CONNECT FOUR

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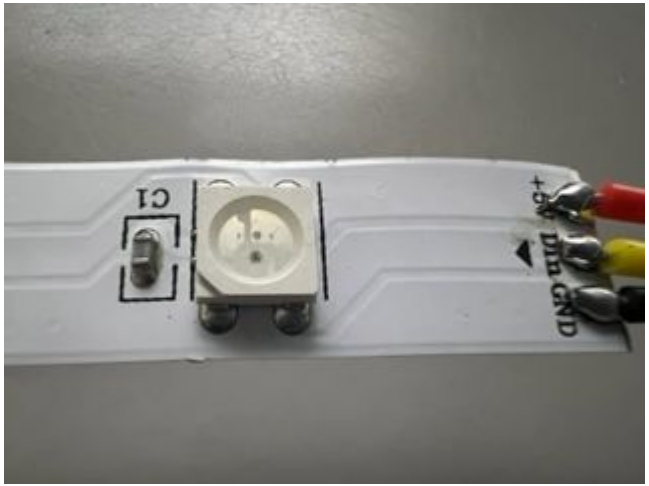
Hardware, build process, and assembly

- 3D printed Connect Four design with custom stand.
- Game logic: Dragon-12 through C-programming language and CodeWarrior. [1],[2]
- Individually addressable LED strips.[3]
- LCD and 7-segment displays used for game play updates and player scores [4],[5],[6]
- Arduino used for controlling the 6x7 LED matrix. [7]
- Joystick-controlled game logic for engagement.[8]

