

Memory Game
ECE 153B project proposal
Javier Jimenez / Benigno Ortega

Website: <https://sites.google.com/view/ece153b-javier-benigno/home>

Overview

We propose to build an interactive two-player memory game using the STM32L476G, Bluetooth module, and four different colored LEDs. The purpose of this game is to test the user's memory by developing an interface where player A creates an initial three colored pattern to toggle the corresponding colored LEDs one at a time. When the LED pattern is created by player A, the same pattern will be displayed on the LEDs and player B has to observe and input the correct pattern. If the pattern is inputted correctly player B has to add to the colored LED pattern and display it on the LEDs for player A to guess the pattern. The colored pattern will continue to grow until one of the players (A or B) guesses it wrong. The first person who inputs the wrong pattern loses, prompting all lights to flash. Throughout the game, there will be an LCD display showing which player's turn it is.

Peripherals

- 4 different color LEDs
- Bluetooth
- LCD Display
- If time permits; add sound for each light pattern
- Speaker (if time permits)
- SD card for audio

Protocols

- Bluetooth - UART (option 1)
- Audio - I2S
- LCD display - SPI
- Wii Nunchuck - I2C (option 2)

Software Design

Create a buffer with the initial pattern, and add on the buffer throughout the game. Create an interface where the users can select the color they want to add to the pattern. Toggle the LEDs corresponding to the pattern one at a time, slow enough for the players to see the colored pattern. First checks if the pattern inputted by the player is correct, then it allows them to add on to it.

Goals

- LEDs glow based on the users' input of memorized pattern and new pattern, assuming the pattern is correct.
- Patterns are recorded and incremented correctly
- If time permits, add an LCD Display to display which players turn it is and display "Game Over" when someone loses.
- Have correct interfacing between Bluetooth module and the STM32 to input the patterns
- Alternatively, we can use a Wii Nunchuck joystick to input the patterns
- If time permits, integrate sound that is unique to each color input, played back after a new pattern is shown.

Group Responsibilities

Javier Jimenez is responsible for the Bluetooth module and creating a software interface for the users to play the game. Benigno Ortega is responsible for the LED and LCD peripherals and determining how to toggle the LEDs depending on the output and change the LCD display depending on whose turn it is. Both of us are going to work on developing a software script to structure the memory game. We'd also work together to implement the sound addition if time permits.