CS/EE 120B Custom Laboratory Project Report

Pac-Man Clone

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Introduction:

The goal of Pac-Man is to collect all the pellets on screen while avoiding the ghost. When the game is on, a startup screen briefly appears featuring the title, high score, and player score. The game proceeds to the level and the player is given control of Pac-Man using the joystick. When the player wins or loses, they are taken back to the startup screen where the score will either increment or reset to 0. The game can be reset completely at any time by pressing the joystick button.

Complexities:

1. Ghost behavior: the ghost has its own state that uses Pac-Man's X and Y position to determine its movement. It also is aware of not overwriting the pellet sprites like Pac-Man and only moves when the game is being played.
2. EEPROM: the game is able to save and display high score data on the LCD using an EEPROM. In the win or lose state, the reset game function is called where the current and high scores are compared. This is accomplished by 2 functions that read and write data from the EEPROM.
3. TFT screen: the TFT screen was not successfully implemented. I was only able to wire it and run test code using libraries.

User Guide: the user interacts with Pac-Man by viewing the text and game sprites on the LCD screen and moving the joystick to control the character in 4 directions. The visual outputs are the Pac-Man, ghost, and pellet sprites, and text. The startup screen provides the user with score information and they can restart the game by pressing the joystick button. There is no sound mechanism in the game.

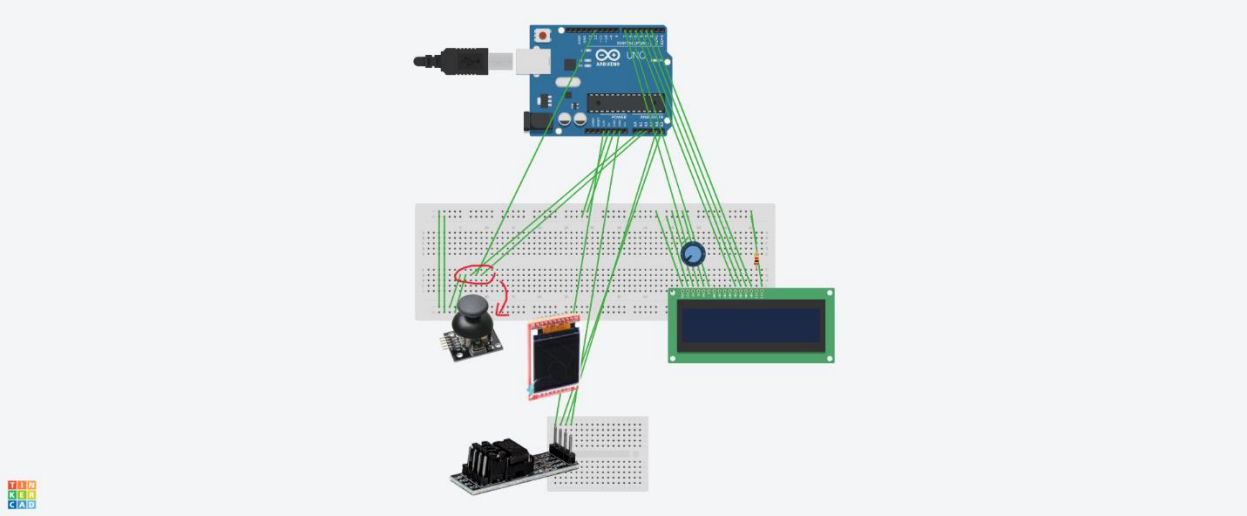
Hardware Components Used:

