CS/EE 120B Custom Laboratory Project Report
Stacker Arcade Game

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12/07/2022

Introduction

The stacker game is a classic arcade game. The game initializes and displays a bar moving at the bottom of a 8x8 LED matrix. The object of the game is to try and stack bars all the way to the top. As you stack more and more bars, the size of the sequential bars becomes smaller and smaller. In order to stack a bar onto the matrix, simply press the button. For each successful grid completion, a point is awarded to the player. If your current score surpasses that of the high score, the high score will update. The high score and current score is displayed on the 4 digit, 7 segment display.

Complexities

My complexities are the External EEPROM that is used to store the high score when the system is turned off, the 4 digit, 7 segment display that is used to display the high score and the current score, and an 8x8 LED matrix that is connected to a MAX7219 multiplexer, that is used to display the game. All 3 of these complexities were implemented successfully. However, the LED matrix connected to the MAX7219 was not the first matrix that I tried to use for the project. Originally I was going to control the matrix using shift registers, but I fried the matrix due to an error on my end, as I did not put the right resistors.

User Guide

A user would interact with this system simply by pressing the button that controls the stacking aspect of the game. The game indicates when you lost by displaying an L on the matrix and will indicate when you have won by displaying a happy face on the matrix. The game will update the scores on its own and will automatically restart itself.

Hardware Components

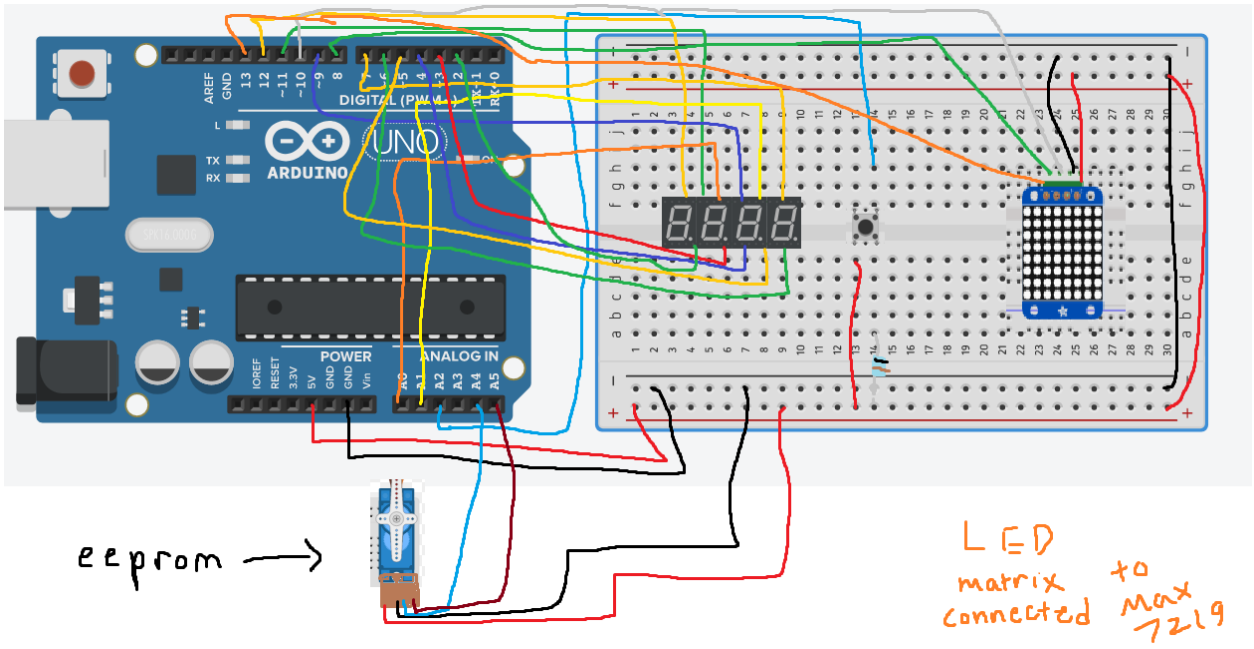
- Elegoo Uno R3 Microcontroller
- Breadboard
- Wires
- 1 button
- 1 220 Ohm Resistor
- 1 External EEPROM
- 1 4 Digit 7 Segment Display
- 8x8 LED Matrix

