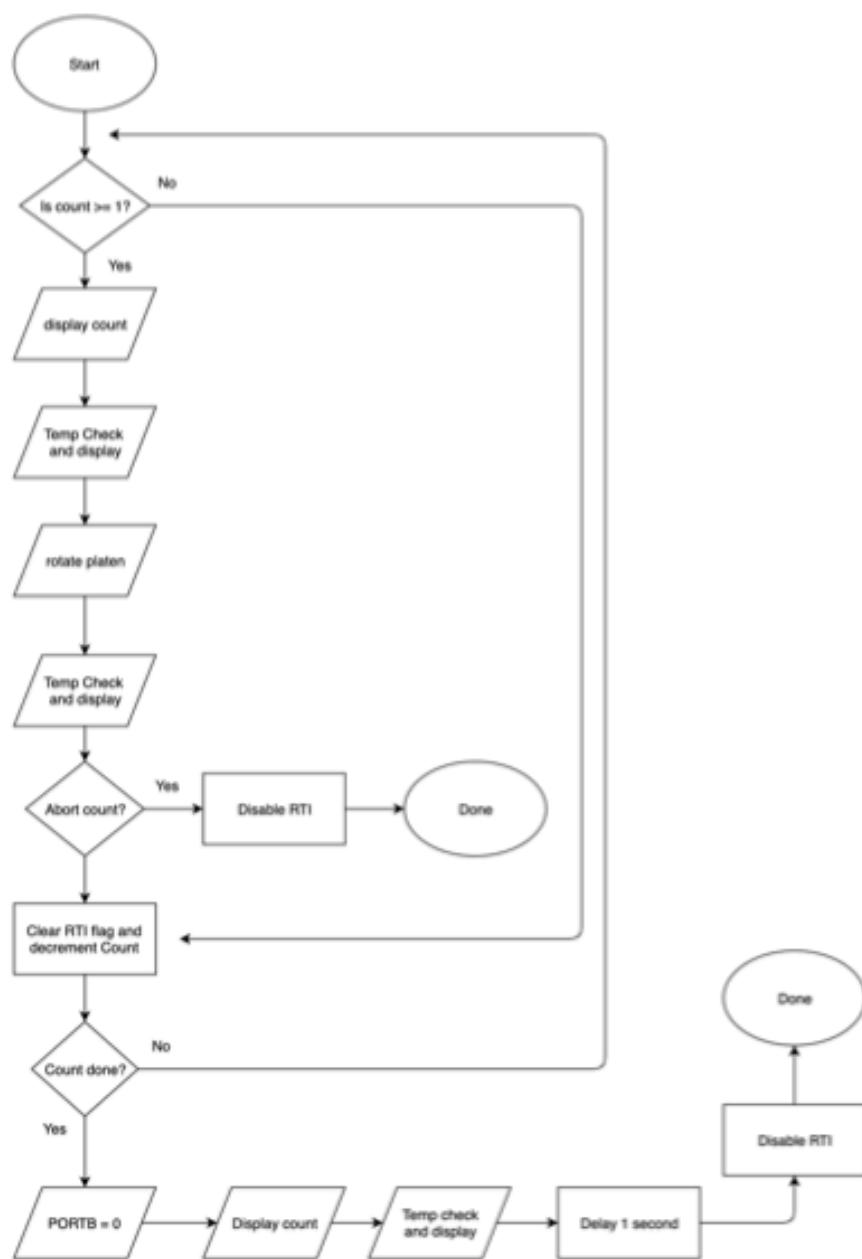
Logic Flows

main(void)

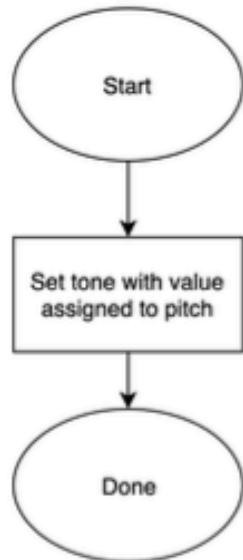


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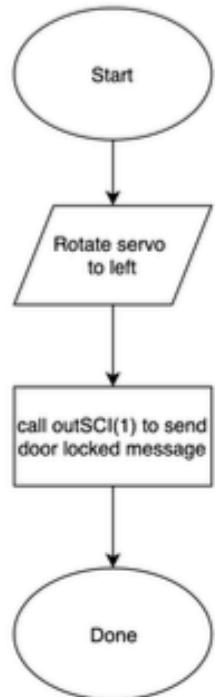
Counter RTI



Buzzer RTI

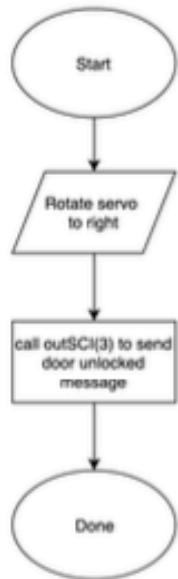


latchDoor()

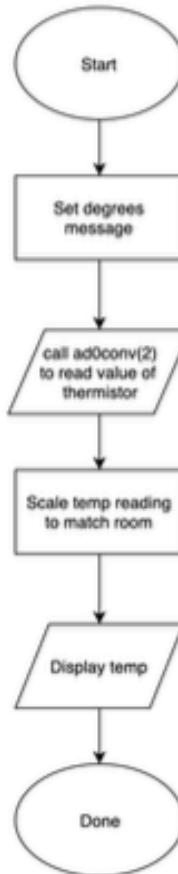


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unlatchDoor()

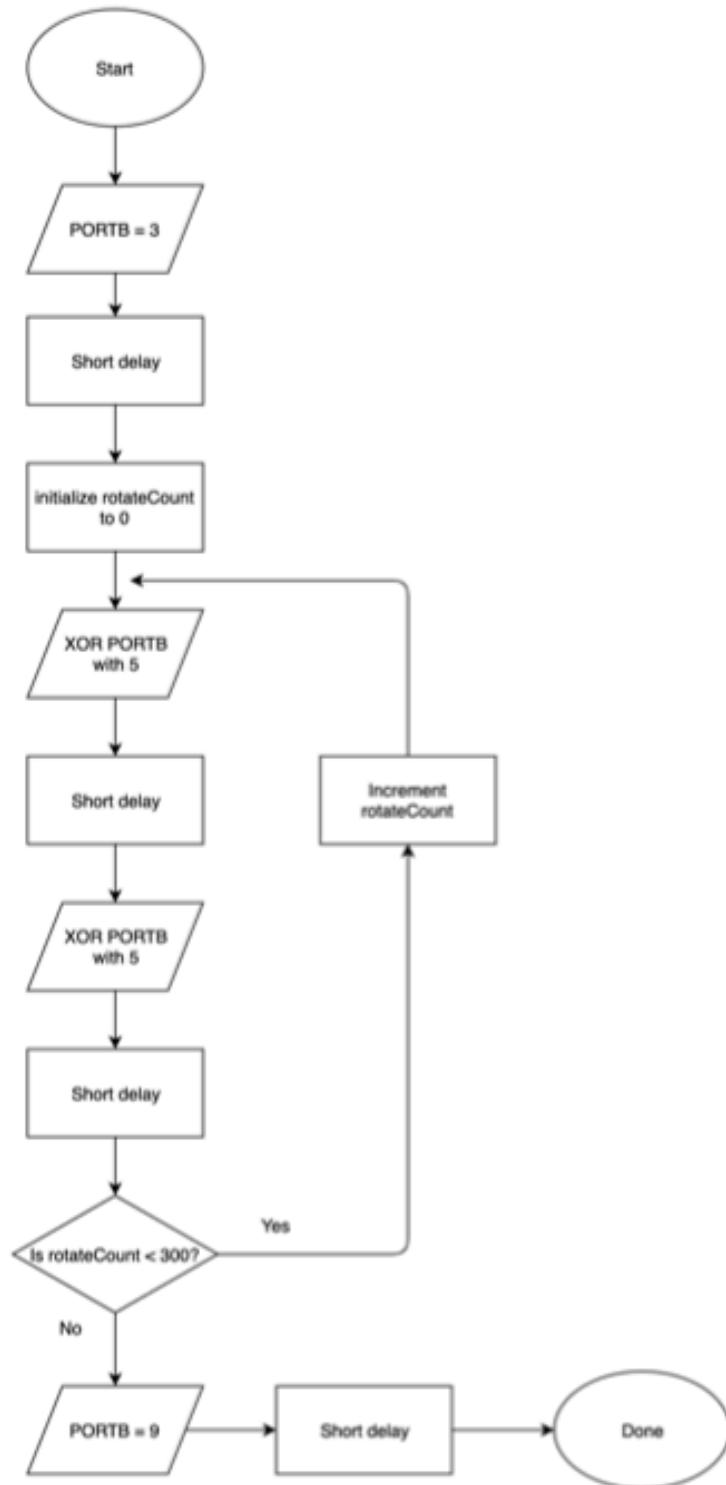


tempCheck()