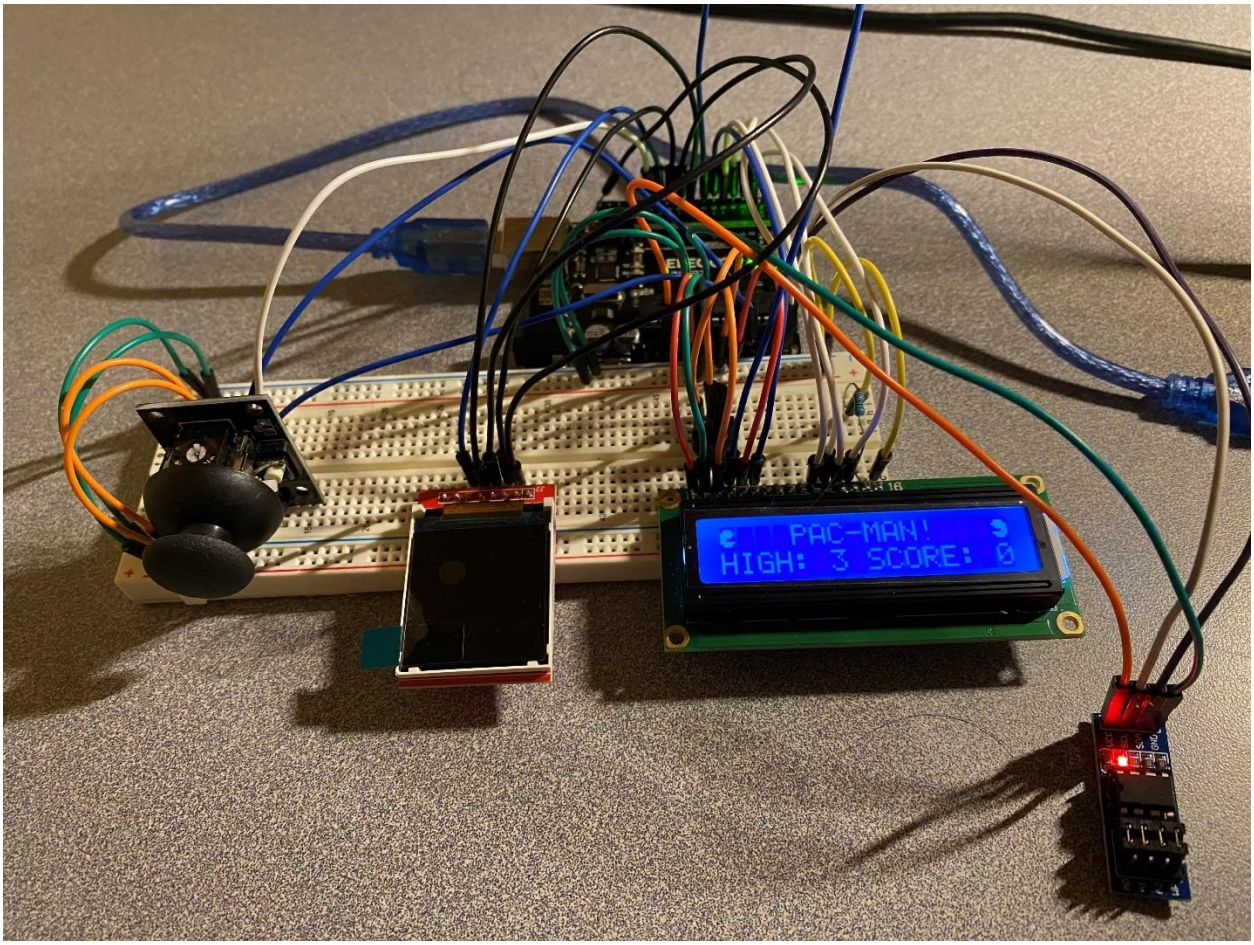
1. LCD 1602 Module
2. Joystick
3. EEPROM
4. HiLetgo 1.44" Colorful SPI TFT LCD

Software Libraries Used:

