HW2: Reaction Time Game.
Note

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1 Design

This is a Reaction Test game made with Genuino Uno. It uses an LCD display, two buttons, LEDs and piezo. Main button is for playing the game and the other one is for showing the scoreboard. Red LED is on all of the time except for when the player needs to press the buton to test their reaction. Then green LED turns on. After each play, the player's result is displayed. If the result makes it to the top scores (default 10, but can be changed), LCD displays a message and piezo buzzer makes a sound. The best results are stored in EEPROM. This project uses 3 interrupts (ISR): two external (for each button) and one timer interrupt.

2 Timing budget

In this project, Timer1 (16-byte) is used to generate a 1 ms interrupt. The timer is used both for reaction time calculation and for managing non-blocking displays.

3 Test/Accuracy results

In general, I have tested my project in every way I could possibly think of - I tried to keep pressing the buttons very rapidly, or keep pressing it for longer time, etc. When it comes to accuracy, I have not done any real tests to measure the calculated reaction time precision and correctness, this is definitely something for future improvements. Other than that, the project behaves as expected.

4 Issues

The hardest part of this project was dealing with and managing interrupts. As for external interrupts(buttons), the logic was not very complicated but still had to fix the debounce issue. The most challenging was the timer interrupt. I had to do a lot of research to understand how it works and then make it work. To be honest, I am still not quite sure that I understand it completely but definitely more than I did before doing this project. Another part that was a bit confusing was working with EEPROM, but after some research, I seem to have figured the main ideas out.