Report

Full Demo link: https://www.youtube.com/watch?v=Zq1nB3RPcSs

- Complexity 1: https://www.youtube.com/watch?v=pkXWmvYUpdo
- Complexity 2: https://www.youtube.com/watch?v=WjbVnxWe5ZY
- Complexity 3: https://www.youtube.com/watch?v=4YawkqXI9s8

Project Description:

The project is a spin-off of the popular game "Snake" onto the ATMEGA1284. An LED matrix with shift registers is used to display the state of the game, and joysticks are used to play the game.

User Guide:

Rules:

Move the snake into the block of food to increase the length of the snake as well as your score. Don't run into the edges of the stage, or else you will lose!

Controls:

Left Joystick
- Move - Change the direction that the snake moves
- Click - Pause game

Right Joystick
- Move - Change the position of the food pixel

Special Considerations:

N/A

Source File Description:

- main.c - contains the task schedulers for the concurrent synchSMs that manage the game

- - - LED matrix code obtained from
      https://docs.google.com/document/d/1HylaAjAIF7Ok5y7U3S9mu4u629ZwiNetajc_02Pv-30/edit#heading=h.khucvj2ndl9w
    - multiple ADC input logic obtained from
      https://www.electronicwings.com/avr-atmega/atmega1632-adc
  - snake.h (header file) - contains logic for the snake's motion, position, and status

Component Visualization
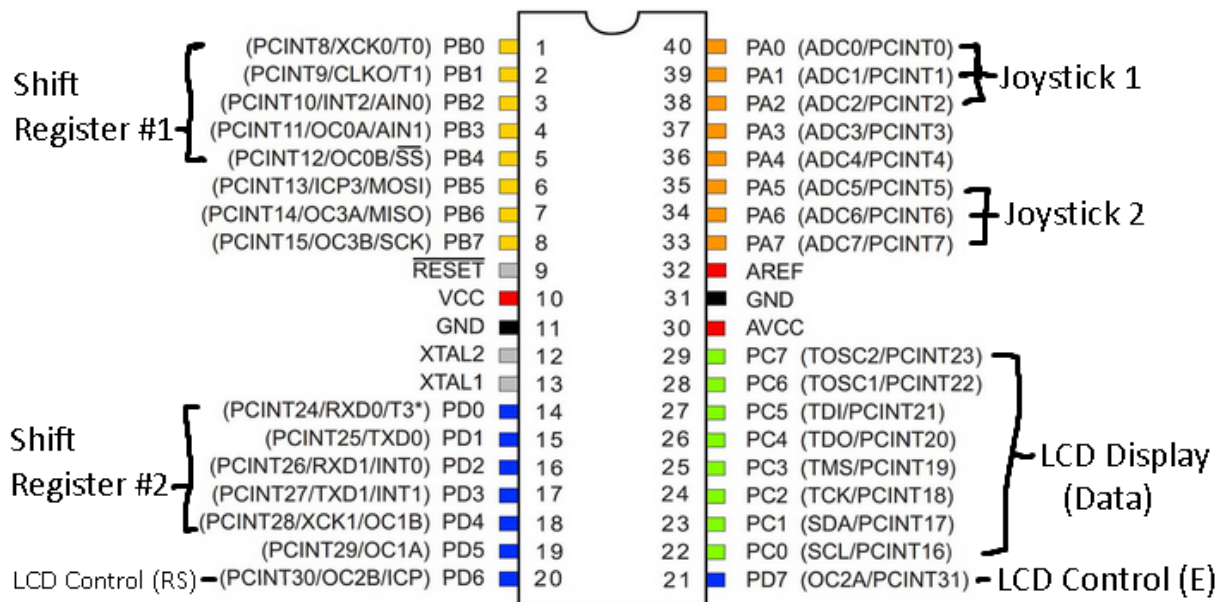
Technologies Learned

- Displaying to LED matrix
  - Learned how to use row and column pins to set LED's, rather than a per-LED basis like a 2d array
- Displaying to LED matrix using shift registers
  - Learned to send each bit of the row/column data to the shift register to be shifted into the storage register
  - Storage register can then display all of its contents at the same time
- Multiple ADC inputs
  - Learned how to receive multiple ADC inputs on the ATMEGA1284 using ADMUX to change the input pin on PORTA