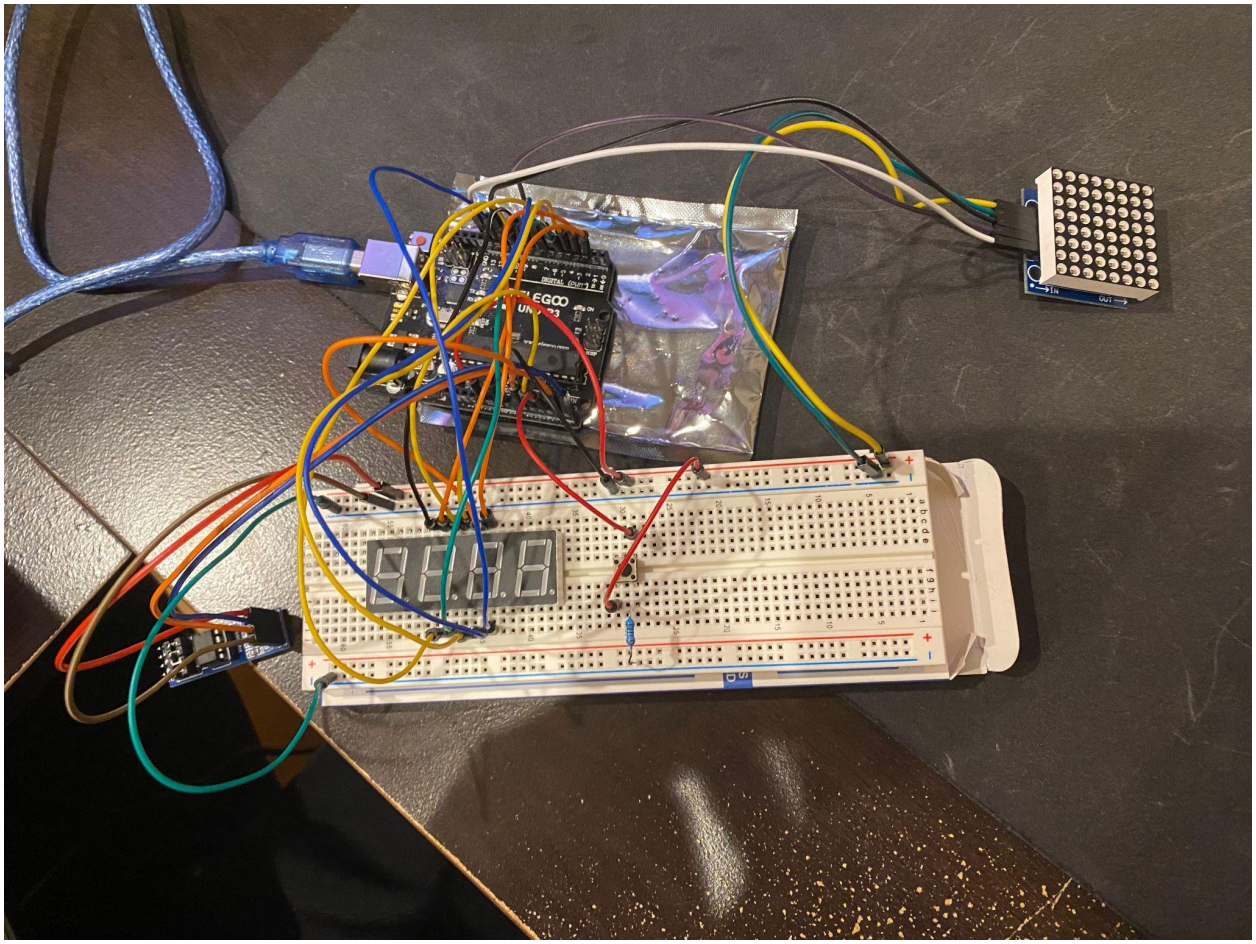
- MAX7129

Software Libraries Used

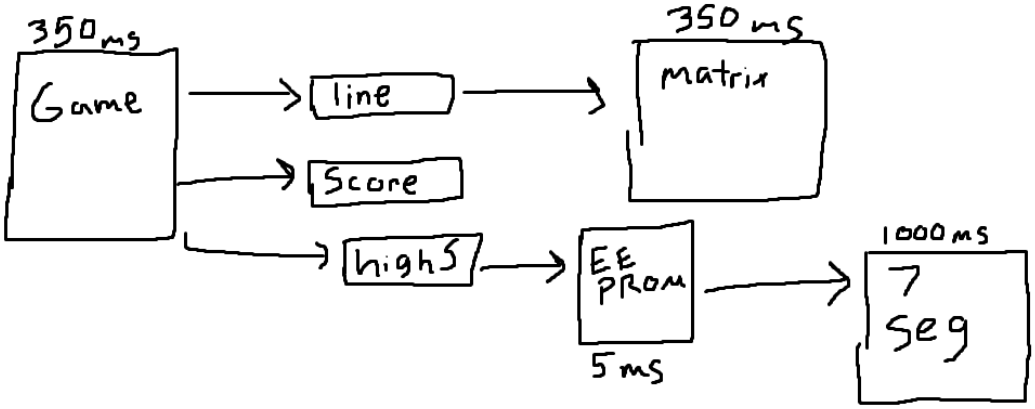
- Wire.h - Used to write and read from the External EEPROM
- SPI.h - Used to transmit and write data to the matrix

Wiring Diagram





Task Diagram



Shared Vars:
Byte line[8];
Int score;
Int highScore;

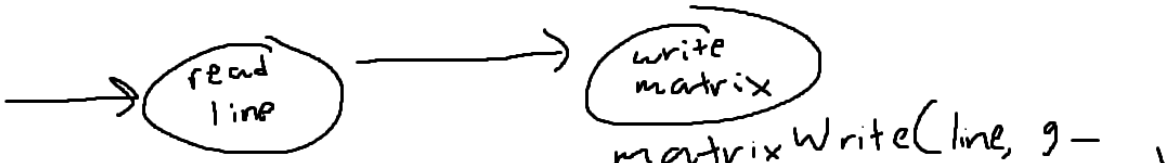
Period = 350 ms

Task game

```
int level = 5;
int score = 0;
int currentRow = 1;
int sim = 3;
byte line [8] = {B11100000, B01110000, B00111000,
                 B00011100,B00001110, B00000111};
byte clearRow = B00000000;
int game_counter = 0;
int pos = 0;
int readVal;
int endCounter = 0;
int scoreCounter= 0;
```

Task matrix

350 ms



matrixWrite(line, g_counter)

Task EEPROM

period = 350 ms

readVal = address 1
if score > hScore
  write eeprom(score)

Task 7 Seg

1000 ms

int cnt