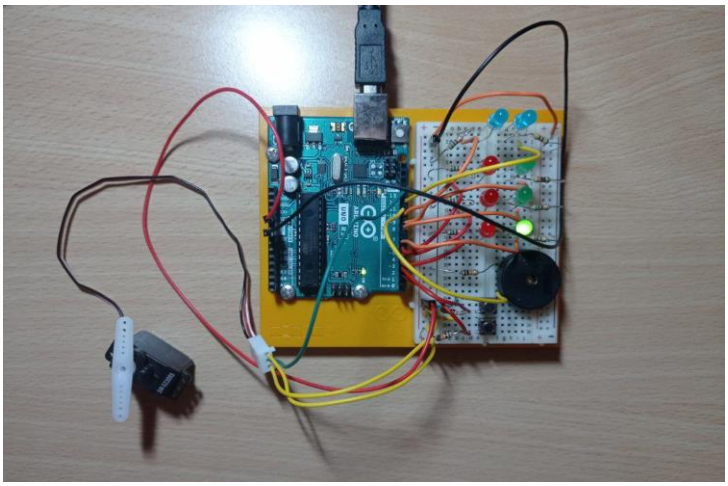
Report on CM10194 Computer Systems Architecture 1 - Coursework 1

"Whac-A-Mole" project



Introduction: Game written for Arduino Uno the main objective of which is to press the button when LED is on and collect points. Player who scores 10 first wins.

My implementation: Person1 operates with red lights and must press the lower button, Person2 operates with green lights and must press the button above. If the key was pressed correctly by either of the players, piezo makes a short sound and a blue LED turns on, indicating that they scored 1 point. If both players get 10 points, then the green and red LED rows will flash and piezo will play "Game of Thrones" opening. If only one person wins, then one green/red row will flash, and a simple melody will play, in both cases servo will perform 180 degrees rotation and counters will be set to zero.

Piezo melodies in my code: "pitches.h" library for notes in piezo's melody https://www.arduino.cc/en/Tutorial/BuiltInExamples/toneMelody . "Game of Thrones" opening was written by Robson Couto and can be found on https://github.com/robsoncouto/arduino-songs/tree/master/gameofthrones.

attachInterrupt approach: interrupt function best solution to the problem. Whenever in loop a player presses the button, this function will be called, scoring +1 if pressed in time. Another approach would be to use a tight loop with a lot of conditions to check whether the button and the LED match, however inefficient. On the other hand, the problem I encountered with this solution is that I cannot implement a three-player game, because I do not have enough pins for the interrupt function.

Code: I put all the repeated text into functions. For example after the condition whether one player won is satisfied, function *void one_winner(int ledPin[])* is called, it takes set of pins (for green or red LEDs) as a parameter. delay(rand() % 500 + 100) was good to use to increase unpredictability of LED flashes and make the gameplay more complex.

Ideas on improvement: It would be great to add a Liquid Crystal Display (LCD) for the project, which would display score of the players, but then I would need a bigger breadboard. Also, a good idea would be to add a user interface over the board.

Scheme