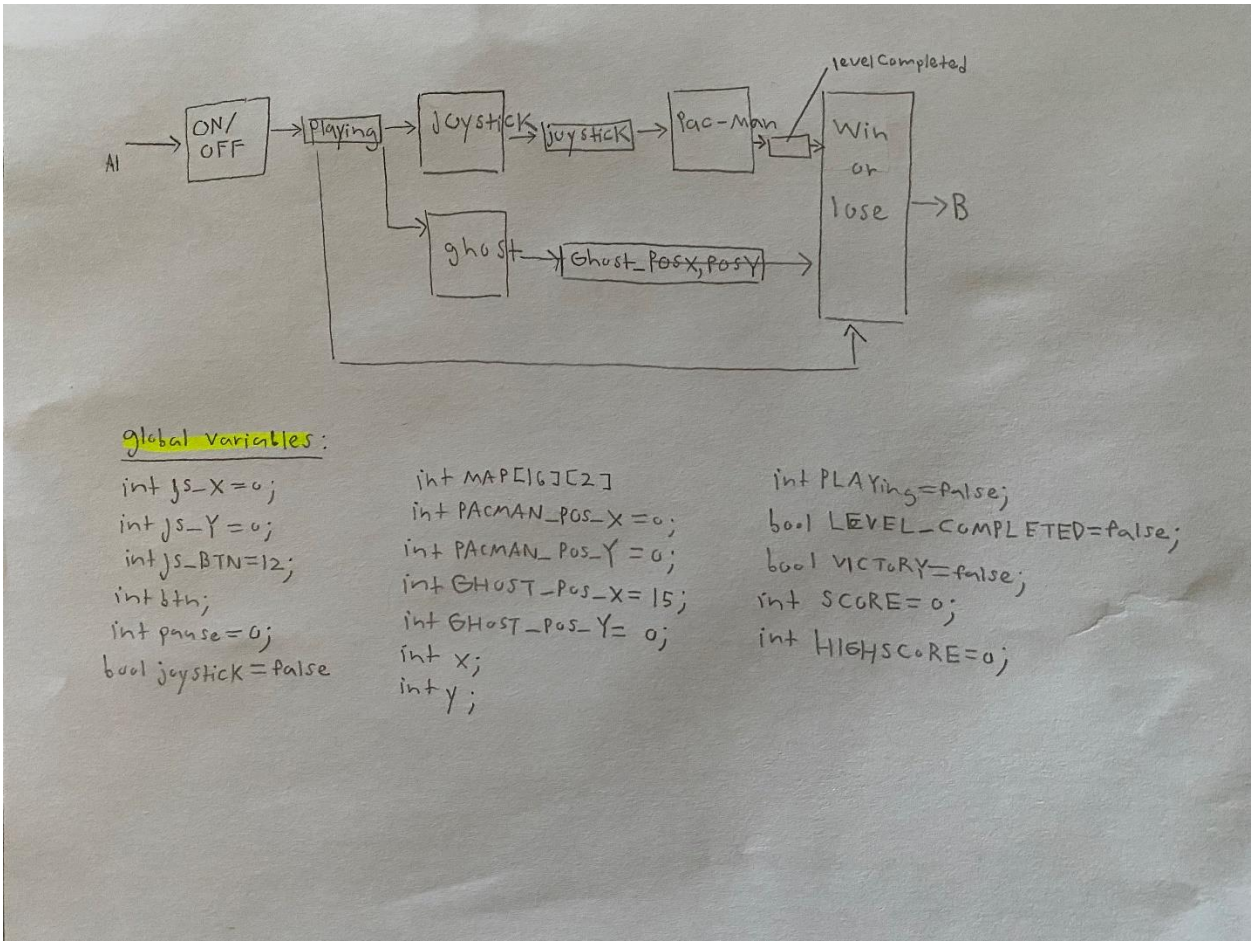
1. LiquidCrystal: used to display graphics and text on the 16x2 LCD (primarily game sprites).
2. Wire: used for the functions to read and write from the EEPROM. This allowed me to use commands to write and begin and end transmission to the child device.

Wiring Diagram:





Task Diagram:



SynchSM Diagrams: