CMPE 121 Lab Project
Othello (Reversi) for the PSoC-5 Microcontroller

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1 Introduction

The purpose of this lab project was to implement a fully functioning game called Othello (Reversi) on the PSoC-5 Microcontroller which built on everything we have learned up to this point in the class. The goals at the end of the final project were that we would have learned to create a functioning hardware and software component. I will go over the whole process and go over core functionality of the project in the order that I implemented it. However, I will start by explaining the process of setting up the hardware first, but it should be noted that each hardware component was built only when it came time to implement it in software. There are many features that I wanted to implement as well, but do to time constraints I was unable to start them. I will ultimately finish the features I didn't implement over the winter break. I will go over the details of what those features are in the Conclusion section.

2 Hardware Design

There were three components that were required to be connected to the microcontroller for this project. They were the RGB LED Matrix, Wifi Controller, and the SD Card Reader. As mentioned before, each part was only implemented when it came to implement it's respective software component. However, It should be noted that first, the breadboard was used to prototype the component and test it with the code. Once that was verified, it was verified that it was working correctly, the components were soldered onto the Perf Board provided to us in the Lab Kits. All initial schematics were drawn by hand.

This class was the first time I was introduced to soldering, so I was bound to make a mistake. In the process of soldering I made bad connections and burnt myself once. This was alright however since I was able to verify the my circuit with continuity checks. I had to get a replacement SD Card Reader however. In the process of soldering, I initially placed the pins the wrong way. Removing the pins was literally impossible, but eventually I was able to remove the pins. However there was still some leftover solder covering the holes where the pins should go. Hence I needed to use the soldering iron and the solder remover to remove that remaining solder. Sadly, in the process of removing the solder, I managed to burn away the metal plate. Luckily BELS was kind enough to allow me to get it replaced for free (it is $10 normally).

Seen below are pictures of the schematic and actual perf board after soldering was finished.