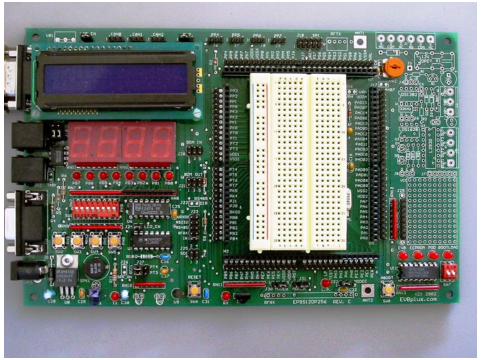
LCD

7-segment display

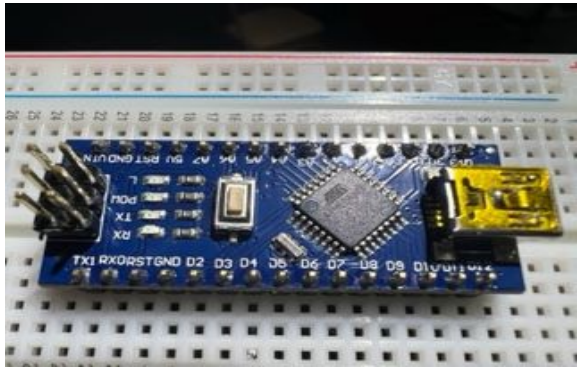


WS2812B Individually addressable RGB strip

Dragon 12 board & Arduino Nano

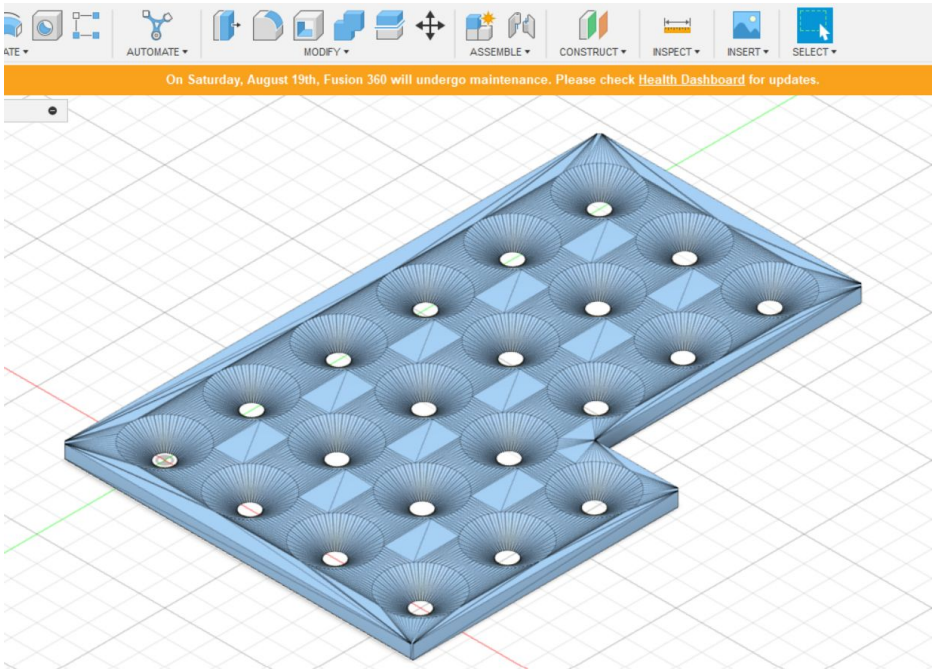


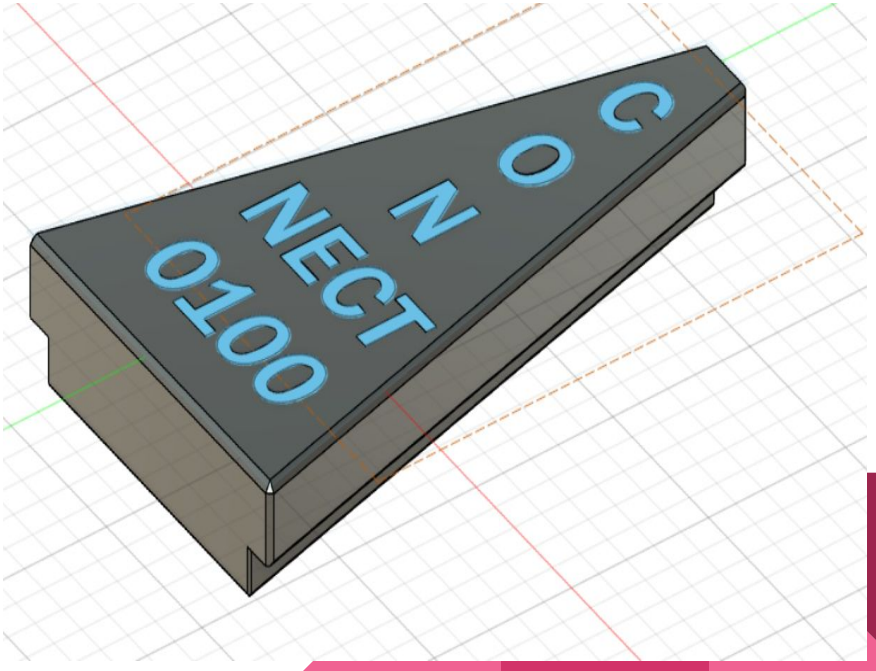
- Serial UART communication between Dragon 12 and Arduino[7]
- Arduino drives leds using Adafruit Neopixel library
- Dragon 12 controls logic and sends neopixel commands and required data one byte at a time[1]
  a. Neopixel_set: position, red, green, blue
  b. Neopixel_reset: position
  c. neopixel_show



