Final Project Report: Down the Rabbit Hole

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Project Idea

The original idea for this project is a maze game. The player would go through obstacles in order to reach the stairs to proceed to the next level. This would all be played on a 16x32 led matrix. There would be moving obstacles and if the player touches anything he/she would have to start over from the beginning of each level.

The player will be controlled by an SNES controller. The player would move with the d-pad, start the game by pressing start, and could reset the game at any time by pressing select.

Actual Project

The end result is very different from what I had originally planned. Instead of having the entire screen as the map, the map is down-sized. Instead of implementing moving objects, it became a simple maze game. The player still moves to the stairs. To proceed the player presses B while on the stairs to progress. At this point, there is only one level. The PWM speaker will make a buzzer noise when the player presses a direction on the d-pad.

Controls

D-pad: Movement Up/Down/Left/Right
Start: Starts game
Select: Resets game
B: Enters stairs

Tech

Software:

- Atmel Studio 7
- Arduino
- Adafruit GFX library

Hardware:

- ATmega1284
- ArduinoUno w/ATmega328p - pu
- 16x32 RGB led matrix
- SNES controller
- PWM speaker
- led lights

Video Link

https://bit.ly/2HAEAXG

Files

Header Files
-timer.h
-usart.h

Main Files
-main.c

This file is for ATmega1284 microcontroller. It controls the snes controller input and output. It also communicates with the ArduinoUno by sending specific values to trigger different outputs on the led matrix. It also accepts specific values to move through the main state machine.

-main_project.ino

This file is for the ArduinoUno. It controls the output of the RGB led matrix. It receives specific values from the ATmega1284 to output title screens and maps of the game as well as objects in the game.

Learning Experience

This was the first time for me to use an ArduinoUno, USART communications, and programming a led matrix. The end result from this time was not completely satisfactory for me. In the future, I do hope to work on this project to a more satisfactory product.