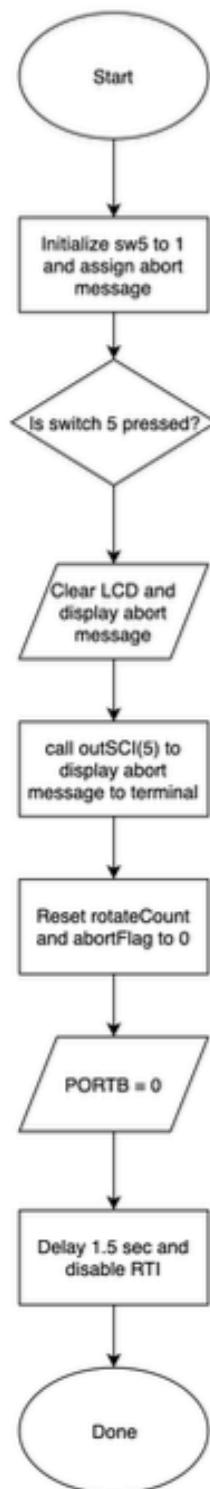


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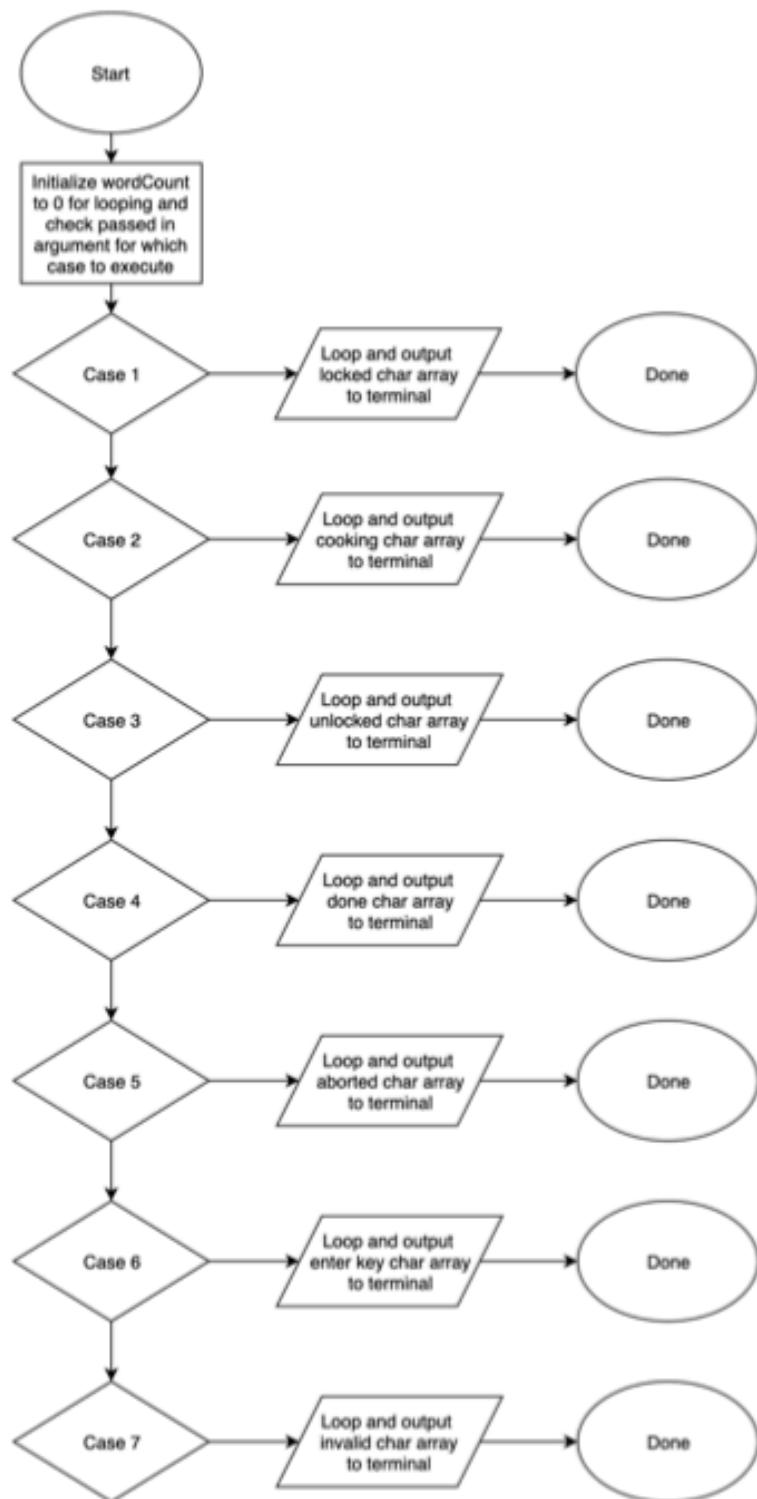
rotatePlaten()



abortCount()

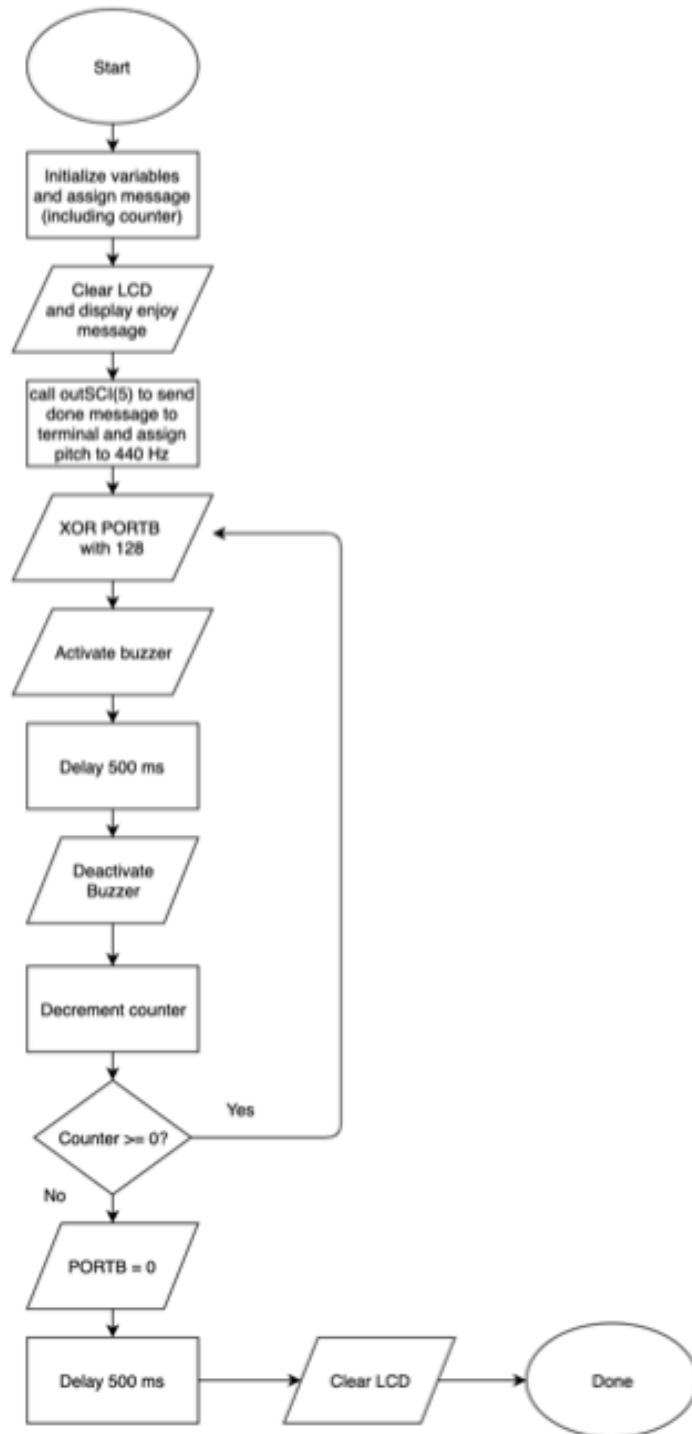


outSCI(int select)



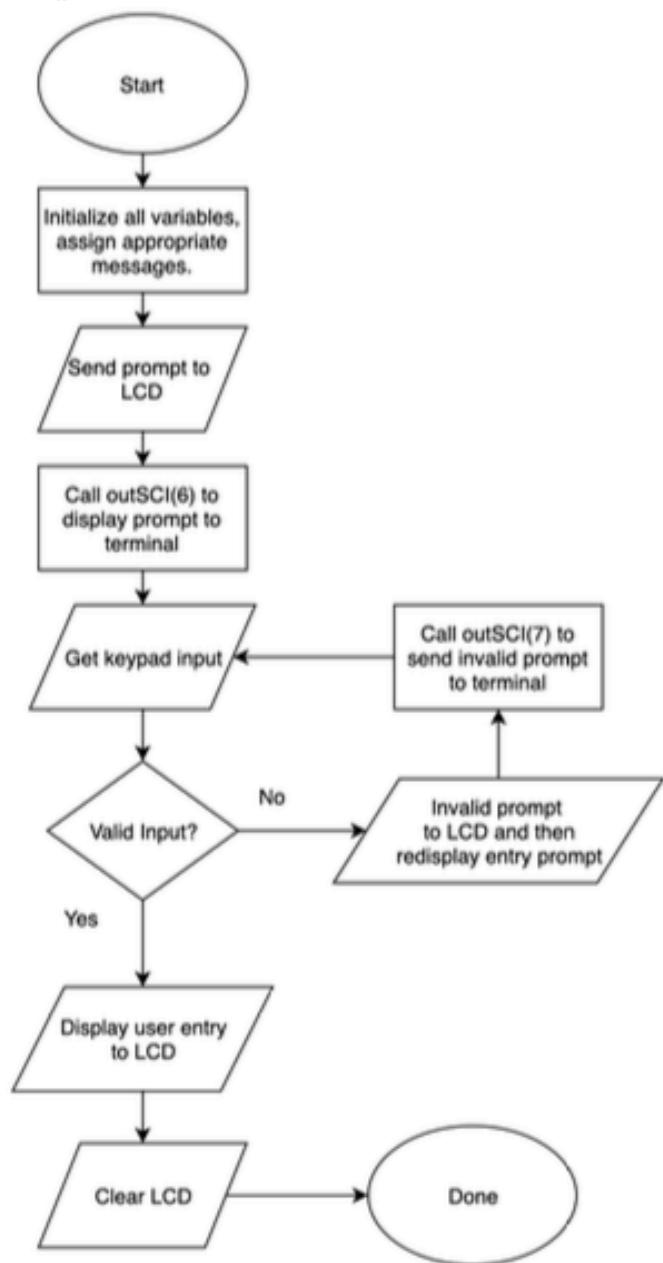
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endDisplay()



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userIn()



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Code

(attached on back)