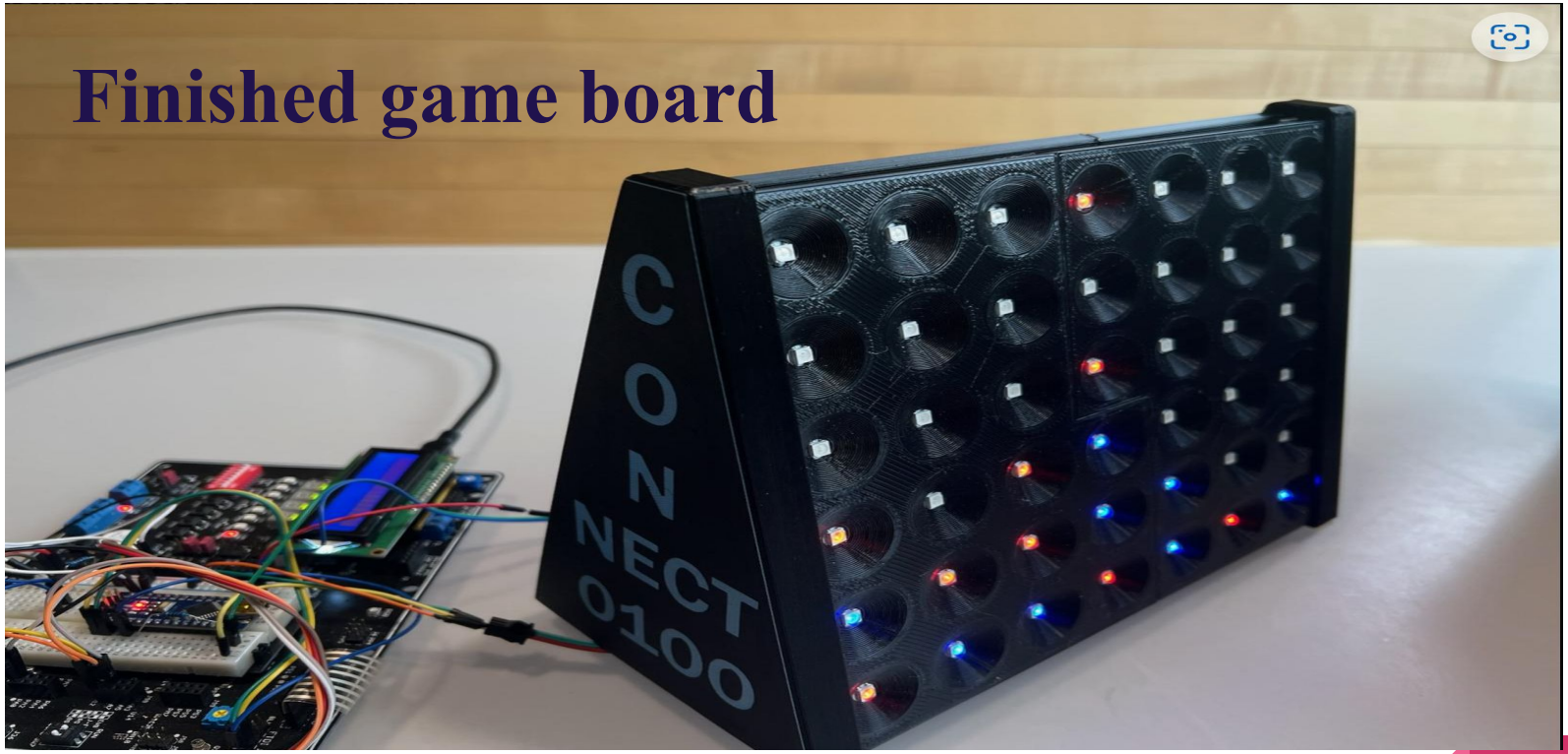
Components

The front/rear and side panels were created using modeling software and a 3D printer.





Finished game board



Using joystick control

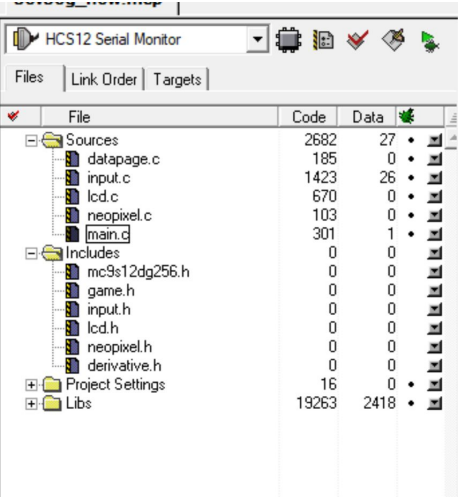
- Multiplayer with two joysticks connected to four ADC channels.
  a. Reads in 10-bit unsigned values [8],[9]
- Joysticks for LED color control and gameplay.
- Players select colors individually via joysticks for interactivity.
  a. Left/Right: switch color value
  b. Up/Down: increment color value by 10
  c. Button: finalize selection

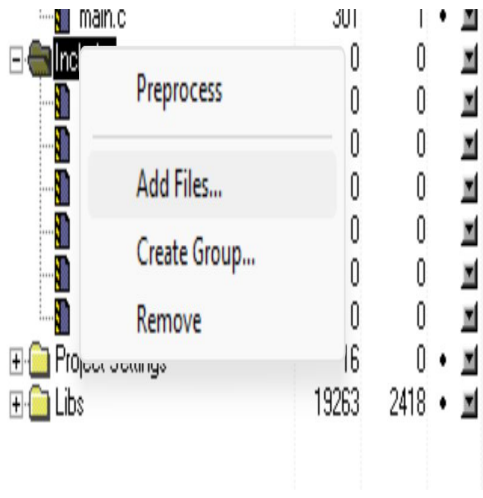
USING THE LCD

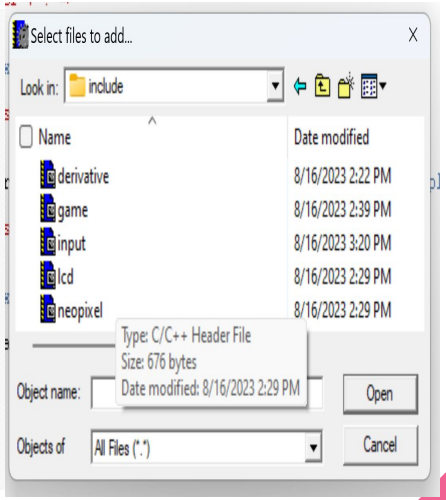
- Used the built-in LCD control functions from: hackaday.io **[4]**
- Various messages displayed depending on the game status
- Customized player color can be displayed at startup

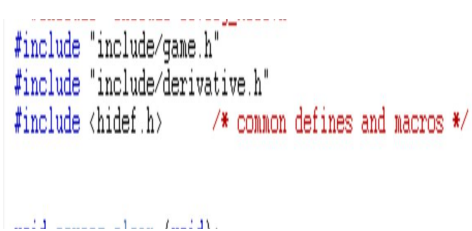
Software and integration of sources

- *Here are the steps we took to add the library to CodeWarrior and how it can be called in the main program,*

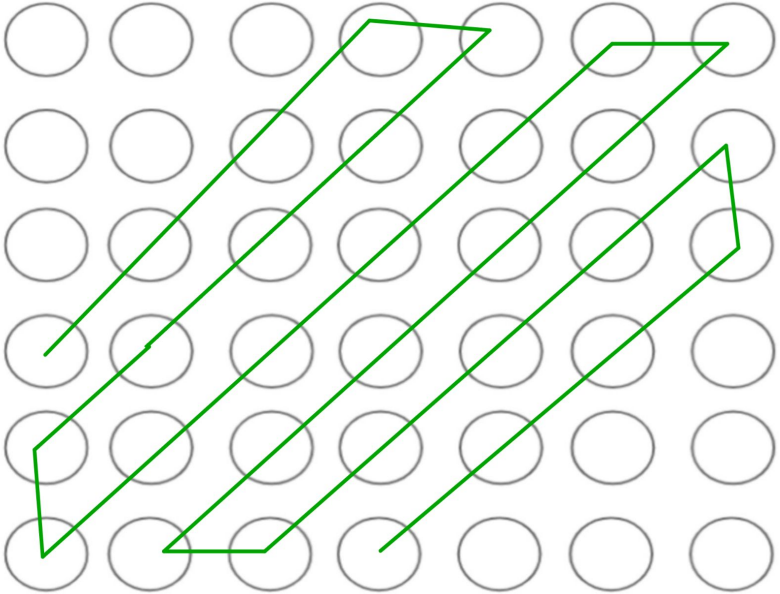




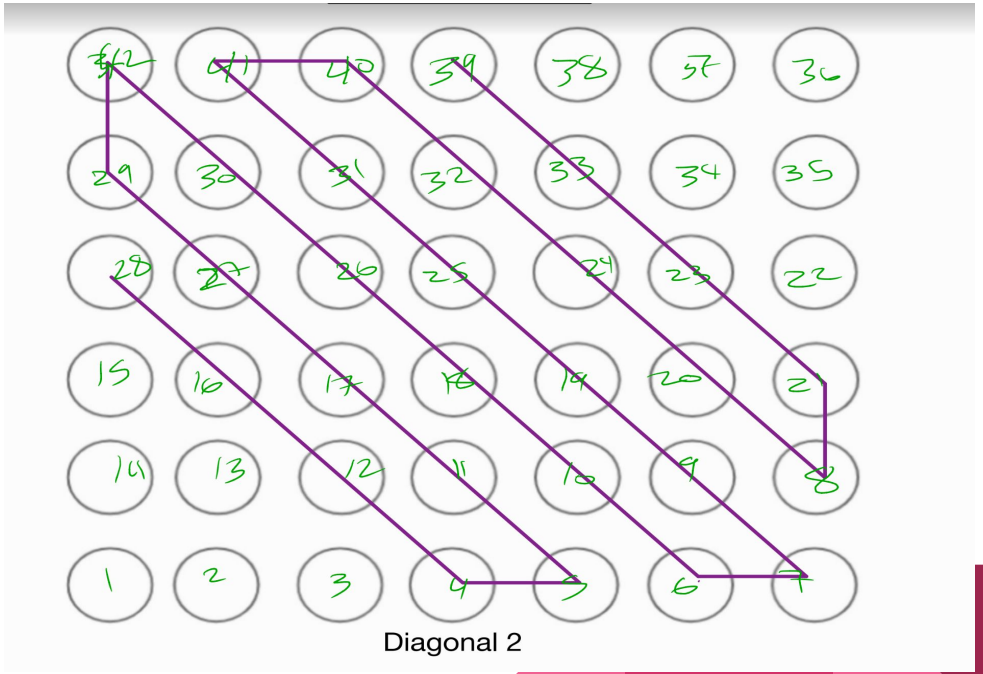




DIAGONAL

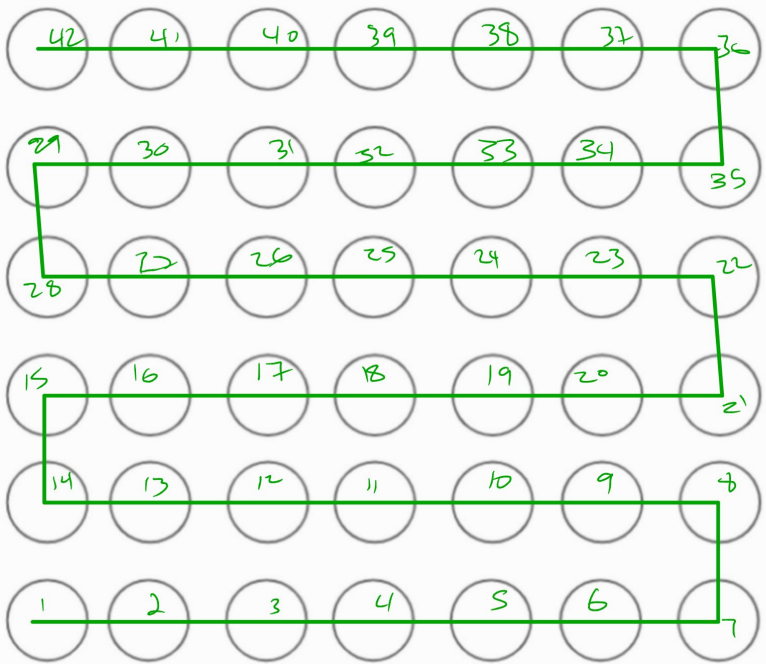


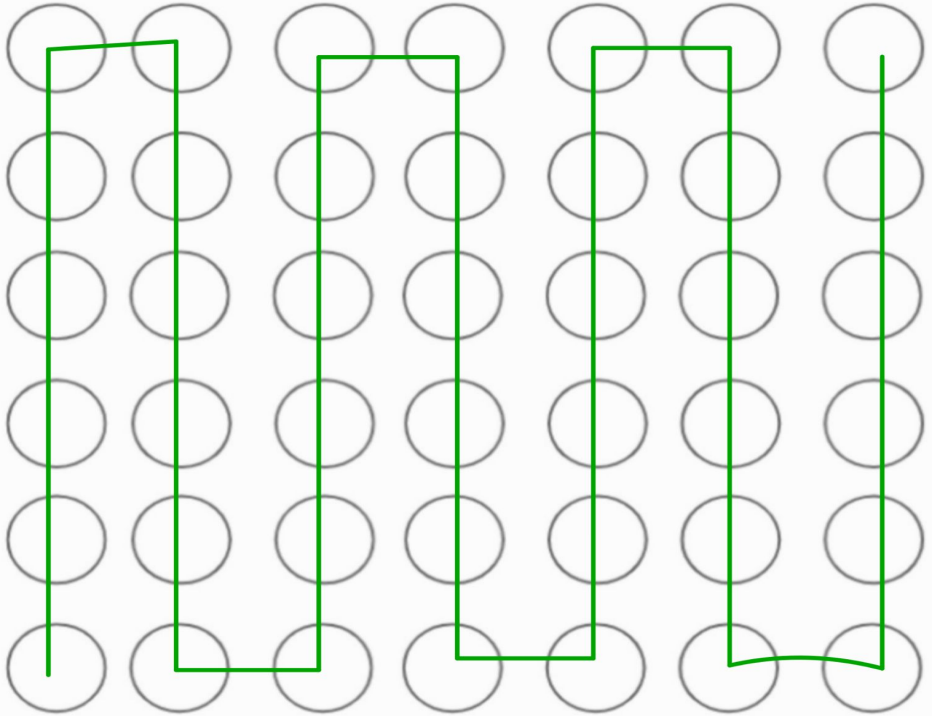
Diagonal



Diagonal 2

Horizontal and vertical





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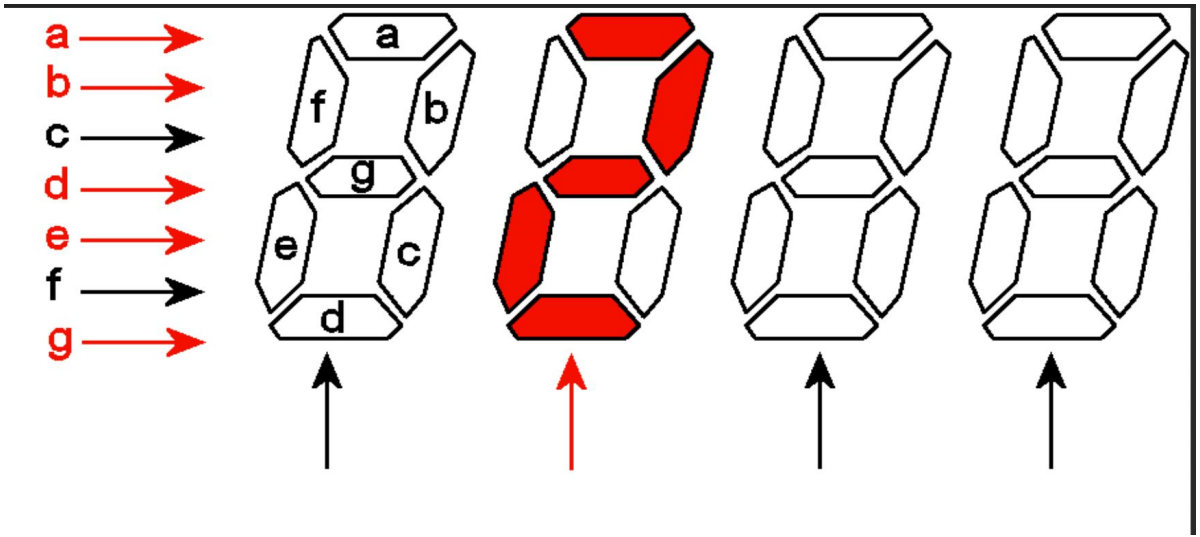
7 segments

- The connect-4 checks are performed, then the player score is updated and displayed on 7-seg display.
- Used 7-segment displays and provided example to create real-time game status update.**[6]**
- Displayed player scores and numbers using the 7-segment setup.



Demo Video

https://www.youtube.com/watch?v=HfYWu-1aC-o

Sources/ Works Cited:

[1] **Freescale. (03/2006). *CPU12 Manual*. Available:https://moodle.oakland.edu/pluginfile.php/8514788/course/section/2772092/CPU12RM.pdf**

[2] "WYTEC evaluation boards," EVBplus, http://www.evbplus.com/hcs12_9s12/mc9s12dg256.html (accessed Aug. 17, 2023).

[3] Feature - Adafruit Industries, https://cdn-shop.adafruit.com/datasheets/WS2812B.pdf (accessed Aug. 18, 2023).