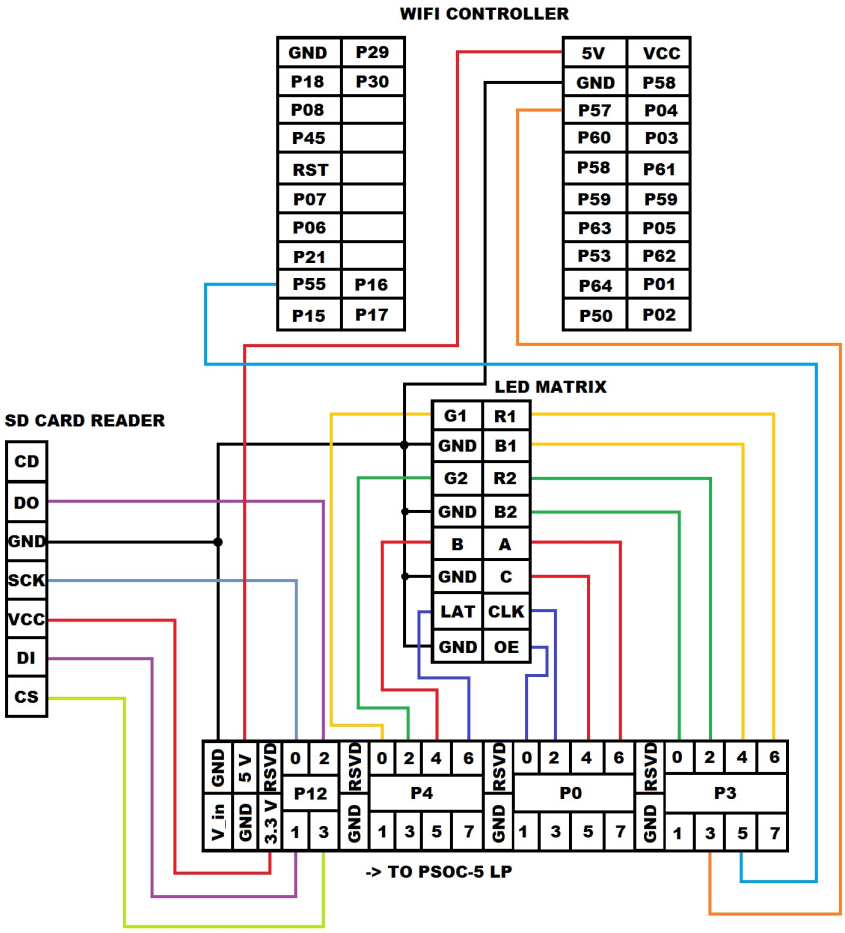

Figure 1: A rough schematic of the connections found on the Perf Board

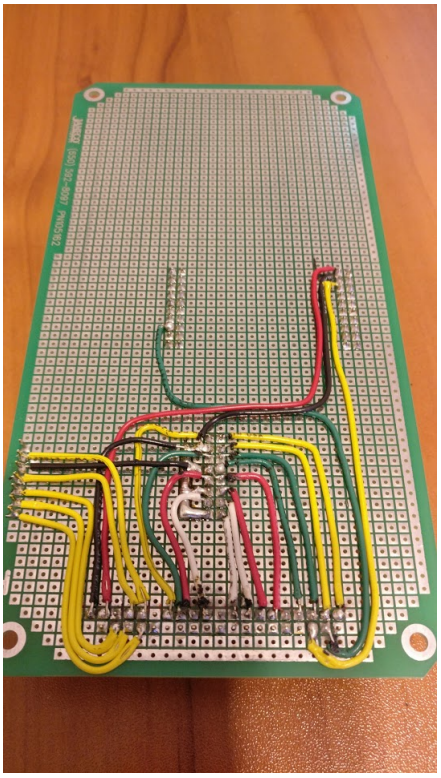

Figure 2: A look at the actual Perf Board

3 Software Design

3.1 Workflow and Overview

For this lab, I initially made a flowchart of how I wanted to proceed. Originally, I made the flowchart on paper, but for the sake of convenience, I have made it digital. You can see it below. For each section I have made a list of high level goals that I wished to implement. Unfortunately, I was not able to get to all of them.

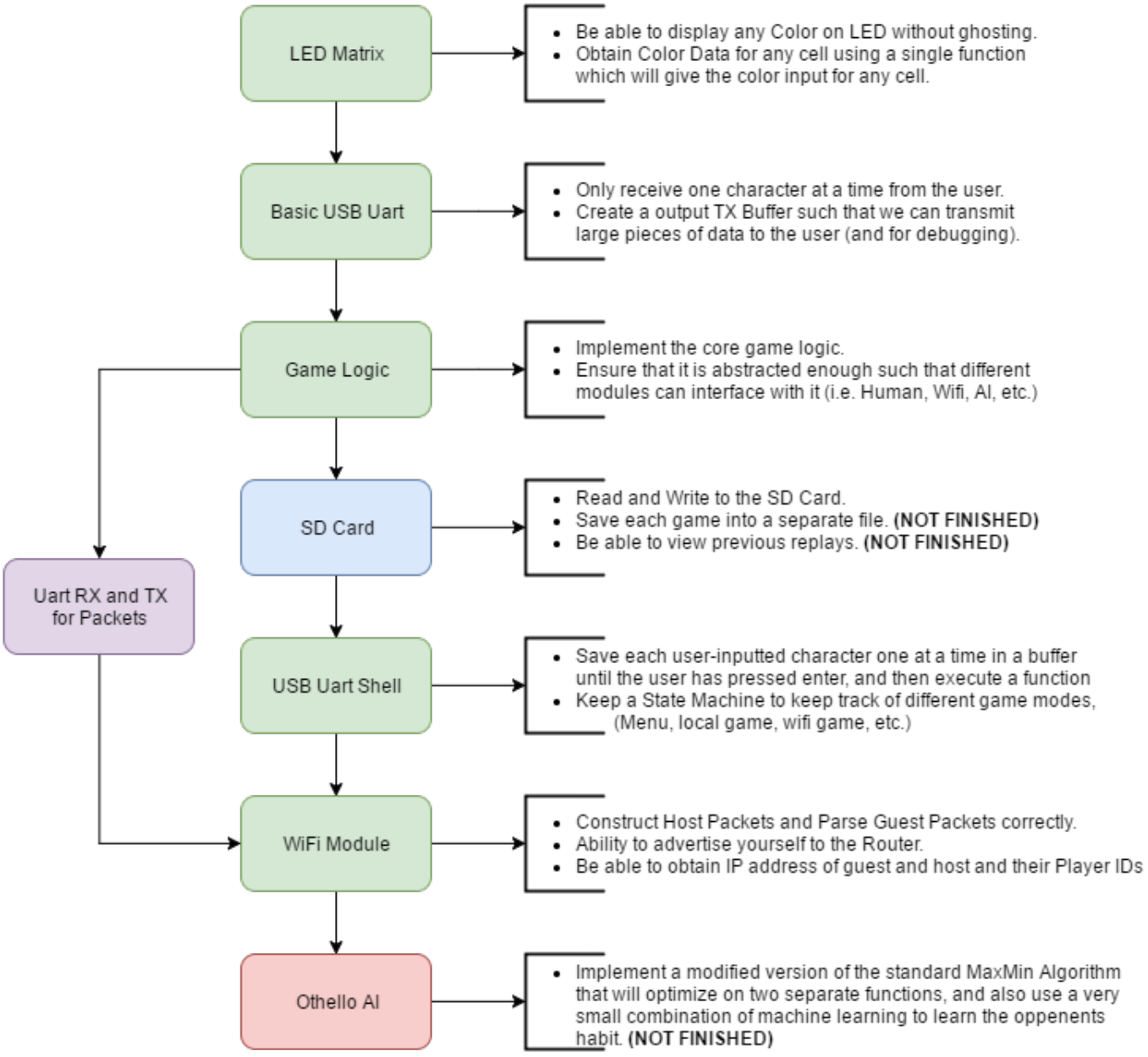

Figure 3: A look at the actual Perf Board