[4] " LCD and keyboard interfacing, " hackaday.io, https://cdn.hackaday.io/files/10693457489312/Lab09_LCD&Keyboard.pdf (accessed Aug. 17, 2023).

[5] S. Alawneh, "," ECE-3720-31390.202330-Microprocessors, https://moodle.oakland.edu/course/view.php?id=279793 (accessed Aug. 17, 2023).

[6] S. Alawneh, "Displaying number on 7seg using C," ECE-3720-31390.202330-Microprocessors, https://moodle.oakland.edu/mod/resource/view.php?id=6350314 (accessed Aug. 17, 2023).

[7] "Arduino - Serial Monitor: Arduino tutorial," Arduino Getting Started, https://arduinogetstarted.com/tutorials/arduino-serial-monitor (accessed Aug. 17, 2023)

[8] "Arduino - joystick: Arduino tutorial," Arduino Getting Started, https://arduinogetstarted.com/tutorials/arduino-joystick (accessed Aug. 17, 2023).

[9] "Arduino - button - debounce: Arduino tutorial," Arduino Getting Started, https://arduinogetstarted.com/tutorials/arduino-button-debounce (accessed Aug. 17, 2023).

THANK YOU FOR
YOUR LİSTENİNG

DO YOU HAVE
ANY QUESTİONS?